



COVID-19: INITIAL IMPACTS AND RESPONSES TO THE PANDEMIC FROM ROAD AND TRANSPORT AGENCIES

PIARC COVID-19 RESPONSE TEAM



STATEMENTS

PIARC (World Road Association), is a nonprofit organisation established in 1909 to improve international co-operation and to foster progress in the field of roads and road transport.

The study that is the subject of this report was defined in the second update of the PIARC Strategic Plan 2020-2023 as amended by the Strategic Planning Commission and approved by the Executive Committee in October 2020. The PIARC Strategic Plan 2020– 2023 is ultimately approved by the Council of the World Road Association, whose members are representatives of the member national governments.

The members of the PIARC COVID-19 Response Team responsible for this report were selected from among the PIARC Technical Committee and Task Force members nominated by the member national governments for their special competences.

Any opinions, findings, conclusions and recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of their parent organisations or agencies.

The ideas and examples shared here are for illustration only and shared to support timely and mission-critical responses by road and transport agencies in tackling the COVID-19 pandemic. They do not necessarily represent official policy of PIARC or its members. The ideas presented will be subject to further evaluation in delivering recommendations for policy and practice in due course. While care has been taken in the preparation of this material, no responsibility is accepted in its use for any omission or damage that may be caused.

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FOREWORD

At PIARC, we are firm believers in the vital importance of sharing knowledge worldwide. This has been our *raison d'être* since we were created more than 110 years ago. The fact is that sharing knowledge helps practitioners realise their goals more quickly and more efficiency. To achieve this, PIARC identifies priority issues, convenes groups of experts, organizes seminars and other events and prepares technical publications. However, when it emerged in early 2020, the COVID-19 pandemic could have upended all of this overnight: meetings became a health issue, everyone's priorities were scrambled, and it became difficult to discern or implement coherent strategies.

In spite of, or perhaps because of, these challenges, while many countries were entering severe lockdown in March 2020, a small group of our international experts decided to take the initiative and started organizing knowledge-sharing webinars. The aim was to provide a platform for road practitioners all over the world to voice their concerns and to share ideas about how best to cope with COVID-19 and its many consequences. PIARC did not have a long experience of organizing webinars, but this has not deterred our COVID Response Team: they selected tools and developed working methods, all in a matter of days. Between March and July, this developed into an extensive series of more than 20 webinars; some of them were very broad in scope, others focused on a given road-related topic, while others focused on a specific geographic area. These webinars attracted more than 90 speakers and reached an audience of more than 1,500 participations.

This bottom-up approach should be commended. It complements PIARC's structured strategic planning methods, and it demonstrates that an association like ours can be reactive, and that it is able to attract the best and brightest. If the new world that emerges when this pandemic is behind us is going to be agile, resilient and innovative, then we can safely say that PIARC is ready.

The PIARC COVID Response Team developed rigorous methods and work pace, with almost daily meetings when necessary. Thanks to that level of commitment, the Team was able to structure the issues that road agencies and operators were faced with in a way which proved useful and helped many countries get ahead of the curve. In time, they identified best practice, which was shared in briefing notes, in our Routes/Roads magazine and on our website, on which a very lively section was created to capture all this knowledge. The webinars were recorded and shared to all those who needed them, together with the translations of all presentations in English, French and Spanish.

This was a tremendous undertaking, which is to be saluted. It is leading today to this new Report. It presents in a very structured way, as we usually do at PIARC, the lessons that were learned and the actions that should be taken next. If we were to highlight just four: our COVID-19 Response Team will continue its work into 2021; PIARC and other stakeholders will need to evaluate all measures that have been implemented to date; PIARC will continue sharing knowledge worldwide and identifying actual user needs and policy demands, i.e. what the "new normal" is.

Indeed, roads and the road transport system have demonstrated their amazing resilience and their ability to move people and essential goods safely, even in the midst of a pandemic. We need to continue developing and improving them, so that we can, as a community, meet all economic, social, environmental and flexibility expectations, and continue serving the needs of society. In the meantime, we hope that you will find this Report useful.

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- The entire PIARC General Secretariat Team

DISCLAIMER

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EXECUTIVE SUMMARY

The COVID-19 pandemic has been an unprecedented event in recent times, since it was declared by the World Health Organization (WHO) as a global emergency on 30th January 2020. This Crisis has been identified as a social, public health and economic catastrophe resulting in millions of cases and deaths, and a dramatic slowdown in business activity, a stalling of international travel and large rises in job furloughs and lay-offs. Over the year, COVID-19 has continued to spread globally with many countries now facing a “second wave” and continued uncertainty for millions of people.

In this context, the road transport sector, and the organisations and professionals who manage it, has been recognised as an essential service with a vital role in ensuring connectivity, keeping goods, workers, supplies and services moving, maintaining the integrity of the supply chain, and ensuring that public health, law enforcement and other emergency response professionals can do their jobs effectively.

Early on, PIARC recognized the potential for COVID-19 to cause severe disruption to the road transport sector. In mid-March 2020, the PIARC General Secretariat, with approval from the President and Chair of the Strategic Planning Commission, therefore moved to establish a formal PIARC COVID-19 Response Team. The main mission of this Team was to explore the rapid sharing of knowledge and practice between PIARC members in terms of pandemic impacts, associated economic and social crisis and the relevant responses. Activities were rapidly launched focused on an extensive programme of more than 20 webinars, briefing notes, surveys and other analysis of the pandemic and its impacts on the roads and transport sector.

The focus of this Report is on the impacts of COVID-19 on organisations in the roads and transport sector and PIARC’s work in responding. Specifically, it aims to:

- Summarise the aims, activities and outputs of the PIARC COVID-19 Response Team;
- Highlight the programme of PIARC COVID-19 webinars between March and July 2020, what was presented by who, key discussion points arising, and conclusions;
- Set out impacts of, and responses to, COVID-19 from the roads and transport sector in the early stages of the pandemic, based on Response Team activities;
- Highlight lessons learnt and recommendations which may be relevant to the remaining period of the pandemic or to subsequent crises which may arise on an equivalent scale;
- Briefly touch on some of the key issues which may be relevant to economic and social recovery from the pandemic in the coming months and years; and
- Set out possible lessons which might be considered, to PIARC’s mission, programmes and operating practices, including within the current Strategic Planning Cycle 2020 – 2023.

It is emphasised that this Report focuses on initial work of the COVID-19 Response Team during the early phase of the pandemic, particularly the PIARC COVID-19 webinar programme between March and July 2020.

EXECUTIVE SUMMARY

The key conclusions and recommendations of the Report as the pandemic continues into 2021 highlight the strategic and essential value of road transport, and acknowledge that road and transport organisations have demonstrated their speed of reaction and adaptability.

Key conclusions and recommendations address the following areas.

Declaration of Emergency

- Mandate authorities with appropriate emergency powers
- Be prepared to issue interpretative orders and instructions to ensure the provision of critical or essential services for the protection of people, property and places, and maintain activity in key (essential) economic sectors

Economic Measures to Support Businesses

- Establish recommendations for contracts, especially for PPPs
- Plan to maintain road-related activity and business continuity
- Mitigate the economic and financial consequences of reduction in traffic

Road Works

- Be alert and agile
- In certain cases, accelerate some maintenance works to take advantage of low traffic volumes, with operations adjusted according to the traffic decrease
- Secure access to adequate resources to ensure that work can be continued
- Investigate the feasibility of strategic stockpiles of material that could become in short supply in the event of global disruption of supply chains

Data

- Think about data as something of great value for road transport organizations
- Recognise that real time information is needed to meet the needs of users and operators
- Evaluate the power of partnership for data collection and management to drive innovation through road transport

Security

- Recognise that physical security and cyber-security are essential for the application of the concepts related to resilience: prepare, prevent, protect, respond, recover
- Increase the security of I.T. systems

Disaster Management and Resilience

- Address the resilience of roads, transport, road-related functions, connections with other modes and connections with other stakeholders as a whole
- Develop a disaster-resilient road network, securing road infrastructure in times of crisis
- Apply the Preparedness, Response, Recovery, Prevention/Adaptation model
- Be prepared to face additional disasters while facing a pandemic

Passenger and Public Transport

- Restore citizen's confidence in collective (mass) public transport
- Analyze how the urban landscape shifts
- Look into how we can build flexibility in the infrastructure that we build to allow for the changing and uncertain mobility dynamics and expectations that our customer base is facing.
- Analyse how ITS can help public transit provide more reliable service

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Freight and Logistics

- Establish guidelines/agreements on national/international level to keep freight moving during pandemics - keep key road networks and facilities open and operational
- Prepare and implement amendments to the law/regulations to have more flexibility regarding exemptions during pandemics or other disruptions.
- Support the digital transition for ITS solutions in logistics and freight transport to reduce physical handling and control processes and to minimize obstructions on traffic flows
- Prioritize investments for key freight corridors for economic recovery and good framework conditions for long distance road freight transport

Intelligent Transport Systems

- Focus on integration and management of the road network with an end-to-end and user-centered approach
- Consider low-cost ITS solutions as a valid option for road network operations, for all countries and for large and small jurisdictions. ITS does not have to be expensive to be effective.
- Even in ITS: Do not reinvent the wheel, and instead aim to benefit from others' experiences and knowledge

Road Safety

- Recognize the risk situations created by the crisis
- Identify local or network-wide measures for potential road safety improvements
- Educate and inform

Winter Service

- Implement heightened precautionary measures to protect workers
- Learn from each other and employ techniques used by Southern Hemisphere agencies during the first wave of the pandemic

Workforce

- Celebrate road workers
- Apply health and safety protocols like all businesses
- Design work-from-home processes with care
- Apply success factors that enable women to continue to thrive at work
- Use technology wisely

A series of implementation actions are also presented. They provide a blueprint for road authorities and operators as well as for PIARC.

PIARC's Response

- Remain agile to react to the continuously developing situation with COVID-19
- Continue the rapid sharing of information through webinars
- Focus on quick sharing of outputs such as articles and Bulletin Notes
- Coordinate within PIARC

Monitor the New Transport Normal

- Be on the alert: what is demand for transport going to look like from now on, including the work from home?
- How can we build some uncertainty into our models and processes?
- Pay even more attention to the needs of the users to be more "customer – centric"
- Do not lose focus of society's pre-COVID expectations regarding GHG emissions, cost-efficiency, resilience, and service levels... They are still relevant

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Contribute to Economic Recovery

- Recognise that roads are key for economies and societies (they stayed open during the crisis; road freight worked)
- Include investments in road infrastructure or road transport in national COVID-related economic recovery plans

Continue Collaborations with Partner Organisations

- Implement a global thinking approach to address global issues, not only look at ourselves (the road and road transport sector) but look to work with other partner and global organizations that are leading in particular topics
- Develop collaborations and engage with organizations that are relevant for the road sector, e.g., UITP for public transport, ITS for Mobility Management and ITS 2.0, etc.
- Monitor what specialized organizations recommend on non-PIARC topics that are relevant for the road community (e.g., workforce, security)

Fill Gaps in Evidence / Evaluate

- Evaluate all measures that have been implemented in a hurry during the crisis
- Identify actual user needs and policy demands; i.e., what is the “new normal”

Share Knowledge

- Promote the use of existing PIARC reports
- Promote the use of other available knowledge
- Engage with LMICs in particular
- Continue providing a networking tool for people to connect
- Analyze the survey, renew it when appropriate

Unfortunately, at the time of writing in December 2020, infection levels are once again increasing and new pandemic impacts and responses are still emerging. The COVID-19 Response Team is therefore continuing its activities into 2021, including further webinars, knowledge exchanges and bulletins reflecting ongoing developments as they occur.

Looking forward, there is an opportunity to re-imagine the post-COVID world. This includes accelerating key trends, such as digitisation, online services, and automation, as well as renewed commitment to tackling pressing pre-pandemic challenges, such as congestion, pollution, and climate change, with new resolve. This means reconfiguring road and transport systems and services to drive a better, greener recovery which supports more sustainable, resilient, and happier communities. As we head into 2021, we should look beyond today's trials and tribulations, and focus on preparing well to build the economy and society of tomorrow.

It is also intended that PIARC Technical Committee and Task Forces will pick up on COVID-19 issues relevant to their topics and lines of enquiry as relevant and appropriate.

GLOSSARY OF ACRONYMS

Term	Definition
AAC	Argentinean Road Association
AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials (USA)
AGERROUTE Ivory Coast	Ivory Coast Road Management Agency
AGERROUTE Senegal	Senegal Road Management Agency
AISCAT	Italian Association of Motorway and Tunnel Dealership Companies.
AMAM	Mexico Association of Mobility Authorities
AMT	Portuguese Mobility and Transport Authority
ANAS S.p.A.	Italian National Autonomous Roads Corporation
ASECAP	European Association of Operators of Toll Road Infrastructures.
ATC	Spanish Technical Association of Roads
ATR	Tunisian Road Association
APC	Paraguayan Road Association
BCR	Benefit-Cost Ratio
CAF	Development Bank of Latin America
CATS	China Academy of Transport Sciences
CAV	Connected and Autonomous Vehicle
CICA	Confederation of International Contractors' Associations
COCONAL	Mexican National Contractor Company
COVID-19	Coronavirus Disease 2019
CRT	COVID-19 Response Team (PIARC)
CUNY-UTRC	The City University of New York – University Transportation Research Center
DFID	Department for International Development (UK) (Now FCDO)
DIRCAIBEA	Iberia and Ibero-American Council of Road Directors
DNIT	Brazilian National Department of Transport Infrastructure
DOT	Department of Transport (USA)
DSCR	Debt service coverage ratio
ECTRI	European Conference of Transport Research Institutes
ERTRAC	European Road Transport Research Advisory Council
EV	Electric Vehicle
FCDO	Foreign, Commonwealth & Development Office (UK)
GODKIA	General Directorate for national Roads and Motorways (Poland)
GDP	Gross domestic product
GHG	Greenhouse Gas

HVT Programme	High Volume Transport Applied Research Programme (UK)
IATR	International Association of Transport Regulators
IDB	Inter-American Development Bank
IMF	International Monetary Fund
IMT	Mexican Institute of Transport
IMT	Portuguese Institute for Mobility and Transport
INVIAS	Colombian National Road Institute
iRAP	International Road Assessment Programme
IRF	International Road Federation
IRU	International Road Transport Union
ITF	International Transport Forum
ITS	Intelligent Transport System
IVT ETH Zurich	Institute for Transport Planning and Systems at the Swiss Federal Institute of Technology in Zurich
LMIC	Low- and Middle-Income Country
MITMA	Spanish Ministry of Transport, Mobility and Urban Agenda
MTOP	Ecuadorian Ministry of Public Works and Transport
MOPC Dominica Republic	Dominican Republic Ministry of Public Works and Communications
MOPC Paraguay	Paraguayan Ministry of Public Works and Communications
MUV	Multi Utility Vehicles
NCHRP	National Cooperative Highway Research Program (USA)
NEXCO	East Nippon Expressway Company Limited
PIARC	World Road Association
PPE	Personal Protective Equipment
REAAA	Road Engineering Association of Asia and Australasia
PPP	Public Private Partnership
PSP	Private Sector Participation
RNO	Road Network Operations
SANRAL	South African National Roads Agency
SARS	Severe Acute Respiratory Syndrome
SCT	Mexican Secretariat (Ministry) of Communications and Transport
SDG	Sustainable Development Goals
SEFI-FNTP	Syndicate of French International Entrepreneurs - French National Federation of Public Works
SEIT	Ecuadorian Society of Transport Engineering
SNS	Social Networking Sites
TC	Technical Committee (PIARC)
TF	Task Force (PIARC)

TRAFIKVERKET	Swedish Transport Administration
TRB	Transportation Research Board
UITP	International Association of Public Transport
UNAM	National Autonomous University of Mexico
UNRA	Uganda National Roads Authorities
VAT	Value added tax
VMS	Variable message sign
WFH	Working from Home

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1. INTRODUCTION

1.1. CONTEXT – A CRISIS LIKE NO OTHER

Following its emergence in late 2019, the World Health Organisation (WHO) declared COVID-19¹ an international health emergency on 30th January 2020 and a global pandemic on 11th March. Compared to previous pandemics such as SARS and Ebola, the current crisis is a “black swan event” without precedent, exhibiting multiple and acute impacts across the World, over and above conventional disaster management and recovery.

Since it burst into public consciousness at the beginning of the year, COVID-19 has continued to spread across the World. It is clear at the time of writing, in December 2020, as the number of global cases surpasses 65 million with over 1.5 million deaths², that the pandemic will spread wider, peak later and last longer than most early forecasts. With many countries now facing a “second wave” of infections, cases and deaths are likely to continue to grow until therapeutic care improves and a vaccine is available, possibly in the first half of 2021. Until then the realities of social distancing, face masks, track & trace, home working, strict confinements and localised lockdowns will remain an unsettling reality for millions.

The Crisis is as much an economic crash and social catastrophe as it is a public health emergency, sparking a dramatic slowdown in business activity, a stalling of international travel and large rises in job furloughs and lay-offs. Globally, economic growth in 2020 is forecast to be -4.9 per cent, a more negative outcome than initially anticipated and with recovery projected to be weaker than previously projected. Whilst global economic growth may resume next year, global GDP by the end of 2021 is now expected to be 6.5 percentage points below the pre-COVID-19 levels of January 2020. Economists talk about 2022, or even 2023 or 2024 for some sectors, as the time horizon for a full recovery³.

This means that the policy goals around COVID-19 have changed in many countries. The first half of 2020 was dominated by widespread and intense lockdowns in economic and social activity, border controls and various restrictions on personal mobility, including international, regional and local travel. In April, around 3.9 billion people, or half the World’s population were asked or ordered to stay at home to prevent or slow the spread of COVID-19 with compulsory or recommended confinements, curfews and quarantines in more than 90 countries or territories⁴. The International Labour Organisation estimates that 93 per cent of workers reside in countries which have implemented some kind of workplace closure or disruption, with 5.4 per cent of working hours lost in Q1 2020 and 14.0 per cent in Q2, equivalent to 400 million full-time jobs.⁵

More recently, whilst containing the virus remains vitally important, a key focus has therefore been on re-opening economies, supporting businesses and restarting growth. Whilst this is being made more difficult by a resurgence of COVID-19 in many countries in the last months of 2020, the challenge is how to achieve or maintain re-opening safely, restore business and consumer confidence and provide the right economic and fiscal stimulus which will support the early stages of a viable recovery in 2021.

In the medium-term, with an effective vaccine and the resolution of the pandemic within prospect, the recovery will need to lay foundations for the post-COVID World, supporting economic growth, restructuring and diversification, recognising constraints on public sector finances, fostering a

¹ Coronavirus is the name given to a family of related viruses, many of them causing respiratory and other acute or chronic illnesses. Coronaviruses cause COVID-19, SARS, MERS, and some strains of influenza, or flu. The coronavirus that causes COVID-19 is officially called SARS-CoV-2, which stands for severe acute respiratory syndrome coronavirus 2. The name of the illness caused by the coronavirus SARS-CoV-2, COVID-19, stands for “coronavirus disease 2019.”

² John Hopkins University as reported via <https://www.worldometers.info/coronavirus>.

³ International Monetary Fund. June 2020. World Economic Outlook.

⁴ Euronews.com. 3rd April 2020. Coronavirus: Half of humanity now on lockdown as 90 countries call for confinement.

⁵ International Labour Organisation, 2020 – ILO Monitor: COVID-19 and the World of Work.

strong private sector and embracing genuine sustainable development. This means there is a necessity, as well as a window of opportunity, to do things differently and look towards a “new normal” which may emerge stronger and more resilient from the crisis. That task needs to start now and must incorporate lessons learned across the World both in combating the pandemic and in successful economic reopening so as to address future events that may arise.

1.2. THE ROADS AND TRANSPORT SECTOR

The roads and transport sector, and the public and private organisations within it, have been very strongly impacted by COVID-19. However, it has had a vital role in keeping essential goods and workers moving, maintaining as much as possible the integrity of the supply chain, and ensuring that public health, law enforcement and other emergency response professionals can do their jobs effectively. Road transport is an essential service. The sector will have a vital role in the recovery too, especially if Governments prioritise infrastructure investment as an economic stimulus. With air transport severely hampered by the pandemic, surface transportation has become even more important in maintaining connectivity and providing a lifeline to even the most remote places.

Globally, land transport is estimated to account for 60 million direct jobs, 2% of total employment⁶. Indirect employment in the wider supply chain is even greater and land transport provides physical mobility which supports employment in multiple other sectors. Direct employment in public agencies in the land transport sector is estimated at around 1.3 million⁷ at local, regional and national level. The COVID-19 crisis has brought major changes to these agencies, their supply chain, and related workforces, in the following ways:

- The demand for mobility, and in some cases transport capacity, has seen a significant decrease, with contraction in travel varying across different modes and networks;
- Border closures, inspections and movement restrictions have been implemented between nations, regions and cities;
- The continued access to, and operation of, transport infrastructure and services has been critical to keep the supply of essential workers and goods moving;
- While in some countries, construction, rehabilitation and maintenance work on road and transport infrastructure and assets, and other related contracts, have been suspended, slowed down or rescheduled in other countries construction activities have been declared essential and not only continued, but accelerated due to reduced traffic;
- Road operators in general experienced significant reductions in revenues either as a direct impact of the reduction in daily traffic or due to countries temporarily suspending toll collection during the height of the pandemic;
- Public transport operators (and sometime their concessioning authorities) have likewise seen sharp deterioration in financial performance due to the need to maintain operations at a time when ridership, and therefore revenue, has collapsed;
- Employees have had to continue duties, whether delivering frontline services or working in administration, but under more stringent health and safety arrangements and conditions of acute professional and personal disruption; and
- In the private sector, economic slowdown has been accompanied by considerable stress on business activity, disruption to supply chains and commodity flows, strains on cash flow and solvency, as well as employee furloughs and lay-offs.

⁶ International Labour Organisation and United Nations Economic Commission for Europe, 2020 – Jobs in Green and Healthy Transport.

⁷ Based on an extrapolation of estimates for public transport agencies by UITP 2009.

Such impacts have been unprecedented in the lives of many working in the sector, requiring organisations and individuals to step up to new roles, find rapid workarounds to multiple problems and innovate ways to continue to get the job done. That they have done so is testament to their professionalism and dedication and deserves public recognition and appreciation.

1.3. THE PIARC RESPONSE

Very early on, PIARC recognised the potential for COVID-19 to cause severe disruption to organisations, individuals' working lives, and to movement of people and the delivery of goods, supplies and services.

In mid-March 2020, the PIARC General Secretariat, with approval from the President and Chair of the Strategic Planning Commission, therefore moved to establish a formal PIARC COVID-19 Response Team with the following objectives:

- To explore the rapid sharing of knowledge and practice between PIARC members in impacts of, and responses to, COVID-19 and the associated economic and social crisis;
- To propose and quickly implement specific short-term actions to support PIARC members, as well as roads and transport professionals more widely, in facing the pandemic;
- To track the course of the pandemic and advise on what further actions needed to be taken by the Association and others, as the crisis eased, and recovery commenced;
- To advise on what considerations should be given to studying the medium- and long-term implications of the pandemic on the road and transport sector, and how these should be reflected in possible changes to PIARC's Strategic Plan and amendments to the activities of specific Technical Committees or Task Forces, as well as other initiatives; and
- To present its activities, findings and recommendations (including lessons learned) through various PIARC channels at the at the request of the General Secretariat.

The most tangible output of the Response Team was the organisation of a programme of webinars to share emerging roads impacts, responses and good practices as the pandemic unfolded.

The first webinar was rapidly organised on 25th March and the Team continued with further events, in three languages, on a near weekly basis through to 29th July. During that time, roads and transport organisations from multiple countries shared a wide range of COVID-19 experiences, perceptions and responses. The knowledge generated and disseminated by the webinars represented material support to all those seeking advice and inspiration as they sought to deal with the crisis. Recordings of the webinars, as well as summary bulletin notes, have been placed within a dedicated area of the PIARC website and uploaded to the PIARC YouTube channel.

Further details of PIARC's response to COVID-19, the Response Team, its activities and the webinar programme are provided in Chapters 3 and 4 of this Report as well as supporting appendices.

1.4. PURPOSE OF THIS REPORT

The focus of this Report is on the impacts of COVID-19 on organisations in the roads and transport sector and PIARC's work in responding to these. Specifically, it aims to:

- Summarise the aims, activities and outputs of the PIARC COVID-19 Response Team;
- Highlight the programme of PIARC COVID-19 webinars between March and July 2020, what was presented by who, key discussion points arising, and conclusions;
- Set out impacts of, and responses to, COVID-19 from the roads and transport sector in the early stages of the pandemic, based on Response Team activities;
- Highlight lessons learnt and recommendations which may be relevant to the remaining

period of the pandemic or to subsequent crises which may arise on an equivalent scale;

- Briefly touch on some of the key issues which may be relevant to economic and social recovery from the pandemic in the coming months and years; and
- Set out possible lessons which might be considered, consistent with PIARC's mission, programmes and operating practices, including within the current Strategic Planning Cycle 2020 – 2023.

The principal evidence base for this Report comes from the presentations, recordings and transcripts of the COVID-19 webinar programme between March and July 2020. However, the Report also references existing PIARC Technical Reports, various other sources and parallel initiatives relevant to the road and transport sector as appropriate.

1.5. STRUCTURE OF THIS REPORT

Following this initial Chapter, the remainder of this Report is structured as follows:

- **Chapter 2** provides an overview of the COVID-19 pandemic to date and its key stages;
- **Chapter 3** summarises PIARC's overall response, key activities and working methods during the pandemic, as well as referencing advice and best practices on crisis management and other topic available from previous planning cycles;
- **Chapter 4** describes the PIARC COVID-19 webinar programme between March and July 2020 and the key statistics associated with speakers and participants, as well as the online survey of PIARC members and the key findings;
- **Chapter 5** set outs the general issues and responses from the road and transport sector to COVID-19 as identified from the webinar programme, against several themes;
- **Chapter 6** focuses on several thematic issues, represented through the various PIARC Technical Committees, which were discussed through the webinar programme;
- **Chapter 7** sets out the overall conclusions on impacts and responses to COVID-19 as it applies to roads and transport during the early phases of the pandemic and presents recommendations of immediate applicability as they may apply to future crises impacting the sector; and
- **Chapter 8** summarises the next steps being proposed by the Response Team and other bodies within and outwith PIARC.

The report includes a Glossary as well as several supporting appendices, for example around details of the COVID-19 Response Team, webinar programme and selected mobility data.

1.6. STATUS OF THIS REPORT AND FUTURE PIARC ACTIVITY

This Report focuses on initial work of the COVID-19 Response Team during the early phase of the pandemic, particularly the PIARC COVID-19 webinar programme between March and July 2020.

However, at the time of writing in December 2020, new pandemic impacts and responses are still emerging. This includes an acute second wave of COVID-19 infections in Europe, United States and other parts of the World in late 2020, with a resumption of national or local lockdowns in a number of countries. The impacts are likely to remain severe until better therapeutic treatments and vaccines are widely available and administered to populations at a large scale in 2021. Moreover, a longer track record and range of experience will allow a clearer understanding of what represents best practice in pandemic response as well as allowing issues around economic recovery and long-term consequences of COVID-19 to be considered.

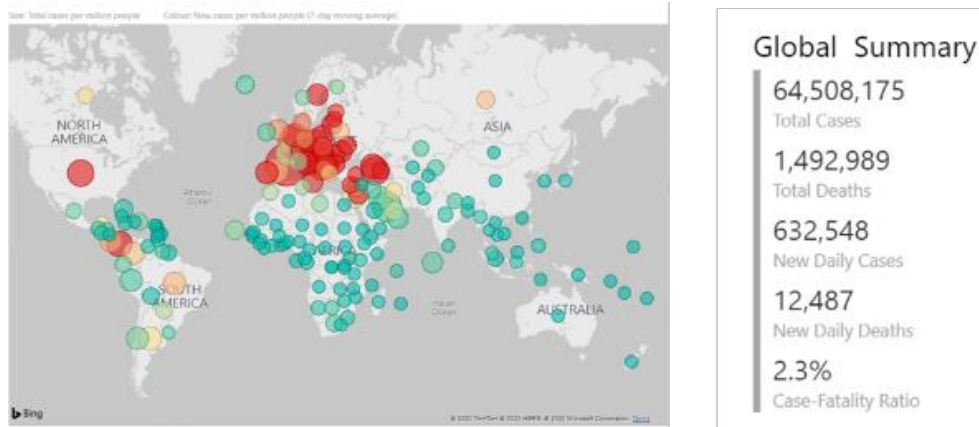
The COVID-19 Response Team is therefore continuing its activities into 2021, including further webinars, knowledge exchanges and bulletins reflecting ongoing developments as they occur. This will be reported in due course and next steps are defined in the final Chapter of this Report.

2. OVERVIEW OF THE COVID-19 PANDEMIC

2.1. GLOBAL INCIDENCE OF COVID-19 TO DATE

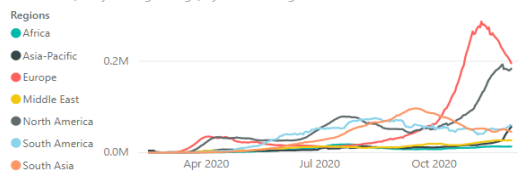
Globally, as of **2nd December 2020**, reported COVID-19 cases globally topped 64.5 million and almost 1.5 million were reported to have died. Figure 2.1 below illustrate key trends across regions.

Figure 2.1: Incidence of COVID-19 across the World (2nd December)⁸

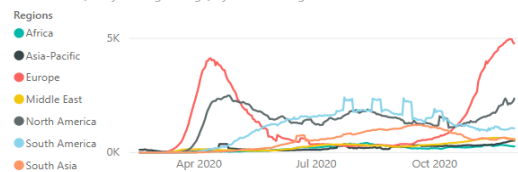


Regions	Total Cases	Total Deaths	Total Cases per million people	Total Deaths per million people
South America	11,279,462	327,883	26,119	759
North America	16,224,888	410,255	27,675	700
Europe	17,729,720	405,767	23,697	542
Middle East	3,368,129	79,323	12,905	304
South Asia	10,685,923	155,275	5,882	85
Africa	2,201,303	52,581	1,643	39
Asia-Pacific	3,018,007	61,890	1,178	24

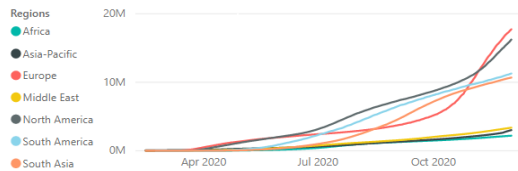
New Cases (7-day moving average) by Date and Regions



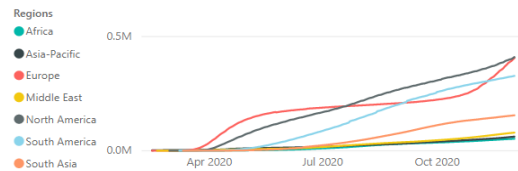
New Deaths (7-day moving average) by Date and Regions



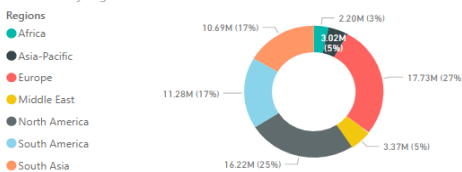
Total Cases by Date and Regions



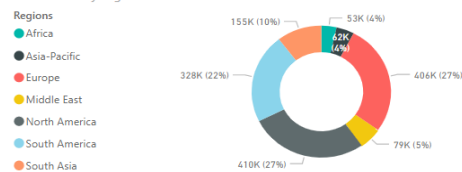
Total Deaths by Date and Regions



Total Cases by Regions and Date



Total Deaths by Regions and Date



⁸ Data on confirmed COVID-19 cases and confirmed deaths published by the European CDC, John Hopkins University and Oxford Coronavirus Government Response Tracker index.

2.2. LOCKDOWNS AND RESTRICTIONS ON ECONOMIC AND SOCIAL ACTIVITY

Early in the pandemic, prohibitions and restrictions on travel, personal mobility, social and business activity were imposed in many countries as Governments took decisive action to prevent, delay and contain community transmission. As remarked in Chapter 1, in April 2020 around half of humanity was living under some kind of activity or mobility restriction. A range of initiatives dictated or strongly encouraged people to stay at home, make essential trips only, retime or reassign their trips and continue professional and personal business online when and where possible. In some instances, regular public transport or shared transport was suspended or restricted in capacity or operating hours, whilst monitoring and law enforcement was deployed across road networks to ensure journeys made were for essential purposes only. Likewise, business travel and tourism virtually ceased as international and internal borders were closed, airlines and cruise lines ceased scheduled passenger operations and issuance of visas and other support for travel was suspended.

From May, blanket lockdowns were progressively eased, with activities, buildings and facilities re-opening to varying degrees of access and capacity. Nevertheless, Winter in the Northern Hemisphere has led to a resurgence of infection in many countries and citizens and residents are being encouraged, required or are choosing to stay at home for all but essential travel. Localised lockdowns remain, or have been reimposed, in some areas and many international borders, including airports, remain closed to all but essential travel, cargo and repatriation flights for citizens and residents, with varying degrees of quarantine or testing for travelers in place.

Looking ahead, more sustained resumption of activity can be expected heading into 2021, including tourism, business travel and progressive re-starting of international flights. This reflects the development of vaccines, and their certification and roll out across populations. Nevertheless, restrictions are likely to remain for some time around some high-risk activities, large gatherings, social distancing, use of face masks and access to certain services. Activity will also be depressed by public confidence, unemployment and repatriation of tens of thousands of migrant workers to their home countries. It seems quite possible that it will be the second half of 2021 before life reverts to “normal” in pre-pandemic terms.

2.3. IMPACTS ON MOBILITY

Lockdowns, stay at home orders and restrictions on activities across the World have inevitably affected personal mobility and, by implication, access to various destinations and services. According to mobile data collected by Google and Apple, non-residential destinations have seen falls in excess of 60 to 90 per cent at maximum restrictions. Mobility levels have partially recovered in some countries as facilities have re-opened, but are still around 20 to 40 per cent below pre-lockdown levels. Renewed falls in mobility are also evidenced in some cities in late 2020 as lockdowns are reimposed to handle second waves of infection. It is likely to be some time before activity returns fully, impacted by the cessation of businesses and jobs, the substitution of some activities with online services, and the short-term repatriation of migrant workers to their home countries.

The imposition of lockdowns and restrictions on economic activity have had some unforeseen positive consequences. Congestion levels have fallen sharply in cities across the World, air quality has improved, carbon emissions have fallen, noise levels have reduced and some citizens and residents perceive an improved quality of life in working from home and interacting in their local neighbourhoods rather than commuting to a city centre office. There is also some evidence that road accidents, which kill around 1.2 million people a year globally, may have fallen in line with reductions in traffic levels, but this is not universal and the impact on accident severity may be less positive as motorists drive faster on quieter roads resulting in higher impact collisions⁹.

⁹ See Section 6.5 for a more detailed discussion of road safety impacts.

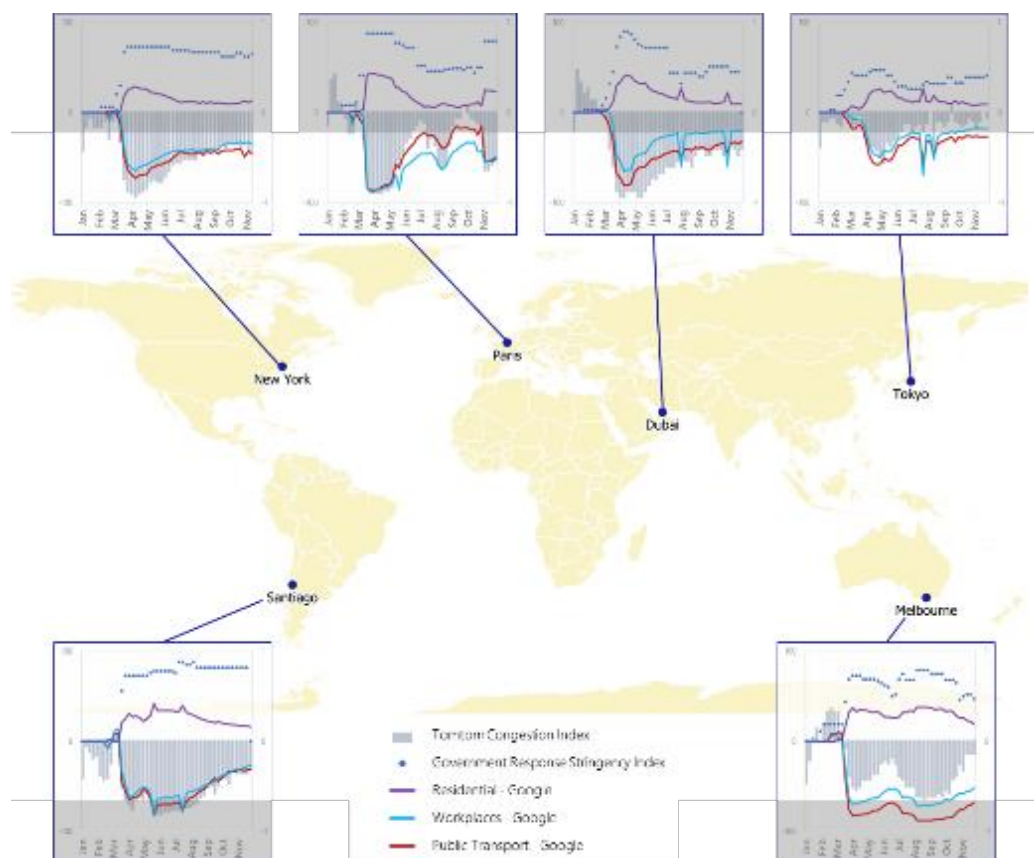
Table 2.1 and Figure 2.2 show changes in selected mobility and congestion indices from selected cities around the World based on data from Google and Tomtom. Further data is provided by city and region in the Appendix B of this Report.

The full impacts of COVID-19 on mobility, demand for transport, operational and environmental performance of the roads and transport sector are explored in Chapters 5 and 6 of this Report.

Table 2.1: Changes in Key Mobility and Congestion Indices in Selected Global Cities during COVID-19 Pandemic

City	Tomtom Congestion Index			Google Mobility Workplaces			Google Mobility Public Transport		
	Lowest	Date	Current (26 Nov)	Lowest	Date	Current (26 Nov)	Lowest	Date	Current (26 Nov)
Athens	-0.79	20 Aug	-0.68	-62	26 Mar	-44	-78	26 Mar	-64
Bologna	-0.69	19 Mar	-0.38	-74	26 Mar	-26	-85	26 Mar	-49
Dubai	-0.93	02 Apr	-0.4	-65	09 Apr	-20	-81	09 Apr	-32
Johannesburg	-0.72	09 Apr	-0.19	-78	09 Apr	-21	-81	09 Apr	-19
London	-0.76	02 Apr	-0.29	-78	02 Apr	-50	-80	02 Apr	-59
Madrid	-0.86	19 Mar	-0.14	-92	09 Apr	-29	-92	09 Apr	-38
Manchester	-0.78	09 Apr	-0.44	-69	02 Apr	-38	-79	02 Apr	-57
Melbourne	-0.64	20 Aug	-0.14	-72	06 Aug	-52	-88	06 Aug	-68
Mexico City	-0.86	21 May	-0.41	-73	09 Apr	-39	-69	09 Apr	-41
Milano	-0.81	20 Aug	-0.65	-79	26 Mar	-43	-88	26 Mar	-60
Montreal	-0.86	02 Apr	-0.25	-74	09 Apr	-42	-78	09 Apr	-54
New York	-0.94	09 Apr	-0.58	-77	26 Nov	-77	-73	09 Apr	-68
Paris	-0.89	26 Mar	-0.53	-86	26 Mar	-49	-87	26 Mar	-51
Rome	-0.8	16 Apr	-0.32	-76	26 Mar	-33	-86	26 Mar	-46
Santiago	-0.81	21 May	-0.3	-83	21 May	-27	-82	21 May	-31
Sao Paulo	-0.8	09 Apr	-0.37	-59	26 Mar	-18	-66	26 Mar	-22
Singapore	-1	28 May	-0.55	-83	07 May	-23	-72	07 May	-27
Tokyo	-0.55	07 May	-0.06	-70	23 Jul	-18	-58	23 Apr	-27
Toronto	-0.84	09 Apr	-0.56	-70	09 Apr	-48	-75	16 Apr	-60
Wuhan	-0.96	26 Mar	-0.11	0	#N/A	0	0	#N/A	0

Figure 2.2: Changes in Key Mobility and Congestion Indices in Selected Global Cities during COVID-19 Pandemic



Notes to Table 2.1 and Figure 2.2:

Data as of 26th November 2020

The **Tomtom Congestion Index** represents the relative difference of average congestion levels in 2020 from standard congestion levels in 2019. Daily and weekly differences are based on weighted averages derived from hourly data. Each week starts on Monday and ends on Sunday. The daily standard congestion level for each weekday represents the daily average for that weekday over 2019. The weekly standard congestion level represents the mean of average weekly congestion levels in 2019. The values range from -1 to 1.

Tomtom Traffic Index

https://www.tomtom.com/en_gb/traffic-index/

Google Mobility Indexes from **Google Community Reports** show how visitors to (or time spent in) categorized places change compared to our baseline days. A baseline day represents a normal value for that day of the week. The baseline day is the median value from the 5-week period Jan 3 – Feb 6, 2020.

Community Mobility Reports, Google

<https://www.google.com/covid19/mobility/>

The Government Stringency Response Index records the number and strictness of government policies. The index is published in the Oxford COVID-19 Government Response Tracker and is calculated using publicly available information on 17 indicators of government responses. Eight of the policy indicators (C1-C8) record information on containment and closure policies, such as school closures and restrictions in movement. Four of the indicators (E1-E4) record economic policies, such as income support to citizens or provision of foreign aid. Five of the indicators (H1-H5) record health system policies such as the COVID-19 testing regime or emergency investments into healthcare. The values range from 0 to 100.

Coronavirus Government Response Tracker

<https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>

2.4. A FRAMEWORK FOR THE KEY STAGES OF THE PANDEMIC

Whilst much of the focus of most transport professionals has been on tracking, managing and recording the consequences of what the International Monetary Fund (IMF) has called “The Great Lockdown,” attention has increasingly turned to sustainable exit strategies and dividing actions in response to the COVID-19 pandemic into different stages. These need to be designed to not only release people from isolation, but carefully restart economic and social activity and pave the way for a viable and sustainable recovery into 2021 and beyond. For the transport sector, this also means allowing people, businesses and communities to reconnect with jobs, markets and opportunities, whilst controlling COVID-19 and mitigating, as far as possible, a return of the congestion, road casualties, pollution and other externalities which characterised the pre-pandemic system.

At the time of writing, the strictest national lockdown measures have largely ended in most part of the World, changing at different times and with varying profiles in different places. Whilst a “second wave” is evident in some regions, for example Europe, in others, for example East Asia, infections have declined considerably. With the prospect of better epidemiological management, lower rates of infections and mortality and the prospect of a vaccine in 2021, it is time to start thinking about life after COVID-19, how people, goods and services will move, and how this will support a return to prosperous, sustainable, resilient and happier societies.

To assist in this process, the PIARC COVID-19 Response Team has made reference to a three-phase model called Reopen – Recover – Reimagine¹⁰. The model includes:

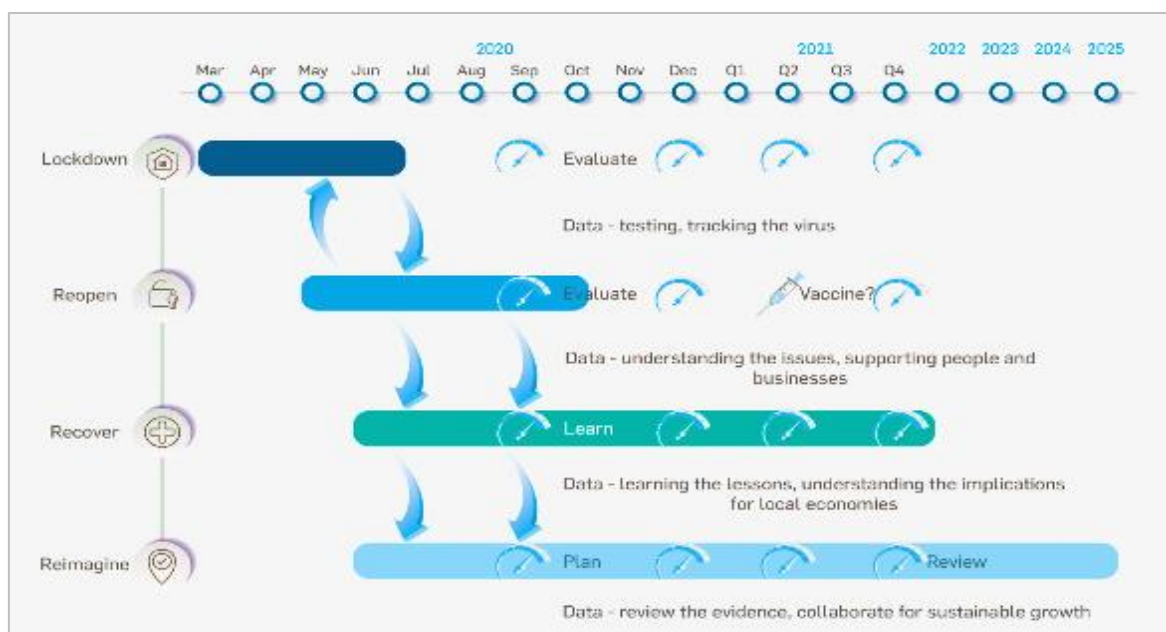
- Short-term **Reopening** from lockdowns, based on social distancing, face masks and other personal protection and greater intelligence and experience in tracking and managing the virus, with risks carefully managed until a vaccine and more effective therapeutic treatments are available. This release period is evident in some regions and countries in late 2020, but with the very real prospect of renewed lockdowns in others in response to second or third waves as infection rates increase again. Life is unlikely to get back to “normal” until well into 2021.
- Medium-term **Recovery** of national and local economies, supported as Governments and the private sector assess immediate needs and launch various initiatives for rehabilitating businesses, creating new employment, and rebuilding the sectors and localities worst impacted. This period is expected to last into 2021 and likely well beyond, including accelerated infrastructure delivery, technology research and other tools of economic stimulus and industrial strategy.
- Long-term **Reimagining** of how the transport system will meet future needs, reflecting impacts, challenges and opportunities of COVID-19 and other agendas such as the post-oil economy, social inclusion, Sustainable Development Goals, urban vs. rural connectivity, climate emergency and net zero programmes, and consideration of measures looking to transform and future-proof transport infrastructure and services towards 2025 and beyond. This period has already started.

The framework has a strong emphasis on the application of data and evidence, evaluation and rapidly learning lessons to shape decision-making. Data, testing, learning and knowledge sharing will be critical, most obviously in controlling the spread of COVID-19 in the transition from lockdown to successful and permanent reopening. Effective data will also be central to understanding user perceptions and behaviour, transport choices, policy decisions and in collaborative working across public agencies and with the private sector to rebuild resilient and sustainable economies and

¹⁰ Atkins. September 2020. COVID-19 White Paper II: Reimagining Transport and Mobility for a Sustainable Economic Recovery.

communities, better able to withstand future shocks which will almost certainly arise. A key outcome of this should be better preparation for the next crisis before it happens.

Figure 2.3: Reopen – Recover – Reimagine Framework and Roadmap



SOURCE: Atkins COVID-19 White Paper, September 2020

2.5. SPECIFIC ROADS AND TRANSPORT SECTOR RESPONSES

Each stage of the Reopen-Recover-Reimagine Framework requires a different set of planning, operational and governance responses from road and transport organisations. The responses to date, as recorded by the PIARC COVID-19 Response Team, are classified and explored in more detail in Chapters 5 and 6 of this Report. These sections focus largely on the priorities around the Lockdown period of the pandemic and the immediate challenges in securing early Reopening¹¹. The challenges, opportunities and practical recommendations for the Recovery and Reimagine stages will form the basis of future activities and technical reporting of the Response Team.

However, with regards to the latter, even before COVID-19, the transport sector was facing the prospect of major changes in the ways that people and goods move. Demographics, urbanisation, big data, digitisation, future mobility technology and service models, environmental sustainability, diversity and gender equality, futureproofing and climate change all represent disruptive megatrends with a potentially transformative impact requiring a response from policy makers, regulators, infrastructure and service operators, as well as customers and wider civic society. Many of these issues were already subject to PIARC technical research through engagement via Technical Committees and as structured under the 2020 – 2023 Strategic Plan.

On top of this, the requirement for infection control, personal protection and social distancing has already caused profound changes in people’s perceptions of different modes, attitudes to risk and their travel choices. Public agencies must therefore recognise that to a large extent the roads and transport sector is already operating under the “new normal.” For example, the switch to homeworking looks set to redefine the office and city centre of the future, as cities worldwide have introduced pop-up lanes for walking and cycling; new emergency contracting regimes have been introduced for public transport, new mobile apps have been introduced capable of tracking personal mobility. Equally, the development of electric vehicles may accelerate and the

¹¹ As noted, many countries partially reopened in mid-2020 after the initial wave of COVID-19 infections receded. However, there has been a second wave in late 2020, in Europe and North America in particular, with a reimposition of significant lockdown restrictions.

management of road networks and supporting facilities is being considered in light of new expectations, outputs, asset performance regimes and impact assessments.

2.6. COVID-19 AND DISASTER MANAGEMENT

The COVID-19 crisis is an example of a pandemic. A pandemic can be described as a global disease outbreak. Depending on the characteristics of the disease, it may spread easily, there is little or no immunity to the disease, no vaccine is available, and there is a high rate of people getting sick and/or dying. Pandemics cause significant absenteeism, change patterns of commerce, have limited immediate medical solutions, and interrupt supply chains. Addressing decision-making challenges in pandemic response in the roads and transport context is a multi-dimensional task, involving not only transportation/transit organizations, but health organizations, emergency management agencies, and communications outlets as well.

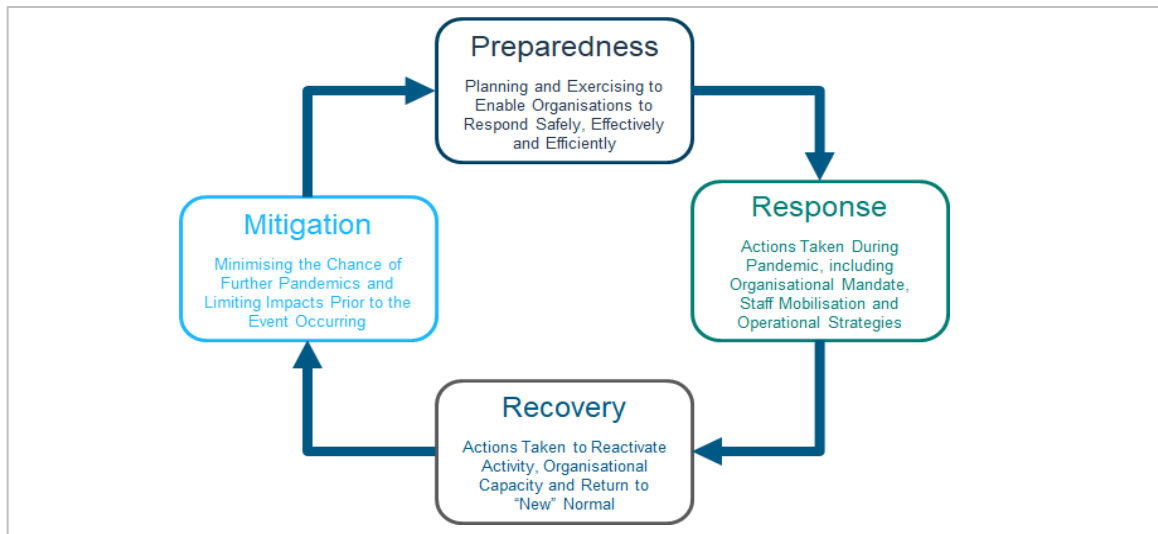
Comparing the disasters caused by pandemics and those caused by other natural and manmade hazards, such as floods, earthquakes, extreme weather, civil unrest and terrorism, there are similarities and differences. In particular, around 80% of responses due to pandemics may also be required for all hazards¹², with 20% being unique to the hazard and locality, for example with pandemics exhibiting impacts which:

- Are global rather than localized in occurrence, impact and perception;
- Exhibit multiple and complex direct and indirect effects;
- Show high incidence of worker sickness and absenteeism;
- Exhibit significant human impact without structural damage;
- See response times in weeks or months rather than days;
- See healthcare, civil defence and primary responders potentially over-stretched;
- Require specific actions (e.g. social distancing) to protect public health and limit spread;
- Generate fear, anxiety and risk of panic which requires strong communications (and management of rumors and speculation, intended and unintended); and
- Have major economic and social dimensions.

It is also reasonable to say that, prior to COVID-19, many emergency response & business continuity plans, whether at Government, local authority or individual corporate level, had not adequately considered a massive, global pandemic event of the scale, complexity and strength of impact seen in 2020, with lessons to be learnt against all stages of the disaster management cycle shown below.

In the roads and transport sector specifically, differences between pandemics and other hazards are characterized by damage to road infrastructure and the impact on the traffic flow. In the case of many natural disasters, the damage to infrastructure is generally more serious and localised, and traffic flow in the affected area also suffers indirectly (e.g. through congestion, road closure). Therefore, the most important task is usually to identify and restore physical damage. In the case of pandemics, although the infrastructure is undamaged, public anxiety, impacts on road workers and measures such as movement restrictions, all affect traffic movement. The latter will generally lead to a reduction in traffic, but there may be other effects, such as increased home delivery service traffic on municipal roads. Ongoing road management activities in response to potential complex changes in the demand for transport and traffic flow will be a challenge.

¹² National Cooperative Highway Research Program, Report 769: A Guide for Public Transportation Pandemic Planning and Response.

Figure 2.4: Disaster Management Cycle

SOURCE: Figure from NCHRP Report 769: A Guide for Public Transportation Pandemic Planning and Response

Comparing pandemics and other hazards, the environment in which business continuity management is carried out is also very different. In the case of natural hazards, it is important to identify and restore road damage in an early stage. Since human and material resources may be inadequate in disaster areas, outside support is important. Therefore, it is important to share information on the disaster, and to coordinate and collaborate across different organisations. In the case of pandemics, the measures to prevent the spread of disease are the most important. However, measures to prevent disease transmission whilst ensuring business continuity will have no small impact on road management. Control measures that quarantine people and restrict human activities also have a secondary effect on the supply chain. The challenge is therefore to continue road management activities effectively in a restricted environment. It is important to achieve emergency response activities with limited and restricted human and material resources while taking measures to cope with infectious diseases.

It should be noted that the occurrence of pandemics and other types of disaster may overlap. Since the COVID-19 crisis commenced, the World has seen a range of other events in 2020 which have required urgent response. These include, for example, forest fires (Australia, USA), typhoons (Philippines, India, Bangladesh, Honduras), volcanic eruptions (Indonesia), civil unrest (USA, France, Belarus) and industrial accidents (Lebanon). The existence of a global pandemic did not remove or reduce the need to deal with such crises, help the victims, repair the damage and safeguard against future events. However, disaster response in such circumstances is constrained in capacity and flexibility of action by the ongoing context of the global pandemic.

Hence, in the post-COVID-19 era, it will be more necessary than ever to address the resilience of roads, transport and road-related functions. It is important to develop a disaster-resilient road network, securing road infrastructure in times of crisis, maintaining the inspection and diagnosis of roads using appropriate measurement and monitoring procedures and technologies, sharing information dynamically, deploying personnel and equipment and sharing experiences and best practices.

The following sets this out in more detail:

1: Developing a disaster-resistant road network

- It is important to ensure that road tunnels, bridges, embankments, and other structures maintain consistent disaster-resistant performance to cope with a wide range of increasingly severe and widespread events, so that the roads remain open and can continue to perform their function under all circumstances.

2: Securing road infrastructure in times of crisis

- It is important that the road network ensures uninterrupted flows of people, goods and supplies to all areas that require them, minimizing the loss of lives and damage to the economy.

3: Maintaining inspection and diagnosis of roads using appropriate measurement and monitoring procedures and technologies

- It is important to save and use manpower efficiently and effectively in the inspection and diagnosis of roads, not only in times of disaster but also in daily business, including through the deployment of new technology, data and systems.
- It is important to monitor travel demand and traffic conditions and seek to optimise flows of people and material by providing information and guiding traffic in response to constantly evolving circumstances.

4: Sharing Information Dynamically

- Dynamic information sharing and processing can support effective disaster response and crisis management. The type and amount of information to be shared will be broader in the case of complex disasters such as pandemics which require responses in multiple dimensions. It is important to promote information sharing beyond conventional frameworks, across all organisations that need it, and through a wide range of media.
- In the event of complex disasters involving both infectious and natural disasters, it is important to set up and coordinate response efforts at a national and local level with both able to make appropriate and rapid decisions according to the circumstances.
- The significant expansion of big data, data analytics and processing capability in recent years, including via social media and similar channels, offers a major source of disaster-related information which can be exploited.

5: Sharing Experiences

- It is necessary to secure materials, equipment and human resources to conduct appropriate disaster response, taking into account both infectious disease and natural disasters.
- It will be important to draw on the experience of COVID-19 to create policies, procedures and best practices in dealing with disasters caused by infectious diseases, and to prepare for combined disaster scenarios in terms of business continuity operations.

2.7. EVIDENCE, UNCERTAINTIES AND GAPS

Ultimately, the evidence of the full impacts of COVID-19 on the road and transport sector, of the responses made and the full implications for transport and mobility beyond the pandemic is still emerging, incomplete and subject to proper tracking, research and evaluation in the longer-term. Many research questions can be asked, and hypotheses set out, but not yet answered with statistical validation, certainty and confidence, even if numerous universities, institutes and think-tanks have launched multiple longitudinal studies.

What is presented in this Report is therefore a “snapshot” of the state of knowledge of the early stages of the pandemic, based on the PIARC webinar programme between March and July 2020. The findings must be considered interim in that:

- The pandemic is still ongoing, including a resurgence of infections and new national and localised lockdowns in many countries, and therefore the impacts are not yet complete across the full cycle of disease transmission, infectivity and recovery;

- Public policy objectives continue to evolve, in particular between containing Coronavirus, restarting economic and social activity and fostering a sustained recovery which is essential to the wellbeing of communities and individuals across the World;
- In the road and transport sector, a wide range of responses to the pandemic are evident, with varying degrees of application and success, but there has not yet been a through and comprehensive examination of what works well and what constitutes “best practice” and under what circumstances;
- A range of longitudinal studies, overall and on specific topics, have commenced from various public, academic and industry bodies, but these are clearly in their early stages and not yet at a point of drawing definitive conclusions, although certain hypotheses may be posed; and
- Responses and activities around, or following from, the Recover and Reimagine stages of the pandemic still lie in the future, gathering pace in 2021, although they can be debated, anticipated and speculated on now.

There remain, therefore, considerable uncertainties, gaps and different margins of confidence in the evidence base on road and transport sector impacts and responses to COVID-19. There is a strong need for forensic evaluation of measures (for example, what worked and what did not), further knowledge sharing and for a fresh look on the “new normal” of what the transport sector needs and how it is structured in the post-pandemic World.

The COVID-19 Response Team makes a number of remarks in Chapters 7 and 8 of this Report on how these questions can be addressed over various timescales and will take some of the resulting actions into its own programme of activities in 2021, as well as suggesting other initiatives within PIARC.

3. OVERVIEW OF THE PIARC COVID-19 RESPONSE

3.1. OVERALL PIARC COVID-19 RESPONSE

As noted in the previous Chapter, the COVID-19 pandemic has caused severe disruption to individuals' lives, to organizations and to the delivery of goods and services across the World. Like public agencies and organisations in multiple sectors, PIARC and PIARC members have been affected as well and applied various actions to respond. Many PIARC members have also been thrust to the forefront of pandemic response, as governments look to them to maintain critical lines of supply and to keep essential workers and goods moving while at the same time avoiding collapse in road and transport management.

In this context, roads and transport, which are critical to the economic vitality of a country, have to remain operational. Effective management of emergency situations resulting from large, multiple and complex hazards that may disrupt road operations requires cooperation and coordination among several stakeholders including government agencies, road operators, road construction and maintenance companies, emergency services and road users. Some existing PIARC reports are very relevant in the current situation and they are available for free from PIARC's website.

With the pandemic and its impacts expected to last for some time, the PIARC General Secretariat, with approval from the President and Chair of the Strategic Planning Commission, moved quickly in March to establish a formal PIARC COVID-19 Response Team, with a major objective to ensure the rapid sharing of knowledge and practice between PIARC members in impacts of, and responses to, the pandemic and the associated economic and social crisis.

The work of the Response Team forms the main focus of this Report and is described in further detail below. The importance attached to the Team is indicated by the fact that it is chaired by the PIARC Secretary General and has delegated mandate and authority from PIARC to make decisions rapidly on key activities and outputs.

In parallel to the work of the Response Team, the PIARC General Secretariat has:

- Moved to put much of its work online, including staff working from home, conducting remote meetings via Zoom and other packages and allowing access to its offices in Paris only under strict hygiene and COVID-19 secure working conditions;
- Organised the work of PIARC statutory bodies (Executive Committee, Council) online;
- Managed expectations that Technical Committees, Task Forces and other groupings should meet physically at this time, with Chairs and Secretaries empowered to facilitate online gatherings and exchanges to continue PIARC business;
- Started to consider whether any changes to should be made to the Strategic Themes or topics being examined by PIARC Technical Committees in the 2020 – 2023 Strategic Planning Cycle, either in the addition of new topics related to COVID-19 or inclusion of pandemic issues in existing topics; and
- Reviewed its programme of activities and meetings in 2020 and 2021 to provide flexibility and resilience to maintaining the effectiveness of the Association during a challenging time.

3.2. COVID-19 RESPONSE TEAM

Purpose and Representation

Established in mid-March 2020, the main mission of the PIARC COVID-19 Response Team was to share information quickly and efficiently. At its onset, the Response Team set the following strategies and objectives:

- Explore the rapid sharing of knowledge and practice between PIARC members in terms of pandemic impacts and associated economic and social crisis and the relevant responses;
- Propose and implement specific short-term adaptable actions to support PIARC member organisations, individual members, and professionals in the roads and transport sector, in facing the pandemic;
- Track the course of the pandemic and advise on further actions to be taken by the Association and others, as the World and PIARC members move into the recovery period;
- Advise on what considerations should be given to studying the medium- and long-term implications of the pandemic on the roads and transport sector, and how these should be reflected in PIARC activities;
- Undertake and publish technical reports, surveys and other analysis of the pandemic and its impacts on the roads and transport sector, on its own or in collaboration with other industry bodies and stakeholders; and
- Present its activities, findings and recommendations during various PIARC’s meetings or alternative channels from time to time at the request of the General Secretariat.

The original Terms of Reference for the Response Team was for a period to 1st December 2020. Given the continued impacts of COVID-19 in all parts of the World, the mandate has now been extended to 31st December 2021 and Team size expanded to 15 members, as shown below.

Figure 3.1: Overview of PIARC COVID-19 Response Team

PIARC COVID-19 Response Team

Summary Terms of Reference (Revised PIARC Strategic Plan)

- To explore rapid sharing of knowledge and practice between PIARC members on COVID-19 impacts, responses & associated socio-economic crisis
- To propose and implement short-term actions to support PIARC members and transport professionals in COVID-19 mitigation and response
- To track the course of COVID-19 over time and advise on further actions to be taken by PIARC and others during the crisis and into the recovery
- To advise on medium- and long-term implications of COVID-19 on the roads and transport sector and how these should be reflected in PIARC activities
- To prepare and publish technical reports, surveys and other analysis on COVID-19, alone or in collaboration with other industry bodies & stakeholders

Currently established to 31st December 2021, extendable as required.

Current Membership

- Patrick Maljean, Secretary General, PIARC (Chair) (FR)
- Christos Xenophonos, Rhode Island DOT, TC 1.1 Chair (USA)
- José Manuel Blanco Segarra, Ministerio de Transportes, Movilidad y Agenda Urbana, TC 1.1 Spanish Secretary (ES)
- Jonathan Spear, Atkins, TC 1.1 WG 2 Leader (UK)
- Fabio Pasquali, ANAS S.p.A., TC 1.2 Chair (IT)
- Caroline Evans, National Transport Commission, TC 1.4 Chair (AU)
- Yukio Adachi, Hanshin Expressway Engineering Co., TC 1.5 Chair (JP)
- Andrea Simone, University of Bologna, TC 2.1 Chair (IT)
- Martin Ruesch, Rapp Trans Ltd, TC 2.3 Chair (CH)
- Valentina Galeoso, Deloitte Consulting, TC 2.4 Chair (IT)
- Pascal Rozagny, CEREMA, TC 3.3 French Secretary (FR)
- Savero Patchetti, ANAS S.p.A., TF 3.1 Chair (IT)
- Andrea Pires, Paraguay National Committee (PY)

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SOURCE: Figure from Jonathan Spear on behalf of the COVID-19 Response Team

In October of 2020, the Response Team was formally established as a cross cutting team in the second revision of PIARC’s Strategic Plan 2020-2023. A copy of the Approved Terms of Reference (ToR) of the Response Team is included in Appendix A. The inclusion of the Response Team in the Strategic Plan, will allow PIARC to address important issues relative to COVID-19 in a holistic manner and continuing beyond the end of the pandemic.

The Association is grateful to all members of the Response Team for stepping up at a time of crisis and contributing to PIARC in addition to their other ongoing professional work, and other roles on Technical Committees or Task Forces and other Association activities.

Working Methods

The Team took a “Just Do It!” approach and delivered valuable information in a very short amount of time. The COVID-19 Response Team held very frequent meetings in order to agree actions, allocate tasks and review the knowledge that had been collected.

In an effort to share time-sensitive information on actions taken by road and transport administrations during this crisis, which would also be of use to other jurisdictions, the Response Team rapidly organized a series of webinars for practitioners and experts to share their experience, knowledge, and some of the most effective responses that are emerging regarding COVID-19.

As of October 31, 2020 the Response Team has been responsible for the organization of 26 webinars, the publication of two short bulletins and an article in the Routes/Roads magazine and a number of short articles in different periodicals. A summary of the webinars and topics covered during the webinars between March and July, the focus of this Report, is provided in Chapter 4. A complete list of webinars, presentations, and speakers is provided in Appendix B.

Figure 3.2: Webinars Organised by the PIARC COVID-19 Response Team



SOURCE: Figure from Christos Xenophontos (USA) & Valentina Galasso (Italy) presentation, PIARC webinar 29 July 2020

To accomplish this volume of work, the Response Team broke new ground, using new collaboration tools and established new norms on how to get things done quickly.

There was a time when working on the Synthesis Notes, for example, that the Team took advantage of the time zone differences amongst members and worked collaboratively on advancing outputs on an effective rolling 24-hour working day.

A dedicated PIARC Special Webpage on Covid-19 Response has been set up and can be accessed via: <https://www.piarc.org/en/News-Agenda-PIARC/Coronavirus-PIARC-and-Covid-19>.

3.3. IDENTIFICATION OF EARLY EMERGING ISSUES

In ascertaining the rapidly emerging situation and preparing for its initial programme of activities, the Response Team first looked to identify the key issues and challenges across the roads and transport sector. An analysis of the information available to Response Team members identified the following six categories of issues as the most evident:

- **Ensuring road and transport employees' health and safety:** in general, in respect of customer-facing roles, in the office environment and in other facilities; .
- **Maintaining business activity and continuity:** with limited human resources, staff working at home, supporting employees with high-risk concerns, suffering indirect impacts, prioritising essential activities, maintaining access to road and transport services, deploying technology, and maintaining links across the supply chain;
- **Managing transport impacts:** maintaining flows of essential goods and personnel (e.g. health workers) over different trip types and distances, whilst regulating general mobility, dealing with the cancellation or reduction of public transport, and a range of associated effects, such as reduced fee income, lower emissions and traffic congestion;
- **Engaging with and supporting business relations:** with supply chain partners, contractors, SMEs and other supporting businesses, including shared interventions, assessing and exercising contractual provisions, dealing with Force Majeure and managing changes in contract costs, timescales, quantity and quality of outputs;
- **Customer and stakeholders relations and joint working:** providing timely and accurate information from a user perspective, taking coherent and effective actions across public agencies, balancing technical planning and delivery with directives from civil authorities, and managing relations with the media and communicating key messages; and
- **Security:** including increases in cyber-attacks, changes in the roles of frontline operational staff, maintaining security whilst increased access to teleworking, and relationships with emergency services, civil defence and other essential agencies.

These categories were tested and confirmed as relevant during exchange of knowledge and discussions held during the first three COVID-19 webinars. A further step was taken in summarising relevant issues for dissemination to the PIARC members and community, as follows¹³:

- Tracking changes in demand for transport, by mode, together with associated positive and negative implications (e.g. falls in revenues, improvements in air quality and noise);
- Changes to the role, mandate, and powers of transport agencies during a time of crisis, including their recognition in supporting the work and effectiveness of other agencies;
- Keeping road networks open, operational and effective at the required level of service;
- Regulating and maintaining the movement of essential goods, workers and services;
- Ensuring the health & safety of transport agency staff, especially those in operational roles and having contact with the public;
- Connecting, managing & maintaining effectiveness of office-based staff working from home, including technology support, team management and business continuity;
- Continuing, postponing, or bringing forward road construction and maintenance activities;
- Personal mobility management during COVID-19 travel restrictions (including monitoring via smart applications);

¹³ Presented by Jonathan Spear, TC 1.1 and Response Team Member, at the webinar held on 8th April.

- Relations of public agencies with their supply chain, including contract management, continuation, and variation; and
- Longer-term implications beyond the immediate crisis, user behavioural change, business resilience planning and accelerated development of technology and automation.

Figure 3.3: Dimensions of Change During COVID-19 Pandemic



SOURCE: Figure from Daniel Gerardo Russomanno (Argentina) presentation at PIARC webinar on 07 April 2020

Based on the information presented during the first four webinars, the Response Team published the first PIARC Bulletin Note on COVID-19 in the roads and transport sector on 21st April. This concluded that the emerging issues identified could be validated and further expanded in breadth and depth from the six categories identified early on.

These categories inform the structure of reporting the findings of the webinars set out in Chapters 5 and 6 of this Report.

3.4. BEST PRACTICE IN EXISTING PIARC TECHNICAL REPORTS





In recent times, PIARC has produced an extensive collection of Technical Reports driven by the work of numerous experts collaborating within its Technical Committees. During the Strategic Planning Cycle for 2016 – 2019, which ended with the World Road Congress in Abu Dhabi in October 2019, for example, more than 1.000 experts produced 46 Technical Reports. These documents represent the core of PIARC's knowledge sharing mandate and contain best practices and lessons learnt on all policy, regulatory, technical and organisational aspects of the roads and transport sector.




It was noted early on that a number of the current library of Technical Reports, all available for download on the PIARC website¹⁴, are directly relevant to various aspects of the COVID-19 pandemic and crisis, either without modification or through some reinterpretation in light of the new circumstances. These are summarised in Table 3.1 below, linked to the relevant Technical Committee or Task Force responsible for their preparation and dissemination¹⁵.

¹⁴ <https://www.piarc.org/en/activities/Search-Publications-PIARC?q=&after=1986&before=2020&sort=date>.

¹⁵ Click on the cover to connect to the cited Report on the PIARC website.

Table 3.1: Existing PIARC Technical Reports Relevant to the COVID-19 Pandemic

PIARC Technical Report	Main Content	Relevance to COVID-19 Pandemic and Crisis
Technical Committee on Disaster Management		
 <p>Disaster Information Management for Road Administrators</p>	<ul style="list-style-type: none"> • The type of technology necessary to manage disasters and how they have been developed in order to respond to the emergency management phase • The benefits of combining hard and soft management techniques to improve overall disaster management outcomes • Case studies and best practices for improving management techniques in disaster situations 	<p><i>Cooperation and coordination is the fundamental part of disaster management. Information management is the core of the cooperation and coordination</i></p>
Technical Committee on ITS and Road Network Operations		
 <p>Road Network Management for Improved Mobility</p>	<ul style="list-style-type: none"> • Basic information about ITS and how they can play a role for the improvement of mobility of people and goods • How ITS can enhance communication and information exchange between operators and with the stakeholders • The expectations of road users in terms of services they need 	<p><i>Information exchange is the key. In this time of crisis, it is important to manage the flow of information among road operators and stakeholders and with road users. ITS has been deployed through a range of applications in 2020</i></p>
 <p>Low Cost ITS</p>	<ul style="list-style-type: none"> • New emerging technologies can play an important role in developing ITS solutions when dealing with low budgets and limited operational costs • They can also be a valid alternative when there is no time or scarce resources to implement more complex solutions and there is a compelling need of providing road users with services 	<p><i>Low cost ITS solutions can be introduced as a new paradigm when obstacles intervene, but a solution is needed. This approach in time of crisis could be a good starting point to try the potentiality of ITS without needing great mobilization of resources</i></p>
 <p>Big Data for Road Network Operations</p>	<ul style="list-style-type: none"> • The importance of data and how they can influence the whole value chain in the road transport sector • Best practice in order to use Big Data for internal processes related to road network operations • Preliminary investigation about how Big Data can support decision making and best practices 	<p><i>In time of crisis it is important to re-evaluate strategies and rethink RNO and ITS to better consider the fundamental value of data to support decision making and to enhance interoperability and cooperation between different road operators</i></p>

PIARC Technical Report	Main Content	Relevance to COVID-19 Pandemic and Crisis
Technical Committee on Performance of Transport Administrations		
 <p>Evaluating the Transformation of Transport Administrations</p>	<ul style="list-style-type: none"> • Research into key megatrends, expectations and challenges impacting on the future of transport agencies • Development of a 10-stage conceptual framework, guiding principles and toolkit for change management • Case studies of change management exercises • Practical advice on change management 	<p><i>Transport agencies will be faced with multiple forces for change emerging from, and as a result of, COVID-19 and will need to execute change management strategies in response</i></p>
Task Force on Security of Road Infrastructure/Technical Committee on Risk Management		
 <p>Security of Road Infrastructure</p>	<ul style="list-style-type: none"> • The different factors in infrastructure security; • Key considerations in performing a security risk assessment in respect of resilient road network assets; • Practical examples of the risk assessment process; • Recommendations for managers / owners of road infrastructure. 	<p><i>PANDEMIC is considered a threat: unintentional, non-directed, unpredicted</i></p>
 <p>Risk Management for Emergency Situations</p>	<ul style="list-style-type: none"> • Analysis of world practices in emergency situation management • Presentation of integrated frameworks for risk and business continuity planning • Recommendations for best practice in managing risk and emergency situations both generally and across the road network 	<p><i>Effective and efficient management is a continuous and dynamic process before, during and after the occurrence of a hazard and its consequences, including pandemics</i></p>
 <p>Security of Road Infrastructure</p>	<ul style="list-style-type: none"> • Assessment of physical security • Different methodological approaches to safety and security programs • Application of knowledge in security by design, including retrofit of existing infrastructure 	<p><i>A correct understanding and a suitable handling of the security of road infrastructure is not only important to safeguard the infrastructure itself, but is also relevant to cover the protection of the social and economic values and delivery of services</i></p>

3.5. SURVEY OF ROAD AND TRANSPORT AGENCIES

Following five months of intensive work and webinars, PIARC launched a global survey on COVID-19 and roads. The intent of the survey was to assess how road and transport administrations, operators and other organizations are coping with the COVID-19 pandemic and to identify best practices implemented among different countries in the world.

The survey invited experts and practitioners to share their experience on the impact of COVID-19. The goal was to collect as many experiences as possible, on road-related topics such as Employees' and Users' Health and Safety, Maintaining Activity and Business Continuity, Impacts on Transportation of Passengers, and other relevant issues. To encourage a broader participation PIARC did not solicit official policy, but rather sought individual responses and opinions.

The survey was conducted between August 17th to September 28th and it was possible to collect 225 replies within 3 different languages. The survey allowed the Response Team to acquire:

- Experiences related to specific measures implemented within several countries in the world;
- Insights on the main issues from the pandemic in its initial phases, which are also analysed in this report;
- The point of view of an heterogeneous audience and made them interact with PIARC (almost 41% of the survey replies came from non PIARC members, that wanted to share their experience with us following had been previously done in the webinars);
- The outlook coming from LMICs and their perspective in relationship to other countries on the pandemic.

The information collected will be subject to further evaluation by PIARC experts and used in deriving recommendations on policy and practice in a forthcoming PIARC survey report article that will be made available to all in early 2021.

3.6. BULLETIN NOTES AND ROUTES AND ROADS ARTICLES

As well as its past Technical Reports on a range of relevant topics, PIARC has produced a number of short publications on COVID-19 and the current economic and social crisis. These are detailed below and they are, of course, complemented by the release of this Technical Report at the end of 2020.

Bulletin Notes

Following the successful completion of the first four webinars between 23rd March and 15th April, the Response Team published its **first Bulletin Note** on 21st April¹⁶ identifying the following early key issues and commonalities across the topics, countries and organizations presented:

- The COVID-19 pandemic is a single disruptive event, with multiple complex economic and social impacts which will leave a deep permanent mark, including the operating and business environment for transport administrations and their supply chain partners.
- There have been major changes (downwards) in the demand for transport, including from public to private transport, with associated implications (e.g. falls in revenues), and these will need to be tracked, fully understood into the recovery period, and managed.
- It is too early to evaluate all the changes the pandemic will bring; some can be predicted with some certainty now, but others will take time to emerge and play out fully. It is also predicted that some sharp impacts, such as traffic volumes and transport revenues, will bounce back after the pandemic, but the rate and profile of the recovery is uncertain.

¹⁶ <https://www.piarc.org/ressources/publications/12/95cfb73-33177-COVID-19-2020BN01EN.pdf>

- Whilst the impact of the pandemic is strongly negative on the economy and society in the short-term, there are some positive impacts, including reduction in transport emissions, improvement in air quality, less noise, greater biodiversity, and increase in walking and cycling and a sharp fall in road accidents and casualties; efforts must be made to maintain these positive impacts after the crisis, including in the context of tackling climate change and decarbonization.
- Road and transport administrations have emerged as an essential service for keeping key road networks and facilities open, especially for regulating and maintaining the movement of essential goods, supplies, services and workers, and integrity of the supply chain.
- There is increasing practice and procedures in protecting and ensuring the health and safety of transport agency staff, especially those in operational roles, and thereby maintaining the capacity of organizations to discharge their duties.
- Connecting and managing office-based staff working from home is an area where initial “work-arounds” will lead to the development of effective practices and changes in the distribution of tasks amongst staff which may outlast the pandemic.
- There has been considerable debate around the case for carrying on with, postponing, or bringing forward road construction and maintenance activities, including opportunities for engaging in works when there is limited traffic (and therefore cause for disruption) on the road network if programs can be re-scheduled.
- There have been rapid advances in personal mobility management during the pandemic, initially to maintain shelter-at-home travel restrictions, but increasingly to improve track and trace capability as activities restart, via mobile phone and Bluetooth enabled devices.
- Relationships between road and transport agencies with their supply chain, have been disrupted, but many organizations have arrived at workable solutions, with implications for contract management, continuation and variation, as well as recognition of the need to safeguard private sector jobs, including Small and Medium-Sized Enterprises (SMEs).
- There are longer-term implications of COVID-19 beyond the immediate crisis, including uncertainty over the speed and shape of recovery in transport demand, behavioural change, business resilience and accelerated development of technology and automation.

The issues validated, and further expanded, the evidence based on the six early categories identified by the Response Team and served as a basis for subsequent webinars.

The Response Team highlighted an additional emerging theme, that a future pandemic should find the road and transport sector more resilient and better prepared for the phases of prevention, containment, mitigation and return to a (new) normal, and with a battery of measures aimed at assisting employees in all positions, customers, suppliers and the public in general.

A **second Bulletin Note** was drafted summarizing the findings from the six Seminars held from 15th to 30th April. This Note, dated 18th May¹⁷, set out a further summary of emerging issues, confirming and expanding the evidence base on the pandemic from the first four Seminars. The issues were split into the following four categories:

- General impacts and approaches;
- Road network operation, freight, and logistics;
- Construction work; and
- Economic impacts and future resilience planning.

¹⁷ <https://www.piarc.org/ressources/publications/12/9900c7f-33428-COVID-19-2020BN02EN.pdf>.

The key findings against each of these points are set out in Chapter 5 of this Report.

The Response Team intends to publish further Bulletin Notes to update its work on COVID-19 in 2021, including the findings of the survey of transport agencies cited above and conclusions of future webinars, as its work continues over the next year.

Routes/Roads Magazine

In addition to the two Bulletin Notes, the Response Team worked with the PIARC General Secretariat on an Article in the *Routes/ Roads* magazine presenting the key observations and learnings from the twenty-plus webinars organized on COVID-19 up to that time.

The Article “COVID-19: Key Lessons for the Road and Transport Community from the Early Phase of the Pandemic” is available in the No. 384/385, 2nd Quarter issue of *Routes/Roads*¹⁸.

3.7. OTHER ACTIVITIES

Members of the Review Team have also taken the opportunity during the preceding months to publish a number of articles or present at events through their other professional affiliations.

For example:

- Caroline Evans and Patrick Malléjacq co-authored an article titled “COVID-19: Key Lessons for the Road and Transport Community” for the Road Engineering Association of Asia and Australasia (REAAA);
- Christos Xenophontos and Patrick Malléjacq co-authored an article titled “Global Insights: Learning from a Global Pandemic” for AASHTO’s Committee on Performance Based Management Quarterly Newsletter¹⁹;
- Jonathan Spear and Patrick Malléjacq participated in a discussion panel on PIARC’s response to COVID-19 at Highways UK; and
- Jonathan Spear is one of the founding members of the COVID-19 Working Group of the Association of European Transport which has initiated its own sharing of key data and reports on COVID-19 and holding regular online webinars on key pandemic-related topics²⁰.

3.8. LINKS AND COLLABORATION WITH OTHER ORGANISATIONS

PIARC engages with other organizations that are addressing issues within road infrastructure and road transport as a means to achieve its objectives and provide value to PIARC members.

“Cooperation may include knowledge sharing and exchange, joint projects with regional road organizations and with other international organizations with related goals. Cooperation with other organizations will benefit the broader road and road transport community through efficient use of resources, improved relevance on a geographical and thematic level, better visibility of the Association and its topics and products.”

(PIARC Strategic Plan 2020-2023)

Given this strategic approach, and the multitude of topics related to the impact of COVID-19 on roads and transport, it was a natural choice for PIARC to create links and to collaborate with other international transport organizations when addressing the breadth of challenges being faced. The main objectives were to share PIARC’s insights with other transport organisations, so that they

¹⁸ <https://routesroadsmag.piarc.org/ressources/documents2/6230-Routes-Roads-Magazine-384-385-Road-Stories-EN.pdf>.

¹⁹ <http://bit.ly/399fWeA>

²⁰ <https://aetransport.org/aet-covid-19-conversations>.

could include PIARC's perspective in their work, and to help PIARC members access the latest information and analysis made publicly available by other organizations.

This collaboration has consisted of several approaches:

- Inviting external speakers to take part as panelists in PIARC COVID-19 webinars;
- Keeping a list of COVID-19 initiatives from other organizations on the PIARC website;
- Having PIARC speakers take part in other organizations' events; and
- In a few instances, organizing joint COVID-19 webinars.

PIARC's extensive series of webinars have included speakers from most of PIARC's main partner organizations, including the World Bank, International Transport Forum, CAF, UITP, POLIS Network, among others. PIARC is grateful for the contributions and information provided from these organisations.

In addition, PIARC has co-organized two webinars with the UK's FCDO (Foreign, Commonwealth & Development Office), though their High-Volume Transport Programme, addressing COVID-19 organizational impacts as well as COVID-19 impacts on women in transport.

PIARC held a virtual meeting with its Advisory Group²¹ on 26 May which was largely dedicated to collecting input from partner organizations regarding the impacts of, and actions on, COVID-19 that they had identified at the time. This was a great opportunity for PIARC and it invited organizations to acquire an overview of activities and to identify possible areas for further cooperation.

Figure 3.4: Other Bodies Involved in PIARC COVID-19 webinars



SOURCE Figure from Christos Xenophontos (USA) & Valentina Galasso (Italy) presentation, PIARC webinar 29 July 2020

Besides inviting other organizations to speak in PIARC webinars, PIARC representatives have participated as speakers in external forums to share the findings of PIARC's work related to COVID-19 impact, both in more general terms and on specific topics. For example, PIARC has provided speakers on topics related to COVID-19 at IRF Global's 9th Caribbean Congress and at Highways UK.

In addition to speaking at external events, PIARC has also contributed to the international analysis on the pandemic and its impacts via other collaborative efforts, such as SuM4All.

²¹ PIARC's Advisory Group is a forum where PIARC invites representatives from partner organizations to discuss recent developments in the road sector and to acquire high-level input to PIARC's strategic direction. The Advisory Group meets twice yearly.

Finally, PIARC's efforts to collaborate with other organizations and to facilitate access to other organizations' work for PIARC members via its website has also contributed to an increased awareness of the work that PIARC has carried out so far over the course of the pandemic. This is influenced partly by increased awareness and knowledge sharing among other partners of our activities, but also by having our partner organizations link to and reference content on the PIARC website.

Most importantly, the collaborative efforts related to COVID-19 has brought added value to PIARC members who can benefit from access to the work to support efforts on national and local level.

Wider collaborative activities are planned to continue. For example, the USA's TRB will organise a joint webinar with PIARC in the second quarter of 2021, and PIARC is joining a REAAA webinar in January 2021.

It is therefore clear that PIARC's intense programme of activities on COVID-19 has contributed to raising the Association's standing with its partners.

4. THE PROGRAMME OF PIARC COVID-19 WEBINARS

4.1. INTRODUCTION

The main focus of the work of the PIARC COVID-19 Response Team in its initial phase of activity has been the organisation of a programme of knowledge-sharing webinars between practitioners across the global roads and transport community.

A total of 24 international webinars were held between 25th March and 29th July 2020, with 17 in English, three in French and four in Spanish. Of these, the webinar held on July 29th 2020 was focused on lessons learned so far and the way forward.

In order to allow more open and frank disclosure of information and debate from the webinars' participants, PIARC issued a disclaimer: *"The ideas and examples shared here are for illustration only and to support timely and mission-critical responses by road and transport agencies in tackling the COVID-19 pandemic. They do not necessarily represent official policy of PIARC or its members, and may be subject to further evaluation in delivering recommendations for policy and practice in due course. While care has been taken in the preparation of this material, no responsibility is accepted in its use for any omission or damage that may be caused."*

The webinars provided a range of services:

- an overview of the current situation with COVID-19 in different countries;
- the issues faced by road and transport agencies;
- best practices from relevant PIARC reports; and
- emerging planning, operational and customer service responses and selected perspectives from other international bodies such as the World Bank, ITF and UITP.

All webinars included a diverse portfolio of presentations from speakers from all parts of the world and provided an opportunity for questions and answers.

More importantly, the webinars touched on alternative approaches and measures taken by road and transport administrations in a number of areas relevant to COVID-19, such as business continuity, road network operations, tolling and transport revenues, and issues relating to public versus private and individual versus mass transport. They also included identification of the impacts of COVID-19 on freight, mobility management, active travel modes, and resilience among others. Finally, they provided an opportunity for supply chain viewpoints, and how private companies are being impacted, as well as the many public agencies world-wide.

A dedicated area of the PIARC website has been created with copies of all the videos and presentation slides from all the webinars. The presentation slides have been translated and are available in English, French and Spanish. This information can be found on the PIARC webpage on COVID-19 Response: <https://www.piarc.org/en/News-Agenda-PIARC/Coronavirus-PIARC-and-Covid-19>. This valuable information is accessible free of charge to all.

4.2. ORIGINS AND OBJECTIVES OF THE WEBINARS

In mid-March 2020, it was becoming clear that COVID-19 would be a prolonged and global crisis that would deeply affect all sectors. The PIARC COVID-19 Response Team, as soon as it was formed, therefore planned, as its first priority action, a series of webinars online to discuss the multiple and complex impacts of the pandemic as quickly as possible. These were designed to share knowledge and practice and seek to draw out some early conclusions that would be useful for immediate, urgent and effective operational and planning decisions required by the health, social and economic situation in many countries.

In order to obtain and disseminate as much information as possible, it was decided from the outset:

- Each webinar would be held entirely in one of PIARC's three official languages (English, French and Spanish);
- The corresponding video would be uploaded on the special page created by PIARC on its website dedicated to the response to COVID-19 as well as on PIARC's YouTube channel, where they would be freely accessible; and
- All presentations would be translated into the other languages so that they would be available in English, French and Spanish, after the webinar has taken place.

The general format of each webinar was decided as, and has been generally been, the following:

- First, an explanatory introduction about PIARC, the COVID-19 Response Team and some key ideas and concepts all carried out either by Patrick Malléjacq (PIARC Secretary General), in the webinars in English or French, or Miguel Caso Florez (PIARC Technical Director) and Marina Domingo (PIARC Communications Manager) in the webinars in Spanish.
- Then the successive presentations, usually three or four, from the invited speakers of the day; and
- Finally, Questions and Answers moderated by Christos Xenophontos (USA, TC 1.1 Chair) in the webinars in English, Valentina Galasso (Italy, TC 2.4 Chair) or Robin Sébille (PIARC Deputy Secretary General) in French, and Verónica Espejel (PIARC ST 1 Technical Advisor) in Spanish.

4.3. PRESENTING THE WEBINARS

The webinars between March and end of July can be divided into three main types:

- Multi-focus events in which different countries or organisations have presented on various aspects of the impact of COVID-19, and their responses, from the perspective of the road and transport sector overall;
- Multi-focus events in which countries with similar characteristics or stages of development have dealt with COVID-19 and some common perspectives; and
- Thematic events focusing on a single subject related to the impact of COVID-19, such as road safety or urban mobility.

As a final session, the 23rd webinar, held on 29th July, was dedicated to synthesising lessons learned so far and the way forward.

Detailed information for each of the webinars, including topics covered, speakers and overview of presentations, is provided in Appendix B and is grouped as follows:

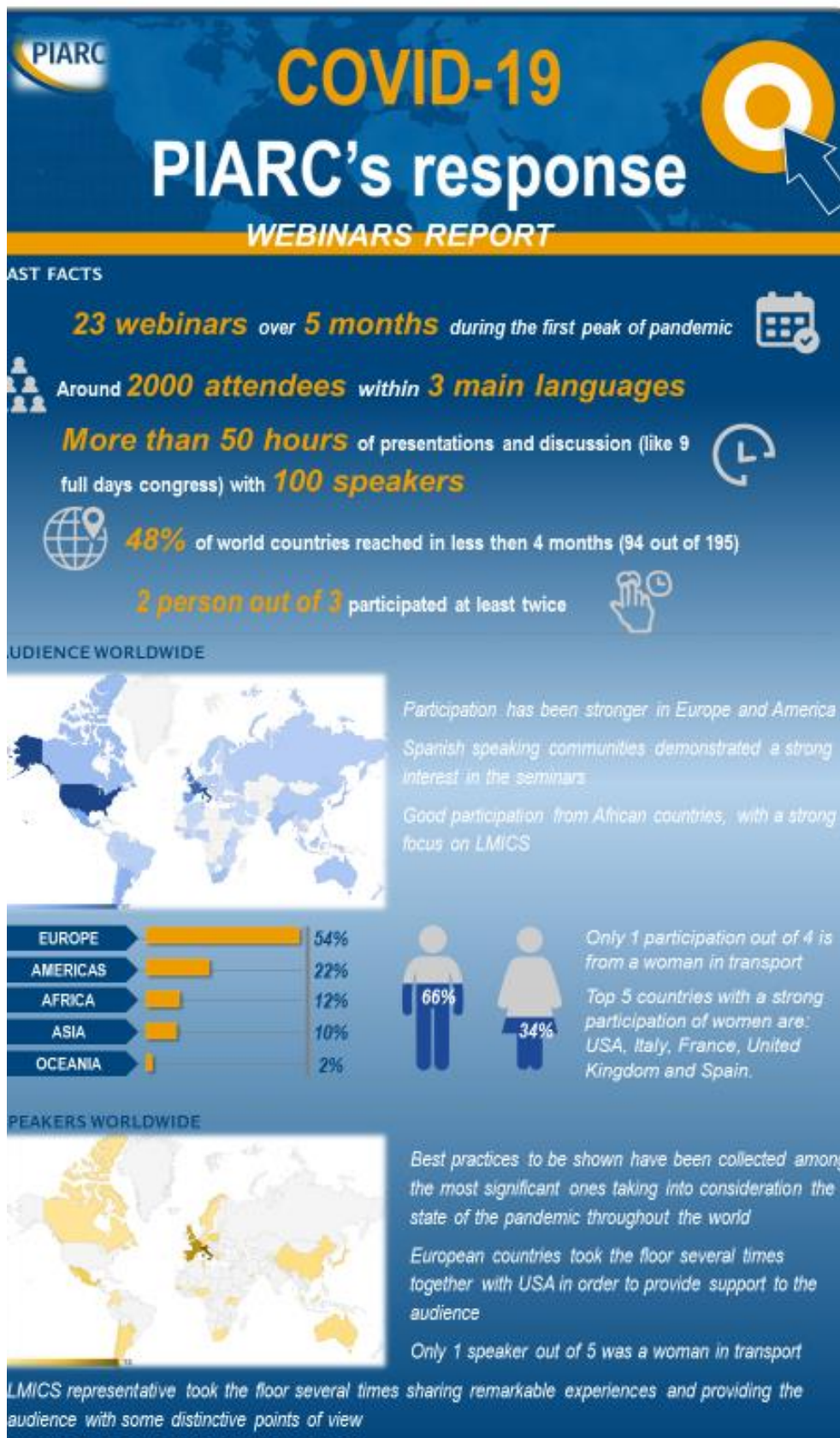
- The first four Seminars held from 25th March to 8th April;
- The six Seminars from 15th April to 30th April;
- The five Seminars in May, which were focused on a specific subject; and
- The eight Seminars in June and July, four of them focused on a specific subject, with the last one focused on overall lessons learned to date and way forward.

It should be noted that the Response Team resumed its programme of webinars from mid-October 2020 and plans to continue events well into 2021. The topics, discussion points and conclusions arising from these webinars will be reported subsequently, for example in further Bulletin Notes.

4.4. WEBINAR REGISTRATION, PARTICIPATION AND REPRESENTATION

The global outreach of the 23 webinars held between March and July 2020 can be showcased by the following statistical information, displayed in Figure 4.1 below.

Figure 4.1: Summary of PIARC COVID-19 Webinar Activities



SOURCE: Valentina Galasso for COVID-19 Response Team

In the 23 webinars that are summarized here, PIARC reached close to 2,000 attendees representing almost half of the countries of the world (94). Almost 100 presenters shared their knowledge and expertise and contributed to more than 50 hours of presentations and discussions.

Out of the total number of attendees, one out of every four was a woman. This increases to one in three if we look at the individual participations. The top 5 countries relative to woman-in-transport participation in our webinars were the United States, Italy, France, United Kingdom and Spain.

Participation from Europe was much stronger than other regions, perhaps because Europe was most severely impacted by COVID-19 during this particular period. The time of the webinars was also more European and African friendly than for the Americas, Asia and Australia.

Within Europe, Italy, France, United Kingdom and Spain showed the most interest in the webinars, while the United States, Mexico, Argentina and Canada demonstrated the most interest within the Americas. There was also good participation from African countries with a strong speaker participation from presenters from Low- and Middle-Income Countries (LMICs).

Recognizing the global outreach of these webinars, and to share the value gained from the excellent presentations provided, the Response Team worked with PIARC General Secretariat staff to develop a Special COVID-19 Web Page which is freely accessible to all.

5. ISSUES FROM THE PANDEMIC IN ITS INITIAL PHASES

As has already been remarked, the PIARC COVID-19 webinar programme elicited an enormous amount and range of evidence on various impacts and responses to COVID-19 in the roads and transport sector. This Chapter summarises the overall findings arising under eight main categories:

- General effects and measures;
- General impacts on the road and transport sector;
- Employee and customer health and safety;
- Maintaining activity and business continuity;
- Impacts on the demand for transport;
- Impacts on business, including the construction sector;
- Relationships with customers and stakeholders; and
- Early evidence on re-opening and easing of lockdown.

It is re-emphasised that the evidence presented here is a “snapshot” of experience, as presented during the webinars, from the pandemic between March and late July 2020. At the time of writing, COVID-19 continues to cause public health, logistical, economic and social impacts around the World and there will be similarities, as well as differences, with this early experience. In future reporting, all the evidence needs to be assessed in its totality in order to draw firm conclusions, to understand what constitutes truly “best” practice and inform advice for future crises.

The PIARC COVID-19 Response Team will present and analyse further evidence in its activities and reporting in 2021

5.1. GENERAL EFFECTS AND MEASURES

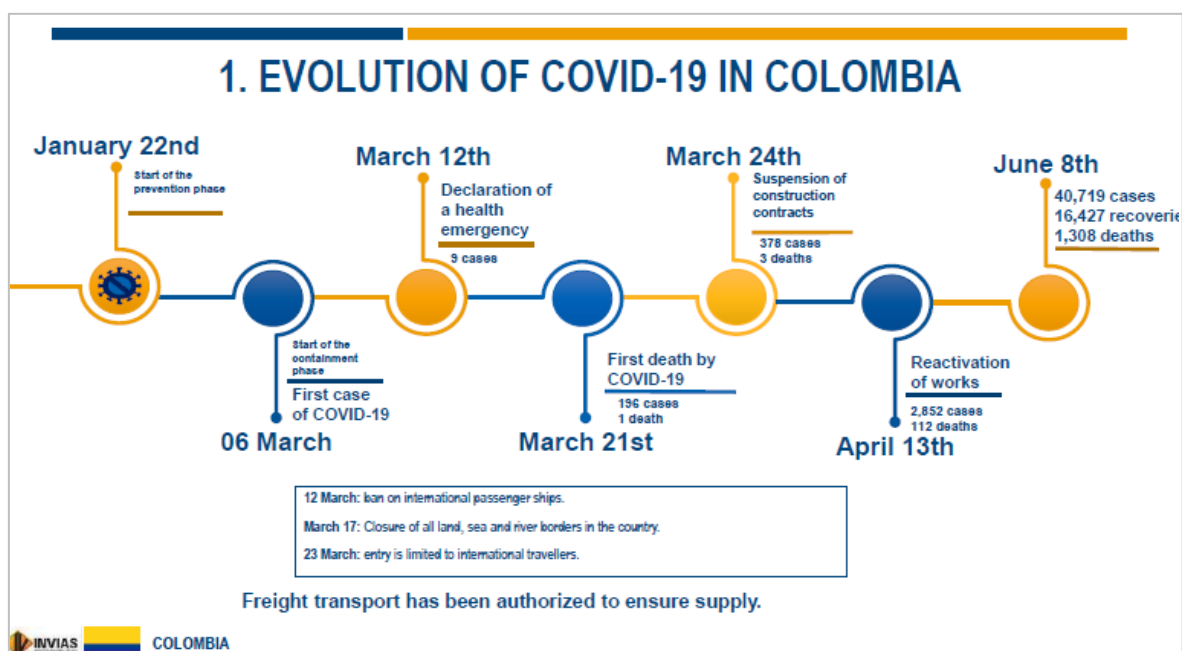
The overall goal of Governments in most countries during the early stages of the pandemic, from March 2020, was to face the public health crisis head on and suppress COVID-19 transmission. In this situation, this goal generally took precedence over limiting the level of economic damage, minimising social impacts and thinking extensively about reopening and recovery.

Lockdowns on personal mobility, economic and social activity have been accompanied by a large drop in the economic activity, with countries more dependent on international transport or tourism being particularly adversely affected. This has been reflected in a dramatic reduction in passenger and goods transport and decrease in traffic volumes as shown in Chapter 2. The fall in demand has also seen reduced fuel consumption, lower air and water pollution, less waste and less noise, with natural ecosystems being given a brief respite to recover from human environmental impacts. In some cases, increasing protectionist measures, some of which preceded COVID-19, and encouragement of use of domestic rather than foreign products, has an additional effect on international trade and freight transport.

The experience of the pandemic has also seen a dramatic uptake of public and private initiatives for digital innovation and use of new technologies, for monitoring and containing the pandemic, assisting teleworking, improving the efficiency of logistics, and meeting the needs of citizens confined to their homes, sometimes in remote locations.

General pandemic responses have included the measures described below addressed to, and disseminated amongst, people, businesses & communities.

Figure 5.1: Example of COVID-19 Pandemic Evolution within a PIARC Member Country



SOURCE: Figure from Juan Esteban Gil Chavarria (Colombia) presentation at PIARC webinar 10 June 2020

Declaration of States of Emergency and Granting of Extraordinary Powers

- Declaration of State of Emergency or equivalent terminology (Alarm, Catastrophe, Disaster, Alert) by Governments, providing special powers, capacity, funding or flexibility to act and take extraordinary actions, varying by country in extent, duration and detail.
- Designation of various boards, committees or councils for crisis management, establishing mechanisms for the coordination of administrations, ministries, agencies and sectors, through existing entities or through newly created bodies, as well, as designating certain competent authorities and their mandates and areas of responsibility to lead activities.
- Mandating authorities with emergency powers to issue interpretative orders and instructions to ensure the provision of critical or essential services for the protection of people, property and places, and maintain activity in key (essential) economic sectors.
- For agencies in the road and transport sector, this has included granting the necessary powers to monitor or restrict non-essential mobility, whilst maintaining the movement of essential workers, goods and services to support the economy and society.
- In most countries, sub-national agencies (for example, municipalities, urban transport authorities, local highway authorities) have maintained their legal obligations, powers and activities, but these have often been conducted within directives and advice put in place by the competent national authorities to address the pandemic.

Lockdowns and Restrictions

- Full or partial lockdowns of all activities, and movement related to activities considered non-essential, with the exception of areas such as health, medical, agricultural and food products, and the maintenance of critical infrastructure, including roads.
- Curfew, stayhome, and quarantine measures at international, national or local levels.
- Closing all/most educational, commercial, hospitality, cultural, religious and recreational establishments, events, and activities, with differing policies on public transport.

Containing or Delaying Transmission of COVID-19

- Putting in place general biosafety protocols and preventive measures, including mechanisms to detect and track infection and protect individuals from exposure to the virus. This includes social distancing, with variable regulations, metrics and penalties across countries, and reduction in maximum capacity of establishments.
- Mandatory quarantine or preventive isolation in case of symptoms and for citizens returning from abroad, with exceptions for essential workers, for example in the health, law enforcement, logistics or other strategic sectors.
- Enhancement of intensive care and securing appropriate therapeutic treatments and medical services for COVID-19 patients with evidence of rapid improvement in these areas across many countries after the initial wave of the pandemic.
- Encouraging and requiring behaviour modification from citizens to reduce transmission, for example to avoid the “Three C’s” as much as possible:
 - Closed spaces with poor ventilation;
 - Crowded places with many people nearby; and
 - Close-contact settings, such as close-range conversations .

Figure 5.2: The Three Cs to Reduce COVID-19 Transmission



SOURCE: Figure from Jun Takeuchi (Japan) presentation at PIARC Webinar 29 April 2020

- Differing policies towards use of public transport, but with frequent official advice to avoid buses and trains, suspension of services in some instances, and general enhancement of the sanitisation of surfaces and use of PPE by staff and passengers.
- Public information for voluntary restraint of travel to essential purposes only, disseminated at roadside service stations and parking areas, public transport terminals and stops, through VMS, via broadcast media, social media and other channels.
- Clear awareness that the use of new technologies would play a fundamental role in containing and tackling the pandemic.

Figure 5.3: The role of innovation to face the COVID-19 Pandemic



In detail, special focus on:
Initiatives of the Innovation Ministry of Italy in the last weeks

10th March – The Digital Solidarity Initiative: a campaign to get internet companies and publishers to provide free services to help people work and study from home, or to assist and enhance citizen life during confinement.

19th March – Fast Track Procurement for Public Administration: a facilitated process for all Public Administrations to acquire digital goods and services, with particular reference to services operating in the cloud. The entities will be able to purchase these goods and services with a negotiated procedure.

20th March – Innovate For Italy Initiative: A new invitation to companies, universities, public and private bodies and research centers, associations, cooperatives, consortia, foundations and institutes, for the use of technologies useful for monitoring and containing the virus

23rd March – Fast Call «Use of new technologies to fight COVID-19» : A three-day call for contributions to support the Ministry of Health and the Istituto Superiore di Sanità in collaboration with the WHO, to identify the best digital solutions available for telemedicine and home care applications for patients and for "active" monitoring of the risk of infection

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SOURCE: Figure from Saverio Palchetti (Italy) presentation at PIARC webinar 01 April 2020

Measures to Maintain Activity and Daily Life

- Measures to ensure the continued availability and supply of essential services and supplies, such as food, medicines, power, water, phone and internet.
- Suspension of requirements for many activities to be physically conducted face-to-face or in close proximity, with processes and systems to undertake transactions online, or regulated through social distancing and use of PPE.
- In many countries, rapid expansion of information and communication technologies (ICT) to promote remote services and transactions.
- Continuing services for road freight, including adjustment to regulations and operating procedures, to safely maintain supply chains, especially for essential commodities.
- In many cases, changes in procurement procedures to ensure rapid supply distribution.

Measures for the Workforce

- Widespread partial or total workplace and office closure, flexible working hours, granting of paid or unpaid leave, and in some cases, job furloughs or lay-offs.
- Encouraging and implementing Working from Home (WFH) policies and practices, reducing the need to physically commute or interact with colleagues in the workplace.

- Advice and support for physical and mental health for workers subject to lockdown and confined to home during lockdown periods.
- Granting mobility permits, in paper or electronic form, for citizens to travel to a range of essential or permissible reasons.
- Financial aid to employees laid off or suspended during the pandemic.

Economic Measures

In view of the very negative economic and social effects of the pandemic, Governments adopted a wide range of economic measures to mitigate the effects on the population and, in some cases, very early economic stimulus measures were also taken. An example of this is the one presented by Jim Tymon (AASHTO, USA) at the webinar held on 1st April, announcing that US Congress was considering that the 4th COVID bill will focus on economic stimulus and safeguarding of jobs.

In this regard it is worth noting that also from the initial stages PIARC was fully aware of the importance of focusing also on "reactivation and how to carry it out," as expressed by PIARC Technical Director Miguel Caso Florez during the Seminar held on 8 April 2020.

The measures taken by Governments during the initial phases of the pandemic have included the following:

- Measures focused on maintaining the economy during lockdowns, including various Government stimulus packages, financial and tax assistance to companies and workers, or the creation of emergency mitigation funds.
- Economic action to support citizens, including targeted subsidies, suspension of loan or interest repayments, relaxed social welfare rules and price controls.
- Economic measures to support businesses, including transport operators, in such areas as:
 - Extension of tax deadlines and moratoriums on contributions and debts;
 - Increase in terms and grace periods for debt payments;
 - VAT refunds or suspensions; and
 - SME support, and funds to help companies and lines of credit.

General Mobility Measures

- Closure of land, sea and river borders with entry restricted to flights, shipping and passengers, with exception of essential goods and personnel, including the virtual cessation of tourism and leisure travel.
- Curfews restricting the use of public amenities, use of public roads, paths, streets, spaces, with fines to prevent inappropriate travel, including to second homes, unless permitted.
- Activation of law enforcement, civil protection and similar forces to carry out necessary checks on persons, goods, vehicles, premises, and establishments to verify activities and services with a duty on citizens to comply and cooperate with regulations.
- In some countries, suspension of road tolls, parking charges and other fees for all or some categories of vehicles, such as those carrying essential goods or in the health sector.

Figure 5.4: Road Checks on Vehicles and People During COVID-19



SOURCE: Picture from Ernesto Barrera (Chile) presentation at PIARC Webinar 07 April 2020

5.2. GENERAL IMPACTS ON THE ROAD AND TRANSPORT SECTOR

“According to the World Bank, world GDP is expected to fall by 5.2% in 2020, the deepest recession in almost a century. In some cases, such as the world’s most advanced economies, GNP is expected to fall by 7-8% with respect to 2019... Depending on the nature and speed of recovery, COVID-19 effects will extend over several years into the coming decade” (Oscar de Buen, Past President of PIARC , 29th July Seminar).

The provision of road and transport infrastructure and services is an important part of the overall public sector. It is therefore not surprising that, as shown below, there has been a broad parallel between the general measures taken by Governments as described above and those taken by organisations working in the road and transport sector.

Figure 5.5: General and Road and Transport Sector Responses to COVID-19

Steps adopted by Governments		Steps adopted for Road Authorities
<p>Declaration of State of Alarm. Health Crisis Designation of competent and empowered authorities Coordination & rapid reaction procedures. Public awareness. Role of subnational jurisdictional levels. General measures suspension, lockdown but essentials, of activity, service, meetings, social distance, mobility Limitations on occupancy of transport vehicles (public or private, collective or not). Communication.</p> <p>Consequences: sharp drop & constraints in economic activity and mobility including tourism, schools, social life. Border closure. Modal shift. Less revenues (fuel tax, tolls...) Inmobility: only essential trips, quarantines, curfew, Measures to address crisis, seeking balance essential mobility (not so much immobility) – protecting health Trying to return to a safe “new normality”. De-confinement.</p> <p>Realization COVID is as much economic crisis as health one, GDP reduction. Minimization of socio-ec damage States passing bills on economic considerations (extension of tax deadlines, moratoriums, deferral of credit payment, Credits Funds for helping & stimulus...) protecting: People in general, workers and self-employed workers Companies, focus on SMEs and liberal professions Post-COVID-19 reactivation economy. Billionaire funds on stimulating economy. Roads as priority & efficient means to restart the economy (stimulus)?</p>		<p>Emergency response. Health Crisis. Instructions from Head of Road Authorities to employees and companies. Protection of staff as a priority (teleworking, e-Administration) Identification of vulnerable employees / workers Determination of road (infrastructures) & Transport as essential. Electronic communication broadband suppliers may not suspend Need to fulfil Mandate: road network open, road transport in service Task Force and Crisis team. Message, messenger, media?</p> <p>Designation of infrastructure workers as essential Frontline staff and personnel “in the field”. Focus on transportation provisions and essential workers and supplies (somewhat problematic in many cases, in early stages) Services Areas (petrol, toilets, food, rest...), and to create networks of open establishments in the rest. Maintenance is essential. Different views / responses on Road Works and Tolls Economic considerations regarding the suspension of contracts Almost of all tenders have been suspended (but exceptions) Emergency processing</p> <p>Project measures: in some nations “a country priority” (high contribution to GDP and jobs). Structuring new projects. Dilemma. Re-definition and/or re-arrangement of existing contracts Review of economic balance of concession contracts Start to think in medium- long-term implications. Future role of Road Authorities. Communication.</p>

SOURCE: Figure from José Manuel Blanco Segarra (Spain) presentation at PIARC webinar 29 July 2020

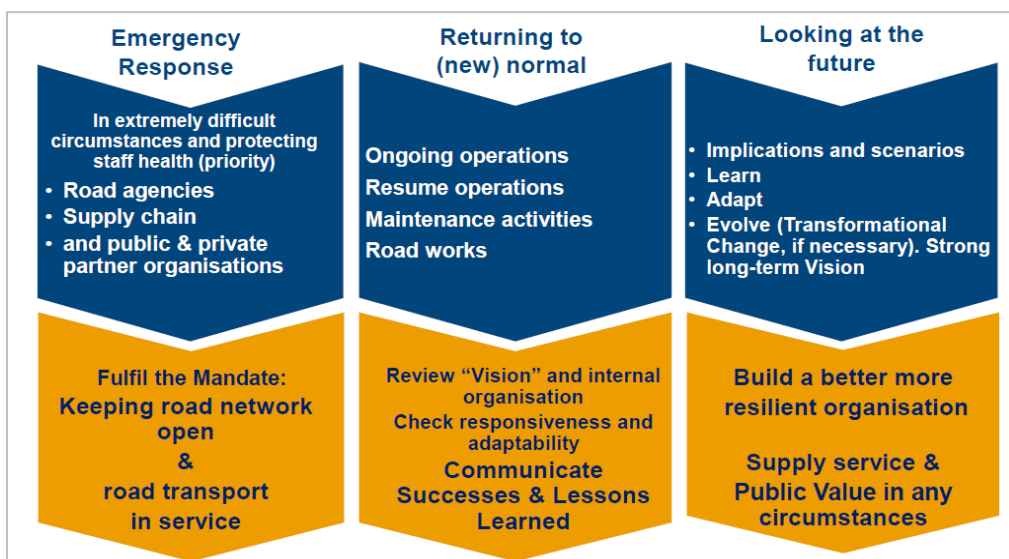
The figure below shows the three main phases of the response to the pandemic from road and transport organisations, based on evidence presented during the webinar programme, and broadly aligned with the Reopen-Recover-Reimagine framework presented in Chapter 2.

During the first phase, the primary mandate of road or transport agencies has been to keep their networks open and assets and services operational, often under rapidly moving and difficult circumstances. In this regard, most agencies have been able to maintain everyday core services and activities, whilst taking a more discretionary approach to non-essential construction and maintenance work (in-house, contract, concession), management of road projects and management of impacts on the supply chain and productivity.

In the second phase, the priority is for a progressive return of all activities to a “new normal” where the vision, strategic goals and internal organization of road agencies is subject to review and potential adaptation under the new circumstances, and importantly, communicating successes and lessons learned.

The third stage is to look to a more long-term future, to foresee different scenarios, to generate a clear long-term vision, to evolve and change what is necessary, all with the final objective of building a more resilient organisation which is capable of creating public value under any circumstances.

Figure 5.6: Responses to COVID-19 from Road and Transport Organisations



SOURCE: Figure from José Manuel Blanco Segarra (Spain) presentation at PIARC webinar 29 July 2020

The three main aspects of these phases involve transport demand, daily work and road works.

- Transport is declared as an essential service, necessary to ensure mobility of citizens, enable access to jobs and basic services, and transport goods and provisions. Road operations have generally continued, therefore, with administrative functions shifted to home working.
- The pandemic has generated a sudden and substantial fall in transport demand as a result of suspended activities, lockdowns, curfews, cessation of tourism and border controls. As noted elsewhere in this Report, reduction of passenger transport has been up to 90% and freight up to 60% in the early stages of the pandemic and despite the subsequent recovery, pre-pandemic levels have generally not yet been recovered.
- Due to the lower volume of traffic, positive operational and environmental impacts have been observed, such as reduced congestion, emissions and noise. There has also been a

decrease in accidents, although this is not universal due to occurrences of inappropriate behavior and speeding vehicles on open roads.

- The pandemic has generated anxiety of using public transport, sometimes added to by Government advice to avoid buses and trains. This has led to a relative increase in the use of private vehicles although this is normally counterbalanced by the general decrease in mobility in absolute terms.
- Within the overall designation of an essential service, there have been different reactions on whether to stop road construction or maintenance work. In general, but not everywhere, works have been suspended during the most acute phase of the pandemic, or have at least seen slowdowns in execution rates²².

Road Agency and Operator Revenues and Costs

In many countries, road agency revenues come directly or indirectly from road traffic and the volume of vehicles on the road. Less traffic therefore equals less revenue, falling financial performance and the emergence or worsening of operating deficits. Sources of revenue include:

- Transfer of road-based fiscal revenues, including fuel taxes;
- Various forms of direct road charges or tolls;
- Royalties paid by concessionaires; or
- Minor market sources (services directly sold to operators).

The costs of road operation are rigid, since only some are variable according to traffic volume. It is therefore very difficult to manage cost efficiency when unplanned and new activities occur, such as pandemic response. In this respect, road agencies have been involved in many crucial (and costly) activities during COVID-19:

- Re-organization of general activities through smart working;
- Re-organization of road activities, requiring redistribution of operations, shifts and services;
- Support to police and other authorities for patrolling or monitoring roads;
- Rearranging contracts (construction, maintenance, operations, services); and
- Activities focused on immediate operational relief for transportation agencies.

The implication, explored in further detail elsewhere, is that the financial sustainability of many road agencies has been sharply reduced during the pandemic and may only recover over time as traffic demand returns and operating costs stabilise.

Role of Road Agencies and Operators

In many cases, there have been changes to the role, mandate and powers of transport agencies, often fast-tracked at a time of crisis, which may need to be re-examined or formalized in due course.

For example, border controls have been put in place in Australia for the first time in history and quarantine measures exist for returning people. Border restrictions, including new requirements for people to have their temperature checked or complete health questionnaires, have resulted in major queues on approach roads and delays in crossing. Passengers have also been increasingly subjected to domestic quarantine and self-isolation arrangements. However, a range of mitigation actions have been put in place for essential goods and services and cross border workers; some

²² In some cases, low traffic volumes have been used as an opportunity to carry out some maintenance work on road assets that under normal conditions would have significantly affected traffic and caused major congestion.

countries have opened additional traffic lanes with truck drivers subject to exemptions on movement or quarantine, or fast-track measures in processing.

The sudden spread of working from home (also known as teleworking) has led to the need for rapid reorganisation of office procedures and the sharing of tasks and functions. There is a need to adopt measures for simplified and rapid procurement to acquire digital goods and services. Teleworking also has associated risks as regards cyber security, especially in large public organisations, due to new cyber threats appearing such as pseudo-official communications (phishing and similar) or stealing the contents of computers.

In many road organizations it has become clear that there is a need to create or further strengthen security arrangements, to coordinate a resilient response to businesses within the organization. These responses relate, for example, to the protection of operative personnel and new health and safety equipment on board service vehicles.

A case in point is that of companies with concessions in different countries, which have had to adopt special measures for business continuity and to address the impacts and challenges of the recovery phase.

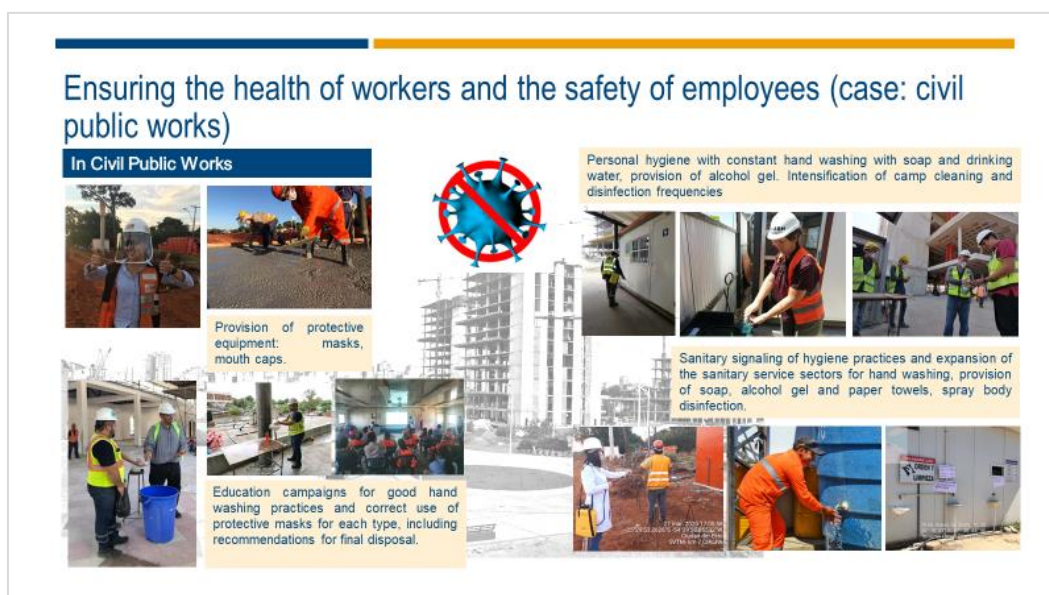
5.3. EMPLOYEE AND CUSTOMER HEALTH AND SAFETY

Much of the initial response from road and transport agencies has been focused on ensuring the health and safety of staff. This includes protecting frontline employees through revised operational procedures and equipment, restricting or regulating direct contact with customers and making home working effective, and minimizing and monitoring risk of infection.

Employee health and safety, and also of customers, has therefore emerged as a critical component for business continuity for all road organisations during the pandemic, to be able to maintain their capacity and to undertake their duties. This extends traditional dimensions of safety, for example around preventing accidents, to a new focus on hygiene and controlling infection, which will likely remain as a legacy in operational policies and procedures after COVID-19.

A range of new practices and procedures have been implemented to protect staff. These include: the provision of protective masks, equipment, education campaigns for correct use of this equipment and regular hand washing, disinfection and good hygiene in general. Based on discussions during the webinars, further details are set out below.

Figure 5.7: Health and Safety of Road Workers During COVID-19



SOURCE: Figure from Andrea Peris (Paraguay) presentation at PIARC webinar 07 April 2020

Office-Based Staff

- A priority has been to make business-critical positions and functions available and connected at all times. In addition to high-level management (and their supporting units), this include managers responsible for security, ICT and facilities management.
- New or enhanced policies and procedures have been implemented to avoid physical presence in the office and foster teleworking from home, with upwards of 60% to 70% of staff transferred to a domestic working environment in some cases.
- In some cases, laptops and other equipment have been provided to enable remote work, with access to the corporate networks. In many cases, staff have been required to use their own equipment which has normally been accepted by staff as an interim measure in view of the circumstances.
- There has been intensification of cleaning and hygiene measures in offices and facilities which remain open, or reopen after lockdown periods. Attention has also gone into making buildings “COVID-secure” with minimal risk of disease transmission between staff, for example through greater distancing between desks and regulation of meeting rooms.
- A further focus has been the identification of employees at risk (e.g. over 60 years, pregnant women, individuals with health problems). For most people in these categories, if their functions are not a priority or required for on-site work, they have been advised to stay at home. If their presence is required at work, they are advised to adhere to the available means of protection.
- For contractors and consultants, domestic and international travel or working at client premises has been suspended, scaled back or subject to enhanced risk assessments.

Operational Staff

Special measures have been implemented for customer-facing, frontline or site staff who work with customers or on operational activities. This also includes staff working in offices and staff working on the road itself. These measures include ensuring that personnel are:

- Equipped with masks, gloves and sanitisers.
- Required to apply available guidelines for health protection at passenger terminals and transport vehicles (applying to personnel in cashiers or booths too).
- Protected by increased cleaning and sanitisation of public areas, with a particular focus on touch points.
- Supported by deep cleaning of public transport vehicles, with enhanced technical guidance for disinfection, for example the type of chemicals to use.

On Site Personnel

- Intensive protection measures have been adopted for operational personnel, including equipment in service vehicles, offices, workshops, and facilities.
- Specific protection measures have been introduced for drivers of official vehicles, including how to handle the documentation required to be carried, windows open when possible, no heating or air conditioning, mandatory use of facemasks. Additional measures include behavioural measures such as sitting diagonally from people and/or avoiding conversation.
- Directors of work contracts, maintenance contracts, motorway and toll road inspectors have been permanently available, connected through mobile and email, and trying to limit physical visits and movements, always following the health recommendations, and communicating relevant incidents.

Figure 5.8: Health and Safety for Road Contractors and Professional Associations

1. Ensuring employees health and safety

- Primary concern for contractors and their Professional Associations (PA)
- In many countries, recommendations were published regarding appropriate safety measures to be adopted by contractors
- Often drawn up jointly by government and PAs
- Either general or specific (e.g. in France, road contractors, pipe-fitters,...)
- Also differences urban/rural environment, building/infrastructure
- PAs have organized training sessions (mainly aimed at SMEs), pilot jobsites




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SOURCE: Figure from Michel Démarre (SEFI-FNTP) presentation on behalf of CICA at PIARC webinar 29 April 2020

Road workers in Construction and Maintenance Activities

It has been important to maintain operations and for ordinary road works to continue as an essential service with reinforced precautionary measures which include:

- Reducing team size to avoid crowding.
- Disinfecting of shared elements at the beginning and end of each shift.
- Avoiding personal contact when transmitting news or orders (e.g. mobile or email).
- Daily monitoring of workers body temperature and other vital signs.
- Protective equipment, as well as provision of soap, alcohol gel, spray body disinfection.
- Special and periodic sterilization of critical equipment and spaces for nebulization.
- Awareness, communications and education of staff at all levels as to new procedures.

Passenger Transport

As has been widely shared by UITP and other industry associations in other COVID-19 related events, public transport has been subject to a range of interventions during the pandemic. In some cases, services have been entirely suspended or the public has been discouraged only to use them unless absolutely essential. Where services have continued, sanitisation has been a priority, as well as practices around protecting drivers and operational staff, use of PPE, or adapted door opening and seating arrangements.

Additional measures for public transport also include:

- Guidelines: for example around disinfection in public transport, capacity reduction and spacing, together with compliance checking and penalties for non-compliance.
- Cleaning and disinfection of public transport equipment and facilities.
- Fostering electronic ticketing and prepaid cards for minimal passenger interaction with staff, as well as encouragement of digital payment via contactless technologies.

- Drivers or operational staff protected by cabins or screens or seating and standing capacity eliminated or reduced in immediate proximity of the driver.
- Encouraging, or requiring, passengers in taxis to sit in the rear passenger side.
- Removing the middle row in minivans to increase social distancing.

Some countries have introduced technology to monitor passenger health. These include digital passes with personal health codes, infrared temperature measurement, and facial recognition.

Figure 5.9: Health and Safety Measures in Operations and Maintenance



SOURCE: Figure from Ricardo Tiago and Vasco Goncalves (Portugal) presentation at PIARC webinar on 22 April 2020

Figure 5.10: COVID-19 Monitoring Measures on Public Transport in China



SOURCE: Figure from Wang Jian (PR China) at PIARC webinar on 1st April 2020

Goods Transport

Freight movement has been essential in preserving supply chains during the pandemic. Goods movement traffic has seen a smaller decline in demand as compared to passengers movement. However, health and safety concerns have been paramount and the sector has experienced a number of practices as follows:

- Provision of health care along motorways and highways for truck and van drivers at truck parks and rest and service areas;
- Separation of trucks and other vehicles and road user types at rest and service areas;
- Enhanced health and safety protocols for drivers, agreed with carriers' associations;
- Disinfection and enhanced cab hygiene on every trip; and
- Supply of masks and protective equipment for truck drivers.

Further information on these and other measures can be found in Chapter 6 (Section 6.2).

5.4. MAINTAINING ROAD ACTIVITY AND BUSINESS CONTINUITY

As already noted, road and transport agencies, and their staff, have emerged as an essential service for keeping key networks and facilities open and operational. In this context, there are many lessons to be learned about various aspects of road management during the pandemic in maintaining activity and business continuity. These aspects include:

- Maintaining everyday activities of offices, road management, inspection or surveillance;
- Keeping roads open and in service, especially for freight;
- Managing road projects;
- Managing impacts on the supply chain; and
- Working with other agencies and organisations to secure these outcomes.

The main conclusion from the PIARC webinars is that road and transport agencies have been able to respond successfully to challenging circumstances. They continue to deliver services for their customers, often under difficult circumstances. The following sections explore key activities and experiences in more detail.

Maintaining Office-Based Activity

Road and transport agencies have been successful in connecting and managing office-based staff working from home, and continuing day-to-day business, in a variety of ways.

- Forming crisis management teams, procedures and communication networks;
- Identifying critical, essential or priority positions and functions;
- Maintaining access to, and functions of, high-level management and their supporting units, including continuing to issue operational instructions to staff in central services, regional and subsidiary offices and personnel on site and in operational roles;
- Increased use of ICT, and supporting protocols, to connect staff in different locations;
- Proceeding, without interruption, with instructions, transactions, payments to employees, suppliers and contractors;
- Issuing mobility permits to eligible personnel to justify movements in case of inspection;
- Supporting working from home and other remote practices with measures to maintain a team spirit, support employee morale and achieve social connections; and

- Suspending or appropriately adjusting milestones for corporate procedures and processes.

General organisational measures have been strengthened to make the widest possible use of ICT to avoid physical presence, social proximity and the use of paper, whilst maintaining coordination across locations, functions and roles. As a result, the pandemic has presented itself as an unprecedented opportunity for the expansion of teleworking, reorganisation of staff tasks and duties and a reconfiguration of pre-pandemic commuting patterns. This requires special attention as many employees have had to face new professional and personal roles and pressures, and have had to make major adjustments to their daily routines.

One of the remarkable consequences of teleworking is reflected in the following quote from André Broto (Coordinator of PIARC ST 2 Mobility) *“The introduction of a culture of networking, by making maximum use of the potential of digital services, is an asset, as well creating a culture of decentralization, leading to “bosses” in the field having authority and means to do their jobs.”*

Maintaining Road Inspection and Surveillance

Organisations’ roles of road inspection and surveillance, whether as a standing function or for individual projects, have been successfully maintained. For example, engineers have been permanently connected during the pandemic to their contractors and inspectors, as well as the personnel who collaborate with them, and have been able to reduce their physical site visits to the minimum necessary whilst maintaining activity.

Agencies have also issued mobility permits, or equivalent, to justify essential travel during the pandemic, including securing the necessary clearances from other authorities.

Maintaining Traffic Control

The speed and accuracy with which data on the traffic volumes, composition and network conditions is obtained is an instrument of great importance for the authorities responsible for road network management, public health and economic matters.

Figure 5.11: Utilising Traffic Control Centres During the Pandemic



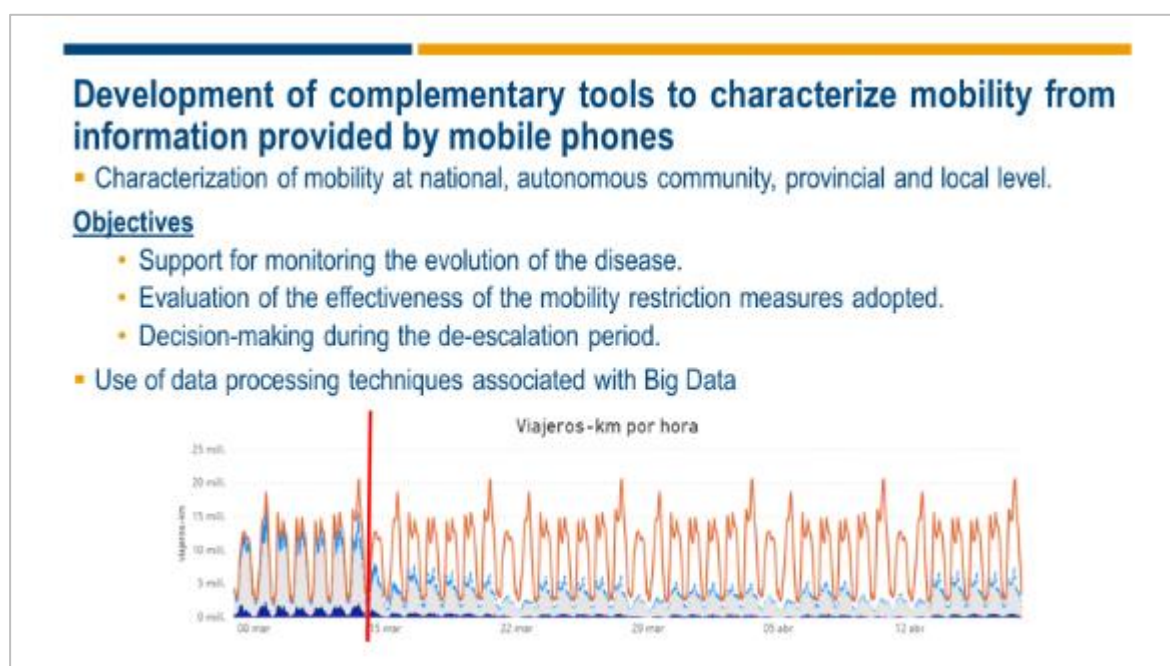
SOURCE: Figure from Dominique Verlaive (Belgium) presentation at PIARC Webinar 17 April 2020

Traffic Control Centres have been developed over many years as key points of collecting, analysing and disseminating such data. One of their most important tasks regarding COVID-19 is the development of tools to understand mobility from a variety of sources to provide:

- Support for monitoring the evolution of pandemic;
- Evaluation of the effectiveness of, and public compliance with, mobility restriction measures adopted by Government;

- Monitoring and decision-making during re-opening after lockdown periods, as well as renewed local lockdowns or travel restrictions where relevant;
- Development of dynamic dashboards and modelling techniques that allow network and service adaptation to changing stages of the pandemic; and
- Monitoring of controls and law enforcement activity to ensure road safety.

Figure 5.12: Monitoring Mobility at Various Phases of the Pandemic



SOURCE: Figure from Ana Luz Jiménez (Spain) presentation at PIARC webinar 23 April 2020

Maintaining Freight Transport Including Service and Rest Areas

The freight sector has been treated as a national priority in almost all countries, especially for sectors such as pharmaceuticals, food and agriculture deemed essential during a pandemic. Some general measures adopted maintaining the freight sector during COVID-19 include:

- Exempting freight from general restrictions on movement and mobility;
- Relaxing rules on driving time, rest periods, license renewal and persons in truck cabins;
- In some countries, creation or enhancement of logistics or consolidation centres; and
- Implementation of truck only lanes at border crossings or toll gates, allowing freight to pass through rapidly.

During the first weeks of the pandemic, many countries saw major problems for freight haulage due to lack of rest and service areas or the closure or restriction of many existing facilities. In Norway for example, the rest areas were first closed due to public health reasons, but were later re-opened after consultation with industry to ensure supply chains remained operational. Overcoming such problems has been a major challenge and achievement for the sector.

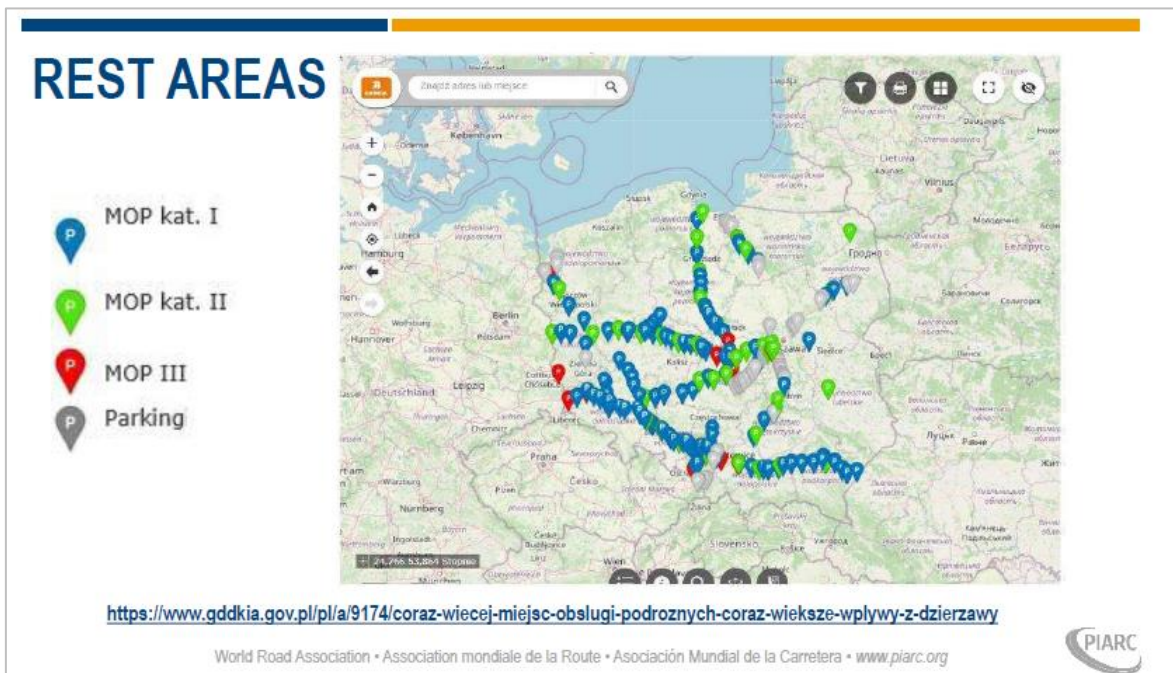
Responses raised during the PIARC webinars included:

- Keeping shops in service areas open, selling food, cleaning or personal hygiene products, automotive products and other essential items;
- Implementing measures to ensure service areas remain clean and secure;

- Developing apps for drivers and users in general to report problems observed, especially around health, safety and hygiene.
- Provision of information to drivers, for example through maps (Australia) or online (France), on which service and rest areas have amenities open.
- Increasing parking availability, especially for larger commercial vehicles (for example double-articulated lorries in Japan).

Additional information on freight transport can be found in Chapter 6 (Section 6.2).

Figure 5.13: Providing Information to Truck Drivers on Service Areas



SOURCE: Figure from Piotr Macuk (Poland) presentation at PIARC webinar 06 May 2020

Figure 5.14: Maintaining Supply Chains During the Pandemic



SOURCE: Figure from Carlos Santillán (Mexico) presentation at PIARC webinar 23 April 2020

Maintaining Road Construction

In many countries, the road sector is one of the largest clients in the construction sector. Where a decision to maintain road construction during the pandemic has been made, this has been achieved through cooperation with contractors who have identified appropriate ways of implementing preventive health and safety measures on site. Retaining jobs and the integrity of companies within the supply chain has often been a major consideration in the decision to continue work provided it can be done safely.

Where works have been temporarily suspended, the PIARC webinars provided examples of reactivation after the initial lockdown periods have come to an end. Again, restarting work safely has been a priority with enhanced sanitation, social distancing and monitoring of workers’ health all being measures put in place.

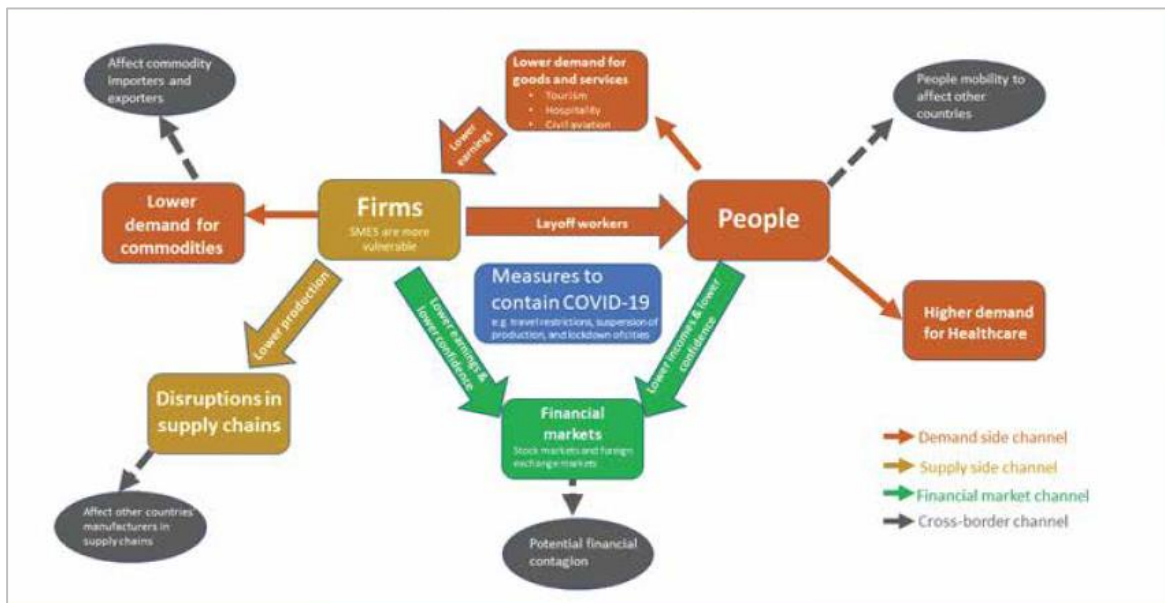
5.5. IMPACTS ON THE DEMAND FOR TRANSPORT

Impacts on the Overall Demand for Transport

Data presented in Chapter 2 showed that COVID-19, and the public health policies designed to slow transmission, have had a dramatic impact on the demand for transport. There was a sudden and deep decline in volumes for most surface transport modes in March and April, followed by a slow recovery from mid-year which is more variable and hesitant.

The pandemic has affected all branches and sectors of the economic system and almost all economic operators. The figure below shows this effect with a constraint on the mobility of people and goods through which both the supply chain and the demand chain are disrupted.

Figure 5.15: Channels of COVID-19 Impact on Economies



SOURCE: Figure from Fabio Pasquali (Italy) presentation at PIARC webinar 20 May 2020

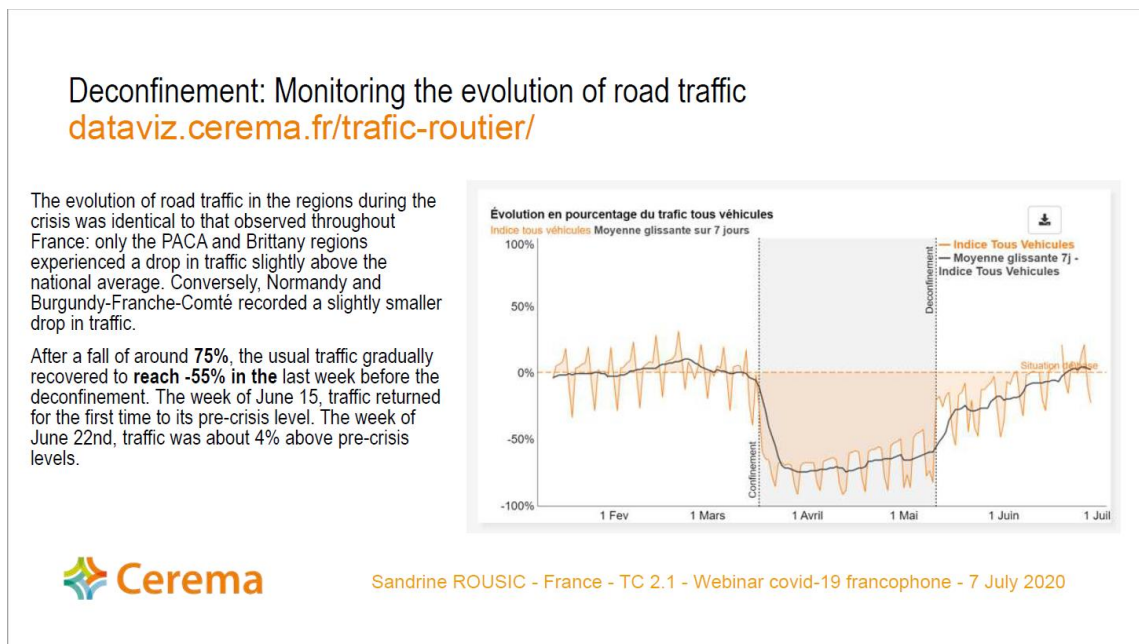
Although the supply chain has been maintained for the most essential sectors during the pandemic, the lockdown has had several economic effects:

- The lack of mobility has reduced, or even made impossible, the occasions to sell and buy goods; this has caused lower production, lower sales, lower profit and higher stocks, with heavy economic and financial effects on the supply side.

- The constraints to the circulation of people has had severe effects for those economic sectors based on mobility, such as tourism, transport in general, accommodation and recreation; those sectors are essential in the urban economy and are responsible for some 70% to 75% of overall GDP.
- The huge and unforeseen slowdown of the economy has worsened expectations in terms of investment by firms and individuals and the final effect has been the lack of accumulation and postponing of major investment plans.
- In many countries, mostly where there is no welfare system that provides safety nets to weaker sectors, the number of people below the poverty threshold has increased and stress on the social system has worsened.
- International relations in terms of exchange of goods and services have been affected, not only in economic terms, but also for the exchange of knowledge; this has slowed the development of innovation and technology worldwide.

In quantitative terms, the effects of COVID-19 on overall mobility vary from country to country, since lockdown and other measures have been imposed at different times and intensities. Furthermore, in almost all countries, there were relaxations of lockdowns after June 2020, although from September a resurgence of infections has moved many Governments to reimpose some restrictions. This is shown in the data presented in Chapter 2 and Appendix C.

Figure 5.16: Deconfinement: Monitoring the Evolution of Road Traffic



SOURCE: Figure from Pascal Rossigny (France, CEREMA) & Sandrine Rousic (France, CEREMA, TC 2.1) presentation at PIARC Webinar 7 July 2020

An example of the effects of the pandemic in different countries and transport infrastructures is given by the Atlantia Group, active in the toll road sector in several countries as well as airport management, across the World. The table below shows changes in year-on-year traffic flows after the first four months of lockdown, March to June, 2020, in a representative section of the overall national toll road network of Italy, France and Spain in Europe as well as Brazil, Chile and Mexico in the Americas. The overall impacts on traffic account for about a decrease of 14% to 38%, depending on the country. The decrease in airport demand is greater, up to 70%.

Figure 5.17: Atlantia Group Weekly Traffic Performance 2020

Change vs equivalent week of 2019 (Preliminary figures)	TOLL ROADS						AIRPORTS	
	Italy (ASPI)	Spain (Abertis)	France (Abertis)	Brazil (Atlantia + Abertis)	Chile (Atlantia + Abertis)	Mexico (Abertis)	ADR (FCO+CIA)	NICE
	ADR	ADR	ADR	ADR	ADR	ADR	pax	pax
YTD (1/1/2020 to 5/7/2020)	-37,4%	-38,5%	-33,3%	-14,7%	-33,6%	-15,8%	-69,5%	-68,2%

SOURCE: Figure from Fabio Pasquali (Italy) presentation at PIARC webinar on 20th May 2020

During the seminar on 12 May, Emanuela Stocchi presented data which showed that the European Association of Operators of Toll Road Infrastructure had suffered a drop in traffic of up to 80-85% across its total network of over 87,000 Km.

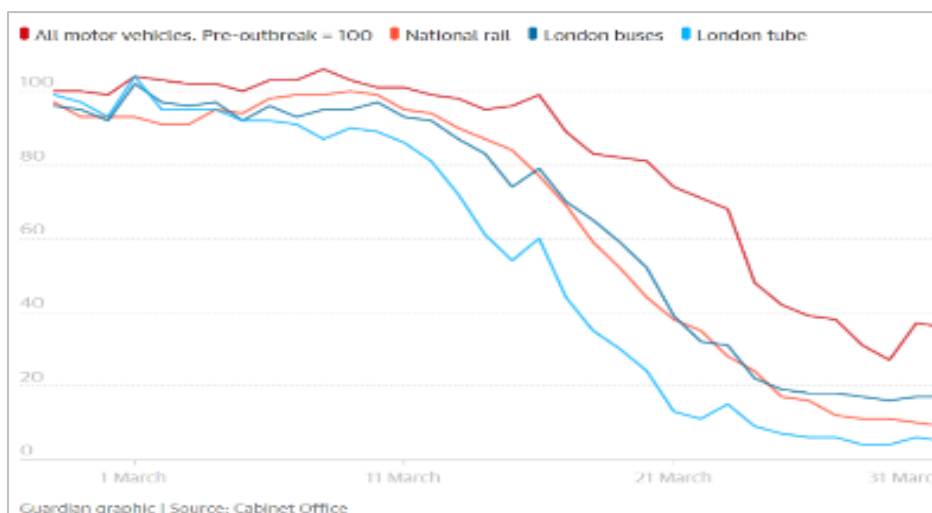
The PIARC webinars demonstrated time and time again, and virtually without exception, that all countries have experienced a fall in demand across all modes. The decline has been especially marked across public and shared transport, which has also experienced a much slower recovery compared to private transport.

For example, Matt Daus from the International Association of Transport Regulators (IATR) presented evidence from New York City, where road traffic saw a 60% reduction during lockdown. Taxis saw a 91% reduction in ridership and public transit between 50% (bus) and 60% (metro).

Susana Magro Andrade, Deputy Director of Mobility Planning from Madrid City Hall stated at the webinar on 10 June that reduction of mobility in Madrid had been from 10 million trips per day to 1,3 million and regarding modal split, the use of public transport reduced to 22% whilst private vehicle traffic increased to 44% due to perceived health risks in public transport and absence of congestion inviting use of private vehicles, adding that the “Rush Hour” 8:00-9:00 has disappeared and now was recovering slowly with less intensity.

Elsewhere, London, UK has seen its lowest demand for transport since 1955. In March 2020, underground (metro) journeys dropped by 95% and bus usage fell by 85%. Early on, Transport for London was forecasting a reduction in farebox revenue of up to £500 million, but has since revised this estimate, and the related operating deficit, severely downwards as the pandemic, and the drop in public transport ridership, has lasted into the final quarter of 2020.

Figure 5.18: Transport Demand in London during March 2020



SOURCE: Figure from Mark Stevens & David Ogden (UK) presentation at PIARC webinar 15 April 2020

It is too early to anticipate when and how the demand for transport will recover after the pandemic. This will be variable across different countries, modes and local contexts. However with the

pandemic now lasting until 2021, the PIARC webinars highlighted that it seems reasonable that demand may generally be stabilised for some time at a 10 – 20% decline from pre-pandemic levels, depending on local circumstances and if changes in travel habits will be maintained or not. It is acknowledged that this has been a significant issue across the road transport sector throughout the pandemic.

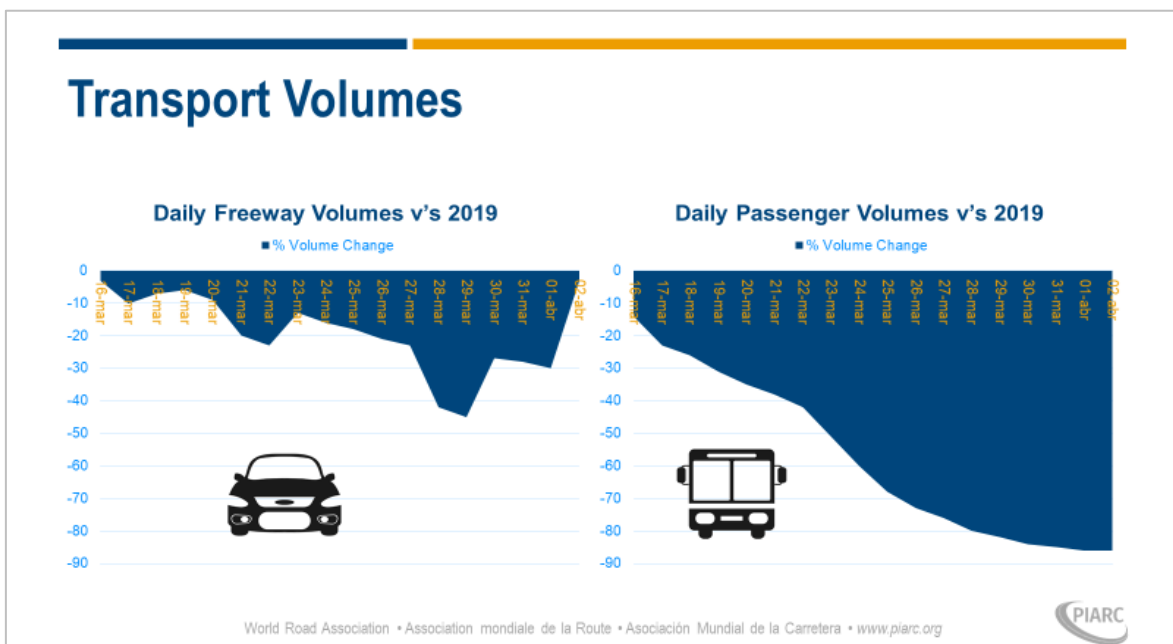
Impacts on Public Transport

The above evidence also reflects the fact that across the World, public transport has experienced a crisis of confidence as a result of COVID-19. Ridership has fallen by up to 90% in many instances. Demand – and revenue – is not expected to see a rapid swift return to pre-pandemic levels. Indeed, whilst the pandemic continues, the advice from some Governments to avoid buses and trains, and the requirement to maintain social distancing make this impossible.

The PIARC webinars heard arguments that cities will come out of the pandemic with sharply negative impacts on public transport. Instead, demand has shifted to increased walking and cycling for local trips during lockdown, and with the strong potential for increased car use. This is in spite of a range of sector responses, including enhanced cleaning, social distancing and limitation of capacity, avoidance of crowded conditions and no reduction in service at peak times.

Evidence was presented that no mass transport system can operate at full capacity while maintaining social distance at all times. Reduction of bus capacity can be up to half of normal levels and sometimes even less. At the same time, the volume of passengers and therefore farebox revenue has decreased, but the costs of operation, including cleaning and sanitation, have increased. This has created a financial crisis for many operators and public transport authorities which will outlast the pandemic. Governments have had to step in to support the sector and there will be potentially major consequences for the economic viability, business models and funding arrangements of the sector.

Figure 5.19: Transport Demand in Western Australia during March 2020



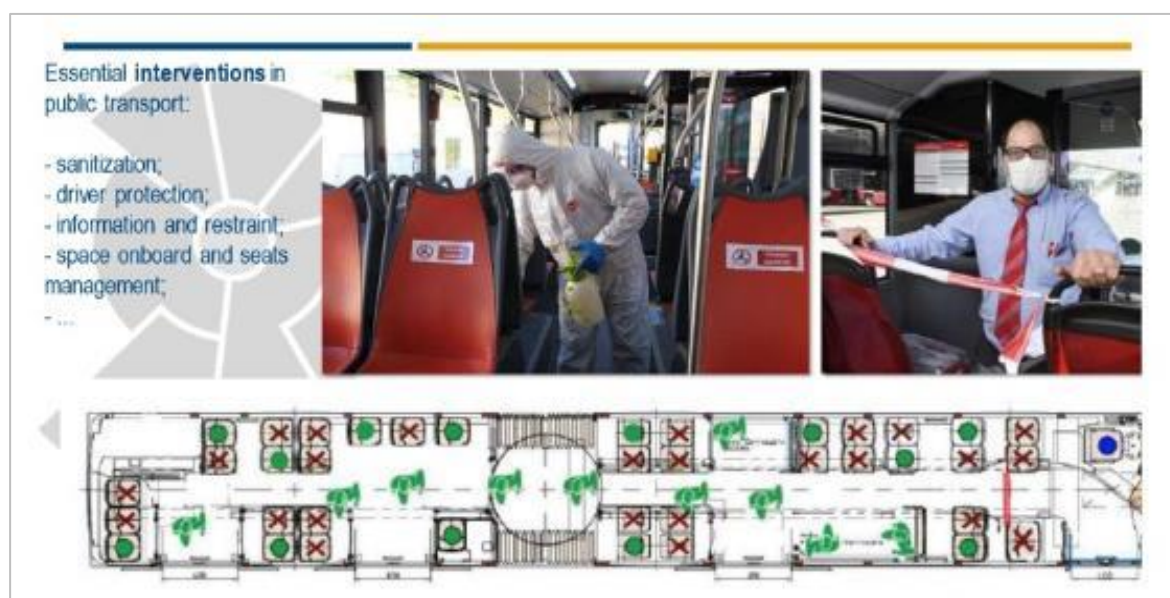
SOURCE: Figure from Alan Colegate (Western Australia) presentation at PIARC webinar 08 April 2020

Spacing onboard and seat management has been implemented on buses and trains in many countries to minimise crowding. The figure below shows that on some vehicles it is necessary to block seats. Other complexities were raised during the webinars as to whether the driver skip stops

if the bus is at capacity for maintaining social distancing, and what measures, including telematics, can be put in place to enhance passenger information.

Ultimately, the future of cities will depend on the restoration of safe, effective and attractive public transport. However, in order to deliver this, there will need to be measures to restore passenger confidence, for example around enhanced sanitation, network monitoring and promotional campaigns and fare and other incentives to rebuild ridership.

Figure 5.20: COVID-10 Measures on Public Transport



SOURCE: Figure from Tommaso Bonino (Italy) presentation at PIARC webinar 03 June 2020

Impacts on Shared Transportation

The PIARC webinars heard evidence that taxis and ride-hailing services have lost 50% and more of their passengers during the pandemic and in some cases up to 90%. Uber is reported to have experienced a 60-70% loss in business. Some cities have even temporarily banned taxi and ridesharing.

In many jurisdictions, taxi and ride-hailing services have shifted to food, package, and prescription deliveries and transport of emergency or medical supplies. Discounts have also been made available for transporting essential workers, for example hospital staff.

Matt Daus from the International Association of Transport Regulators (IATR), also presented on measures being taken to maintain social distancing and protect passengers in taxis. These include limiting passengers overall, banning passengers from the front seat, installing partitions between driver and passengers, enhanced sanitisation of vehicles between shifts and regular driver testing. IATR is working on COVID-19 Model Regulations for safety equipment, smart meters, cashless payment, transportation data access and privacy and other best practices²³.

Other actions adopted by the sector in response to the pandemic include extension of license renewals and deferral of certain fees and taxes, as well as suspension of requirements for vehicle inspections and enforcement of non-critical violations.


²³ See <http://iatr.global> for further details.


Figure 5.21: IATR Model Regulations on COVID-19 Safety and Resilience

IATR Model Regulations for COVID-19 Safety & Resiliency

IATR will be working on emergency model regulations on COVID-19 Policy & Resiliency.


Prior Model Regulations:





1. Safety Equipment (Cameras, Partitions & Other Devices)
2. Soft Meters (Smart Meter Technology)
3. Digital Advertising on Taxicabs, Transportation Network Company (TNC) Vehicles, and Other For-Hire Vehicles
4. Transportation Data Access & Privacy
5. NEMT Best Practices and Certification

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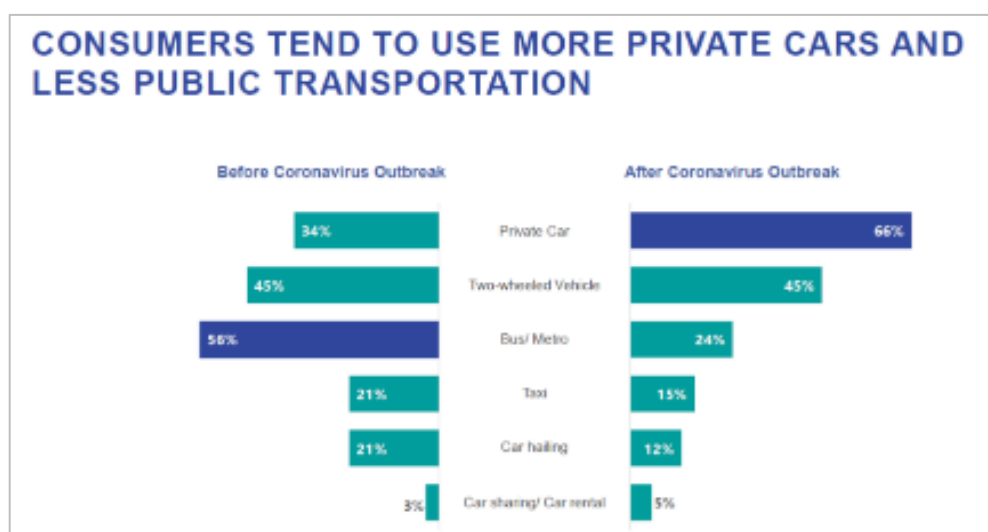


SOURCE: Figure from Matthew W. Daus (IATR) presentation at PIARC webinar 15 April 2020

Modal Shift

When discussing the impact of COVID-19 on transport demand, many participants in the PIARC webinars observed the potential for a modal shift away from public and shared transport towards greater private car use, seen as safer and more secure during the pandemic. This is illustrated in the figure below which shows travel preferences between private cars and public transport in China before and after the COVID-19 pandemic. This highlights that private cars are anticipated to increase post-crisis in use in urban areas, and will double their share; use of public transport is more than halving, and cycling is estimated to remain stable.

Figure 5.22: Modal Preferences in China Pre- and Post-COVID-19

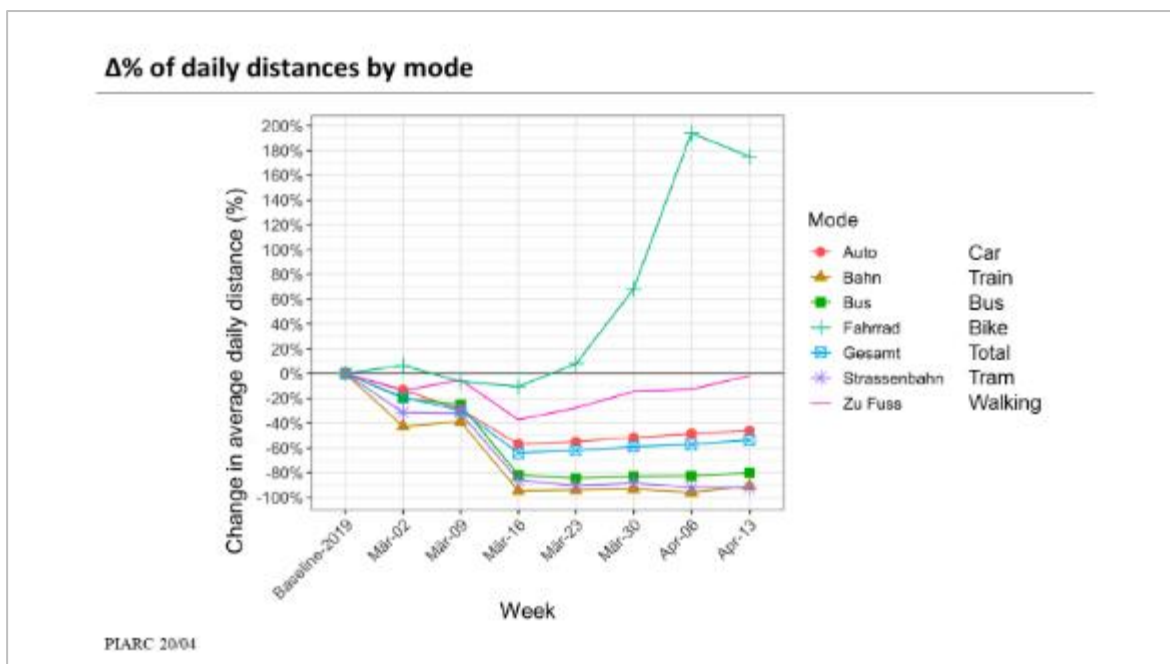


SOURCE: Figure from Fabio Pasquali (Italy) presentation at PIARC webinar 15 April 2020

It certainly appears that looking forward, travel choices could become “more individual” or in other words “less collective.” Whilst this could mean greater purchase and use of cars, it could also provide an opportunity for a shift to active modes, walking and cycling, as well as micromobility in the form of e-scooters. There is some evidence of the greater take-up of the latter in some countries in mid-2020.

In Switzerland, it has been observed that there has been a dramatic reduction in reduction in the average area of the geographical space of activity of individuals - people are travelling more locally over shorter distances. Such reduced trip length is partially a reflection of working from home. Peaks in travel have also become less pronounced since people are commuting less at fixed times. The promotion of staggered timetables to avoid congestion in collective transport has further contributed to this.

Figure 5.23: Modal Choices in Switzerland in March/April 2020



SOURCE: Figure from KW Axhausen, J Molloy & C Tchervenkov (Switzerland) presentation, PIARC webinar 29 April 2020

It was also observed that cities have taken the opportunities presented by this potential shift to active travel to reallocate roadspace and reconfigure their streets in order to accommodate more cyclists and pedestrians. For example, new cycle streets, popup cycle lanes and widened pavements have been planned or implemented in cities such as Milan, Paris and Berlin and in the UK, France and Australia, Governments have provided additional funding to support such schemes.

Figure 5.24: Reallocating Roadspace to Active Travel Modes and Public Realm

SOURCE: Figure from Karen Vancluysen (POLIS) presentation at PIARC webinar 03 June 2020

It is observed that the cities that acted fast during the pandemic, and have done so with a long term vision, are those cities that already had Sustainable Urban Mobility Plans (SUMPs) or equivalent frameworks in place and integrated packages of measures already ready for delivery. Because schemes were already in the pipeline, this makes it possible for those measures to be fasttracked and also to remain in place permanently after the pandemic ends. For example, in Paris, there has been a fasttracking of the very wide regional city network with 650km cycling paths being introduced at a faster pace than previously planned.

Looking ahead, further data is needed to see whether active travel behaviour is maintained during less favourable winter months, whether the rapidly-implemented pop-up schemes are kept in place. It will also be necessary to track the perceptions of all road users as to their desirability, utility and long-term potential post-pandemic.

5.6. IMPACTS ON BUSINESS INCLUDING THE CONSTRUCTION SECTOR

Toll and Fuel Tax Revenue

In most countries, the road sector, through vehicle owners and users, contributes several percentage points of GDP to the public revenues and the State balance sheet.

It is widely recognized that direct and indirect taxation on vehicles and road circulation is an important and usually stable source of revenues for the Governments. Indirect taxation is the most important component and includes excise duties and VAT on fuel, as well as VAT on tolls and other sales related to vehicle circulation (e.g. revenues from rest areas). In some countries these revenues are earmarked and represent the main financial source for operating, maintaining, and in some cases also building or rehabilitating the primary road network.

COVID-19 and the associated lockdowns have generated a dramatic and sudden decrease of traffic as described above. This has generated a proportional drop in Government revenues. The effects have been different from country to country and can be summarized as follows:

- In countries where a Road Fund is in place, the operational activity of the Road Agency/Administration has not been reduced because of the need to ensure availability of the road network for freight movement during the pandemic; the decrease of revenues, associated to approximately the same level of costs, has generated a current deficit that the State is going to bear, increasing public debt.

- In countries where a Road Fund contributes to the financing of road investments, both for new roads and for rehabilitation of the existing ones, a slowdown of the process has resulted, with cancellation or postponement of planned investments.
- The same process has occurred in countries that already have in place a system based on vehicle taxation size, emission class or distance travelled; the decrease of traffic has interrupted the process of accumulation of financial resources, usually to be used for investments in the general area of the green economy.
- Where road projects are based on a PPP approach, there have been different situations: in the concessions where traffic risk is borne by the concessionaire, the Government has not generally been involved²⁴. Conversely, in the cases where traffic risk is shared or entirely borne by the State, the losses have involved the public side of the concession. All PPP projects based on shadow tolls have caused a loss for the State and a neutral situation for the private concessionaires.
- PPP-based programmes have in general been slowed down and in some cases canceled.

We see different cases in how the Government has treated the losses of the public and private sector in road-related industries:

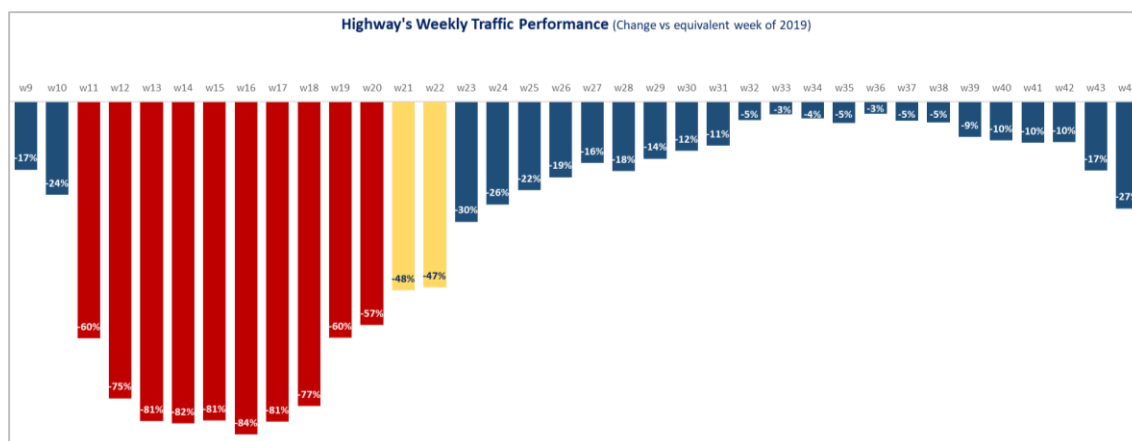
- Although small private entrepreneurs and firms have been partially protected, major private companies have often borne the losses caused by the pandemic; toll concessionaire companies have suffered from the decrease of traffic and only in a few countries has the Government accepted the need to vary the terms of the concession and/or to take into consideration an extension of the concessionaire's contract;
- In the case where a State-owned road agency is organized in the form of a limited share company, with all shares owned by the State, an extra-transfer has been included in the "relief package," such as in Italy; and
- As a measure to counter-balance the economic crisis generated by the pandemic, a program of investments in infrastructure including roads has been decided; the European Union has launched the Recovery Fund following the same rationale.

Toll waivers for vehicles providing social or health-care based services during the lockdown have been reported in the PIARC webinars. For example, many USA State DoTs have granted this, usually in association to the official declaration of emergency, for example Texas, Indiana, Virginia.

In general terms, the road industry has been negatively affected by the general crisis. It is worth noting, however, that other transport modes are experiencing even worse effects, such as rail and aviation. In absolute terms the road industry is suffering for the decrease of traffic and related revenues, but in relative terms the preference for individual mobility in order to avoid crowded or congested mobility options generally favors roads and private vehicles.

The figure below shows a comparison between weekly traffic in 2020 and 2019 for the toll network of Autostrad SpA, which operates about 3,000 km (50%) of the Italian toll road network, during the months of total or partial lockdown (histograms in red and yellow). The drop in traffic has been severe; at the same time, with no restriction to the mobility of people or goods, traffic quickly recovered to pre-crisis levels after lockdown was ended. The data also shows the starting of the second wave of COVID-19, at the end of last September.

²⁴ Apart from the VAT component of road tolls.

Figure 5.25: Traffic Volumes for Autostrad SpA 2020 Compared with 2019

SOURCE: Figure from Fabio Pasquali (Italy) presentation at PIARC webinar 29 July 2020

Toll Road Concessions

The effects of COVID-19 on toll road and other transport concessions can be seen in two basic models. These are, firstly, concessions managed by a company or group, usually owner of a portfolio of concessions, and, secondly, concessions managed by a single purpose company.

The companies in the first group have a higher resilience with respect to temporary financial shocks, since the debt to equity ratio is more favorable for the company and they can rely on the reserves cumulated during the years of management of the concession. The strength of those companies, able to cross-subsidize their concessions within the asset portfolio, has been of no use in this case, since the pandemic has affected all countries, although in different times and levels. The situation of single-concession companies is different: no country worldwide has granted funds to compensate the drop of toll revenues of private concessions and in some cases the critical situation phase generated a condition of default of the company.

As stated by Standard & Poors²⁵ the situation is different from case to case, “depending on how well a given project can handle significantly reduced traffic. Mitigants include robust debt service coverage, hybrid revenue streams (availability payments with some traffic risk), capital structure, and significant liquidity reserves”. In any case, major rating companies worldwide foresee a period of 12-18 months, after a complete relaxation of pandemic restrictions and the return to normality, to absorb the effect of the pandemic. There are some emerging lessons for the toll road sector in the future:

- Building more flexibility into contract arrangements;
- Re-considering the risk/revenue sharing within the concession schemes;
- Meeting higher servicing ratios, since eco-financial shocks are not a remote eventuality anymore; and
- Rapidly updating traffic demand modelling, to including possible pandemic and other dramatic events, which may have a major and rapid impact on traffic volumes.

²⁵ <https://www.spglobal.com/ratings/en/research/articles/200619-infrastructure-global-toll-roads-steep-climb-out-of-covid-11531767>.

Figure 5.26: Impact of COVID-19 on Toll Road Traffic



SOURCE: Figure from Bill M.Halkias (IRF Geneva Programme Centre) presentation at PIARC webinar 08 April 2020

It is still early to set conclusions and make final recommendations. The public sector side of PPP is also facing a new picture for project assessment and for the standards of services which form the basis of concession agreements. This may focus on asset management, for example, and the question of whether to maximize the existing network and build resilience, as opposed to building new infrastructure, with a strong injection of innovation and commitment to the environment. It may also be necessary to consider revised welfare parameters such as travel time, equitable toll levels, or access to mobility by disadvantaged users and segments.

Road Construction

The experience of road works in the face of the pandemic has varied widely from country to country. These responses range from immediate action to suspend road construction activities to ensuring business as usual.

The most common response has been partial or total suspension of standard work contracts followed by safe reactivation or looking to advance works where possible. Most contractors did not suspend work voluntarily; key factors were employee concerns, supply chain failure, national directives, or orders from road authorities.

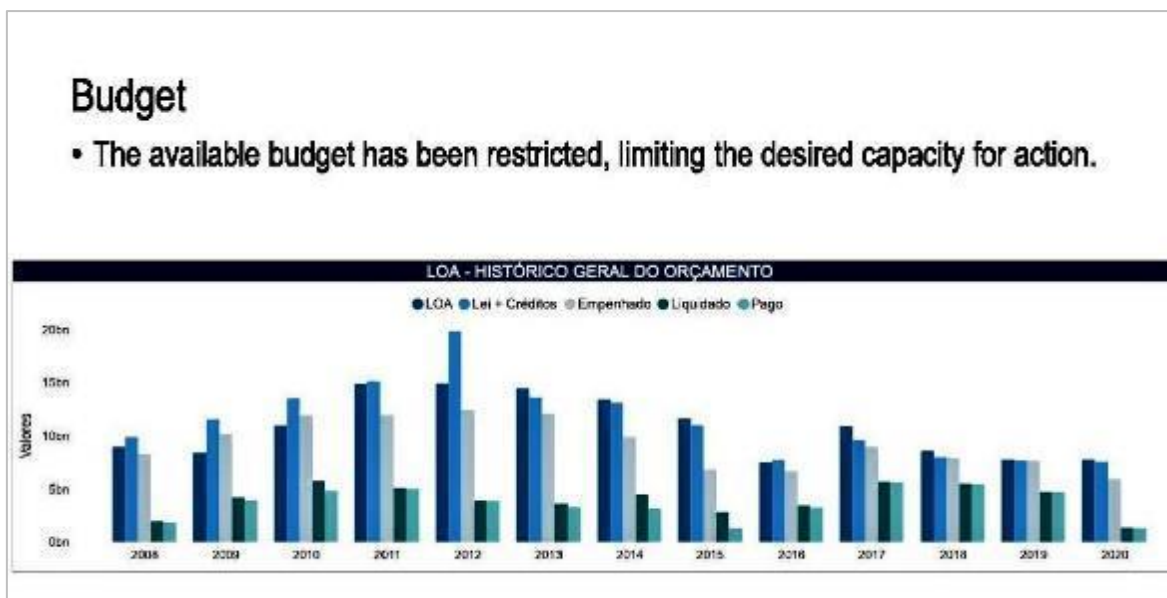
In some countries, the Government adopted measures to ensure the continuity of public works through very strict and systematic control of compliance with health measures. Preventive precautions were reinforced where and when works are not suspended, and there have been major efforts to ensure that contractors receive the latest preventative guidelines on an ongoing basis.

Even where continuing, many constructions project have suffered some slowdown due to delays in receiving materials or components, lower productivity of the supply chain and the impact of mobility restrictions on the workforce and experts. It has been generally observed that the investment in roads and transport is a good lever for economic recovery.

Other associated impacts have been identified in some countries such as the United Arab Emirates, where it was noted that most of the working population are expatriates, and labour mobility in the wider region is reliant on aviation which has been at a standstill.

In low income countries such as Uganda, there is a need to determine future financing priorities in construction. For example, there is a need to consider whether resources need to be redirected to fighting the pandemic. There are potential impacts associated with funding from development partners and diversion of resources which affects purchasing of new construction materials and resources.

Figure 5.27: DNIT Brazil Annual Budget



SOURCE: Figure from Luiz Guilherme Rodrigues de Mello (Brasli, DNIT) presentation at PIARC COVID-19 Webinar 9 July 2020

Road Maintenance

Road maintenance can be carried out in-house or by contracts or concessions, and the main goal of this activity is to keep the road network open and transport in service. Additionally, ensuring the movement of freight and essential workers in all pandemic stages, whilst protecting staff through reinforced safety measures, are both of critical importance.

It is important to prioritize between essential and non-essential activities, and this can allow for new opportunities for maintenance and other works on the network in a period of low demand. The large decrease in traffic has resulted in less stress on the roads, which has provided temporary relief for their maintenance. Some of the other main responses are as follows:

- Identification of priority services for ongoing maintenance: surveillance, communications, primary attention to traffic accidents and incidents of any kind, tunnel control, winter service, and routine maintenance.
- In certain cases, acceleration of some maintenance works, taking advantage of low traffic volumes, with operations adjusted according to the traffic decrease.
- Minimum levels of maintenance with reinforced precautionary measures through biomedical protocols, reduced manpower, split teams, disinfection of shared vehicles or elements, nebulisations, avoiding crowding and personal contacts at work including attention to incidents and including third parties.

Impacts on the Supply Chain

The supply chain of road agencies and operators, as well of those of most industries, have been negatively affected by COVID-19 on an unprecedented scale both globally and domestically. Road agencies have endeavored to keep relations with their suppliers. However, looking ahead, business failures and bankruptcies are expected, which could create disruptions in the supply chain. For

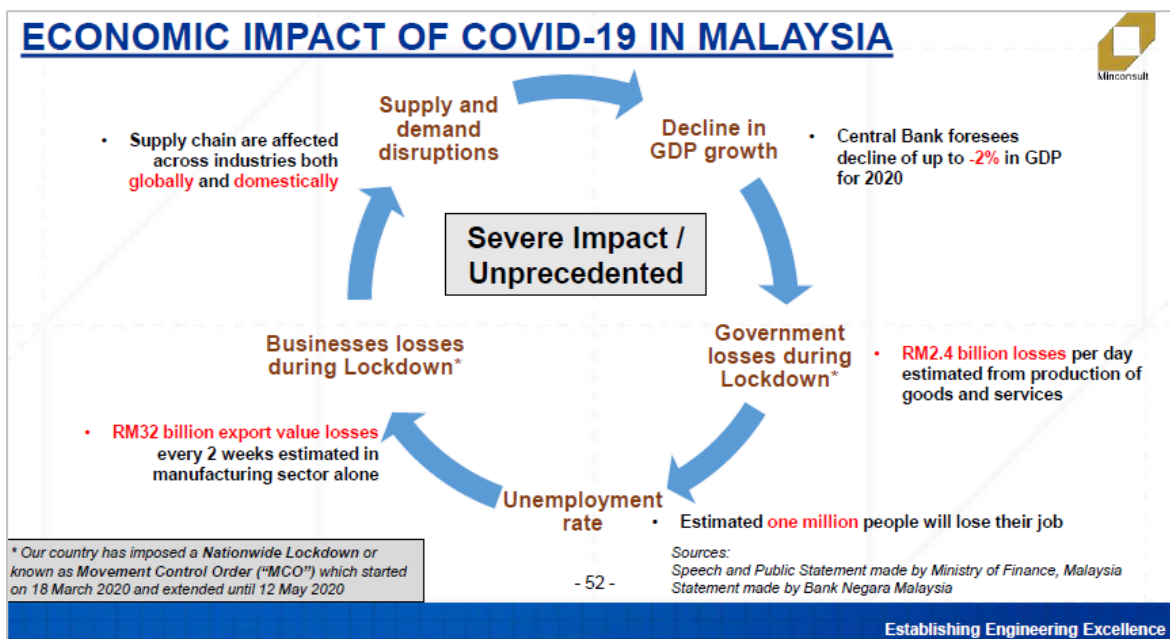
example, in some jurisdictions, there has been reduced demand for asphalt, concrete and other road materials due to the cancelation or slowdown of construction and maintenance work which means some suppliers shutting plants.

In addition to commercial viability, the other primary concern for contractors is to ensure employees' health and safety. In many countries, recommendations and training advice on COVID-19 were drawn up jointly by the Government and industry associations.

Contractors have experienced lower productivity due to initial staff fear and supply difficulties regarding masks, sanitizers and other PPE. Restrictive measures of social distance, disinfection, and hygiene, as well as difficulties and restrictions in daily transportation to worksites also had an impact on productivity. Labour shortage problems have been exacerbated by curfews, quarantines, and in some jurisdictions self-isolating foreign workers, as well as problems for food (canteens) and accommodation. Specialist tasks have been deferred and there have been limitations of participants in any meeting on worksites. Despite all of the above issues, after the initial concerns were addressed, there has been little increase in illness and absenteeism. Contractors have also faced delays to materials and components delivery, not only for products or raw materials from abroad, but also for domestic products.

The consulting sector, covering planning, design and engineering, has switched massively to teleworking. An initial lack of preparedness for remote work has been largely overcome with corporate networks and data platforms which were upgraded. Information and Communications Technology (ICT) has been substantially strengthened for working from home, video conferencing and access to technical applications.

Figure 5.28: Supply Chain Impacts of the Pandemic



SOURCE: Figure from Dennis Ganendra (Malaysia) at PIARC webinar 13 May 2020

5.7. RELATIONSHIPS WITH CUSTOMERS AND STAKEHOLDERS

Through the PIARC webinars, it was observed that the response to the pandemic has helped to facilitate closer communication channels between road and transport stakeholders, among other achievements. For example, in Mexico, Roberto Aguerrebere, General Director of the Mexican Institute of Transport stated: "There has been much closer communication with the members of the Mexican Association of Mobility Authorities. AMAM is a professional organization consisting not

only states and main municipalities but also business organizations of industrialists and of cargo and passenger transportation, at the federal level.” (webinar on 7th April 2020).

Contractual Measures

Road agencies and operators have to maintain their relationships with supply chain partners, contractors, small to medium size enterprises. They have also to maintain their own business (business continuity planning and execution). Every level has had to deal with exercising contractual provisions (e.g. Force Majeure), implementing concession contracts, dealing with added costs and delay.

In response to the pandemic and also as a result of the contacts maintained by road agencies with supply chain partners, numerous measures have been taken:

- In many cases, instructions have been provided to project managers, contract engineers and contractor personnel recommending remote exchange via mobile and electronic correspondence, teleconferencing, accepting e-mail letters as submitted in person, accepting field reports through electronic confirmation. Most work documentation and information can be processed in electronic form.
- A key concept is that a pandemic is a public health problem, not specifically one of health and safety in the workplace. This approach has consequences when dealing with the issue on site and establishing protocols and procedures so, in many countries companies do not have to modify their Health and Safety Plans but rather to incorporate the instructions of the Health Authority into their Protocols. In any case, measures taken to prevent the spread of infection on road works include in many cases medical control on entry and exit.
- In many cases, due to the difficulties experienced by the contractors, term extensions have been approved.
- Aspects that are much discussed in many countries are the compensation to be given to contractors if they are forced to stop work by order of the road or national authority, and the application of the law and the conditions of the contract if the contractor is forced by circumstances to stop or slow down work.
- In the case of work contracts which execution is impossible due to COVID-19, the contractor may request suspension and extension of deadlines. A controversial issue is whether the contractor authority must pay damages and if so, which ones (salary expenses, maintenance of guarantee and insurance, rental or maintenance of machinery or installations assigned to the contract and which cannot be used for other purpose) and how to accredit them, i.e. how the contractor must demonstrate (prove) that such costs have been incurred.
- A social precaution is whether the contractor, in order to receive compensation, must be up to date with payments to subcontractors and suppliers.
- There is a need for flexibility in the interpretation and application of contract clauses and a broad view of the concept of force majeure, as well as postponement of deadlines.
- A general, but not unanimous, approach is COVID-19 as a cause of “force majeure.” However, the language of contract may leave room to different interpretation to the parties.
- Usually costs of delay are borne by each party and application of sanctions for delay are excluded. Contractors are called upon to ensure contingency plans are up to date to enable continuity as far as possible.

- This flexibility, in general, does not apply so much for road maintenance contracts and service or supply contracts necessary to guarantee the mobility and security of infrastructure, communications or safety.

It is also acknowledged that contractual conditions have been eased during the pandemic. For example, this may include requiring a performance bond or guarantee of 3% of contract value rather than the usual 10%. “Force Majeure” has been invoked in some contracts, but this is potentially a complex area and legal definitions, and the rights and obligations of contractor and client, are not the same everywhere. This has the potential to result in lengthy and costly litigation if it is not well handled.

Substantial effort and financial assistance have been provided to support the construction sector, preserve jobs and prepare for restarting during the recovery (e.g. deferral of taxes, furlough schemes).

Managing Public and Shared Transport

As highlighted in section 5.5 and chapter 6 of the Report, the need to manage the pandemic effectively has led to adjustments for passengers in respect of public and shared transport as follows:

- Recommendations for passengers to follow official advice depending of the level of COVID-19 restrictions on mobility and the ability or advisability to travel, including possible discouragement of using public transport;
- Recommendations to avoid peak hours or travel in general for high risk groups such as the elderly or those with underlying health conditions;
- Procedures for detection, handling and notification of passengers suspected of having COVID-19, and tracking and tracing of their contacts;
- Changes to public health processes and responses, such as enhancement cleaning and use of PPE; and
- Promotion of modal shift to walking or cycling for local trip making, with the use of private vehicles being encouraged in some cases.

During the most acute phase of pandemic, a big challenge for public transport has been to strike the right balance between the need to provide mobility for key workers and essential travel and to discourage unnecessary trips. In some countries, there has been temporary suspension of medium and long-distance transport to avoid exodus of passengers to other regions or cities, as well as in some cases, also a temporary lockdown of urban public transport.

As identified above, the pandemic has generated fear amongst citizens and residents of using public transport. This has led, in some instances, to a relative increase in other modes, including active travel, micromobility and private vehicles, although this is counterbalanced by the general decrease in mobility in absolute terms.

In some cases, due to reducing passenger capacity, concessionary companies of public transport services have sought to minimize the financial impact reducing the fleet of vehicles in operation, thus increasing the occupation rate.

Data Management and Communications

There have been rapid advances in personal mobility management during the pandemic, initially to monitor and maintain stay-home restrictions, but increasingly to improve track and trace capability as activities restart, with mobile phones and other Bluetooth enabled devices using data analytics.

In this context, communication and the provision of timely and accurate information to users is critical, as well as taking coherent and effective actions across a complex collective of public

authorities and private organisations. If anything has become clear during the pandemic, it is the need for speed and accuracy in obtaining, processing and communicating data and information. A range of advice is being disseminated by public agencies using all media. However, as well as the technology and media, road and transport agencies have had to keep in mind the importance of the message and the messenger.

In addition, the pandemic has seen the development and dissemination of various mobile applications related to public transport, to communicate arrival and departure times, connections with other modes, manage the demand for taxis, ride-hailing, car sharing and the like.

Reinforced awareness campaigns have been launched about behaviour and measures to be taken on public transport. In addition, traffic information has been disseminated by the authorities through radio and television, websites, social networks, mobile applications, and VMS. One of the most common cases is that of national campaigns on VMS, SMS and social media to “Stay at Home”. In this context, Traffic Control Centres and ITS Management Centres can collect and disseminate a wide range of data and information, not only on traffic volumes, but also environmental data, road accidents, weight and dimensions, cargo categories and other considerations.

In the case of ongoing road works, already discussed above, it is also important to understand public perceptions, which are varied. For example, regarding highway works there is some acknowledgement of the wisdom of maintenance and improvements on a quiet road network, but some people misunderstand and consider this an abuse or privilege - Why am I locked in my house and they can go outside?

Collaboration across Organisations

During the different phases of the pandemic, road organisations have maintained coordination and collaboration with a wide range of agencies, administrations and stakeholders, including:

- Road agencies have been able to maintain the necessary inter-ministerial and inter-jurisdictional coordination and sharing of information, in communications to population, sector, and operators.
- International agreements have provided for faster border controls, freight, passengers, foreign workers, essential workers and other categories.

Figure 5.29: Cooperation to Improve Border Operations



SOURCE: Figure from Szymon Piechowiak (Poland) presentation at PIARC webinar 29 April 2020

- Numerous regulatory modifications and adaptations on traffic and transport issues have been adopted, usually through coordination of several organisations.
- There has been collaboration with sector associations, contractors, operators for aspects such as the creation of crisis committees and the preparation of action protocols, as well as guidance for public transport, continuity of road transport and the like.
- Cooperation with security and law enforcement agencies for compliance and support in the establishment of check control points, border controls: deployment of equipment, appropriate signposting, marking, barricades, cones, vehicles with flashing lights and signal arrows, etc. There has been an impact of Police checks on road transport and safety. Checks usually are carried out by law enforcement officials and the road agency's role is to provide logistical support.
- Monitoring mobility with technology applications, linked to technology companies, mobile firms, app developers and other innovators.
- Collaboration with health authorities and government entities to achieve compliance with health measures in the construction sector, with dissemination campaigns to workers and in some cases, permanent medical personnel on worksites.
- In some countries passenger information is collected through online systems, scanning QR codes, non-contact (infrared) temperature test and other data forwarded to health authorities, plus observation stations along routes.
- In some countries, cooperation with emergency services, civil defence, municipalities and others in disinfection and street cleaning tasks.
- Collaboration with municipalities on priority for pedestrians and cyclists, as well as facilitation of permits for restaurants and other establishments to occupy roadspace.

Coordination between the different jurisdictional levels has not always been perfect, especially in the first days or weeks of the pandemic owing to various circumstances. Challenges have included lack of experience in managing major crises, differences in assessing the magnitude of the problem or the measures to be adopted, political clashes, overflowing with immediate tasks to be dealt with. Where there has been an initial phase of confusion, the reaction has generally been fairly rapid and issues have been rectified.

Thus, one of the good examples of coordination is that described by Anne-Marie Leclerc (First Delegate of Canada-Québec and Honorary President of PIARC) at the webinar on 7 July in the relations with Contractors and Communications. Her statement was

“The development of tools for communication with stakeholders is an essential element in structuring activities and adapting the transport sectors' response.”

5.8. EARLY EVIDENCE ON RE-OPENING AND EASING OF LOCKDOWN

“When fate hands you a lemon, make lemonade” (Dale Carnegie, quoted by Jonathan Spear in PIARC COVID-19 webinar 1st April 2020).

The PIARC webinars focused on the short-term impacts and responses during the early phase of the pandemic. Other impacts will be evident in the later stages of the pandemic, as infections surge in many parts of the World. It is also clear that some of the impacts of COVID-19 will be permanent and transformational, and a “new normal” may emerge in due course. The PIARC COVID-19 Response Team will focus on identifying and tracking some of the emerging areas, which include:

- Changes in attitudes, behavior and the overall demand for travel, including differences across transport modes and especially if partially substituted by digital connectivity;

- A greater emphasis on transport network and supply chain management, especially from a resilience and risk management perspective;
- Consideration of sustainable transport and infrastructure in a strategy to retain, or regain, some of the environmental and social benefits seen during lockdown; and
- Increasing inter-agency and inter-jurisdictional cooperation, sharing experiences for rapid, agile and integrated responses to new circumstances.

Some future challenges we can potentially predict with some certainty at this point:

- Transport demand levels have not fully recovered. Investment in remote working and ICT will reduce need to travel in short- to medium-term. This means current and longer-term reductions in revenue and financial performance for operators.
- Due to reduced economic activity and lower volume of traffic, environmental benefits were observed during early lockdown, e.g. air quality. The question is how to maintain them or, where they have been eroded, how to get them back.
- Working from Home has gone better than expected for many. This will inform future organisational practices, as well as policies to office real estate and city centre planning.
- Short-term economic performance will be painful for many countries and sectors of the economy. Jobs will be lost, in roads and transport as in other sectors, and not all companies will survive. Restructuring of the transport sector will favour more resilient enterprises.
- Where public agencies have already cut their budgets, they will likely pass this onto suppliers in terms of project cancellations or delays, and required contractual savings. Where key capital projects continue, the discipline of stronger prioritization of resources and budget control should be maintained.

Looking specifically at road construction, the sector is facing a complicated environment:

- In case of future possible partial or total suspension of road works, setting priority criteria to determine decision making and resource allocation.
- Adjusting construction and maintenance contracts according to issues around cost of protective measures, variation in materials prices, timetable and distribution of resources.
- Construction may be hindered by short-term shortages of materials, equipment, and logistics.
- New risks to private sector financing for PPP projects could delay completion of planned projects, but offer new business models, and modified assessment criteria. The question of reviewing the economic balance sheet of many existing or planned concession contracts should be under consideration.
- Parties shall cooperate in a long-term perspective to settle their claims regarding “force majeure” and future new contracts should contain assumptions regarding consequences of COVID-19 or similar future events.

As well as challenges, the crisis presents some positive opportunities:

- Continuity of maintenance work guarantees safety and operability of infrastructure, and supports employment as an essential element for the recovery of the economy.
- The problems observed during the pandemic in transport of passengers and in freight, have highlighted the importance of looking at the whole logistics chain.
- Progression of new transport technologies, such as vehicle automation, micromobility and new forms of transit, have undoubtedly been slowed down in the short-term as investment

in research and development has been cut in favour of basic cashflow and corporate survival. However, post-pandemic, already established technology trends are likely to accelerate, driven by stronger, consolidated players.

- The continued preference for road transport compared to other modes, as well as the threat to traditional sources of revenue based on car use and fuel taxation, could be an opportunity to revisit road tolling and direct user charging as a way to regulate network use and traffic flows, especially when associated with changed working hours.
- Rapid development and dissemination of mobile applications related to mobility, and of platforms aimed at improving their efficiency, will likely be maintained to support planning and management in the long-term.

Finally, there is a key point to keep in mind for the recovery: construction, including of roads, is a key economic driver and a potential stimulus. In many countries, the sector will therefore be included amongst national priorities to reactivate the economy provided this can be squared with parallel agendas around sustainability, social equity and resilience.

6. SECTOR-SPECIFIC AND THEMATIC ISSUES

6.1. INTRODUCTION

Chapter 5 covered a wide range of perspectives on the COVID-19 pandemic as presented and discussed at the PIARC webinars with a multi-focus orientation. In Chapter 6, we summarise material presented at the webinars, or raised by the COVID-19 Response Team, which are themed around a single subject or area of interest and which cover countries of similar characteristics or stages of development.

Within this context, the following specific issues are discussed:

- Freight;
- Urban mobility and roadspace management;
- ITS, technology and road network management;
- Road safety;
- Resilience and climate change;
- Workforce issues;
- Security;
- Women in transport; and
- Impacts on Low and Middle Income Countries.

A number of the webinars featuring these topics were organised and supported by the relevant PIARC Technical Committee or Task Force, or external organisations as identified in Chapter 3. We are grateful for all the assistance provided to the Response Team and note that issues arising from the subject matter will also be taken forward by the relevant TC or TF grouping and work programme over the rest of the Strategic Planning Cycle.

As with the analysis presented in Chapter 5, it is noted that the issues raised here relate principally to the early phase of the pandemic between March and late July 2020, although insights based on ongoing work by PIARC Technical Committees and Task Forces is also referred to where considered relevant and informative. Evidence from the pandemic later in 2020 and into 2021 will be collated and reported in future reporting by the COVID-19 Response Team.

Inevitably, a number of issues have come to light in respect of COVID-19, such as social equity or urban planning and design, which were not a significant focus of the first PIARC webinars. Where this is the case, they have been noted by the Response Team and, where appropriate to PIARC's mandate, will feature in future webinars and activities with subsequent reporting in due course.

6.2. FREIGHT AND LOGISTICS

Introduction

This section looks at the impacts and challenges caused by COVID-19 regarding logistics and freight transport, reinforcing building on evidence already presented in Chapter 5. It also presents the main strategies and measures taken by the road agencies and operators to address these challenges and draws conclusions on how to deal with COVID-19 from a logistics and freight perspective.

As with other parts of this Report, this section has been written based on contributions to the PIARC webinars and publications on COVID-19 and freight transport between March 2019 and July 2020. In particular, material presented here draws on the PIARC webinar dedicated to freight issues held on 6th May 2020 featuring presentations from Poland, Australia, USA and South Africa.

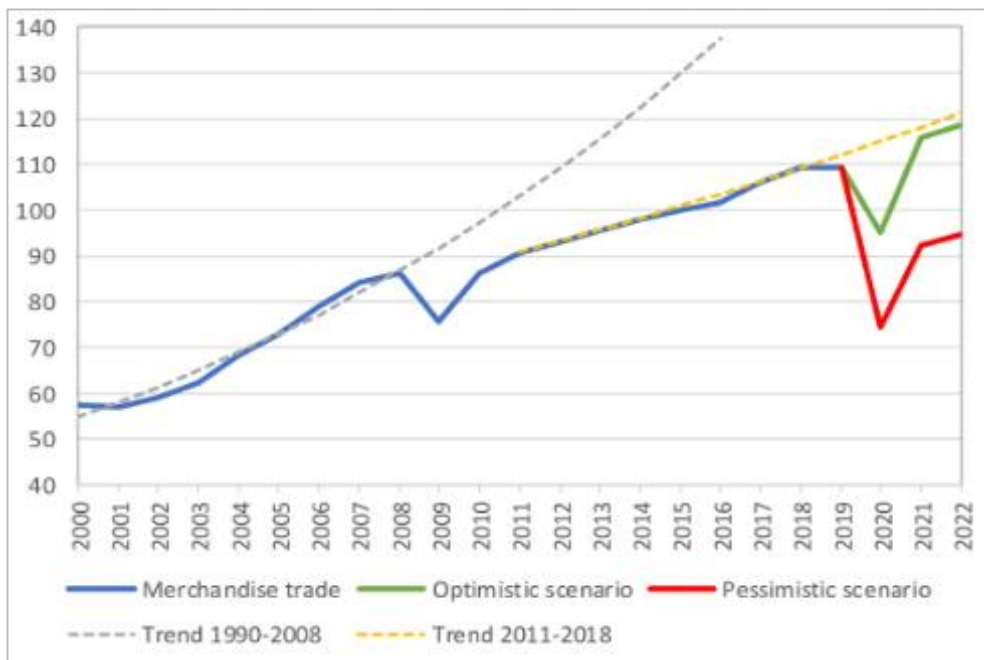
Developments and Challenges for Freight Posed by COVID-19

Impact on World Trade and Supply Chains

World trade is expected to be heavily affected by COVID-19, falling by between 13 and 32% in 2020 as the pandemic disrupts normal economic activity (WTO, April 2020). Trade has been hit by direct supply disruptions, but also by demand disruptions caused by economic recession, wait and see purchase delays by consumers and investment delays by firms. The impact is expected to be much stronger compared to the financial crisis in 2009 and the recovery expected to take longer.

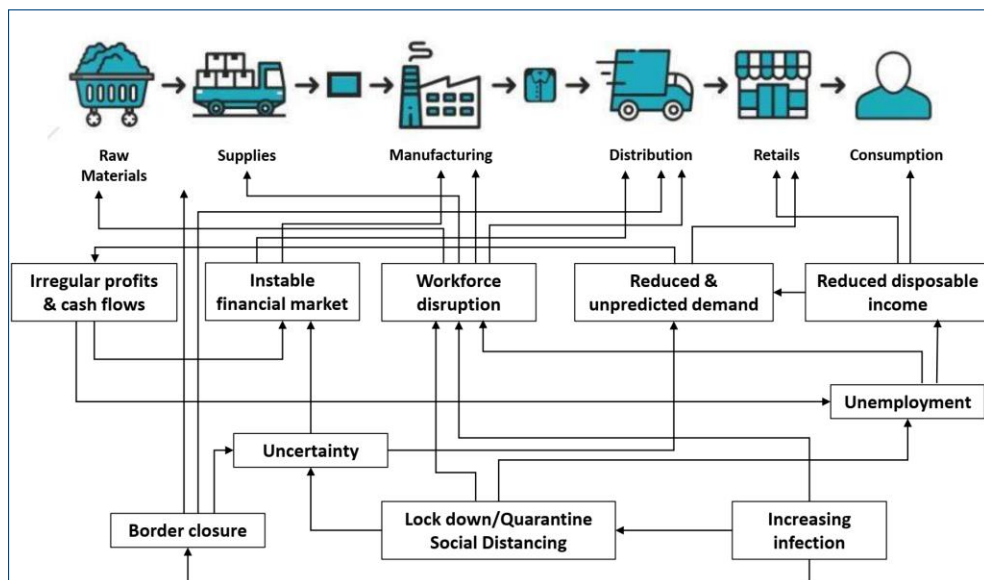
Freight is quite heavily affected by reduction in trade, but also by restrictions to prevent COVID-19 transmission. The distortions to supply chains can vary significantly as shown below.

Figure 6.1: Trends and Projections of World Trade



SOURCE: WTO, April 2020, Martin Ruesch (Switzerland) presentation at PIARC webinar on 29 July 2020

Figure 6.2: COVID-19 Disruptions of Supply Chains



SOURCE: IEC April 2020, Martin Ruesch (Switzerland) presentation at PIARC webinar on 29 July 2020

COVID-19 has impacted production due to lock downs, quarantine and social distancing, the latter leading to reduced capacities in logistics centers. Due to travel restrictions and the reduction in trade, transport capacity has decreased, on roads, but also in air freight or shipping. At the beginning of the pandemic, freight rates rose because of capacity constraints, especially for essential goods. However, increased competition for lower volumes transport, meant revenues decreased. This was paralleled by supply problems in many countries caused by stockpiling of basic foodstuffs (e.g. rice, pasta) and sanitary articles (e.g. toilet paper) by consumers.

A huge change in freight demand has been observed. The demand for food, medical equipment and so on has increased whereas other commodities as raw materials for manufacturing, textiles, and energy has decreased. The delivery channels have also changed. E-Commerce and last mile deliveries have increased massively at the expense of deliveries to shops, especially for medical equipment, household goods, baby products or toy and games, health and wellness.

Before COVID-19, pandemics were ranked as a material risk to supply chains by only 11% industry forecasters, compared to natural disasters at 59% and extreme weather at 30%²⁶. This is expected to change in the future.

Impacts on Long Distance Freight Transport

As has been noted in Chapter 5, the road transport sector has been heavily affected by COVID-19. The situations differs very much with the extent of the restrictions in any given country and the impacts on the economic activity. For long distance freight transport following observations have been reported during the webinars from nearly all continents:

- Reduced fleet in operation (international, long distance transport) (e.g. 25% in South Africa in the first phase);
- Loss of industry capacity due to closure of many freight companies (e.g. South Africa);
- Increased operating costs due to the needed compliance with COVID-19 regulations, inefficiencies and delays at border controls and ports;
- Drivers facing increased risk of unemployment (e.g. South Africa);
- Freight companies storing non-essential goods in their warehouses, which is costly; and
- Incorrect application of the lock down regulations by law enforcement agencies, including unlawful arrests & impounding of trucks, for example for importation of goods via Germany designated for Switzerland.

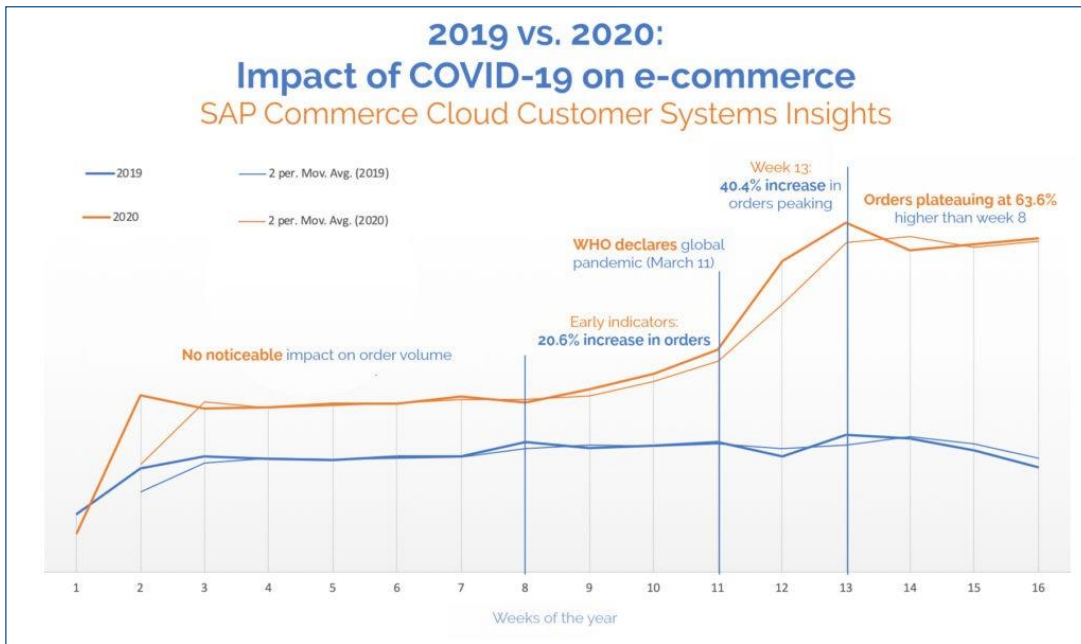
Right after the implementation of travel restrictions, some cases of bureaucracy have been reported by the International Road Transport Union (IRU). Later on in the pandemic, this problem decreased because of increasing flexibility for the authorization and control processes. Nevertheless many truck companies have been and are struggling to survive.

Impacts on Urban Freight Transport

The situation is different for urban freight. Due to COVID-19 restrictions, e-commerce has increased substantially. This is especially the case for medical products, household goods, baby products, toys, health and wellness, food & beverage and electronics which have been ordered in much greater volumes via online channels.

²⁶ Source: WEF 2011

Figure 6.3: Impact of COVID-19 on E-Commerce



SOURCE: SAP Software, Martin Ruesch (Switzerland) presentation at PIARC webinar on 29 July 2020

Increasing quantities of these goods are directly transported to customers (B2C) rather than to retail outlets (B2B). Courier services also experienced problems to fulfill quality requirements (lead times, delivery times) due to the limited capacity of sorting centers, limited numbers of vehicles and drivers. Due to the COVID-rules (e.g. social distancing) it has not always been possible to use the full capacity of distribution centres. During lockdown, shop owners also started to set up their own home delivery services.

Consequently, the number of distribution trips by delivery vans has increased substantially with urban freight and logistics proving much more resilient than long distance freight transport.

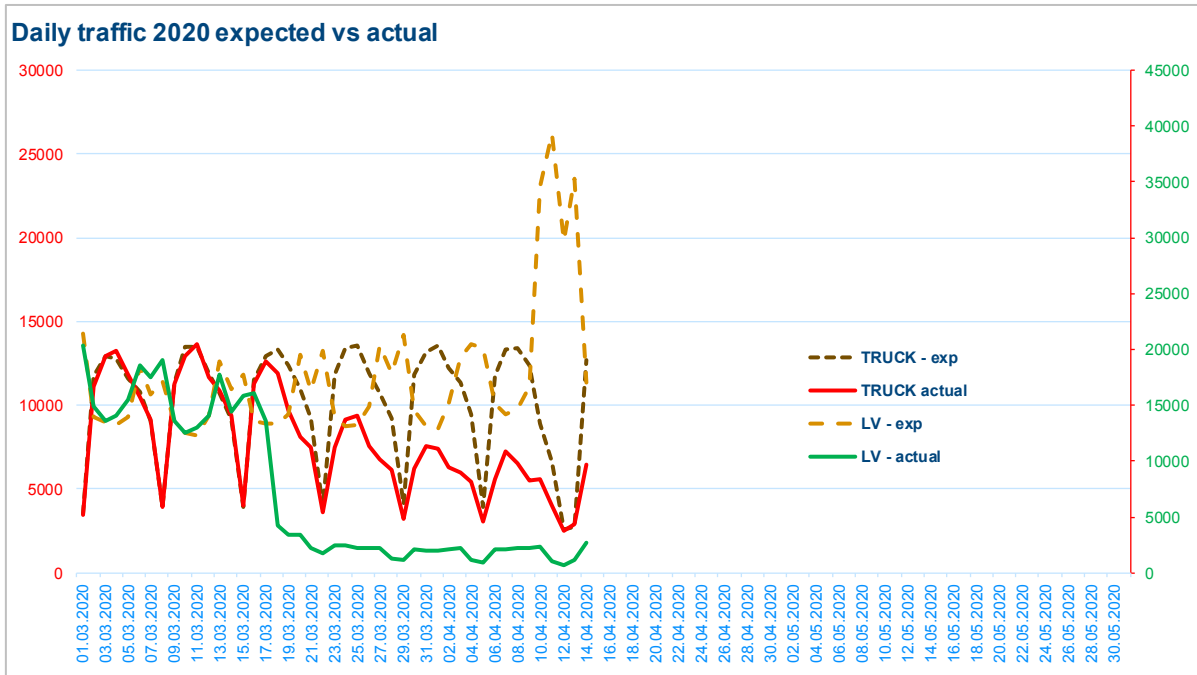
Impacts on Truck Volumes and Empty Trips on Roads

The decrease in truck traffic has been lower than light vehicles and traffic in general and has also varied according to extent of the COVID-19 restrictions. There was a higher reduction in demand at the beginning of the pandemic, with some recovery due to the implementation of rules to keep road freight moving. International traffic has been much more affected than domestic freight transport due to border closures and restrictions.

Countries with a harder lockdown faced a reduction of 50% - 60% of truck traffic (e.g. France, Spain, Italy, South Africa), at least at the beginning of the pandemic. Countries with fewer restrictions had a lower decrease of 10 – 30% as seen in Switzerland, Poland, Australia or the United States. As 2020 has progressed, truck traffic has recovered in many countries to levels roughly pre-pandemic levels (e.g. in Switzerland or Germany).

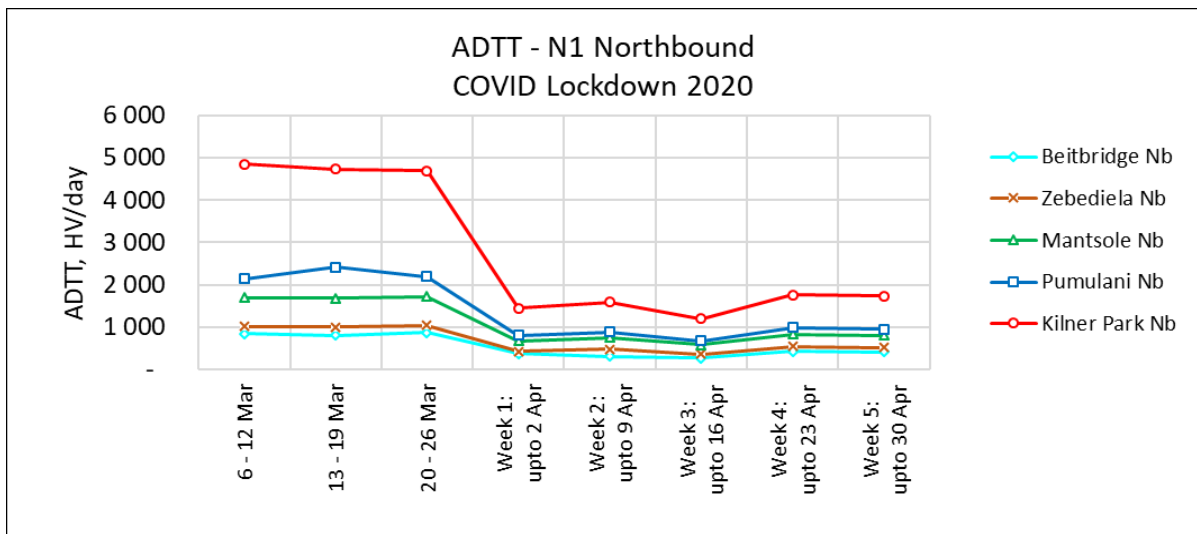
The figure below shows the expected and actual truck volumes on the A 63 Motorway in France. Volumes decreased by 50% against 90% for light vehicles. Equivalent falls were also seen on motorways in South Africa.

Figure 6.4: Truck Volumes on A63 Motorway, France



SOURCE: Figure from Olivier Quoy (France) presentation at PIARC webinar 22 April 2020

Figure 6.5: Truck Volumes on Motorways in South Africa

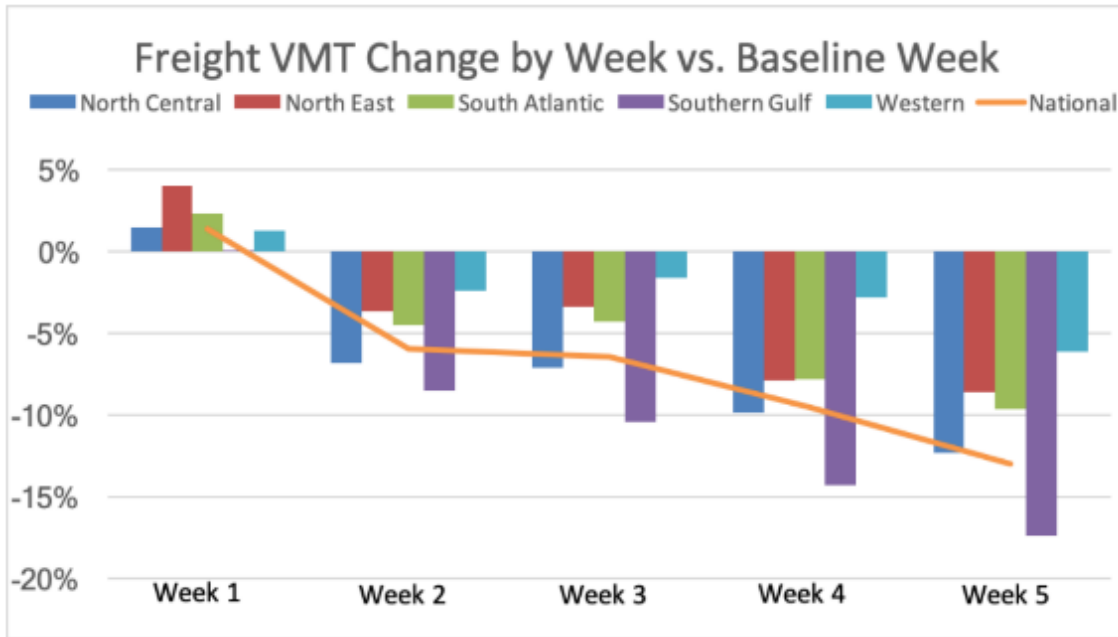


SOURCE: Figure from Layton Leseane (South Africa) at PIARC webinar on 06 May 2020

Truck Vehicle Miles Travelled (VMT) also decreased substantially after lock down as shown in the figure for Texas, USA, below. Such reductions lead to a substantial loss in toll revenues and fuel taxes which affects the financial stability of road operators (e.g. South Africa, France, Italy) as reported in Chapter 5. Freight activities of railways have usually been less affected, for instance in Switzerland or Germany.

The IRU have reported difficulties for hauliers to find freight for return trips, which has resulted in an increase of empty trips by 40% , reducing truck transport efficiency (Source: IRU, Jens Hügel). However, there were also individual cases reported where truck traffic increased as for instance in Ivory Coast. This was due to closure of maritime transport.

Figure 6.6: Vehicle Miles Travelled on Motorways in Texas



SOURCE: Figure from Caroline A. Mays (USA) based on INRIX data at PIARC webinar 06 May 2020

Impacts on Driver Working Conditions

Working conditions for truck drivers have become more complex and difficult, especially immediately after the imposition of COVID-19 restrictions. They had to face obstructions, traffic jams and delays at border crossings, especially at beginning of lock downs and often exacerbated by controls on passenger vehicles.

As shown below, congestion hotspots in Europe are evident especially at the Czech and the Swiss borders in mid-April 2020. The delays could go up to 2 or 3 hours²⁷ with some individual countries reporting delays in terms of days. Truck drivers faced also lengthy delays at ports of entry or requirements to quarantine in case of suspected or confirmed COVID-19 infection.

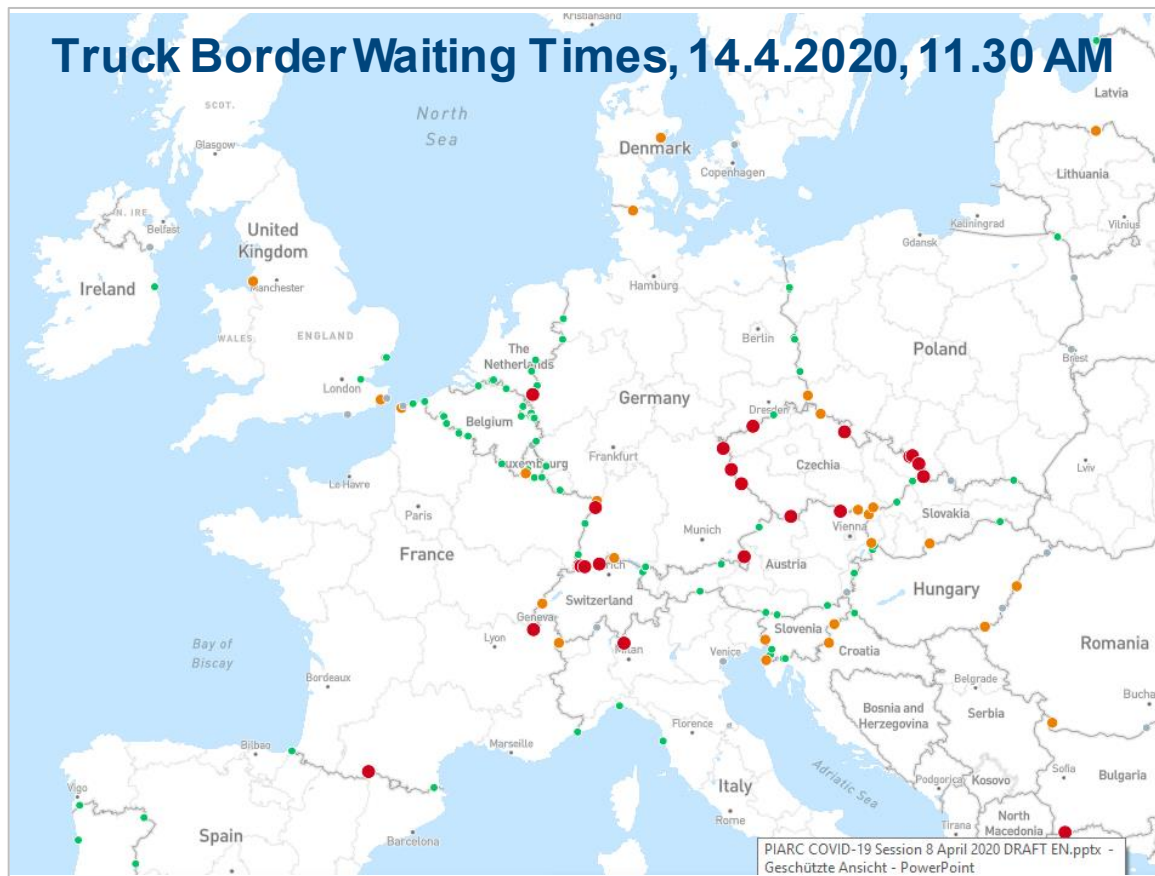
Some countries enacted bans for transit truck traffic (usually for non-essential goods) or closed some border crossings entirely, which resulted in detours for trucks and longer lead times. A variety of rules and practices were introduced, partly due to a lack of international coordination, leading to problems regarding route and time planning. IRU provided the valid rules for each country (www.iru.com) soon after the implementation of restrictions.

Access to services for truck drivers along motorways has been a challenge, especially for long distance transport, with closure of rest stops and restaurants, toilets and showers. At the beginning of the pandemic, there was insufficient information on the traffic situation and COVID-relevant information (at border crossings, and truck parking).

Truck drivers have not been disproportionately affected by COVID-19 in most countries. In Queensland (Australia), this was a concern, but there is no evidence that truck routes increase the transmission of infection, but basic hygiene and protection measures have been implemented.

²⁷ Red: delays >1 h, orange: delays <1h, green: no significant delays.

Figure 6.7: Truck Waiting Times at Borders in Europe, April 2020



SOURCE: Figure from Martin Ruesch (Switzerland) presentation at PIARC webinar 29 July 2020

Figure 6.8: Truck Queue at German – Polish Border



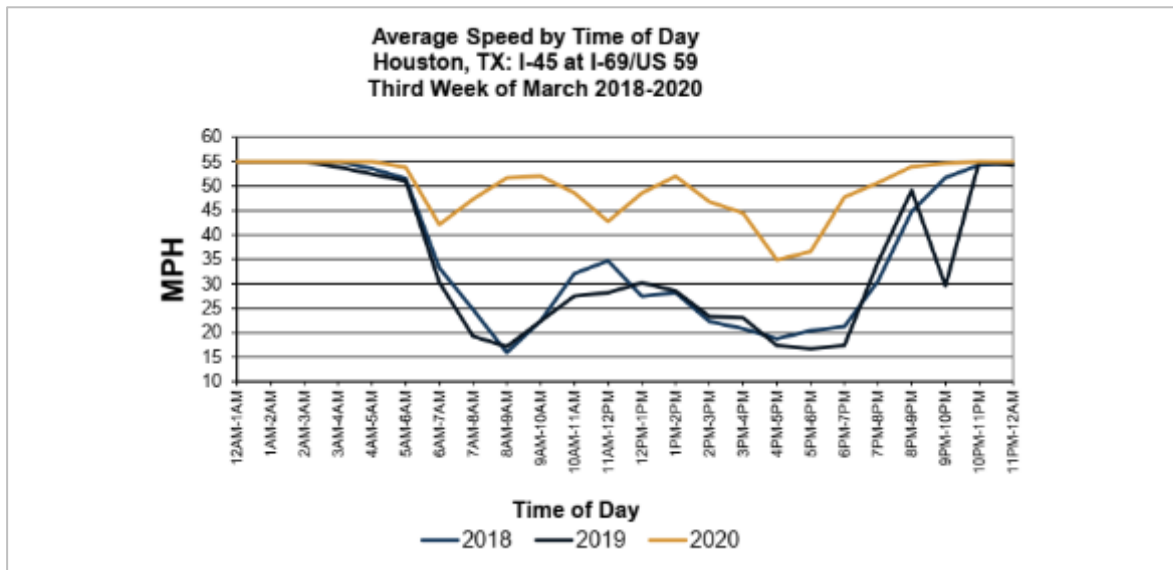
SOURCE: <https://www.dw.com>, March 2020

Positive Impacts

Despite many negative impacts, there have been some positive effects on the freight sector, depending on the perspective of being a truck driver, road operator, rail operator, environmental agency or policy maker. Examples include:

- Due to less passenger cars, there was more capacity for trucks available on motorways and a substantial increase in average truck speed and improvement in journey time. Congestions delays decreased substantially, at least at the beginning of lock downs.

Figure 6.9: Travel Speed by Time of Day



SOURCE: Figure from Caroline A. Mays (USA) base don INRIX data at PIARC webinar 06 May 2020

- Capacity for rail freight also increased due to fewer passenger trains, at least in countries with mixed rail networks (e.g. in Europe).
- There have been positive environmental impacts by the reduction in the general demand for movement. Some modal shift has been observed in short term, but it is very doubtful if this will last long-term. There is no evidence of modal shift per se, but different sectors will be affected by different extents e.g. electronics and automotive are down more than agriculture, but the evidence across modes is limited so far.
- Most countries have observed an increased level of road safety, not only by the reduction of traffic, but also lower accident rates.
- There has been more cooperation and (usually) less bureaucracy for administrative or customs processes.
- COVID-19 showed very clearly also the importance of logistics and freight transport which has led to appreciation of the sector, its companies and services.

Summary of Challenges

The main challenges brought by COVID-19 from a logistics and freight perspective have been to maintain the efficiency and quality of transport services and to provide safe working conditions for road and border crossing management staff, truck and van drivers. Further challenges include the economic viability of road transport companies and reduced toll revenues and financing. The latter has already been covered in Chapter 5 of this Report.

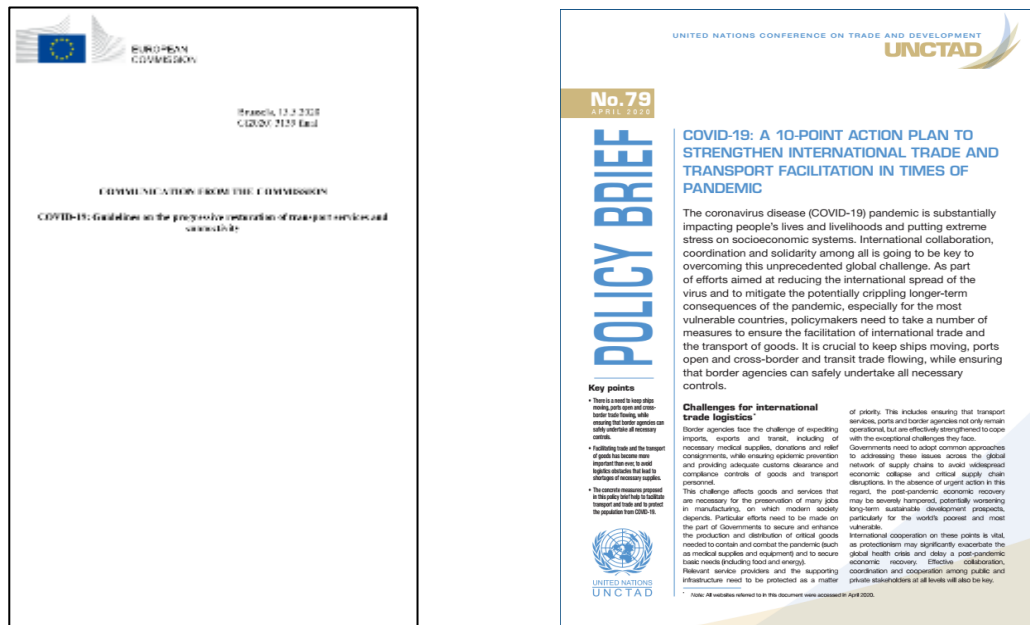
Strategies and Measures

General Strategy of “Keeping Freight Moving”

The policies of national governments and international institutions in response to COVID-19 were and are very similar in different countries. The main objective was and is to ensure the supply of goods and keep logistics and transport services in operation, whilst at the same time protect transport workers and passengers. The transport of goods essential. Therefore important national links and international freight corridors have to be maintained. Freight transport has to be kept moving for delivering food, health equipment and other vital supplies.

National governments and international institutions developed guidelines with basic principles to facilitate freight movement, especially international freight transport. “The free movement of goods is necessary for the continued availability of goods.”(EU COVID Guidelines). The guidelines included border management measures and green lanes for freight transport. “We must take extraordinary measures to protect our citizens”, also drivers and staff at logistics centers etc. (EU COVID Guidelines).

Figure 6.10: Guidelines for Keeping Freight Moving



Source: European Commission, UNCTAD

In addition, closer cooperation between governments, road operators, customs control and police was established (e.g. Poland). Administrative processes have been simplified and often bureaucracy reduced.

Easing Truck Regulations

Most countries eased regulations as a mechanism to keep truck transport moving. For example:

- Suspension or easing of driving bans on weekends (e.g. Austria, Switzerland, Poland, France);
- Suspension of night driving bans (e.g. in Switzerland);
- Easement of maximum weight limits either overall or for emergency supplies (e.g. South Africa, United States);
- Easing of driving and rest time regulations, (e.g. Norway, Sweden, Denmark, Poland);
- Exemptions regarding internal border restrictions (e.g. Australia);

- Exemptions from internal/sanitary control (e.g. Poland);
- Waiver for permits for the passage of non-standard (oversized) vehicles transporting medical equipment (e.g. in Poland);
- Extension of driver licences (e.g. Argentina), qualification cards (Spain) and visas; and
- For goods transport, two persons are still allowed in the cabin, when necessary (e.g. Spain).

With these measures, the flexibility, efficiency and reliability of road freight transport has been improved, including a harmonization of border rules and control processes. After the initial phase of the pandemic, some measures were removed, for instance in Switzerland and the United States, although it may now be questioned whether they should be fully or partially introduced as COVID-19 cases rise towards the end of 2020.

Traffic Management, Traffic Information and Tolling

Traffic management and information solutions and measures have been implemented to reduce the obstacles caused by COVID-19 restrictions.

Border crossing management with priority for trucks and vans was introduced in several countries. For instance trucks should not need more than 15 minutes, better 0 minutes within the European Union (EU COVID-19 Guidelines). In several countries priority lanes for trucks have been implemented (e.g. Portugal, Poland, Argentina), hard shoulders kept clear for freight vehicles.

At toll checkpoints, lanes have been reserved to freight, health and security personnel to prioritise them over less essential transport (e.g. Argentina). Free-flow tolling has shown its importance (e.g. A63 in France, Australia). As well as less delay, free flow tolling reduces the risk of infections due to the avoidance of cash and less contact between truck driver and road operating staff.

Figure 6.11: Free Flow Tolling on A63 in France



SOURCE: Figure from Olivier Quoy (France) presentation at PIARC webinar 22 April 2020

Actual information is crucial for the route and time planning for the drivers. In this context, real time information services on facilities and COVID-rules along motorways/freight corridors have been introduced for drivers. Some countries set up web portals for the information exchange (e.g. France, Australia). IRU provides also actual information on the restrictions which have to be faced in the different countries (www.iru.org/covid19).

The IRU has encouraged the use of the TIR system (IRU), particularly eTIR, to ensure seamless and paperless border crossing by electronic processing of documents. TIR enables goods to be shipped from a country of origin, through transit countries, to a country of destination in sealed load compartments that are controlled by customs via a multilateral, mutually recognised system. This kind of border crossing facilitation avoids the need to check every driver and load compartment, again reducing the risk of disease transmission (www.iru.org).

Supply and Services along Motorways and at Logistics Facilities

Beside other institutions, road agencies and road operators took important measures to provide and guarantee sufficient supply and services along the motorways and highways. Health and safety regulations for trucks and truck drivers have been implemented in many countries. Service areas, fuel stations that have toilet facilities must allow truck drivers to use them. Those with kitchen or restaurant must provide them with catering. Public owned service areas and those on toll roads should be kept open and clean. Their shops selling food, cleaning products or automotive products should remain open. This is also the case for publicly accessible multimodal transshipment facilities or private logistics centers.

Existing services have been adapted and new services implemented. Relevant examples are

- Increasing cleaning services to keep the use of facilities secure for truck drivers; more frequent patrols and e.g. last cleaning time displays;
- Supply with health material and equipment (e.g. masks, gloves, disinfectants);
- Separation of areas for trucks and light vehicles at rest and service areas, dedicated facilities for truck drivers; and
- Provision of alternative services: food truck initiatives, special offers (cleaning kits, free coffee/drinks, etc.), clothes cleaning.

For services along motorways, information and communication between road operators and truck/van drivers is a key issue (e.g. in Mexico). Guidelines and programs have been established to maintain the supply chain, tackle the health emergency and maintain employment.

Conclusions from the Freight and Logistics Perspective

From the logistics and road freight perspective, the following conclusions are evident on the COVID-19 pandemic to date:

- It is important to establish guidelines/agreements on national and international levels to keep freight moving by keeping key road networks and facilities open and operational.
- Strong stakeholder engagement between government and the freight and logistics sector is needed to handle pandemic and equivalent situations. Governments, road operators, shippers, logistics and service providers should be better prepared for similar crises
- Amendments to laws, regulations and enforcement procedures should be implemented to have more flexibility during pandemics or other disruptions, including harmonisation of arrangements along international freight corridors.
- Digital solutions such as electronic document processing, online information tools, free flow electronic tolling and truck management should be further promoted to minimise physical contact and support efficiency of movement and handling.
- We should try to keep positive interventions regarding processes and cooperation.
- There is a case for making investment in key freight corridors to support economic recovery.
- We should also investigate further long term effects of COVID-19 on logistics, the road freight sector and road freight traffic. Logistics strategies will change in the direction of diversification of the procurement and potentially sourcing closer to locations of demand as well as greater storage.
- Pandemics and equivalent events should also be better considered in resilience strategies for logistics / supply chains and transport systems.

At the time of writing, it is difficult to assess which permanent long-term consequences will result from COVID-19. More robust supply chains may be aimed at more variety of procurement options and sources, reducing dependency on one provider or country. There may be more near sourcing and more buffer capacity to reduce risks of supply chain disruption. Another long-term impact may be the dampening of globalization with a lower growth of international trade and intercontinental shipping. This will have implications for the volume and distribution of freight traffic by all modes.

COVID-19 has clearly caused an expansion of e-commerce and this is expected to continue. Urban freight transport by trucks, and especially vans, will likely increase. More trips and loading/unloading processes in private and public city space will result and this will have implications for urban traffic, access and kerbside management. Strategies and measures to efficiently use the road space in urban areas in light of such developments are urgently needed.

6.3. URBAN MOBILITY AND ROADSPACE MANAGEMENT

Overview

Urban transport has been very acutely affected since the onset of the COVID-19 and the associated lockdowns which substantially constrained economic and social activities in cities across the World. It is still early to determine the lasting legacy of the pandemic, especially with new waves of infection in many locations in late 2020, but it is clear that there is a great deal of public fear, anxiety and mistrust of urban transport systems. Few expect to see a swift return to pre-pandemic conditions. Mass transit, in particular, faces a crisis of confidence and commercial sustainability because few urban system can operate at full capacity while maintaining social distancing.

PIARC has identified a strong connection between the the impacts of COVID and urban transport, as outlined in various presentations dealing with these aspects, as well as a mono-thematic webinar held on 3rd June in which different aspects were reviewed.

During the most acute phase of the pandemic, in many cities it has been forbidden or heavily restricted to circulate on public roads, paths or streets, except for a few permitted activities. The latter have included acquisition of food, pharmaceuticals and basic necessities, or working in an essential service. City centres have been turned into ghost towns for weeks or even months on end.

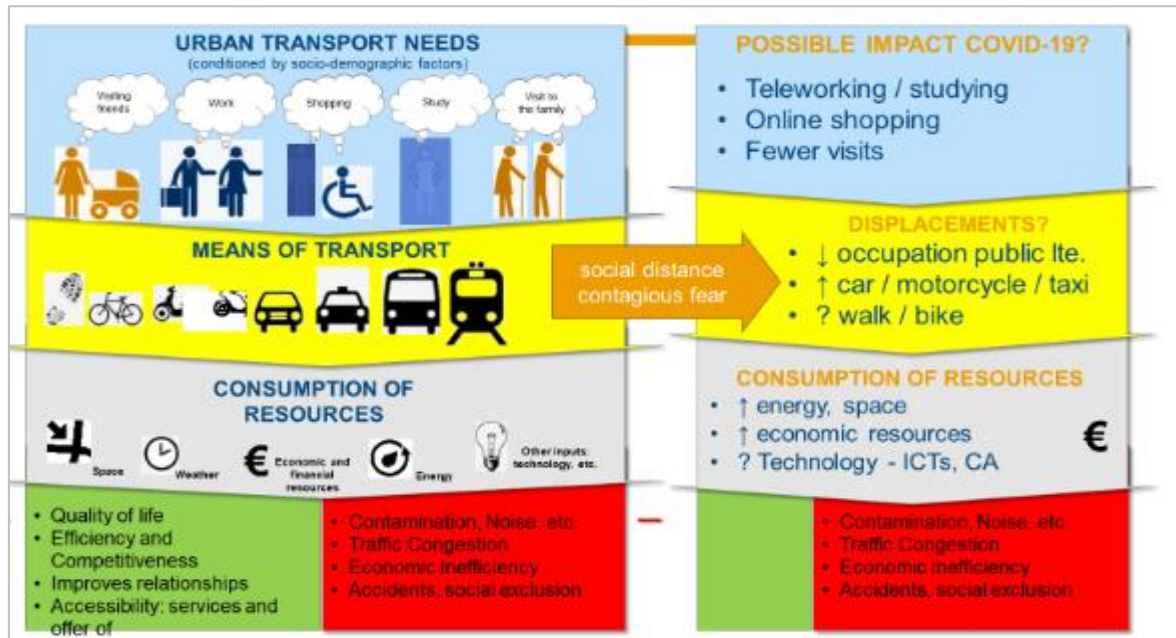
The demand for transport has fallen by up to 90% in many city centres, recovering over mid-2020 but still remaining well below pre-pandemic levels. There has also been a clear shift away from public transport towards both private car use and, in some places, greater take-up of active modes. The latter is an opportunity to plan city mobility on more sustainable lines whilst the former is a threat which threatens to follow the public health emergency brought on by COVID-19 with a traffic emergency which could bring gridlock, congestion, pollution and other serious consequences to city residents, workers and visitors without strong remedial policies. The combination of COVID-19, lockdown restrictions, move of work, shopping and other services online, crisis for public transport and shift from collective to individual modes of transport threatens, according to some presenting at the PIARC webinars, to make cities economically, socially and environmentally unsustainable.

Public transport modes such as bus, trams, metro and suburban trains have made successive adjustments of their offer, according to national policies to discourage unnecessary use and maintain social distance²⁸. There have been major reductions in the capacity of transit vehicles, plus deep cleaning and sanitisation. This has resulted in a loss in operating efficiency, increased costs and falls in farebox revenue, with growing operating deficits. Other forms of shared transport, such as taxis and ride-hailing, have been similarly affected, although in some cases regulations have been eased to allow them to switch to delivery of food, medicines and essential goods.

²⁸ A contrast is drawn between transit systems in Europe and North America & some cities in Asia, such as Singapore, Hong Kong, where carrying capacity of vehicles has been restored, but with passengers required to wear masks and desist from social interaction.

The life and the functioning of cities is complex as is a population's urban travel needs, the means of transport used, the consequent consumption of resources and impacts on the natural and built environment. It therefore follows that the impacts of COVID-19 on urban transport will also be complex and interrelated, as Andrés Monzón de Cáceres explained during the webinar on 12 May.

Figure 6.12: The Impact of COVID-19 on Urban Transport

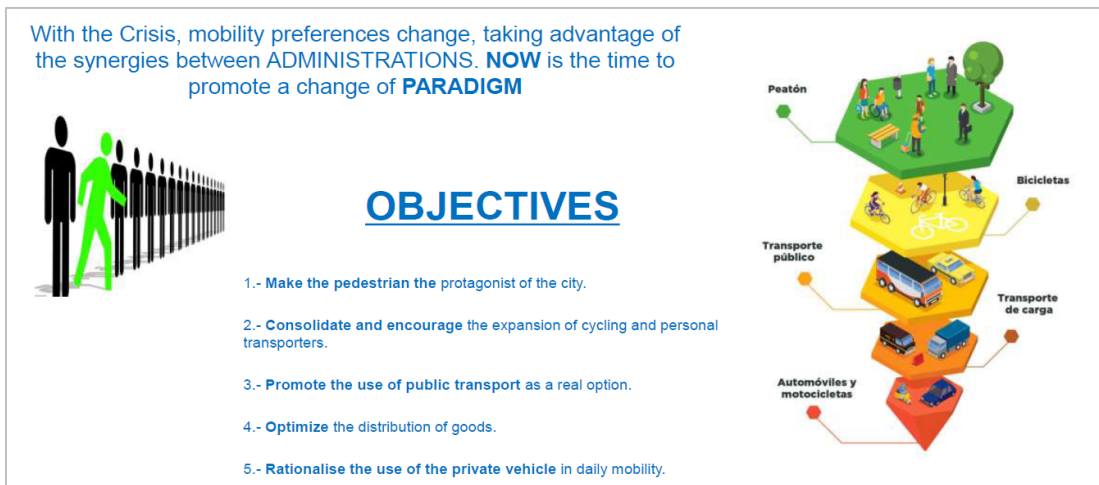


SOURCE: Figure from Andrés Monzón de Cáceres (Spain) presentation at PIARC webinar 12 May 2020

A New Paradigm for Cities

Looking forward, the urban crisis brought on by COVID-19 has no clear short-term policy for its resolution. The pandemic has led to the closure of offices, exodus of workers and visitors and deterrence from other economic and social activities which are the lifeblood of cities. Public transport is in operational and financial meltdown as passengers shift to more individual means of mobility and the shutdown of activity is driving a rethink of what the city is essentially for.

Is the city, for example, just an economic construct, for growth, agglomeration and attractor of inward investment? Or it is also an instrument to maximise quality of life for all and build local resilience and sustainability, keeping its citizens safe and healthy? Will there be a reduction in mobility due to less commercial activity, will there be a recovery of that mobility or will working from home and e-commerce have a lasting and remarkable effect? In the PIARC webinars, some presenters provided substantial evidence of the threat, whilst others saw opportunities to define a new post-pandemic urban paradigm as set out below.

Figure 6.13: New Opportunities for a New Urban Paradigm

SOURCE: Figure from David Pamitjavila (Andorra) presentation at PIARC webinar 23 April 2020

Implications for Urban Mobility, Roads and Transport Networks

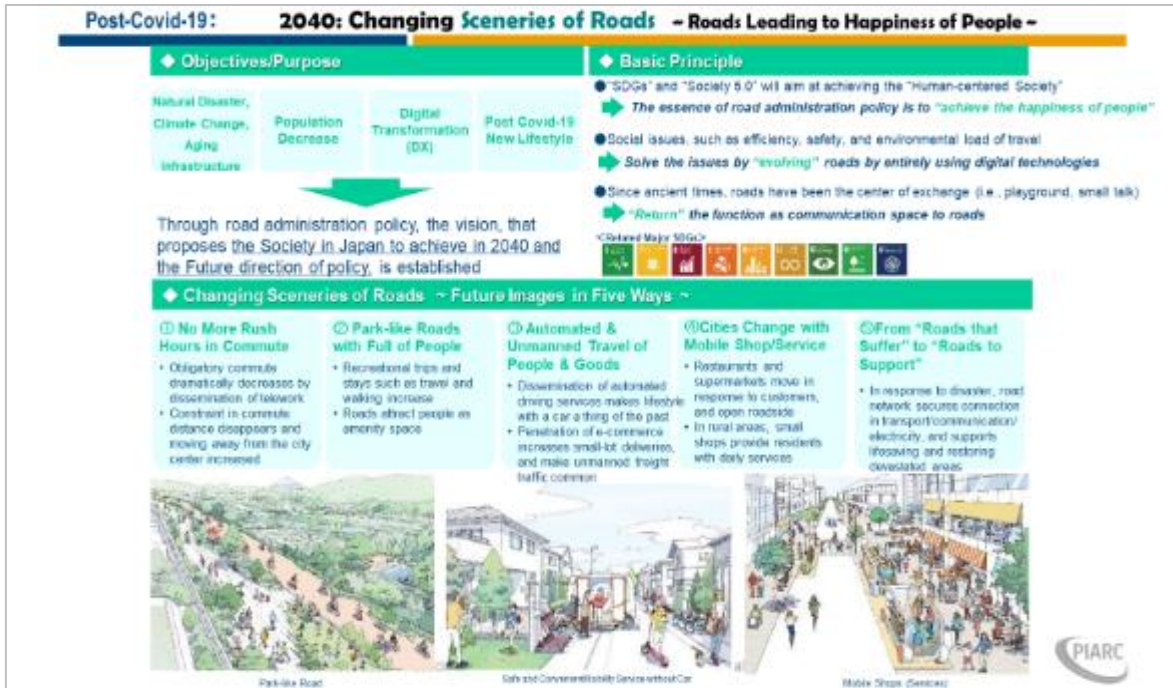
In particular, in an effort to increase use of active modes rather than private vehicles, cities in many countries have increased the public space for walking, cycling and, in some places, micromobility. In many cases, lanes or whole streets have been closed temporarily or permanently to motorised traffic and dedicated to walking, cycling and space for outside eating and recreation, taking advantage of the reality of less traffic and congestion.

Going further, some towns and cities with more ambitious political leadership, want to take the opportunity to launch urban renewal, develop people-focused policies, pursue sustainable urban mobility, respace streets and give the pedestrian a greater role whilst at the same time:

- Rationalising the use of private vehicles and reducing vehicles speed limits;
- Stimulating electric mobility through installations of electrical recharging points, subsidy schemes for purchasing eco-friendly vehicles and targeted measures to reduce emissions;
- Optimising the distribution of goods (logistics) for example through consolidation centres, access controls and shifting deliveries to electric or alternative fuels;
- Promoting intermodality, abandoning the dichotomy between public and private transport, developing exchanges and mobility hubs between all transport modes, pursuing park and ride and providing better access to car and bike sharing;
- Promoting the use of active modes of transport, consolidating and encouraging the expansion of cycling, e-scooters and other personal mobility devices, as well as putting into service more lanes for buses and public transport vehicles; and
- Promoting and looking to a time when confidence in public transport will be restored, with choice of mode taking into account not just time and cost, but health and sustainability.

Some at the PIARC webinars defined these changes not just as a transport project, but one which touches happiness, wellbeing and the long-term health of society, as shown below.

Figure 6.14: Roads and the Happiness of People



SOURCE: Figure from Jun Takuchi (Japan) presentation at PIARC webinar 15 July 2020

Urban transport planning after the pandemic offers the opportunity, therefore, to develop new approaches on multimodality, urban space allocation and a focus on revitalised public transport, cycling, walking, micromobility, sustainable urban logistics and public realm, linked to the reshaping of local infrastructure and services. This concerns wider agendas such as placemaking, the 15 minute city and healthy cities which will help civic leaders and citizens find their place, position and compete in the post-COVID world. Cities will need support from all levels of government, across a range of public agencies, from the private sector and civil society, collaborating in new ways, to make this happen.

6.4. ITS, TECHNOLOGY AND ROAD NETWORK OPERATIONS

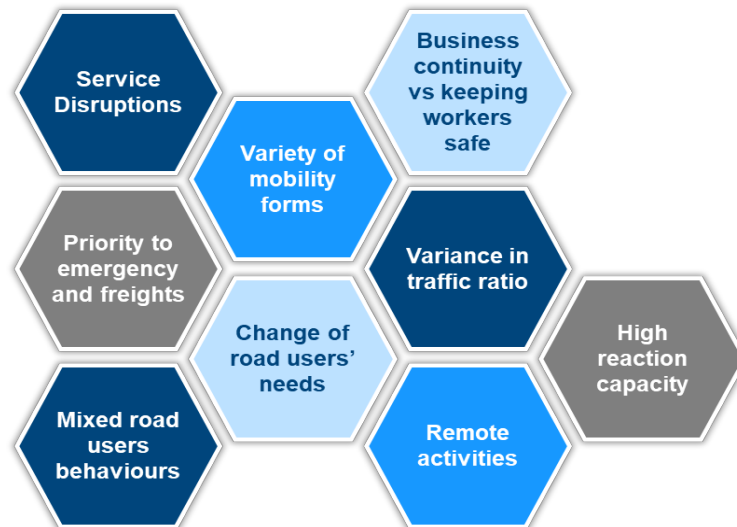
General Overview on Road Network Operations During the Pandemic

In past decades, Intelligent Transportation Systems (ITS) have garnered popularity, due to considerable advancements in information technology, the development of mobile and smart devices, and improvement in sensing technologies. ITS and new ways of managing road network operations have transformed the policies and practices of road agencies and operators.

The implementation of road-based ITS has resulted in the enhancement of road operations, better surveillance of the road network and drastically improved safety for road users, together with renewed capacity to better understand road users' expectations and needs. Crucially in the context of this Report, the deployment of ITS has provided more effective response to events management, and reaction to disaster and extraordinary conditions.

There was significant change in road network management even before COVID-19. The pandemic can be viewed as both a challenge and an opportunity. This is especially true as technology and data have generated the ability of network managers to view the mobility picture from one end to another, and to be able to identify the changing attitudes and behaviours in road users.

While the world deals with the combined crisis associated with the global pandemic and associated economic downturn, the imminent emergence of a new mobility ecosystem appears in doubt. However, whilst there are many uncertainties, there is an opportunity for road networks to develop new ways of undertaking core activities, and this involves the uptake of ITS technologies.

Figure 6.15: Dimensions of COVID-19 and Road Network Operations

SOURCE: Figure from Valentina Galasso (Italy) presentation at PIARC webinar 29 July 2020

For road network operators, there are many challenges during the pandemic, such as:

- **Increased complexity in mobility management:** The pandemic has rapidly changed transport users attitudes and behaviour, especially on public transport. There have also been a significant increase in the popularity of cycling and micromobility due to ease of use and compliance with social distancing guidelines. This results in complexity in mobility needs that needs to managed.
- **More heterogeneous environment to monitor and control 24/7:** As cities start transitioning out of lockdown, many are offering options on how and when to travel. This will assist citizens in recommencing their new normals as effectively as possible, and seeks to avoid a mass return to the use of private cars. There will be an increased need for road agencies to access and analyse detailed granular data in order to both ensure that the network is available and reliable, and adapt their services to the new normal.
- **Constant and real time evaluation of solutions:** This will involve different options and behaviours together with the trade-offs of securing the health of transportation workers such as those in front-office or in the field roles.
- **Increased pressure on stakeholders:** Since the beginning of the pandemic, the overall mobility of people and goods has been an important factor in managing transmission of infection. The need to influence mobility and also the monitoring and controlling capabilities of road network operators has had a key role. Many countries rely on mobility data in order to make decisions related to lockdowns, curfews and delivering of specific services. This has required road network operators to continually collect data and maintain performance at a desirable level.
- **Ensuring business continuity:** During this time of uncertainty, road transport wasn't "able to fail": Goods needed to be delivered to support the health and logistics response, emergency vehicles needed road availability. There was a need for road transport users to maintain business continuity.

The analysis undertaken by PIARC, considers both the direct experiences from around the world and early studies conducted relating to the influence of COVID on road transport. It appears, that in order to guarantee the availability of the road network, keep road and transport employees safe and keep performance high, there is a need for road network operators to adapt, often through the capacity to use technology and innovative ideas.

The use of data for road network management and supporting decision-making processes has been one of the main accomplishments achieved during the pandemic. Many road agencies have

identified an opportunity to undertake special testing of new technologies previously under consideration. This has involved special partnerships between public authorities and private entities and/or research institutions to implement innovation in traffic and mobility management. These trials, during lockdowns and peaks of pandemic, have become more useful and feasible, due to the reduction in traffic experienced on many road networks during lockdown.

Numerous presentations throughout the webinar cycle included aspects of ITS. In particular a webinar was organized which was dedicated exclusively to how new technologies can help address the various impacts of the COVID-19 crisis on mobility and roads.

Experimentation was also used for information exchange with road users. Many countries and road operators, used not only standard channels, such as radio and variable message signs, but also decided to adopt different information means, like use of social media. This was initiated in order to reach as many users as possible with information related not only to traffic conditions, but to also provide guidelines and recommendations from official sources, such as government and national health organizations. The trend of using social media and mobile applications in order to exchange information with road users, has been confirmed during the pandemic. It was also clear that users have demonstrated a willingness to share information related to their behaviours.

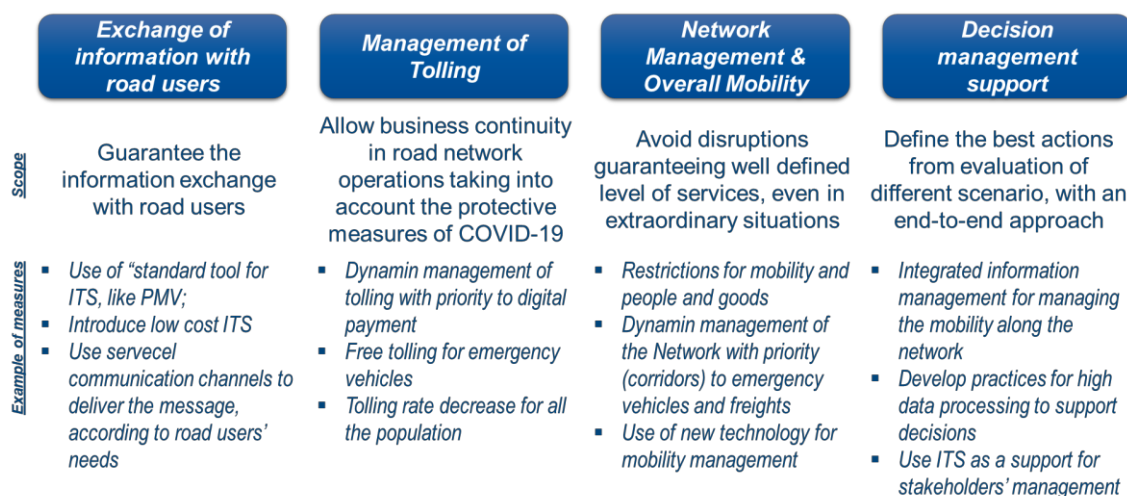
Experiences Reported During the PIARC webinars

Between March and July 2020, the PIARC COVID-19 webinars series identified several best practices related to ITS and Road Network Operations. These generally aimed to ensure business continuity and delivery of more customized and adapted services to road users. There are examples of how:

- ITS can enhance the mobility of people and goods, and the enable availability for critical infrastructure for emergency vehicles and increased efficiency in delivering goods;
- ITS can improve the communication exchange between internal and external stakeholders;
- ITS can support the decision-making process; and
- ITS can allow road operators to communicate more safely through technological devices, and to enable the continuity of transport services.

These experiences are organized around four pillars of analysis, often considered as being key domains within RNO, shown in the figure below.

Figure 6.16: Road Network Operations Applications During Pandemics








SOURCE: Figure from Valentina Galasso (Italy) presentation at PIARC webinar 29 July 2020

On exchanging information with road users it is possible to cite the following measures taken:

- Fast tracking of information in order to ensure that road users receive notifications when mobility is required;
- Enhance the exchange of communication using several tools or channels (PMV, SMS, etc.), and managing the most appropriate communication medium according to users’ expectations and need;
- Manage information flow acknowledging the integrated and interoperable platforms that can allow road operators to trace the information shared and provide historical analysis of data;
- Use non-conventional tools, such as social networks, as a valuable assets to reach road users and obtain key data and information; and
- Ensure that the delivery of information is immediate and simple.

The figure below provides information related to five countries which have provided these experiences, and the references to the PIARC webinars where they were discussed.

Figure 6.17: Best Practice in Exchanging Information

<u>Country</u>	<u>Experience</u>	<u>Webinar reference</u>
Argentina	Use of ITS to communicate with Road Users, thanks to PMV and remote controlled equipment 	PIARC&COVID-19 Webinar on April 7th – Daniel Russomanno
France	Customize communications to take care of special type of road users, like i.e. truck drivers or emergency work force 	PIARC&COVID-19 Webinar on April 22nd – Olivier Quoy
Italy	Multichannel communication strategy for road users in accordance with the RNO strategy 	PIARC&COVID-19 Webinar on May 12th – Emanuela Stocchi
Portugal	Communication exchange through different channels 	PIARC&COVID-19 Webinar on April 22nd – Ricardo Tiago
Spain	Use social network to share information with users and to get information from them as well 	PIARC&COVID-19 Webinar on April 23rd – Ana Luz Jimenez Ortega





SOURCE: Figures from Valentina Galasso (Italy) presentation at PIARC webinar 29 July 2020

On toll management it is possible to cite the following measures taken:

- Allow dynamic management of tolling sites to provide the possibility to maintain business continuity in a time of crisis;
- Consider electronic payments as a valid alternative to to improving the road network management;
- Be aware that road users’ expectations and needs change according to the role they have in mobility ecosystems and other conditions (e.g. COVID-19); and
- Enable new technologies and innovation to enhance the diffusion of ITS systems and provide advanced road network management.

The figure below provides information related to four countries that provided these experiences, and references to PIARC webinars.

Figure 6.18: Best Practice in Toll Management





<u>Country</u>	<u>Experience</u>	<u>Webinar reference</u>
Argentina	 <p>Allowing free transits for all with mobility priority given to essential and health services, including management of freight</p>	PIARC&COVID-19 Webinar on April 7th – Daniel Russomanno
France	<p>Dynamic management of tolling stations and enhancement of free flow and quasi free-flow and high rate of electronic tolling</p> 	PIARC&COVID-19 Webinar on April 22nd – Olivier Quoy
Greece	 <p>Rapid switch to contactless tolling station in order to protect road users and road workers</p>	PIARC&COVID-19 Webinar on April 8th – Bill Halkias
Italy	<p>Pay after you go in Italy: allowing road users to pass through and adjust the payment also later</p> 	PIARC&COVID-19 Webinar on May 12th – Emanuela Stocchi

In regards to network management and overall mobility, the following experiences were identified:

- Consider integration and management of the road network with an end-to-end approach,
- Do not underestimate the power of ITS, and low cost capabilities: Developing ITS solutions does not necessarily mean implementing complex and expensive projects. In times of crisis, options are available using smartphone devices and sensors for instance;
- Do not reinvent the wheel, and instead aim to maximize from others experiences;
- Identify the positive effects of a crisis: This can accelerate innovation and implement faster effective solutions in times of need.

The figure below provides information related to four countries that provided these experiences, as well as references from the webinars.

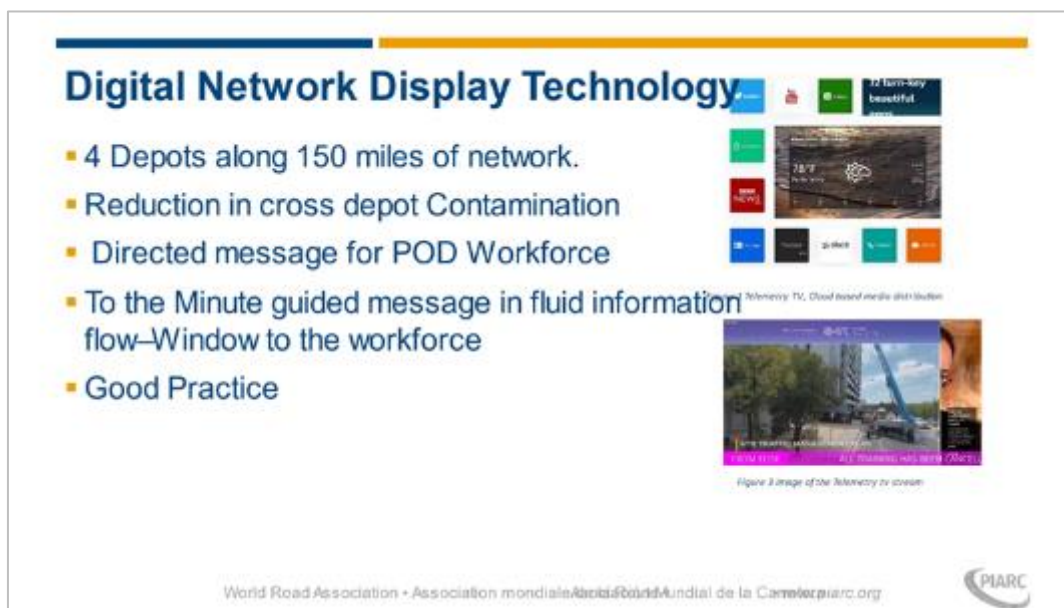
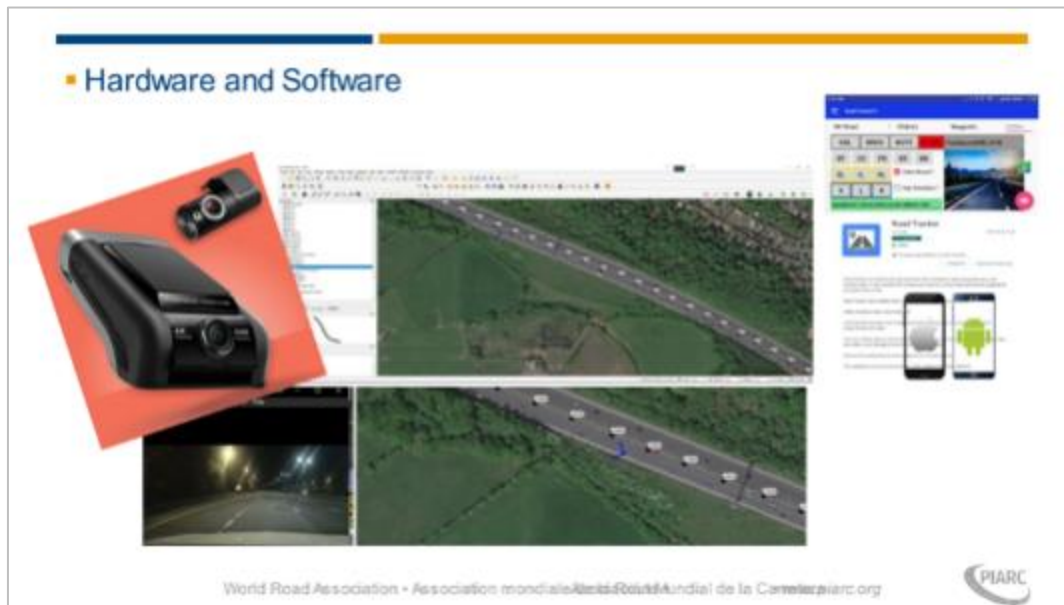
Figure 6.19: Best Practice in Network Management

<u>Country</u>	<u>Experience</u>	<u>Webinar reference</u>
China	<p>Use of low cost ITS solutions to regulate mobility on public transport</p> 	PIARC&COVID-19 Webinar on April 1st – Jian Wang
Paraguay	 <p>Road Network Operations management enhanced by ITS and remote controlling of the road network, also in partnership with the law enforcement</p>	PIARC&COVID-19 Webinar on April 7th – Andrea Peris Yegros
UK	<p>Introduction of Innovation and new technology to monitor and control the Road Network</p> 	PIARC&COVID-19 Webinar on June 17th – Graham Kingstom
Singapore	 <p>Centralization of ITS platform to increase RNO management</p>	PIARC&COVID-19 Webinar on June 17th – Chandrasekar

SOURCE: Figures from Valentina Galasso (Italy) presentation at PIARC webinar 29 July 2020

The figure below provides information related to a company that was able to develop ad hoc tools in-house very rapidly.

Figure 6.20: Rapid innovation with IT tools



SOURCE for both: Figures from EGIS presentation at PIARC webinar on 17 June 2020 on the use of new technology

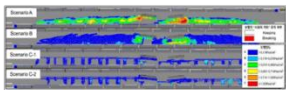

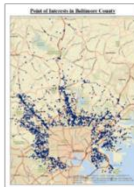
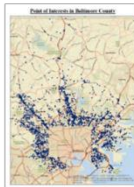
In regards to decision-management support, some challenging items were discussed:

- Consider data as a key asset for organization working in transportation;
- Develop independent ITS and RNO solutions with a long-term and end-to-end vision, and with a strong connection to data management and processing;
- Allow the use of new technologies for RNO and ITS: These can enhance mobility solutions and empower road workers to do their job better and more efficiently;
- Introduce planning and predicting features into organizations RNO systems to facilitate decisions;

- Allow better exchange with stakeholders based on data and scenarios 'planning; and
- Provide mobility data with the right value within the mobility ecosystem.

The figure below provides additional information.

Figure 6.21: Best Practice in Decision Management Support

<u>Country</u>	<u>Experience</u>	<u>Webinar reference</u>
Korea	Using Big Data and Advanced analytics to identify different scenarios for transport management 	PIARC&COVID-19 Webinar on June 17 th – Seonha Lee
Spain	Use of advanced and new technologies to support the decision making process for the road operators  	PIARC&COVID-19 Webinar on April 23 rd – Ana Luz Jimenez Ortega
USA	Device data processing to determine mobility trends and establish ITS based on data platform 	PIARC&COVID-19 Webinar on June 3 rd – Lei Zhang

SOURCE: Figures from Valentina Galasso (Italy) presentation at PIARC webinar 29 July 2020

6.5. ROAD SAFETY

The safety of road users continues to be a major focus of countries throughout the world. In 2018, the Global Status Report on Road Safety (WHO, 2018) found that deaths from road crashes had increased to 1.35 Million per year, meaning approximately 3700 person killed per day. Common reasons for these deaths include poor design and operational standards, speeding, driving under the influence, failure to wear safety belts, and helmets.

This compares to COVID-19, where the average for June 2020 there was 50,000 cases and 2,800 lives lost²⁹, road trauma results in 100,000 cases per day and 3,700 lives lost each year on an ongoing basis³⁰. The unfortunate and sad reality internationally is that the epidemic of traffic deaths and injuries will continue without significant changes from all with a the shared responsibility a safe road system.

Crashes occur when the human, the road, or the vehicle, singularly or together lead to errors at some point during the driving task. During a crash deaths and serious injury crashes occur when the forces on those involved in the crash exceed what the human body can tolerate.

Road safety professionals actively seek to reduce the frequency and severity of crashes by well thought out systems that inherently provide for the safety of the road users by simplify the driving task and providing for forgiving road safety systems that intend to lower the forces to the individuals involved.

When more vehicles are present in the road system there is a greater likelihood that a crash will occur. During congested conditions this is also usually the case, fortunately as speeds begin to slow serious injury potential usually reduces. The COVID-19 pandemic significantly changed mobility choices with stay at home orders for all: limiting trips to only essential travel to reduce the spread of the virus.

²⁹ Source: <https://covid19.who.int>.

³⁰ Source: <https://www.vaccinesforroads.org/global-impact-of-injuries/>

As has been documented extensively elsewhere in this Report, worldwide travel restrictions during the peak of the pandemic led to significant reductions in daily travel. A common percentage drop between 2019 and 2020 figures was 60%, with Great Britain at 85% and EU average of 36%³¹.

Because of the contagious nature of COVID-19, social distancing has been a common preventative response in virus spread. This has been impactful on modes with large numbers of users in confined spaces, such as buses, trams, metro, suburban trains and ferries. These modes have shown significant losses in ridership with many of these individuals shifting to more independent forms of transport such as walking, biking, and riding two wheeled motorised vehicles. These effects correlate to a substantial increase in vulnerable road user travel on the urban and suburban systems. This has increased the number of road users being susceptible to injuries on many road systems.

Put in context, the congestion reduction seen in many countries has led to increasing speeds and extreme speeding events. The consequence of this, is higher injury potential and increases in fatal and serious injury accidents. So while there was an overall reduction in the number of accidents, the number of accidents with higher severity has increased. For instance speeding fines in Delhi during the 3 month lockdown increased by 1,500,000+³² and Jaime Campos Canessa (Head of Road Safety Department, Chile) commented at the webinar on 10 June that there have been observations of excessive operating speed on roads, ignoring of traffic signs, poor emergency response to traffic accidents and weak inspection of the Caribiniers (national police force).

COVID-19 responses present dynamic events influencing safety where stay at home orders can have immediate impacts on the likelihood and the injury severity of crashes. A well designed and operated road system is the best means to prevent deaths and serious injuries. From the perspective of mitigation of COVID-19 safety impacts, these longer term strategies require higher cost infrastructure investment that are less likely to be applied immediately. While effective when put in place, these preventive responses require significant financing, planning, design, construction which often take several years to complete. More rapid and deployable schemes such as enforcement, education, and traffic/speed management are more effective response tactics to travel changes due to COVID-19 as they can be applied where issues are occurring in real time.

In either case, data and the ability to analyse data is of importance. Having the ability to understand the potential safety performance of the road network will take on different forms based on countries' ability to invest in, and provide for the ability to diagnose, analyse and evaluate roads to determine priorities within the country. These data driven approaches range from risk based evaluations that use road and traffic characteristics to multivariate statistical analyses. The intent is to develop a strong safety management framework that can identify needs and in selecting interventions to reduce death and serious injury potential.

The emergent needs from COVID-19 have highlighted the use of quicker response tactics. A number of countries have developed solutions to modify road design to allow for the increased bicycle and walking volumes while also providing social distancing. For example, the diagram below from Poland shows a vehicle lane being modified for walking and biking use.

Some transport agencies have reacted to speed increases through enhanced speed management. This has included the lowering of speed limits, enhanced enforcement targeting speeding events, education, use of variable speed limits and modification of signal control schemes.

During COVID-19, increases in long haul transport have been addressed by special use lanes, and importantly by providing rest areas and parking to reduce fatigue related crashes.

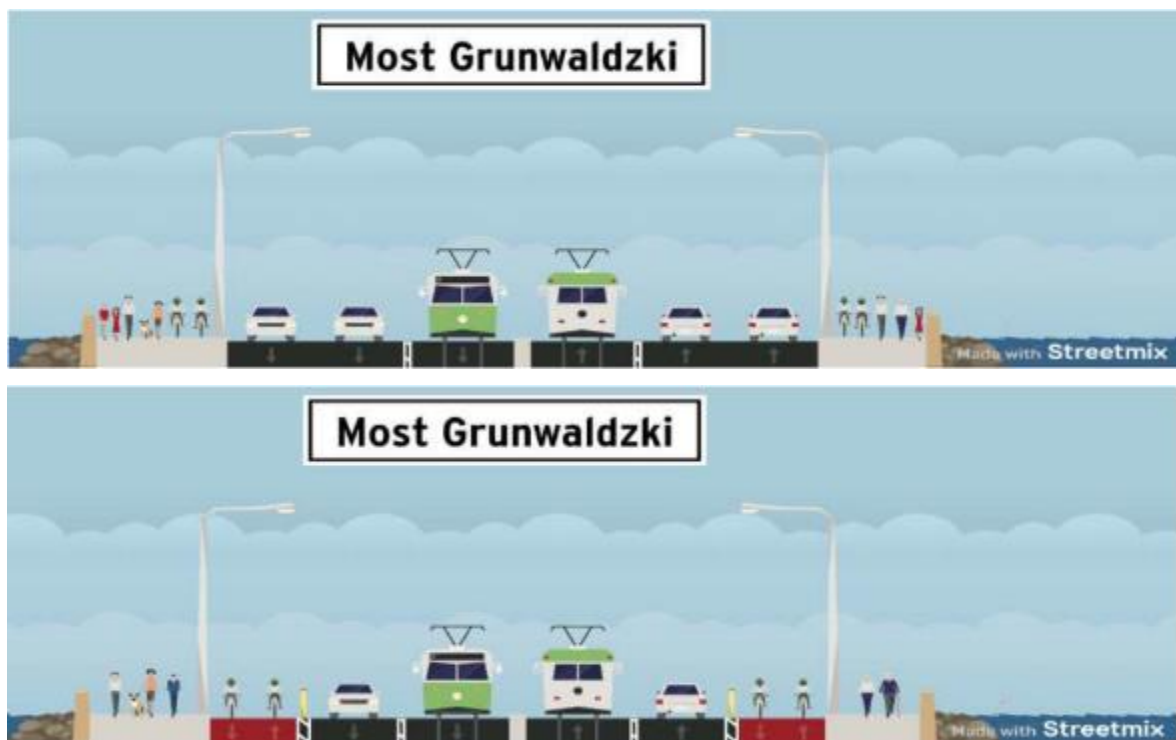
³¹ Source: https://etsc.eu/wp-content/uploads/PIN-Corona-Briefing_final.pdf

³² Source: <https://www.thehindu.com/news/cities/Delhi/traffic-violations-rise-on-empty-roads/article31884769.ece>

In summary, it is important to have a Safe System, that accounts that recognises that crash are preventable, and that when crash do occur the roadway and roadside safety systems will be in place to reduce injury potential. Data are an important aspect to making reliable decisions about what the interventions will provide the best return on lives saved. COVID has created many challenges as changes are occurring every day and emergent system modifications will be needed.

In several presentations throughout the webinars, aspects related to road safety were provided. Rob McInerney (iRAP CEO) stressed at the webinar on COVID-19 and Road Safety held on 15th July that investing now on roads will not only help economic recovery but will be a stimulus to save lives, to save money and to create jobs.

Figure 6.22: Before and After Comparison of Street to Provide Social Distancing and Space for Increases in Walking and Cycling



SOURCE: Figure taken from Marius Kieć (Poland) at PIARC webinar 15 July 2020

6.6. RESILIENCE AND CLIMATE CHANGE

Reducing the vulnerability of infrastructure (and increasing its resilience) is of fundamental importance to current and future transport planning. It is acknowledged that there are many definitions for resilience, which include the ability “to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions...” (Federal Highway Administration (FHWA) Order 5520). Additionally, according to the EU-project RESILENS (which stands for “Realising European RESILIENCE for Critical INfraStructure”), resilience is defined as the ability to survive in the face of complex, uncertain and an ever-changing future. It is a way of thinking about both short-term cycles and long-term trends. As a result, a resilient system should encompass:

- Failure probabilities of infrastructure;
- Direct or indirect consequences of failures, in terms of lives lost, damage, and negative economic and social consequences; and
- Time to recover (restoration of a specific system or set of systems to their “normal” level of functional performance).

Typically, the key motivation for any assessment of resilience is to ensure and enhance the performance of the road network, asset, operation or service in the face of climate change, extreme weather and other all-hazard events. The aim is to assess the impacts that these events have on reducing the vulnerability of key parts of networks and the trade-offs involved. This involves developing more resilient infrastructure and services, which can better withstand all types of hazards such as climate change, natural disasters, aging infrastructure, man-made disasters such as cyber and cyber-physical threats, and the incidence of pandemics. This will also help to support the continued provision of essential services (largely provided by infrastructure that is critical) to businesses, governments and the community, as well as to other sectors (PIARC WG1 2019).

Figure 6.23: COVID-19, Risk and Resilience

Risk & resilience - Pandemic as an «unwanted event»

- **The risk is impossible to assess:**
 - Low probability, high consequences
 - Vast uncertainty in factors affecting the event.

- **Complexity:**
 - Road networks and transport, and intermodal transport are complex in itself
 - **Cascade effects** are present: less capacity to handle one problem increases the risk of another problem.
 - **Resonance:** the nature does not “stop”; natural hazards are still there - storms, landslides, avalanches, earthquakes..





Photo: ST, Gunval, Medhus

World Road Association • Association mondiale de la Route • Asociación Mundial de la Carretera • www.piarc.org



SOURCE: Figure from Gordana Petković (Norway) at PIARC webinar 15 April 2020

Road networks are a fundamental component to the effective running of the economy. Where disruptions occur due to hazards, the network is compromised leading to serious loss in financial and economic costs to agencies, road operators and transport users.

The COVID-19 pandemic is a single disruptive event, which has had multiple and complex impacts associated economic and social impacts which may leave a deep permanent mark, including in the operating and business environment for road and transport administrations, and their supply chain partners.

As noted in Section 4.4.2, the topic of resilience has been covered throughout the PIARC COVID-19 webinar series in the context of:

- Continuity of construction and maintenance work and facilitating a resilience approach that could “match” a pandemic threat.
- Actions to address pandemic from a resilience perspective focused on transport corridors, transport restrictions & closed municipalities plus actions in Freight Transport, Public Transport, Toll Highways, Federal Road Network, Intercity Passenger Transport and continuity of Telecommunication and broadcasting services.
- General impacts and approaches, road network operations, freight and logistics, construction works and economic impacts and future resilience planning.

- Longer-term implications beyond the immediate crisis, user behavioural change, business resilience planning.

Throughout the webinar series, a number of presentations were provided relating to resilience. The different webinars were delivered by:

- Gordana Petković, Norway Public Road Administration, Working Group 2 Leader and Member of PIARC Committee 1.4 on Climate Change and Resilience of Road Networks
- Mark Henry Rubarenzya, National Roads Authority, Uganda, Member of PIARC TC 1.4 on Climate change and resilience of road networks and First Delegate of Uganda, PIARC
- Caroline Evans, National Transport Commission, Chair PIARC TC 1.4 on Climate change and resilience of road networks
- Roberto Aguerrebere Salido, General Director of the Mexican Institute of Transport (IMT) and First Delegate of Mexico, PIARC and
- Juan Fernando Mendoza, IMT, Mexico, Spanish Speaking Secretary and Member of PIARC TC 1.4 on Climate change and resilience of road networks.

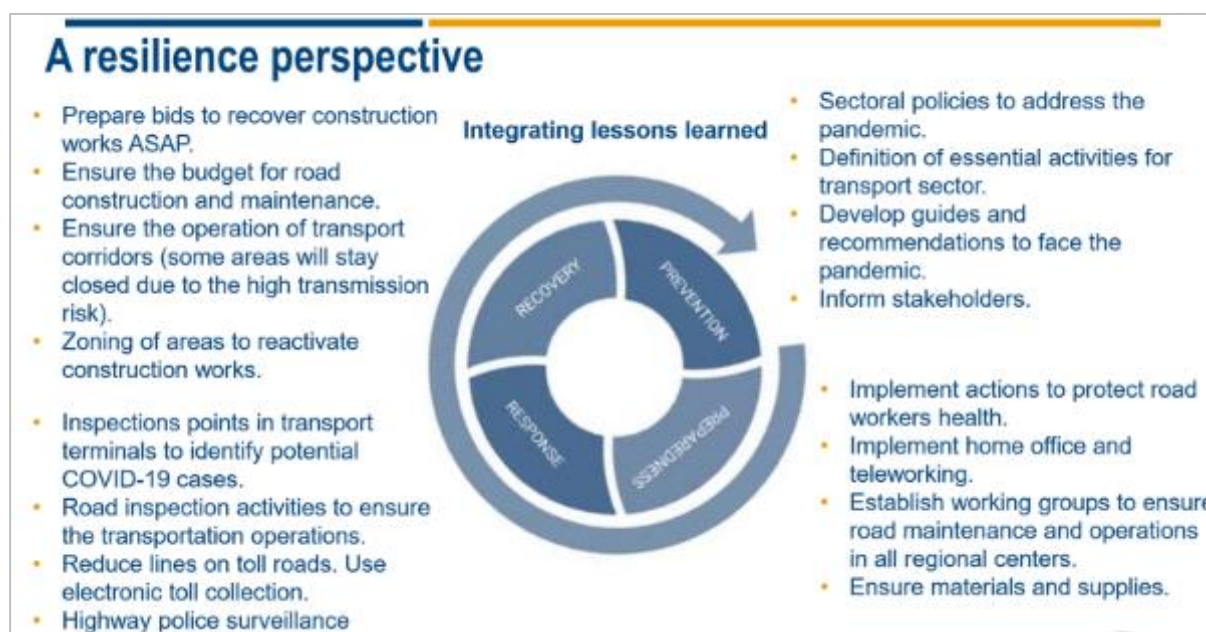
Additionally, in July 2020, these members of Technical Committee 1.4 (Climate Change and Resilience of Road Networks) and the PIARC COVID-19 Response Team published an article with Resilience Shift³³. This article outlined key emerging issues identified throughout the PIARC webinar series in the context of resilience from the perspective of key responses to COVID-19, Recovery from COVID-19 and Adaptations to COVID-19.

As illustrated the figure below, there is a need to integrate the lessons learned and consider resilience in terms of:

- Preparedness (planning to enable organizations to respond safely e.g. protect road workers health, ensure materials and supplies);
- Response (actions taken during the pandemic, staff mobilization and operational strategies, use of electronic toll collection);
- Recovery (actions taken to re-establish activity, organizational capacity and return to new normal e.g. zoning of areas to reactivate construction works); and
- Prevention/Adaptation (minimising the chance of further pandemics and limiting impacts prior to the event occurring e.g. sectoral policies or guidelines, recommendations in the face of the pandemic).

³³ A pivotal moment for the transport sector – and lessons for resilience, <https://www.resilienceshift.org/a-pivotal-moment-for-the-transport-sector-and-lessons-for-resilience/>

Figure 6.24: A Resilience Perspective



SOURCE: Figure from Roberto Aguerrebere and Juan Fernando Mendoza Sánchez (Mexico) presentation At PIARC webinar 13 May 2020

It has also been strongly identified that there are vast uncertainties in factors affected by the pandemic, and there are complexities for road networks, transport, and intermodal transport, such as cascading effects, where reduced capacity to handle one problem increases the risk of another problem. In addition, the COVID-19 situation can amplify the effect of other otherwise manageable threats. For example, other natural hazards, such as landslides, floods, storms or earthquakes are still occurring in the face of COVID-19, leading to further complexities for owners, operators and society due to the pandemic.

It is acknowledged that problem can be exacerbated, as governments have redirected resources to attend the emergency due to COVID-19, reducing their capacity to face other types of natural emergencies.

The vast effects of the pandemic on all aspects of society have not been experienced in our lifetime. An emerging theme is that future pandemics will (and must) find road and transport administrations more resilient by being better prepared for these events in the future. This can assist in enabling the development of sectoral policies for addressing pandemics and develop resilience guidelines aimed at reducing the vulnerabilities of road infrastructure and network operations, and assisting employees, customers, suppliers, and the public.

Experiences from COVID-19 reveal the need for road agencies to prepare for and manage new and unconceivable threats. This means building up flexibility, and our ability to quickly recognise and choose the most sustainable measures that enable us to efficiently and effectively return to normal.

6.7. WORKFORCE ISSUES

As already noted in Chapter 1, the land transport sector is estimated to support 60 million direct jobs across the World, around 2% of total global employment³⁴. Indirect employment in the wider supply chain is an order of magnitude greater and land transport infrastructure and services, including roads, provide physical mobility of people and goods which enables business activity and

³⁴ International Labour Organisation and United Nations Economic Commission for Europe, 2020 – Jobs in Green and Healthy Transport.

employment in multiple other sectors. Direct employment in public agencies which plan, regulate and oversee the sector is estimated at around 1.3 – 1.5 million³⁵ at local, regional and national level.

The COVID-19 crisis has brought major disruption and imposed changes to these agencies, road operators and companies in their supply chains, and related workforces in a number of ways:

- Mobility for employees has seen a significant decrease, variable across different modes and networks, including sharp contraction of commuting and the introduction of internal and external border closures for business travel between nations, regions and cities;
- The continued availability and operation of public infrastructure, facilities and services has been critical in keeping essential workers and goods moving, with key managers and frontline staff needing to remain in situ to ensure this;
- Staff working in office-based roles have had to shift rapidly from their workplaces to working from home and continue their duties in a wide range of domestic circumstances;
- Where continuing to work on site, in customer-facing and operational roles, staff have had to adopt enhanced hygiene, health and safety practices, including social distancing, use of PPE and regular monitoring of body temperature and other health status indicators;
- Construction, refurbishment and maintenance work, and related contracts, have been suspended, slowed down or rescheduled, requiring a redeployment of site staff; and
- In the private sector in particular, the suspension or slowdown of work has been accompanied by considerable employee furloughs and layoffs, driving rises in unemployment or the return of migrant workers to their home countries.

Globally, the International Labour Organisation estimates that 93% of workers reside in countries with some kind of workplace closure or disruption in the first half of 2020, with 5.4% of working hours lost in Quarter 1 and 14.0% in Quarter 2, equivalent to 400 million full-time jobs³⁶.

In many countries, hard lockdowns of early 2020 have given way to a gradual re-opening, with Governments now prioritising economic, alongside public health, considerations. This is driving, even if the face of a resurgence of COVID-19 cases, a shift in policy towards protecting businesses, safeguarding jobs and supporting those affected by furloughs and lay-offs. This aims to protect the integrity, capacity, skills and effectiveness of the workforce working in roads and transport. Nevertheless, disruption, working hours lost and employment in the sector is unlikely to recover until well into 2021. Some sub-sectors, such as aviation and maritime, are unlikely to return to pre-pandemic levels until 2023 or beyond and their future structure and viability may be permanently altered.

The table below summarises some of the key impacts, and responses, resulting from COVID-19 in organisational and workforce terms.

Considering employees working for road and transport agencies during the pandemic, their experience is one to be commended and celebrated. Managers and staff have encountered many logistical and practical issues on site, and turned to a range of measures such as PPE, modified shifts and social distancing to protect themselves and customers from infection. Such practices are reported elsewhere in this Report. In many cases, road employees are also “key workers” with recognised role, specific civic duty and ongoing role to maintain public infrastructure and services and ensure continued mobility during a time of crisis. There are numerous stories of employees at all levels and across all functions carrying on, rising to the challenge, finding practical work-arounds to short-term challenges and getting the job done.

³⁵ Based on an extrapolation of estimates for public transport agencies by UITP 2009.

³⁶ International Labour Organisation, 2020 – ILO Monitor: COVID-19 and the World of Work.

The other dominant workforce issue resulting from COVID-19 has been the observed shift to Working from Home for staff not assigned to a frontline and direct operational role. During the early stages of the pandemic, an estimated 88% of organizations encouraged or required their employees to work from home³⁷.

For many, the experience has been a relatively successful one, allowing jobs to continue and organisational effectiveness to be maintained. However, the provision and suitability of ICT, the impact of long periods of solitary working on line management, team cohesion and mental health, and the fact that “home” reflects a wide variety of logistical, economic and personal circumstances of individual workers³⁸, mean that the picture is a more complex one than often portrayed. Looking ahead, as many as 74% of companies plan to permanently shift to more remote work³⁹, indicating that COVID-19 may massively accelerate pre-existing trends towards teleworking and more flexible working practices already driving employers to new working practices and geographies.

Figure 6.25: Examples of Celebrating Frontline Workers Keeping Roads Open



SOURCE: Figures from Mark Stevens & David Ogden (UK) at PIARC webinar 15 April 2020

³⁷ Gartner, Coronavirus in Mind: Make Remote Work Successful!, 5 March 2020.

³⁸ For example, families with children, single parents, young people in shared accommodation, or those with caring duties for vulnerable or elderly relatives.

³⁹ Gartner, COVID-19 Bulletin: Executive Pulse, 3 April 2020.

Table 6.1 – Impacts and Responses of COVID-19 on Transport Organisations and Workforces

Dimension	Impact	Response
Operations & Facilities	<ul style="list-style-type: none"> • Direct productivity impacts from staff self-isolating, sick or unable to work • Frontline operations severely disrupted from staff shortages and need for social distancing • Offices and facilities largely shut down and shifted to remote Working from Home • Employees stepping up into new roles and adapting to working differently 	<ul style="list-style-type: none"> • Activation of Business Continuity Plans, Emergency Management Committees and equivalent • Maintaining or reopening frontline operations safely, for example through requiring staff to use PPE • Strengthening ICT for Working from Home, including VPN, security & access to technical applications • Rapidly finetuning key communications platforms e.g. MS Teams, Zoom over Skype • Preparing precautions for safe reopening of office working (e.g. deep clean, sanitiser, social distancing)
Travel & Mobility	<ul style="list-style-type: none"> • Commuting sharply curtailed by the closure of offices and corporate facilities • International travel virtually shut down or requiring top management approval • Domestic business travel similarly allowed only by exception and for “essential” purposes only 	<ul style="list-style-type: none"> • Investment in remote working and ICT reducing or eliminating the need to travel in short- to medium-term • Organisational travel policies and procedures suspended or over-written • Staff adjusting to realities of working from a domestic environment, with positive and negative experiences
Workforce	<ul style="list-style-type: none"> • Staff whose job allows it Working from Home, varying policies on return to the office • Homeworking presents issues of line management, productivity and wellbeing, especially when combined with lockdowns and differing personal circumstances (e.g. childcare) • Loss of the “social” aspects of life within the workplace and/or working in teams, with wider implications for mental health and wellbeing 	<ul style="list-style-type: none"> • Increased communications and management via intranet, staff notices, virtual team meetings • Arranging virtual staff check-ins to manage workload, provide updates and address issues • Emphasis on physical & mental well-being (relating to lockdown as well as Working from Home) • Virtually replicating team socialising (e.g. Zoom Coffee Breaks, WhatsApp Groups)
Contractual & Regulations	<ul style="list-style-type: none"> • Health and safety now top of agenda with new regulations/procedures to comply with • Need to review and change employment policies, contractual terms and conditions • Lines blurring between work, professional and personal space and time 	<ul style="list-style-type: none"> • Strong focus regulations for employee safety, wellbeing and protection in contractual and practical terms • Review of workplace policies beyond practical temporary workarounds
Commercial	<ul style="list-style-type: none"> • Increased risk or actual cancellation, postponement & rescheduling of workload and key milestones • Redundancies, forced leave, retirements and pay cuts, especially in private sector) • Changed workload resulting in repatriation of migrant workers to home countries. 	<ul style="list-style-type: none"> • Re-scheduling of work and transactions with stringent management of avoidable costs • Use of furlough schemes, unpaid leave and other Government support to protect jobs • Deliberate decisions to continue project commitments, work programmes and deployment of staff, including SMEs

Some organisations have demonstrated that innovative processes can be used, such as virtual reality, in order to enable experts to reduce their travels.

Figure 6.26: Using augmented reality in road works



SOURCE: EGIS, webinar on 28 October 2020 (French language)

Figure 6.27: Using virtual reality for training sessions



SOURCE: EGIS, webinar on 28 October 2020 (French language)

This shift to remote working, whether during or if maintained after the pandemic, may not be straightforward and raises a number of challenges in managing teams and maintain organisational effectiveness. At the PIARC webinar on 1st July on the theme of "Organisational Impacts and Responses from Managers and Employees" Lauren Ellis, Atkins Acuity, considered a number of dimensions to be considered, including:

Changing the Way We Work

- Fully understanding and responding to potential and limitations of Working from Home;
- Deploying the right technology across and between remote workers, and encouraging employees to be “digital natives” at ease with emerging platforms and applications;
- Helping employees draw work-home boundaries and achieve effective time management;
- Considering the future of the office in role, functions, physical layout and operations.

Leading and Evolving Roles Remotely

- Dealing with new duties, pressures and expectations resulting from remote working;
- Identifying and optimising new or changed activities, processes and systems;
- Managing employees effectively through virtual means, including maintaining (and maximising) employee motivation and collaboration when not physically connected.

Staying Physically & Mentally Safe

- Recognising that Working from Home is potentially less active, especially during lockdown, and encouraging physical and mental exercise and dexterity as part of the working day;
- Connecting with and appropriately managing families and partners in a combined work and domestic space; and
- Tackling concerns over physical and mental health, which may be exacerbated and are more likely to go undetected and untreated during the pandemic.

In response to these challenges, a framework for action was proposed as set out below, requiring responses by organisations, by their leaders and from individual employees in terms of the physical and virtual working environment, attitudes and behaviours and a commitment to meaningful change management to achieve revised corporate goals. Such considerations are not unique to the roads and transport sector, but do suggest certain lines of enquiry for PIARC looking forward.

Figure 6.28: A Framework for Managing Teams During COVID-19



SOURCE: Figure from Jonathan Spear (UK/UAE) presentation at PIARC webinar 29 July 2020

Looking ahead, it is highly likely that some organisational practices and workforce impacts adopted in the past eight months will outlast the COVID-19 in their full, or a hybrid, form. These include a

greater and expanded focus on occupational health and safety, stronger business continuity and resilience planning and the retention – by organisational policy or individual preference – of some level of Working from Home for certain categories of job and employee.

The impacts of the latter are likely to be especially far reaching, with implications for the structure and functioning of organisations, corporate culture, values and behaviour, the future of offices and real-estate in town and city centres, and changes to traditional commuting patterns with major impacts on the demand for transport and the use of urban road and public transport networks. This is likely to be a major focus of investigation for PIARC and a number of relevant Technical Committees in coming years.

6.8. SECURITY

Approaching the Covid-19 pandemic requires skills similar to those for managing security as pandemic is a security threat. Furthermore, the growth of cyber attacks in this period increases the importance of both security managers and competent structures such as the Departments of Corporate Protection, in the context of Public and Private Agencies, including those responsible for roads and transport.

Management of the pandemic

The world crisis caused by the spread of Covid-19 has called into question the operational management of every organization and in particular of road and/or transport agencies in order to ensure the performance of operational, economic and administrative activities in a pandemic context. The pandemic has highlighted the importance of the ability to deal with complex emergency situations which require a multidisciplinary approach: labour, legal, financial, logistical, health skills and security.

Pandemic as a threat

A pandemic is a security threat that is considered unintentional and unpredictable. COVID-19 pandemic has resulted in a crisis situation for which the concepts related to the issue of resilience are totally applicable⁴⁰: to start well ahead of possible events (prepare, prevent, protect) and to include the phase after the occurrence of the event (respond, recover). At the onset of the pandemic, it is therefore necessary to define a plan to ensure business resilience for the management of business continuity, for overcoming the crisis and for restarting operations.

Biological and cyber viruses

The type and depth of response needed to battle a pandemic is similar to the level and depth of response needed to ward off cyberattacks. It starts by training groups of people about the value of having safer interactions (in cyberspace as well as in physical space) and providing them with effective tools to do so. Creating a culture of security is the essential first step to face cyber threats. Enacting a varied approach like the above, is called “security minded approach”⁴¹. It must develop to include organizational processes, protocols and resources to detect, prevent and respond to cyber attacks, going beyond good habits and paying attention to how the organization is secured from the inside out. The same approach is required to counter the development of a pandemic. Biological and cyber viruses have a lot in common. While it may seem odd to assess methodologies in seemingly different disciplines — epidemiology and cybersecurity —, parallel analyses like these provide experts with new and valuable insights that can lead to creative and impactful solutions.⁴²

Security manager and corporate protection

⁴⁰PIARC Report “Security of Road Infrastructure” PIARC 2019 EN, § 6 Resilience and § 8.2 Improving Resilience.

⁴¹PIARC Report “Security of Road Infrastructure” PIARC 2019 EN, § 3 Security-minded approach.

⁴²Shouhuai Xu, professor of computer science at The University of Texas at San Antonio, UTSA Laboratory for Cybersecurity Dynamics.

Security managers are equipped with the skills to ensure the overall management of the security process. They can also be useful in the health sector as well as for risk control, technologies and surveillance services. This is to prevent not only cybernetic attacks, as happened in the case of some hospitals, but also physical attacks such as attacks on healthcare personnel or criminal actions aimed at theft and damage. In this sense, health facilities can be understood as "critical infrastructures" and vulnerable to threats, aggressions and damage to people or property, due to the large size of the spaces and the continuous flow of people over the course of 24 hours.

In the case of a large organization such as a road and/or transport agency, a corporate security manager is not adequate and an organizational structure in top staff must be created in order to face more complex situations. Especially in case of many different expertise needed. This can be named in different ways: "Department of Corporate Protection" or "Prevention and Protection Service" or even a "Corporate Crisis Unit". They are created mainly to be responsible for the obligations and the appropriate initiatives in the field of the management of physical and IT security measures.

In the specific time of pandemic, the above structures have been also called upon to address other issues that go from the reorganization and sanitation of workplaces, to the management of measures to protect the health of workers, from the resetting of the methods of employment of employees, to the preparation of the necessary documentation for the presentation of applications and authorizations, the monitoring of employee quarantines and their safe return and behaviour to service and, finally, the facing the IT problems connected with the increase in smart working (or remote working)⁴³.

For the above purposes, operating instructions must be issued, for example "Information management for preventing the spread of Covid-19". An ad hoc Task Force "Contact Tracing & Monitoring" can be also useful to be really operational on the ground H24 7/7 in order to ensure the containment of the spread of the virus, increase and improve the tracking and monitoring activities, preventing to cases of corporate contagion. This activity is particularly necessary in the case of a Road and/or Transport Agency which operates continuously 365 days a year. The activities of this unit must be in compliance with the indications issued by the competent Ministries (in particular Ministries of Interior/Health/Transportation).

In Italy, Anas S.p.A., the administration that manages the national roads and highways, has a Corporate Protection Department which, during the pandemic crisis ensured the primary service of the mobility. This is an absolute civil value and an essential element of the Italian national emergency system to ensure business continuity in the crisis and for the timely resumption of operations in the road sector. The reaction to the pandemic represented an unprecedented case that proved the effectiveness of a preventive preparation and planning for the correct management of traffic in critical conditions, to be carried out in collaboration among road and motorway operators, the Police Forces and the National Civil Protection. The Department provides also to Anas also adequate security measures to the information systems to avoid disruptions or, even worse, exposure to cyber-attacks that can hinder the response to the emergency.

A broader perspective for security functions in the time of pandemic

Therefore, in the need to prevent the spread of the pandemic within a road and/or transport agency, the Department of Corporate Protection (or other names) is playing and continues to play an essential role in the pandemic, also assuming functions beyond the traditional field of activity including the coordination of various Departments in a company. With this regard, the list below

⁴³A boom in digital crimes has been detected in the network: digital identity theft, computer fraud, credit card cloning. E.g. In Italy, in the first six months of 2020 there were an average of 52 complaints per day for cybercrime, to which 589 scams and computer frauds were reported on average every day (in *Il Sole 24 Ore*, October 26, 2020). The U.N. disarmament Chief – Izumi Makamitsu – reported in the Security Council meeting on last May 22 that «the cybercrime is on the rise, with 600% increase in malicious emails during the current crisis».

shows activities of close and extensive knowledge carried out in the Covid-19 emergency, articulated in main topics and other possible topics⁴⁴:

i) Government measures:

- Identification of essential critical infrastructure workers (for example, in USA through the Cybersecurity & Infrastructure Security Agency)

ii) Reorganization of workplaces and events, risk analysis and technologies:

- Corporate security protocols and risk analysis
- Reorganization of workplaces and events
- Matrix for control and monitoring and technologies for the minimization of risk

iii) Personnel management and the use of social safety nets:

- Necessary obligations of the worker and the employer both in the classic working environment and in the concept of smart working (teleworking requires the verification of the security of domestic installations before any use of company or administrative equipment at home).
- Privacy protection and exceptions due to the measures to contain the spread of the virus from Covid-19; tracking and geolocation of individuals and workers, in light of the necessary balance between health protection and civil and constitutional rights regarding the processing of personal data

v) Management of contracts:

- Security and procurement

vi) Travel Safety / Travel Risk Management:

- Protection programs for corporate travellers
- Mitigation of risks along the international perimeter of the company's interests

vii) Cyber security:

- Evolution of cyber threats and tactical tools for identification and contrast
- Cyber risk analysis and assessment for the protection of your IT assets
- Cyber risk in the smart working regime
- Obligations deriving from being part of the National Cyber Security Perimeter (Computer Incident Response)

A particular mention should be made of the defense against cybernetic attacks. In this case it is necessary to move from a traditional defense based on the concepts of the "security-minded approach" described above to predictive and contextual preventive defense solutions. In this case, the activity of the company's intelligence must include: the tracking, research and continuous analysis of the attackers, the production of strategic, tactical, operational and technical reports on emerging cyber threats, the supervision and monitoring of the organization's data also outside its perimeter, the ability to respond to complex IT incidents.

⁴⁴Training course for "Emergency Management for the Covid-19 Crisis", ICSA Foundation - Intelligence Culture and Strategy Analysis, Italy, June 2020.

To support activities of a Road Administration in the pandemic period, we can refer to some relevant governmental organizations responsible for infrastructure security. In particular in the UK, the Center for the Protection of National Infrastructure (CPNI) provides a number of recommendations, checklists and useful advice⁴⁵.

6.9. WOMEN IN TRANSPORT

The role of women in the transport sector is of high importance, not only in ensuring diversification in the workforce, but also in enabling the industry to better meet the needs of the customers it serves, empowering transport authorities and organizations in designing new services, and facilitating new ideas within the transport sector from a different perspective.

A joint webinar was organised on “The impact of COVID-19 on Women in Transport” with the UK Department for International Development on May 15th 2020. The webinar identified good practice from PIARC Technical Committee 1.1 “Performance of Transport Administrations”, University of Durham, University of Sokoto, International Transport Forum and Flone Initiative. In this webinar, it was briefly acknowledged that there is a connection between the status of the economy in response to COVID-19, and significant risks posed to women’s health and livelihoods.

Within the transport sector, it is recognised that women are under-represented, and face vulnerable employment situations that COVID-19-related may accentuate. The impacts of the pandemic may threaten some progress made on gender equality in the workplace in recent years. Supporting literature also highlights the importance of analysing the experiences of women working through the COVID-19 pandemic, and assessing how things are perceived in the industry as a result⁴⁶.

There are a number of concerning issues because, for many working women, the pandemic is affecting their work / life balance and physical and mental health, and some may also be led to question their current and long-term career prospects. Additionally, the challenges of working women who have been required to adapt to multiple and concurrent roles such as home-schooling their children, and/or caring for vulnerable family members for is another significant challenge.

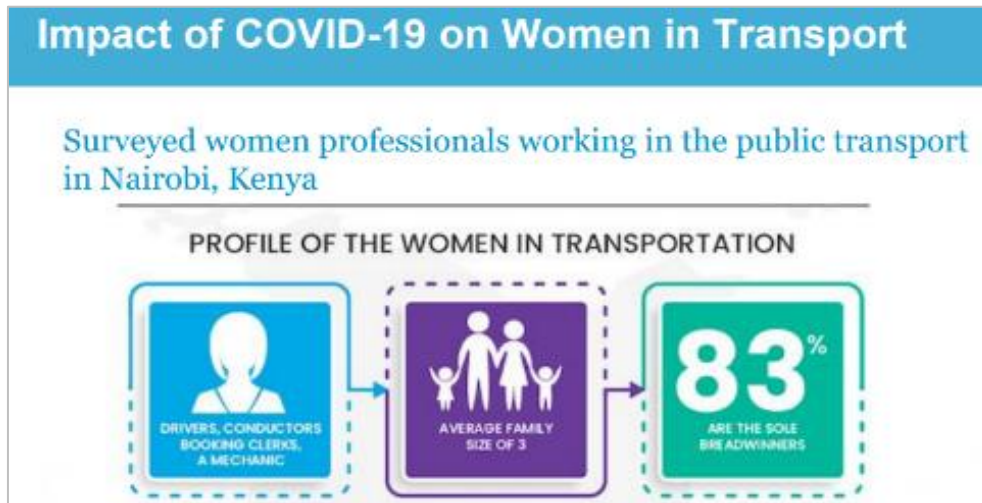
These issues have been discussed by several official entities with relevance to the road transport sector. These include organizations such as the International Transport Workers’ Federation,⁴⁷ UN and UN WOMEN⁴⁸, which pointed out very clearly *“the impacts of COVID-19 are exacerbated for women and girls simply by virtue of their sex”*.

⁴⁵<https://www.cpni.gov.uk/staying-secure-during-covid-19-0>

⁴⁶ <https://www.intelligenttransport.com/transport-articles/106834/covid-19-the-challenges-faced-by-women-working-in-transport/>

⁴⁷ <https://www.itfglobal.org/en/focus/covid-19/women-transport-workers-and-covid-19>

⁴⁸ https://www.unwomen.org/en/news/stories/2020/9/feature-covid-19-economic-impacts-on-women?utm_source=dlvr.it&utm_medium=facebook

Figure 6.29: The Impact of COVID-19 on Women in Transport

SOURCE: Presentation from Naomi Mwaura on Impact of COVID-19 on women professionals working in the public transport industry in Nairobi, Kenya on May 15th, 2020

The main findings and remarks from the DFID-PIARC webinar include:

- Women working in customer facing roles might suffer from an increased vulnerability to catching and spreading the virus and to violence at work. They might also feel guilt leaving their children while they keep working in essential services.
- During lockdowns, keyworkers with children who don't have childcare in place or cannot send their children into school, while working remotely at the same time, might have to juggle childcare and home schooling, with less time to focus on work.
- Many office-based staff expect to continue working remotely at least on a part-time basis for the foreseeable future. This will result in a downturn in use of public transport, which was noted as a concern because a large proportion of women are employed within the public transport domain.
- Many women who work part-time have been required to increase hours of work or have been redeployed into other areas of work. This can place additional pressure when balancing children, in conjunction with learning new roles.
- Along with having to adapt their daily lives in significant ways, many working women are also concerned about the impact the pandemic could have on their career progression. There may be concerns with the need to choose between their personal responsibilities and their careers because they might not be able to be available to work in ways that remote working requires.
- Women usually suffer of low levels of representation in industry decision-making bodies with concern about the long-term impact on women's participation in the industry.

Due to the disproportionate impact which the crisis has had on women workers in the transport sector, there is a need to identify organisations which are developing and implementing any future directions. This was clearly presented during PIARC seminar from Anna Wildt-Persson and Christos Xenophontos⁴⁹ from PIARC TC 1.1 "Performance of Road Administrations" on May 15th 2020. The importance of transport institutions that will be at the forefront of the recovery phase, and their need to incorporate gender mainstreaming in their practices, was also highlighted.

⁴⁹ http://transport-links.com/wp-content/uploads/2020/05/HVT_PiARC-Webinar_COVID_WiT_Summary.pdf

Additionally, at the DIFID- PIARC webinar, a clear message relating to this issue was provided by Claire Clarke, the Deputy Women Transport Workers and Gender Equality Officer at the International Transport Workers Federation (ITF) referencing ILO Resolution 205⁵⁰. In this message, there was a call on all agencies across the world, when responding to an emergency and its recovery, to ensure that planning and implementation includes:

- Gender-disaggregated data;
- Gender impact assessments;
- Gender-responsive planning; and
- Representation in decision-making.

It is acknowledged that gender neutrality in the transport sector needs to be addressed thoroughly. In order to develop a more inclusive transport system for the future, these are important aspects to consider in subsequent work by PIARC and it will be a subject to be further developed during future webinars.

6.10. LOW- AND MIDDLE-INCOME COUNTRIES

Since it is PIARC's mission to address the needs of all countries, including Low-and Middle-income countries (LMICs), this section includes a range of considerations relating to the latter, based on presentations given by representatives of LMICs during the webinar series.

PIARC Actions on LMICs

PIARC invited experts and officials from LMICs to take part in the webinars as panelists, in order to share their experiences and engage with their peers. In addition, a specific webinar was designed with the UK's FCDO, which was focused on the situation in sub-Saharan African countries. The webinars were organized in French or in Spanish, as well as some of those organized in English. These proved to be especially effective at engaging with LMICs.

The main lesson that can be derived from these knowledge-sharing efforts is that LMICs coped very well with the impact of the pandemic on their road transport systems. This is crucial to these countries since almost all of them are strongly dependent on roads for land transport, a large part of exports and imports, as well as access to ports and land borders. Other key conclusions concerning LMICs include:

- Safety of workers and of road users to protect them from COVID-19 was placed very high on the agenda, just like in HICs;
- In most instances, work-from-home schemes were put in place and have worked efficiently;
- LMICs have been able to ensure the continued flow of goods and management of freight traffic; and
- Road agencies and operators have placed increased emphasis on maintaining adequate working relations between stakeholders, including donor agencies, suppliers and other public bodies responsible for dealing with COVID-19.

Many of the problems and approaches in response to COVID-19 have been similar between HICs and LMICs. In this respect, it is worth mentioning the presentation by Rafael Díaz (TRB, USA) in the webinar held on 23rd April 2020. In Latin America agreement was reached which was consistent in many aspects with what was happening in the United States. This is where vulnerabilities and opportunities have been found in the supply chains, and a great variability in response has also been adopted. The variability in USA is due to the fact that it is a complex country with large and

⁵⁰ https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:R205

diversified economy (24% of the world's GDP), large size, population, and road networks and federal structure. Hence, there have been varied responses at different rates, for example: some States have taken advantage of the situation to close down certain motorways or roads in order to speed up work, some tolls have been made free of charge, and instead some investment funds have slowed.

Impact of the Pandemic on LMICs

A key question raised in the webinars related to the preparedness of health systems within LMICs to address COVID-19 as it continues to spread. It was thought that in many cases, in fact, adopting the measures employed by High-Income Countries in LMICs may not be feasible. According to UN/DESA Policy Brief #86 “The long-term impact of COVID-19 on poverty”: *“The COVID-19 pandemic and ensuing global economic crisis are on course to reverse years of gains in the reduction and alleviation of poverty, thus drastically undermining global efforts to meet the Sustainable Development Goal deadline of eradicating extreme poverty by 2030”*⁵¹.

It is also true, however, that the impact has not been uniform. Dennis Ganendra (Malaysia) stated at the Seminar on 13 May 2020 that although most countries will not be spared from the shock COVID-19, some countries in the region of South East Asia are relatively less affected by it. Apart from Indonesia and Philippines, the rest of the countries in SEA have much lower fatalities.

Border Control and Export

Almost all speakers from LMICs explained at the PIARC webinars that, following the onset of COVID-19, their countries quickly adopted tough border control measures, internal sanitary cordons or closures for the transport of people and goods, with exceptions such as essential workers and goods. In some cases, difficulties were experienced in maintaining exports through the ports.

Continuity of Road Works

The importance of continuing road works by considering their regional and social effects was highlighted at webinar on 7th April by Juan Esteban Gil Chavarría (INVIAS, Colombia) who stated that infrastructure was “a country priority”. Additionally, regional works, in conjunction with regional authorities, were prioritized, and accompanied by regional supply plans for inputs and materials.

In the same webinar it was noted that in Paraguay the Government decided to continue all public works *“as this constitutes the engine of the country’s economy...”* adding that *“especially road workswill continue to produce and receive resources to continue serving to the rest of the economy”*.

Some LMIC countries have also maintained the will to continue with construction and maintenance works, however have experienced low work rates due to supply problems, lack of mobility and restrictive health and safety measures. This was the case of Benin, as explained Joseph Ahissou (Benin, Cabinet of Minister of Infrastructure and Transport, TC 1.1) at the webinar on 17th April, as well as Djan Fanny (AGEROUTE, Ivory Coast) at the webinar on 30th April and Dennis Ganendra (Malaysia) on 13rd May 2020.

Mohamed Laye (AGEROUTE, Senegal) described in detail at the webinar on 7th July the reasons for which the rate of progress of the works was declining, offering a good compendium to the reasons expressed by other countries:

- Reduced working hours;
- Slow supply of building materials and spare parts to construction sites;
- Blocking the movement of expatriate staff and service providers from foreign countries;

⁵¹ UN/DESA Policy Brief #86: The long-term impact of COVID-19 on poverty – available [here](#)

- Increasing transport prices;
- Delay in repair or maintenance work on certain construction equipment;
- Lack of control over manufacturing lead times and delivery of supplies and equipment to be imported from Europe or China.

In contrast, other LMICs preferred to slow down or stop new road works and procedures during the lockdown. For example, Burkina Fasso, according to Souleman Oussiman on 17th April, decided slowing down or even halting of works in transport infrastructure construction as well as the suspension of start-up procedures for new projects. In Tunisia, as described by Slah Zouari (ATR, PIARC 1st Delegate) in the same webinar, construction sites throughout the country came to a standstill, whilst the design offices implemented teleworking. Additionally, the Ministry decided that the prioritization of the most urgent solutions should be to be studied on a case-by-case basis for ongoing projects in the context of construction and public works sector contributions.

Attention to Logistics and Transporters

Another generalised lesson from the PIARC webinars is that of adequate attention to logistics. At the webinar on 7 April Juan Esteban Gil Chavarria (INVIAS, Colombia) described how the Logistics and Transport Centre has been created, including the use of safe and healthy rest points on selected routes for transporters. Roberto Aguerrebere (IMT, Mexico) explained the contingency measures adopted regarding cargo road transport.

At the webinar on 10 June Ricardo Paula López, Vice-Minister of Ecuadorian Transport Infrastructure described the six Logistics Corridors that were established at the national level. In particular, Milton Torres stressed at the webinar on 23 April, the special importance of the operational continuity of the corridors linking the ports in Ecuador. Here, the interior of the country, large cities and concessionaires were warned of their obligations to adopt measures to provide services. Finally, Jaime Campos Canessa (Chile) set out on 10 June the need for increasing rest areas.

Figure 6.30: Logistics Corridors between Ports and Cities in Ecuador

LOGISTIC CORRIDORS BETWEEN PORTS AND CITIES



SOURCE: Figure from Milton Torres (Ecuador) presentation at PIARC webinar 23 April 2020

Public Transport

Regarding public transport, large capacity reductions have been reported in city and intercity transport for example in Burkina Faso.

In Tunisia, suburban trains were suspended together with prohibition of inter-city shared transport, and in urban areas metro and bus schedules were modified in line with the needs of workers in vital sectors. In the Ivory Coast, the majority of local public transport was regulated plus prohibition of unauthorized travel was implemented between Abidjan and the interior of the country.

Mexico has also reported difficulties with some passenger transport companies with reductions in the in passenger capacity (and hence financial impacts), reductions in the proportion of vehicles in operation, and incidences of vehicles exceeding the recommended maximum occupancy.

Increased Coordination:

The need to respond quickly and effectively to the pandemic and its associated crisis has encouraged unification of procedures, and increased communication and coordination between road and transport agencies. Daniel Russomanno (Argentina, TC 2.4 Secretary) described the creation of a Unique Certificate of National Circulation, and also noted the absence of an adequate network of regional ITS management centres.

Similarly, Roberto Aguerreberre in webinar on 7th April highlighted, as an achievement, the close communication among the different Mexico Mobility Authorities (AMAM) whilst acknowledging that federal structure limits the homogeneity of measures in States and municipalities.

Tolls

Regarding tolls, the response during lockdown has been extremely varied: PR China has carried out a gradual process of toll release, which began on 23 January with free tolls for small passenger vehicles. This was followed by other vehicles and finally free tolling from 17 February until “the end of the epidemic prevention and control work (webinar on 1st April). Colombia rapidly declared the exemption from toll collection which remained from 24 March to 31 May. Argentina suspended the toll collection on only urban motorways (reduced use of mass public transport by commuters).

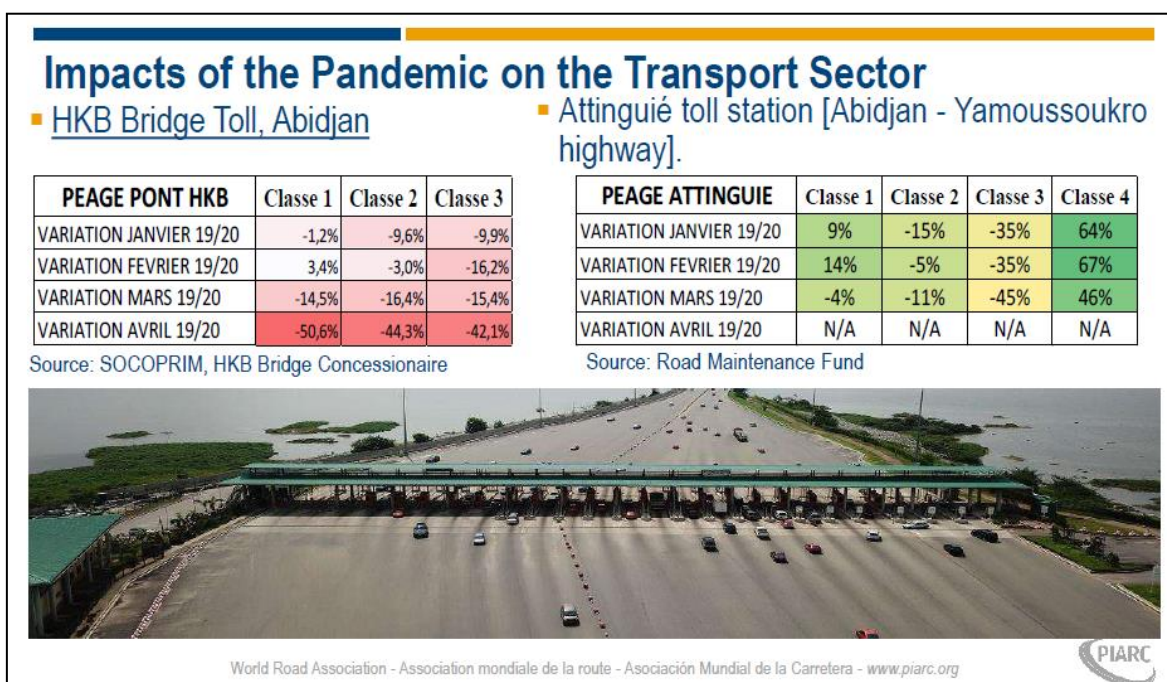
In contrast, Mexico, Paraguay, Ivory Coast and Malaysia have retained tolls, whilst implementing health protocols. Tunisia adopted the generalization of electronic toll collection and limitation of the loading of toll cards online. Senegal also retained tolls, however reduced options for cash payment.

Use of Technology

The pandemic is seen as an opportunity to enhance use of existing technology, e.g. remote work with existing ICT Tools, and to diversify the communication with stakeholders as stated by Mark Henry Rubarenzya (UNRA, Uganda) at the webinar on 22th April.

The effectiveness of early technology applications is also a shared lesson. An example of this is the presentation provided by Wang Jian (PR China, CATS) which identified, among other issues, the use of communication big data travel cards, digital pass-personal health codes, bus codes, infrared temperature measurement in transportation stations and highways service areas.

Figure 6.31: Impacts of COVID-19 on Toll Roads in Ivory Coast



SOURCE: Figure from Djan Fanny (Ivory Coast) presentation at PIARC webinar 30 April 2020

Investment in Roads and Economic Recovery

COVID-19 has impact mechanisms for private sector involvement in road construction and operation. A perceived risk is that of private sector financing for PPP projects, where Mark Henry Rubarenzya (UNRA, Uganda) identified that the pandemic “could delay completion of planned projects”. Hector S. Ovalle (COCONAL, Mexico) noted in the webinar of May 13 that the impact of COVID was a great risk for PPPs as well as relationships with authorities and suppliers, which must “stay closer than before”. On 9 July Hector S. Ovalle extended the detail concerning the COVID-19 impact on PPP’s and roads, for both contracts (based on payments by the government on the basis of performance and availability), and those based on payment by the user, where:

- Financial institutions may be nervous or concerned;
- Possible default on short- or medium-term commitments; and
- Momentary financial imbalance that creates uncertainty for the parties

In the light of these risks and concerns, other presentations shared responses and advice to:

- Keep calm as these projects are long term;
- Communicate in an assertive way;
- Review PPP: funding, contingencies, financial rebalancing alternatives/mechanisms; and
- Keep constant contact with involved parties

However, despite the economic difficulties, the view is widespread that investment in the road sector is a very efficient mechanism for economic recovery and has a variety of rapid positive social effects. Thus, Héctor Hugo Escalada (Argentina) highlighted in the webinar on 12 May, the role of roads in mitigating the economic crisis, and the current objective in identifying productive investment. Similarly, Fabio B. Riveros Peña (Director of Road Planning, Paraguay) identified a proposal to accelerate planned investment in roads to generate approximately 120,000 direct and indirect jobs, and encourage the use of materials from Paraguay’s industry and to support national companies in training and innovation.

The importance of the construction sector in LMICs is indisputable, as shown by the data provided by Dennis Ganendra (Malaysia) where it represents 4.5 per cent of the economy, with over 95,000 contractors in the country, and over 850,000 registered construction workers. This sector is therefore a significant contributor as the whole value chain is contributing the salary of approximately 9 billion USD per annum, thus constitutes *“a key driver for the economy with fast impact.”*

Juan Esteban Gil Chavarría (INVIAS, Colombia) outlined the plan to carry out a public works programme to revive the economy. This included the implementation of 50 roadworks projects with an investment of 3.3 billion USD, which will benefit 24.5 million people, create 105 000 jobs, and reduce operating costs by 530 million USD a year. Additionally, this improvement will involve works on 5,000 km tertiary roads and rehabilitation of 350 bridges.

The Role of Development Banks

As expressed by Héctor Varela (Chief Executive of CAF) at the webinar on 9th July, roads and development banks are allies against COVID-19. Development banks provide support to the public sector: loans, technical cooperation and consultancy, and support private sector investment. A key concept highlighted was to support countries to invest better, leading to efficiency, sustainability, institutionality, equity and integration in the post-pandemic environment.

The order of priorities was stated as:

- Stage 1 Immediate challenges: Services guarantee. Proximity, flexibility and knowledge;
- Stage 2 Economic crisis: Implementation of counter-cyclical policies. Identification of high impact projects; and
- Stage 3 New normal: New development models. Sustainable roads, integration, ICTs.

This represents a theme that PIARC is likely to return to in future COVID-19 reporting in 2021.

7. CONCLUSIONS AND RECOMMENDATIONS

A system of transport is a necessity which, like the respiratory system of the body

we take entirely for granted, as long it is working well

(Colin Clark quote, Seminar 12th May 2020)

PIARC's program of more than 25 webinars devoted to the impact of the COVID-19 crisis on road administrations and road operators has delivered outstanding value. Peers have been able to meet and discuss, which was more than welcome in a period of intense stress. They have also shared problems and possible solutions, and discussed what the future holds in store.

Here is what we have learned. **When recommendations have been identified, they are highlighted in a box.**

7.1. THE COVID CRISIS

The current global COVID-19 pandemic has struck the entire world in 2020 and is having multiple and acute impacts over and above a conventional disaster. As of early October 2020 the number of global cases surpassed 36.2 million with over 1.05 million deaths. This crisis is as much an economic collapse and a social catastrophe as it is a public health emergency, which has brought with it a dramatic slowdown in business activity, the standstill of international travel and large increases in job furloughs and lay-offs. Global GDP by the end of 2021 is expected to be 6.5% below pre-COVID-19 levels and the time horizon for full recovery of some sectors is 2022-2024.

Policy goals around COVID-19 have evolved over the year 2020 in many countries. First half of the year was marked by what the IMF has called "The Great Lockdown", a widespread and intense slowing in economic and social activity, and restrictions on personal mobility and travel to such an extent that in April half the World's population were asked or ordered to stay at home. Containing the infection remains a challenge and is vitally important. Decision makers are also trying or have tried to re-open economies, lifting or replacing national lockdowns with localized measures. The challenge is to guarantee the health and safety of workers and customers, while restoring business and consumer confidence and providing the right economic and fiscal stimulus.

To assist in the analysis of this process, PIARC COVID-19 Response Team had identified three phases that would follow the first lockdown:

- **Reopening**, with risks carefully managed until vaccine and more effective therapeutic treatments are available. Partial or full short-term or localized lockdowns in many countries is still happening; life is unlikely to get back to "normal" well into 2021.
- **Recovery** of national and local economies. Expected to extend well beyond 2021, this will involve accelerated infrastructure delivery, technology research and other tools of economic stimulus and industrial strategy.
- **Reimagining** on how transport system will meet future needs, reflecting the impacts, challenges and opportunities of COVID-19 and other agendas; transforming and future-proofing transport infrastructure and services towards 2025 and beyond. This phase has already started.

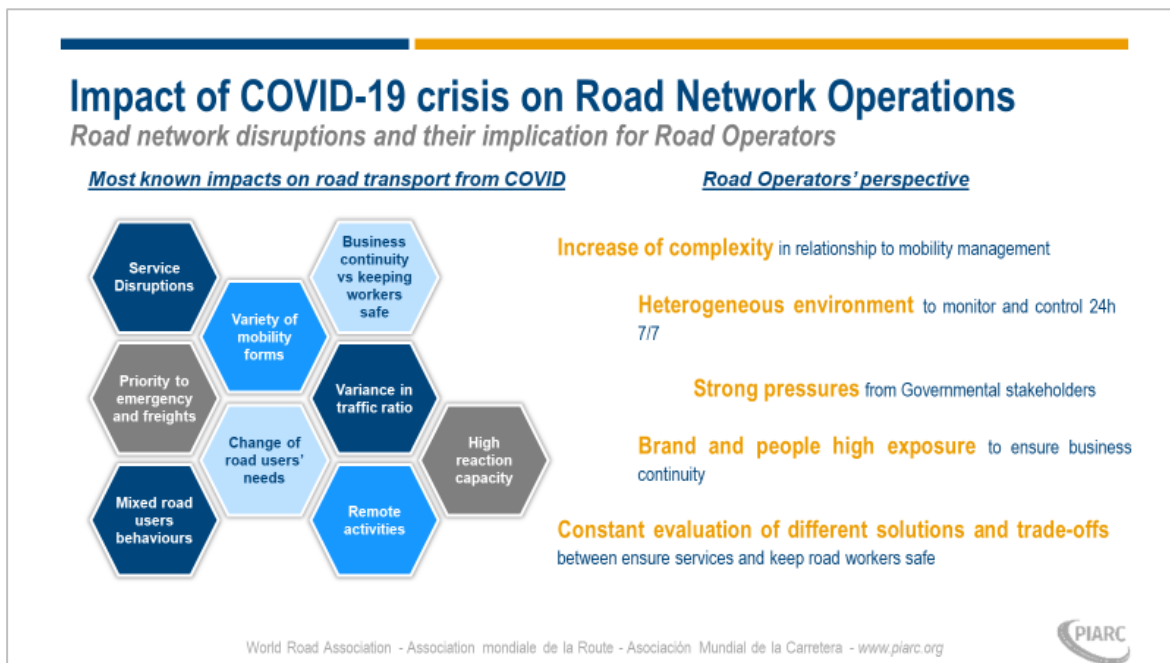
Experience has shown that these phases can actually happen simultaneously, not one after the other, but they remain a good framework for analysing priorities and options. Indeed, the pandemic is still raging in many parts of the world. **Public policies continue to evolve about COVID-19 containment and about fostering recovery.** Last but not least, the perspective of effective vaccines is a strong hope signal for the year 2021.

7.2. STRENGTHS OF THE ROAD SECTOR

Roads have remained open during the pandemic. Road transport has been able to maintain connectivity and to provide a lifeline to even the most remote places. This is true of passenger traffic as well as of freight traffic. This, in itself, is a major success for road administrations and operators.

Road operators have been impacted in all aspects of their work. The figure below appears in Chapter 6 already; it shows the most well-known impacts on road transport and the perspective of road operators:

Figure 7.1: Impact of COVID-19 on Road Network Operators



SOURCE: Figure from Valentina Galasso (Itay) presentation at PIARC webinar 29 July 2020

The pandemic has highlighted **the strategic and essential value of road transport** for social and economic survival and the unavoidable need to protect roads and their management to ensure mobility. PIARC’s series of webinars has made it possible to identify a number of good and noteworthy practices that have been implemented by different jurisdictions across the world.

The practices shared are very relevant since we are still obliged to adapt to the new circumstances as long as the current destabilising reality that is affecting the personal, social, working and economic lives of workers, individuals, communities, companies, administrations and countries continues.

Road and transport organisations have demonstrated their speed of reaction and adaptability to safely maintain daily activity in offices, road inspection, road maintenance (by their own means, contracted or concession), continue to manage road actions and mitigate as far as possible impacts on the supply chain and productivity, all while collaborating with many other agencies and stakeholders.

Road sector employees have continued their duties under conditions of acute professional and personal disruption and accompanied, in the private sector, by considerable stress, employee furlough and lay-offs. The impacts on the personal and professional lives of many working in the sector have been unprecedented: it is requiring to set up new roles, to find workarounds to problems

and innovate in how to continue to get the job done. Road workers deserve public recognition and appreciation, and there are lessons to be drawn from this flexibility.

7.3. DECLARATION OF EMERGENCY

- **Mandate authorities with appropriate emergency powers**
- **Be prepared to issue interpretative orders and instructions to ensure the provision of critical or essential services for the protection of people, property and places, and maintain activity in key (essential) economic sectors**

During the early stages of the pandemic, the overall goal of governments was to face the public health crisis head on and suppress COVID-19 transmission. In this situation, many authorities moved to Declare a State of Emergency (Alarm) providing special powers capacity, funding or flexibility to act and take extraordinary actions to handle the unprecedented crisis.

A critical aspect of these Declarations has been the ability of authorities issue interpretative orders and instructions to ensure the provision of critical or essential services for the protection of people, property and places, and maintain activity in key (essential) economic sectors. In many jurisdictions, the totality of the transportation sector was deemed essential in recognition of the critical services that it provides.

It is critically important however that these Declarations are free of ambiguous language and are clear to the extend of powers granted to the various jurisdictions. For example, early on, it seemed that there was not a clear understanding by many vendors/contractors on the application of the Force Majeure of a contract have been impacted in all aspects of their work.

7.4. ECONOMIC MEASURES TO SUPPORT BUSINESSES

- **Establish recommendations for contracts, especially for PPPs**
- **Plan to maintain road-related activity and business continuity**
- **Mitigate the economic and financial consequences of reduction in traffic**

As stated earlier, many jurisdictions have seen road work and road workers as essential and have taken measures to support the business during the early phases of the pandemic. However, one of the goals of the CRT is to identify opportunities for improvements in the future. This is therefore an area that needs to be continued to be looked into in order to prepare administrations for the future.

7.5. ROAD WORKS

- **Be alert and agile**
- **In certain cases, accelerate some maintenance works to take advantage of low traffic volumes, with operations adjusted according to the traffic decrease**
- **Secure access to adequate resources to ensure that work can be continued**
- **Investigate the feasibility of strategic stockpiles of material that could become in short supply in the event of global disruption of supply chains**

As already noted, road and transport agencies, and their staff, have emerged as an essential service for keeping key networks and facilities open and operational, especially for maintaining the movement of goods, supplies, services and workers, and the integrity of the supply chain.

While in some countries, construction work has been deemed an essential activity and it has continued despite the pandemic, in some other countries, we have seen a slowdown in the execution of development projects due to the impact on project financing, and access to the required resources when those are imported. **Balancing adequate resources in hand versus overhead for keeping them has to be considered.**

In many instances although, most road agencies made effective use of the opportunity to work under less traffic and safer conditions and were able to adjust and continue their road works programs.

7.6. DATA

- **Think about data as something of great value for road transport organizations**
- **Recognise that real time information is needed to meet the needs of users and operators**
- **Evaluate the power of partnership for data collection and management to drive innovation through road transport**

Our sector's response to the pandemic has been quick, exemplary. We have been able to deliver service within very reduced time frames, under severe constraints. We tried and it worked. This has changed customer, partner, and stakeholder expectations and we should anticipate that some of these changes are here to stay, especially in the way of conducting business. For example, customers might no longer accept responses that are not immediate or the lack of availability of information for even minor incidents.

These changes will involve all the mobility sector and transform the transport landscape: gaining the capacity of mastering data management in order to take data driven decision is something that every road agency or administration might want to face right now.

7.7. SECURITY

- **Recognise that physical security and cyber-security are essential for the application of the concepts related to resilience: prepare, prevent, protect, respond, recover**
- **Increase the security of I.T. systems**

The emergency has highlighted the importance of the ability for road organisations to deal with complex situations which require a multidisciplinary approach: labour, legal, financial, logistical, health skills and security. Work from home has also created new challenges for road authorities in dealing with cyber security.

At the same time, in this period, the strong increase of cyber-attacks, underlines the capital importance of a corporate security minded approach for integrated organizational processes, protocols and resources in order to respond to complex IT incidents. Cyber viruses must be taken seriously as they have the potential to cause disruption at the most inappropriate time

Biological and cyber viruses have a lot in common and a cybernetic pandemic scenario is among those that must be taken into consideration for the future. Nowadays, the roles of the security managers and of the departments of corporate protection are of primary importance for the application of the concepts related to resilience: prepare, prevent, protect, respond, recover.

7.8. DISASTER MANAGEMENT AND RESILIENCE

- **Address the resilience of roads, transport, road-related functions, connections with other modes and connections with other stakeholders as a whole**
- **Develop a disaster-resilient road network, securing road infrastructure in times of crisis**
- **Apply the Preparedness, Response, Recovery, Prevention/Adaptation model**
- **Be prepared to face additional disasters while facing a pandemic**

In the roads and transport sector specifically, differences between pandemics and other hazards are characterized by damage to road infrastructure and the impact on the traffic flow. In the case of many natural disasters, the damage to infrastructure is generally more serious and localized, and traffic flow in the affected area also suffers indirectly (e.g., through congestion, road closure).

The occurrence of a pandemic does not however preclude the occurrence of other types of disasters. Since the COVID-19 crisis commenced, the World has seen a range of other events in 2020 which have required urgent response. We have seen these take place during the last few months all over the world, from forest fires (Australia, USA) to hurricanes and typhoons (Caribbean, USA, Philippines, India, Bangladesh, Honduras) and on and on to other natural and man-induced disasters. The existence of a global pandemic has not removed or reduced the need to deal with such crises, help the victims, repair the damage and safeguard against future events. However, disaster response in such circumstances is constrained in capacity and flexibility of action by the ongoing context of the global pandemic.

Hence, in the post-COVID-19 era, it will be more necessary than ever to address the resilience of roads, transport and road-related functions. It is important to develop a disaster-resilient road network, securing road infrastructure in times of crisis, maintaining the inspection and diagnosis of roads using appropriate measurement and monitoring procedures and technologies, sharing information dynamically, deploying personnel and equipment and sharing experiences and best practices. It is also necessary to develop measures aimed at increasing the resilience of road transport in order to limit future impacts prior to an event occurring.

7.9. PASSENGER AND PUBLIC TRANSPORT

- **Restore citizen's confidence in collective (mass) public transport**
- **Analyze how the urban landscape shifts**
- **Look into how we can build flexibility in the infrastructure that we build to allow for the changing and uncertain mobility dynamics and expectations that our customer base is facing.**
- **Analyse how ITS can help public transit provide more reliable service**

Passenger transport, whether public or private, has been one of the hardest hit areas. In particular public transport has faced some extreme difficulties, from services entirely being suspended to severe declines in ridership and associated revenues, at a time when operating expenses are skyrocketing due to the new protocols that must be implemented for cleaning, disinfecting, and capacity reduction in order to maintain appropriate social distancing.

In addition, in the wake of the first wave and the reduction in service by public transport, many people in urban areas have reverted to active transportation modes. This has in turn encouraged cities and towns to look at their streetscape under a different light and to reconfigure streets to provide safe space for active transportation. COVID-19 has changed the transport world, especially in urban areas, and road infrastructure and road transport need to adapt and make the appropriate changes in order to better serve our public.

How should public transport adapt to public's demands for new hygiene and disinfection protocols, social distancing, and frequency and reliability of service? Public transit is facing all of these unknowns at a time of declining revenues. While PIARC is not directly involved in public transit, much of public transit operates on assets owned and operated by road agencies. This provides an opportunity to look into which PIARC TCs and TFs intersect with public transport and to work with partner organizations such as UITP to address these issues and build flexibility in our infrastructure to allow for the changing and uncertain mobility dynamics and expectations that our customer base is facing.

7.10. FREIGHT AND LOGISTICS

- **Establish guidelines/agreements on national/international level to keep freight moving during pandemics - keep key road networks and facilities open and operational**
- **Prepare and implement amendments to the law/regulations to have more flexibility regarding exemptions during pandemics or other disruptions.**

- **Support the digital transition for ITS solutions in logistics and freight transport to reduce physical handling and control processes and to minimize obstructions on traffic flows**
- **Prioritize investments for key freight corridors for economic recovery and good framework conditions for long distance road freight transport**

The freight sector is treated as a national priority in almost all countries. Maintaining freight movements is an essential task that cannot be compromised under any circumstances, especially for sectors such as pharmaceuticals, food and agriculture which are essential during a pandemic. Freight transport has continued operating, despite temporary border controls or closures. PIARC's TC on Freight has been instrumental in assessing the impact of COVID-19 on freight movement.

The following recommendations are a result of the webinars organized by the Response Team, including a specific one on freight, and the work of the TC.

7.11. INTELLIGENT TRANSPORT SYSTEMS

- **Focus on integration and management of the road network with an end-to-end and user-centered approach**
- **Consider low-cost ITS solutions as a valid option for road network operations, for all countries and for large and small jurisdictions. ITS does not have to be expensive to be effective.**
- **Even in ITS: Do not reinvent the wheel, and instead aim to benefit from others' experiences and knowledge**

Intelligent transport systems have proved their key role for road network management and have helped with communication with internal and external stakeholders, together with increasing the efficiency and effectiveness of the decision-making processes. In many cases they allowed for rapid data collection, analysis, and evaluation which helped shape decision-and road control measures. Effective data management will be central to understanding user perceptions, transport choices, policy decisions, and in collaborative work across public agencies and with the private sector.

7.12. ROAD SAFETY

- **Recognize the risk situations created by the crisis**
- **Identify local or network-wide measures for potential road safety improvements**
- **Educate and inform**

The COVID crisis has led to a series of unwanted behaviors: increasing speeds in less congested conditions, extreme speeding events, and driving under the influence of drugs and alcohol. Consideration should be given on how to reduce overall traffic speeds, using infrastructure, traffic management systems, enforcement and education in combination, to reduce risky driving behavior.

It is important to recognize the dynamic nature of the COVID 19 impacts. Given these changing conditions, the monitoring of network performance in real time is beneficial to being able to identify and select locations for potential improvement. However, not all countries have advance traffic management system available to collect and respond to incoming data. In all cases, dialogue and information from police, private society and public officials can be useful in identifying potential locations for intervention.

Moreover, some modal shift has also occurred or has been encouraged, e.g., more cyclists and pedestrians. They should be recognized as vulnerable road users. Appropriate measures are well known, e.g., in PIARC reports, and should be implemented.

7.13. WINTER SERVICE

- **Implement heightened precautionary measures to protect workers**
- **Learn from each other and employ techniques used by Southern Hemisphere agencies during the first wave of the pandemic**

One of the most critical functions of transport administrations is the winter service (operations) that they provide in order to maintain roadways open and safe to the traffic. To ensure that this essential service is continued uninterrupted, it is important to implement heightened precautionary measures. It is also important to learn from the experience of others and implement the best practices identified through that experience. At the beginning of the pandemic for example, the southern hemisphere was in winter while the second rebound wave of the pandemic is hitting the northern hemisphere during winter time.

7.14. WORKFORCE

- **Celebrate road workers**

In many cases, road employees are also “essential workers” with recognized roles, specific civic duties and ongoing roles to maintain public infrastructure and services and ensure continued mobility during a time of crisis. There are numerous stories of employees at all levels and across all functions carrying on, rising to the challenge, finding practical workarounds to short-term challenges and getting the job done. However, very little recognition has been given to these front-line employees relative to the service they perform. It is important for road sector agencies, as it is for all businesses, to find appropriate ways to celebrate these road workers and to recognize them for their service.

- **Apply health and safety protocols like all businesses**

The transportation sector is estimated to support approximately 60 million direct jobs across the world, many of them deemed essential and critical during the COVID-19 crisis. And even though this should be self-evident and fundamental, it is important to highlight the need for road sector agencies to take basic actions in order to protect their workforce. The body of this report provides lots of great ideas were shared through the webinars.

Putting in place general biosafety protocols and preventive measures, including mechanisms to detect and track infection and protect individuals from exposure to the virus is critical in order to ensure continuity of operations. This includes social distancing, with variable regulations, metrics and penalties, and reduction in maximum capacity of occupancy in offices.

- **Design work-from-home processes with care**

While a great number of road transport workers are field personnel and as such must report to the field for their duties, another great number of employees are assigned to offices. To ensure the health and safety of employees, it is important for road sector agencies to think and act like all businesses during this time of crisis and to allow eligible employees to Work from Home (WFH), especially for staff not assigned to a frontline and direct operational role

A proper WFH strategy will recognize that leading a workforce that is working remotely requires new thinking and an evolution in management styles and will support employees to ensure that they are staying physically and mentally safe.

- **Apply success factors that enable women to continue to thrive at work**

It is important to recognize the disproportionate impact which the crisis has on women workers.

- **Use technology wisely**

Many examples are available: it is possible to identify opportunities for staff to attend remote trainings, and to use virtual reality in order for experts to guide works remotely.

8. NEXT STEPS

The previous chapter 7 presents a series of technical recommendations. This chapter 8 presents how they could be implemented.

The publication of this Report represents a major milestone in PIARC's response to COVID-19. At the beginning of the pandemic, the PIARC General Secretariat, with approval from the President of PIARC and the Chair of the Strategic Planning Commission, has moved quickly to establish a PIARC COVID-19 Response Team. One of the primary goals of the new cross cutting team was to *"explore the rapid sharing of knowledge and practice between PIARC members in terms of the impacts of the pandemic and the associated economic and social crisis and the relevant responses"*. In looking back at the many webinars organized by the CRT, the number of Bulletins and Articles published, and the positive feedback received by many who attended the webinars, we can safely say that the Response Team is meeting the challenge.

While there are still a lot of unknown's relative to the progress of the disease, there are two things that we know for sure. First, that the Road Sector will continue to be facing COVID-19 related impacts not just in the next few weeks and months, but possibly for much longer. Second, that it is time to re-evaluate many of the road's and road transport sector's current practices, re-think our strategies and re-imagine our traditional approaches in order to better address the needs of our customers. If we thought before the pandemic that the needs of our customers were quickly evolving with the emergence of new disruptive technologies and business models, the "reality we are in right now" or the "new norm" that is going to re-emerge after the pandemic is over, will require new creative solutions for roads and road transport.

The following provides a blueprint for road authorities and operators as well as for PIARC .

8.1. PIARC'S RESPONSE

- **Remain agile to react to the continuously developing situation with COVID-19**
- **Continue the rapid sharing of information through webinars**
- **Focus on quick sharing of outputs such as articles and Bulletin Notes**
- **Coordinate within PIARC**

Even as we write, the Pandemic is lasting longer, spreading faster and having greater impacts than many of the early already pessimistic forecasts. The updated Strategic Plan 2020-2023 has taken into account the impact of such a disruptive element as the crisis caused by the COVID-19 pandemic and has moved to formally adopt the Response Team as a cross-cutting team across themes and to extend its ToR to the end of the cycle.

The CRT will continue to organize the rapid sharing of knowledge and information through webinars in the three languages of the Association and the publication of bulletins and articles. This approach has proved to be beneficial to many of the people who have been attending the webinars, but also served to raise the profile and standing of the Association through the volume and quality of work.

In addition, the impact of COVID-19 will be addressed individually by topics. It is expected that the impact of a crisis such as COVID-19 pandemic will be addressed in all Technical Committees and Task Forces dealing with issues that may be affected. What's more this important issue will also be addressed in a holistic and comprehensive manner, through the PIARC COVID-19 Response Team (CRT). It is also expected that COVID-19 will form points of discussion and debate at the Mid-Term Meeting with the CRT presenting their work and at Winter Congress and World Road Congress.

Many of the methods employed by the CRT have proven to be effective – and may offer inspiration and experience for how PIARC develops other working groups, especially where agility, flexible working and rapid decisions are required. PIARC and the CRT will continue to monitor the situation

and remain agile in providing valuable resources to the Association’s members. PIARC intends that there will therefore be further Technical Reports on COVID-19. These will be through the COVID-19 Response Team, but may be commissioned as a Special Project to allow the Resource Team to be more focused on the rapid sharing of information through webinars, articles, and bulletin notes.

8.2. MONITOR THE NEW TRANSPORT NORMAL

Figure 8.1: Mobility Patterns as a Result of COVID-19



SOURCE: Figure from Dennis Ganendra presentation (Malaysia) at PIARC webinar 13 May2020; and presented by Caroline Evans (Australia) presentation at PIARC webinar29 July 2020

- **Be on the alert: what is demand for transport going to look like from now on, including the work from home?**
- **How can we build some uncertainty into our models and processes?**
- **Pay even more attention to the needs of the users to be more “customer – centric”**
- **Do not lose focus of society’s pre-COVID expectations regarding GHG emissions, cost-efficiency, resilience, and service levels... They are still relevant**

The short- and long-term response to COVID-19 is presenting the road and road transportation sectors with multiple challenges. A new normal seems to be emerging in society in general with paradigm shifts in daily working and transport and change in users’ behaviors. This new normal will affect the road sector as well as society.

Management of roads will need to consider this new context (new expectations, budget constraints) and assess their impacts. This will help the road sector contribute to the return to most prosperous, sustainable, resilient and happier societies. Road authorities will be expected to provide sustainable road planning criteria & prioritization, innovation for maintenance, operation, and road works, create or strengthen communication channels to public and media. Indeed, even before COVID-19, transport sector was facing major changes in the way that people and goods move and how to manage this. As stated in a recent PIARC report 2019R21EN “Evaluating the transformation of Transport Administrations”, demographics, urbanization, big data, digitalization, future mobility technology and service models, environmental sustainability, and climate change were some of the major disruptors that road and transport administrations need to face. These challenges are still relevant.

The impacts of COVID-19 on travel behavior had some unexpected consequences relative to providing real proof of the carbon footprint of transport and its impact on GHG emissions. If societal expectations in many countries before COVID-19, were that road transport needed to reduce its carbon footprint, it has now become even more important. At the same time, road transport was

expected to help fight extreme poverty, improve access and mobility for all and increase road safety. These expectations have not changed, if anything, they are now more important to address.

8.3. CONTRIBUTE TO ECONOMIC RECOVERY

- **Recognise that roads are key for economies and societies (they stayed open during the crisis; road freight worked)**
- **Include investments in road infrastructure or road transport in national COVID-related economic recovery plans**

The prolonged and on-going duration of the pandemic has created not only a health crisis, but also a social and economic crisis. The longer the world remains under the threat of COVID-19, the more acute the economic crisis and social discrepancies become, and the higher the need for governmental intervention to stimulate and restart the economy.

Roads are key for economies and societies, as demonstrated in a recent PIARC report “The Contribution of Road Transport to Sustainability and Economic Development”. In some countries, investments in road infrastructure or road transport appear prominently in national COVID-related recovery plans, such as in Senegal (15,5% of full plan). Now the sector will have a vital role in the recovery too, if Governments prioritize infrastructure investment as an economic stimulus.

8.4. CONTINUE COLLABORATIONS WITH PARTNER ORGANISATIONS

- **Implement a global thinking approach to address global issues, not only look at ourselves (the road and road transport sector) but look to work with other partner and global organizations that are leading in particular topics**
- **Develop collaborations and engage with organizations that are relevant for the road sector, e.g., UITP for public transport, ITS for Mobility Management and ITS 2.0, etc.**
- **Monitor what specialized organizations recommend on non-PIARC topics that are relevant for the road community (e.g., workforce, security)**

Issues faced by PIARC members are sometimes not unique (e.g., workforce), and sometimes not solely linked to roads (e.g., equity and diversity, mobility management, public transport, and others).

The intense program of activities on COVID-19 that the CRT has undertaken has helped raise the Association’s profile and standing with its partners. For example, PIARC has participated in a webinar on Data Management & Efficient Mobility organized by China’s China Highway Transportation Society (CHTS) that featured young professionals. PIARC is also joining a REAAA webinar in December 2020 and is working with USA’s TRB to jointly organize a webinar in Q2 2021. These webinars allow PIARC technical experts to be featured and participate in partner events and create strategic connections between partner organizations and PIARC Technical Committees.

It is important to continue these collaboration activities and to identify strategic opportunities for further collaboration in other areas. The objectives are to learn from others, on transport related topics as well as on more general topics, and to raise the standing of road transport.

8.5. FILL GAPS IN EVIDENCE / EVALUATE

- **Evaluate all measures that have been implemented in a hurry during the crisis**
- **Identify actual user needs and policy demands; i.e., what is the “new normal”**

In the roads and transport sector, a wide range of responses have been adopted with varying degrees of application and success. Time has not allowed for a full-scale evaluation of these measures, to identify which ones are efficient, and under which conditions. A range of studies have

commenced from various public, academic and industry bodies but not yet at a point of drawing definitive conclusions.

A full evaluation and assessment of the information and practices contained in the 23 webinars organized by the CRT will need to be accomplished while at the same time continuing to be providing timely and relevant information. What is important right now is to identify areas in need of immediate information or areas that more attention is needed and work over the next few months in the organization of additional webinars in those specific areas.

8.6. SHARE KNOWLEDGE

This is PIARC's mission. Our work in the last months has validated it even more. During the unprecedented times of a global pandemic however, knowledge must be shared quickly and efficiently.

- **Promote the use of existing PIARC reports**
- **Promote the use of other available knowledge**

An early review of existing Technical Reports previously prepared by PIARC experts has revealed that a number of them, all available for download on the PIARC website⁵², are directly relevant to various aspects of the COVID-19 pandemic and crisis, either without modification or through some reinterpretation in light of the new circumstances. These Technical Reports can provide good guidance and proved to be invaluable tools during the early stages of the pandemic.

- **Engage with LMICs in particular**

There were many great recommendations and lessons learned from LMICs during the webinars. LMICs coped very well with the impact of the pandemic on their road transport systems. In fact, the main conclusion from the series of webinars is that those countries approached the crisis in ways and with tools that are very similar to those of high-income economies.

It is thus confirmed that all countries, whatever their level of economic development, can fruitfully contribute to the dialogue and learn from each other. In line with PIARC's mission, it will be important to continue engaging actively with LMICs, using relevant approaches and methods.

- **Continue providing a networking tool for people to connect**

In addition to the valuable information that was being shared by the presenters during the webinars, the Response Team observed that many times attendees took advantage of the "chat" function of Zoom to connect with each other, ask questions, share information, and assist each other. With employee moral being affected by the on-going WFH isolation, providing a relief valve to be with colleagues from around the world to just chat and chill out is proving to be beneficial.

- **Analyze the survey, renew it when appropriate**

After more than 5 months of providing information through webinars, the response team looked to conduct a comprehensive survey to assess how road administrations, road operators and other road transportation organizations best deal with and manage the COVID-19 outbreak.

While the survey responses have yet to be fully analyzed, it is recognized that the information collected provides a picture in time based on the responders experience as of the time of submission. Given the complicated nature of the on-going pandemic and its evolution across the globe, it is therefore important to look at periodic follow-up surveys that could provide additional insight to PIARC experts and used in deriving recommendations on policy and practice.

⁵² <https://www.piarc.org/en/activities/Search-Publications-PIARC?q=&after=1986&before=2020&sort=date>.

8.7. CONCLUDING REMARKS

While it can be debated among scholars and members of the Response Team on whether the COVID-19 pandemic was a “Black Swan” event or not, this was an event without precedent in our lifetimes and beyond our normal expectations. The impacts of COVID-19, social, economic and in terms of human suffering will be felt for years to come. Despite the unprecedented nature of the COVID-19 pandemic, PIARC has stepped up and responded, in its own terms and through collaboration with others. True to its Vision and Mission, PIARC stepped up and created the forum for the rapid exchange of ideas and provided significant value to its member by responding to their needs during this time.

All of that was possible because the Association remained agile and flexible at the beginning of the pandemic, avoided bureaucratic pitfalls, and reacted very quickly to establish the PIARC COVID-19 Response Team to help address that need.

The Response Team broke new grounds, using new collaboration tools and established new norms on how to get things done quickly. The Team’s “Just Do It!” approach delivered valuable information in a very short amount of time. Instead of being inhibited by the time zones differences, the Team took advantage of them and extended the day so that at times someone was practically working on advancing things on a 24-hour basis.

Even though many of us never had the opportunity to ever meet in person as we are working on different strategic themes and technical committees, the common goals shared by all and team approach allowed us to quickly break down any barriers and work together not only across Technical Committees and Strategic Themes but also with partner organizations.

As we are bringing this Report to a close and we are beginning our plans for 2021, we have to begin reimagining what the future will be. What we learn is that we need to start from the view point of the customer and road transport users’ expectations. Have they changed? What new policies should be developed? What are the available resources to be put towards these expectations? What is the new revenue situation going to be?

The world has changed and PIARC stands ready to face the new normal with confidence, courage and foresight. We are ready to reimagine a better future and provide the vision and resources to our members to achieve that.

In closing, we are proud of the knowledge shared and engagement with road and transport professionals across the World. For that we are for ever grateful and indebted to the members of the COVID-19 Response Team and others who stepped up. Our sincere thanks and appreciation to the members of the COVID-19 Response Team, our knowledgeable presenters and panelists for sharing their work and ideas with us and to PIARC’s many partner organizations for their collaboration and cooperation on many of our webinars.

For roads and road transport, COVID-19 has presented specific challenges:

How should roads and road transport help to overcome the pandemics?

How can roads and road transport help to fight the economic crisis and move towards a “new normal”

How should longer term policies and initiative in roads and road transportation be adapted to cope with the new realities and the challenges presented by COVID-19?”

(Oscar de Buen, Past President of PIARC, 26th July Seminar)

APPENDICES

A – COVID-19 RESPONSE TEAM TERMS OF REFERENCE

B – SUMMARY OF PIARC COVID-19 WEBINARS

C – MOBILITY AND CONGESTION DATA FROM SELECTED WORLD CITIES

D – LIST OF FIGURES

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APPENDIX A – COVID-19 RESPONSE TEAM

The original Terms of Reference for the COVID-19 Response Team (CRT) were drafted in late March 2020. A revised version, with expanded membership and extended timescale, was produced in late August 2020 and incorporated into the PIARC 2020 – 2023 Strategic Plan as part of second update of the Strategic Plan⁵³ issued in October 2020.

The updated Strategic Plan 2020-2023 has taken into account the impact of such a disruptive element as the crisis caused by the COVID-19 pandemic. This pandemic is a global health and social emergency that requires effective, supportive and immediate action. In this sense, road transport, being an essential service to maintain the movement of workers, goods, supplies and key services, has to remain operational. Moreover, COVID-19 and its effects are expected to last for some time and have medium and long-term consequences for administrations and agencies in the road and road transport sector.

Therefore, while it is expected that the impact of a crisis such as COVID-19 pandemic will be addressed in all Technical Committees and Task Forces dealing with issues that may be affected, the expectation is that this important issue will also be addressed in a holistic and comprehensive manner, through a Response Team, the PIARC COVID-19 Response Team (CRT). The CRT organizes a rapid sharing knowledge of the impacts of and responses to the pandemic and the economic and social crisis it has caused, proposes and implements specific short-term actions, tracks the course of the pandemic and studies medium and long-term implications of the pandemic among PIARC members and even external stakeholders.

The CRT will work in coordination with the Technical Committees and Task Forces. In this way, the impact of COVID-19 will be addressed both individually by topics while having a general overview. The approved ToR for the CRT are provided below for completeness.

STRATEGIC THEME – CROSS CUTTING

PIARC COVID-19 Response Team (CRT)	
Strategies / Objectives	
<ul style="list-style-type: none"> • Explore the rapid sharing of knowledge and practice between PIARC members in terms of the impacts of the pandemic and the associated economic and social crisis and the relevant responses. • Propose and implement specific short-term adaptable actions to support PIARC member organizations, individual members, and professionals in the roads and transport sector, in facing the pandemic. • Track the course of the pandemic and advise on further actions that need to be taken by the Association and others, as the World and PIARC members move through the crisis and into the recovery period. • Advise on what considerations should be given to studying the medium- and long-term implications of the pandemic on the roads and transport sector, and how these should be reflected in PIARC activities. • Undertake and publish technical reports, surveys and other analysis of the pandemic and its impacts on the roads and transport sector, on its own or in collaboration with other industry bodies and stakeholders. • Present its activities, findings and recommendations (including lessons learned) during various PIARC’s meetings or alternative channels from time to time at the request of the General Secretariat. 	

⁵³ <https://www.piarc.org/en/PIARC-Association-Roads-and-Road-Transportation/strategic-plan>

Since its emergence at the end of 2019, the COVID-19 virus pandemic has caused severe disruption to individuals' lives, to organizations and to the delivery of goods and services across the World. Like public agencies in multiple sectors, PIARC members are affected as well and taking various actions to respond. Many PIARC members are also being thrust to the forefront, as governments look to them to maintain critical lines of supply and to keep essential workers and goods moving.

With the pandemic, and its impacts, having greater duration and complexity than initially expected and now expected to last into 2021, and possibly beyond, PIARC has moved to established a formal PIARC COVID-19 Response Team (CRT).

Furthermore, it is recognized that the ideas and examples shared through the CRT are shared to support timely and mission-critical responses by road and transport agencies in tackling the COVID-19 pandemic and they are shared in the spirit that a good idea now could save lives, improve business resilience and minimize disruption of services.

In some instances, issues identified through the work of the CRT, whether they were presented in webinars or included in articles and synthesis notes, may not necessarily represent official policy of PIARC or its members. These ideas and examples will be subject to further evaluation by the CRT and the appropriate TCs and TFs in delivering recommendations for policy and practice in due course.

Outputs	Expected Deadlines
• Webinars	• On-going
• Synthesis Notes	• On-going
• Full report for Phase I	• December 2020
• Full report for Phase II	• December 2021

CRT Composition

The Team will be chaired by the PIARC Secretary General, or an appointed designee, and will include the following members, who are required to make active and ongoing contributions to its activities and outputs:

- Patrick Mallejacq, Secretary General, PIARC (Chair) (FR)
- Christos Xenophontos, Rhode Island DOT, TC 1.1 Chair (USA)
- José Manuel Blanco Segarra, Ministerio de Transportes, Movilidad y Agenda Urbana, TC 1.1 Spanish Secretary (ES)
- Jonathan Spear, Atkins, TC 1.1 WG 2 Leader (UK)
- Fabio Pasquali, ANAS S.p.A, TC 1.2 Chair (IT)
- Caroline Evans, National Transport Commission, TC 1.4 Chair (AU)
- Yukio Adachi, Hanshin Expressway Engineering Co, TC 1.5 Chair (JP)
- Andrea Simone, University of Bologna, TC 2.1 Chair (IT)
- Valentina Galasso, Deloitte Consulting, TC 2.4 Chair (IT)
- Martin Ruesch, Rapp Trans Ltd, TC 2.3 Chair (CH)
- Pascal Rossigny, CEREMA, TC 3.3 French Secretary (FR)
- Saverio Palchetti, ANAS S.p.A., TF 3.1 Chair (IT)
- Andrea Peris, Paraguay National Committee (PY)

APPENDIX B – SUMMARY OF PIARC COVID-19 WEBINARS

B.1 THE FOUR FIRST WEBINARS HELD FROM 25TH MARCH TO 8TH APRIL

The first four webinars helped establishing the key emerging issues that transport administrations, road operators and the transport sector in general were facing due to the multiple impacts of COVID-19. Three webinars in English, and one in Spanish, were held between 25th March and 8th April 2020, and they were aimed at gathering broad representation from high- and low-income countries that, to varying degrees, were already affected by the pandemic and were facing it in various areas. The countries participating were Italy, Spain, Japan, USA, UAE/UK, China, Colombia, Chile, Paraguay, Argentina, Mexico, Greece, and Australia plus staff of PIARC General Secretariat.

The webinars presented the virus/road evolution and situation in various countries plus, in first webinar held in English on 25th March:

- Details on initiatives of Italy in innovation (Saverio Palchetti, Italy, ANAS S.p.A, Direction Institutional and Media Affairs, PIARC TF 3.1 Chair)
- Approaches & measures adopted in Spain in general and concerning road and transport (José Manuel Blanco Segarra, Spain, Directorate-General for Roads, MITMA, ATC Road Financing Committee Chair, PIARC TC 1.1 Secretary)
- And the case of Business Continuity Plan and Action adopted in an Expressway in Japan (Yukio Adachi, Japan, Executive Director, Hanshin Expressway Engineering Co., Ltd, PIARC TC 1.5 Chair)

In the second webinar, also in English, held on 1st April:

- The impact on Transportation in USA (Jim Tymon, USA, Executive Director, AASHTO, PIARC National Committee of the USA Chairman)
- The private sector perspective from UAE (Jonathan Spear, UAE/UK, Atkins Acuity Director Transport Policy & Planning, Atkins Fellow, CIHT Fellow and Chair of Dubai Group, PIARC TC 1.1 Joint Lead WG2)
- Recommendations from PIARC TC2.4 RNO & ITS (Valentina Galasso, Italy, Deloitte Senior Manager, PIARC TC 2.4 Chair)
- And the approach measures taken and considerations in China (Dr. Jian Wang, China, Researcher CATS, A/E-20 Performance Management Committee of TRB)

The third webinar was the first one in Spanish and it was held on 7th April. The presentations were:

- Update of measures taken in Spain (José Manuel Blanco Segarra, Spain, Directorate-General for Roads, MITMA, ATC Road Financing Committee Chair, PIARC TC 1.1 Secretary)
- Measures adopted in Colombia to address crisis and reactivate economy for people, business, projects, and institutions (Juan Esteban Gil Chavarría, Colombia, INVIAS General Director)
- General measures and measures for passenger transport and for administrative activity plus measures of the Road Directorate in Chile (Ernesto Barrera Gajardo, Chile, Road Directorate National Head of Conservation, PIARC ST 1 Coordinator)
- The clear position adopted by Paraguay for ensuring health and safety of public works workers and employees in ensuring continuity of construction, considered the engine of the country economy (Juan Manuel Gómez Salas, Hugo José Florentín, Paul Sarubbi Balansa, Dora Amarilla y Rocío Notario. Speaker Andrea Peris, Paraguay, APC Communication Coordinator, PIARC Communication Commission)

- Measures adopted in Argentina and their results and some first conclusions with some focus in ITS (Daniel Russomanno, Argentina, AAC Board of Directors, President of the Argentinian ITS Civil Association, PIARC TC 2.4 Secretary)
- Measures adopted in Mexico regarding cargo road transport, public transport, toll highways and continuity of telecommunications plus first considerations on achievements and challenges (Roberto Aguerbere Salido, Mexico, IMT General Director, PIARC First Delegate of Mexico)

The fourth webinar was held on 8th April and was started by a summary of the preceding webinars in English and 10 emerging issues, made by above mentioned Jonathan Spear, and a Summary of the previous webinar in Spanish, made by Miguel Caso Flórez (PIARC Technical Director). Then the presentations were:

- Socio-economic contribution of the tollway sector and COVID-19 current consequences & future threats for it, in Greece (Bill M. Halkias, President of IRF Geneva Programme Centre, Managing Director & CEO Attica Tollway Operations Authority).
- The Australian perspective and approach regarding Freight & Logistics looking at the whole supply chain, and regarding Construction projects looking to bring contracts online if possible (Alan Colegate, Australia, Main Roads Western Australia Executive Director Strategy and Communications, PIARC TC 1.1 Secretary and Joint Lead WG1)
- And the Italian view of “public” vs “mass” passenger transport, when consider exiting COVID-19 crisis, and the emotional dimension proposing not talk “about public” vs “private” but “collective” vs “individual” (Tomasso Bonino, Italy, SRM Reti e Mobilità Technical Manager, UITP Organising Authorities Committee member, PIARC TC2.1)

Transport as an essential service, road maintenance as well, the pandemic as disruptive factor leading to permanent changes, the need of rapid and general measures for immediate and effective response, the need of measures for efficient management, the importance of provision of services or facilities to transporters and workers, and the economic considerations, were among the aspects that many of the speakers highlighted, as well as the usefulness of sharing and discussing among professionals to draw much-needed lessons in these dramatic times the world was beginning to go through.

Some main aspects on which there was no unanimity in this first step of pandemic, were:

- On thinking about the reactivation and how carry it out
- Determination of non-essential activities, works and services and the enormous cost of suspending
- Under what conditions will what is suspended be resumed
- The question of taxis, ride-hailing, car-sharing or rental etc.
- The question of keeping, or not, tolls and if accepting paying cash
- Partial or total suspension of construction works
- Staff for the inspection of works and concessions
- Identification of the most necessary works when reactivation

B.2 THE SIX WEBINARS FROM 15TH APRIL TO 30TH APRIL

The forthcoming webinar, on 15th April, was focused in COVID-19 Transport Policy & Resilience, and featured presentations from:

- Italy (Fabio Pasquali, Italy, ANAS SpA Chief Economist – Planning Department, CEDR Co-leader of WG Network Governance, Teacher of Development Economics and Policy at University of Roma Tre, PIARC TC 1.2 Chair) regarding the economic consequences for a NRA of COVID-19 initial phase, the state of the market in the following phase, and the possible role and measures of NRAs so speed up the process of recovery
- IATR (Matthew W. Daus, IATR President, Transportation Technology Chair CUNY-UTRC, CCNY), regarding transportation impacts and emergency actions in USA and Canada, the results of a Survey on responses to COVID-19 outbreak and potential new and future regulations on mobility
- Norway (Gordana Petković, Norwegian Public Roads Administration, PIARC TC 1.4) on the main topics for their Road Administration: safety of staff, transport of good and passengers, continuity of construction and maintenance work and if a resilience approach “match” a pandemic threat
- And from UK (Mark Stevens, Chair of ADEPT Engineering Board and Assistant Director Operational Highways Suffolk County Council and David Ogden, Amey Highways Sector Director, PIARC TC 2.4), the Highway sector’s overview and collaborative response to COVID-19 for accelerating recovery, public perceptions, and current challenges and opportunities for the supply chain

In the first webinar in French language (the sixth one, held on 17th April) covered:

- The condition and decisions in Burkina Fasso (Souleman Oussiman, GEFA 1C Managing Director, PIARC TC 2.2)
- The business impact, the condition, decisions, management of transport and maintenance and road construction during pandemic in Benin (Joseph Ahissou, PIARC TC 1.1 Secretary and PIARC Benin First Delegate)
- The condition in Wallonia (Belgium), containment measures adopted, and effects on road operation (Dominique Verlaine, Public Service of Wallonia – mobility and infrastructure, Department of Infrastructure Operations, PIARC TC 2.4)
- And, finally, the evolution in Tunisia, and the condition of its road transport and road industry and decisions adopted to preserve jobs and sustainability of SME and liberal professionals, and to resume activities (Slah Zouari, ATR President, PIARC Tunisia First Delegate)

Economic issues were rising so, in the webinar held on 22nd April was presented:

- The impact on freight analysed by a French motorway company (Olivier Quoy, France, Atlandes CEO, PIARC TC 2.3 WG1 Leader)
- The timeline and road network operation measures adopted in Portugal in operations and maintenance, and the description of its Road Operators Stakeholders Map and of its public and private road sector (Ricardo Tiago, Portugal IMT Responsible for the C-Roads, PIARC TC 2.4) and Vasco Gonçalves (Portugal, IMT, PIARC TC 2.4)
- The scope and initiatives of Uganda road agency (UNRA), and the economic and operational impact and responses adopted by Government and UNRA plus questions going forward (Mark Henry Rubarenzya, UNRA Head Research and Development, IRF Africa Board member, PIARC TC 1.4, PIARC Uganda First Delegate)
- And finally, from Italy was presented financing and procurement procedures, the emergency procedures, the limits of those and proposed solutions (Francesco Longo, ANAS S.p.A Project Manager, PIARC Italy TC 1.3 Deputy Chair, PIARC TC 1.3 Co-leader WG1)

On 23rd April the second webinar in Spanish was held in which the recovery began to be thought of as an opportunity for major change:

- Andorra presented the pandemic evolution, measures adopted in transport and mobility and the opportunities of a new paradigm when recovery (David Palmitjavila, Andorra, Andorra Head of Road Maintenance and Operation, PIARC Coordinator in Andorra and member of the PIARC Communication Commission)
- Mexico presented on the perspective of road transport logistic operators, the COVID-19 logistics, actors and resources, and the continuity plans in general (Carlos Santillán Doherty, Mexico, ciaO CEO, PIARC TC 2.3)
- From Spain was presented the approach of the Directorate General of Traffic dealing with COVID-19 management and its impact on mobility, and in road safety, development of tools to characterize mobility through mobiles, as well of some opportunities in the context of crisis and conclusions highlighting COVID-19 as disruptor for digital transformation (Ana Luz Jiménez, Spain, Directorate-General for Traffic, Traffic Coordinator in Seville, Ceuta and Melilla)
- USA presented on the impact on the economy and supply chains and reviving the economy after the health crisis with a strategic perspective (Rafael Díaz, Old Dominion University, TRB member).
- Finally, Ecuador outlined the situation, the importance of the logistic corridors and the severe restrictions adopted on mobility (Milton Torres, President of the Ecuadorian Society of Transport Engineering, SEIT); presentation prepared by Belén Suárez (Ecuador, SEIT)
- A summary of the 7 webinars held so far was presented by José Manuel Blanco Segarra, (Spain, Directorate-General for Roads, MITMA, ATC Road Financing Committee Chair, PIARC TC 1.1 Secretary)

In the following two webinars (one in English and the other one in French) most speakers talked on issues arising above mentioned as ensuring health and safety, business continuity, impact on transport, and security.

So, in the English webinar held on 29th April:

- Poland presented its road agency (GDDKIA) and how is dealing with pandemic, maintaining continuity of investments, not suspending works, how is organised the border control and rest areas, and the impact in traffic volume and in road safety (Szymon Piechowiak, Poland, GODKIA Spokesman and Deputy Director in the General Director's Bureau)
- Michel Démarre (France, SEFI-FNTP Senior International Advisor and PIARC TF 1.1 Secretary) presented on the CICA (Confederation of International Contractors' Association) response to COVID-19 on ensuring employees H&S, maintaining activity and business continuity, business relations and Security
- Switzerland presented on first impacts on travelling: daily trips, activity spaces, distance travelled by gender, employment, income, transport mode, etc. and some questions emerging (KW Axhausen, J Molloy and C Tchervenkov, IVT ETH Zürich)
- And Japan presented the three pillars of Japan strategy to combat COVID-19, impact on transportation and in behaviour modification of passengers and measures adopted for ensuring H&S, maintaining activity and business relations and customer and stakeholder relations and joint working (Jun Takeuchi, Japan, NEXCO-Central Director of Human Resources Division and International Affairs Division, PIARC ST 3 Technical Advisor)

In the French webinar held on 30th April 2020:

- France presented the health and transport crisis in the nation, the transport management and some observations on the global health crisis and elements for discussing on the way out of the crisis, regarding metropolises, path and duration of the exit, and the need of a collective vigilance on a number of issues (André Broto, France, Vinci Autoroutes Advisor, PIARC ST 2 Coordinator)
- Ivory Coast presented the case of their country, the Government response plan and Key measures and the impacts on transport sector and national economy (Djan Fanny, Cote d'Ivoire, AGEROUTE Ivory Coast Transport Economist)
- Michel Démarre (France, SEFI-FNTP Senior International Advisor and PIARC TF 1.1 Secretary) presented now in French, the CICA (Confederation of International Contractors' Association) response to COVID-19 on ensuring employees H&S, maintaining activity and business continuity, business relations and Security
- Valentina Galasso (Italy, Deloitte Senior Manager, PIARC TC 2.4 Chair) provided PIARC's TC 2.4 recommendations on the role of ITS in operations, and an overview of applications during the COVID-19 crisis and highlighted PIARC Technical reports and draw some conclusions on the application of ITS technology during the crisis

As stated above, a second PIARC Note, dated on 18th May, was then drafted summarizing the findings from the six webinars held from 15th to 30th April confirming the evidence base on the COVID-19 pandemic gathered from the first four webinars.

B.3 THE FIVE WEBINARS IN MAY. START OF WEBINARS FOCUSED ON A SPECIFIC SUBJECT

The 11th webinar, held on 6th May marked the beginning of a very intense month of May and it was the first webinar completely focused on a specific aspect, in this case: Freight and Logistics, as far as it had proved to be a hot topic. Five speakers from Australia, Poland, South Africa, USA and the IRU (International Road Transport Union) presented on:

- Freight and Logistics Supply Chain in Queensland (Australia), COVID-19 Challenges, measures, and impacts (Christina Heffner, Queensland, Australia, Department of Transport and Main Roads, Executive Director Governance, Freight and Partnerships, PIARC TC 2.3)
- Freight and Logistics Issues in Poland and lessons learnt (Piotr Macuk, Poland, GODKIA Head of Administrative Proceedings Unit, PIARC TC 2.3)
- South Africa's Roads Operations, freight movement and logistics, and conclusions about Post COVID-19 Crisis interventions to be adopted (Layton Leseane, SANRAL Projects Manager)
- Impacts on Texas – Mexico Border Truck Freight Cross-Border (Caroline A. Mays, USA, Texas DOT, Director, Freight, Trade and Connectivity Section, PIARC TC 2.3, Leader WG3)
- Presentation of IRU and importance of road transport services in responding crisis (Jens Hügel, Senior Advisor IRU)

The third webinar in Spanish, held on 12th May brought together speakers from: Mexico, Italy, Spain, Argentina, Paraguay, and Spain:

- Mexico presented the COVID-19 impact on the Road Program, the “planned measures that have come to stay”, the role of roads in the economic crisis and the change coming (Salvador Fernández Ayala, Mexico, SCT, General Director of Road Maintenance)
- From AISCAT Emanuela Stocchi (Italy, AISCAT Director of International Relations) presented the responses of the Italian road sector, suspension of toll collection, user relations and gave an overview of the ASECAP (European Association of Operators of Toll Road Infrastructures) view and response and lessons learned for the future.

- From Spain a reflection was set out regarding urban transport, being his guiding thread: the importance of cities, what motivates displacements and the complex and vicious circle of urban transport, COVID-19 impacts, sustainable road planning criteria and the ERTRAC package of measures to achieve sustainability goals (Andrés Monzón de Cáceres, Polytechnic University of Madrid, Advisory Council of MITMA, President of Spanish Transport Engineering Forum, Chairman of Urban Mobility Group of ERTRAC, Founder of ECTRI).
- From Argentina was presented the new reality of roads in the province of Buenos Aires: situation after health crisis (new normality), semi-permanent and permanent measures, the role of roads in mitigating economic crisis (identification of productive investment), and a strategic reflection (Héctor Hugo Escalada, Argentina, Province Buenos Aires Roads Deputy Administrator)
- And Paraguay highlighted the positive impact of public works on the economy and its National Development Plan 2030 and several observations in the framework of economic reactivation (Fabio Bladimiro Riveros Peña, Paraguay, MOPC Road Planning Director).
- Webinar ended with conclusions and twelve ideas to take away, by José Manuel Blanco Segarra (Spain, Directorate-General for Roads, MITMA, ATC Chair Road Financing Committee, PIARC TC 1.1 Secretary)

The webinar held on 13th May included speakers from China, Mexico (COCONAL), Malaysia and Mexico (Mexican Institute of Transport):

- The Chinese speaker (Xie Hongbing, PR China, DCE of MBEC, PIARC TF 3.1) presented MBEC as well as his experience during Wuhan self-quarantine and prevention measures taken in projects.
- Mexico (COCONAL) set out on Roads operation during COVID-19, how to conduct road works, the impact on traffic revenues and maintaining relations with authorities and suppliers (Héctor S Ovalle Mendivil, Mexico, COCONAL CEO, PIARC TC 1.3 and TF 3.1)
- The Malaysian experience was outlined on: COVID-19 impacts in the Region, the Malaysian Response, the impact on Constructions, road transport, toll roads, public transport and ports & logistics sector, plus the way forward through short- and long-term measures (Dennis Ganendra, Minconsult Sdn Bhd Chief executive Officer, Fellow of the Institution of Civil Engineers UK, Fellow of the Institution of Engineers Malaysia and Fellow of Institution of Highways and Transportation)
- And Mexico (IMT) again exposed on the actions to address pandemic from a resilience perspective focused in Transport corridors, transport restrictions & closed municipalities plus actions in Freight Transport, Public Transport, Toll Highways, Federal Road Network, Intercity Passenger Transport and continuity of Telecommunication and broadcasting services (Roberto Aguerrebere Salido, Mexico, IMT General Director, PIARC Mexico First Delegate) and Juan Fernando Mendoza Sánchez (Mexico, MIT, PIARC TC 1.4 Secretary)

“The Impact of COVID-19 on Women in Transport” was the only subject of the single-theme webinar held on 15th May in which the various aspects of this growing issue were discussed by:

- Jeff Turner (UK, HVT Programme) setting the scene and, at the end of the webinar, presenting Summary and actions
- Louise Cathro (UK, HVT Programme) introducing the HVT Programme
- Christos S. Xenophontos (USA, Rhode Island DOT, PIARC TC 1.1 Chair) introducing the PIARC COVID-19 Response Team Efforts

- Anna Wild-Persson (Sweden, TRAFIKVERKET Chief Strategy, PIARC TC 1.1 WG3 Co-Leader) introducing the PIARC TC 1.1 WG3 Organization of Staff and Human Resources as well as KPI as a strategy to promote equality in the Swedish Transport Administration and some examples of COVID-19 short term impacts with regard to women in the workforce in Sweden
- Gina Porter (UK, University of Durham) on Women's mobility and transport in three African cities since COVID-19 onset
- Fatima Adamu (Nigeria, Usman Danfodiyo University Sokoto & Nana Girls and Women Empowerment, Sokoto) on COVID-19 Response, Public Transport Policy and Prospect for Women post-COVID-19 in Nigeria
- Claire Clarke (ITF Deputy Women's Officer) on women transport workers' rights and COVID-19
- And Naomi Mwaura (Kenya, Flone Initiative) on Impact of COVID-19 on women professionals working in the public transport industry in Nairobi, Kenya

The 15th webinar held on 20th May was also a single-theme webinar, this time dedicated to economic and financial aspects of COVID-19:

- Francesco Sciaudone (Italy, Grimaldo Studio Legale and Grimaldi Alliance Managing Partner, PIARC Italy TC2.5 member, PIARC TC 1.3 Chair) set out about different approaches on legal qualification of COVID-19, contract remedies and about COVID-19 impact on construction contracts and Government measures, all this in the framework of wording of each contract, and exposed relevant final remarks
- Jean -Max Gillet (France, Next Road Engineering Special Advisor, PIARC TC 1.3 Secretary) presented on the French general situation from 11th May (end of containment), the situation in public works and building industry, and he posed several "questions without answers" (for now)
- Flavio di Pietro (Italy, Webuild SpA Executive Vice-President, special lecturer at the Polytechnic University in Milan, PIARC TC 1.3) presented on Post-Pandemic Recovery and impact & potential mitigation actions and he also posed several questions to be answered
- Fabio Pasquali (Italy, ANAS SpA Chief Economist – Planning Department, CEDR Co-leader of WG Network Governance, Teacher of Development Economics and Policy at University of Roma Tre, PIARC TC 1.2 Chair) displayed the general picture of COVID-19 and presented on Assessing road projects regarding economics, funding, funding in the PPP scheme and several Take-away

B.4 THE SEVEN WEBINARS IN JUNE AND JULY

The 16th webinar held on 3rd June was the third consecutive mono-thematic webinar, devoted in this case to Impact of COVID-19 on urban transport:

- Tommaso Bonino (Italy, SRM Reti e Mobilità Technical Manager, UITP Organising Authorities Committee member, PIARC TC2.1) exposed on COVID-19 Phase>1 Urban mobility beyond mass transport and re-shaping local infrastructures & rules
- Lei Zhang (Maryland, USA, Director of Maryland Transportation Institute, University of Maryland) exposed on Interactive COVID-19 Impact Analysis Platform for Situational Awareness and Decision Support based on Mobility Data, their current results and next steps to develop in collecting and integration of mobility/travel data for public health policy scenario analysis

- André Broto (France, Vinci Autoroutes Advisor, PIARC ST 2 Coordinator) presented on COVID-19 Impact on transport in large metropolitan areas in the short and medium term, exposing the mobility trends in France in the last decades, reopening public transport from Lock Down to re-opening, and about the question, from Lock Down to a new mobility? And importance of social expectations
- Andrea Simone (Italy, Professor DICAM Department Alma mater Studiorum University of Bologna, PIARC TC 2.1 Chair) presented the case of Milan and Bologna (Italy) in creating livable urban spaces as a response to COVID-19
- Karen Vancluysen (European POLIS network) dealt with Opportunities and threats for urban mobility in the aftermath of COVID-19, exposing the cities that are stepping into the frontlines, how are coming out from lockdown, respacing streets, some triggers for change, results of a mobility survey, and the need of an integrated multimodal sustainable urban mobility ecosystem
- Dionisio González (UITP, Director of Advocacy & Outreach) exposed on Cities for people and supporting public transport as a key enabler to build back better through sustainable urban mobility strategies

On 10th June was held the fourth webinar in Spanish (and the recording video was posted on PIARC's YouTube channel to reach more people and answer their questions in writing) with six speakers plus conclusions:

- Marina Domingo Monsonís (PIARC Communications Manager) set out the PIARC Institutional Presentation.
- Oscar de Buen Richkarday (Mexico, Ainda Energía & Infraestructura Chair, UNAM Board of Directors member, Past President of PIARC) provided an overview on the fundamental objectives of contemporary transport, main lines of work, examples of ongoing activities, the three steps of the response and questions plus conclusions
- Juan Esteban Gil Chavarría (Colombia, INVIAS General Director) on the evolution of COVID-19, impact on infrastructure projects, measures adopted and actions for economy reactivation
- Euclides Sánchez Almánzar (Dominican Republic, MOPC Vice-Minister of Roads, Representative of the Dominican Republic in DIRCAIBEA) presented the measures taken by the MOPC to combat COVID-19 plus investments in roads after pandemic
- Ricardo Octavio Paula López (Ecuador, MOPT Vice-Minister of Transport Infrastructure) exposed the effects of pandemic and strategies for reactivation of construction sector and road infrastructure
- Susana Magro Andrade (Spain, Madrid City Hall, Deputy Director of Mobility Planning, PIARC TC 2.1) outlined the effects of the health crisis on Madrid mobility, provided a reflection on what will happen and presented the five axes of the Madrid Mobility Plan.
- Jaime Campos Canessa (Chile, Road Directorate Head of Road Safety Department, PIARC TC 3.1) presented on Traffic data in Chile, road safety development and trend during pandemic, current road operations and operation of the road management and some conclusions
- Finally, José Manuel Blanco Segarra (Spain, Directorate-General for Roads, MITMA, ATC Road Financing Committee Chair, PIARC TC 1.1 Secretary) presented conclusions clustered into four subjects: general impacts and approaches, road network operations, freight and logistics, construction works and economic impacts and future resilience planning

The 18th webinar was held on 17th June and was dedicated exclusively to how new technology can help address the various impacts of COVID-19 crisis on roads and road transport. The four speakers were:

- Seonha Lee (South Korea, TOMMs CEO, Professor Kongju National University, PIARC TC 1.1), dealt on Maintaining social distance by an appropriate pedestrian system, presenting background, the study area, methodology and results
- Mr. Chandrasekar (Singapore, Group Director, Traffic and Road Operations Group, PIARC TC 2.4) and Ms Wee Ping Koh (Singapore, Deputy Chief Specialist, Road & Traffic Specialist and Deputy Director, Traffic Analysis & Projects, PIARC TC 2.4) presented the Singapore experience on COVID-19 Impact on Traffic, Public Transport and Road Maintenance, outlining key observations on roads, situation of electronic road pricing and its special review, impact to maintenance obligations and some positive social impact
- Martin Margreiter (Germany, Technical University of Munich, Founder and Partner of Mobility Partners, Consultancy for Traffic and Mobility, Director Innovation Hub Central of EIT Urban Mobility, PIARC TC 2.4) exposed on COVID-19 Impact on Traffic Modes focusing in Germany, Bavaria and Munich and presenting results of Survey on mobility behaviour change in Germany as well as current research on mobility simulation in COVID-19 times for evaluation of pedestrian behaviour and risks
- Graham Kingston (UK, Egis M40 Business Optimisation & Hand Back manager) presented on Utilising Technology for smarter working, introducing Egis M40 London-Birmingham project, the obligations of operations and maintenance and the digital network display technology

The accompanying webinar held on 1st July was also dedicated to a single issue, in this case Organisational Impacts and Responses from managers and employees because, as was stated by Patrick Malléjacq in the webinar Introduction, towards the end of April there has begun to be a shift in planning towards restarting economic and social activity and now is needed to start thinking about pandemic in different phases rather than a single event, and to begin planning the post-crisis phase and as management and staff need to be able to handle changes the question is, how can this be achieved? The four speakers were:

- Laurens Ellis (Atkins Acuity, Middle East & Africa, Senior Manager, People Advisory) presented Leading Teams through COVID-19, dealing with implications for organizations globally, remote working & challenges, lessons learned regarding personal adjustments & roles, and actions
- Paola Filice (Italy, ANAS SpA Industrial Relations and HR Administration) exposed measures adopted in the first steps, then the following ones including measures to support families and solidarity initiative
- Brandye Hendrickson (USA, AASHTO Deputy Director) presented “Impacts to State Departments of Transportation Workforce”: Financial, Construction and Maintenance activities, Operational, Workforce and Organizational
- Kinini Mathews (Lesotho, Ministry of Transport Road Safety Department, HVT) presented the case of Ministry of Transport of Lesotho: COVID-19 effects on transport sector, potential long-term impacts, intervention measures responses from managers and a conclusion

On 7th July was held the third French webinar. Claude Van Rooten (PIARC President) made Introduction on “What is PIARC”, its four key missions and one key concept. After that, the four speeches were:

- Patrick Malléjacq (France, PIARC Secretary General) exposed about “The problems encountered by Road Operators and Administrations” and how PIARC has tentatively structured the analysis around six key questions.
- Anna-Marie Leclerc (Canada-Québec, Assistant Deputy Minister of Engineering and Infrastructure of the Ministère des Transports du Québec, PIARC Canada First Delegate and PIARC Honorary President) presented “Canada-Quebec. Adapting the response to Covid-19 to everyone realities: the role of the actors” describing the general measures, as well as those aimed to associations and companies, users and those specific of the Transport Ministry regarding essential services, continuity, teleworking, internal communications and end of lockdown
- Emmanuelle Freneat (Egis Engineering, Associate Director General) presented “Impacts of the fight against the COVID-19 pandemic on Motorway operation maintenance” on the road network operated by Egis in 16 countries and measures adopted for business continuity, the impact on activities and some challenges of the recovery phase
- Mohamed Laye (Senegal, AGEROUTE Head of Major Road Works Division) presented impact of pandemic on transport sector, Government Response Programme, measures adopted by Ministry and AGEROUTE, implications for procurement and ongoing projects, and Post-COVID19 Recovery Plan
- From France, Sandrine Rousic (CEREMA, Project Manager in the Spatial Planning Department, PIARC TC 2.1 Secretary) and Pascal Rossigny (CEREMA, Head of the Asset Management Business Area, PIARC TC 3.3 Secretary) presented, in one hand, “COVID-19 impact on activity in France” and considerations on post-confinement situation, freight transport, and procurement, and in the other hand on “Mobility difference as a result of COVID-19” dealing with biking, key figures, measures and guides to encourage cycling, and also about evolution of road traffic

The 21st webinar, held on 9th July was the fifth in Spanish and the six speeches were:

- Fabio Pasquali (Italy, ANAS SpA Chief Economist – Planning Department, CEDR Co-leader of WG Network Governance, Teacher of Development Economics and Policy at University of Roma Tre, PIARC TC 1.2 Chair) presented on “Implications for PPs toll roads and prospects for contract renegotiation” dealing on the overall picture of it and the need to review and renegotiate facing a new and uncertain world
- Héctor Varela (CAF Chief Executive) presented on “Roads and CAF, allies against COVID-19 in Latin America) providing details about the development of its portfolio from roads, what CAF does, a diagnosis of Latin America, an industry overview and regional challenges
- Luiz Guilherme Rodrigues de Mello (Brazil, DNIT Director of Planning and Research, Assistant Professor – federal University of Brasilia) presented “COVID-19 and Roads in Brazil” providing main DNIT (National Department of Transport Infrastructure) figures and deliveries plus measures regarding COVID-19
- João Carvalho (Portugal, AMT President, Vice-president of DIRCAIBEA) presented “COVID-19 and Roads in Portugal: measures, impacts and perspectives”: state of emergency and Contingency Plan, main figures in the framework of the mobility transport ecosystem, road specific measures, impacts and development prospects and evolution perspectives
- Héctor S Ovalle Mendivil (Mexico, COCONAL Director, TC 1.3 and TF 3.1) presented on “COVID-19 and Roads in Mexico: PPP vs COVID-19”: contract based, and pay-per-user based contracts, impact on transit revenue and several ideas on action, revision and contact with stakeholders

- Gonzalo Alcaraz (IRF, Switzerland, Head of Innovation) presented on "COVID and roads: shaping the recovery for the road sector": the three IRF strategic pillars, the current opportunity to rethink our priorities and what kind of mobility we want and the four lines of action in the post-COVID recovery for the road sector plus some recommendations
- José Manuel Blanco Segarra (Spain, Directorate-General for Roads, MITMA, ATC Road Financing Committee Chair, PIARC TC 1.1 Secretary) presented the summary and conclusions of the webinar

The single-theme webinar on COVID-19 and Road Safety held on 15th July has been the last one before the Final Session. Six speakers presented the situation and measures adopted in their countries:

- John Milton (USA, Washington State DOT, State Safety Engineer, PIARC TC 3.1 Chair) presented the USA experience in COVID-19 and Road Safety providing details on impacts in travel volume and comparisons between Europe and USA, effect observed in speed, crashes and fatalities, and highlighted the opportunities PIARC Road Safety Manual
- Rob McInerney (CEO of iRAP, former PIARC TC C1 Secretary) presented "COVID-19 stimulus to save lives" and explained about iRAP partnerships, global policy figures and targets, the business case for investment and several successes achieved
- Jun Takeuchi (Japan, NEXCO-Central Director of Human Resources Division and International Affairs Division, PIARC ST 3 Technical Advisor) presented "COVID-19 Impact on Transportation in Japan" dealing on pandemic evolution, road administration policy with and post-COVID-19 highlighting the relevant to road safety
- Mariusz Kieć (Poland, Assistant Professor at Cracow University of Technology) presented "Impact of COVID-19 on Road Safety in Poland exposing about COVID-19 in Poland, changes in road user's behaviour, changes in frequency and severity of crashes in road safety, measures to mitigate COVID-19 effect in road safety, and a reflection on what is needed
- Jaime Campos Canessa (Chile, Road Directorate Head of Road Safety Department, PIARC TC 3.1) presented "COVID-19 and roads in Chile" exposing about Chile's road data, context of road safety and evolution during COVID-19, current road operations, how the Road Directorate does and conclusions

B.5 FINAL WEBINAR ON LESSONS SO FAR AND WAY FORWARD

Finally, to close this long and intense cycle of webinars that had begun on 25 March, the Response Team organised the Final Session webinar whose objective will be "COVID-19 and Roads. Lessons so far and way forward". In this webinar, after the introduction of Patrick Malléjacq (PIARC Secretary General), took the floor first the following speakers:

- Oscar de Buen Richkarday (Mexico, Ainda Energía & Infraestructura Chair, UNAM Board of Directors member, Past President of PIARC) with an Introductory Speech on "COVID-19 knowledge and information sharing and way forward" accompanied by several reflections and conclusions
- Young Tae Kim (ITF Secretary General) with a Keynote Speech on "ITF and the COVID-19 Crisis" devoted to: new world, where are we going? ITF remaining fully operational despite COVID-19 crisis, and as way forward, the ITF COVID-19 Transport Briefs, and several recommendations for Sustainable Recovery
- Christos Xenophontos USA, Rhode Island DOT, PIARC TC 1.1 Chair () and Valentina Galasso (Italy, Deloitte Senior Manager, PIARC TC 2.4 Chair), both Response Team members, presented "The Success of the PIARC Webinar Program", introducing the Response Team,

its Key Concept, Key issues and results in engagement, website, Notes and webinars with strong participation worldwide

The remaining speakers of the Response Team then presented, according to the different areas, the lessons learned:

- José Manuel Blanco Segarra (Spain, Directorate-General for Roads, MITMA, ATC Road Financing Committee Chair, PIARC TC 1.1 Secretary) on “Management of Roads during crisis, business continuity”
- Valentina Galasso (Italy, Deloitte Senior Manager, PIARC TC 2.4 Chair) on “The role for the enhancement of RNO (Road Network Operations) within COVID-19: Lessons learned so far and way forward.
- Caroline Evans (Australia, National Transport Commission - Principal Policy Analyst, PIARC TC 1.4 Chair) on “PIARC Response to COVID-19: Passenger transport & resilience”
- Martin Ruesch (Switzerland, Head of Traffic and Transport Planning Unit in Zurich, PIARC TC 2.3 Chair) on “Logistics and Freight Perspective”
- Jonathan Spear (UAE/UK, Atkins Acuity Director Transport Policy & Planning, Atkins Fellow, CIHT Fellow and Chair of Dubai Group, PIARC TC 1.1 Joint Lead WG2) on “Evaluating the Early Impacts on Employees in the Transport Sector”
- Saverio Palchetti (Italy, ANAS S.p.A, Direction Institutional and Media Affairs, PIARC TF 3.1 Chair) on “Security and COVID-19”
- Fabio Pasquali (Italy, ANAS SpA Chief Economist – Planning Department, CEDR Co-leader of WG Network Governance, Teacher of Development Economics and Policy at University of Roma Tre, PIARC TC 1.2 Chair) on “Evolution of travel demand and economics in a COVID-19 era”
- Christos S. Xenophontos (USA, Rhode Island DOT, PIARC TC 1.1 Chair) on “Wrap Up and Next Steps”

Questions and Answers were moderated by Robin Sébille (PIARC Deputy Secretary General) and to conclude the webinar, took the floor María del Carmen Picón (Spain, Chair of PIARC Strategic Planning Commission and Vice-Chair of Spanish National Committee in PIARC ATC) who exposed on PIARC’s Mission and Strategy, PIARC’s Strategy & COVID webinars, and about PIARC’s Communications & COVID-19 webinars, and Patrick Malléjacq (PIARC Secretary General) gave a final farewell encouraging to know and share the content of the webinars.

APPENDIX C – MOBILITY DATA FROM SELECTED CITIES

Data as of 26th November 2020

Notes:

The **Tomtom Congestion Index** represents the relative difference of average congestion levels in 2020 from standard congestion levels in 2019. Daily and weekly differences are based on weighted averages derived from hourly data. Each week starts on Monday and ends on Sunday. The daily standard congestion level for each weekday represents the daily average for that weekday over 2019. The weekly standard congestion level represents the mean of average weekly congestion levels in 2019. The values range from -1 to 1.

Tomtom Traffic Index

https://www.tomtom.com/en_gb/traffic-index/

Google Mobility Indexes from **Google Community Reports** show how visitors to (or time spent in) categorized places change compared to our baseline days. A baseline day represents a normal value for that day of the week. The baseline day is the median value from the 5-week period Jan 3 – Feb 6, 2020.

Community Mobility Reports, Google

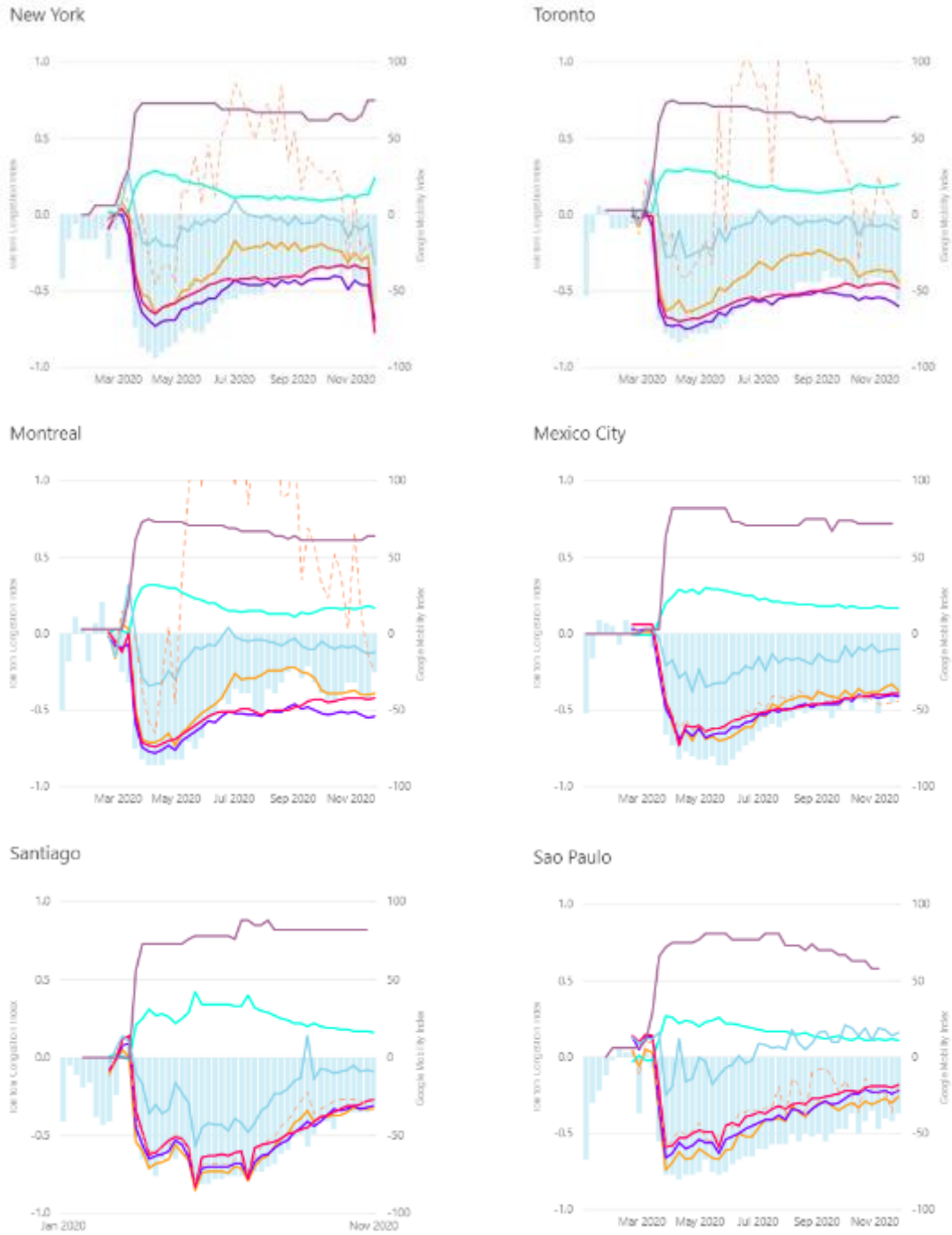
<https://www.google.com/covid19/mobility/>

The Government Stringency Response Index records the number and strictness of government policies. The index is published in the Oxford COVID-19 Government Response Tracker and is calculated using publicly available information on 17 indicators of government responses. Eight of the policy indicators (C1-C8) record information on containment and closure policies, such as school closures and restrictions in movement. Four of the indicators (E1-E4) record economic policies, such as income support to citizens or provision of foreign aid. Five of the indicators (H1-H5) record health system policies such as the COVID-19 testing regime or emergency investments into healthcare. The values range from 0 to 100.

Coronavirus Government Response Tracker

<https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>

North and South America



Legend

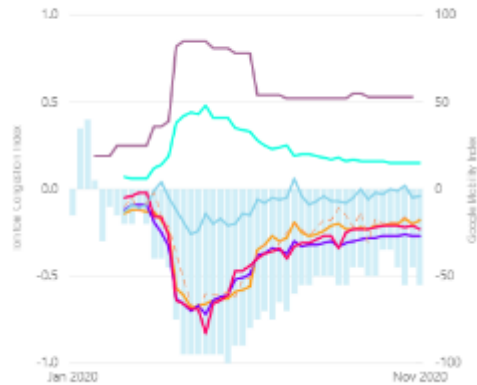
- Tomtom Congestion Index
- Retail and Recreation
- Residential
- Transit Stations
- Workplaces
- Groceries and Pharmacy
- Parks
- Government Response Stringency Index

Asia

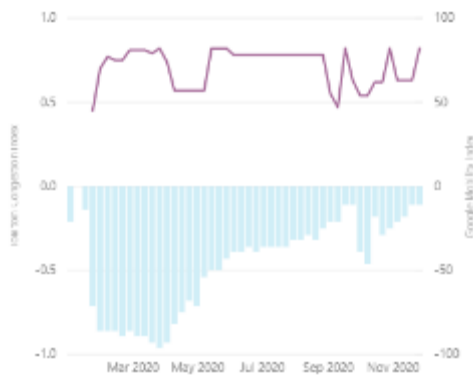
Dubai



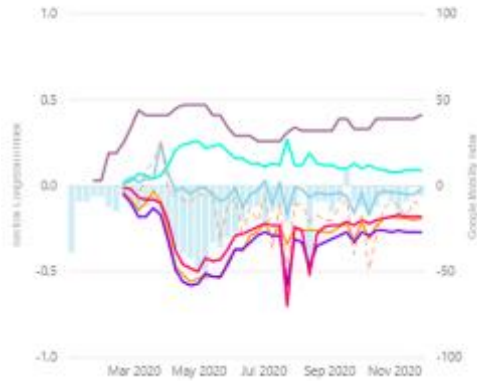
Singapore



Wuhan

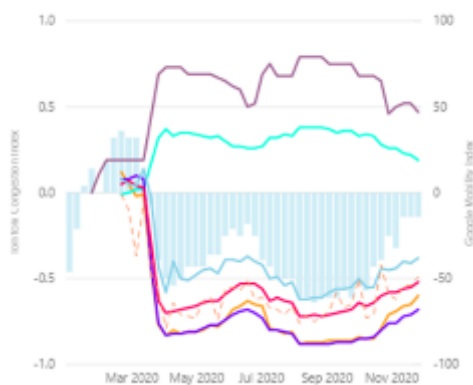


Tokyo



Africa and Oceania

Melbourne



Johannesburg

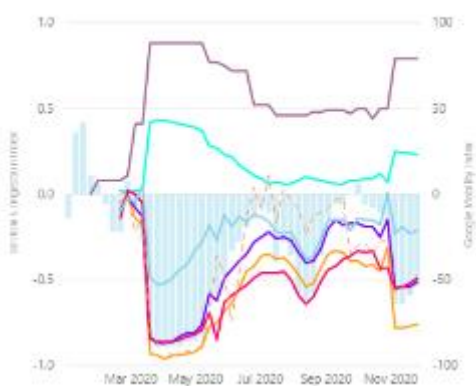


Legend

- Tomtom Congestion Index
- Retail and Recreation
- Residential
- Transit Stations
- Workplaces
- Grocery and Pharmacy
- Parks
- Government Response Stringency Index

Europe

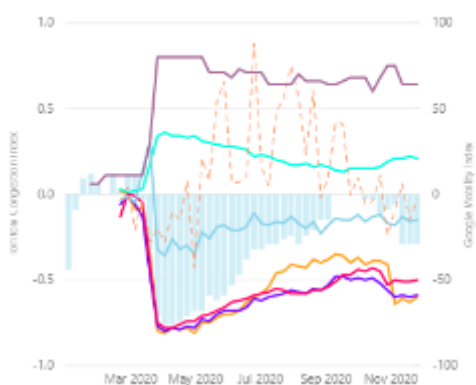
Paris



Madrid



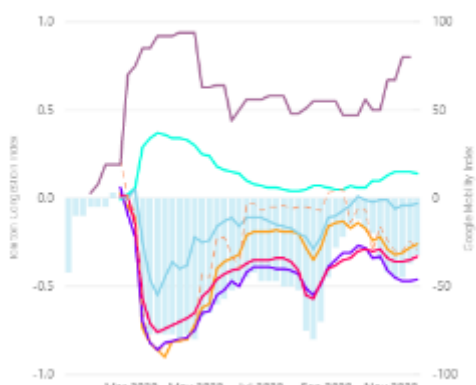
London



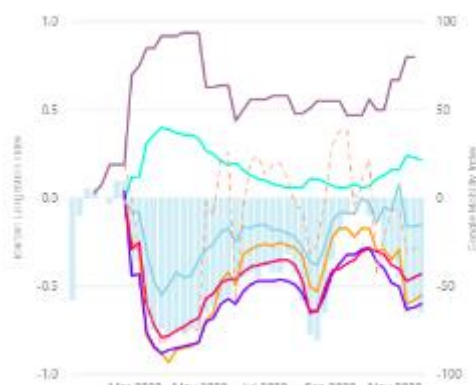
Athens



Rome



Milano



Legend

- Tomtom Congestion Index
- Retail and Recreation
- Residential
- Transit Stations
- Workplaces
- Grocery and Pharmacy
- Parks
- Government Response Stringency Index

APPENDIX D – LIST OF FIGURES

Figure 2.1: Incidence of COVID-19 across the World (2nd December)

Figure 2.2: Changes in Key Mobility and Congestion Indices in Selected Global Cities during COVID-19 Pandemic

Figure 2.3: Reopen – Recover – Reimagine Framework and Roadmap

Figure 2.4: Disaster Management Cycle

Figure 3.1: Overview of PIARC COVID-19 Response Team

Figure 3.2: Webinars Organised by the PIARC COVID-19 Response Team

Figure 3.3: Dimensions of Change During COVID-19 Pandemic

Figure 3.4: Other Bodies Involved in PIARC COVID-19 webinars

Figure 4.1: Summary of PIARC COVID-19 Webinar Activities

Figure 5.1: Example of COVID-19 Pandemic Evolution within a PIARC Member Country

Figure 5.2: The Three Cs to Reduce COVID-19 Transmission

Figure 5.3: The role of innovation to face the COVID-19 Pandemic

Figure 5.4: Road Checks on Vehicles and People During COVID-19

Figure 5.5: General and Road and Transport Sector Responses to COVID-19

Figure 5.6: Responses to COVID-19 from Road and Transport Organisations

Figure 5.7: Health and Safety of Road Workers During COVID-19

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