

# HANSHIN EXPRESSWAY

60 years of integrated experience  
from planning to maintenance

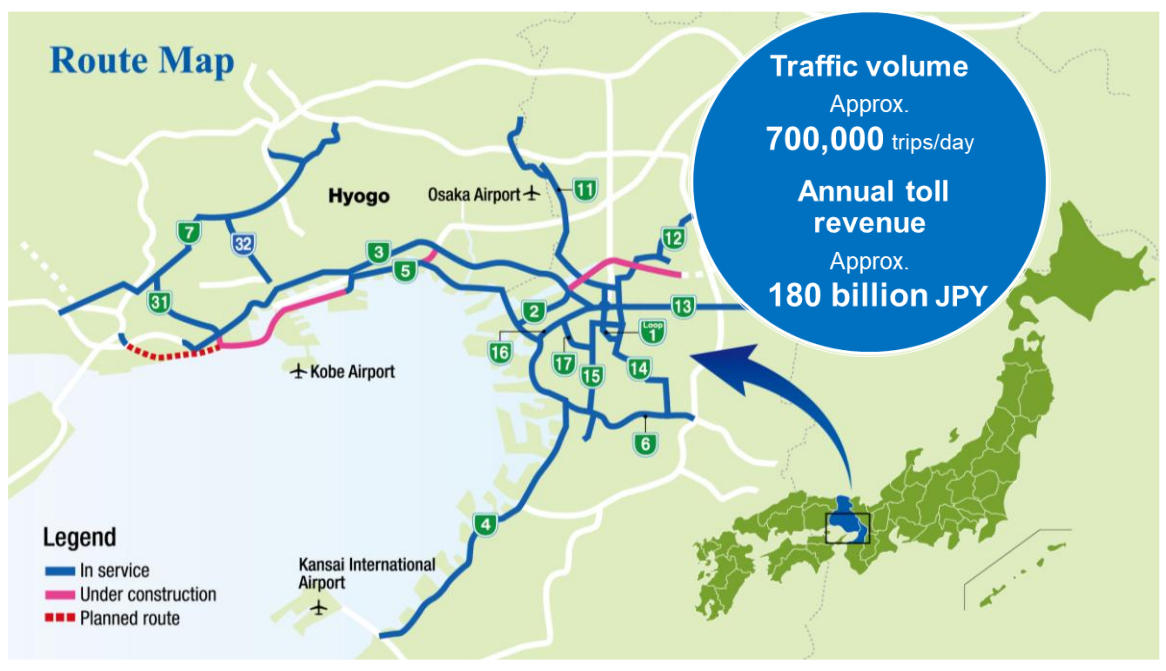
Autoroute Hanshin

60 ans d'expérience intégrée, de la planification à la maintenance

 HANSHIN EXPRESSWAY CO., LTD.



***258.1 km in Operation***  
***28.9 km under Construction***



# Long-Span Bridge Resilience

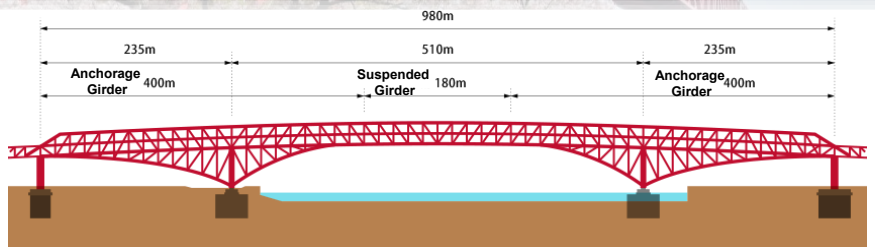
## Seismic Technology and Innovative Inspection

### Résilience des ponts à longue

#### Technologies parasismiques et inspection innovante



|                           |                                |
|---------------------------|--------------------------------|
| <b>Open to Traffic</b>    | <b>July 15, 1974</b>           |
| <b>Bridge Type:</b>       | Three-span Gerber Truss Bridge |
| <b>Foundation Type</b>    | Pneumatic Caisson              |
| <b>Steel Weight</b>       | 41,000 tons                    |
| <b>Construction Cost:</b> | ¥25 billion                    |



## Seismic Safety Improvement

During the 1995 Kobe Earthquake, six sections of the Hanshin Expressway collapsed or tilted, underscoring the need for seismic safety and their role as lifelines. In response, we adopted a resilience-based approach, focusing on control and recovery rather than mere resistance.



### Seismic Isolation

The deck is separated from the main structure to allow sliding during earthquakes.

- Sliding bearings let the deck move.
- Rubber bearings help return the deck to its original position.

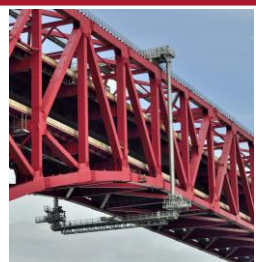
### Seismic Damping

Minato Bridge is the first long-span bridge to use damping braces.

- The braces absorb earthquake forces by stretching and compressing, preventing damage to other parts of the structure.

## Efficient Bridge Inspection – Dr. RING

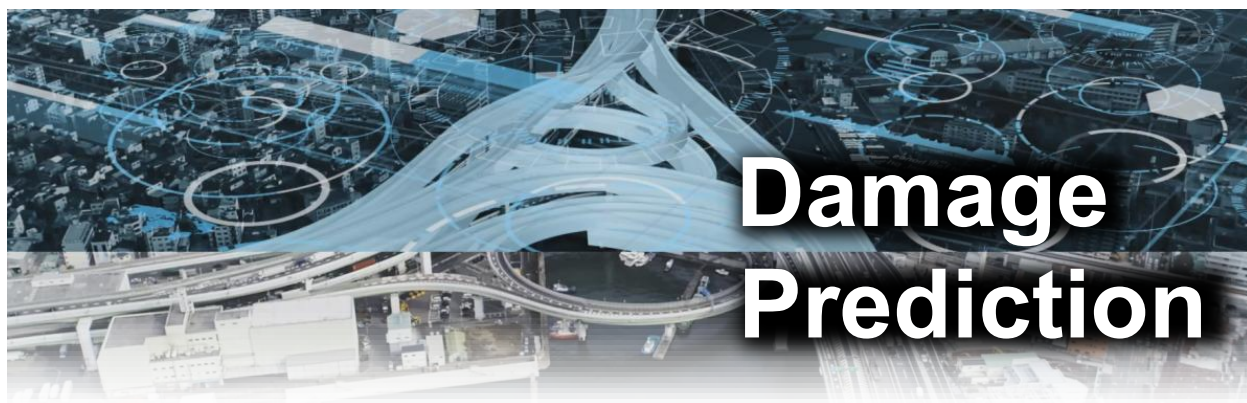
Repair & Inspection equipment for *Nanko Gate* (Dr. RING)  
 Minato Bridge, located at the entrance of Osaka Port, has a complex structure that makes scaffolding difficult. Hanshin Expressway has developed Dr. RING, a new inspection vehicle since 2016, aiming at improving safety and inspection quality. Dr. RING has a rectangle shape that moves vertically to access the underside of the bridge. It also includes safety features that do not hinder ship operations and reduce sway caused by the wind.



# Expressways as Lifelines

## Resilience against Seismic Challenges

Les autoroutes comme infrastructures vitales  
Résilience face aux défis sismiques



## Damage Prediction

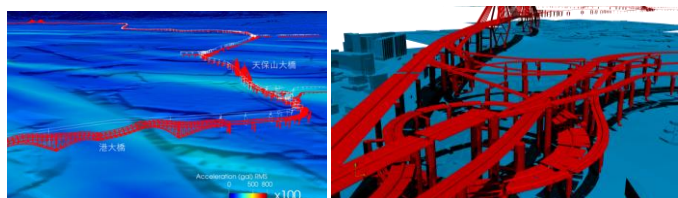
### Cyber Infrastructure Management

Using sensor technology and robots to collect data, we recreate the infrastructure of the Hanshin Expressway in a cyber (virtual) space. Based on various simulations—such as future aging, earthquake damage, and traffic impacts—we make decisions to optimize road management in the physical (real) space.



### Large-Scale Simulation Using Supercomputers

We conduct ground response analyses using multiple seismic sources, simulating earthquake damage across the network to evaluate the bridge structure damage on the route and measure section levels.



## Knowledge Transfer



### Insights from the 1995 Kobe Earthquake

The 1995 Kobe Earthquake severely damaged the Hanshin Expressway. We faced unimaginable conditions and worked tirelessly for early restoration. The 34 components here show the earthquake's power and actual damage. Earthquakes cannot be avoided, but sharing knowledge can help reduce future disaster damage.



[Visit the Earthquake Museum](#)



# Driving Toward Decarbonization

## Sustainable Practices in EXPWY Operations

Engagement en faveur  
de la décarbonisation

Pratiques durables dans l' exploitation autoroutière



# Sustainable Renewal

## Kire-Uriwari Bridge Replacement project

Hanshin Expressway is implementing a renewal project to ensure the safety, comfort, and long service life of its structures. Due to aging, some sections require major rehabilitation to prevent severe damage. The project involves replacing and upgrading entire bridge structures to meet modern standards and improve durability and performance.

The Kire-Uriwari Bridge Replacement Project was carried out because the central hinge section of the aging PC box girder bridge had subsided, making reinforcement impossible. The new bridge is a steel structure designed for a 100-year service life, incorporating high-performance steel decks and permanent scaffolding to significantly improve maintainability and durability. This project also introduced a world-first removal method.



# Sustainable Road Construction

## Low-Carbon Concrete

In the Kire-Uriwari project, we have promoted decarbonization by replacing high-CO<sub>2</sub> cement with low-carbon materials such as calcium carbonate that absorbs CO<sub>2</sub> and supplementary admixtures. This approach has achieved a negative CO<sub>2</sub> balance for materials and realized carbon-negative construction through cast-in-place work on the central median.

