Nippon Road's Initiatives for a Carbon-Free, Recycling-Oriented Future

Nippon Road : initiatives en faveur de la décarbonation et d'une société circulaire

The Nippon Road: Integrating Technology and Environmental Responsibility

We are ready to achieve carbon neutrality.

Mokulock	Biochar Asphalt Concrete	PET Asphalt Concrete	Waste fishing net PET Asphalt Concrete
			
Wood chips	Biochar	NEWTLAC 5500	NEWTLAC 5500FN
			

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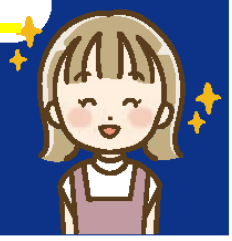
Biochar Asphalt Concrete

Biochar Asphalt Concrete

Wait—can roads really reduce CO_2?

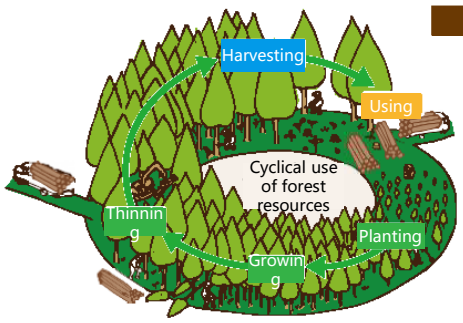
Reducing atmospheric CO_2 by storing it in roads

Biochar Asphalt Concrete



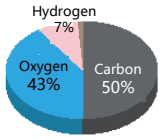
Let me explain.

Wood absorbs CO_2 from the atmosphere during its growth and stores it as carbon. Sawdust generated as a by-product at sawmills is press-molded into bar-shaped briquettes and carbonized at 800°C under oxygen-free conditions to produce charcoal. Offcuts generated during this process are crushed and classified to produce biochar, which is used in the pavement. Through carbonization, volatile components are greatly reduced, and a high carbon content (approximately 91%) is achieved. The resulting biochar has a stable crystalline structure as recalcitrant carbon, enabling long-term carbon fixation over approximately 100 years.



Sawmill

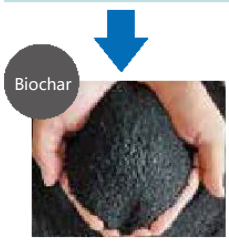
Sawdust

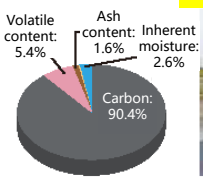


Fine wood waste generated during lumber processing.

By minimizing air intrusion and carbonizing at 800°C under oxygen-free conditions, a recalcitrant crystalline structure is formed while preventing combustion from progressing.

Biochar Asphalt Concrete is a mixture in which a portion of the fine aggregate is replaced with biochar. With an asphalt recycling rate as high as 99.5%, it achieves a highly circular material system, allowing carbon to remain stored in the pavement indefinitely as long as recycling continues.

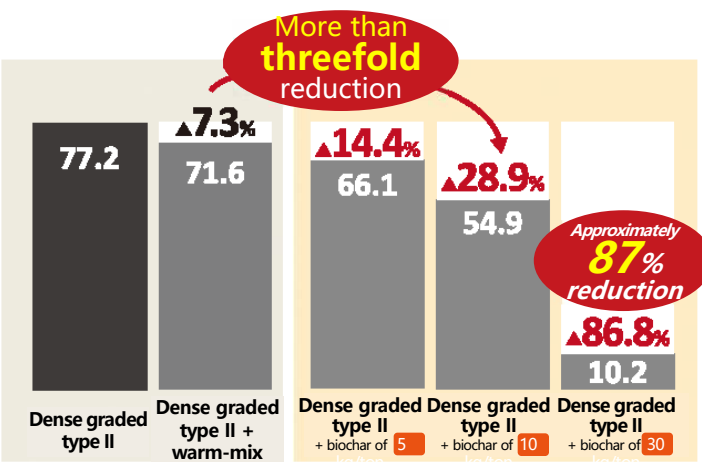




Biochar Asphalt Concrete

Let me explain.

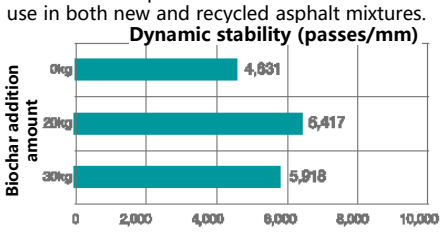
Biochar has a strong CO_2 fixation effect, and even small additions to asphalt mixtures reduce significantly more CO_2 than warm-mix asphalt. Moreover, it can be produced and shipped using standard processes without the need for specialized materials or equipment, such as foamed asphalt generators or warm-mix asphalt binders.



CO_2 emissions per ton of **improved dense graded type II** (kg-CO_2/t)

Properties of Biochar Asphalt Concrete

The mixture's properties are equivalent to those of conventional asphalt mixtures and are suitable for use in both new and recycled asphalt mixtures.



With this technology, carbon neutrality could be achieved by the time I grow up!

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PET Asphalt Concrete Series

Série PET Asphalt Concrete

Resilience

CO_2

Wait—can waste PET bottles really make pavement stronger?

Giving new value to discarded PET bottles while strengthening roads

PET Asphalt Concrete Series

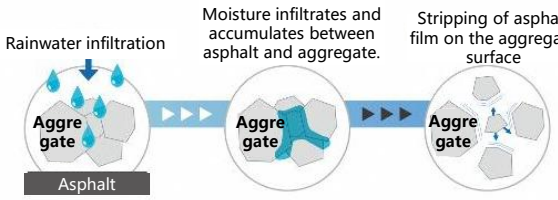
Let me explain. **Current challenges of waste PET bottles**

PET bottles that are difficult to reuse

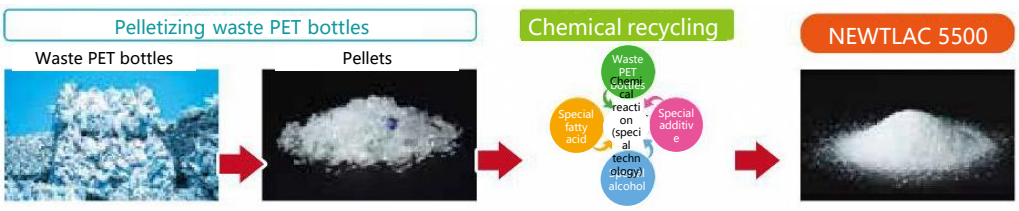
The bottle-to-bottle recycling rate is only 33.7%.

Let me explain. **Weaknesses of conventional pavement**

Water infiltrates and accumulates between asphalt and aggregate, causing the asphalt film to strip from the aggregate and leading to pavement damage.

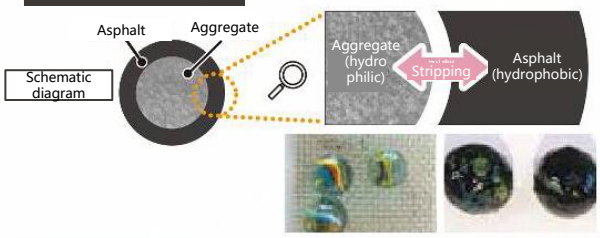


To address both issues simultaneously, a new asphalt additive (NEWTLAC) was developed that uses waste PET bottles to enhance pavement strength.



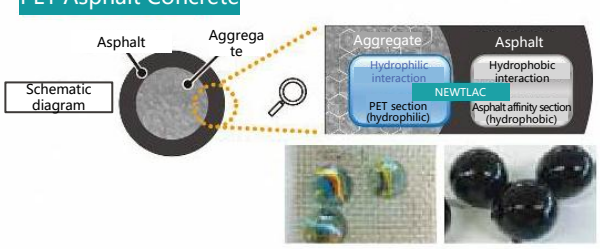
Stripping Test was conducted to evaluate aggregate–asphalt adhesion. To clearly observe the effect of NEWTLAC on chemical bonding, the influence of coarse aggregate surface roughness was minimized by substituting the coarse aggregate with smooth glass beads that have no surface irregularities and a chemical composition similar to that of conventional aggregates (silicon dioxide: SiO_2).

Dense graded type II



Under the test conditions for improved dense graded type II, asphalt film stripping was observed after water immersion, with areas of the glass bead surface exposed.

PET Asphalt Concrete



With the addition of NEWTLAC, no asphalt film stripping was observed even after water immersion, and a uniform coating was maintained. This indicates that NEWTLAC enhances the water resistance of the asphalt film.

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Mokulock

Mokulock

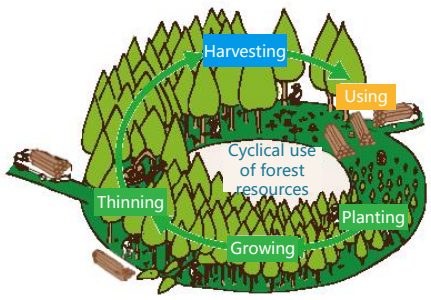
Wait—can thinned timber really reduce CO_2?

Eco-friendly Pavement Material Made from Thinned Timber

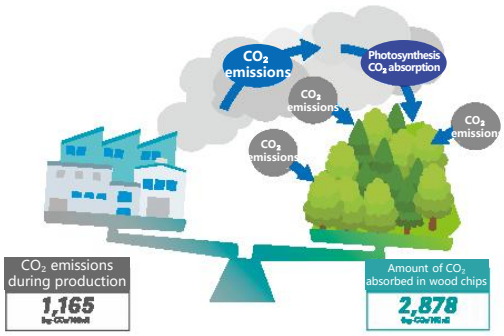
Mokulock

Let me explain.

Through photosynthesis during their growth, trees absorb CO_2 and store it as carbon within the wood. Mokulock, which utilizes thinned timber, is a product that can securely fix carbon within its blocks for long periods, thereby reducing carbon. At the same time, Mokulock promotes healthy forest growth, further enhancing the forest's capacity to absorb atmospheric CO_2.



Mokulock is a carbon-negative pavement material, which means the amount of CO_2 absorbed exceeds the emissions generated during production, achieving net-negative CO_2 emissions. It has attracted attention as a product that contributes to decarbonization.

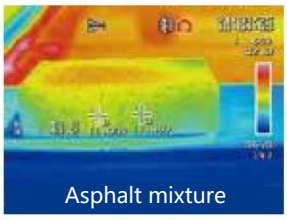


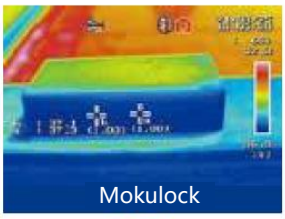
Furthermore...

Mokulock is made from thinned timber and leverages the properties of wood to help mitigate the urban heat island phenomenon.
It can contribute to improving the urban environment.

Mitigating the heat island phenomenon

Mokulock has low thermal conductivity and excellent insulation. It blocks heat at the surface, preventing it from penetrating the block, thereby helping to reduce temperature rise in summer.





Reducing the burden on pedestrians

Sidewalks can actually help achieve decarbonization!

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