Dramix®

Port pavements that are built to last

BEKAERT

better together

Why choose **Bekaert?**

Solution oriented

Our different steel fiber solutions meet the most challenging requirements of any port pavement project.

Experienced

Our fiber reinforcement product range derives from experts spending years of research on finding the best fiber for each unique application.

Global

Thanks to our global network, we offer onsite support and design guidance virtually anywhere in the world.

Port of Algeciras, reinforced with Dramix® steel fibers

A good port pavement is built to last

Port pavements are the base of the port activities, and their main function is to handle port traffic. Those heavy-duty pavements are constantly under great stress. Stacked containers, cranes carrying heavy loads and climatic factors all deteriorate port pavements. Additionally, both cargo loads and traffic have increased over the years, which is why port infrastructure design needs to be upgraded to prevent overstressed, cracked pavements.

To ensure a concrete pavement can withstand all these aggressions, the optimal solution is to reinforce the concrete with Dramix® steel fibers. Used for several decades in numerous ports around the world, Dramix® steel fiber reinforcement concrete has proven itself to ensure port pavements are highly durable and flexible and need very little maintenance.

Steel fibers guarantee a high quality, long-lasting pavement

① Durability

Prevent and control cracks more easily, more efficiently. Dramix® steel fibers reinforce every part of the concrete structure, because unlike steel mesh, the fibers are distributed in every part of the concrete. As a result, steel fibers detect small cracks much faster than traditional reinforcement.

② Low maintenance

Dramix® concrete reinforcement reduces the number of joints and related weaknesses, which helps keep floors in excellent shape for extended service life. Fewer joints mean fewer weak points, resulting in less maintenance in the long term. These weak points, leading to cracks and bumps, create an uneven pavement to drive over. Forklift drivers, crane operators will feel every bump, and it damages the machines as well.

③ Faster and safer

Working with rebar and mesh involves the extremely time-consuming and labor-intensive activity of placement, tying, cutting and bending of the reinforcement. In contrast, Dramix® steel fibers are added directly to the concrete, guaranteeing a fast and safe solution on the construction site.

Further, reinforcement mesh and rebar pose a higher risk of trip-and-fall accidents, hand injuries and severe delays.

④ More sustainable, lower footprint

Steel fiber reinforcement allows for significant concrete and steel savings, which has a significant impact on the carbon footprint of the port's infrastructure.

For port pavements specifically, steel fibers are by far the most sustainable reinforcement solution, as confirmed by the United Nations Conference on Trade and Development and International Association of Ports and Harbors.

⑤ Lower Total Cost of Ownership

Despite the common belief, working with steel fiber reinforcement is cheaper than mesh or rebar. While it is true that rebars per unit weight is less expensive than steel fibers, this does not tell the whole story.

Consider the factors we just mentioned: less concrete and steel used, more durability, lower maintenance over the asset's lifetime, a sped-up construction process, these all contribute to a lower total cost of ownership and thus a lower price in the long run.

	Durability	Maintenance	Faster and safer	Sustainability	Total cost of ownership
Asphalt	●○○	●○○	●●●	●○○	●○○
Unreinforced concrete	●●○	●●○	●○○	●●○	●○○
Concrete with traditional reinforcement	●●○	●●○	●○○	●●○	●●○
Concrete paving blocks	●●○	●●○	●○○	●●●	●●○
Steel fiber reinforced concrete	●●●	●●●	●●●	●●●	●●●

PLATINUM PARTNERS OF PIANC

Together with PIANC, we collaborate in detail, share our knowledge and continue to develop ways to make port pavements more reliable, more durable and more sustainable. Thanks to the contribution of Dramix® steel fibers, it is possible to significantly reduce the thickness of the slab and to increase the joint spacing.

Dramix®, unique, high quality fiber reinforcement

For harbor pavements specifically, we recommend Dramix® 4D steel fibers. Engineered to control small cracks, the 4D fibers protect the pavement surface from the most severe weather conditions and the damaging effects of seawater or chemical substances.

The highest serviceability in concrete reinforcement

- Deformable end hooks for an optimized anchorage
- Extra high tensile strength (≥ 1.500 N/mm^2)
- Engineered for durable structures
- High fatigue resistance

Dramix® 4D is designed to provide superior crack control for concrete structures. The 4D series is the perfect solution for port pavements with high requirements of serviceability for which additional consideration of a stringent crack control is mandatory.

Gluing technology

Dramix® steel fibers are bundled with water-soluble glue. The glue helps prevent fiber balling during mixing and ensures a homogenous distribution of fibers throughout the concrete mix. The result?

- A more efficient mixing process
- Three-dimensional reinforcement
- Better crack control
- A homogenous steel fiber mix

Sustainable

In comparison with traditional reinforcement, Dramix® steel fiber reinforcement can reduce the floor's concrete thickness by 10-25% and save 30-50% of steel. This significantly lowers the CO_2 footprint in comparison to using traditional reinforcement. In the long term, the choice of concrete reinforcement also has an important impact on the quality, durability and longevity of port pavements.

EPD CERTIFIED

We obtained multiple Environmental Product Declarations for Dramix®, which allows builders to compare concrete reinforcement products and see the impact they have on the environment. This objective tool demonstrates how much CO_2 can be saved using Dramix® steel fibers, compared to the traditional reinforcement solutions.

Dramix® & post-tensioning?

Introducing SigmaSlab®

Our newest combined reinforcement solution, SigmaSlab® combines CCL's post-tensioning strands with Dramix® steel fiber concrete reinforcement. The use of Dramix® steel fibers ensures the structural stability and fatigue resistance of the pavement while the post tensioning strands take up the shrinkage and temperature stresses. This allows larger ground slabs with joints that are fewer and farther between. Fewer joints equal fewer, expensive dowels on the one hand and thinner concrete slabs and steel reduction on the other.

In sum, reinforcing with SigmaSlab® ensures:

- Larger concrete pours with fewer joints
- Faster construction and faster field inspection
- Reduced installation costs
- Lower carbon footprint
- Enhanced durability
- Cost-effective
- Low maintenance

Scan the QR-code to watch the first commercial installation of SigmaSlab®: a jointless, exterior floor for Aertssen Logistics in Verrebroek, Belgium.

BEKAERT, YOUR SPECIALIST IN STEEL BASED REINFORCEMENT SOLUTIONS

Bekaert has more than 40 years of experience in producing building products.

We have collaborated in the construction of numerous ports around the world,

adapting them to the needs of each project. For harbor pavements, our solution

is to replace traditional reinforcement by steel fibers, thus speeding up the time of

installation and reducing the cost.

More information?

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