

2025 PAVEMENT WHITE PAPER

The Smart Path to Asphalt Longevity

PROACTIVE PRESERVATION TECHNIQUES

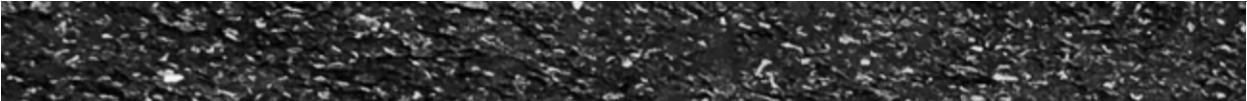
INCLUDED IN THIS WHITE PAPER:

**Proven techniques to prevent oxidation and extend the lifespan of asphalt.
Real-world examples of successful applications.
Cost-saving strategies to minimize frequent repairs and costly resurfacing.**



By Lindsey Hermes
President and Chief Operating Officer
BioSpan Technologies

 **BioSpan**



Asphalt contractors have many customers, including engineers, construction managers, property managers and government officials. And all of them face a dilemma: How to manage pavement maintenance in a new era of extreme weather and shrinking budgets.

Asphalt pavement is everywhere, and keeping it in good shape can be expensive. Cities and states spend billions each year fixing pavement that cracks, crumbles, and wears out. A lot of this damage happens faster than it should because status quo maintenance methods are expensive and don't stop the main cause of the problem: oxidation.

As asphalt contractors know all too well, when asphalt oxidizes, it gets dry, brittle, and more likely to crack. Cracks then let water seep in, which leads to bigger damage like potholes. If you don't stop oxidation early, small problems quickly turn into expensive ones.

BioSpan Technologies created a product called RePlay® to fight this problem. RePlay is a special liquid made from soybean oil and recycled materials. Compared to traditional sealants that work only at the surface, RePlay soaks into the asphalt and restores the flexible oils that were lost because of oxidation. Instead of just covering cracks, RePlay works deep inside the pavement to make it stronger and last longer.

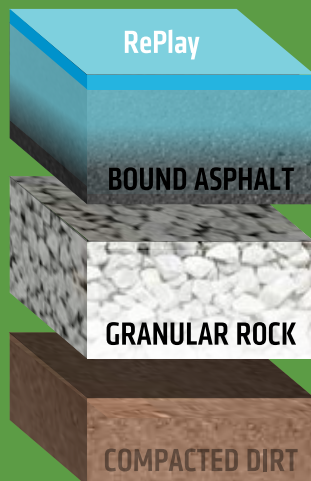


Because RePlay is mostly natural and uses renewable resources, it's better for the environment than traditional petroleum-based road treatments. It also dries quickly — often in less than 30 minutes — which means fewer traffic delays. Overall, RePlay gives government officials and property managers a lower cost, greener, and longer-lasting way to keep pavement in good shape without needing constant expensive repairs.

Stopping oxidation early is the smart move. It saves money, reduces waste, and keeps roads safer for everyone. BioSpan's RePlay is an example of how using better science and greener materials can solve old problems in a smarter way.

TABLE OF CONTENTS

Proactive Preservation Approach	PAGE 4
Port of Portland Case Study	PAGE 5
Bio-Based RePlay	PAGE 6
Town of Jackson Case Study	PAGE 7
The Role of Asphalt Contractors	PAGE 8



CORE SAMPLE

- Penetrates up to 1.25" deep
- Adds flexibility with new polymers
- Cures fast and clear, no restriping
- Eco-friendly – 88% bio-based formula
- Extends pavement life 3-5 years



View technical analysis report

Scan QR code to read the full pavement analysis by Shatek Engineering Consultants, sponsored by BioSpan. Or visit www.biospantech.com/replay-asphaltpro-white-paper

“Petroleum-based sealers and rejuvenators are used with various degrees of success, but they all raise environmental concerns. RePlay offers an effective alternative from both economical and environmental standpoints.”



Dr. Shakir Shatnawi
PhD, PE, President of Shatek
Engineering Consultants.

PROACTIVE PRESERVATION:

Pay now, or pay more later

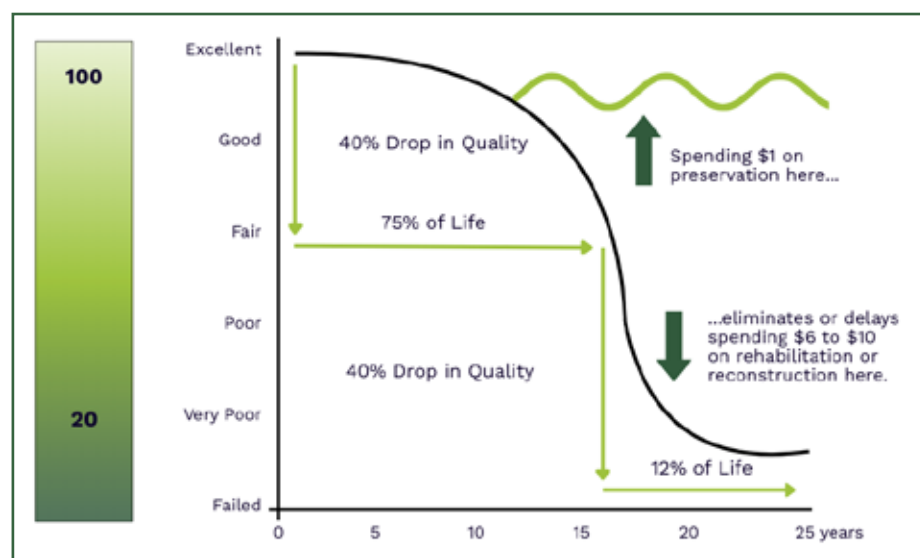
When it comes to managing infrastructure, too many agencies and property owners treat pavement preservation as an afterthought—only addressing problems when they become impossible to ignore. However, pavement maintenance should be Plan A, not Plan B. A proactive approach saves money, extends pavement life, and improves overall infrastructure sustainability.

The Pavement Deterioration Curve: A Lesson in Timing

Pavement doesn't fail overnight. It follows a predictable deterioration curve, which shows that pavements in good condition degrade slowly at first, then rapidly decline once distress sets in. The key takeaway? Investing in preventive maintenance early in the curve significantly reduces lifecycle costs.

Proactive Preservation is the Smart Investment

Bio-based pavement rejuvenator strategy



An example of saving that can be achieved by implementing a preservation program

The most efficient pavement management strategy incorporates preventive maintenance as a core principle. Agencies and businesses that prioritize preservation see higher ROI on infrastructure investments and fewer disruptions due to extensive repairs.

By implementing treatments like bio-based sealants, rejuvenators, and crack sealing while pavements are still in good condition, asset managers can control costs, reduce carbon footprints, and improve safety. The best pavement management plan is one that prevents problems before they start.



CASE STUDY #1

PORT OF PORTLAND:

This critical hub for Pacific Northwest trade uses RePlay® to rejuvenate pavement and lower maintenance costs

At Terminal 6 in the Port of Portland, a large 1.77 million square-foot parking lot made of permeable asphalt was showing signs of wear. The pavement had become brittle, causing small rocks to come loose. These loose rocks were damaging the paint on vehicles being imported and exported through the terminal.

The Port decided to apply RePlay, and immediately noticed significant improvements. Previously, maintenance crews had to sweep the lot four times a year to remove debris. Now, they only need to do it once a year. Additionally, because RePlay doesn't leave a residue on the surface, the Port avoided the costly process of repainting parking lines. This saved both time and money.

Using RePlay helped the Port of Portland extend the life of its pavement, reduce maintenance needs, and lower costs, all while using an environmentally friendly product.



“RePlay has extended the life of the pavement, saving the Port of Portland time and money. The environmental impact of using bio-based material and recycled polymers is an added benefit.”

Craig Stewart

Pavement, Rail, and Bridge Asset Manager • Port of Portland, Oregon



BIO-BASED PENETRATING SEALER: Changing the way we care for pavement

RePlay doesn't just protect asphalt — it changes how we think about pavement maintenance. Traditional methods mostly treat the surface by adding a layer of tar or sealcoat. These treatments might look good at first, but they don't fix the real problem happening inside the pavement: loss of flexibility due to oxidation.

RePlay goes much deeper. It penetrates into the top layers of the asphalt and restores the natural oils that keep the pavement flexible. Flexible pavement is more resistant to cracking because it can move slightly under the weight of cars and trucks instead of breaking apart. This “healing” process extends the life of the road without the need for grinding, patching, or repaving.

Instead of relying on synthetic polymers like older treatments, RePlay uses a nanopolymer-based chemistry that works better with aging asphalt. To make it even stronger, BioSpan developed seven special polymers that help RePlay blend with the pavement's natural binder. These innovations allow RePlay to soak in deeper, rebuild flexibility, and protect from further damage.

RePlay is carbon negative, so it's eco-friendly. Since it's made from 88% bio-based materials, including soybean oil, it reduces the need for petroleum products. Plus, by keeping pavement in good condition longer, RePlay reduces the amount of heavy construction work needed, which cuts down on pollution and saves energy.

In addition, RePlay works fast and cures clear, which means no additional costs for restriping. Streets can reopen to traffic in about 30 minutes, avoiding the long shutdowns that come with resurfacing projects. It's safer for workers, too, because the fast dry time and non-slippery surface reduce accident risks.

By choosing RePlay, agencies and property managers aren't just fixing the pavement— they're using agricultural technology to generate a greater return on investment.

Why Choose RePlay?

Proven Protection: Penetrates asphalt to restore oils, reduce oxidation, and prevent cracking.

Fast Application + Cure Time: Cures in under 30 minutes, minimizes downtime.

Eco-Friendly Solution: Made from bio-based materials, reducing environmental impact.

Cost-Effective Preservation: Extends pavement life, reducing the need for costly repaving.

Low Disruption to Traffic: Quick cure time allows roads to reopen rapidly.

USDA BioPreferred® Certified: Supports sustainable infrastructure maintenance.

CASE STUDY #2



TOWN OF JACKSON, WYOMING:

Historic mountain town faces challenge of preserving 71 lane miles of asphalt roads — in tough conditions

The Town of Jackson, Wyoming, a legendary ski destination and gateway to the Yellowstone and Grand Teton national parks, faces the challenge of preserving 71 lane miles of asphalt roads that must endure subzero, snow packed winters and 90-degree summers. The city also has a new, strategic plan to achieve net zero emissions in its municipal operations by 2030. Under this mandate, the Public Works Department was in search of innovative, eco-friendly solutions to minimize the frequent resurfacing required wherever freeze-thaw cycles are common.

In August 2024, Jackson launched a pilot program to test RePlay. It was applied to five streets with varying asphalt ages, from 2-25 years. Then in January 2025, core samples of pavement were analyzed to measure penetration and percentage of additional binder added at each quarter-inch of depth. The lab report proved that RePlay achieved deep penetration (up to 1.25 inches). The binder content increased by an average of 5.15% compared to untreated control samples, reflecting the effectiveness of the treatment.

The Town of Jackson can expect the treated roads to perform for 4-5 more years before requiring another application of RePlay, significantly extending the lifespan of the asphalt.

“We’re excited about the results we’ve seen with RePlay. The initial core sample reports indicate it is an innovative solution that can reduce our carbon footprint while extending the life of our roads. That’s a win-win.”

Scott Mohror

Senior Engineer for the Town of Jackson Public Works Department

THE ROLE OF ASPHALT CONTRACTORS: Why You Should Be Talking About Preventive Maintenance

Asphalt contractors aren't just builders—they're problem-solvers and educators. You're in a unique position to help government agencies and property owners see the long-term benefits of preventive maintenance. Here's how you can make it happen:

Educate Your Clients:

The first step is simple: help your clients understand the financial and environmental benefits of preventive maintenance. Whether you're talking to a city engineer or a property manager, explain that proactive maintenance saves money and reduces the need for major repairs down the road. If they agree, suggest building maintenance into your next project proposal.

Tailor Solutions to Client Needs:

Every client is different. Some care more about cutting costs, while others are more focused on sustainability. By understanding their priorities, you can offer a maintenance plan that speaks directly to their goals—whether that's saving money, reducing environmental impact, or both.

Leverage Innovation:

More and more, municipalities and property owners are seeking eco-friendly solutions that don't compromise on quality. BioSpan's RePlay is a perfect example of a product that delivers both. By promoting innovative, sustainable products, you position yourself as a forward-thinking contractor ready to meet modern infrastructure needs.

The pressure is on: government agencies and property owners are under increasing scrutiny to cut costs, meet sustainability goals, and keep infrastructure in top shape. It's no longer just about fixing problems when they arise—it's about preventing them in the first place.



**Learn more about BioSpan's
full range of asphalt solutions.**

Scan QR code to learn more about our complete
line of asphalt products or to watch them in action.



BioSpan Technologies, Inc.

1-800-730-8980

Info@BioSpanTech.com

www.BioSpanTech.com