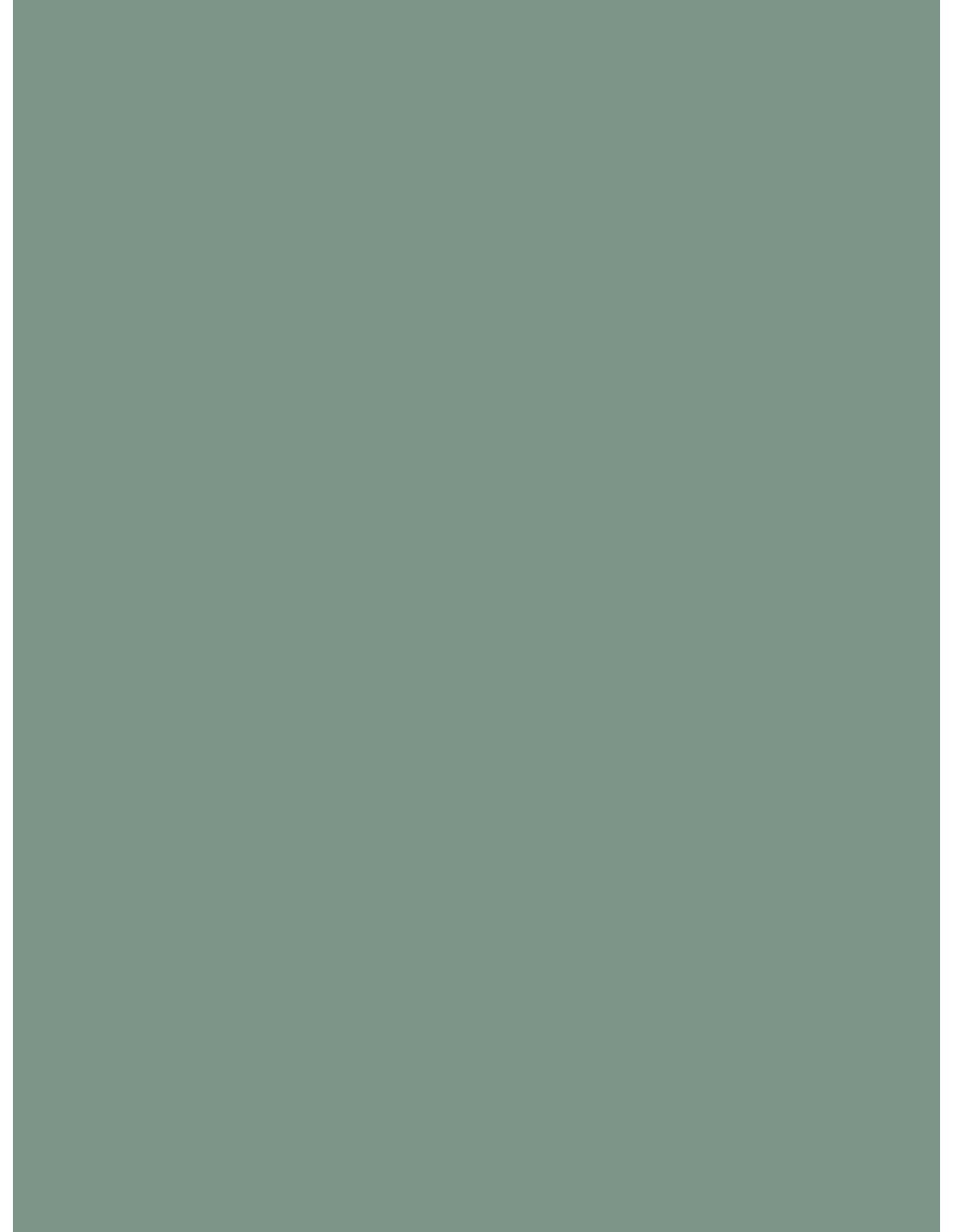


Concrete Pavement



The
Right Choice
Beneath
Your Tires



The Right Choice Beneath Your Tires

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nyone who purchases a product online, shops for groceries, drives their kids to soccer practice, or travels across the country or across town benefits from a vast network of roadways, highways, airports, and industrial pavements. In fact, every day in every way, everyone is impacted by a transportation network that is largely taken for granted.

Whether you are directly or indirectly responsible for or involved in preserving surface transportation infrastructure, or just someone who depends on that network, it is time to take a new look at some of the challenges and new opportunities that are available today.

After you read “The Right Choice Under Your Tires,” we invite you to find out even more answers to your questions by visiting www.pavements4life.com or by e-mailing us at info@acpa.org. We’ll be happy to

provide you with more answers and put you in contact with a local representative in your area.



Because Highways and Roadways Must Last Longer

Concrete has been used to build some of the longest-lasting highways, airports, roadways, and other pavements in the world.

Across the U.S., there are concrete highways and roads that were designed to last 20 years, but have lasted 30, 40, or 50 years, or even longer. Many of these pavements are carrying significantly more traffic, including larger trucks carrying heavier loads, than engineers originally intended.

No matter where you live, you probably have experienced the frequent replacement of roads made from materials that are not as strong and durable as concrete. These pavements were probably a little cheaper to build up front, but in the long run they are robbing all of us with high maintenance costs and lost time from frequent delays for maintenance, resurfacing and replacement.

A very simple combination of water, sand, stone, and a little cement creates strong, long-lasting concrete for pavements. Concrete's basic ingredients have not changed much in 100 years, but new technology is enhancing its features. For example, embedded fibers and special chemical additives, created by some of the brightest minds in the industry, make concrete even tougher and able to withstand today's traffic and heavier loads (demands that are predicted to continue to grow).

No other paving material, no matter how commonly used, can achieve the same high level of performance as concrete. For the longest lasting highways, airports, and roadways, the right choice to put beneath your tires is concrete pavement. ■



Because the True Cost of Ownership is What Matters

Every time you pump gasoline or diesel fuel into your car or truck, you are paying taxes for transportation infrastructure. Paying tolls also is payment for the road under your tires. Taxpayers and road users own the roads and deserve the most informed decisions on how their money is invested.

Concrete pavements are unquestionably the right choice because they almost always have the lowest total ownership cost, and because durable concrete naturally requires far less maintenance than asphalt.

For decades engineers and agencies have settled for using lower quality materials because building with concrete cost slightly more up front, despite the fact that concrete pavements cost as much as a third less during a 30- to 40-year life cycle.

A significant first-cost gap no longer exists today, as inflation of prices for other road-surfacing materials has been far greater than for concrete. In many cases, concrete roads not only provide the lowest ownership cost, they are comparably priced or less costly to build up front.

Engineers and owners can now more clearly see that, whether they are looking at initial project costs or long-term ownership costs... concrete pavements, are the right choice beneath your tires. ■



Because the Transportation Network Needs to Be Preserved

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Almost all of the work on the nation's highways and roadways aims to preserve what is already there instead of expanding the system's capacity.

Concrete overlays are an excellent choice to help preserve and rehabilitate existing systems. Ranging in thickness from 2 inches to 11 inches or more, concrete overlays of existing asphalt, concrete, or composite pavements create a new pavement structure with superior structural and sustainability benefits. Concrete overlays can extend the service life of highways, streets, airports, and other pavements by 15 years or more.

Concrete overlay construction is fast, efficient, and increasingly competitive with asphalt overlays. There's more awareness about these advantages because of recent oil and asphalt paving material price increases, but even if prices ease, concrete provides a viable solution now and for the future. Local supplies of raw



materials for concrete are readily available while world supplies of oil are limited.

Another important consideration is energy conservation in construction. Consider that according to Federal Highway Administration figures, a 10-in. thick concrete pavement requires about 1,900 gallons of diesel fuel per mile to construct, while a similar asphalt pavement requires as much as 5.5 times more fuel. Fuel consumption and costs are lower for concrete during original construction, but also during the life of the pavement, because fuel is also used during frequent resurfacing of shorter-lived pavements.

Concrete pavements are the right choice beneath our tires because they help preserve our network and conserve valuable resources. ■



Because Safeguarding the Environment is Everyone's Responsibility

The world's population grew from 2.9 billion in 1950 to almost 6.8 billion in 2009, according to the U.S. Census Bureau. As the population has increased and industrial development has grown with it, the world's supply of natural resources becomes more scarce and at greater risk of depletion.

Sustainability – balancing environmental requirements with societal needs and economic considerations – is one of the most important issues of our time. Although going green may be a recent thing for many industries, concrete pavements have a long history of exceptional environmental performance.

Recyclability and Reuse—

Concrete is the most recycled construction material in the world, according to the Construction Materials Recycling Association. Concrete is 100% recyclable and reusable, and can be used as aggregate in new concrete pavements, base materials for new roadways, or for other uses, including erosion control and flood prevention.

Local Supplies—Concrete pavements are typically produced from abundant supplies of locally available resources, such as rock, sand, cement, and water. Modern concrete also incorporates waste materials, such as slag, which comes from iron manufacturing, and fly ash, a byproduct of energy production.



Light Reflectance—Concrete is naturally light-reflective, which reduces street lighting requirements (and saves energy). This enhances safety and helps reduce urban air temperature (reducing heat island effects). Darker colored paving materials cannot provide these benefits.

Durability—Because concrete pavements last longer than other pavements, they don't waste additional resources, including the fuel consumed in frequent maintenance and repair of pavements made from less durable materials. This also means that there is less traffic congestion with concrete pavement which, in turn, saves fuel that would be used by cars and trucks waiting in traffic, and lowers pollution emitted from vehicles idling in long construction work zones.

Fossil Fuel Savings—Vehicles traveling on concrete roadways use less fuel because the “rolling resistance” is much lower than on other paving materials. Studies show that trucks get as much as 6% percent better fuel efficiency on concrete pavements. Concrete pavements also require less fuel to construct than roads built in many thin layers, like asphalt. In fact, according to fuel usage factors published by the Federal Highway Administration, it can be shown that an asphalt roadway requires about 4.5 times more diesel fuel than a concrete road designed for the same traffic.

For pavements that meet sustainability goals, concrete is the best material choice under our tires. ■



Because Streetscapes Build Civic Pride

Civic leaders and people responsible for planning and building our communities are finding that it is not only possible, but very practical to balance natural elements with man-made structures. Concrete plays a key role in transforming cities and towns into beautiful, exciting, thriving areas that support the environment, while also benefiting residents, businesses, and the community.

Concrete's natural reflectance brightens roadways, parking areas, and sidewalks. It looks cleaner and stays clean-looking longer than other construction materials.

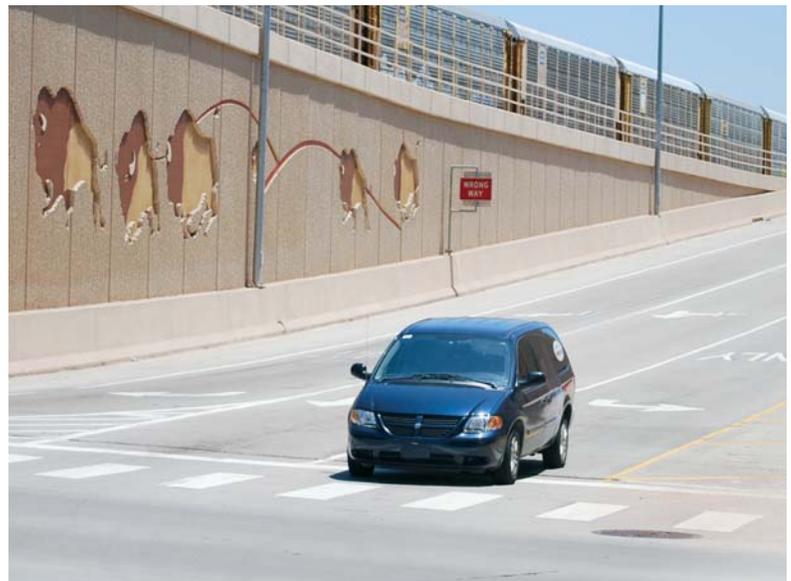
Decorative and colored concrete pavements are breathing new life into urban areas, increasing civic pride. Red-colored, stamped concrete is used to simulate brick in crosswalks and other areas to create



decorative patterns, which enhance the appearance of the cityscape.

Designers have even added state symbols, pictures, and other decorative aspects to concrete roads, bridge columns, crosswalks, and more.

For planners and public works officials looking to enhance the beauty and functionality of their cities and towns, concrete pavements are the right choice. ■



Because Innovation Benefits Everyone

If there is such a thing as an all-purpose pavement to meet all demands, concrete pavement may well be the answer, as a result of decades of innovation. The concrete pavement industry is continually developing new paving processes and products, all aimed at meeting the changing demands of the traveling public, as well as those of the people responsible for our nation's surface transportation network.

A new generation of quiet pavements ... In response to urban noise and the public's demand for quieter urban roadways, the concrete pavement industry has invested millions of dollars to develop and extensively test (in the lab and in the field) a unique surface texture that can be used for either new or existing concrete pavements.

The "Next Generation Concrete Surface" (NGCS) is

currently in field evaluations, where it is showing some promising results. NGCS sections are proving to be as quiet as or quieter than any alternative, including the newest generations of asphalt pavements. Concrete pavements with NGCS are not only quiet when they are first built, they remain quiet during their service lives.



Next Generation Concrete Surface

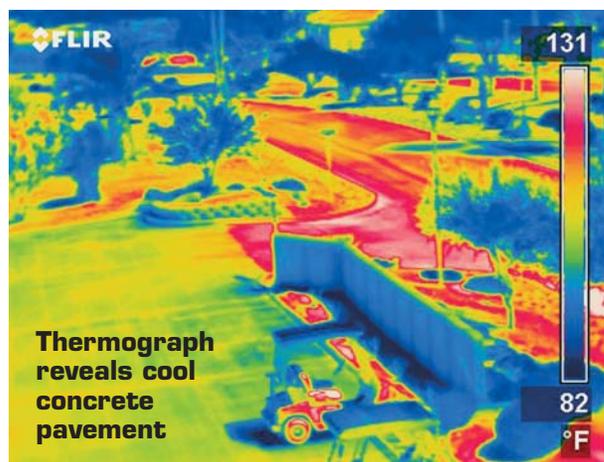
A different kind of CPR ... All pavements eventually need to be repaired or replaced. This is true because of the effects of routine wear and tear, the effects of constant changes in the environment surrounding the pavement, and the soils beneath the pavement.

A technique called concrete pavement restoration (CPR) can preserve and extend the service life of older concrete pavements when sections become uneven or when the pavement loses some of its surface features. This typically involves grinding away a small amount of the surface to remove bumps and minor damage, leaving a like-new pavement that is smooth, quiet, durable, and safe.

Diamond grinding is almost always a cost-effective alternative to overlays, particularly on heavily traveled routes where asphalt resurfacing may last only five to seven years. Diamond grinding can extend highway pavement life by another 16 or 17 years, according to research by the California Department of Transportation.

Fast-track paving ... "Get in, do it right, get out, and stay out!" This is not just a promise, it's a way of life for the concrete pavement industry. In cases where construction or repairs are on

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Concrete overlay technology

Because Innovation Benefits Everyone

(continued)

particularly busy pavement sections, fast-track paving is the answer. Unique planning and construction staging techniques, advanced traffic management, and special rapid-setting concrete mixtures are used to build or rehabilitate pavements quickly and with minimal disruption. Many fast-track pavements have been completed overnight and then opened to rush hour traffic the next morning.

New techniques using pre-cast concrete slabs are also gaining popularity. Precast slabs are made in an off-site facility, shipped to the construction site and lifted into place, allowing traffic to resume using the roadway within hours.

Better resurfacing ... Thin concrete overlays, measuring 2 inches to 4 inches thick, were created by industry engineers of the ACPA to provide a cost-effective alternative to thin asphalt overlays pavements, which typically last about 10 years. Concrete overlays typically outlast the competition, as well as exceed their life expectancy. The result? Some of the earliest and thinnest concrete overlays, placed in the early 1980's, were

carrying traffic for nearly 20 years—more than twice their engineered design life.

Summary

For today and tomorrow, concrete pavement is the most cost-effective, most sustainable choice for highways, airports, roadways, and other pavement applications. Concrete pavements are the right choice beneath your tires. ■



Precast concrete panel

About the ACPA

The American Concrete Pavement Association is the national trade association for the concrete pavement industry. The primary mission of the ACPA is to create and maintain a strong national presence through dynamic, strategic leadership; effective technical expertise and resources; and persuasive advocacy on behalf of the concrete pavement industry.

Founded in 1963, the American Concrete Pavement Association is headquartered in Chicago at
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Visit our public education website at www.pavements4life.com
Visit our technical website at www.acpa.org.

“The Right Choice Beneath Your Tires” is a publication of the American Concrete Pavement Association (ACPA). This edition, adapted from “Why Concrete Pavements?” published in 1999, includes information from ACPA’s “Quick & Direct” flyers, websites, and other source materials. References for data and other information mentioned in this document may be found on the website, www.pavements4life.com. This publication is ©2010, the American Concrete Pavement Association (ACPA), 5420 Old Orchard Road, Ste. A100, Skokie, Illinois 60077 (USA). All rights reserved. No portion of this publication may be reproduced or re-transmitted electronically or mechanically without the expressed, written permission of the publisher.

