Resiliency and sustainability—some of asphalt’s greatest (but lesser-known) benefits

There are plenty of reasons agencies and contractors choose to pave with asphalt—from lower lifecycle costs, to greater opportunity for minimally-invasive rehabilitation, to faster opening to the driving public. Resiliency and sustainability are two more reasons asphalt should be your pavement of choice.

Resiliency

When we use the word resiliency, we’re referring to a community’s ability to recover from natural disasters such as hurricanes, floods, landslides, fires or earthquakes. Roads that are damaged by such disasters severely limit response and recovery efforts.

In considering road construction options that promote resiliency, asphalt pavement is the clear winner. It is the fastest application for road construction and repair, allowing miles of surface to be constructed in a single shift, and roadways to be opened to traffic immediately in most cases. In addition, many asphalt plants are portable so they can be situated near the construction site and be fully operational within a 24-hour period. Asphalt is also less rigid than other construction options like concrete, resulting in greater flexibility and more resistance to cracking when disasters do occur.

Asphalt proved its benefits in response to severe damage caused by catastrophic flooding in Colorado in 2013. Seventeen inches of rain in just a few days wiped out entire sections of roadway and cut off communities like the town of Estes Park from critical resources. The Colorado Department of Transportation quickly partnered with paving contractors who immediately hauled in rock crushing equipment and set up asphalt plants. The pavers worked non-stop to get the roads to the mountain communities open before winter.

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Tom Clayton
Colorado Asphalt Pavement Association

This canyon road linking Boulder and the town of Nederland was washed out in places during the 2013 flood. More than 200 miles of state highways and at least 50 bridges were damaged or destroyed. (AP Photo/Brennan Linsley)
either stranded in their house if they were lucky to be high enough, or they couldn’t get back to their houses after they evacuated. The governments wanted to provide access as soon as possible, and trying to do that with any other pavement but asphalt would not have worked.”

Closer to home, Oregon coastal communities deal with road failures caused by shifting earth on a regular basis. Just last summer a culvert failure under Highway 101 south of Wheeler caused a large sinkhole right before the Fourth of July. ODOT was forced to close the highway. Within 2-1/2 days and in time for the holiday weekend, the contractor was able to repair the culvert (which was 20 feet below grade), place base rock, pave the surface, and open the Highway.

Even if a disaster prevents making asphalt locally, research conducted at Mississippi State University for the Department of Homeland Security has shown that warm-mix asphalt mixtures can be made several hours away and trucked to the disaster zone to successfully rebuild pavements.

**Sustainability**

When we think about sustainability as it relates to asphalt, it’s usually about asphalt’s ability to be constructed using recycled materials, and for the asphalt pavement itself to be rehabilitated or recycled. There are sustainability features related to warm mix asphalt pavement and porous asphalt pavement structures as well. But these are not the only ways asphalt contributes to sustainability.

The condition of a road significantly impacts vehicle maintenance and fuel costs. Rolling resistance, which considers stiffness, surface texture and smoothness of the road, influences these costs. Of these traits, smoothness—measured by the number of irregularities like cracks, potholes and bumps in the pavement—has the greatest cost impact.

A 2012 report from the National Cooperative Highway Research Program (NCHRP Report 720) estimates that for very rough pavements, fuel efficiency can drop as much as 12 percent. Other studies show that less significant smoothness improvements can improve fuel efficiency by 2 to 6 percent. Similarly, rough pavements can increase tire wear by 5 percent, and repair and maintenance costs by 70 percent, for a total net vehicle operating cost increase of 22 percent with all factors considered.

Smother pavements provide cost benefits for the agency responsible for the structure as well. Studies show that improving pavement smoothness (and thereby reducing wheel bounce on the pavement structure) by 25 percent can increase a pavement’s longevity by almost 10 percent.

Asphalt pavement is the smoothest option because it is placed continuously without the need for expansion joints, and surface overlays or inlays quickly restore smoothness in older pavements and provide like-new conditions, which are benefits that most other preservation treatments can’t provide.

**In summary**

Asphalt provides many advantages over other materials. Resiliency and sustainability are just two more examples of how asphalt provides greater benefit for the agency, taxpayer and driving public.
The Asphalt Pavement Association of Oregon, Inc., (APAO) is dedicated to promoting the use of asphalt concrete by developing customer driven programs to enhance quality and excellence in all aspects of asphalt technology. We believe that the key to growth and prosperity in the industry is continuous quality improvement obtained through active association membership, positive customer relationships, education, and training.

For quality asphalt projects, call one of our members.

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For member contact information, visit www.apao.org and click the membership tab.

EDUCATION

In 2017, the APAOEF and Baker Rock Resources awarded the following scholarships.

APAOEF Scholarships

Sunny Lewis received a $2,500 scholarship from the APAOEF. Sunny was a graduate student at Oregon State University in 2017, and focused her studies on asphalt pavement materials and structures. She is interested in furthering the sustainable attributes of asphalt pavement.

While fewer college-age students are showing interest in careers in transportation infrastructure, having educated professionals in the field is vitally important. The APAOEF Education Foundation (APAOEF) awards scholarships to Oregon secondary education students interested in asphalt paving technology, and provides financial assistance to Oregon educational programs that include asphalt paving technology as part of their curriculum.

Kevin Baker received a $2,500 scholarship from the APAOEF. In 2017, he was a graduate student at the Oregon Institute of Technology, and throughout college completed multiple classes involving asphalt pavement and infrastructure design. One of his internships involved working on a paving crew where he helped repave a major highway.

Dawn Lindeman Memorial Scholarship

Tyler Van Meter received a $2,500 scholarship in honor of the late Dawn Lindeman, APAO’s longtime office manager. Tyler was a senior at the Oregon Institute of Technology in 2017, and completed internships with infrastructure design and infrastructure construction companies.

Mike Huddleston Memorial Scholarship

Matthew Haynes received a $2,500 scholarship in honor of the late Mike Huddleston, who was the first executive director of APAO. Matthew was a graduate student at Oregon State University in 2017, worked as a research assistant in OSU’s Pavement Materials Laboratory and served as an intern with the Oregon Department of Transportation.

Baker Rock Resources Scholarship

Grant Schroeder received a $2,500 scholarship from Baker Rock Resources. Grant was a senior at George Fox University in 2017 and interned with a local highway construction company. Grant maintained a fantastic GPA while being a student athlete and paying for his own education out-of-pocket.
Transportation infrastructure requires additional funding to maintain roads and bridges to current conditions

The Oregon Legislature passed House Bill 2017—aka Keep Oregon Moving—that will generate approximately $5.3 billion in infrastructure funding over the next 10 years. The funds will come from increased vehicle registration fees, increased gas taxes, new sales taxes on bikes and motor vehicles, a payroll tax to fund public transit, and tolling in certain locations. APAO greatly appreciates the Oregon Legislature’s leadership in passing the largest infrastructure funding bill in Oregon history.

The funding need for our roads and bridges, however, cannot be realistically met with any single piece of legislation. The Oregon Transportation Commission’s 2017 investment strategy (prepared before HB 2017) estimated that an additional $795 million per year ($7.95 billion over 10 years) was needed to preserve and maintain just our state-owned highways, bridges, and culverts. In other reports published before HB 2017, the Oregon Department of Transportation estimated that a 52-cent gas tax increase was needed to maintain state and local pavements and bridges.

While HB 2017 increased the gas tax and included other funding mechanisms, the funds will be distributed to more than just pavements and bridges. Plus, HB 2017’s 10-cent gas tax increase is incremental over the next 6 years, so it will not even be fully realized immediately. At the end of that period, Oregon’s gas tax will still be far below current or projected gas tax levels in Washington and California.

Although HB 2017 was a big step in the right direction, we cannot ignore that the costs to maintain our pavements and bridges to existing conditions will require more funding.

APAO supports a hybrid approach for bringing infrastructure funding in line with the need, combining both gas tax and VMT (vehicle miles traveled) methodologies. This approach allows for more balanced fee assessments based not only on fuel use, but also on actual road use (miles traveled).

Visit www.dontletamericadeadend.us, and contact your representatives and make them aware that their job is not done. Our roads and bridges are essential to our economy and require a lifetime investment commitment that extends beyond HB 2017.