



CENTERLINE

AROUND THE STATE

Some GOOD news from 2020



It wasn't *all* bad news in 2020 – below are a few examples of good things APAO members did to help their communities.

Industry Safety

When there was significant confusion over proper road construction safety practices (March and April 2020), CRH (Riverbend Material's parent company) posted a COVID-19 safety video to YouTube that included important information and practices to help protect workers from COVID-19. The video was available to everyone and helped the entire industry implement best practices to keep employees safe.

Diversity Equity & Inclusion

Lakeside Industries did not let COVID or any of the other 2020 distractions disrupt its diversity, equity and inclusion efforts. Finding quality workers is a big industry challenge, but a large segment of the industry has not done the work necessary to ensure that women and minorities are represented in the workforce. Lakeside continued to support training programs focused on improving opportunities for women and people of color, hired interns in protected classes, supported scholarships (including the APAO Education Foundation scholarships), and supported its own Lakeside Women of Asphalt, which is a group dedicated to providing a support network for women employees.

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Lakeside interns (left-right): Isabel Murphy, Jennifer Tidball, Asa Reyes-Chavez and Diane Fankhanel

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The good, the bad and the ugly of environmental product declarations

The consequences of misunderstanding EPDs range from unnecessarily increasing costs to increasing emissions.

Environmental Product Declarations (EPDs) are gaining traction in road construction. EPDs are a way to communicate a product's or a material's environmental impact—similar to how food labels communicate nutrition information. Cities, counties and other agencies are starting to consider programs to collect such information for road and bridge materials such as asphalt, steel, and concrete.

Materials producers get EPDs through a process that is created by a program operator (often an industry association). Organizations like the International Organization for Standardization (ISO) published standards for EPD consistency and credibility, and program operators typically follow one or more of the standards. To apply the standards to a specific product, program operators create product category rules (PCRs). The standards require checks and balances designed to increase reliability, and include requirements for independent data verification and transparency.

For example, the EPD program operator for asphalt mixtures (the National Asphalt Pavement Association) formed a committee that included experts from academia and public agencies. The committee selected ISO standards and worked with experts to create PCRs that defined the boundaries for an asphalt pavement EPD (e.g., where the analysis starts and ends, how to assess recycled materials). The PCRs are intended to ensure that EPDs for asphalt pavement would be based on the same baseline assumptions. The committee and the experts then analyzed the environmental impacts of asphalt pavement materials over their life cycle. The process, data, and modeling was reviewed by an independent review panel.

Next, NAPA developed a software platform through which asphalt pavement producers can enter information specific to each mixture and plant, and get an EPD. The software was checked by a third party to verify that it produces accurate EPDs and has sufficient internal checks on the information used to produce the EPD (e.g., inputs are checked against industry norms). All EPDs are subject to an audit to verify accuracy. Once verified, producers may publish their EPDs, which simply means that they are posted on a publicly available webpage hosted by NAPA.

Although accurate environmental information is good, there are risks. The consequences of misunderstanding EPDs for road construction materials range from unnecessarily increasing costs to increasing emissions.

Many asphalt pavement producers are also reluctant to embrace EPDs because they frequently see confusion leading to problems with many other asphalt pavement issues. Agencies and other owners frequently want large aggregate mixes because they want “stronger” mixes, others think the newest silver bullet (e.g., fibers, plastics, glass) needs to be mixed in with the aggregates and binder, or the classic request for a highway mix for a parking lot. When the result is something other than a smooth and durable surface, it becomes the producer's problem and producers are scared EPDs will add to the confusion.

How do we use EPDs and avoid the risks and confusion? We need a strategy that touches on education, avoids unintended consequences, and promotes regional uniformity.

Education

EPDs typically use parameters and units that are not well known. Before I checked, I did not know the difference between eutrophication and abiotic depletion, or that calorific values represent the amount of heat energy produced during combustion expressed in joules per volumetric unit. Most people intuitively know what “global warming potential” is meant to express, but understanding the units (kg CO₂-Equiv.) is less obvious.

The Federal Highway Administration has published EPD technical briefs and there are other available references. A common theme is more information is better. But, quality information is almost always better than quantity. If the risk that an asphalt mixture will cause eutrophication (excessive nutrients in a water body) is exceedingly low, then I want to know to focus on something else.

If global warming potential (GWP) is the most important parameter, producers and engineers need to know what it means and its relative importance. GWP is generally used to compare how different gases contribute to global warming by using carbon dioxide as a benchmark.

But, you cannot compare the GWP of two products without knowing the GWP timeframe. For most things, the GWP changes with time because things tend to break down over time. For example, the U.S. Environmental Protection Agency says that methane's GWP is 28-36 over 100 years, but 84-87 over 20 years.

Units and quantities are also critical. Most EPDs will specifically declare a unit, which is the quantity on which the EPD is based. The declared unit for asphalt mixtures is one short ton – an asphalt mixture with a GWP of 15 kg, means that one short ton has the same impact on global warming as 15 kg of carbon dioxide.

EPDs published for the same type of material by the same program operator will be based on the same time horizon and units. But, that may not be the case for other materials, and the variables significantly influence EPD results. Therefore, EPDs for different materials, such as concrete and asphalt, should not be compared to each other without a thorough understanding of each material's PCRs.

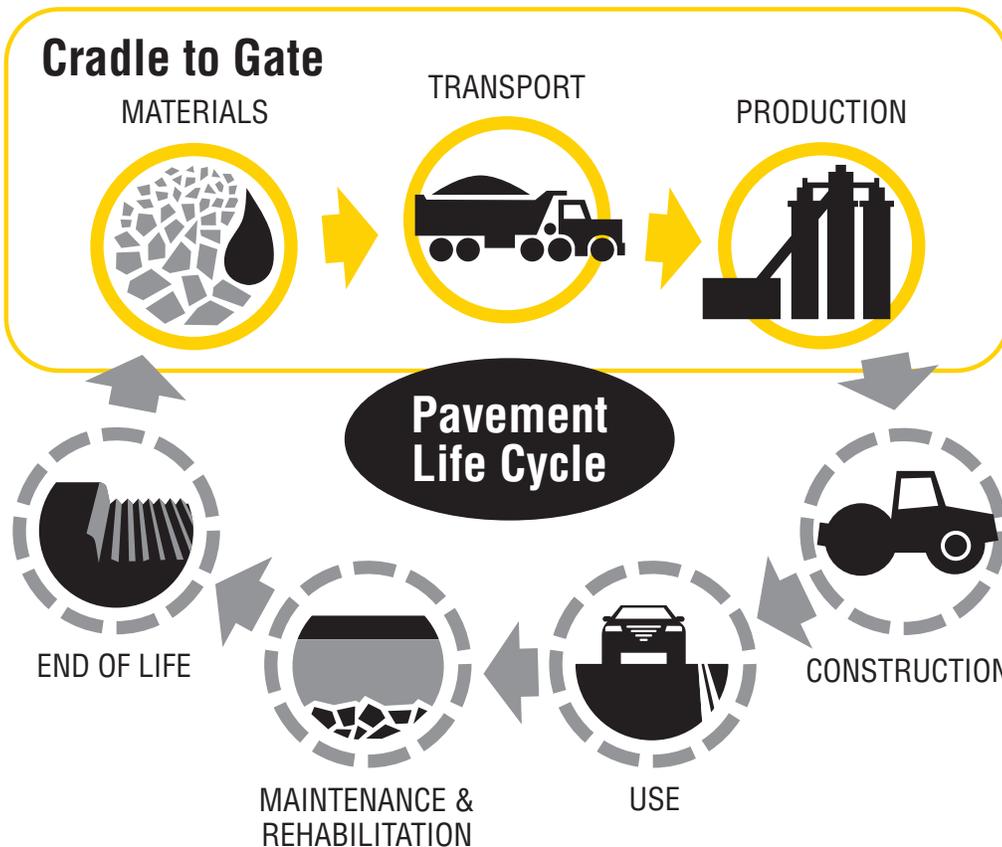
Unintended Consequences

Agencies and other owners (and politicians) trying to do the right thing could easily use EPDs in a way that results in more emissions.

EPD information for a material or product is based on a life-cycle assessment, which implies that the environmental impacts are quantified over the product's full life cycle. But, EPDs for most construction materials (including asphalt mixtures) are "cradle-to-gate," which means they do not cover anything after the materials leave the gate of the manufacturing facility (the asphalt plant for asphalt mixtures). Because construction materials producers do not always know how or where their products will be used or how the products will eventually be recycled or discarded, it is impossible to reliably quantify the environmental impacts after the product leaves the manufacturing facility.

But, how a product is used, recycled, or discarded matters. For example, almost all asphalt pavement is recycled into new asphalt pavement, but other construction materials such as steel and concrete are either repurposed or discarded. Misunderstanding what is meant by "life cycle assessment" and how a product will likely be used, recycled or discarded, almost guarantees unintended consequences.

The most obvious unintended consequence would be using one asphalt pavement mixture over another because it has lower global warming potential, but trucking it further than the other



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.

MEMBERS

For quality asphalt projects, call one of our members.

Regular Members: 7 Peaks Paving, LLC; Baker Rock Resources; Bayview Transit Mix; Brix Paving; CPI, Inc.; Eagle-Elsner, Inc.; Granite Construction Company; Granite Construction Northwest Columbia 1; H & H Paving Co.; Hampton's Inc.; Harney Rock & Paving Co.; High Desert Aggregate & Paving, Inc.; Humbert Asphalt; Interstate Concrete & Asphalt Company; Knife River - Idaho Division; Knife River - Northwest; Knife River - Materials; Kodiak Pacific Construction Co.; Lakeside Industries, Inc.; Mt. Hood Asphalt Products, Inc.; North Santiam Paving Co.; Oregon Mainline Paving; Porter W. Yett Company; Portland Road & Driveway; Riverbend Materials - Eugene; Riverbend Materials - Salem; Road & Driveway Co.; ROBOD, Inc.; Rocky Mountain Construction; Roy L. Houck Construction Co.; S-2 Contractors; S-C Paving Company; South County Asphalt, LLC; TFT Construction; Tidewater Contractors, Inc.; Vic Russel Construction; Wildish Sand & Gravel Co.

Associate Members: Ad-Tek Calibration; AggReCon West; Albina Asphalt Company; Astec Industries; Blue Line Transportation; CMI Roadbuilding Inc.; Caterpillar Global Paving; Construction Equipment Co.; D'Ambra Equipment & Supply; DeAtley Crushing Co.; DynaPac USA; Gencore Industries, Inc.; Idaho Asphalt; J. Stout Auctions; KPI-JCI & Astec Mobile Screens; Maxam Equipment, Inc.; McCall Terminals; Meyer Laboratory, Inc.; Modern Machinery; PacWest Machinery, LLC; Papé Machinery; Peterson CAT; RoadTec, Inc.; Stansteel Asphalt Plant Products; Volvo Construction Equipment, N. America; Western States Asphalt; Windsor Rock Products; Zydex Inc.

Affiliate Members: ACS Testing; AGC Oregon Columbia Chapter; American Concrete Company; Anchor Insurance & Surety; Antigo Construction, Inc.; Apply-A-Line, LLC; Asphalt Consulting & Management; Ball Janik LLP; Carlson Testing; Coral Constructing Co.; David Evans & Associates; Enterprise Fleet Management; FEI Testing and Inspection, Inc.; GeoDesign, Inc.; GeoPacific Engineering; GRI; Ingevity; Intertek-PSI; Jonnic Construction; Jordan Ramis, PC; LaPorte - Insurance; Materials Testing & Inspection; Northwest GeoTech, Inc.; NW Natural; Northwest Screening Supply; Oregon Concrete and Aggregate Producers Association; Oregon Institute of Technology; Oregon State University; PSI-Portland; Peterkin Burgess; Powerscreen of Washington; Safety Electric Inc.; Umpqua Research Company; Ward Insurance

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

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EPDs— continued

mixture such that the added distance results in more carbon emissions.

Other possible unintended consequences are more subtle, but equally dangerous. EPDs are sensitive to differences in asphalt binder content (more asphalt binder will produce higher EPD numbers), but asphalt binder is critical to pavement performance, and putting less binder in mixtures than is optimal will result in early failure. So, picking an asphalt mixture with lower EPD numbers could result in the road or parking lot needing additional maintenance or to be replaced much sooner than an asphalt mixture with a higher EPD.

We cannot lose sight of the principle that the most sustainable asphalt pavement is the one with longest life – which requires mix and structural design principles to take precedence over EPD information. EPD information is valuable, but we need a cautious approach.

Sample EPD information for an Oregon concrete mixture

ENVIRONMENTAL IMPACTS

Declared Product:

7 SK 1/2" CURB

Compressive strength: 4000 PSI at 28 days

Declared Unit: 1 m³ of concrete

| | |
|--|---------|
| Global Warming Potential (kg CO ₂ -eq) | 323 |
| Ozone Depletion Potential (kg CFC-11-eq) | 3.73E-6 |
| Acidification Potential (kg SO ₂ -eq) | 1.56 |
| Eutrophication Potential (kg N-eq) | 0.17 |
| Photochemical Ozone Creation Potential (kg O ₃ -eq) | 31.5 |
| Abiotic Depletion, non-fossil (kg Sb-eq) | 2.62E-6 |
| Abiotic Depletion, fossil (MJ) | 463 |
| Total Waste Disposed (kg) | 0.54 |
| Consumption of Freshwater (m ³) | 3.32 |

Product Components: natural aggregate (ASTM C33), type 1L cement (ASTM C595), fly ash (ASTM C618), admixture (ASTM C494), batch water (ASTM C1602), admixture (ASTM C260)

Additional detail and impacts are reported on page three of this EPD

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Regional Uniformity

Predictability through regional uniformity is critical for asphalt producers. In construction, the inability to predict costs, regulations, quality, workforce and similar issues has caused many bankruptcies. Asphalt paving has additional risks involving land use, mining, and complex equipment. Producers are only willing to take the risks and make the long-term investments needed to make asphalt pavement if the local agencies and other owners are committed to a predictable partnership.

Asphalt pavement production complexity creates challenges that are not well known. There are countless steps between picking up a rock and compacting a scientifically designed asphalt pavement mixture with a big roller. As with any complex process, consistency is critical. Small changes in materials or procedures can have bigger than expected impacts on the final product. When requirements differ in a region, producers must make frequent changes, which makes consistent quality challenging.

Area and equipment also limit the number of available mixtures. Loading asphalt pavement into trucks typically requires silos. Each silo can only have one asphalt mixture in it at a time and are big and expensive enough to make having more than a couple impractical, which limits the mixtures available during any production day.

Roundtable discussions about EPDs among regional agencies, other owners, and producers can help manage expectations across the region. A forum for communication will bring some predictability to EPD implementation and will make the necessary changes more manageable and fair.

Implementation Models

Proposed legislative mandates represent the ugly of EPDs. A proposed Oregon bill would have required the Oregon Department of Environmen-

tal Quality and the Oregon Department of Transportation to develop a program under which EPD information for concrete, asphalt and steel would be converted to hypothetical dollars, which would be added to contractor bids before determining the lowest bidder.

Any such program is ripe for the unintended consequences described above and if the hot air generated from the lawyers were factored in, it would be easy to see that the approach is not the most practical or sustainable.

The U.S. Green building Council approached the issue differently. In its LEED (Leadership in Energy and Environmental Design) green building certification program, points are awarded for various sustainable building practices and more points will result in a higher certification level (e.g., LEED Platinum requires 80+ points, where LEED Gold requires 60-79). LEED awards a point if a project uses 20 or more products that have EPDs. LEED recently made an additional point available for “optimized” products, which are products with EPDs that show improvement over previous versions of the product or an industry benchmark. Although the optimization point has logical appeal, many details need to be worked out – for instance, as explained above, improved EPD information does not necessarily mean the product is the right product for the application, but using

the right product is almost always the most sustainable practice.

A benefit of LEED’s approach is simplicity. LEED encourages sustainability while reducing the potential for unintended consequences by relying on the nature of competition in construction. Competition drives efficiency. Contractors constantly look for tools to help them do more with less – and EPDs can do just that. LEED encourages producers to publish EPDs for their products and those who do learn how different products and processes affect the production of their products. In many cases, that information will help producers gain efficiencies. LEED does not get into the weeds or cause disputes, which should create an environment that promotes innovation.

EPDs are a tool to communicate the potential environmental impacts of road and bridge construction materials and promote sustainability. But, the desired outcomes will not happen through laws or specifications that fail to address education, potential unintended consequences, and the complexities inherent in the asphalt pavement and similar industries. Agencies contemplating EPDs should hold regional roundtables with producers, carefully consider different implementation models, and recognize that EPDs may not be practical for all projects.

— John Hickey
Executive Director
Asphalt Pavement
Association of Oregon

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Sample EPD information for an Oregon asphalt mixture

| Parameter | Unit | Asphalt 1 Short Ton | | |
|--|-----------------------|----------------------------|-----------|------------|
| | | Raw Material Extraction | Transport | Operations |
| Global Warming Potential | [kg CO2-Equiv.] | 20.2 | 3.78 | 15.8 |
| Ozone Layer Depletion Potential | [kg R11-Equiv.] | 3.11e-09 | 1.45e-10 | 1.54e-11 |
| Acidification Potential | [kg SO2-Equiv.] | 0.0973 | 0.0136 | 0.0243 |
| Eutropication Potential | [kg Phosphate-Equiv.] | 0.0113 | 0.00304 | 0.00297 |
| Photochem. Ozone Creation Potential | [kg Ethene-Equiv.] | 0.0126 | 0.000673 | 0.00222 |
| Abiotic Depletion | [kg Sb-Equiv.] | MND* | MND* | MND* |
| Abiotic Depletion for Fossil Resources | [MJ surplus energy] | MND* | MND* | MND* |

*Module Not Disclosed: Insufficient data available to calculate this value



Asphalt Pavement Association of Oregon

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AROUND THE STATE

Good news — continued

Local Community Support

Before COVID, hundreds of thousands of Oregonians sought food assistance each year. Over the year 2020 the number skyrocketed. Knife River stepped up and donated \$50,000 to help Oregon food pantries and shelters. Oregon Food Bank estimates that every \$10 donated provides 30 meals. Knife River also provided funding for childcare so employees would not have to decide between their jobs and their children. In addition, the company invested in Oregon communities hit hard by COVID and/or wildfires with hundreds of thousands of dollars in donations and sponsorships.

Local Business Support

Although construction work continued throughout 2020, COVID devastated many other local businesses. Baker Rock Resources made significant donations to the Hillsboro Community Foundation and the local Chamber of Commerce to provide critical support to local businesses through grants and initiatives like “No Business Left Behind.” Baker Rock also issued stimulus payments to employees and asked that they spend the money locally. Supporting local businesses has been a significant challenge, but one that is necessary to preserve the overall health of our communities.

Wildfire Support

As wildfires ravaged the state, they created hazards in many areas not accustomed to fires, like the Oregon Coast. When the Newport Police Department expressed concern for the safety of people walking in the Newport area because of narrow roadways and poor visibility, Road & Driveway Co., donated high visibility vests to the Department to be distributed to the public.



Road & Driveway Co. donated high visibility vests to the Newport Police Department to be distributed to the public

There are many more examples. APAO members large and small proved that they care about their neighbors and will help in times of need. We are proud of members' and their employees' efforts. They remind us how we can succeed when we help one another.