



The Road Ahead: Performance Testing of Asphalt Mixes

By Jon Young, Executive Director, Hawaii Asphalt Paving Industry and Jayanth Kumar, Quality Control Engineer, Jas. W. Glover Ltd.

Performance tests are used to indicate an asphalt mixture's resistance to types of distresses that could occur in the pavement. Performance testing is conducted to evaluate three distresses: rutting, cracking and moisture damage susceptibility. Let us review the reasons asphalt performance tests are necessary and a brief overview of what is being done in Hawaii for our road and highway asphalt mixtures.

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Asphalt pavements exhibit these distresses within their expected service life due to the combined effects of material properties, climatic conditions and vehicular loading. Of the three, traffic loading and climatic conditions are not in the hands of the asphalt mix designer. However, selecting suitable material with acceptable quality for the intended road application can make a significant difference in ensuring superior performance throughout a pavement's service life for any levels of traffic loading and weather.

Asphalt pavements account for over 94% of paved roads and airport runways in the U.S. Asphalt mixes used to pave these roads and runways have been predominantly designed for nearly a century using Marshall, Hveem or Superpave methods, which rely on volumetric concepts. While these methods provide mixes of acceptable quality, the drawback of these methods is that they cannot account for all the different conditions, including varying traffic loading, climatic conditions, additives (such as polymers, rubber, fibers), reclaimed asphalt pavement (RAP) and so on to evaluate mix performance.

It is important to accurately determine the properties of asphalt mixes to predict their performance in the field. Therefore,

agencies have turned their attention toward characterizing asphalt mixes using advanced test methods, called "performance testing," to predict field performance.

Our Hawaii DOT Highways Division (HDOT) has not used performance tests before. But now HDOT has an ongoing pilot project, which has five test sections and one control—two sections produced with 50% RAP; and two sections pro-

duced with a plastic additive (NewRoad). The control section mix is the standard Mix No. IV, with 20% RAP, produced using a modified binder. They are using performance tests to check that the performance of the RAP and plastic additive mixes is equal to or exceeds the performance of the control section mix.

Performance tests are also utilized in designing asphalt mixes by optimizing material use and performance, known as balanced mix design (BMD). The American Association of State Highway and Transportation Officials, an organization that represents highway and transportation departments in the U.S., defines BMD as "asphalt mix design using performance tests on appropriately conditioned specimens that address multiple modes of distress taking into consideration mix aging, traffic, climate and location within the pavement structure."

Various groups including the National Asphalt Pavement Association, the National Center for Asphalt Technology, the Asphalt Institute, universities, state departments of transportation and others have been working in the development, evaluation and validation of performance testing methods considered in the implementation of BMD. Currently,

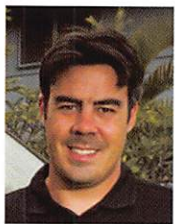
BMD implementation in several states is based on asphalt mixes meeting the criteria established to evaluate rutting, cracking and moisture-induced damage properties.

In broad terms, rutting refers to longitudinal surface depression that occurs in the wheel path due to lateral movement of materials due to traffic. Cracking typically occurs due to repeated traffic loading. Moisture-induced damage, otherwise known as stripping, is normally loss of bond between asphalt binder and aggregate due to the presence of moisture.

Locally, HDOT has set up a task force comprising staff, members from the Hawaii Asphalt Paving Industry and a professor from the University of Hawaii at Manoa to guide the state's BMD program and implementation. The group has recommended using the following performance test methods to evaluate mixes produced in Hawaii. Rutting: Hamburg wheel-tracking test; cracking: IDEAL-CT test; and moisture-induced damage: tensile strength ratio (TSR).

Implementation of a BMD program takes several years, and the success of this program in terms of cost-effectiveness and long-lasting superior-quality pavements will be seen years down the line. HDOT has taken on the challenging program and is leading the efforts by collaborating with various stakeholders to build truly sustainable and durable roads for the community.

It will be interesting to see what the future holds for performance testing in Hawaii. ■



Hawaii Island Residents Benefit From Upgrade Projects

By William Lee, President
Association of Hawaii Island Contractors

The year 2022 has flown by in what feels like record time. We have continued to be busy on the Island of Hawaii with various types of jobs throughout east and west Hawaii. Projects like Kalaniana'ole Avenue Renovation and Kona Village will be finishing up. Residential home builds in Puna and affordable housing projects on the west side continue to thrive, and we hope the trend will continue going into 2023.

State and county roadwork will continue

to be an important part of the coming year and beyond, to keep up with the growing number of residents in the rural areas of our island. Bridge repair work along the Hamakua coast will continue into 2023 and is a critical lifeline for our communities. The county has some park upgrades like Kolekole Beach Park, Magic Sands Beach Park and Waiakea Uka Gym that will help us enjoy these areas and create memories with our families.

With interest rates rising and the possibility of private development slowing down, we may have to depend on state and county jobs to survive. Hopefully, these types of projects will continue to line up and be funded. We are always going to be strong as a community and will continue to build the Big Island so that our future generations will enjoy everything our island has to offer. ■



Affordable Housing Builds Will Get Us Through

By Patrick Gill, President
Hawaii Steel Alliance

Everything we were worried about last year came true: rising interest rates; supply chain shortages and delays; and inflation like we have not seen in decades. Yet because the demand for housing is so high in Hawaii, we still saw a record number of projects completed in 2022. We are still in the "post-pandemic correction period," and it will be another year of turbulence as we wait for the ripples in the economy to stabilize and correct themselves.

As we transition into 2023, we still lack affordable housing. This will cause developers to re-design their next phases to build more affordable units as interest rates hold at record high rates. We are hoping they will level off and start to come down so more first-time home buyers will be able to qualify for mortgages in the coming year. Otherwise, the lack of affordable housing in Hawaii will keep us building units for the greater part of 2023.

We should also see material prices start to come down in 2023 due to the housing market cooling off nationwide, but fuel and oil prices, the diesel shortage and railroad strikes could continue to keep material prices high and in short supply. If China

continues to have a "COVID Zero-Tolerance" policy, we will continue to have disruptions and the country needs to reduce its dependence on Chinese manufacturing.

Cold-formed steel framing is still the material of choice on Oahu, where most walls are framed out of this termite-resistant, non-combustible product. Hoopili and Koa Ridge are our biggest subdivisions on Oahu currently under construction benefiting from straighter walls and fewer callbacks.

The Hawaii Carpenters Union Apprenticeship program continues to train its carpenters in the fundamentals of cold-formed steel, providing us with an experienced labor pool. We have fared much better than other labor markets in keeping a strong workforce.

In summary, it is the pent-up demand that will get us through in 2023. Hopefully, by the end of the year material supply will be back to near-normal, supply issues will improve and interest rates will ease back to allow for more home buyers. ■

GENERAL CONTRACTORS ASSOCIATION OF HAWAII CONTINUED FROM PAGE 40

(USACE) also has an impressive list of projects around the corner. The GCA has a USACE Committee, one of several standing committees that has made considerable progress to strengthen communications and relationships between private-sector contractors and the USACE. For example, contractors and USACE personnel collaborated to find future solutions to price escalation, so that risk does not solely fall on the shoulders of contractors.

Gov. Josh Green's stronger emphasis on affordable housing will be key to addressing the lack of affordable homes and the state's challenges with homelessness, particularly on Oahu. The newly established position of chief of housing in Gov. Green's cabinet demonstrates his serious commitment to the issue, and we believe this will result in more opportunities for the construction industry to support the state's efforts.

We are also hopeful that Gov. Green will end the standstill on the Thirty Meter Telescope, so that this can move forward and allow contractors to responsibly and respectfully work with the community to advance this major scientific project.

Expanding broadband access in our state was identified as a top priority for our state following the pandemic to ensure equitable access for all, including the most vulnerable populations in rural areas. With strong support from Lt. Gov. Sylvia Luke, we anticipate this will also create more construction industry jobs in Hawaii. ■