



NATIONAL ASPHALT  
PAVEMENT ASSOCIATION

CASE STUDY

# RECLAIMED ASPHALT: PAVING THE WAY TO SUSTAINABILITY

When the Ohio Department of Transportation's (ODOT) Office of Materials Management met with Ryan Smith of Columbus-based RAP Management in 2020, the conversation was all about reclaimed asphalt pavement (RAP). Smith had recently purchased an Ammann high recycling technology (HRT) batch plant, and he was interested in showing ODOT what he could do with a high-RAP mix consisting of 55 percent recycled material.

Earlier that year, RAP Management had done a *Roads & Bridges* virtual event featuring a demo project; ODOT expressed interest at that time. Smith wrote a spec around the new material, and they began looking for a paving project to try out the high-RAP mix together.

By 2021, they had one: a 4.6-mile section of State Road 664. "The asphalt industry is trending toward using measurable tests to see how materials will perform in the field. Our goal was to show ODOT that we could deliver a product equal to what they were currently using," says Smith.

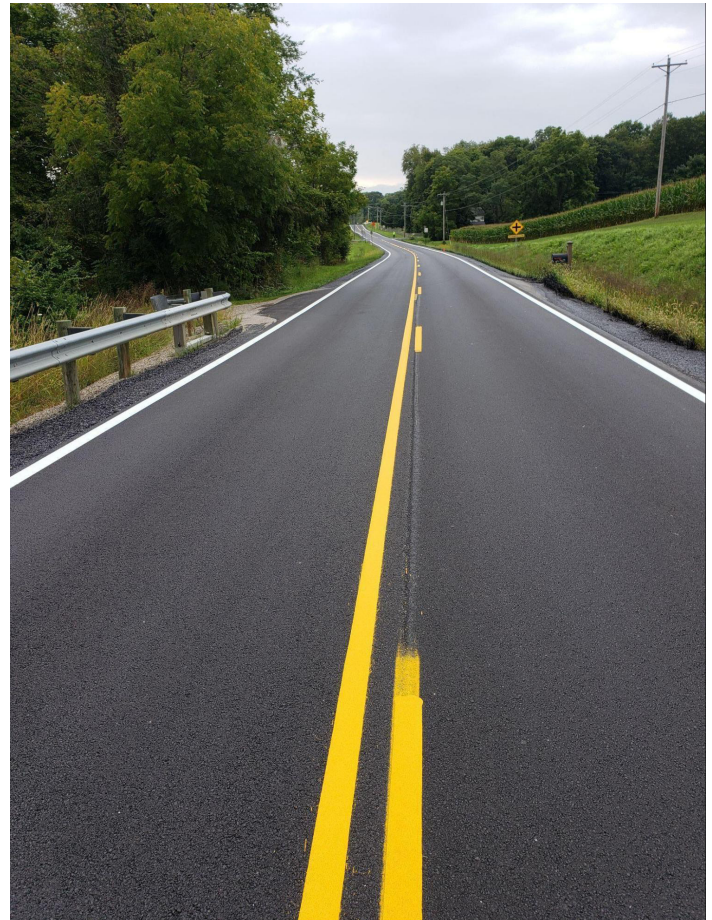
Eric Biehl, Ohio's State Asphalt Materials Engineer, also wanted to know if that was possible. "My overall objective was to see how a 55 percent RAP mix would place compared to a normal medium traffic mix. My hope was that the long-term performance would be the same, if not better."

To test this theory, ODOT decided that the southbound lanes of the highway would be paved with 55 percent RAP, and the northbound ones would be paved with a standard asphalt mix made of 20 percent RAP to serve as a control.

## THE ADVANTAGES OF RAP

Using more RAP is not only more economical than traditional asphalt paving but requires less in the way of virgin materials. "It's our ethical and moral responsibility to manage the product we're generating," says Smith, "and we can do that without sacrificing quality or cost." What remained was to prove that to ODOT.

The balanced mixed design (BMD) approach, as established by a Federal Highway Administration (FHWA) task force in 2015, was utilized. According to the American Association of State Highway and Transportation Officials (AASHTO), BMD is an "asphalt mix design using performance tests on appropriately conditioned



A resurfaced section of road two weeks after paving, with the 55 percent RAP material applied to the left lane.

specimens that address multiple modes of distress, taking into consideration mix aging, traffic, climate and location within the pavement structure."

Biehl notes, "It was ODOT's first BMD project. That was exciting. We were very interested to see how BMD would work for mix design acceptance — and during production."

Ideally, the material would be resistant to both rutting at high temperatures and cracking at lower ones. To evaluate this, the Hamburg Wheel-Tracking and Indirect Tensile Asphalt Cracking

(Ideal-CT) tests were performed beforehand to assess the material's resilience. "Acceptance was based on asphalt content and gradation, as well as density gauge readings on the placed material," explains Biehl. ODOT also collected buckets of both the RAP and the control mix, most of which were sent to the FHWA for evaluation.

## OVERCOMING THE CHALLENGES

One concern during the project was the distance between the RAP plant and the paving site. Smith says, "Our material is perishable by temperature. The further the distance it has to travel, the more time it has to cool, and it needs to be installed above 250°F. ODOT's standard is a limit of 50 miles between plant and site, and the mix must still be hot when it gets to the job so as not to pose problems with compaction."

The control mix came from a plant just 16 miles away. However,

the RAP plant was a 43-mile haul from the paving site. While there was some concern about maintaining the RAP mix's temperature during the journey, that proved to be a non-issue. The mix stayed hot at a temperature of around 325°F during the trip, Biehl notes, and created no placement issues.

The work was completed within a few days' time in August 2021. The density of the two materials proved comparable, with QA testing being performed every 700 tons each day. The results were in: the RAP mix performed as well as, if not better than, the control mix.

Smith says, "We exceeded all the specification requirements. We are able to mix to the highest standards, consistently and precisely."

Biehl agrees. "Overall, we determined that high RAP mix can be produced and placed successfully," he says. "And I think BMD will open the door to greater use of RAP in the future."

## A MORAL IMPERATIVE

Born into a family in the asphalt business, Smith explains his mission has always been to take a unique approach to its production. "I started this company because I wanted to manage the RAP generated from our infrastructure's reconstruction.. However, we couldn't do that with the methods that were previously in use within the U.S."

While there had been a misconception that recycled materials equate to poor quality, Smith notes that the Ammann technology from Switzerland has made this a non-issue. "We felt we could actually develop a better product than what's currently specified in the market while using recycled materials instead of virgin ones." The ODOT project proved him right.

"I wanted my business to be something different," he continues. "It's just not sustainable to continue to mine quarries to produce virgin asphalt material. Now we know we can use a lot of the recycled product that would otherwise end up in a landfill and do it to the highest standards. The whole purpose of RAP Management is to use more of this material while delivering a top-quality product."

Smith envisions the future as one involving partnerships with other companies, elsewhere in Ohio and beyond. The use of recycled asphalt material has him excited about aligning sustainability and quality while remaining profitable, and he sees a bright future for it.

"This is good for our infrastructure, for business and for the environment," he says. "I feel blessed to be in a place where I can push this technology forward." ●



High RAP mix is shown being placed on a section of Ohio's State Road 664.