state-of-the-art RAP PROCESSING

The RAP-fractionating or processing activity at P & S Paving begins with a front-end loader depositing RAP—the by-product of the company's road-milling operations—into the 42-in. x 16-ft. (1.0 x 4.9-m) Telsmith vibrating grizzly feeder (left photo, above). The material then passes to the Telsmith 5252 HSI horizontal shaft impactor (right photo, above) where it is crushed to the predetermined size. If ever a very large chunk hangs in the inlet, a guillotine powered by two cylinders will cut and force the chunck into the crusher, eliminating extensive shutdowns.

WHEN YOU GET A GOOD IDEA from someone you respect, the next logical step is to follow through and put that idea into practice. About two years ago, Tim Phillips—president of P & S Paving, Inc. in Daytona Beach, Florida—attended an Executive Seminar at the Astec headquarters in Chattanooga, Tennessee. One topic discussed in that seminar resonated for Phillips: Fractionating RAP.

"I was so impressed with that part of the seminar that I called back here to the plant before the first day was even over," Phillips said in a **Hot-Mix Magazine** story in 2001 *(Volume 6, Number 1)*. "And I told them to start doing it immediately. Some of the people at the seminar were just sitting there, shaking their heads, like it wouldn't make much difference. Well, I'm here to tell you that we're running higher percentages of RAP now—and the quality of the asphalt is far superior to what it was under our old procedure."

Fast-forward three years. Now you will find that P & S Paving is having continued success with fractionating RAP, but they have added a new twist: a completely self-operating, closed-loop RAP-processing facility. And this cutting-edge technology has helped propel P & S Paving to the top of their market.

Fractionating RAP is the act of processing it to screen, crush, size, and separate the various sizes into stockpiles that are uniform in size and composition.

"Today we're running 50 percent RAP, whenever state specifications allow," said Phillips in a recent interview. "And we've perfected it. In the old days, we were out there, like most other contractors, taking up asphalt on jobs that we had paved because we got out of specification. Today, since we added this machine, we haven't taken up a single ton of asphalt."

A new stage in fractionating RAP

For most people, fractionating or processing RAP is not an entirely new concept: by sizing RAP and separating it into specific piles, a producer gains more control over the size and amount of the reclaimed aggregate that goes into new mixes, as well as the amount of liquid-AC that is being used during production.

This is the concept that captured Phillips' attention at the Astec Executive Seminar back in 2001. But early in 2004, Phillips and Astec Industries CEO Don Brock began talking together about a slightly different concept: a RAP-processing facility that would crush, size, separate, and store RAP—all within one automated, closed-loop system.

"We wanted to make sure that it did not have an operator," said Phillips. "We wanted to merely turn it on, and then the only manpower needed would be the loader operator."

Once material enters this system, oversized material is screened and then fed back to the crusher until it is sized correctly and can be deposited into one of two piles: 1/4-in. (0.635-cm) minus and 1/4-to-1/2-in. (0.635-to-1.27-cm).

Phillips avoids using the word *crushing*. "Even though the oversized material is passed through a crusher," he said, "we don't like to call it *crushing*. Instead, we like to think of it as *separating*. We are actually separating the millings and returning them back to their virgin state. We don't want a true crushing operation because crushing creates fines—and fines create problems."

Phillips said that once the RAP is separated, the material is handled just like any virgin aggregate. "The only difference is that this material is coated black. And that one fact makes the material extremely valuable to us."

At their location in Florida, P & S Paving has limited resources for virgin aggregate: it is shipped by rail from either Georgia or south Florida. This, of course, drives up the cost of the aggregate to about $20 per ton. Plus, Phillips pointed out, the costs of liquid-AC has continued to rise.

Meanwhile, P & S Paving seems to have an endless supply of RAP from their milling operations.

"Before this RAP-processing system came in, our milling piles were becoming enormous," said Phillips. "We were looking for more land where we could put all the millings we were accumulating. We realized that we needed to do something—we actually needed to be using the same amount of millings that we were bringing in.

"Now, we've solved that problem. Since we installed this system, our RAP piles have remained at a constant size rather than growing.

After leaving the Telsmith HSI crusher, the material moves to the PEP PSP 2618M screening plant (left photo, above). This unit has a double-deck high-frequency screen with a 6 x 18-ft. (1.8 x 5.5-m) top deck and a 6 x 12-ft. (1.8 x 3.7-m) bottom deck. The material is separated into two sizes, with oversize returning to the crusher. The screened material moves on belts to a system of radial-stacking conveyors (right photo), each of which has a 30-in. x 70-ft. (76-cm x 24-m) stacking conveyor. The sized RAP is then deposited into stockpiles. In a single day, P&S Paving processes about 1,000 tons (900 tonnes) of RAP.

That's because of the increase in the percentage of RAP that we're able to use in new mixes: Instead of running 30 percent RAP, we're now running 50 percent."

Unique equipment equals serious production

P & S Paving knows how to use state-of-the-art equipment to promote company growth—and to turn out serious production rates. Several years ago, they upgraded from a 1956 batch plant to a brand new Astec Turbo 400 Double Barrel® drum-mix plant. With three paving crews out in the field, that HMA plant is now producing close to 450,000 tons (408,000 tonnes) per year.

"We're literally running it around the clock, almost 24 hours a day, seven days a week," Phillips said. "We're getting very good volume out of one plant!"

With that high production rate, the new RAP-processing plant needed to be able to keep pace. One element that keeps the processing plant moving is the fact that not all of the RAP has to go through the crusher.

"Before we got this system, we merely threw RAP onto a high-frequency screen—and 70 percent of the return was material that didn't really need to be crushed," said Phillips. "With the new RAP-processing plant, we have the ability to go around the crusher. We simply throw the RAP into a hopper, screen it, and separate it by size. Everything that is oversized automatically goes to the crusher. If everything went straight into the crusher, we would end up crushing all of the material and creating more fines. This system avoids that problem completely."

Phillips said that P & S Paving will have used more than 200,000 tons (181,500 tonnes) of RAP by the end of 2004. In order to do that, the plant's Telsmith 5252 HSI horizontal-shaft impact crusher processes about 350 tph (317 tonnes per hour). "We crush about 1,000 tons (900 tonnes) a day," said Phillips. "It is extremely fast: It only takes about four hours to crush that amount."

P & S Paving used more than 200,000 tons of processed/fractionated RAP in the first six months that the system was in operation. Whenever specs would allow, they were running 50 percent RAP in their new mixes.

P & S Paving upgraded to state-of-the-art hot-mix-asphalt technology in 2001 with the purchase of the Astec Turbo 400 Double Barrel® drum-mixer plant shown here. The installation included the drum-mixer, a five-compartment cold-feed system, and a one-compartment RAP feed system. A single 200-ton (181-tonne) Astec storage silo was part of the original order, but a second silo was added later. According to Tim Phillips, president of P & S Paving, the new plant has allowed the company to expand its hot-mix production and paving operations significantly. With the addition of the RAP-processing system earlier this year, the company has no problem running new mixes with 50-percent RAP content.

FOR MORE INFORMATION

about RAP-processing, contact one of these resources:

Diane Hunt at Astec, Inc.
Phone: 423-867-4210 • Fax: 000-000-0000
E-mail: *dhunt@astecinc.com*

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Jim Schreiner at Telsmith
Phone: 800-765-6601 • Fax: 262-242-6600
E-mail: *jschreiner@telsmith.com*

———

Ron Earl at Astec Mobile Screens
Phone: 800-545-2145 • Fax: 815-626-6430
E-mail: *sales@astecmobilescreens.com*

In order to assure the best-quality material, P & S Paving creates RAP inventory on a just-in-time basis. In other words, they process only as much RAP as they will need and when they will need it.

"We do that for an important reason," explained Phillips. "The processed-RAP piles will actually harden if they sit there with the sun beating down on them. So we process the RAP on a day-by-day basis—typically the day before the material is to be used in the hot-mix plant. There is another advantage to that: We do not let the piles get wet—and that cuts down on drying costs."

One more safety measure that P & S Paving has put in place is their quality-control program. "We have set up a quality-control plan in order to do daily checks on the volumetrics of the RAP, as well as the viscosity," said Phillips. "That report is turned over to the Florida DOT."

Phillips said that despite the daily checks by their technicians, P & S Paving has found that the volumetrics and viscosity tend to be very consistent. This is due in part to the care and attention to detail that is taken by the operator of the front-end loader.

"The loader operator can see color changes in the RAP piles. If the pile starts getting streaky, then he knows the AC content is not consistent," said Phillips. "So, the operator can help you or hurt you in that process—and we have trained our loader operators to feed that crusher consistently."

Since the RAP-processing facility went into operation about six months ago, Phillips said it has attracted the attention of others in the industry. "We've had some of our competitors come in and look at it—and I think one of them even purchased a system like it," he said. "We're not doing anything magical here. Producers have been crushing RAP for a long time. But they have not been screening it on a high-frequency screen like we do here.

"That's the real difference in what we're doing." ▼▲▼