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## The Missing Link

**Riverbend Construction Services Uses Interlinked Jaw, Cone and Screen to Speed Production, Reduce Costs.**

**Plus: Interview with NSSGA Chairman Randy Lake • Mobile Connectivity On-Site**

# The Missing Link

## Interlinked Jaw and Cone, Screen Speed Production, Cut Costs for Riverbend Construction Services.

**By Tom Kuennen**

*Backhoe feeds new Mobicat MC 110 Zi EVO primary jaw crusher.*

An independent contract crushing company is using its new mobile jaw and cone crushers – flanking a new mobile screen – to boost aggregate processing productivity while saving money on fuel.

"Our current business model is to do contract crushing," said Duff Boyd, president, Riverbend Construction Services, Jefferson City, Tenn. "We focus on mining of construction aggregates and material recycling."

Riverbend operates in the southeastern United States in Tennessee, Georgia, Alabama and South Carolina. It has three portable crushing plants, and the Kleemann plant is the newest.

Riverbend owns no quarries or gravel pits; instead it provides services to the aggregates industry, such as overburden removal, drilling and blasting, site development, and in this case, contract crushing and screening.

At an established quarry in South Carolina, Riverbend was taking granite production to a new level – supplementing demand for product – that was unattainable by the quarry owner working with its own forces and equipment.

There, a new Mobicat MC 110 Zi EVO primary jaw crusher, a Mobiscreen MS 15 Z screen, and a Mobicone MCO 9i EVO secondary cone crusher – all from Kleemann and acquired in summer 2017 – were working together via Kleemann's Interlink technology to smooth production and lower costs.

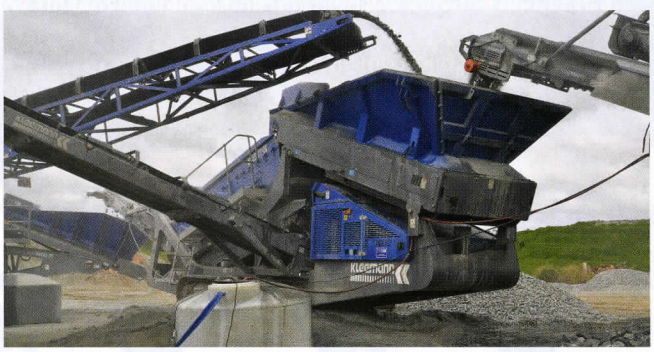
"Here we are making crusher-run granite road base and a No. 4 material, which is 2 in. by 1 1/2 in. with no fines," Boyd said. The crusher run size is 100 percent passing 1 1/2 in., all the way down to 200 mesh size. Riverbend does the drilling and blasting of the gray granite, and loads and hauls the raw stone to the processing site on the top of the pit.

### Prescreen Saves Fuel, Wear

With the new interlinked equipment, Riverbend was averaging 305 to 335 tph, depending on the feed. "If the feed is a good, well-blasted material, with this closed-circuit arrangement I can easily put up to 340 tph through. By well-blasted I mean a rock that's not chunky, that's shot well throughout with some fines in it and a variety of sizes that go into the primary. But as the rock gets coarser, productivity slows down."

Instead of a grizzly, Boyd's new Mobicat primary jaw crusher utilizes an independent prescreen that speeds productivity.

"The prescreener pulls all the fines out, and that's where the tons per hour really pick up," Boyd said. "But if its a coarse material, it all has to go through the jaw and my tons per hour will go down. The prescreen is the ticket. Currently we don't drop any fines through the prescreen that kick out the side; instead they drop right underneath and bypass the jaw, and we blend and mix them at the scalping screen.



*Jaw (right conveyor) and cone crusher (left) send aggregate to Kleemann Mobiscreen MS 15 Z for further classification.*

*Kleemann Mobiscreen operates in closed circuit with jaw and cone.*

"When we crush through the cone, those fines return back and we blend the pit fines with the crusher fines to make a more consistent crusher-run product, with stable gradation," Boyd said. "If we kicked them out at the jaw, and made crusher run at the screen, we'd have two separate products; instead we send both fines products to the screen, where it blends and mixes and stays consistent."

The feeder itself sets the feed rate for the tons per hour coming into the plant. "It runs at a higher frequency," Boyd said. "The prescreener cleans the feed up and keeps the fines out of the crusher, and that's huge. Instead of being kicked out the side by conveyor, they go down a chute – bypassing the crusher – and mix with the crushed material coming out of the jaw. It cuts down on the wear on the jaw dies, and the cheek plates. It prevents wear and tear, and increases throughput."

The prescreen also equates to better fuel consumption. "These machines literally sip fuel compared to the competitors," Boyd said. "I've been very, very impressed with the fuel consumption, especially the Kleemann conveyor. They use hardly any fuel at all and are very reliable."

## Closed Circuit Crushing

The interlinked equipment is set up in a closed circuit. Material is primary-crushed at the jaw, and both crushed material and all fines go to the mobile screen.

The MS 15 Z mobile screen has two decks, the top with 2-in. panels, and 1 1/2-in. panels on the bottom deck. The top deck overs go to the cone crusher to be sized down (as the jaw is set to 65 mm, a 4- to 5-in. size rock goes to the cone). The cone crushes that material and sends it back to the screen for resizing.

The bottom deck overs are a 2 x 1 1/2-in. rock, and the bottom deck screen throughs is a 1 1/2 in. size, which is stacked as a product. Anything dropping through is crusher run, which is stockpiled and loaded on trucks.

One great benefit of the Kleemann plants is its diesel-electric drives, Boyd said. "The jaw and the cone are diesel over electric," he said. "The crushers are run off fluid couplings, but the rest of the plant is electric. The advantage is that the electrical systems are much easier to work on; any electrician

*Kleemann Mobicat MC 110 Zi EVO primary jaw crusher, Mobiscreen MS 15 Z screen, and Mobicone MCO 9i EVO secondary cone crusher – all from Kleemann and acquired in summer 2017 – work together in Interlinked mode.*

*Feed to cone crusher gets dust suppression.*

who knows about three-phase electricity can troubleshoot or repair it. That's unlike competing makes, in which all of the products are hydraulically driven. And when you have hydraulic problems, they are very difficult to troubleshoot.

"And Kleemann's control panels are cushioned with springs, and sealed tight," Boyd said. "They work fabulously. Electrical over hydraulic is much easier to troubleshoot, repair and maintain."

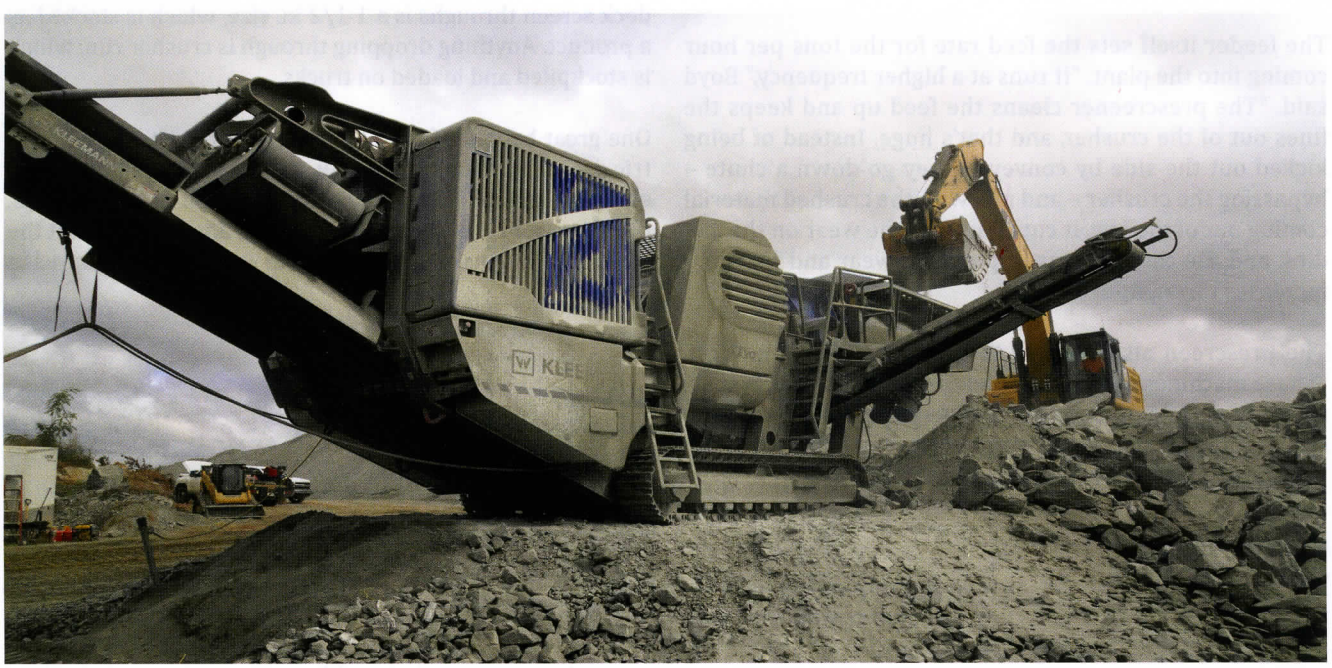
## Interlinked Plants

The other great benefit Boyd found was how the jaw and cone crushers are interlinked and communicate with each other.

"Via a control wire, the cone 'talks' to the jaw," Boyd said. "The cone sets the pace for the plant. If the cone starts to get too much stone, it tells the jaw to slow down a little bit until it catches up. What's fascinating is that every 20 minutes the cone and the jaw analyze what has happened, and the system gets smarter as it goes on."

For example, throughout the day, if the cone determines that it has let the jaw slow down too much, it will adjust for that. "As the day goes on, the plant runs just fabulously," Boyd said. "As the day progresses, and we start to see a little manganese wear on the cone or die wear on the jaw, and factors change throughout the day, the plant adapts too. It takes a lot of human error out of the equation."

If he sees the recirculating load is rising out of the cone in the closed circuit loop, Boyd can "tighten" the cone via adjustment of its closed-side setting.



*Instead of a grizzly, new Mobicat primary jaw crusher utilizes an independent prescreen that boosts productivity while reducing wear and tear on system from abrasive fines.*

*In Interlinked operation, jaw and cone crushers (cone shown) communicate with each other.*

"We can go in on a daily basis and do a zero-point set on the cone," Boyd said. "The cone will screw itself down until it touches, and then back itself off. It's a super-accurate way of checking your closed-side setting. If you just go in and set it, unless you know where the zero point is, it's not an accurate measurement. By being able to automatically zero out your cone, you don't have to use lead weights or slugs being crushed to measure the lead to see what the setting should be. The automatic setting is fantastic; you push a couple of buttons and it's set within five minutes."

*Riverbend's Duff Boyd utilizes touch screen to control production.*

The Mobicat jaw crusher design also aids maintenance, Boyd found. Like the Mobicone, it features fully automatic hydraulic crushing gap adjustment, which guarantees quick setup times and on-the-fly adjustments.

"The swing die on the jaw crusher is much longer than the stationary die," he said. "That longer swing die not only protects the pitman on the jaw crusher, which is great, but secondarily, it eliminates the edge or lip on a shorter swing die on competing crushers that gives an opportunity for bigger rocks to catch and hang on to. Kleemann's taller jaw die all but eliminates stoppage due to big rocks. If you are doing 330 tph, and you have to stop for a half hour to dig the rock out, you've lost 165 tons of productivity."

While Riverbend has two other mobile aggregate processing plants of other makes, Boyd chose Kleemann after doing research that included visiting Kleemann's plant at Göppingen, Germany, outside Stuttgart.

"I visited Kleemann's factory about two years ago, and was fascinated by the design, engineering and fabrication of Kleemann equipment," Boyd said. "The engineering is fantastic. As a result I had to give them a try."

At same time, he found support for his existing equipment was getting weak. "The support I get from Kleemann and Linder Industrial Machinery Co. has been fabulous," he said. "It's of excellent quality." ▲

*Edited by* Rock Products *from material contributed by Kleemann/Wirtgen Group.*