

Fit-for-purpose vibrating screens built to last

Specialist vibrating equipment OEM, Kwatani, stands out for its heavy-duty machines that are engineered for tonnage and customised for specific applications. CEO Kim Schoepflin and GM Operations, Riaan Steinmann discuss how the company is leveraging years of experience in the field to bring fit-for-purpose products to clients.

With more than 15 000 units of Kwatani vibrating screens and feeders operating around the globe, the company is one of the largest OEMs operating in Africa. This, Schoepflin says, is all owing to the company's over 35 years of experience in heavy duty minerals applications.

"What makes us a respected OEM in the industry is the holistic approach we take to ensure customers get the best value for their plant application and their pockets. We have engineered thousands of Kwatani vibrating units and feeders based on specifications we have gathered from doing extensive research on a plant," Schoepflin begins.

To put its design and manufacturing capacity into context: A 2017 contract put the OEM on the map when the largest single order came in for 44 giant screening machines for an open cast coal mine in Limpopo. Schoepflin explains that over half of the screens for this order were very large. The largest spanning a width of 4.3 m in total.

In a challenging economy, Kwatani manufactured and delivered all 44 screens (in two-week intervals) together with the related base frames, exciter drives and spare parts, within six-months, to meet the tight project time lines.

"Each of our screens is designed for the client's exact application. You will not see a catalogue or a list of machines in our brochure because we have a customised approach," she says.

Adding to this, Steinmann says that an OEM selling out of a catalogue can only select the closest machine to fit the application of the client. Catalogue based machine selections do not factor in plant variances and/or deviations, thus, an OEM makes its machine selections with a higher risk of plant and machine mismatch.

"For an iron ore mine, for example, we have built our strongest and heaviest scalping screen yet," says Steinmann. "The screen is a single line unit and runs 24/7. It is engineered to be robust and to perform continuously."

At 54 tons, the screen is not necessarily the largest, but it is the heaviest the company has made. It is driven by three of the largest exciter gear boxes that exist – each weighing more than two tons – while exerting a centrifugal force of up to 700 kN each to lift the screen up and down by 13 mm over 800 times per minute, to process 7 000 t of large iron ore boulders.

Large drop heights, very heavy run of mine ore boulders and large cut sizes all mean that



Kwatani GM operations Riaan Steinmann and CEO Kim Schoepflin.

this screen and its component parts must be specifically designed for the excessive tonnage, loads and stresses not normally seen in dry screening processes. The scalping screen design, amplitude of stroke, excitation force and screen deck selection must be optimised to limit pegging on screen deck apertures. At the same time, clay build-up must be prevented as far as possible. Bed depths at the feed- and discharge ends are critical elements in the design of the screen.

The mass of the scalping screen could not be too high as the output of the exciter gearboxes has a finite limit of centrifugal force. Kwatani manufactures its own exciter gearboxes and offers the highest centrifugal force available of any exciter gearbox manufacturer in South Africa.

Good design meets great engineering Schoepflin believes these kinds of orders are possible because of the company's trusted design and engineering capabilities and fit-for-purpose brand promise.

"The company has an extensive range of vibrating screens and feeders operating across a broad spectrum of commodities and industrial applications. We are a trusted OEM in the industry because of our innovation and ingenuity.

"Our vibrating screens are customised for specific applications but it is their engineering, which incorporates structural endurance, robustness and serviceability, that produces an excellent combination, which we at Kwatani refer to as 'the sweet spot'."

Keeping simple and effective processes

Schoepflin explains that not a lot of new processing plants emerge during tough economic times, so the bulk of the projects the company is called to do involve brownfield

expansions, replacements, and improvements.

"We have a system whereby we go to customers as a consultant and review their ore and the required application. For each plant the application will be different so, naturally, the processes followed will be different. We have to research and develop a machine that fits the client's layout, processing plant requirements and existing infrastructure – where everything is going to fit, what is downstream and what is upstream. This is critical because the best screen in an unsuitable situation would not perform and could cause downtime.

"So we try by all means to use our technology to find out what the client is trying to achieve. Is it more tonnage, more efficiency, reduced vibration of the surrounding buildings or is there a water overcarrying problem? Once we establish the problem or the plant's concerns, we go in with a process engineering as well as a mechanical engineering mindset to find a solution. Only then do we start designing.

Once the design process is complete, we move to our facilities in Kempton Park, where our screens are engineered and fabricated on our own site under strict quality control. The many parts that make up a Kwatani screen are all assembled together before testing on the on-site test bench, which is specifically built for each screen. Each screen, under close engineering supervision, is then tested for an hour prior to dispatch.

"The efficiency and quality of our work process allows us to design, manufacture and deliver custom-designed screens in the same timeframes that other OEMs deliver standard models," says Schoepflin.

"This is particularly demanding as custom-designed equipment undergoes an intensive design process after being verified by rigorous finite element analysis in-house. Prior to dispatch, all units endure intensive testing before being commissioned on our customer's site. For this reason, Kwatani boasts its own in-house advanced testing facilities at its Kempton Park facility. Aligned to ISO 9001 standards, the testing protocols have been developed in-house with decades of experience. This allows full testing similar to cold commissioning, even before delivery to site.

"This does not mean we're more expensive. On the contrary, using our machines could be far more cost effective based on the built-for-fit ideology. Typically, using our machines will result in a more cost-effective option because changing plant infrastructure to fit a machine is rather cumbersome.

"Our offering results in a longer machine life and greater process efficiency, which translates into a reduced total cost of ownership compared to competitors. We don't just want to sell a screen, we want to sell a solution," Schoepflin tells *MechChem Africa*.

On a manganese mine

Kwatani recently supplied four heavy duty vibrating screens and 10 feeders to help boost throughput as a vital aspect of a plant expansion at a Northern Cape manganese mine.

Schoepflin explains the screens were a custom job built to meet the mine's challenging operational requirements.

"Manganese ore is very harsh on vibrating screens as it has a high specific gravity and is also very abrasive," says Schoepflin. "Our machines are engineered to perform the application's duty requirement while being robust enough to deliver maximum uptime."

The units supplied included a 3.6 m double-deck scalping screen, a 3.0 m double-deck screen, a 2.4 m screen and a 1.8 m dewatering screen.

On a coal mine

On a large coal mine, Kwatani engineers were called in because the mine wanted to increase its throughput by 17% with existing equip-



A Kwatani double deck exciter drive screen for a diamond mining operation.



A scalper feeder leaving Kwatani en route to the end user.



A view of the busy Kwatani assembly floor with screens of various sizes and applications.

ment. Other suppliers told the mine it needed new screens, and that is what they offered. However, the issue was it needed more power to drive the new screens.

"To change power cables on a mine is a massive project," says Schoepflin, "and there are environmental implications to such a project as the mine would have to use more power.

"For this particular project, we ended up engineering a new exciter gearbox for the client. We put it on the existing machine and did an FEA of the machine to see if the machine could handle a stronger gearbox – and it could. We resolved a major problem at a fraction of the cost, without having to change the power infrastructure."

Schoepflin explains that Kwatani's innovative engineering approach ensures it always finds the best solution for the client. "Customers choose us for our engineering track record – developing technology that can manage the tonnages they require," she says. "This means understanding each mine's specific conditions and then building a design to meet a range of complex mechanical and metallurgical factors," she concludes. □



A Kwatani single deck loaded carbon recovery screen for a gold mining application.