SA's niche hydraulic systems engineering company

MechChem Africa visits the Jet Park facilities of hydraulics specialist RB Engineering Services and talks to the company's MD, Richard Bartholomew.

First registered in South Africa in 1981, RB Engineering Services (RBES) began as a designer and manufacturer of high-pressure water-based solutions for the mining industry, such as control and safety valves, jetting guns and couplings. "We did a lot of work on dust suppression systems, for example, to remove the dust and fume after a blast," begins Bartholomew.

Growing quickly, a dedicated factory was built in Kya Sands in 1990, where the company developed pure water-based high-pressure equipment for the New Hydropower mining system, including the then revolutionary Combi Valve.

For the Trump Ocean Club Hotel and Casino in Panama City RBES designed and manufactured the hydraulic shutter-lifting systems for the lift shafts, mast and the hotel's arcs (inset), which were required to position the shuttering to form the parabolic shape.

Today, RBES has become an hydraulic engineering specialist with niche expertise in shutter-lifting systems for the construction industry; freight handling systems for companies such as Schenker, SA Airlink, Swissport, African Flight Services and Mega freight; and for general industry, custom-designed hydraulic presses, specialised machines, hydraulic cylinders, hand crimping tools, hydraulic cable guillotines, buzz bar twisting machines, scissor lifts and hydraulic turnover tables.

Hydraulic shutter lifting systems

The most notable success for RBES has been its hydraulic climbing systems for the construction industry. "We have developed systems with up to ten cylinders under independent control, capable of lifting up to 200 t of platform, formwork and/or safety screening," Bartholomew tells *MechChem Africa*.

"These are whole systems that are ratcheted up a building as it is constructed. The shuttering platforms, which include access ladders and safety railing, enable rebar to be set in place and concrete to be poured to suit the specific design of the building under construction," he says.

RBES' most recent export success is the Trump Ocean Club Hotel and Casino in Panama City. "We designed and manufactured the shutter-lifting systems for the entire building's lift shafts and mast, which were vertical lift systems, along with the more complex system for the hotel's arcs, which were required to lift the shuttering upwards and sideways before re-positioning it in order to form the parabolic shape with varying curvatures," Bartholomew reveals.

At 284 m, this 70-storey, 5-star hotel is now the tallest building in Panama and by using these three unique RBES-designed and built climbing systems, construction was completed in less than one year, "without a hitch".

"We have also developed a wall climber

that can lift shuttering or safety screening up the outside of a structure," continues Bartholomew. "And although these systems are typically purpose-built to suit the architecture of a particular building, our design team can either adapt standard equipment to suit specific needs or design a unique system," he adds.

A unique pup-coil press for Hulamin

Expertise gleaned from its sophisticated hydraulic climbing systems, in particular the parallel positional control of multiple cylinders required for precise vertical lifting, has also been adopted to manufacture special purpose presses.

"Hulamin Aluminium had a requirement at its smelter for a pup-coil press," Bartholomew explains. "Foil and sheet products are rolled onto coils on the production line, but there is always some end-of-coil material that requires recycling back into the smelter to reduce waste and improve profit margins."

This material, according to Bartholomew, needs to be compacted for two reasons: first, to make it fit back into the smelter more easily and, second, to increase its density so that it will sink below the slag floating on the surface of the melt.

Following research, Hulamin decided that the best way to recycle the pup coil was to crush it. "There are inherent dangers in other processes. If you get water into the aluminium, for example, then it explodes when dropped into the furnace. By crushing, inside spaces are removed and any surface water can easily be seen and removed before adding the material to the smelter," he says.

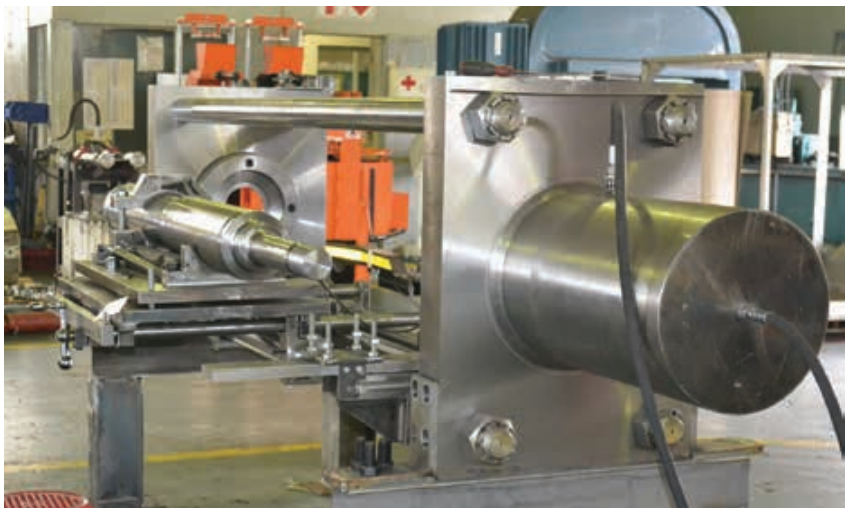
The reel of each pup coil is taken out before crushing the aluminium, which could be of various foil thicknesses and roll diameters: typically up to 3.0 mm sheet thickness on a 1 000 mm roll. "A forklift is used to lift two pup coils at a time, one on each of its forks for loading into the custom-built hydraulic press we have developed." Bartholomew says.

"Due to the extreme variation in coil diameter, thickness and length of each coil, the press platen would normally have skewed if using traditional press designs.

In its innovative design, RB Engineering has overcome this problem by adopting some clever hydraulic thinking. "We have developed a control strategy for a four-cylinder hydraulic press, so that, whatever is happening with respect to the load positioning, the press will always remain parallel."

How? "It's all managed via oil flow," Bartholomew explains. "Instead of simply energising the four cylinders from one pump, which causes more flow to be directed to the cylinder experiencing the lowest load, we ensure equal flow to each of the four cylinders. For uneven load situations, this system inherently balances the press and directs the pressing forces to where needed, regardless of the load positions," he explains.

The pup-coil press built for Hulamin Aluminium uses a control strategy for a four-cylinder hydraulic press that always ensures the press remains parallel.



Under test at RBES' Jet Park premises is a custom built hydraulic press for manufacturing railway couplings.

The system also adopts regeneration to accelerate the action of the press under no load conditions. "There might be as much as a metre of daylight to close the gap to the load before pressing. To speed up the process, as well as pumping oil into the cylinders, we direct the oil from the annulus side of the cylinder to the crown. Then, as soon as the system detects a pressure build-up from the load, we shut off regeneration to focus on pressing the pup coil.

"The full pressure differential is then immediately available to press down the load," he says, adding, "each of the four cylinders is powered by its own power pack, with the system flow under PLC-control to ensure parallel operation at all times.

"We believe that our biggest strength comes from design innovation: thinking out of the box. We don't simply design hydraulic circuits. We like to look at a whole process and to understand exactly what is required and what the pitfalls are.

"Then we can come up with well-engineered, custom-designed hydraulic solutions that help customers to achieve the outcomes they want," Bartholomew concludes. ❑