

Port Botany Container Terminal

Case Study

masonry.
style and
function



Heavyweight Champion

For heavy duty installations, concrete pavers knock their opponents out of the ring.

Project: Patrick's Container Terminal

Location: Port Botany NSW

Head contractor: Fulton Hogan

Paving contractor: ACP Hardstand Solutions

Featured product: Austral Masonry Zetech Techpave 100 heavy duty concrete pavers, natural colour

Photography: Alex Mayes, production photos courtesy ACP Hardstand Solutions

The humble shipping container has revolutionised international trade, lowering costs and simplifying handling and transport. Ports across the world are taking this to the next level by automating the movement of containers off ships, and into and out of the port.

Patrick's Container Terminal at Sydney's Port Botany has recently been extended to cater for additional traffic and new straddle carriers that will operate unmanned 24/7 using guidance technology.

Austral Masonry's Techpave 100 concrete pavers from the Zetech range, were selected to cover the 60,000 square metres of the Port Botany extension. They were laid by Perth-based ACP Hardstands using specialised equipment that speeds up the construction process and lowers costs.

But first some background. Containers are heavy, even more so when they are stacked three high as they are for this site. (On some sites they reach up to five or more.)

Each container stands on four small feet, multiplying the effective loading. Patrick's new straddle carriers are no lightweights either, each weighing 65 tonnes unladen.

Conventional asphalt paving cannot reliably carry these loads and mass concrete is expensive to construct and difficult to maintain in the event of wear or localised failure. Asphalt is also susceptible to damage by fuel or oil spillages.

In contrast, heavy duty concrete pavers are economical, hard wearing, easy to maintain, and highly resistant to being displaced by horizontal or vertical forces. In the event of damage, individual pavers can be easily removed and replaced or reinstated. The pavers are laid on a sand bed about 20mm thick.

The cost effectiveness of concrete pavers has been enhanced by the introduction of mechanised laying. ACP Hardstand Solutions is the market leader in heavy-duty segmental pavement construction through the use of specialised equipment such as the Probst



Powerplan PP screeding machine which lays a thin bed of sand to support the pavers. Using laser guidance, the machine deposits the sand and screeds it to the finished level with a speed and precision that would be unattainable using manual methods.

The pavers are laid using a vacuum attachment on a skid-steer loader that lifts a layer of pavers from a pallet and deposits them in the pattern. For this project the pavers were laid at an average of 1500 square metres per day, peaking at about 2000 square metres.

The pavers are cast in special moulds at the Austral Masonry factory, arranged in the final laying pattern. The pattern chosen for Port Botany was 90 degree herringbone, which has strong interlocking characteristics.

"Pavers that are 80 to 100 millimetres thick and laid in a 90 degree or 45 degree herringbone patterns are the only ones we would use on heavily-trafficked areas," explains Ryan Daly, ACP's contracts manager.

The pavement is then compacted using a hydraulically-driven vibrating triple-plate compactor attached to a skid-steer loader. "The initial compaction is made as soon as a section of pavers is laid and then two further compactions are applied before the end of the day," says Ryan. Compaction drives some of the sand up into the joint between the pavers, enhancing their interlock.

The result is a smooth, massively strong pavement that will readily handle the loads at a container terminal. "One hundred tonne Caterpillar D11 bulldozers are driven over one ACP installation and it's not rutting at all," Ryan reports. "You are not really going to get anything heavier than that!"

This was the first time ACP has used Austral Masonry's Techpave 100 heavy-duty concrete pavers ... and Ryan Daly is impressed. "We didn't have any problems with size variation or anything like that."

As well as ports, heavy-duty concrete pavers are also finding a ready market in airports, car parks, intermodal terminals, mining sites, and more.

"From my point of view, and I've been in the industry for 12 years, these Techpave 100 pavers are the best product we have used," Ryan Daly concludes.



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