GREG October 2023 Technical Tour of Thornton Engineering

On the 12th October, twelve GREG members and two enthusiastic secondary school students attended the Thornton Engineering plant tour.

As previously noted, "Thornton Engineering provides design and fabrication of structural steel, pressure vessels, heat exchangers, plate, and piling steel products for major projects Australia wide. Established in 1975, from a small workshop in Penshurst, Victoria, the family-owned business has grown to become one of the leading steel fabricators in Australia. Thornton Engineering operates five workshops, including the dedicated Vessel Shop, two Beamlines, a Plate Shop, and the Penshurst workshop."

We met our tour guides, Brenton West, Production Manager, and Ash Caldwell, a Project Engineer in the Vessel Shop and were taken into a meeting room within an office complex attached to the most recently completed Vessel Shop building. Brenton explained how the company had expanded over a couple of decades at the Lara site from the relatively small workshop in the northwest of the site to the large Vessel Shop (see Site Plan below).

Early in the conversation, after Ash had explained the use of sophisticated robotics among other items used in the Vessel Shop, he explained that the great length of the buildings is to facilitate in-line sequential fabrication of items. The steel materials enter at one end of the building and are cut to size before proceeding through the factory, where they are further shaped and welded together, heat treated, if necessary, sandblasted, and then painted, with the finished product emerging at the other end of the building.

The open state-of-the-art fabrication workshops employ in-line lean manufacturing techniques in the buildings:

Beamline # 1: 275m long x 25m wide

Beamline # 2: 320m long x 25m wide

Vessel Shop and Plate Shop each 325m long x 30m wide.

The tour focused on the Vessel Shop first which was designed to handle vessels of all shapes and sizes.

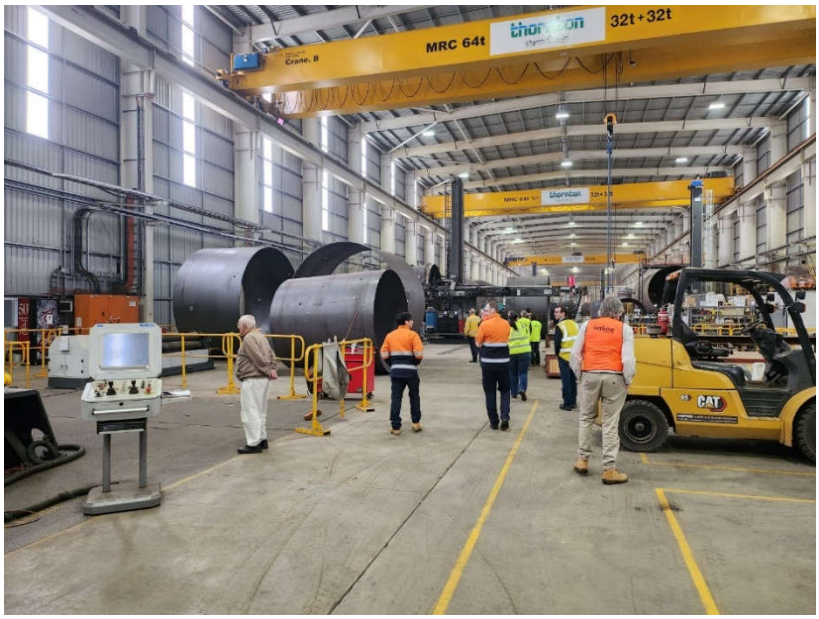


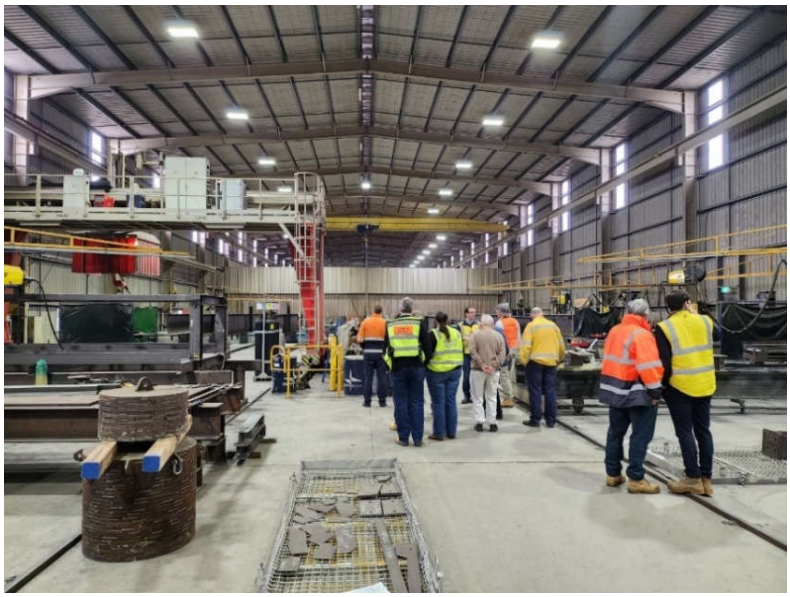
Plate steel is first cut to size, then rolled to form a cylinder and the ends welded to complete a segment of the vessel.

Next, the segments are welded together and the end domes, supplied by external contract, and other necessary components are welded to the cylinder. Much of the welding is carried out robotically.

Completed vessel requires stress relieving. This process is achieved through heat treatment in an oven, that is 25m long, 7m wide and 7m high, shown here, left of centre. The temperature range is 300 to 800^{o}C with a maximum 1000^{o}C. The oven slides over the vessel to be treated as it sits on metal stands and is then lowered to floor level. The ends are then closed off. The stands are replaced after 6 - 7 cycles to avoid failure.

The new Plate Shop, which is like the new Vessel Shop, offers clients heavy plate fabrication and full modular assemblies. While we did not inspect this shop, an example of the projects made in the shop is shown below.

Beamline No. 2 was our next factory to inspect. The "two extensively equipped Beamlines are designed to turn CAD drawings into fully fabricated structural steel within 48 hours." The "Beamlines are the perfect solution to deliver a high-volume of structural steel with a short lead time.



All components for the structure are firstly cut from steel stock at the end entrance to the workshop and

When the size of a projects allow, two projects can be worked upon simultaneously, one on either side of the factory.

As components are completed, they move progressively down the line towards where they are sand blasted.

After they have been sand blasted, they are moved along

Eventually the items reach the end of the factory and are loaded on to trucks for dispatch to the customer.

This last port of call was the completion of the tour.

We thanked our guides, Brenton, and Ash, for taking the time to show us their excellent workshops and for answering all our questions before returning to the office and departing from the site.