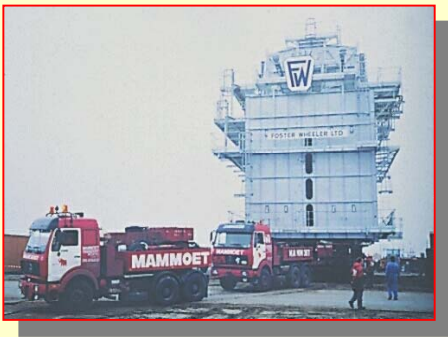


For modern grassroots refineries modularisation of major items of equipment is nowadays commonplace, particularly where access to site is limited and shutdown time is the always the most expensive commodity. Pre-assembly off-plot reduces site erection costs and manpower requirements dramatically, and, as much of the pre-commissioning can be done at the fabrication yards, final commissioning and start up are kept to a minimum. Shop fabrication ensures highest control of quality.

FIRED HEATERS-ON THE MOVE



Nowadays, large purpose built barges and ships are available to transport major sized modules around the world. Multi-wheeled, self-steering, self-powered, hydraulic trailers are used to lift and move modules of several hundred tonnes to and from vessels and onto pre-prepared foundations at their permanent location.



Where an existing heater is to be replaced with a new heater located on the same plot, other considerations often lead to novel approaches and techniques. The existing heater will often be required to operate for as long as possible up to the turnaround.

Removal of the old heater can, in itself, be a major exercise on a live plant, particularly if there are asbestos containing refractories involved.

Sometimes, the existing heater can be isolated and disinvested by removal in one or more pieces for later dismantling in controlled conditions away from the operating site.

However, great care must be exercised when removing such structures, as corrosion or modifications during the life of the heater may require that the steelwork be reinforced prior to lifting, moving or dismantling. This is particularly important for heaters originally built “piece-small” at site.

Modularisation



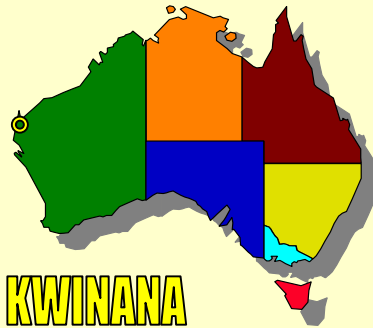
BP's Vacuum heater revamp project required all the **FHD**'s expertise and innovative engineering skills. Australia's biggest refinery, BP Kwinana, was built at Perth in the early 1950s, and the original Vacuum Heater, H-101 was designed and supplied by Foster Wheeler's **FHD** in 1961.

After 37 years of good service, a replacement with twice the original capacity, again, designed and engineered by **FHD**, was to be installed.



The new heater was to occupy the same plot as the original and, because downtime was to be minimised, a novel design approach was needed.

It was decided to build the heater, complete with piping, ladders, stairs, platforms, instruments, electrics and lighting, off plot and move it into place during the shutdown. The existing heater would operate right up to the time when the new heater was completely built, tested, and ready to install.



BP KWINANA

The route from the temporary build plot to the permanent plot entailed crossing a live pipe trench. The final weight of the heater at **650 tonnes**, meant that jackable type trailers, as commonly used to move such large structures, were unsuitable due to ground loadings over the live pipe bridge. **FHD** had, many years before at the same refinery, skidded two replacement CCR Furnaces into place using a skate type arrangement on steel rails. This time however, with much greater weights involved, it was decided to adapt a system previously used in bridge building, whereby the heater, (specially designed to take the stresses of the move), would be slid on lubricated Teflon® pads along stainless steel rails. The Teflon® pads were designed such that the pre-installed lubricant would not migrate from under the pads under the weight of the heater during the construction period.



While the construction of the new heater was under way, the construction of the civil reinforced rampart and rail system was completed. Additional temporary protection was given to the live pipelines under the pipebridge and the concrete foundations for the rails laid. Meanwhile, the heater construction progressed so well, that it was decided to complete the refractory dry out before the move, to reduce weight and save time during tie-ins and commissioning.

D-Day - After 35 years continuous service, the old heater was demolished in two days - flat!

(The existing top sections of the stack were carefully removed to be reused on the new heater).



The permanent foundations for the new heater, which had been designed and built into the rail system, were now installed over the original foundations such that, when the heater reached the allocated plot, the connection to the main transfer line and other tie-ins could take place.

The top 22 metre section of stack was installed and final commissioning completed. The changeover from old to new heater took just 28 days! The net savings using this method was approximately A\$3m and the time taken that of half of the normal heater reinvestment method.



The new heater, measuring in at 22 metres long, 5 metres wide, and 40 metres high, was now slowly pushed along the tracks, 1.5 metres at a time, by twin 50 tonne hydraulic rams at the rear of the heater - every inch of progress carefully monitored. The heater passed smoothly and safely over the pipebridge.



Asbestos is no longer used in heater refractories. However, it is recommended that disinvestment of older heaters be undertaken by specialist contractors wherever the presence of asbestos is suspected or known. Such disinvestment can considerably extend the time and costs of plant shutdowns. Foster Wheeler can offer expert assistance in the detailed engineering and project management for this type of procedure.

The **FIRED HEATER DIVISION** has considerable expertise in modularisation of very large heaters, by road, ship and rail - the only limiting factor is accessibility. Modularisation saves on downtime and can reduce site construction manpower by fabricating off site. Furnaces can be totally dressed, hydro-tested, and all pre-commissioning carried out prior to final placement on the permanent foundations. The need for heavy lift equipment and scaffolding is eliminated, saving time, space and costs.



The UK **FIRED HEATER DIVISION** has successfully completed over sixty major revamp projects world-wide over the past forty years, many incorporating the latest modularisation techniques.



Foster Wheeler Fired Heaters are available for all refining and petrochemical processes including: **Distillation, Cracking, Steam Reforming, Platforming, Coking, Hot Oil Heating, Reboiling, and Paraxylene, Benzene, Styrene** production.

Foster Wheeler also specialises in **Heat Recovery for Steam Generation** or **Thermal Oil Heating** from **CO Incineration, Gas Turbine Exhaust** and **Process Furnaces**.

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