



Winfrith Polar Crane



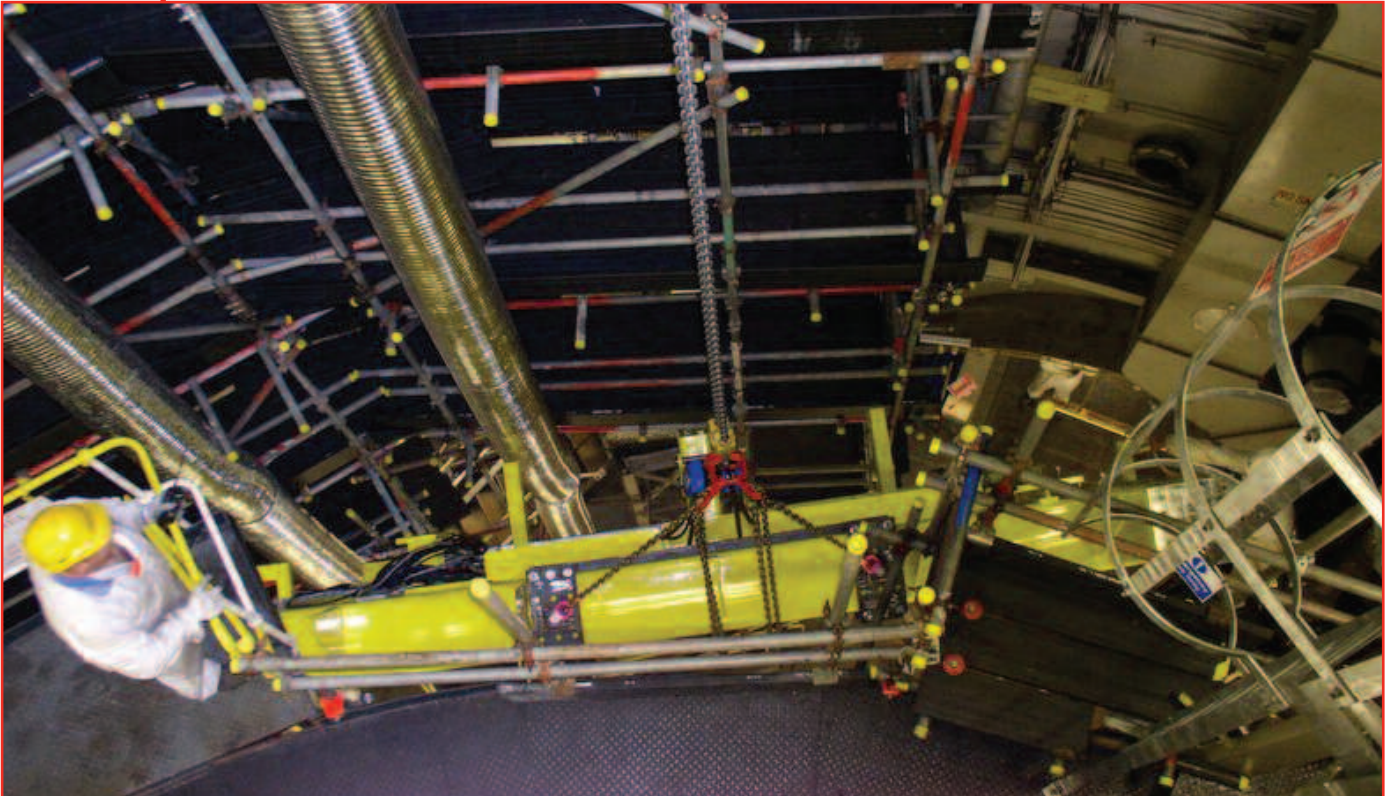
SCX Ltd have completed a year-long refurbishment program on a 25Tonne polar crane at Winfrith Nuclear Power Station.

The reactor in the Dragon Building at Winfrith has been out of service since 1975 and the polar crane has had little use since that time. The decision to now decommission this facility necessitated the refurbishment and reconditioning of the crane as it is a vital piece of equipment for both phases 1 and 2 of the decommissioning. Phase 1 involves removing the internals of the inner containment including all the ancillary equipment around the reactor. Phase 2 will be the removal of the reactor itself.

A full structural analysis of the crane along with an assessment against modern crane standards revealed that whilst the main polar bridge was structurally sound, the crab unit, its hoists and the polar drives were not. SCX won the contract to replace the crab, hoists and polar drives along with

adding a state of the art control system. Polar Cranes are designed so as to rotate on a circular gantry. The polar crane at Winfrith was originally only able to complete a single rotation before it stopped and had to be driven back in the opposite direction. SCX replaced the restricting power-umbilical with a combined power and control slip-ring to enable the crane to complete infinite rotations, so providing vastly improved flexibility and efficiency.

The crane features 2 hoists: a 25Tonne main hoist to be used for lifting the larger equipment out of the facility, and a smaller, more agile 5Tonne auxiliary hoist, which will undertake 95% of the handling duties. Due to the heightened requirement for reliability in a nuclear environment the hoists are of a high integrity design, having secondary drive units on each primary gearbox along with emergency disk brakes mounted directly onto the rope drum.



The system is fully PLC controlled and can be operated from either a remote controlled pendant, or the touch-screen HMI (human-machine interface) system. This has graphics to show the position of crane, as well as the height of the hooks and weight of the loads being lifted. Each drive has encoders to provide feedback on the position of the crane, and the control system has been mapped in 3D so as to safeguard the crane from colliding with any obstructions. In addition to this, SCX installed over-speed relays, overload relays and shaft relays to protect the crane against running over its safe working load and speed limits.

What made this installation particularly arduous was the very limited space available to remove the old crab and raise the new equipment into position, and the lack of another crane to utilise for this operation. In places the gap was

as little as 6m by 2m, and so the crab had to be designed so as to allow it to be stripped into manageable sections. These sections were then lifted and manipulated by a complicated pulley system supported by two A-frames, before being reconstructed upon reaching the crane bridge.

