

Eastleigh Long Rail Depot

Ensuring Safety - Improving Productivity

Issue

The Eastleigh Long Welded Rail Depot (LWRD) supplies 216m lengths of railway track and conductor rails to the network by welding together two no. 108m sections to make one long rail.

The 108m lengths of rail, each weighing more than 6 tonnes, are delivered to the depot by train, offloaded and stored using a series of lifting hoists supported from overhead gantries.

To make the long rail, these same hoists are then used to lift and place each rail onto a conveyor system that transports the rail to the welding plant. Once the welding is complete, the long rail is taken by the conveyor system to a temporary marshalling area, ready to be transferred onto specialist rolling stock for deployment to the rail network. Loading the unwieldy rails safely onto the conveyor systems and placing them within the allowable tolerances was time consuming and often

problematic, requiring physical interventions by the workforce, adding manual handling risks to the process, and causing delays to the welding.

Recognising the need for a safer, more efficient way of controlling the heavy lengths of rail, Network Rail's Engineering Facilities Team came up with the idea of adding guides to the conveyor system and approached Four-Tees Engineers to develop, design and install their concept of "V-Guides."

Working in collaboration with Network Rail's Senior Engineering Facilities Manager and his wider team, an innovative solution was devised that would not only significantly reduce the operational risks associated with transferring the 108m rail sections onto the conveyor but would also increase productivity of the LWRD by an impressive 25%; which is equivalent to nearly 8000 tonnes, or more than 640 additional long rails each year.



Solution

Whilst simple in appearance, finalisation of the V-Guide solution required a thorough understanding of the mechanics of the process, necessitating site surveys and measurements, and the use of a prototype and analysis, that informed the detailing and practicalities of the final design.



The existing long rail welding methodology used a series of overhead hoists connected to a gantry to lift the 108m lengths of rail into position on the conveyor, but due to its extreme flexibility, the rails would often clash with the conveyor apparatus during lowering. This would require the 6-tonne sections to be manually levered into the exact location required on the conveyor.

This involved the workforce walking the length of the rail to progressively push it to the correct position as it was gradually lowered. Hence the primary objective of the innovative V-Guide addition to the conveyor system was to remove these potential safety risks to the workforce and reduce the possibility for human error during operation of the hoists.

V-Guide solution prototypes were detailed, fabricated and installed by FTE, which carefully considered the location of conveyor traction rollers, the clamping mechanisms on the

overhead lifting hoists and the possible magnitude of the deflections of the unwieldy 108m long section of suspended rail. The performance of the prototype trials was carefully analysed, which identified the inclusion of minor improvements.

The successful V-Guide prototype was then passed to the FTE In-house Design Team to complete the detailed design of the components for each V-Guide. A Form G design was concluded, including a Category 1 check to confirm the reliability and assurance of the proposed solution. Upon approval, FTE detailed, procured, fabricated, and installed the system across the full length of the two conveyors.

The V-Guides are constructed from a spliced 40mm galvanised square bar with an Ultra High Molecular Weight Polyethylene profiled cover strip to reduce friction at the contact points when the rail is landed. They are easy to install, and whilst relatively maintenance free, each component can be disassembled and replaced if required, hence minimising disruption to the operational depot.

Outcome



Following installation of the V-Guides to the conveyors, Network Rail resumed production as usual with no issues arising from new permanent guide solution.

The time taken to lower and accurately position the rail ready to be transported by the conveyor was substantially reduced, having a game changing impact in reducing operational safety risks whilst also significantly improving the long rail production capacity.



Mike Lockwood Senior Engineering Facilities Manager at Network Rail Route Services commented:

"The new V-guide system that was designed, detailed and installed by FTE has delivered substantial safety and productivity improvements. Whilst current rail demand is below the resulting improved welding capacity of this innovation; we are now so much better placed to play our part in continuing to ensure the resilience and reliability of train services for passengers and freight customers.

We now have far greater agility to respond to peak periods of rail replacement activity and are prepared for any increase in future demand for long rail. Not to mention the many other associated benefits the FTE delivered solution has provided, such as more time for maintenance and reactive works, less walking for the operators, a rail lowering process with less

potential for human error and operational risk that has unquestionably improved the safety of our workforce. It was genuinely a pleasure working with Four-Tees Engineers on this project."

Eastleigh LWRD Welding Capability	Before V-guide install	After V-guide install
Landing time for each 108m rail	4 mins 30 secs	1 min 30 secs
Full welding cycle time	30 mins	24 mins
Annual total number welded 216m rails.	2576	3220
Total tonnage of rails welded per year.	31,556t	39,445t
Increased Annual Depot Capability	7,889 tonnes	
Increased Annual Welding Capability	25%	



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