



Case Study

POWER TRANSMISSION



Industry sector:
STEEL

Application:
CRANE RE-DESIGN

Actual saving:
£500,000

Payback period:
IMMEDIATE



**ERIKS technical
EXPERTISE**



**BESPOKE design
ENGINEERED from
scratch**



**REDUCTION
in costly
DOWNTIME**

The biggest single challenge ERIKS Power Transmission ever faced

THE ISSUE

The client required a significant re-design for 10 of its new long travel drives on one of their dock side 900 tonne unloader cranes.

As the crane was originally built in the 1960s, due to its age and decades of continued expose to the elements and aggressive materials, maintenance costs had begun to peak together with loss of production.

Therefore, the new improved design was required to stop the ingress of iron ore, coal and sea water entering the carriages and corroding the open gear systems, which was the main origin for the high maintenance costs and loss of production.

With the monumentous weight and size of the crane, and its operations in a busy dock, this job was one of the biggest re-design projects ERIKS Power Transmission team had ever faced.

‘shutdown would come at a significant cost, so ERIKS found a way to avoid this scenario’

To put this into perspective, basic calculations revealed that the crane has to bring in 4.75 million tonnes of iron ore per year, and it weighed the same as 2-and-a-half A380 Airbus aeroplanes.



Initial inspection

The enquiry came through EMS Swansea and following multiple inspections and discussions, the design was finalised, but a number of issues were brought to our attention.

Essentially, the project was to re-design an efficient drive without the open gears, but one of the initial issues faced was the amount of carriages available. It was concluded that altogether there were 10 carriages, but the crane required a minimum of eight to operate, meaning that at one given moment, the crane would not be in working order - this left no option but costly downtime.

THE SOLUTION

As the bearings carried the lion share of the weight, we acquired the assistance of SKF to calculate the loading on the shaft to design a bearing arrangement from imperial taper roller (which were limited availability and great expense) to modern spherical roller bearings that would handle the excessive loads.

Remember, if these bearings fail, there is a 900-tonne crane sitting on top with people inside, a ship in the harbour and civilians on the ground and on deck, so it's critical that they were fully suited for the job.

It was also decided that new wheels would be required to incorporate the new bearing arrangement - a suggestion ERIKS made at an earlier stage to reduce both the cost of the wheels and maintenance.

Following a new and improved blueprint, we were able to strip a lot of machining and materials off the original design, making them approximately

100-200kg lighter. Subsequently, 10 of these were ordered.

‘The new and improved design was approximately 100-200kg lighter after stripping of unnecessary components’

Avoiding Downtime

Fully understanding that any period of shutdown would be costly, ERIKS looked at multiple ways to avoid this scenario. Obviously, the simplest way would be to avoid removing the carriages full stop, and that's exactly what we did. We decided to fabricate two new carriages from scratch, which were completed to the clients satisfaction.

A Better Solution For Improved Reliability

The final hurdle was not only to redesign without the open drives, but also to protect the remainder of the drive and brake components from exposure to the elements of such a harsh environment.



The Fenner P Series gearbox was coupled to the drive shaft bearing assembly, which provided a better solution in terms of efficiency.

‘The cranes were originally built in the 1960s, overly exposing them to the elements, therefore additional protection was required’

In addition, we also designed and installed a better solution for the braking of the cranes by fitting an IP65 enclosed electromagnetic braking system to the Fenner gearbox.



The final installation was a clear success, exceeding the clients expectations by delivering a more efficient design that eliminated the worry of exposed components, hence reducing both maintenance times and costs, together with loss of production.

OUTCOME AND BENEFITS

- ERIKS Power Transmission Product Business
- The team of specialists overcame various obstacles to redesign the bearing arrangements, braking system and wheel design
- Two of the new carriages were built from scratch, reducing costly downtime
- Calculations meant that the new and improved design could be 100-200kg lighter than the previous
- Cost savings of £500,000 were achieved courtesy of the turnkey solution