

# AUTOMATED STUD REPAIR LINE

For the Primary Aluminium Smelters  
Efficiency Safety Ergonomics



## Mobile and stationary equipment for the aluminium industry

# WHO WE ARE

HMR Hydeq's business idea is first and foremost to design and build special vehicles and machinery for the aluminium industry with high quality that satisfies the strongest demands regarding safety, technological solutions and working conditions in the smelter.

The enterprise, which in 1989 was named Hydeq, grew out of a department of the Hydro Aluminium Årdal (one of Norway's largest aluminium smelters), that had been established in 1973. It is today a private company, incorporated in HMR Group. The holding consists of nine companies, specialized in supply of product, equipment and engineering advice to the aluminium industry for well over 50 years.

The products are tailored according to the demands and specifications from the customer. Maintenance, service and spare parts are a natural part of the deliveries from HMR Hydeq. Located very close to Hydro Aluminium Årdal, HMR Hydeq benefits from close co-operation with smelter specialists, operators and R&D personnel in developing the most suitable equipment.

The company is certified in accordance with NS EN ISO 9001:2008 and qualified in Achilles supplier management solution.



# AUTOMATED STUD REPAIR LINE

## Improving quality and efficiency in the rodding shop

The Automated Stud Repair Line (ASRL) from HMR repairs anode yokes by replacing worn-out studs with the new studs whilst anode yoke and rod is on the powered and free conveyor in the rodding shop.

Advantages of HMR's ASRL:

- The line is completely automated and requires just one supervising operator.
- The process is efficient and very safe for the floor personnel.
- It reduces repair down-time to the minimum.
- There is no need for removal of anode rods out of the conveyor during replacement.
- Fewer anode rods are used in the plant (estimation 2–4%).
- Studs are replaced exactly according to the procedure set up by the customer.





# HOW IT WORKS

HMR's line is fully automatic and requires one operator only.

## Cleaning

The area where the studs are to be cut and re-welded must be cleaned, because rust and remaining bath reduce the lifetime of the saw blades and the quality of the weld. The cleaner on HMR line is installed on a robotic arm, programmed to clean the intended area only. The operating costs of the device are low and the reliability high.

## Cutting

The cut is made by a CNC-controlled band saw. This results in an accurate and effective accomplishment of the cut and a surface perfect for re-welding of the new stud.

## Welding

Welding is executed by the welding robots. A robotic arm picks up a new stud from the pallet and brings it to the automatic grooving machine, which makes the selected groove. Then the handling robot positions the stud perfectly on the surface of the old stud, signals the welding robots which tacks welds of the new stud. When the tack welding is ready made, the handling robot starts over again with a new stud, while the welding robot finishes the weld on the first stud.



# PERFORMANCE, CAPACITY AND QUALITY

HMR's ASRL brings the studs distinctively to the same condition as on the new anode yoke.

The operation provided by ASRL results in a low electrical resistance of the joint owing to optimized cutting and welding procedures developed by HMR and executed repeatedly by the automated robotic line.

The system has a repeatability of  $< 0,1$  mm (NB. depending on anode rod condition) and a productive capacity of  $\leq 6$  min. (NB. depends on groove welds design, number of studs per anode rod and a conveyor speed). The welding time is about 4 min. per stud.

#### Safety System and Environment

HMR's ASRL is secured with a safety and access control system which meets all the demands of Machinery Directive 2006/42/EC. ASRL shall be connected to an ordinary dust and gas treatment system used in your plant.



## HSE AND QA

Health and safety are core values at HMR, and we honour them.

We will not only strive to meet the intention of the law, but also have a proactive attitude to achieve continuous improvement of the results.

All accidents can be prevented.

We believe that high standards of health and safety will help to strengthen our results and that our health and safety policy is strictly linked with the quality of the services we provide.

Environmental protection and waste reduction are integral parts of the group's business strategy. By fulfilling our environmental responsibilities, we are increasing our ability to deliver competitive and profitable products and services.

We will continuously increase awareness and understanding of the company's HSE and QA policy, and its consequences for all those working for and on behalf of the company.

[www.hmr.no](http://www.hmr.no)



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