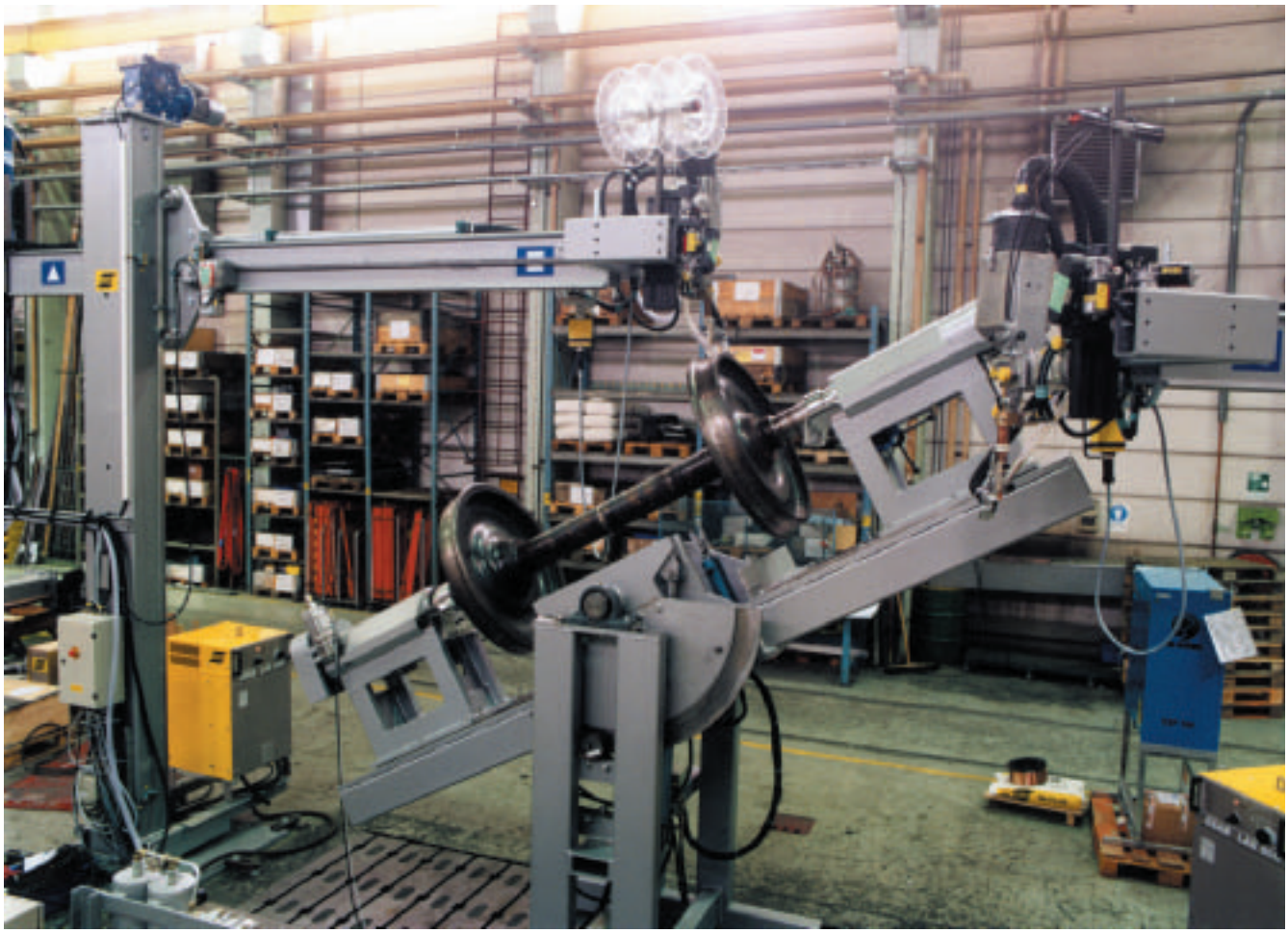

ESAB delivers engineered automatic welding station to Ghana in Africa for build-up welding of worn railway wheels

by Peder Hansson, ESAB Welding Equipment, Laxå, Sweden

The wheels of rolling stock are exposed to extensive wear. Braking, acceleration and passing bends all result in the gradual wearing down of the running surface of the wheels. In particular, the lateral forces generated when a wheel passes a bend cause a great deal of wear in the transitional zone between the “tyre” or running surface of the wheel and the side flange. In most cases, this wear occurs both radially and axially and results in a negative change in the profile of the wheel.

Welding and hardness

Wheel	Consumables	Hardness
C 0.7, Si 0.5, Mn 1.4	OK Flux 10.96, OK Tubrodur 14.71	Face edge 520 HV
C< 0.5, Si 0.3, Mn < 0.9	Ok Flux 10.71, OK Autrod 12.24	Face 200 HB
C< 0.5, Si 0.5, Mn 1.5	Ok Flux 10.71, OK Autrod 12.40	250 HB
C 0.45, Si 0.3, Mn 0.55, Cr 1.1, Mo 1.2	OK Flux 10.71, OK Tubrodur 15.40	32-40 Hrc

The wheel can naturally be given its original profile once again using a lathe turning process. However, one significant drawback of this method is that it involves the removal of a large amount of material that is not worn out. This takes time and also results in a wheel of smaller diameter.

A more effective method involves rebuilding the worn part of the wheel surface by welding. Using a suitable filler material and the correct welding method, the welded material is equally good or even better than the base material and the wheel can then be given its original profile by fine grinding.

The process and the welding equipment

Welding is done without removing the wheel or bearing housings and both wheels can be welded simultaneously using two submerged arc-welding heads.

The axle complete with wheels is rolled in on rails into the bottom of the machine, build-up welding is performed and the axle is then rolled out again.

The manipulator, which is down in a pitch, clamps the axle with the wheels and rotates the wheels.

For welding in the best position, the manipulator and the wheel set can be tilted ±50 degrees.

The two automatic A6 welding heads are mounted on ESAB MKR columns and booms, allowing the heads to be positioned in the desired position in relation to the wheels.

The welding process is either single wire or twin wire (two wires connected to same power source). The power sources are two ESAB LAF 1250 for a maximum of 1,250 A.

The welding process controller is the ESAB computerized PEH process controller.

Flux is automatically fed from floor level to the welding heads, by means of pressure and hoses with compressed air.

Scope of Supply

1 - Tiltable manipulator with head- and tailstock

2 - Column and Boom, type MKR 300

2 - Welding head, type A6S - Arcmaster for Twin or Single wire SAW

2 - Process controller, type PEG1

2 - Joint tracking equipment, type A6 GMD

2 - Power sources, type LAE 1250

2 - Flux recovery units, type OPC

1 - Flux feeding equipment, type OPC 75

Spare part set

Consumables, wire and flux

About the author

Peder Hansson joined ESAB in Laxå in 1969 as a mechanical designer. He is now responsible for the sale of engineered solutions within ESAB Automation in Laxå, primarily in the shipyard and pipemill sectors.