

Repair welding of blades for rubber mixing

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When manufacturing tyres for vehicles, it is necessary to produce a special blend of rubber containing several compounds which enhance properties that extend their life span. These chemical additions consist of a certain amount of solid, fine-grained materials like soot.

One of the main steps in production is the mixing process in which raw rubber is “alloyed” with the other compounds. These finegrained materials act as abrasives on the mixing equipment.

As a result, a special kind of wear appears; it is called erosion. After a certain life cycle, the mixing equipment has to be re-built, because of excessive wear to the edges of the mixer blades.

The main task before rebuilding the edges of the mixer blades was to choose a suitable weld metal. It had to be hard enough to ensure wear resistance for one life cycle and strong enough to withstand separation from the base material during operation. The owner of the rubber mixer has already encountered negative results with weld metals consisting of a very high amount of chromium and other carbides that were said to be very resistant to wear. The problem was that parts of the very brittle weld metal broke off during the mixing operation.

Dienst-Apparatetechnik and ESAB preferred a different weld metal. To ensure that the weld metal did not separate from the base metal, it was decided to begin by applying a tough, strong buffer layer before hardfacing. For this reason, **OK Tubrod 15.34** was used to weld the buffer layer on the machined edge of the mixer blade (Fig. 1) and, for the hardfacing layers, **OK Tubrodur 15.81** was chosen, giving a martensitic weld metal including fine-grained, dispersed carbides (Fig. 2). This is important when it comes to creating very high wear resistance to fine-grained abrasives causing erosion. OK Tubrodur 15.81 is also suitable for abrasion from fine-grained materials combined with high pressure or a medium impact load. If a weld metal with large grained chromium carbides in a ledeburitic matrix is used, the matrix between the carbides wears out before the carbide itself. This is avoided by using OK Tubrodur 15.81.

After more than a year in operation, the repaired mixer blades display no significant wear or damage. The owner of the mixer is very satisfied and approved both flux-cored wires and the welding procedure for this application.

OK Tubrod 15.34	EN 12073:	T 18 8 Mn M M 2
	DIN 8555:	MF8-200-CKNPZ
	AWS A 5.22:	E307LT1-G
OK Tubrodur 15.81	DIN 8555:	MF6-60-GP



Fig. 1. First build-up layer welded on the mixer blade with OK Tubrod 15.34.



Fig. 2. Repair welded mixer blade ready for profiling by grinding.