

# On site roller press recovery

by **Welding Alloys Group, UK**

*Since the introduction of hardfacing technology with cored welding wires and automatic equipment, Welding Alloys Group has been able to develop know-how and technology for the repair and recovery of dimensional profiles for roller presses in situ without removing the rollers.*

The technology Welding Alloys developed presents major advantages for roller presses owners. Firstly, it dramatically reduces the time spent dismantling the rollers as this procedure is no longer necessary. Secondly, it minimises the possibility of damaging the main bearings. It can also increase the efficiency of the process by up to 70 per cent, reducing energy consumption up to 30 per cent and, most importantly, it does not require an investment in new rollers.

At the present time, when the economy and the business models of cement companies require low inventories, hardfacing of parts subject to wear is an ideal option, especially when time, money and resources are key limitations.

For more than four decades, the Welding Alloys Group (WAG) has been developing solutions for this type of application: through its research and development department and with over 60 metallurgical engineers worldwide, the company offers excellence in repairing and rebuilding solutions to the cement market.

Welding Alloys has developed specific solutions according to the type of rollers, tailoring the application to their manufacturing materials and gaining extensive experience in the hardfacing of:

- forged and hardfaced rollers
- bainite cast spherical rollers
- compound cast rollers.

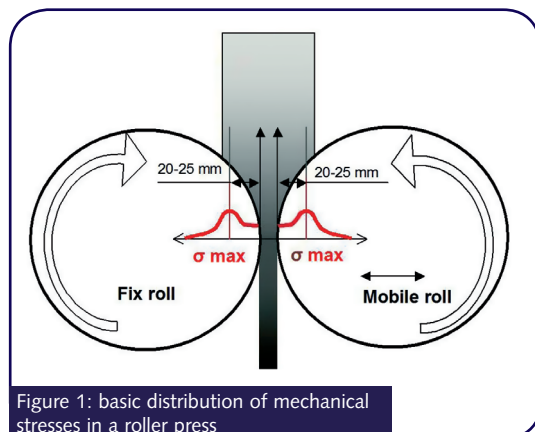


Figure 1: basic distribution of mechanical stresses in a roller press



Above and below: The welding process

Figure 1 shows the analysis of the basic mechanical stresses in roller presses. The hardfacing technology developed by WAG presents optimal characteristics, making the technique effective, suitable and reliable by:

- welding crack-free deposits
- reducing the thickness of the hardfaced layer
- enhancing wear-resistance
- allowing the refurbishment and considerably extending the component's service life.

To achieve the above mentioned characteristics Welding Alloys:

- defines optimal alloys' composition by developing flux cored wires specifically designed for the high pressure roller press market
  - defines welding procedures
  - designs specialised welding equipment
  - offers welders' training
  - carries out the operation at local Integra Service Centre or in-situ depending on the required refurbishment and condition of the roller press.
- Welding Alloys can supply new advanced roller press grinding components according to OEM or client's specific requirements and offers additional services within their



maintenance package. These include: monitoring surface wear, the application of chevrons to increase efficiency or specific geometries on the surface of the roller press.

## Case study 1

### Hardfacing a 140-170 roller press

Welding Alloys Panamericana (Mexico), one of the youngest subsidiaries in the WAG, has played a key role in testing and establishing the value of Welding Alloys' solutions by effectively applying Welding Alloys' hardfacing solutions to roller presses on several occasions and for different customers.

Since its foundation in June 2004, Welding Alloys Panamericana has successfully completed over 40 roller press repairs and refurbishment. Its offering ranges from simple chevron pattern recovery to new forged and hardfaced rolls made at its Integra Service Centre.



Figure 2: roll before recovery



Figure 3: final shape and chevron pattern

In the last year only, Welding Alloys Panamericana carried out several jobs specific to the repair and refurbishment of roller presses.

A specific solution was applied to a 140/170 roller press located in a plant in Colombia. The refurbishment was carried out on site with all the repair processes and operations performed simultaneously on both rolls using open arc cored welding wire. The steps taken for the recovery of the two rollers, with the processes used for this specific component, were:

- clean excess ground (clinker) material
- gouging using a specially-developed technique offering improved gouging rates
- grinding using high-speed portable grinders
- non-destructive testing
- localised repairs
- preheat full rolls
- application of buffer layers
- application of hardfacing layers
- application of hardfacing chevron
- post heating
- final inspection.

The production before the refurbishment was 245tph and after the refurbishment it was 390tph.

### Case study 2

#### Partial roller press repair on site

Welding Alloys Panamericana completed a partial repair of a 140/105 15.0 roller press installed at a customer's plant after 34 months of operation (equivalent to 18,400 hours).

In 2007 Welding Alloys Group manufactured and hardfaced these two rollers and they began to be operational

in June of that same year. The forgings, supplied by a local foundry, were hardfaced in the WA Integra Service Centre with a specifically-developed cored wire using a submerged arc process. Before adopting and implementing the WA solution, the customer's rollers had a maximum life of 5000 hours before being in a critical status, in need of repairing with SMAW process or eventually completely replaced. WA Integra Service Centres can offer different packages to suit different customers' requirements.

In this occasion, WA Panamericana offered a full package: it provided new forged and hardfaced rollers, included the maintenance service before the arrival of the new rollers and added a service extension chevron regeneration following the delivery. Opting for the full package

situ by Welding Alloys' Integra specialists using WA Integra technology and equipment.

The refurbishment was completed in seven days, including the constant and meticulous monitoring of the process to avoid affecting the surrounding areas: as the equipment was in operation for more than 18,000h some areas were already affected by mechanical stress by normal process operation.

Specialised in hardfacing, cladding and repair by welding, the Welding Alloys Integra Service Centres are strategically located all over the world. Experienced teams of welders, fully-equipped with automated welding equipment, are available for rapid intervention for the benefit of the cement industry worldwide.

**Table 1: roller press characteristics**

size of roller (mm)	1400 x 1700
pressure (bar)	130
calculated working pressure: (kN/m <sup>2</sup> )	7000
material	clinker
production (design) (tph)	400
grinding process	recycling when necessary (decisions made in control room)

**Table 2: repair on-site versus roller press rolls exchange**

Description	In-situ repair	Changing rollers for new ones
time	9 days	12 days
changing bearings	No	Yes
changing seals and rings	No	Yes
workforce required	2	12



Figure 4: different stages of the repair process

offer, the customer benefited from the peace of mind of a regular and efficient activity of his equipment for the duration of the contract. In this case, the roller press' performance remains within the parameters required for plant operation.

After 18,400h the rollers required a localised repair and this was performed in-

