

# Absafe Remedial

## Hazelwood Chimney Repair

### La Trobe Valley, Victoria



#### Background

Absafe is a progressive and innovative Specialist Access contractor, providing a broad range of remedial engineering solutions for industrial, construction and maintenance projects. Their broad experience working on complicated jobs in difficult to access areas was put to good use when engaged to develop a more cost effective and efficient means to remediate spalling concrete around the capping of a 50 year old, 140m tall concrete chimney rising above Victoria's pastures in the La Trobe Valley, Australia, as part of a scheduled maintenance program.

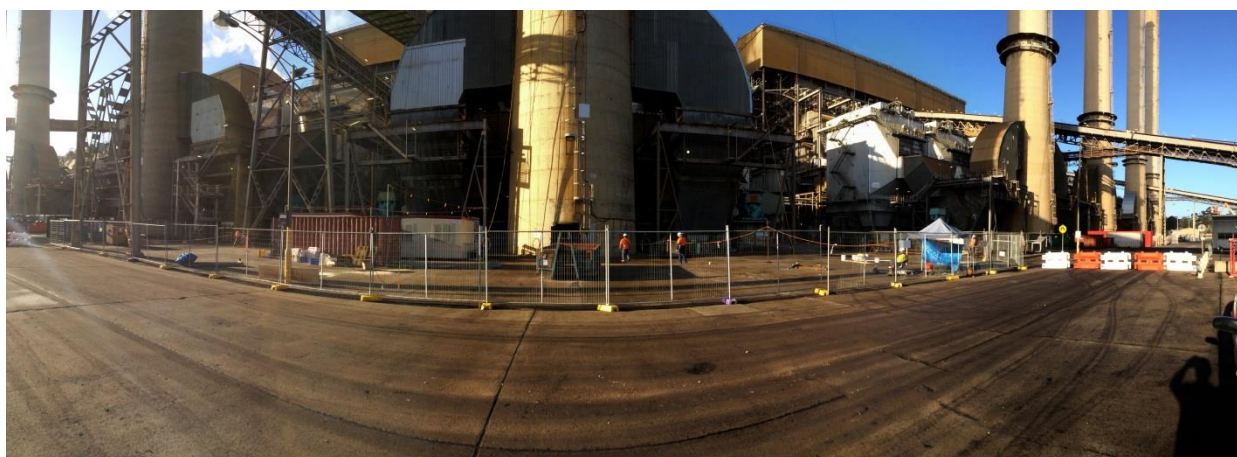


When confronting the scope of works required after their initial inspection, Absafe and Hazelwood Power Station looked for an innovative solution to an increasingly common issue on these types of structures. Driven by Hazelwood's continuous improvement process, Absafe extensively researched the potential for shotcreting at height. As the best source of this type of specialist equipment, Absafe consulted Antec for advice and to assist with the correct specification to carry out these remedial works.

#### Job Description

Concrete spalling is often termed concrete cancer. Its main symptom is concrete flaking from the surface of the affected area accompanied by nearby staining. Staining can be a first symptom, with a commonly held misconception being it is caused by the weathering process.

Concrete spalling is caused when steel reinforcement within a concrete slab begins rusting. When steel rusts it expands approximately 4-5 times its original size causing concrete displacement and flaking. On becoming damaged, more water can enter the affected area, speeding up the process. In the case of the Hazelwood site over many years hand patching as well as form and pour repair methods have been undertaken. Both are relatively slow tasks, are laborious in nature and expensive to undertake during major shutdowns where tight timeframes are closely managed. There had to be a better way, a way that was quicker, safer and more cost effective.



# Absafe Remedial

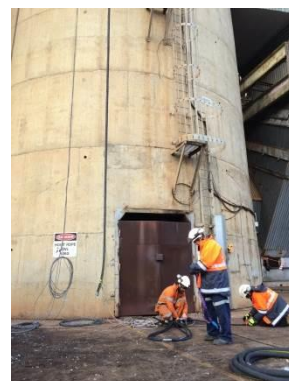
## Hazelwood Chimney Repair

### La Trobe Valley, Victoria



#### ANTEC Product Solution

- As the Australian Distributor for German specialist dry shotcrete manufacturer Clever & Co. ANTEC Engineering provided ABSAFE with a new **SBS Type TSN Shotcrete Machine**. The TSN machines successfully pumped BASF Master Emaco S820CI repair mortar and water in separate lines to the Chimney capping located 140m above ground level. The mortar and water was blended by experienced nozzle man Paul Stedman to provide a shotcrete finish capable of being trowel finished.
- The quality of shotcrete is largely dependent on compliance with a specified water/cement ratio and the correct mix of both spraying material and water. To achieve this result it is crucial that the process is pulsation free which optimises the spraying material mix at the nozzle where a Homogenous mix design is required to meet specified compressive strengths.
- The intelligent SBS Control Chamber system allows the user to easily and reliably produce excellent quality shotcrete in the toughest conditions over exceptionally long distances of up to 1500m. At Hazelwood our water and cement were conveyed individually to a height of 140m from the machine which was located 10metres horizontally from the base of the chimney. Lots of small pockets (in this case 18) load the air flow with small even portions of spraying material. An adequate supply of the spraying material in the feed chamber and a constant flow of air (5bar) ensure thin-flow conveying with a pulsation free, even material flow to the nozzle tip. The electric hydraulic drive in the spraying machine guarantees stepless adjustment of the material quantity by altering the speed of the pocket wheel. The allocator unit responsible for loading the feed chamber seals the pressurised part of the machine reliably, guaranteeing that the machine works in an absolutely dust free manner.
- The SBS machine works in conjunction with a separate High Pressure 415v PANDA pump specially designed to deliver consistent water pressure of up to 100bar. Maximising efficiency with a good mixing effect of water/cement relies on matching the size of the conveying hose and nozzle reflecting the desired output for each particular project. In this case we used a material conveying hose of 52mm OD hose, 32mm ID (1 1/4") along with 12mm 160bar rated high pressure hose to convey water to the nozzle from the PANDA pump located at ground level. Working in an extremely difficult working environment in winter, at height and with minimal manoeuvrability (600mm) from the repair face, a 25mm Clever & Co. nozzle was chosen in conjunction with the above mentioned hoses. With water pressure delivered at 2000psi and 80psi air pressure (5bar) we managed to spray one pallet per hour (breaking bags every 90 seconds).



# Absafe Remedial

## Hazelwood Chimney Repair

### La Trobe Valley, Victoria



#### ANTEC Product Solution continued

- Whilst the machine has significant capability to spray much higher volumes of material we were somewhat limited on the amount we could spray apply due to the conditions, the access and height involved. The feature appreciated most on this particular project which proved invaluable was the “set and forget” functions of the TSN. Once air pressure and feed were adjusted and agreed upon by the nozzle man, operating the machine was very straight forward and required only monitoring of air and water pressures via two way radios between base level and the chimney capping team. The TSN provides consistent results each and every day with little maintenance required daily.

#### Facts:

- 1 bag consumed every 90 seconds
- Pocket Wheel Speed 3.9RPM-4.3RPM via Siemens Simatic Touch Panel
- Hose Dimension: 52mmOD/32mmID & 160bar rated 12mm hydraulic hose
- Water Pressure 2000-2100psi. Air pressure 5 bar at machine, 7.5 from compressor
- Daily Maintenance: Check fluids, tighten and inspect feeder cone if required, grease bearings via the nipples.



- The water required to mix the cementitious shotcrete is pumped through high pressure hoses to the nozzle system, a unique feature of which is its laser bored jet holes. The jet bores are arranged in such a way that the resulting water jets form a high velocity “mesh” of hydration through which the shotcrete material passes. The water jets penetrate into the centre of the mix material providing full saturation of all particles, creating less dust and significantly less rebound. The nozzle system is designed in such a way that it is easily cleaned and can be dismantled for cleaning with minimal effort.

#### The Material

- MasterEmaco S820 is a ready to use BASF product, kiln dried, pre-blended and designed as a shotcrete mix for the repair of bridge decks, tunnels, drains, sea walls and culverts providing a compressive strength (MPa) of 50.0 after 28 days with a flexural strength (MPa) of 6.0 over the same period of time. The product was applied after all unsound concrete, dirt and debris was removed from the Chimney capping. Prior to shotcrete works the reinforcement steel was primed with Emaco Nanocrete AP. Embedded galvanic anodes were installed for the protection of reinforcing steel from accelerated corrosion.



# Absafe Remedial

## Hazelwood Chimney Repair

### La Trobe Valley, Victoria



#### Advantages at a Glance

- Low Rebound shotcrete processing by means of even delivery flow
- Dust free machine operation due to a fully contained system
- Conveying distances to 1500m, conveying heights to 180m
- Stepless conveying capacity setting from 0.3m<sup>3</sup> to 15m<sup>3</sup>/hr
- Low wear cost due to cooling of housing and lubrication of wear parts

#### The Result

The Hazelwood chimney is back online, the project was completed within two weeks and the capping should now be sound for many years to come.

#### About Antec

Antec is a manufacturer and distributor of a wide range of products to the mining, minerals processing and infrastructure industries in Australia. Antec are the exclusive distributor of the Clever & Co range of shotcrete machines which are available for hire or buy.

*For further details contact us:*

Andrew Howard  
Equipment Manager  
0419 264 425  
andrew.howard@antec.com.au



Free call: 1300 55 34 73

Web: [www.antec.com.au](http://www.antec.com.au)

Email: [info@antec.com.au](mailto:info@antec.com.au)

NSW (Head Office) | VICTORIA | QUEENSLAND | SOUTH AUSTRALIA | WESTERN AUSTRALIA