



Repair & Re-Lining of severely corroded Chimney Stack Internals with Duromar SAR & Duromar EXP

Scenario Description

Aggressive corrosion damages & metal loss were noticed on the flue can internals of a Chimney Stack at a 1300 MW Coal Fired Power Plant.

The carbon steel chimney had been in operation for over 5 years and the internal surfaces were cladded with titanium sheets.

Overtime however, dew-point corrosion had caused severe damages to the titanium cladding and as a result had significantly weakened the chimney structure.

Corrosion had aggravated to such an extent that the chimney was exposed to the risk of complete collapse – Thus resulting in extended downtime and huge capital expenses.

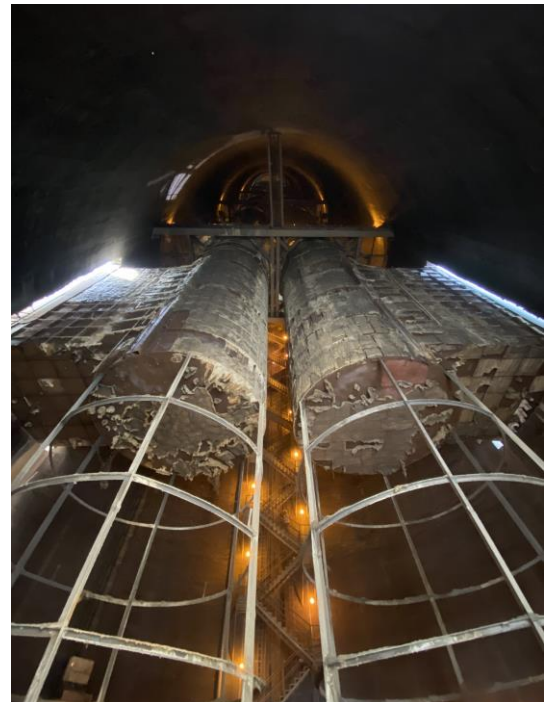


Chimney Stack Description

275-meter-tall & 7-meter diameter Carbon Steel Chimney stack, internally cladded with titanium Gr2 liners.

The Chimney Stack was connected to a Wet Flue Gas Desulfurization (FGD) system and with wet H₂SO₄ fluid fumes and pH levels as low as 2.

The operating temperatures varied between 60°C to 150°C under continuous operation with flue gas velocity of approximately 24 mtr/sec.



Chimney Stack Condition Assessment

i. Weld Joint Damages

Upon inspection, it was noted that the weld joint areas of the titanium liners had been significantly impacted because of the dew-point corrosion and stood as the primary area of concern with regards to any further aggravation and metal loss.

The weld joint areas were 2.5 inches thick and desperately needed to be repaired to avoid any further surface metal damages.



Severe corrosion damages noticed on weld joint areas of titanium cladded internal surface of chimney stack

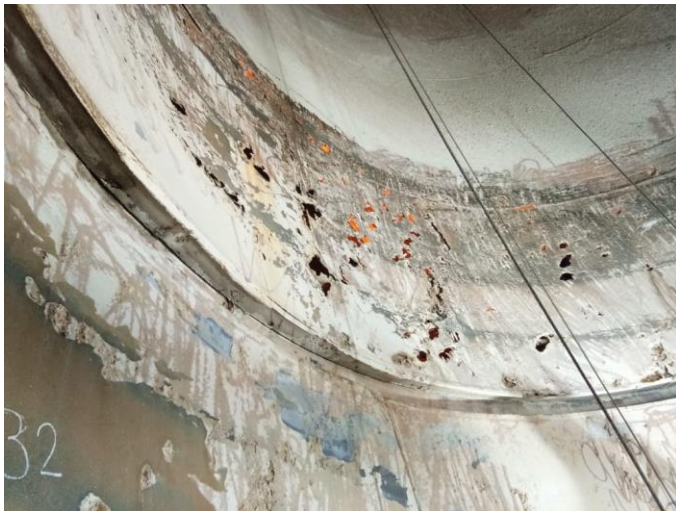
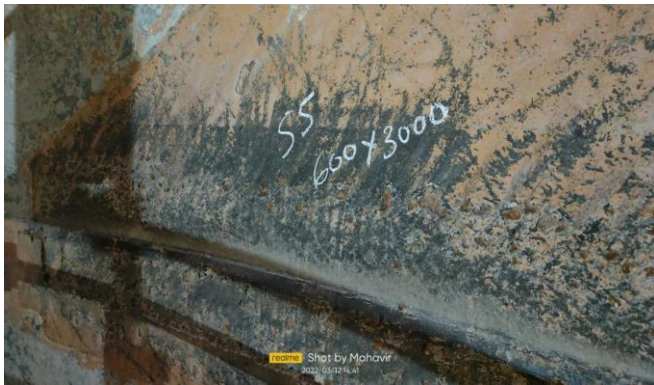


ii. Plain Surface Damages

Given the aggressive operating conditions and fluctuating temperatures, it was also noted that the elevated surfaces (above 50 metres) were severely damaged because of Sulphuric Acid corrosion.

Despite the protective barrier being of titanium grade, corrosion damages had aggravated to such an extent that the parent metal of chimney had severely weakened over the course of operation.

Corrosion damages of upto 10mm was noticed across several areas of the chimney internals, exposing the stack to the risk of complete collapse if not rectified.



Severe corrosion damages noticed on titanium clad internal surfaces of chimney stack

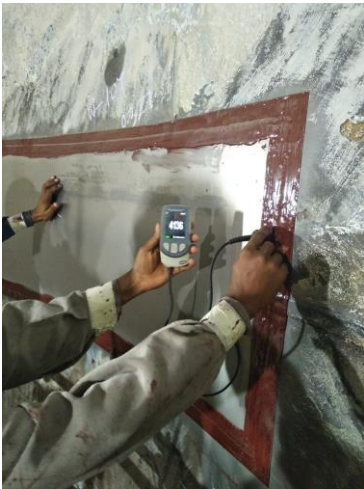
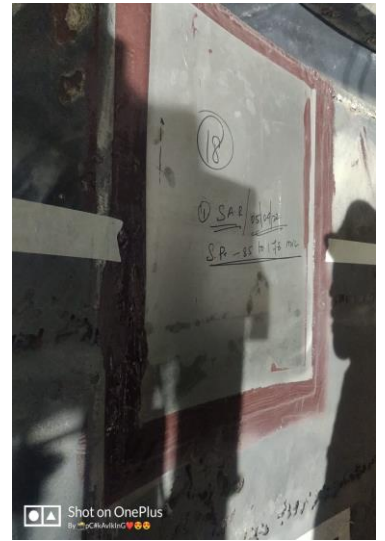
Solution/Application

i. Protecting the Titanium Cladded Weld Joint Areas

Arudra identified the need to protect the weld joint areas with a highly chemical & temperature resistant epoxy novolac that also provided enhanced flexibility under continuous operation.

Duromar EXP, a 100% solid (Zero VOC) epoxy novolac with outstanding chemical & cavitation resistance and excellent fluid flow characteristics was applied along the weld joint areas of the titanium sheets at a thickness of 2.5mm – 3mm.

The weld joint surfaces were abrasive blasted using aluminium oxide grid (as per SA 2.5 standards), to achieve a surface profile of 80 - 120 microns and to ensure highest quality adhesion levels.



Protecting weld joint areas with Duromar EXP



ii. Repair & Rebuild of damaged plain surfaces

Given that pitting's of upto 10mm in depth were noticed across several areas of the stack base surface, Arudra proposed to rebuild the damaged portions with a ceramic putty **Duromar SAR** & topcoat the surfaces with the flexible epoxy novolac **Duromar EXP** at an average thickness of 2mm-2.5mm.

Duromar SAR is a versatile easy-to-use rebuilding putty with excellent abrasion and chemical resistance. This product is heavily filled with aluminium oxide and can be built up to an inch in thickness or more.

Like the weld joint surfaces, the plain surfaces were abrasive blasted (aluminium oxide grid as per SA 2.5 standard) to achieve a minimum blast profile of 80 – 100 microns.

The coating was left to cure for 48 hours, and a spark test was carried out across all coated areas to detect any pinholes and rectify the same accordingly.



Rebuilding damaged surfaces with Duromar SAR and protecting surfaces with a 2mm thick liner of Duromar EXP



Arudra Engineers Private Limited

No 79, Valmiki Street, Thiruvanniyur, Chennai – 600041.

Phone No: +91 44 24901623 email id: coatings@arudra.co Website: www.arudracoatings.com



Results:

The use of polymeric epoxy coating materials proved to be far more efficient than traditional practices such as welding repairs - both in repairing existing damages and protecting surfaces against any further corrosion & erosion under continuous operation.

Given the flexible nature of polymeric materials, Duromar products are easy to install whilst providing outstanding adhesion levels to a range of metallic & concrete surfaces.

Duromar epoxy coatings are 100% solid (ZOC) polymeric epoxy materials and hence also stand as the safest of repair systems used under confined industrial spaces.

Moreover, installation of Duromar coatings also proved to be the most time-efficient system in solving corrosion & erosion issues – thereby helping the power station reduce operational downtime and costs.

Arudra managed to protect an approximate surface area of 300 m² across varying elevations (upto 225 metres in height) over a span of 12 days. – with engineers working round the clock over 2 shifts each day.

The installation was inspected by the Engineering heads of the 1300 MW Power Station and the user to happy with the quality of Duromar products & workmanship of Arudra Engineers.

Arudra are the sole licenced Indian manufacturer of Duromar® range of anti-corrosive, anti-erosive and anti-abrasive two-part polymeric epoxy putties and coating grade products.



Rebuilding severely corroded portions of chimney stack with Duromar SAR and protecting corrosion sensitive areas with Duromar EXP.



Arudra Engineers Private Limited

No 79, Valmiki Street, Thiruvannamipur, Chennai – 600041.

Phone No: +91 44 24901623 email id: coatings@arudra.co Website: www.arudra coatings.com