



# Protective Internal lining of Storage Silos & Bunkers

Corrosion & Erosion protection - Duromar® coatings & linings

## A. Problem

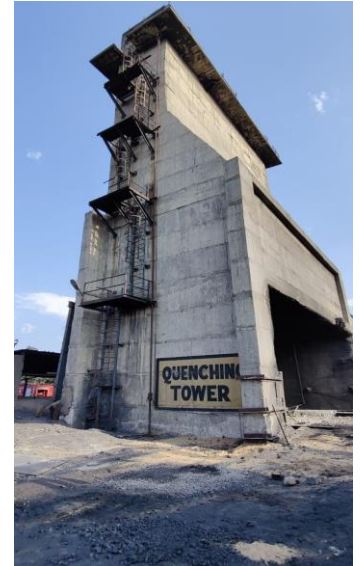
The maintenance teams of a coke quenching unit of a Steel Manufacturing facility were looking to protect the internals of their existing Coal Bunkers & Silos.

The moisture content of coal stored in silos varies with distinct operating & service environments.

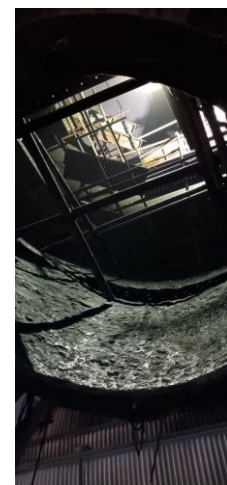
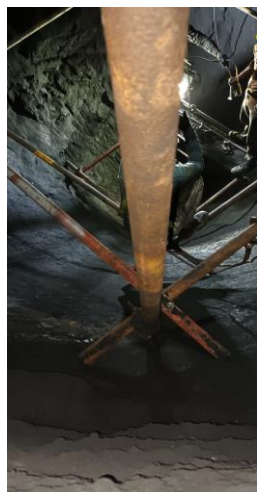
When the moisture content increases, the coal particles happen to stick onto the surface (both concrete & steel grades) of equipment's such as silos, hoppers, rollers & feeders – Hence resulting in extended downtime & maintenance costs.

There was a desperate need for the maintenance teams to overcome the **sticking issue** – particularly before the start of the monsoon season – to avoid expensive down time and maintenance costs.

Arudra was required to assess the condition of the silos and provide a suitable long term protective lining solution.



| Protective coating & lining of Coal Storage Bunkers & Silos |                              |   |
|---|------------------------------|---|
| 1   | Industrial Unit              | Coke Quenching Unit – Steel Plant         |
| 2   | System Equipment             | Coal Storage Silo – Quenching Bunker      |
| 3   | No of operating years        | 6 years                                   |
| 4   | Year of Coating Installation | March 2022                                |
| 5   | Surface Metal Type           | Carbon Steel                              |
| 6   | Operating Conditions         | Max Wet operating temp: 40°C              |
|   |                              | pH level – 4-7                            |
|   |                              | Surface Area Coverage: 350 m <sup>2</sup> |



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## B. Solution

Upon inspection, the amount of corrosion damage seemed to be significant, thereby requiring Arudra to propose a ceramic rich, smooth 1 mm thick epoxy liner.

- i. Installation of scaffolding & cleaning entire internal surface of silo.
- ii. Holiday inspection of the internal surface of the silo.
- iii. Abrasive blasting the surfaces as per SSPC 10 standards to achieve SA 2.5 profile.
- iv. Installing the Duromar® SAR ceramic putty along the severely damaged pitting's on the silo and letting the Duromar® SAR cure for 24 hours before installation of the coating.
- v. Installation of Duromar® EAC - LV using a roller brush to achieve an overall thickness of 1mm – installed in 2 coats.
- vi. Letting the Duromar® EAC- LV cure for 72 hours and conducting a thorough holiday tests across coated areas.





### **C. Results**

A holiday test was carried out throughout the silo by Arudra's NACE certified engineers, to ensure there were no pin holes or any scope for penetrative corrosion.

The Duromar® EAC - LV was intact across all areas of the internal surface of the coal storage silo showcasing outstanding adhesion levels and bond strength – the adhesive strength value was above 15 MpA on an average.

Additionally, a manual test was carried out to assess if the sticking of moisture rich coal continued despite the coating layer – the coating ensured that there was smooth flow of the moisture rich coal, leaving no scope for the coal to stick onto the surface and further corrode the carbon steel layer under continuous operation.

### **D. Value Addition of Duromar® systems**

- i. Duromar® EAC - LV is filled with ceramic fillers, that provides an ultra-smooth finish to help the storage material to flow smoothly through the mouth of the silo – hence eliminating any 'sticking issue' under continuous operation.
- ii. Duromar® EAC – LV also helps provide outstanding resistance against corrosion attacks caused from sulphuric acid that is formed from the bulky moisture rich coal.
- iii. Duromar® EAC - LV is applied at 1mm in thickness as a two-coat system, as against traditionally thicker systems such liner plates that are more expensive and take longer to install.
- iv. Duromar® systems are highly flexible, withstanding varying levels of fluctuating temperatures under continuous operation and provide the required levels of chemical resistance, with fluctuating levels of pH over the course of operation.
- v. Duromar® systems are easy to repair and rebuild in the case of any unforeseen maintenance damages.
- vi. Duromar® liners installed to protect storage silos have in the past proved to enhance life by 15 + years under continuous operation.

**Arudra - in technical collaboration with Duromar Inc (USA) – [www.duromar.com](http://www.duromar.com) - is a licensed manufacturer & applicator of Duromar® epoxy coating & lining products.**



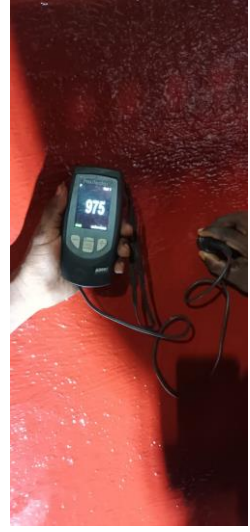
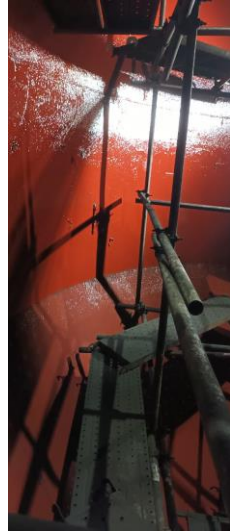
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**Coal Storage Silos protected with Duromar® Systems - Illustrations.**



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