

BELZONA PROTECTS 165 MW HYDROELECTRIC GENERATING UNIT FROM EROSION-CORROSION AND CAVITATION DAMAGE

ID: 10285



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PROBLEM

Continuous exposure to high-velocity water flow and entrained particles caused erosion-corrosion and cavitation damage on critical waterways components of Unit 1 at a hydroelectric power plant. The deterioration was evident on the spiral casing, stay vanes, guide vanes, turbine runner, draft tube cone, and draft tube wall, threatening hydraulic efficiency, equipment reliability, and long-term operational performance.

APPLICATION SITUATION

During a scheduled maintenance shutdown, the hydroelectric plant sought a practical solution to mitigate ongoing erosion-corrosion and cavitation damage affecting the turbine waterways. Conventional replacement or extensive metal restoration would have involved significant costs, lengthy outages, and complex logistics. Additionally, abrasive blasting was restricted due to the risk of contamination and potential damage to sensitive equipment within the generating unit. A Belzona solution was selected to restore and protect the affected surfaces using cold-applied materials that could be installed within the outage schedule while providing long-term resistance against erosion-corrosion and cavitation.

APPLICATION METHOD

The affected surfaces were inspected and mechanically prepared by power grinding to remove contaminants, oxidation, deteriorated coatings, and damaged material. Surface preparation was carried out in accordance with approved procedures to achieve a clean and firm substrate suitable for coating application. Belzona 1212 and Belzona 1161 (Super UW-Metal) were applied to rebuild damaged areas and provide a surface-tolerant foundation for subsequent coatings. Belzona 1321 (Ceramic S-Metal) was then applied to stay vanes, guide vanes, draft tube cone, draft tube wall, and turbine runner areas requiring enhanced erosion-corrosion and cavitation resistance. Belzona 1331 (Ceramic R-Metal) was applied to the spiral casing operating under continuous immersion conditions. Additional coating thickness was applied to leading edges and high-wear zones to maximize protection and service life.

BELZONA FACTS

Belzona was selected because it provided a practical and cost-effective alternative to component replacement while overcoming site restrictions that prevented conventional abrasive blasting. Belzona 1212 and Belzona 1161 exhibited excellent adhesion to manually prepared surfaces, enabling effective rebuilding and priming without the need for extensive blasting operations. Belzona 1321 was chosen for its proven resistance to erosion-corrosion and cavitation in hydroelectric applications, while Belzona 1331 provided long-term protection for continuously immersed surfaces. Previous trial applications within the facility demonstrated excellent coating performance, giving the customer confidence to implement the system on critical turbine waterways. The completed application restored surface integrity, improved protection against future degradation, minimized maintenance requirements, and helped extend the operational life of the generating unit.

INDUSTRY

Power

LOCATION

Pantabangan, Nueva Ecija,
Philippines

APPLICATION DATE

May 2021

PRODUCTS

Belzona 1161 (Super UW-Metal)
Belzona 1212
Belzona 1321 (Ceramic S-Metal)
Belzona 1331

SUBSTRATE

Carbon steel

PHOTOS

1. Erosion-corrosion and cavitation damage identified on the turbine waterways prior to repair.
2. Mechanical surface preparation completed to remove deterioration and prepare the substrate for Belzona application.
3. Ongoing application of Belzona coating systems to protect critical turbine waterways against erosion-corrosion and cavitation.
4. Completed Belzona coating system providing long-term protection for Unit 1 hydroelectric turbine waterways.

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