# Cavitation Repair of Runner Blades Using Belzona Solutions

*ID: 9932*

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| Industry: | *Power* | Customer Location: | *Ontario, Canada* |
| Application: | *FBC-Fans, Blowers and Compressors* | Application Date: | *May 2025* |

Substrate: *Carbon steel*

Products: *Belzona 1161 (Super UW-Metal),Belzona 1341 (Supermetalglide),Belzona 2141 (ACR-Fluid Elastomer),Belzona 2941 (Elastomer SP-Conditioner)*

### Problem

*A hydroelectric facility was experiencing severe cavitation damage on the runner blades of a unit. The affected areas showed significant material loss, particularly at the blade-to-band transition zone on the suction side, where cavitation effects are most aggressive. This wear threatened operational efficiency and long-term equipment integrity.*

Section of the runner affected by cavitation

Substrate after surface preparation via abrasive blasting

Application of 1st coat of Belzona 1341

Completed repair with 2141 over the most critical areas

## Application Situation

Belzona was contacted to provide a long-term repair and protection solution. A series of meetings were held with the Engineering and Production teams to assess repair options. Belzona 1161 was selected to rebuild the lost material. To protect the blades against future wear, Belzona 1341 was chosen for its anti-wear and hydrophobic properties, and Belzona 2141 for its proven resistance to cavitation.

Prior to the repair, Belzona and the facility team jointly inspected a spare runner stored onsite to evaluate surface preparation needs, as its cavitation damage closely mirrored that of the unit being repaired.

## Application Method

The repair process began with surface preparation, where the runner blades were blasted using stainless steel media to avoid rust contamination from carbon steel grit. Belzona 1161 was then used to rebuild the damaged areas on all 15 blades, restoring the lost metal and surface profile. A second coat of 1161 was applied to about 7 blades to fill remaining voids or imperfections. After curing



ISO 9001:2015
FS 695214
ISO 14001:2015
EMS 695213

Belzona products are manufactured under an ISO 9000 Registered Quality Management System.

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for 3–4 hours, the repaired surfaces were sanded and blended to match the original blade contours. Once the rebuilding phase was complete, Belzona 1341 was applied to all blades to provide a smooth, hydrophobic, and erosion-resistant finish. After curing, Belzona 2941 conditioner was applied to the areas designated for additional cavitation protection and left to cure for 8 hours. Belzona 2141 was then applied in a controlled manner over the critical cavitation-prone zones. Following the application, the facility's Asset Integrity Management team performed a 3D scan of the runner to establish a baseline for future monitoring and wear assessments.

## Belzona Facts

This project involved not only material supply but a complete engineered repair solution. The customer received a detailed Inspection and Test Plan (ITP) outlining each stage of the surface preparation, application, and post-application inspection. The ITP was reviewed collaboratively several times prior to the job to ensure alignment between all parties. The Belzona repair approach provided a much simpler and faster alternative to conventional weld and machining-based repairs, significantly reducing downtime and complexity for the site team. The application will be reinspected after one year of service, and if the repair performs as expected, the lead engineer has indicated it will be presented internally to colleagues as the preferred repair method moving forward.