

DRAFT TUBE REPAIR – Hydro Facility PNG



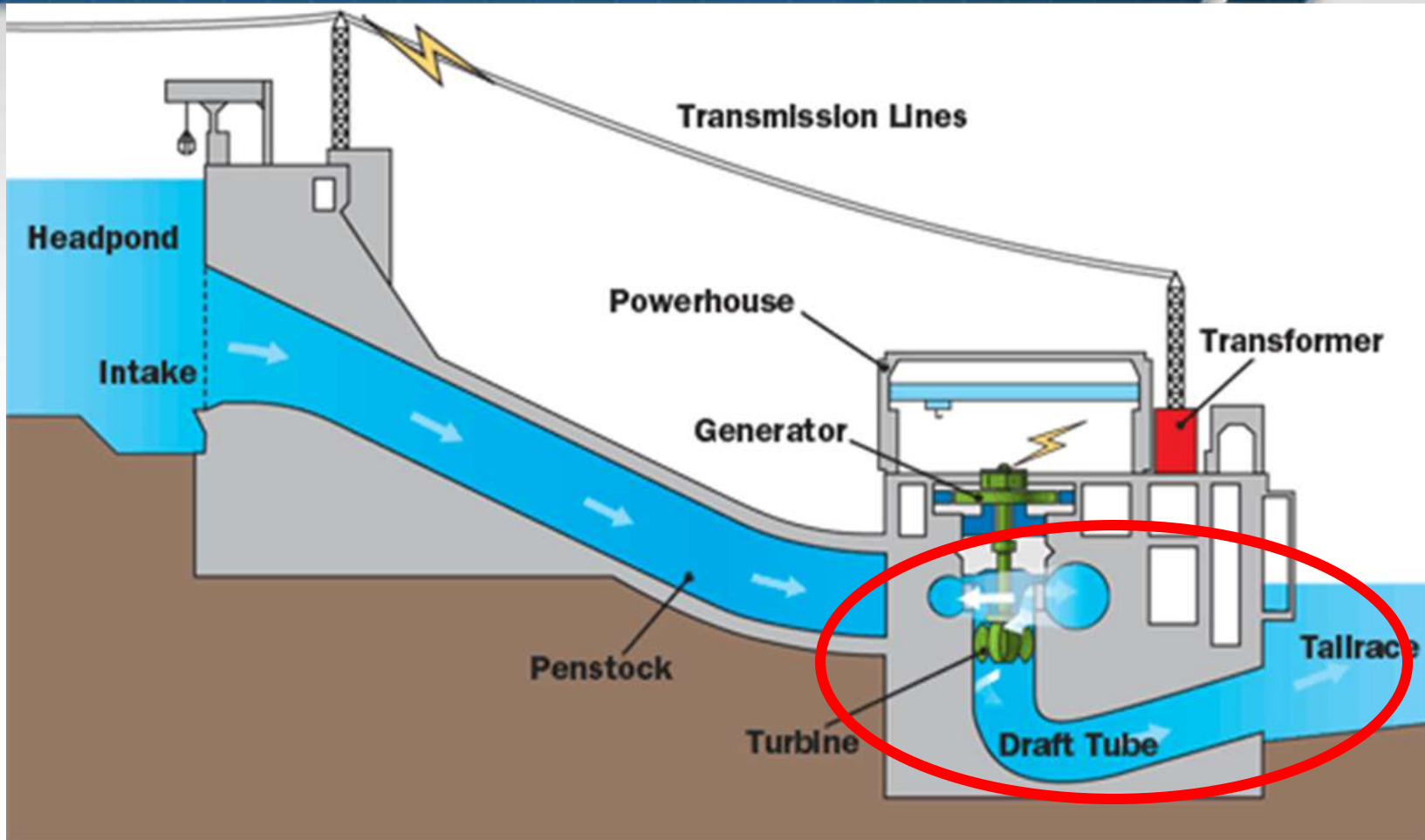
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CASE HISTORY

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What is a Draft Tube



Working Area Restrictions



The Draft Tube is located over 200 Metres below Ground level and is inside this Pump Turbine

This is the area we had to work within (Approx 1.5mm Square)

Inspected Condition of Draft Tube



Quote Submission.

- A Quotation was offered repair the steel liner by fabrication & using Imatech as a specialist subcontractor to offer technical advice on product for concrete backfill methodology between Steel Shell & Eroded Concrete (up to 100mm) & then final protective ceramic coating.
- Imatech Initially quoted 1mm of Sd4i ceramic consumable for final coating of Draft Tube.

Draft Tube Steel Fabrication Repair & Backfill of void with High strength Epoxy Grout.



Possible Issue Identified

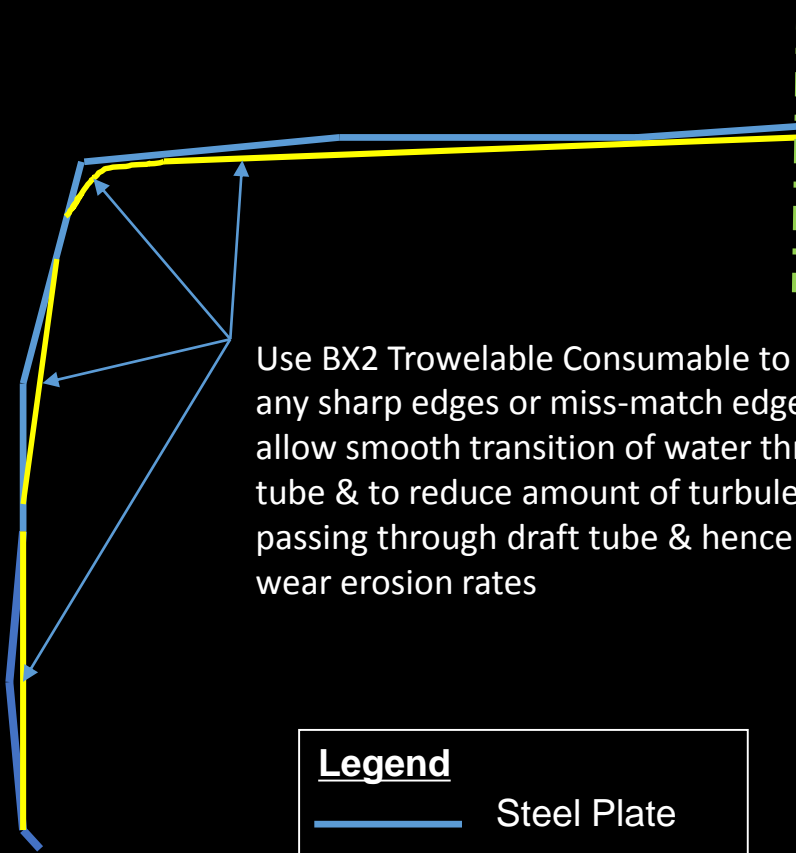
Prior to starting our Blasting operation before application of ceramic coating we noticed a potential problem.

As it can be seen there is mismatch from where fabricated plates are jointed together due to configuration & accessibility issues in Draft Tube, if we were to put 1mm thickness of our coating over this area it will lead to accelerated wear areas due to turbulent water flow and our product would fail very quickly.

We discussed our options and formulated a plan & requested a meeting with the Manager of the facility & the Mechanical Engineer.



Proposed Repair Suggested



Use BX2 Trowelable Consumable to smooth out any sharp edges or miss-match edges of plate to allow smooth transition of water through blast tube & to reduce amount of turbulent flow passing through draft tube & hence reducing wear erosion rates

Legend

- Steel Plate
- BX2 Ceramic



Product Datasheet: ARC BX2

100% solids, modified epoxy formulation, reinforced with a proprietary blend of ceramic beads and powders for fine particle, abrasive sliding wear environments. ARC BX2 industrial wear resistant coating is designed to:

- Protect areas exposed to moderate sliding abrasion
- Resurface damaged metal in lieu of more traditional weld overlays
- Replace ceramic tiles and rubber linings which can more easily disbond
- Easily apply by trowel

Application Areas

- Slurry pumps
- Hydropulpers
- Transport screws
- Pipe elbows and spools
- Bins and hoppers
- Slurry pipes
- Wear plates
- Chutes and hoppers
- Fan blades and housings
- Hydro-cyclones
- Turbo separators



Packaging and Coverage
Nominal, based on a 3 mm (120 mil) thickness

- 1.5 liter kit covers 0.50 m² (5.38 ft²)
- 5 liter kit covers 1.67 m² (17.94 ft²)
- 20 kg kit covers 2.82 m² (30.32 ft²)

Note: Components are pre-measured & pre-weighed. Each kit includes mixing and application instructions plus tools.

Colors: Gray or Red

Technical Data

Composition	Matrix	A modified epoxy resin reacted with an aliphatic amine curing agent	
Reinforcement (Proprietary)		Blend of medium to fine sintered alumina beads & fine SiC powders treated with polymeric coupling agent	
Cured Density		2.2 g/cc	137 lb/ cu.ft.
Pull-Off Adhesion	(ASTM D 4541)	238.2 kg/cm ² (23.4 MPa)	3,390 psi
Compressive Strength	(ASTM D 695)	950 kg/cm ² (93 MPa)	12,500 psi
Flexural Strength	(ASTM D 790)	690 kg/cm ² (68 MPa)	9,800 psi
Tensile Strength	(ASTM D 638)	340 kg/cm ² (33 MPa)	4,800 psi
Impact Resistance (reverse)	(ASTM D 2794)	6.0 N-m	53 in.-lb.
Linear Coefficient of Thermal Expansion	(ASTM C 531)	3.9 x 10 ⁻⁵ cm/cm°C	2.2 x 10 ⁻⁴ in/in°F
Shore D Durometer Hardness	(ASTM D 2240)	90	
Vertical Sag Resistance, at 21°C (70°F) and 6 mm (1/4")		No sag	
Maximum Temperature (Dependant on service)	Wet Service	95°C	203°F
	Dry Service	205°C	400°F
Shelf life (unopened containers)	2 years (stored between 10°C (50°F) and 32°C (90°F) in dry, covered facility)		

Features and Benefits

- High ceramic loading level
 - Extends life of equipment exposed to fine particle wear
 - Lowers coefficient of thermal expansion
 - Extends equipment life
- Chemically resistant polymer matrix
 - Covers a broad range of chemical exposures
 - Resists cracking & delamination
- High adhesive strength
 - Resists disbonding
- Single coat application
 - Saves time and versatile
- Low mixed viscosity
 - Eases mixing, application and finishing
- 100% solids; no VOCs; no free isocyanates
 - Enhances safe use
 - No shrinkage on cure



Half Cross Section through Draft Tube

Repair of Draft Tube Rev 1.

- If we had put our coating on at 1mm thick, It would not have performed to its optimal performance due to it not being the correct product for the application,
- BX2 material is classed as dangerous goods & plans were in place before we left site for product to be airfreighted at soonest possible opportunity to site.
- Imatech were back at site within 3 weeks to complete the Draft Tube repair.

Draft Tube Area Garnet Blasted Class 2.5 prior to Ceramic Coating Application.



Top Coat of Sd4i Product over BX2



HYDRO RUNNER CAVITATION REPAIR – Hydro Facility PNG



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Video Inspection of Cavitation Damage



Application & Dress of Cavitation Areas

