

WHAT IF you knew the wear rate of every high-wear position — without sending a technician to any of them?

Erosion Monitoring for Slurry Transport

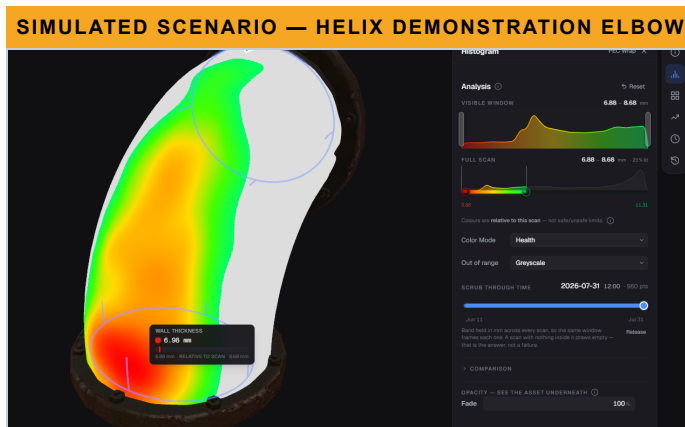
- *WHAT IF the changeout date came from the measured wall — not from the worst campaign the site has ever seen?*
- *WHAT IF a wear-rate change showed up when solids or pump pressure moved — not months later, at the next UT round?*

CHALLENGE

Slurry erosion concentrates where the flow changes direction — the extrados of elbows, reducers, and the turbulence around welded joints — and the wear band moves when the process moves: solids content, particle size, pump pressure and water content all shift where metal is lost fastest.

History is a poor guide. A weld-root protrusion, a bore mismatch or a liner defect can set up local wear that no previous spool in that position ever showed.

And the hardest positions to reach are the least measured: elevated racks and jacketed runs get a handful of UT grid points a few times a year, readings rarely land on the true minimum, and the line is unwatched between rounds. So intervals get set by assumption — and healthy steel is scrapped with the calendar.



HELIX's instrumented demonstration elbow in HELIX Horizon: wall heatmap, per-point tooltip, per-zone histogram, scan slider. Colours are relative to this scan — not safe/unsafe limits.

SIMULATED SCENARIO — MODELLED 24-IN CYCLONE-FEED ELBOW, NOT A CUSTOMER RECORD

3 / yr

CHANGEOUTS PER POSITION, ON THE CALENDAR

30–40%

USABLE WALL SCRAPPED PER SPOOL

\$35,000

ALL-IN COST PER CHANGEOUT (2026 CAD)

Representative modelled numbers from the HELIX slurry-elbow scenario study (HLX-CAS series) — replaced by a site's own figures in scoping.

OUR SOLUTION

Wrap the worst positions. Screen the rest. Forecast both.

Continuous measurement on the positions that wear fastest, periodic non-intrusive screening on everything else, and one software model over both — so changeouts run on measured wall.

HELIX Sensor Wrap

Patent-pending flexible sensor wrap, installed permanently on the spool. Continuous, temperature-compensated wall-loss monitoring, several scans a day, reported per zone — no technician at the position.

HELIX PEC + ECA screening

Periodic in-service screening of the wider circuit: pulsed eddy current wall-response and eddy current array weld screening — through coatings and insulation, with no surface preparation.

HELIX Horizon

Every wrap reading and screening result registered to its location on a LiDAR + photogrammetry 3D model, with per-zone history, rate tracking, and a probabilistic replacement forecast.

<1%

WALL-LOSS DETECTION THRESHOLD (WRAP PILOT)

±25 µm

TEMPERATURE-COMPENSATED READINGS

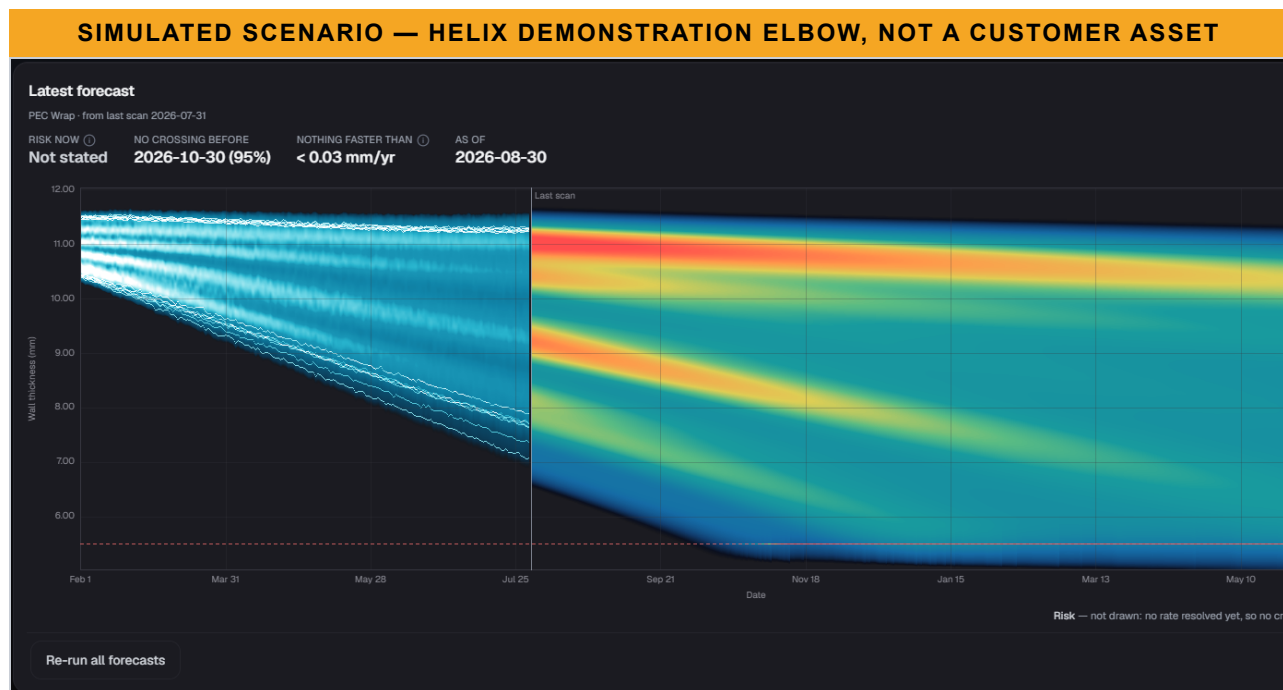
2,002 h

WRAPPED SCAN TIME TO DATE

360M+

DATA POINTS COLLECTED

THE FORECAST BEHIND THE REPLACEMENT DATE



HELIX Horizon “Latest forecast” on HELIX’s instrumented demonstration elbow: measured per-zone history left of the last scan, projection to the right, retirement criterion dashed. Verdict as shown: no crossing before 2026-10-30 (95%), wear under 0.03 mm/yr.

THE BANDS

Each band is a group of zones on the elbow: measured history to the left of the last scan, the same zones projected to the right, widening as uncertainty grows.

THE CRITERION

The dashed line is the retirement wall agreed for the asset. The forecast is scored against it and returns a date with a stated confidence — not a calendar guess.

THE VERDICT

Forecasts are sealed, then scored against the scans that follow. Where wear is too slow to resolve a rate, Horizon says so rather than claim one.

HOW IT WORKS

1 Screen the circuit in service

A HELIX crew screens the high-wear candidates — pump discharge, cyclone feed, coarse underflow — with PEC wall-response and ECA weld screening, and captures the line with LiDAR + photogrammetry. No shutdown, no surface prep, through coatings and insulation.

2 Wrap the worst positions

The site's own crew wraps a spare spool at ground level ahead of a scheduled changeout: bond the array, removal tape, stretch film, weather membrane, jacket, enclosure. No tools, no hot work, under a day — monitoring starts with the spool's first hour in service.

3 Stream every position into Horizon

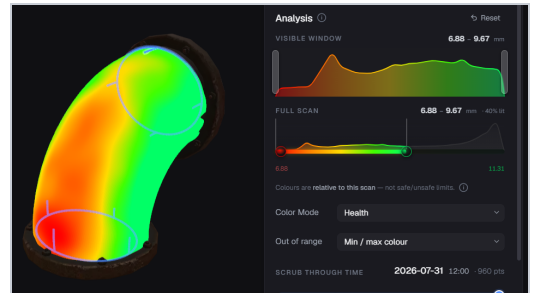
Each coil averages the wall beneath it, temperature-compensated, several scans a day. Horizon registers every reading to its location on the 3D model and tracks per-zone thickness and rate of loss — and can feed the plant historian if wanted.

4 Replace on forecast, not on the calendar

Horizon scores a probabilistic wall forecast against the agreed retirement criterion and issues a dated verdict. Spool changeouts — or rotations, once the thin quadrant is known — are planned on measured wall.



HELIX Sensor Wrap: planar spiral coils wound over the spool. Patent-pending, tileable across diameters.



Wear mapped over the whole position (demonstration elbow, simulated scenario). Colours are relative to this scan, not safe/unsafe limits.

BENEFITS

- **No shutdown to get a baseline.** PEC and ECA screen in service, through coatings and insulation — no cutting, draining or dismantling.
- **Forecast-driven spool replacement.** A dated, probabilistic verdict against an agreed retirement wall — instead of a calendar interval sized for the worst campaign.
- **Rate changes flagged.** Continuous per-zone tracking shows when a change in solids, pump pressure or water content moves the wear band.
- **No scaffolding for a reading.** Wrapped positions report on their own, several scans a day — nobody climbs to the position to collect data.
- **The whole position, not a few grid points.** A wear map across the elbow, ranking where erosion concentrates — confirmable against the pulled spool.
- **Field-proven mechanics.** ~100 m of 1970s piping screened in place at DFO's Capilano River Hatchery — four days, 378,407 screening samples (HLX-2026-001).

Run the pilot on one position

One fast-wearing spool, wrapped ahead of a scheduled changeout, run in shadow for one cycle: the site keeps its schedule and its UT programme, and the wrap is scored against both — UT agreement, sealed blind forecasts, the wear-rate map checked against the pulled spool.

You bring a spare spool, about an hour of crew time, UT at the monthly checks, and process context to correlate against. HELIX brings the wrap, install kit, edge node, gateway and HELIX Horizon.

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Simulated scenario: modelled positions, scenario numbers and software imagery in this flyer are representative, drawn from HELIX's instrumented demonstration elbow (scanned February–July 2026), not customer records. HELIX screening is not a certified inspection to any code scheme; fitness-for-service assessment remains with the client's engineers. PEC results are relative wall-response comparisons unless a material reference exists. HELIX Sensor Wrap is patent-pending. Certifications: contact HELIX. © 2026 HELIX Sensors Inc. All rights reserved.