



SQUID Online Heating Coil Inspection

US Gulf Coast Storage Tanks



The mission

A major oil company selected hibot SQUID for a field pilot at its lubricant additives plant on the US Gulf Coast. The target was the steam heating coils inside its above-ground storage tanks. Hibot and its US service partner inspected seven tanks on site. The plant kept running as usual the whole time.

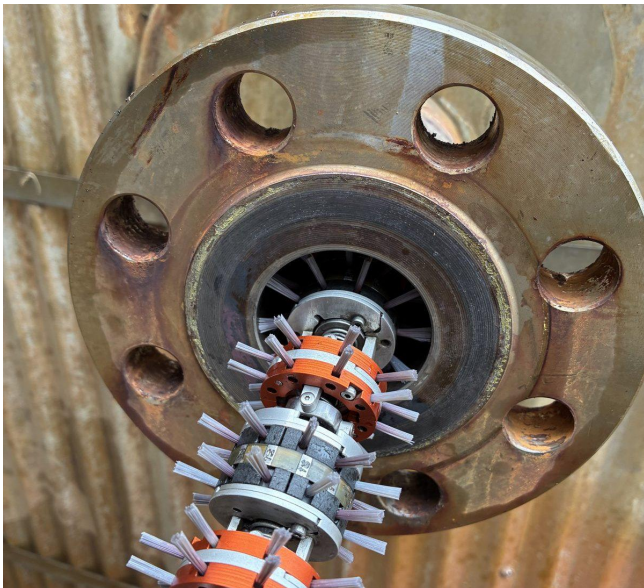
Why the coils matter. Heating coils keep viscous product pumpable. The coils in this pilot are 2-inch Sch 80 carbon steel serpentes with around 25 bends. Checking them the conventional way means taking the tank out of service, emptying and cleaning it, and sending inspectors inside.



The opportunity

The coils sit inside live tanks, full of product at working temperature. The only access is two 2-inch flanges, sometimes on opposite sides of the tank and up to 1.1 m above ground.

The serpentines are long, with around 25 U-bends in a single coil. Years of service had left scale, rust and sludge inside the pipe.



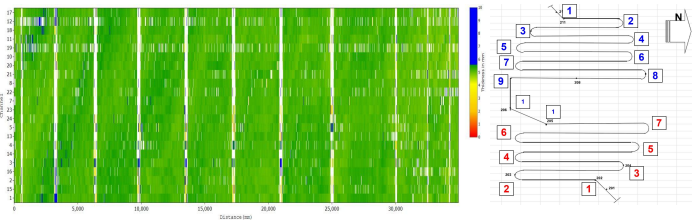
Our approach

Both coil flanges are opened. SQUID enters at one and water circulates out through the other, so the coil must be continuous flange to flange. A water-coupled ultrasonic sensor head, centred by brushes, maps the wall as it travels.

UT reads only through water onto a clean wall, so dirty coils are flushed first in an open circuit.

Nobody enters the tank and nothing is drained.

Coils longer than the 35 m cable are inspected from both ends.



C-scan along one coil. White stripes mark the bends.

40 min 2/day 330 m 0

to scan 60 to 70 m of coil trained crew, of coil tank entries
70 m of coil tanks prepared inspected or drains

The results

Seven tanks inspected in service. On one tank, operations refilled it with lubricant while the scan was running.

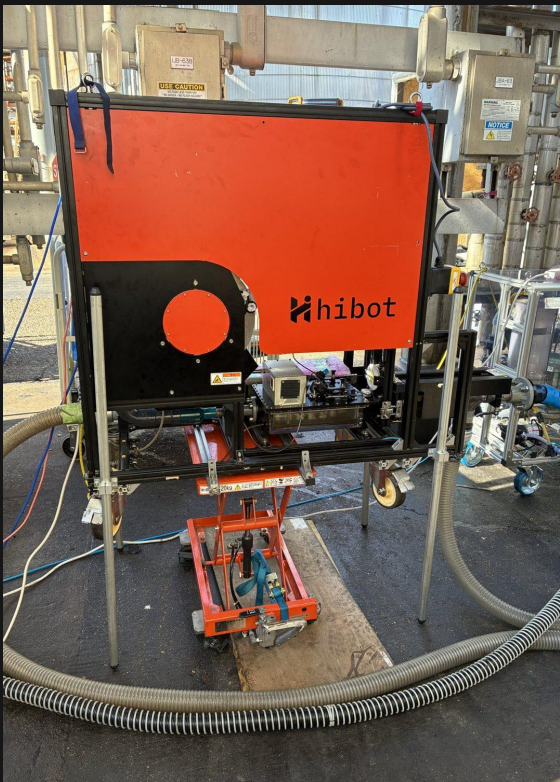
On clean coils, SQUID scanned 60 to 70 m per coil in about 40 minutes. Most of the time on site went to preparation, not measurement. One run passed 14 U-bends in 35 m, a record for SQUID.

SQUID: IN-SERVICE INSPECTION FOR TANK HEATING COILS

SQUID was built to inspect boiler tubes from the inside. The same system now reaches heating coils in operating storage tanks, through the two coil flanges that are already there.

24 UT channels read the wall every 5 mm while the sensor travels at 100 mm/s. The result is a continuous thickness map along the coil, instead of a few readings where an inspector could reach. That gives the integrity team a measured basis for risk-based planning, without waiting for the next tank shutdown.

One crew, one trailer, zero confined-space entry.



CONVENTIONAL VS SQUID

	Conventional	SQUID
Tank status	Out of service	In service
Preparation	Empty, clean, gas-free	Open both coil flanges
People inside	Confined-space entry	None
Data	Spot readings where reachable	Continuous UT map, 5 mm pitch

PERFORMANCE PER TANK

Per tank	Range
Dry set-up (incl. assembly)	24-41 min
Calibration (probe sealed in)	20-22 min
Wet set-up (to first reading)	19-24 min
Measurement	32-41 min
Flange swap (second entry)	16-32 min
Pack-up	26-42 min
Coverage	55-91%
Reach per flange	35 m cable, ~70 m per coil

Total inspection time and coverage depend on preparations and pipe cleanliness. Clean, prepared coils sit at the fast end.

What makes a coil a good candidate. Continuous, both flanges accessible, carbon steel or stainless, up to about 70 m. Water at the outlet up to 45 °C, higher case by case. Scale is fine; heavy sludge needs pre-cleaning. Water supply at the tank. The 70 m is set by the 35 m cable we ran here. Longer cable, longer reach, so tell us your coil length. On a prepared, clean tank, plan four hours and two tanks a day.



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