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- 28th September 2021

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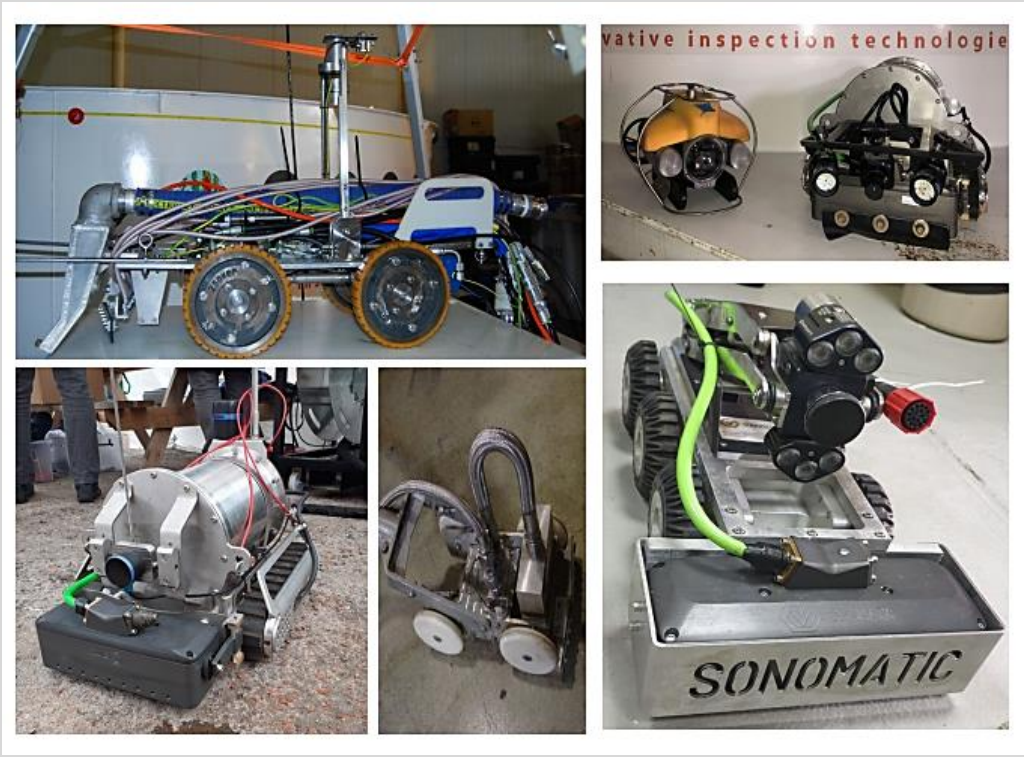
“Introduction to Robotic systems used in Storage Tanks while still in service”

About the TOPICS

- In-Service Ultrasonic Tank Floor Inspections
- This paper outlined selected recent highlights from the Sonomatic Storage Tank Division: •
- Introduction to Robotic systems used in Storage Tanks while still in service. • Explanation of safety systems used to safely deploy robots in Above ground Storage Tanks (AST) while they remain online and full of product. • A summary of Ultrasonic data collected, and software developed to assist with analysis and reporting activity. • Case study of a Storage Tank that required in service inspection.



About the Presenter

- Matthew Beatty.
- Currently used as an Advanced Ultrasonic Inspection Technician at Sonomatic's Abu Dhabi branch.
- Constantly working for major Oil and Energy companies concentrating on various inspection techniques such as ToFD (Time of Flight Diffraction), High Temperature ToFD, Manual Ultrasonics, HTHA (High Temperature Hydrogen Attack), HDPE (High Density Polyethene) and AE (Acoustic Emissions).

Q&A

- **Presentation –** Introduction to Robotic systems used in Storage Tanks while still in service

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- Q1. Many thanks Matthew.....the Robots are clearly very advanced and multi-tasking. Although there are many Alarms/Controls...there may be some occasions when inspections cannot be completed fully. What is the most common reason for having an incomplete inspection ?

- A1. Most common reason is unpumpable sludge esp. when under directly Probe array along with internal obstructions.

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- Q2. What are limits of H2S while running robot in sour environments.

- A2. We would aim to have zero H2S in tank roof, at start.

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- Q3. What are safety precautions taken in the deployment of the Robot in floating roof tank having product?

- A3. No power. Use Brass Tools and electrically grounded.

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- Q4. If you are inspecting from inside the tank and have internal corrosion on the tank floor, how do you confirm the wall thickness? I believe you would need a specific surface condition for the probes to give you an accurate reading? What surface condition do you require?

- A4. As clean as possible really is best. Pump sludge and discharge clean product also to inspect area. UT probe floats above floor with 30-40mm water stand-off.

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- Q5. How does the system differentiate between corrosion from within the tank (on the tank floor) to corrosion occurring beneath the tank (soil corrosion) ?

- A5. B scans will be affected from top side, soil side observations can easily be distinguished.

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- Q6. How is the robot's position is being monitored and how accurate it is?

- A6. From the Transducers. Very accurate within smaller tanks.

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- Q7. Thank you. I was wondering about installed Sac. Anode obstructions and how you deal with that.

- A7. Can become an issue. Need to have scan plans to plan around all obstructions…..use multi-manways in this case.

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- Q8. Any specific qualifications required for Robot's operators or technicians?

- A8. They are Level 2 ASNT certified.

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- Q9. What is the biggest problem with sludge that you encounter?

- A9. Heavy paraffin waxes in crude difficult..inc. Temp.

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- Q10. For a multi tank in-service inspection what is the estimated time to move from one tank or site to the next incl. control room , robot etc?

- A10. Prob. a full day to change over…for water tanks… maybe 2 hrs.

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- Q11. Is robotic system intrinsically Safe?

- A11. Not at present. under development Zone 1 for Hyd Robot though. 2ins of shell.

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- Q12. Any mechanism to check the thickness of coating? or to check the coating condition especially in opaque products like crude.

- A12. Yes, can determine if missing coating.

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- Q13. Can we define the type of corrosion?

- A13. Can do general or pitting corrosion (yes if large 10mm+).

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- Q14. Have you used this on an offshore installation or are these examples all onshore based. I think I heard you saying a 20ft container control room?

- A14. Yes, on Islands (considered as an Offshore Facility).

THANK YOU FOR ATTENDING

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