



North Texas Exploration and Production Safety (NTEPS)



PRESENTATION

BY: Kevin Shipman



Presentation Outline

- ” Background: McDowell~TecEng
- ” Safety – Confined Space Entry
 - . Brief “Overview and Risk”
- ” Our Solutions
 - . Inspection
 - . Robotics
- ” CASE STUDY Project: In-Service Jet Fuel Storage Tank Inspection (NAVFAC)
- ” Questions and Ideas

Background: McDowell~TecEng

- “ Robotic Inspection and Cleaning Systems / Remote Operated Vehicle (ROV) Solutions
- “ NDT Inspections and Safety & Health Services

Confined Space Examples

- “ Tanks
- “ Clear Wells
- “ Vessels
- “ Flume Chambers
- “ Cooling Towers



Tank Related - Confined Space Risk!





Permit-Required Confined Spaces in General Industry



A confined space has limited openings for entry or exit, is large enough for entering and working, and is not designed for continuous worker occupancy. Confined spaces include underground vaults, tanks, storage bins, manholes, pits, silos, underground utility vaults and pipelines. See 29 CFR 1910.146.

Permit-required confined spaces are confined spaces that:

- May contain a hazardous or potentially hazardous atmosphere.
- May contain a material which can engulf an entrant.
- May contain walls that converge inward or floors that slope downward and taper into a smaller area which could trap or asphyxiate an entrant.
- May contain other serious physical hazards such as unguarded machines or exposed live wires.
- Must be identified by the employer who must inform exposed employees of the existence and location of such spaces and their hazards.

CONFINED SPACE RISK

According to data collected by the [U.S. Department of Labor \(USDOL\), Bureau of Labor Statistics \(BLS\) Census of Fatal Occupational Injuries \(CFOI\)](#) program, Year 2015

- Fatal injuries in confined spaces averages 92 fatalities per year (Approximately two per week)
- According to OSHA, over 4.8 million confined space entries are made every year in the United States, and over 11,000 injuries occur



Our Approach – Risk Reduction

ROV Inspection Services

Inspection Services

Robotic Tank Inspection Services:

- “ Video Inspection Services - Remote Operated Vehicle (ROV) inspection submarine that provides an internal video profile of the storage tank to estimate the level of sedimentation build up and evaluate the condition of the tank.



ROV Cleaning

Robotic Cleaning Services

- “ Robotic Cleaning ROV is designed to extract and discharge the accumulated sedimentation/sludge from the containments and tanks.
- “ The crawler unit is equipped with an underwater camera system that is used to navigate the machine throughout the tank.
- “ The cleaning services are performed while the storage tank remains full (No Draining) and on-line.

Robotic Cleaning Unit

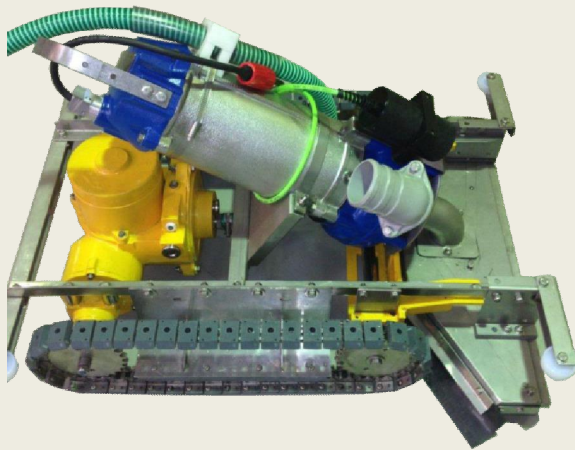


Large Industrial ROV Cleaner



New! Cooling Tower ROV

ROV Cooling Tower Cleaning Unit



NDT Tank Inspection Services

TANK MANAGEMENT



*Providing comprehensive inspections, non-destructive testing and cleaning services while storage tanks remain **Full and In-Service**.*

We specialize in robotic technology to provide inspection and cleaning services for many types of tanks across a variety of industries, including water, petroleum, chemical and power.

Our team includes inspectors with the following **CERTIFICATIONS:**

API 653 Fuel Tank Inspection Services: (Internal and external) and reporting

API 510 Pressure vessels: In-service inspection and reporting

API 570 Piping Systems: In-service inspection and reporting

API 653 Tanks - steel, fiberglass and polymer: Inspection and reporting

STI SP001 Steel Tank Institute Inspections and reporting

ASME Tank inspections and reporting

We follow ASNT-SNTC-IA "Standards and Practices for Nondestructive Testing"

Tank Services (Cont.)

INTERIOR INSPECTIONS

New! NDT ROBOTIC INSPECTION SERVICES

Designed to perform ultrasonic-thickness (U/T) testing on the floors of Fuel Storage Tanks (e.g. JP-8 jet fuel, Diesel, etc.) while they remain FULL (No draining) and In-Service.

Our process includes use of our REMOTE OPERATED VEHICLES (ROVs) to perform an internal survey of your tank or water containment system to evaluate the metal integrity of the tank floor using NDT methods, and determine whether sedimentation and sludge cleaning are required.

The inspection survey is specifically designed to video your tank while it remains in service (Full with NO Draining Required). The survey will provide feedback on the tank's interior coating, roof and all the internal structural items (e.g. ladders, influent/effluent piping, over-flow, drains) to evaluate any corrosion as well as identify the level of sedimentation that has accumulated on the tank floor.

SAFE

Our service teams are trained to utilize our ROVs to deliver high quality inspections and cleaning services in confined areas and conditions that are unsuitable for man.

EFFICIENT

Our uniquely designed machines allow us to perform inspection and cleaning services while your storage containment remains completely operational.



EXTERIOR INSPECTIONS

API INSPECTIONS AND NON-DESTRUCTIVE TESTING

We provide assistance with a comprehensive mechanical integrity plan for the protection of your equipment. Our team of API certified inspectors and support personnel will inspect your pressure vessels, tanks and associated piping and provide detailed reports and recommendations for your review.

STEEL TANK INSTITUTE (STI) INSPECTIONS

One of our Certified Inspectors will provide a thorough inspection based on the criteria identified by The Steel Tank Institute (STI) Standard for the Inspection of Aboveground Storage Tanks, SP001, in order to determine the suitability for continued service of aboveground storage tanks (AST) until the next scheduled inspection.

VISUAL INSPECTIONS

A complete visual inspection allows our team to verify the condition of each piece of equipment. Areas inspected include the foundation, anchoring, protective coating, vibration, and signs of external corrosion.



Ft. Worth, NAVFAC Project



Robotic FUEL Tank Inspection Unit

In-Service API-653 Inspection - ~~No~~ No Draining Required+



ROV Prep-Services





Set-Up and Deployment



ROV Control Center



Sludge/Sediment Mapping

(Fuel or Crude Tank Inspection Profiler Tool)

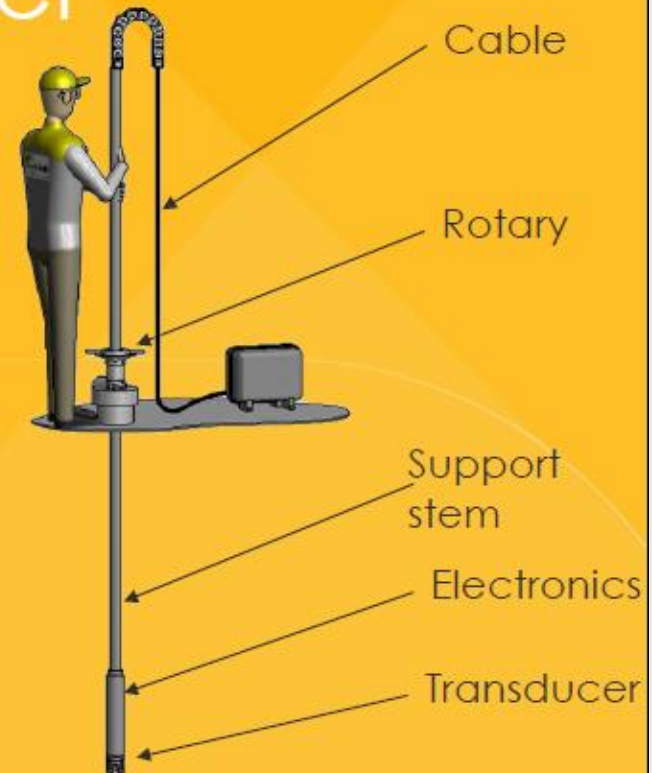
The Profiler

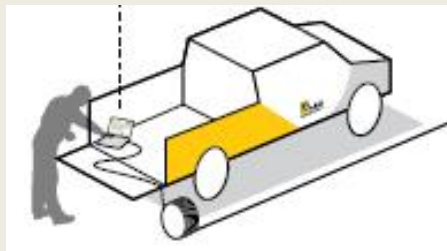
Deployment:

- Man Portable
 - Profiler tool weight <25kg
 - Battery powered

Tank Entry:

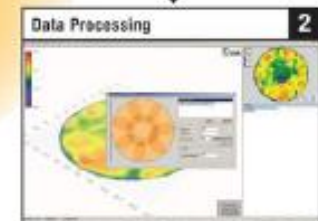
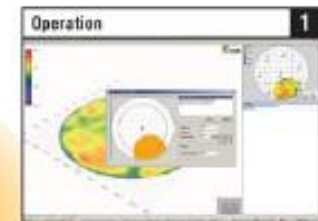
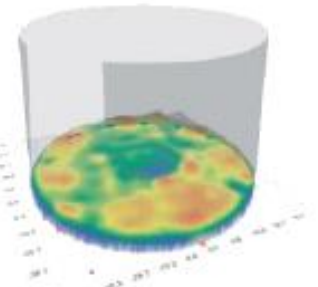
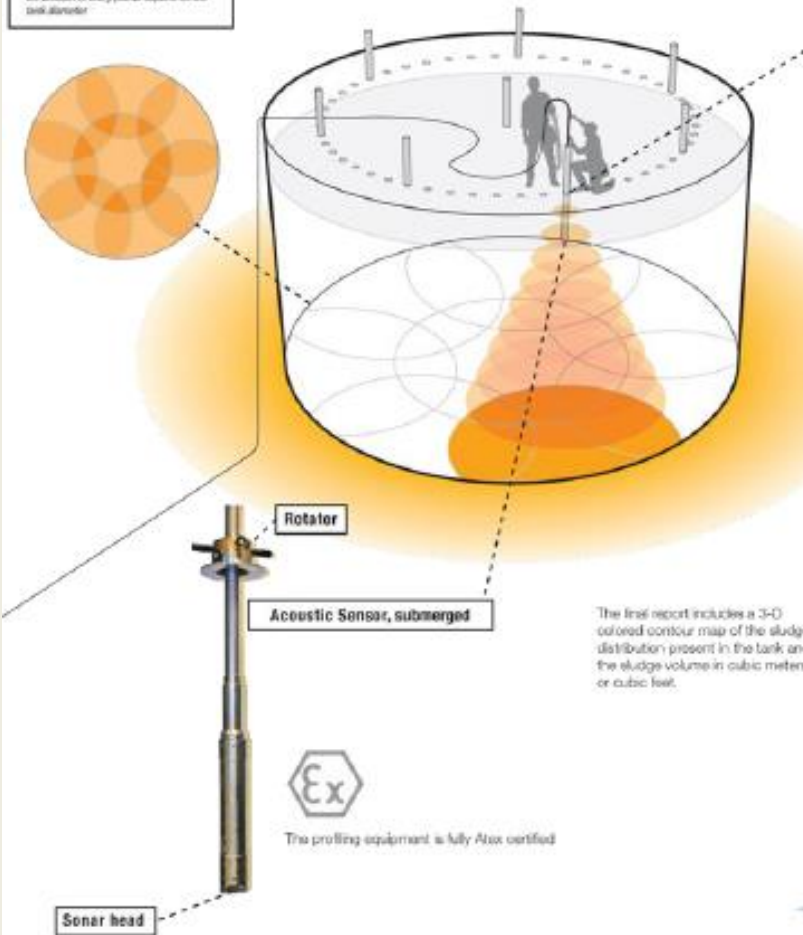
- Profiler tool OD 90mm
- Enters thru 4" roof support hole or manway





Acoustic Sludge Profiler

- 100% coverage of tank bottom depending on entry points*
- over 95% accuracy
- * the amount of entry points depend on the tank diameter



The final report includes a 3-D colored contour map of the sludge distribution present in the tank and the sludge volume in cubic meters or cubic feet.

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