LANDMARK
Elevating Expectations

Bobcaygeon Composite Elevated Tank
Remotely Operated Vehicle Inspection and Report
July 16, 2018

Landmark Municipal Services

3091 Harrison Court
Burlington, ON CAN L7M 0W4
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August 23, 2018

Ontario Clean Water Agency
123 East Street South, PO Box 279
Bobcaygeon, ON K0M 1A0

Att: **Mr. Geoff Reddin**
greddin@ocwa.com

Tel: 705.738.9737

Re: **LMS Job #LM18041**
Remote Inspection & Report - Bobcaygeon Composite Elevated Tank

Mr. Reddin,

A comprehensive inspection was performed at the above mentioned potable water storage facility on July 16, 2018. Tank interior surfaces were inspected with a remotely operated vehicle (ROV). The ROV unit and tether cable were disinfected in accordance with AWWA-C652-11 Method #2 guidelines (200ppm solution) prior to entry into the tank interior. Landmark's ROV equipment is designated for potable water use only.

Please find a comprehensive report enclosed as follows;

1) Composite Elevated Tank Inspection Report — Pages 1 – 5

2) Photographic Record of Report — Pages 6 – 29
- Photographs are numbered in accordance with the corresponding numbers throughout the report.

3) Protective Coatings & Linings Report

4) Summary of Recommendations – Quotation #Q18144

5) ROV Video – Electronic copy on USB flash drive

Should you have any questions or comments regarding the content of this report, please contact us at 905 319 7700.

Yours sincerely,
Landmark Municipal Services ULC

Dave Baker
Encl.

Fall Arrest System Update

Effective December 1, 2016, the CSA Group updated its standards relating to fall arresters and rigid rail systems. The update has resulted in the previous standard, Z259.2.1-98 (2011) (the "2011 CSA Standard"), being separated into two new standards: (a) CSA-Z259.2.4-15 – Fall Arresters and Vertical Rigid Rails; and (b) CAN/CSA-Z259.2.5-12(2016) – Fall Arresters and Vertical Lifelines.

The impetus for the changes to the 2011 CSA Standard was driven by an incident in which a worker was critically injured while using a rigid rail type of fall protection system in 2014 – a copy of this notice is included at the end of this report. The Ontario Ministry of Labour's investigation into the matter revealed a weakness in the design of some Class Frontal-Fixed Rail Ladder Fall Protection Systems, which may not adequately protect workers who fall backwards or who squat and roll backwards into a fall while connected by a body harness to the trolley which slides along the vertical rail.

Particular to our review of the subject potable water storage facility is CSA-Z259.2.4-15 – Fall Arresters and Vertical Rigid Rails ("2016 CSA Standard"). Generally, the revisions included in the 2016 Standard fall into 3 categories: (i) increased compatibility requirements between fall arresters, harnesses, and vertical rigid rail systems. These changes can primarily be found in sections 4.3.5, 4.4, and 4.5; (ii) the addition of 4 new mandatory testing requirements for rigid rail systems, which can be found in sections 5.3 through 6.4; and (iii) new marking requirements in sections 7.1, 7.2, and 7.3.

As per section 5.3.1, all new testing requirements must be met in order for the rigid rail system to be certified as compliant under the 2016 CSA Standard.

Landmark has followed up with the CSA Group in an attempt to determine the status of the exiting FRL's system compliance. In the case of fall arresters and vertical rigid rails, it appears that the current system has not been certified by the CSA Group with respect to the new 2016 Standard.

Please refer to quotation #Q18144 for pricing to remove and replace the existing fall arrest system with Honeywell Safety Products – "Soll GlideLoc" who are compliant with the new 2016 Standard.

This report has been prepared by Landmark Municipal Services for the City of Kawartha Lakes.

This report has been prepared in order to provide the facility owner with a detailed description of the following:

The present condition of interior and exterior coatings, any pitting and/or corrosion on the interior of the water retaining vessel, the apparent condition of exposed foundations and the status of and recommendations for upgrades on safety equipment and other facility appurtenances.

Landmark Municipal Services has not performed a design review, an ultrasonic, x-ray, or destructive and/or non-destructive testing unless stated in the report. Comments and recommendations are based on visual inspection only and represent Landmark's professional judgement in reference to industry standards and best practices. This report may be based on information provided to Landmark which has not been independently verified. Its accuracy is limited to the time period and circumstances in which it was made. It was prepared for the specific purposes described in the report.

Any estimates regarding construction costs represent Landmark's judgement in light of our experience. Since Landmark has no control over market conditions, we do not make any representations or guarantees whatsoever with respect to such estimates or their potential variance from actual construction costs or schedules. Landmark accepts no responsibility for any potential losses.

In the case of subsurface, environmental or geotechnical conditions, the report may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time. Landmark makes no other representations or warranties whatsoever and accepts no responsibility for any events that may have occurred since the report was prepared.

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COMPOSITE ELEVATED TANK INSPECTION REPORT

Landmark Contract No.	Inspection Date	Last Inspection Date
LM18041	16-Jul-18	Unknown
Inspector	**Report Date**	**Inspected By**
P. Furtado	10-Aug-18	Unknown

OWNER / CONTACT

Owner	**City of Kawartha Lakes**	**Contact**	**Mr. Geoff Reddin**
Project Location	Bobcaygeon Composite Elevated Tank	**Title**	Operations Manager
		Phone	705.879.5999
Address	85 Dunn Street Bobcaygeon, ON	**Fax:**	--
		Email	greddin@ocwa.com

TANK DESCRIPTION

Constructor	Landmark Structures Co.	**Tank Capacity**	969,000 Imperial Gallons
Tank Type	Composite Elevated Tank	**Year Built**	1994
Dwg's Available	No	**Tank Diameter**	76'
Dwg's Reviewed	No	**Pedestal Diameter**	38'
Coating System	Steel Cladding	**HWL**	1022.41'
Lining System	Epoxy	**LWL**	978.76'
Exterior Roof	Steel Cladding	**Grade Elev.**	861.22'
Age of Paint	Original (24 years)		

REPORT SUMMARY

Repairs Made During Inspection

4pc pedestal light bulbs replaced	48	--
Aircraft warning light bulbs replaced	81	--
Watertight cap installed on rescue port	75	--

Recommended Repairs

SITEWORKS		**ACCESSORIES**	
	--	Anti-slip tape required on smooth ladder rungs	48, 61, 68
	--	S&I roof kickplate (120')	83
	--	Surface prep and paint roof handrail	78
SECURITY		Relocate antenna cables to proposed cable tray system	70
2pc padlocks required on hatch to tank interior	94, 98		--
	--		--
	--		--
VALVE CHAMBER			--
	--		--
	--		--
	--		--
FOUNDATIONS		**FALL ARREST**	
	--	Remove and replace fall arrest system	47, 61, 68
	--	***Please review cover letter for latest information regarding CSA Standard CSA-Z259.2.4-15 (Fall arresters and Vertical Rigid Rails)**	
	--		
SUPPORT STRUCTURE			--
	--		--
	--		--
	--		--
INTERIOR LANDING		**CONFINED SPACE & RESCUE SYSTEM**	
	--	Rescue port base required beneath top landing grating	53
	--		--
	--		--
	--	**COATINGS, LININGS AND METAL CONDITION**	
	--	Separate report available	--
	--	Paint rail replacement	--
	--	Repaint dry side of access tube	--
	--	Remove graffiti and apply anti-graffiti coating on pedestal	--

Existing Maintenance Contract? **No**

Thank you for allowing Landmark Municipal Services to assist you in the maintenance of your elevated water storage facility.
To maintain the integrity of your facility we recommend that you schedule your next:

Safety inspection and report	**2019**	
Clean, inspect and report	**2018**	
Remote Inspection & Report	**2021**	***3 yrs after CIR***

		Photo No.
SITEWORKS		
WALKWAYS / DRIVEWAYS	Good	1 - 2
OVERFLOW SPILLWAY	Good	16 - 17

REPAIRS OR MAINTENANCE REQUIRED

SECURITY		
FENCE & GATES	Fair	1
HATCH LOCKS	None	94, 98

REPAIRS OR MAINTENANCE REQUIRED

2pc padlocks required on hatch to tank interior

VALVE CHAMBER		
CONDITION OF VALVE CHAMBER	Good	35 - 41
CONDITION OF PIPING	Good	35 - 41
CONDITION OF VALVES	Good	35 - 41
ARE THERE ANY INDICATIONS OF SETTLEMENT?	No	35 - 41
IS THE CONCRETE IN THE CHAMBER CRACKED, SPALLED OR LEAKING?	No	35 - 41
IS THERE ANY INDICATION OF PIPE MOVEMENT?	No	35 - 41

REPAIRS OR MAINTENANCE REQUIRED

FOUNDATIONS		
ARE THERE ANY INDICATIONS OF FOUNDATION SETTLEMENT?	No	14 - 20
IS CONCRETE CHIPPED OR CRACKED	No	14 - 20
IS THE SOIL AT THE BASE SATURATED OR IS THERE PONDED WATER?	No	14 - 20
IS THERE ANY INDICATION OF UNDERGROUND PIPE LEAKAGE?	No	14 - 20
IS SOIL AT BASE ERODED?	No	14 - 20
IS THE FOUNDATION UNDERMINED OR EXPOSED?	No	14 - 20

REPAIRS OR MAINTENANCE REQUIRED

SUPPORT STRUCTURE		
PEDESTAL EXTERIOR - IS CONCRETE CRACKED?	No	4 - 12
PEDESTAL INTERIOR - IS CONCRETE CRACKED?	No	30 - 33
IS PEDESTAL CEILING CRACKED?	No	62 - 67
IS PEDESTAL CEILING LEAKING?	No	62 - 67

REPAIRS OR MAINTENANCE REQUIRED

Remove graffiti at bottom of pedestal and apply anti-graffiti paint on pedestal

INTERIOR LANDING		
IS LANDING DECK IN GOOD CONDITION?	Yes	56 - 60
IS LANDING KICK PLATE IN GOOD CONDITION?	Yes	56 - 60
IS LANDING HANDRAIL IN GOOD CONDITION?	Yes	57 - 60
ARE SPLICES, SUPPORTS AND SHAFT CONNECTIONS IN GOOD CONDITION?	Yes	56 - 60

REPAIRS OR MAINTENANCE REQUIRED

ACCESSORIES			Photo No.
EXTERIOR DOORS & HARDWARE		Good	14
INTERIOR DOORS & HARDWARE		Good	34 - 35
ENTRANCE ALARM		Good	22, 24
CHAMBER ROOF & GUARDRAIL		Aluminum guardrail and ladder system recommended	29
LADDERS	* To Valve Chamber Roof	N/A	--
	* To Top Landing	Good (Rungs need to be serrated / anti-slip)	47 - 55
	* To Tank Floor Hatch	Good (Rungs need to be serrated / anti-slip)	61 - 62
	* To Roof (Access Tube)	Good (Rungs need to be serrated / anti-slip)	68 - 72
	* To Tank Interior (From Roof)	N/A	--
REST SEATS		Good (4pc)	49 - 52
ROOF HATCHES	* Size (Access Tube)	30" dia. aluminum hatch	73 - 74
	* Condition	Good	73 - 74
	* Size (Tank Interior)	1pc - 30" dia. aluminum hatch, 1pc - 28" x 28" aluminum hatch	93 - 102
	* Condition	Good (Padlocks required, surface prep and paint hatch collar)	93 - 102
VENT	* Type	16" Frostproof S.S. Combination vent / vacuum relief unit	76 - 77
	* Condition	Good	76 - 77
VACUUM RELIEF UNIT	* Type	16" Frostproof S.S. Combination vent / vacuum relief unit	76 - 77
	* Condition	Good	76 - 77
PAINT RAIL ACCESS	* Interior	Good	86
	* Exterior	Good	55
PAINT RAIL (Must be inspected prior to each use by. P.Eng)	* Interior	Moderate to severe corrosion	103 - 115
	* Exterior	Appears good from grade level	4 - 7
GIN WHEEL		Good	67
ACCESS TUBE (48" dia.)		Dry side - Good, Wet side - Paint damage in areas	69 - 72, 186 - 189
ROOF HANDRAIL		Kickplate required; Moderate surface corrosion throughout	83 - 86, 89
FLOOR MANHOLE		24" dia. submarine hatch	62
INSULATION	* Tank	Good	??
	* Riser(s)	Good	???
RISER AND OVERFLOW PIPING		Good - 12" inlet and outlet, 8" - 16" overflow	17, 39
AIRCRAFT WARNING LIGHTS		Bulbs replaced during inspection	81
CATHODIC PROTECTION	* Type	Impressed Current - Not operational	155, 179, 183
	* Manufacturer	Corrosion Services Ltd.	7
ANTENNAE	* Anchorage / Mounting	Fair	78 - 79, 91
	* Cable Routing	Poor - Antenna cables mounted to ladder siderails in pedestal and access tube. Cable tray system required	70
	* Surveys / Warning Signage as per Safety Code 6: Health Canada	None	--
LIGHTNING PROTECTION		None	82
TANK GROUNDING		2pc conductors down pedestal	31 - 32
CHLORINE ANALYSIS / DEAD ZONE TESTING		Recommended	--
MIXING SYSTEM		None	--
ARE ROOF PLATE RADIAL SEAMS WELDED?		Yes	104- 106

REPAIRS OR MAINTENANCE REQUIRED

Aluminum handrail system recommended on chamber roof

Anti-slip tape required on smooth ladder rungs

S&I roof kickplate (120')

Surface prep and paint roof handrail

Relocate antenna cables to proposed cable tray system

FALL ARREST

Photo No.

SAFETY RAIL

LADDER LOCATION	SYSTEM TYPE	COMMENTS	
* To Valve Chamber Roof	N/A	--	--
* To Top Landing	Alum TS Rail	Remove and replace FRL system	47
* To Tank Floor Hatch	Alum TS Rail	Remove and replace FRL system	61
* To Roof (Access Tube)	Alum TS Rail	Remove and replace FRL system	68
* To Tank Interior	N/A	--	--

REPAIRS / UPGRADES OR MAINTENANCE REQUIRED

Remove and replace fall arrest system

***Please review cover letter for latest information regarding CSA Standard CSA-Z259.2.4-15**

(Fall arresters and Vertical Rigid Rails)

TRANSFER STATION 'D' RINGS

LOCATION	YES / NO	CONDITION	
* To Chamber Roof	N/A	--	
* To Top Landing	Yes	Good	55
* To Tank Floor Hatch	Yes	Good	62
* To Roof (Access Tube)	Yes	Good	72 - 73
* To Tank Interior	Yes	Good	92

REPAIRS OR MAINTENANCE REQUIRED

CONFINED SPACE & RESCUE

RESCUE PORT BASES

LOCATION	YES / NO	CONDITION	
* At roof access hatch	Yes	Cap installed	75
* At tank access hatch	Yes	Cap installed	75
* At Top Landing	No	--	53

REPAIRS OR MAINTENANCE REQUIRED

Rescue port base required beneath top landing grating

Security fence recommended around tank perimeter

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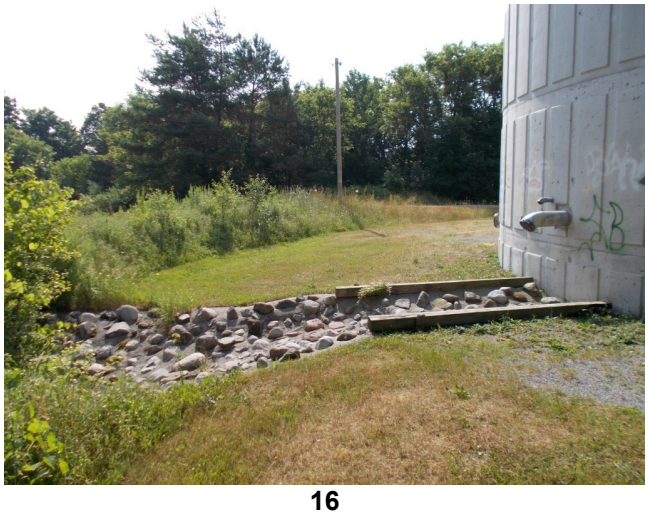

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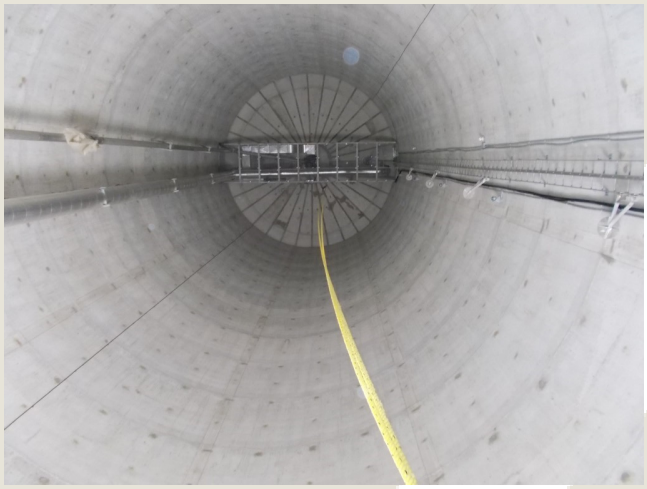

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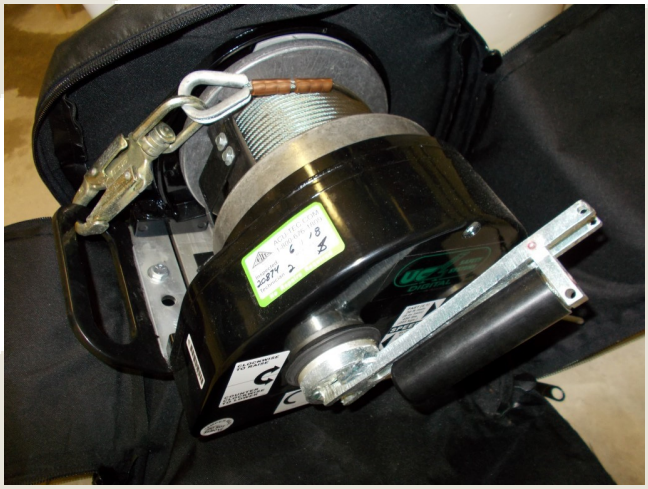

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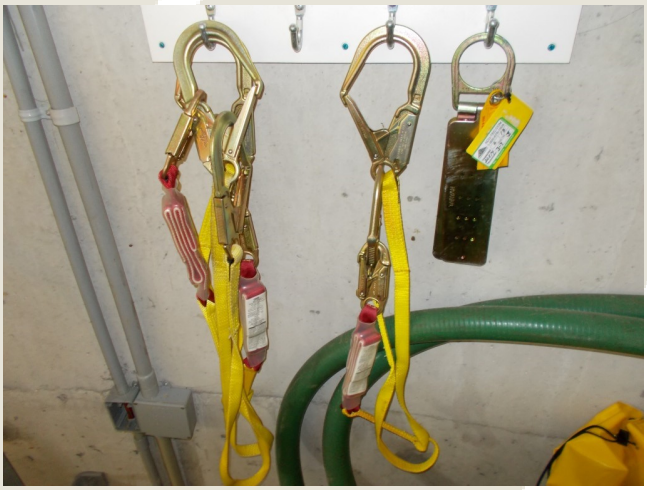

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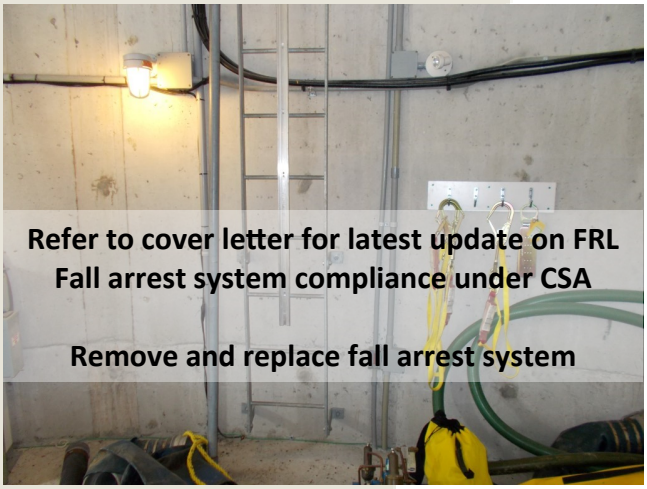

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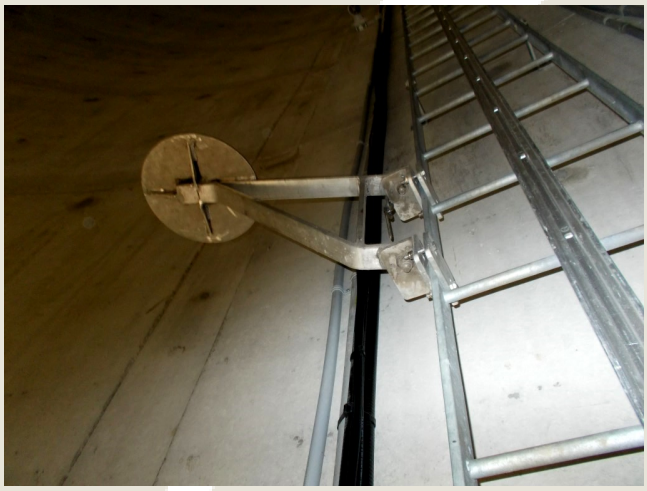

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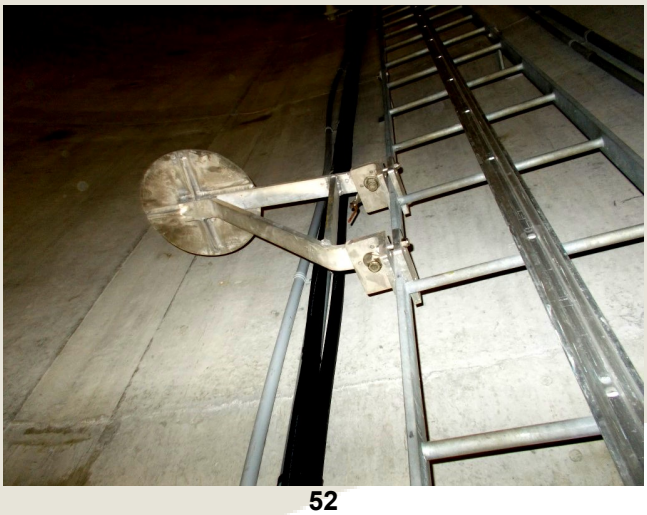

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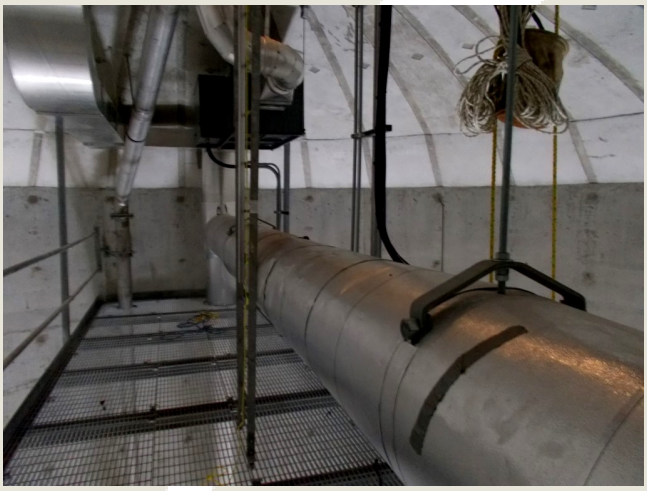

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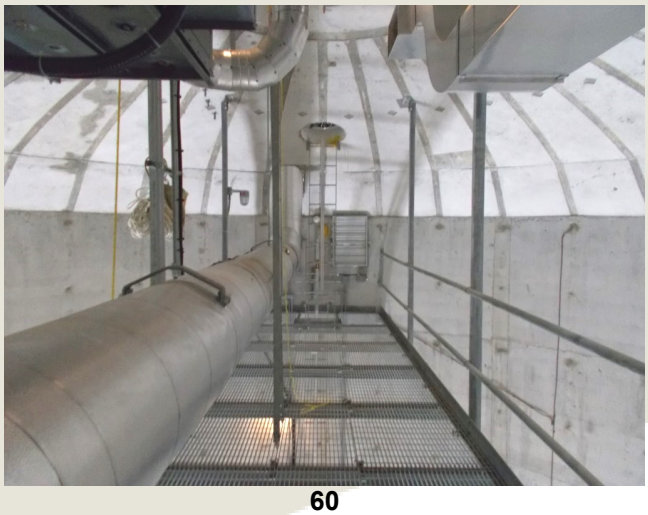

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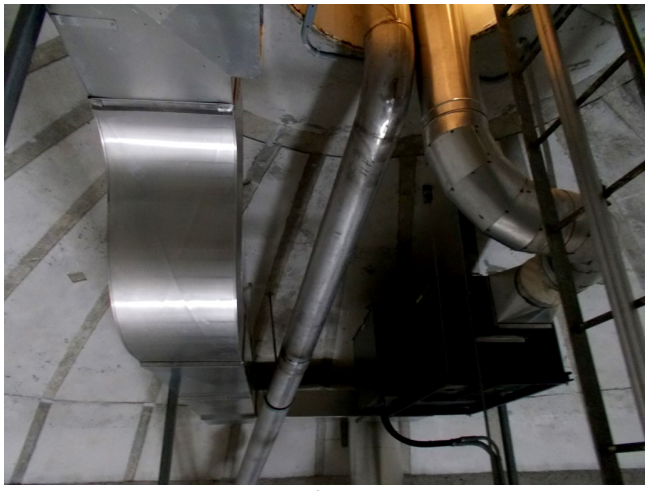

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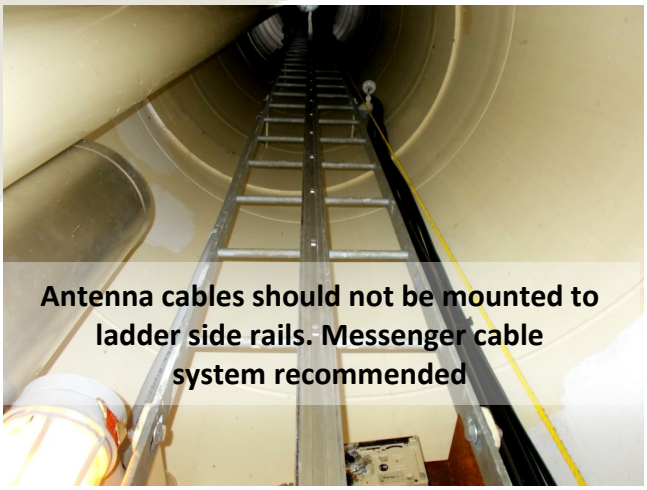

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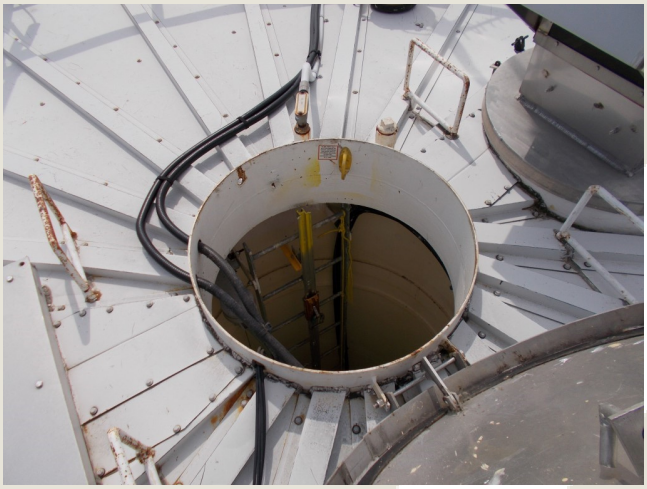

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Watertight cap installed during inspection

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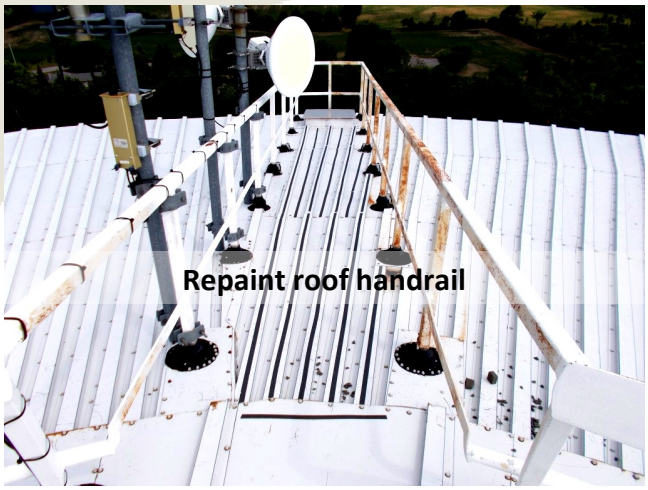

Repaint roof handrail

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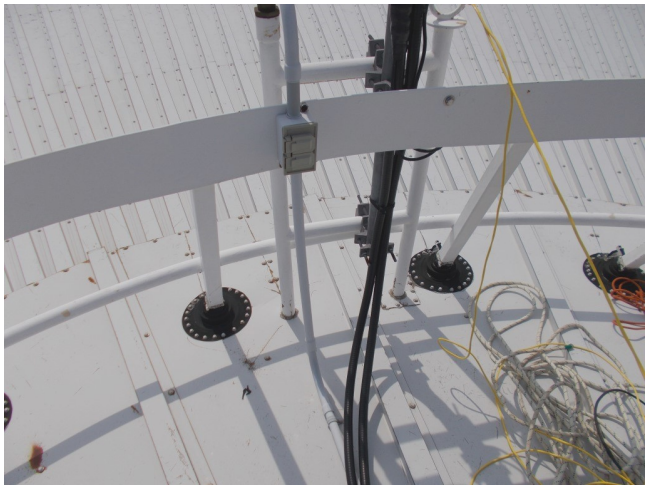

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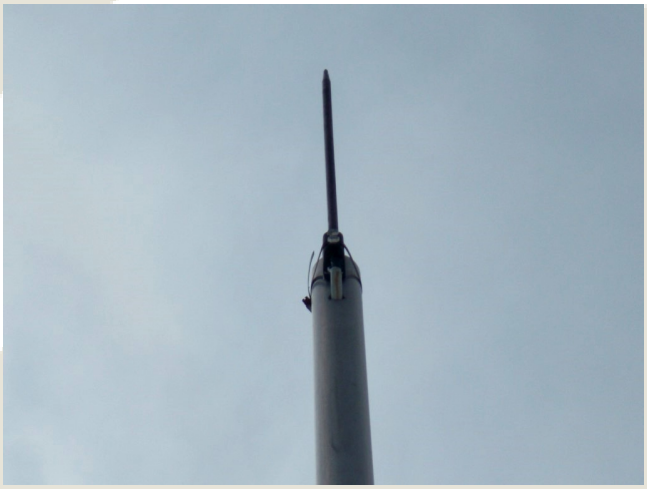

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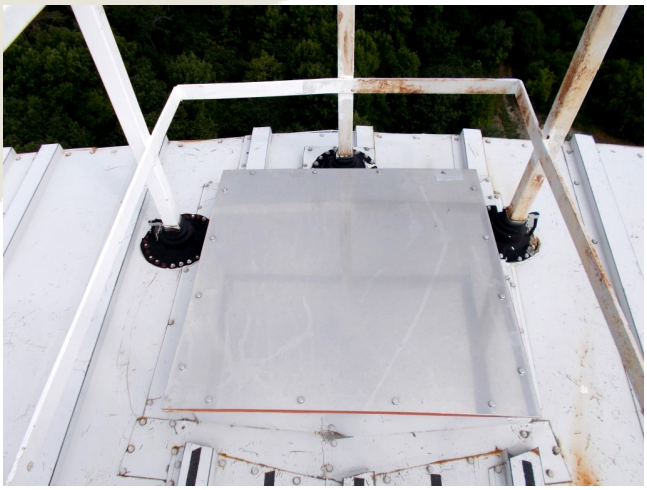

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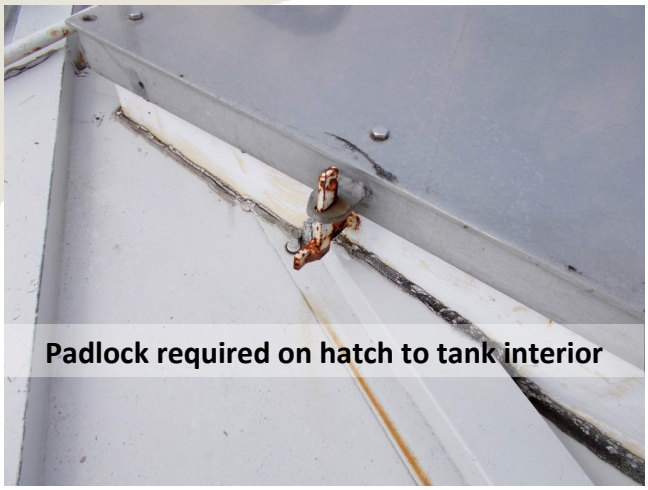

Padlock required on hatch to tank interior

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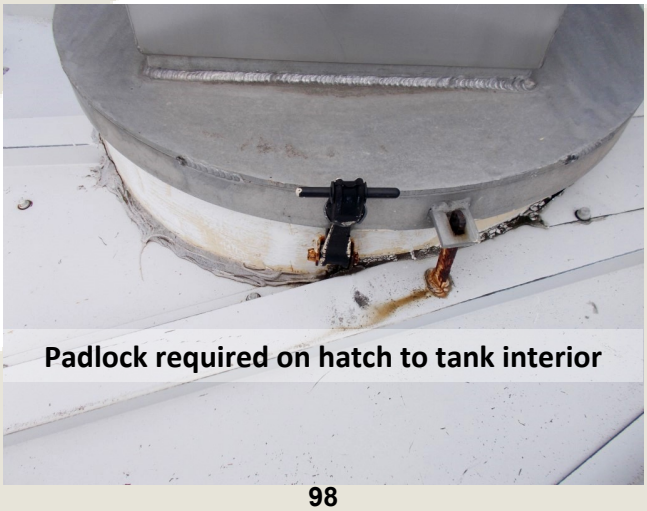

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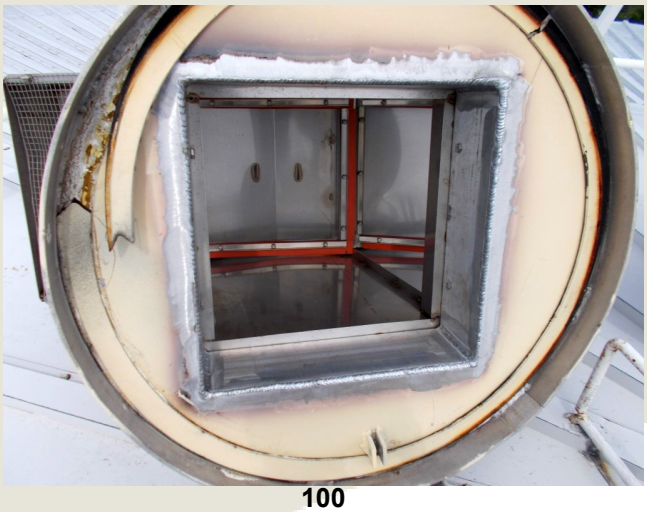

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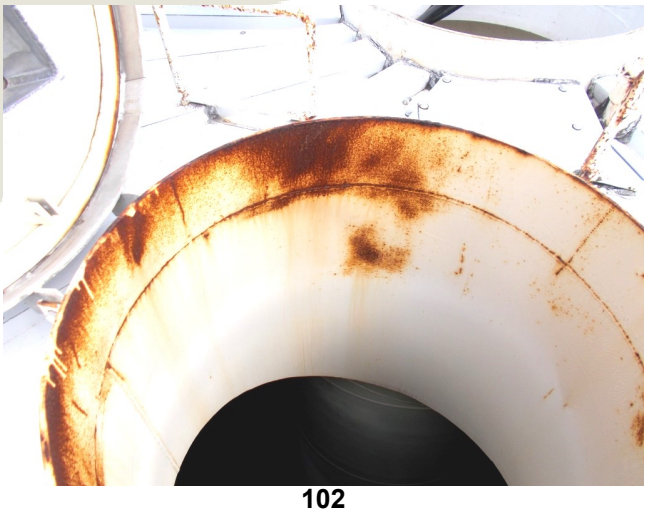

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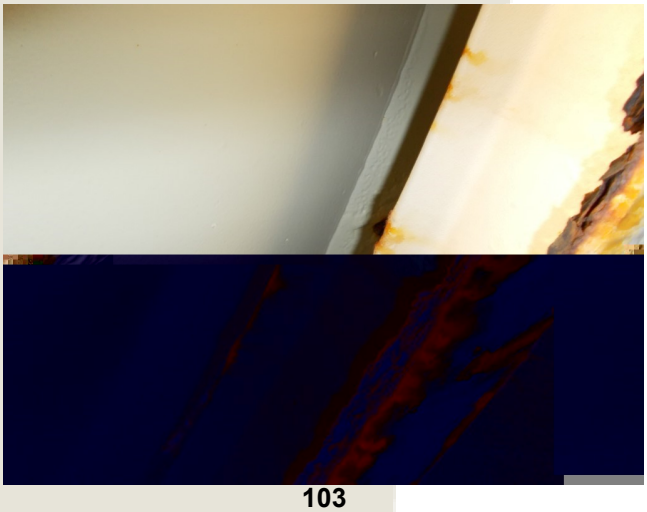

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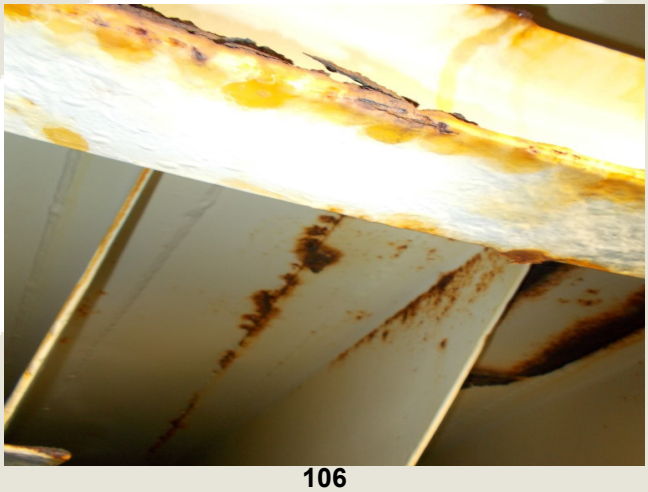

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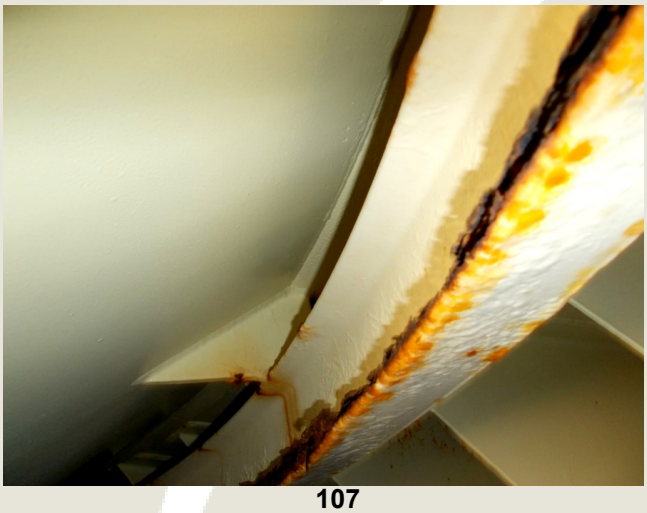

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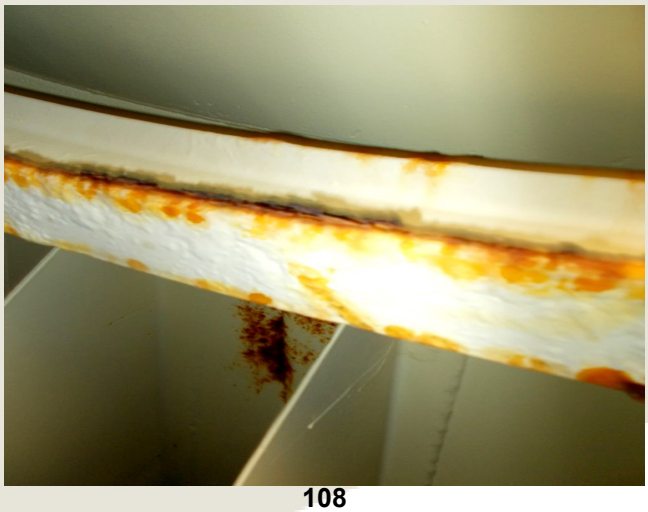

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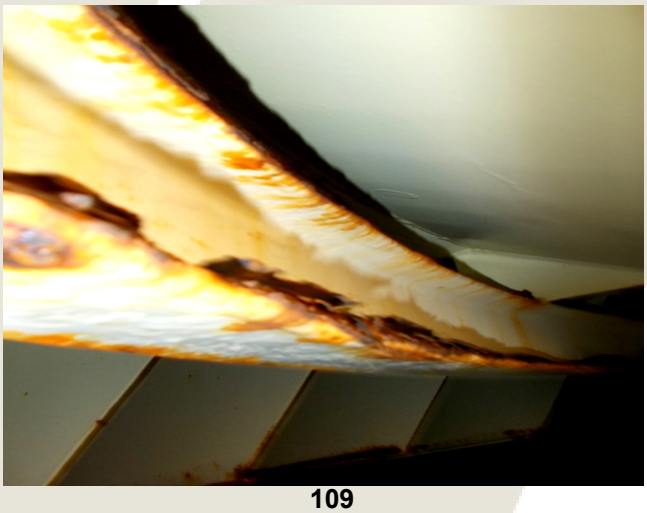

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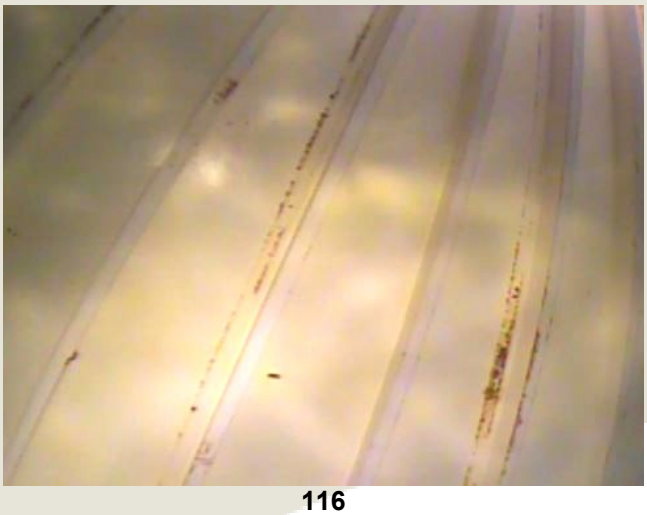

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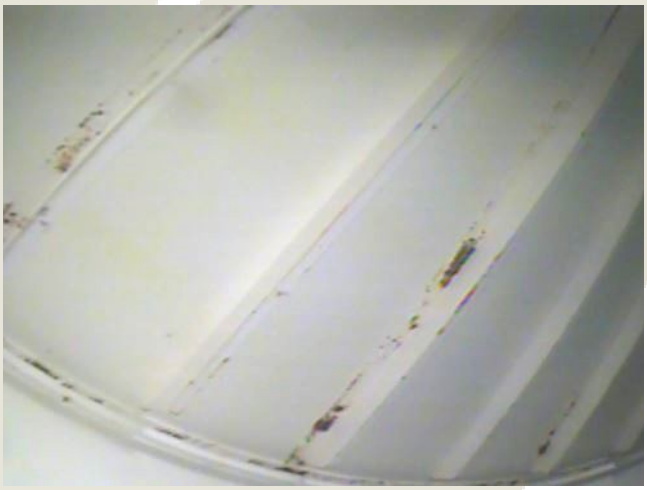

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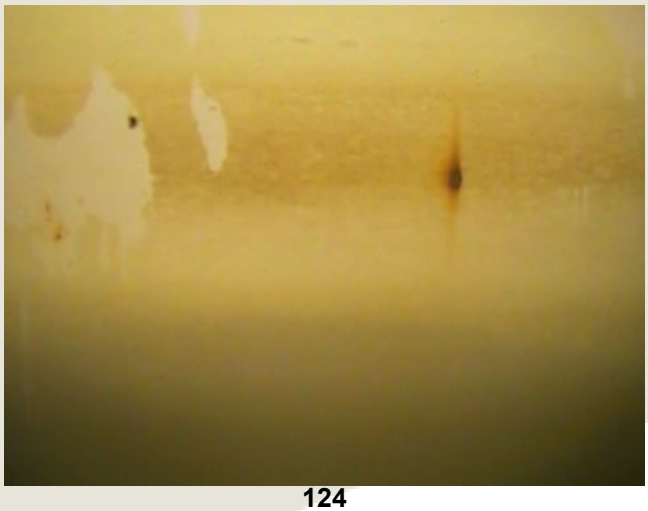

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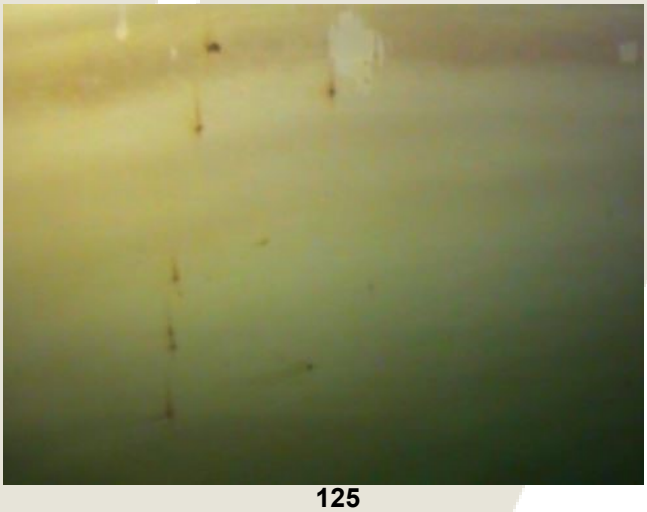

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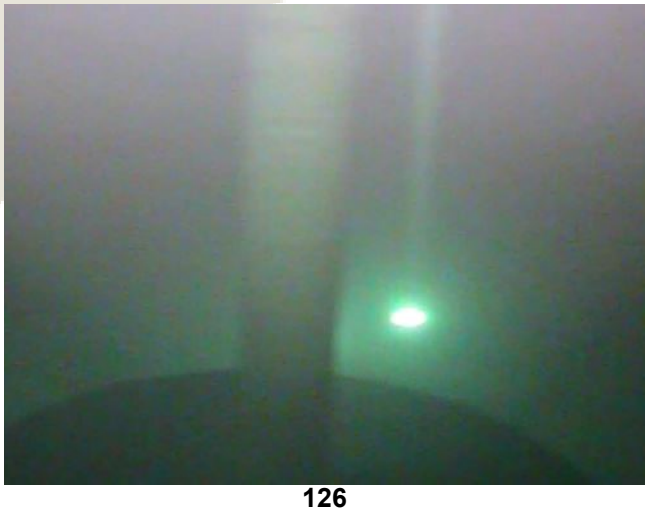

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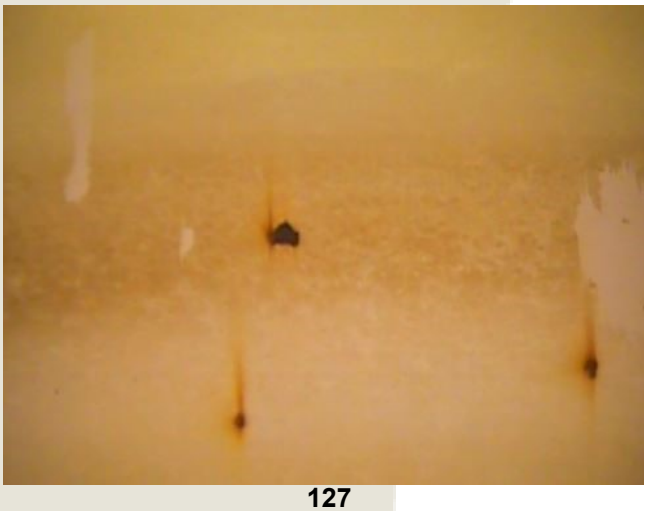

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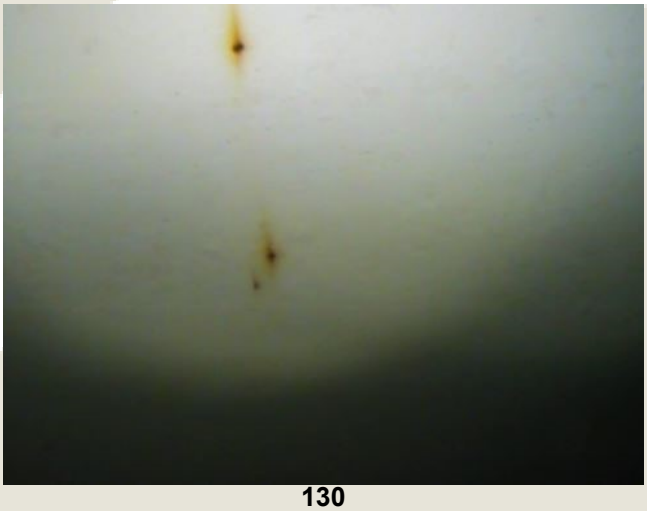

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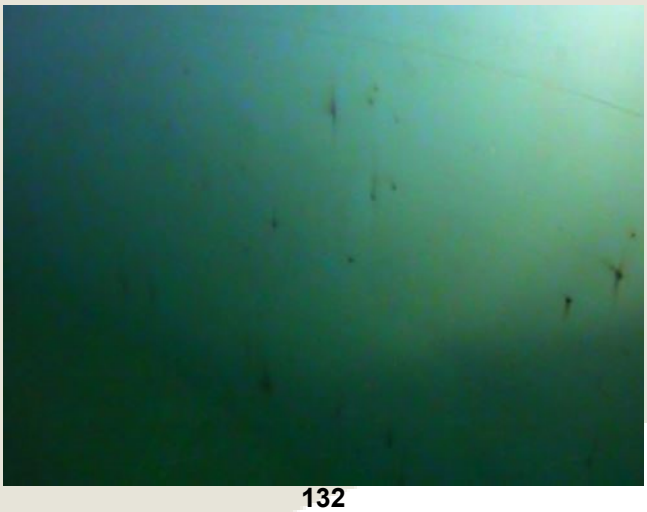

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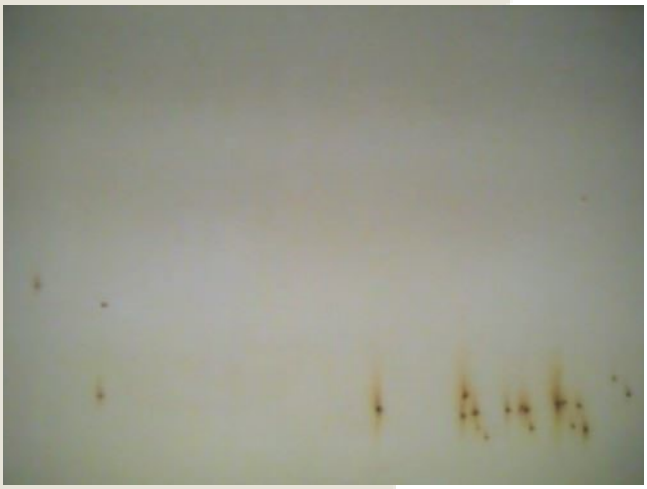

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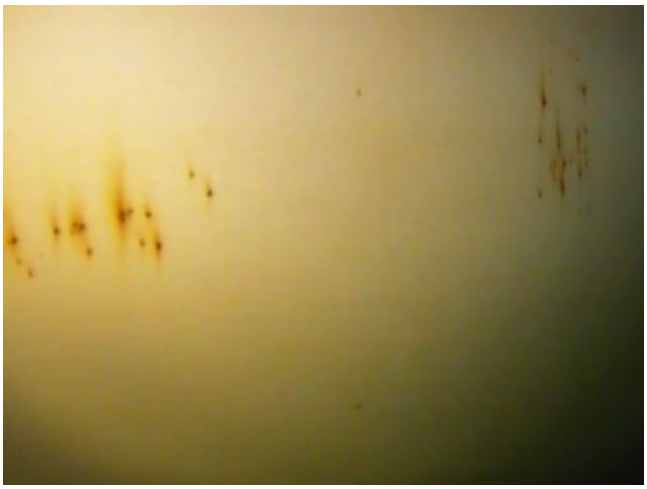

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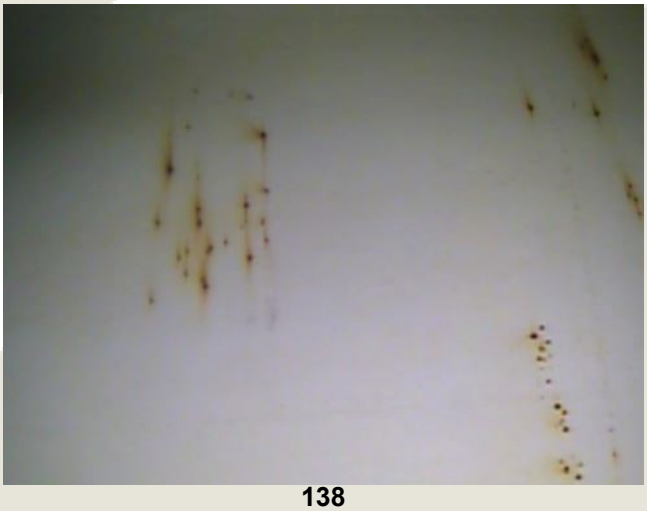

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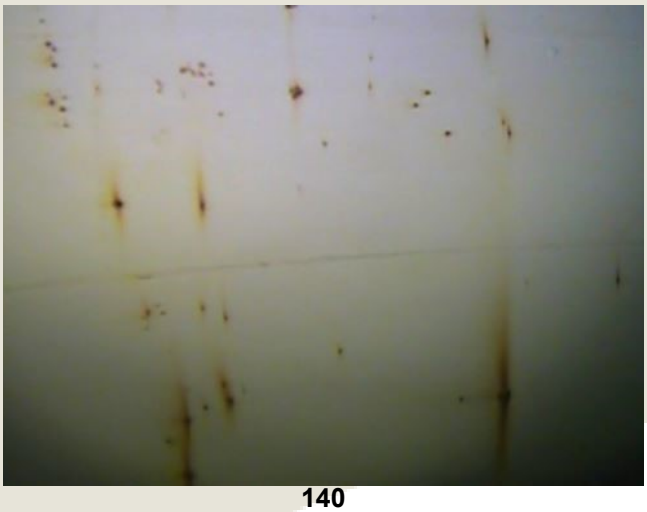

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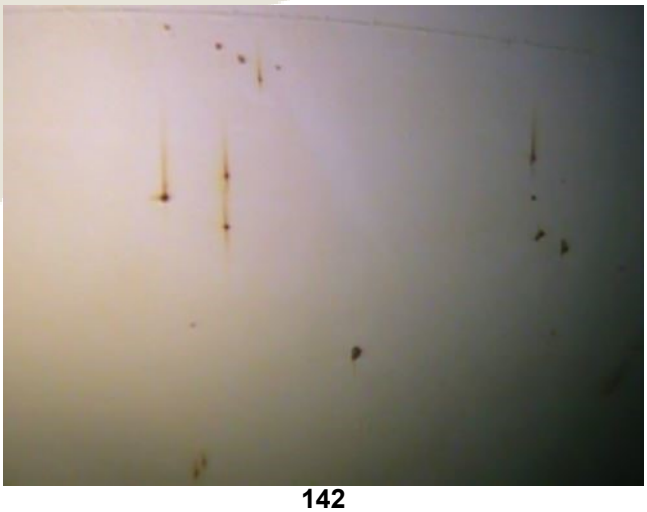

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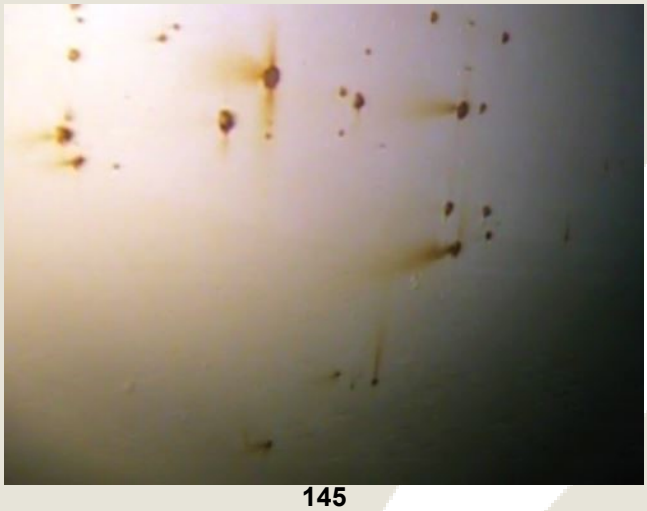
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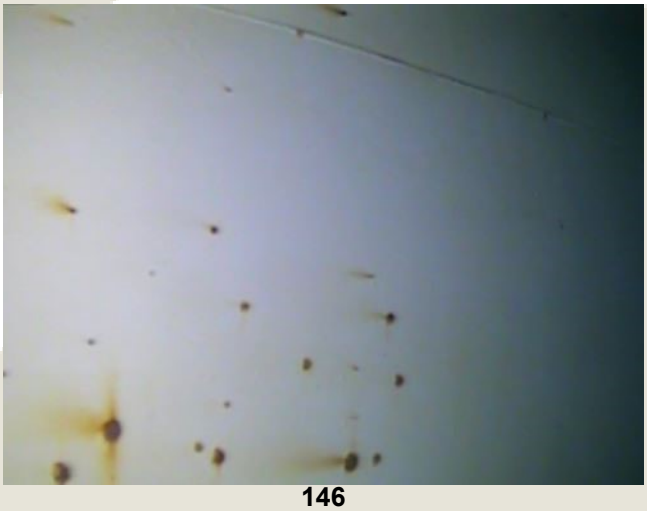
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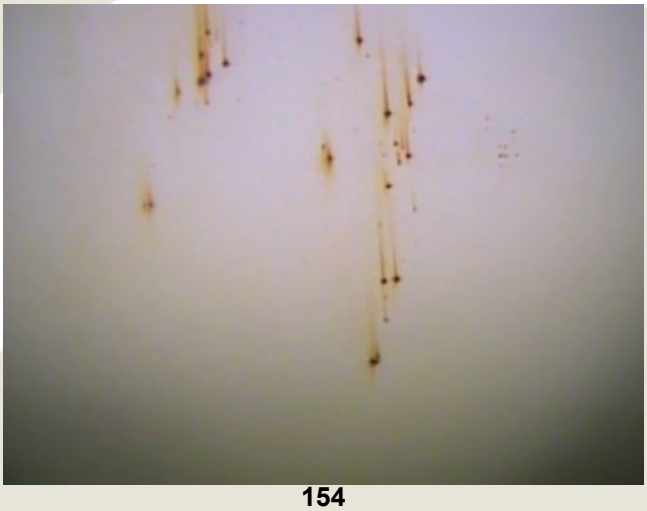

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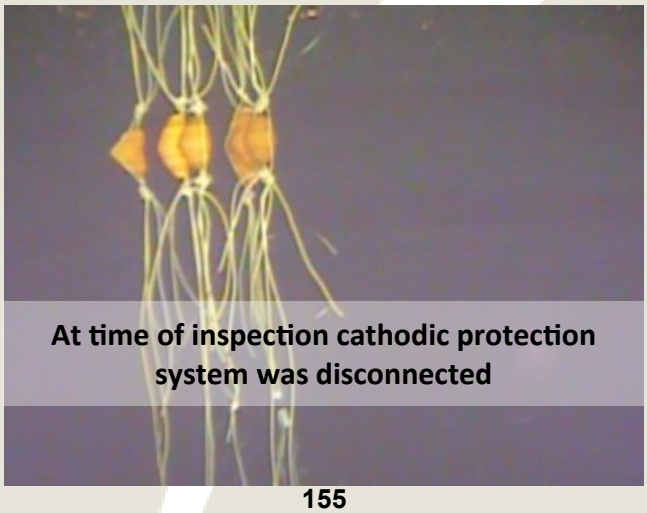

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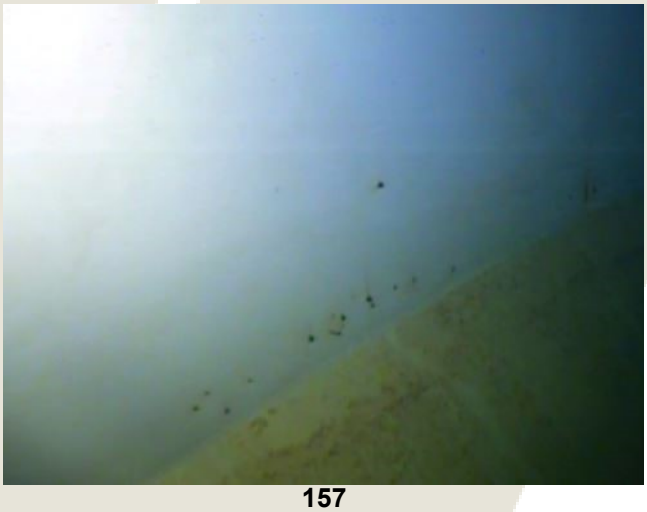

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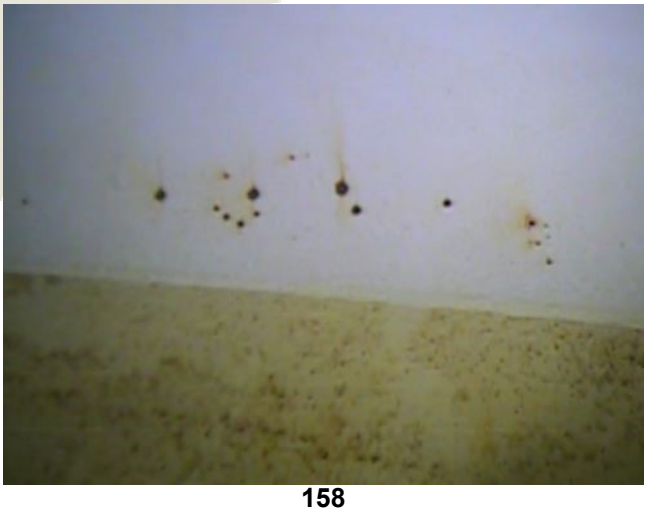

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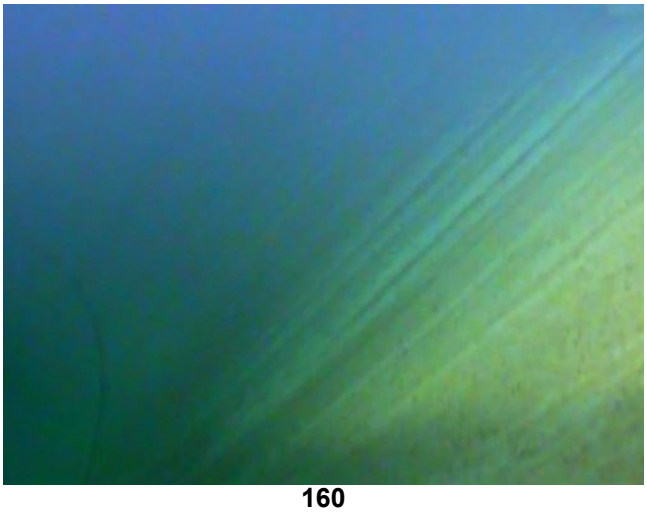

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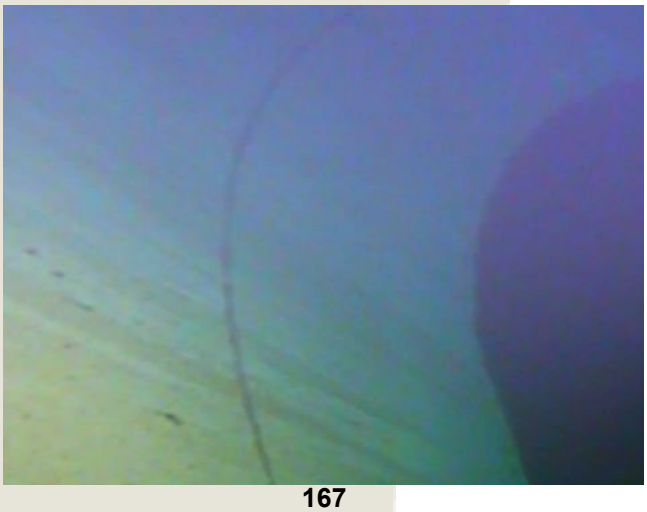

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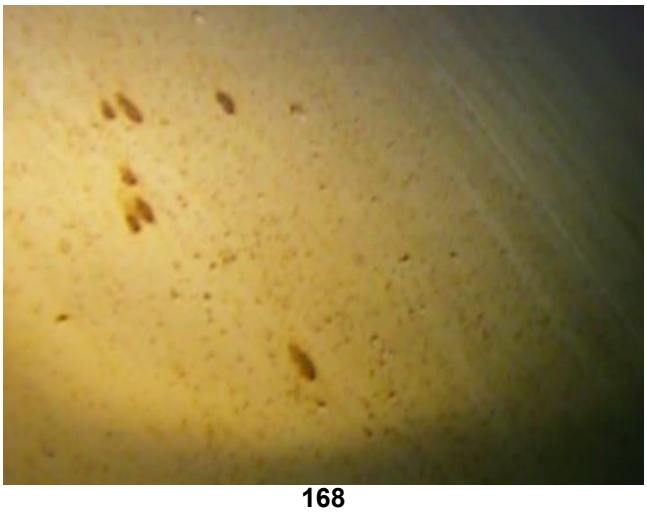

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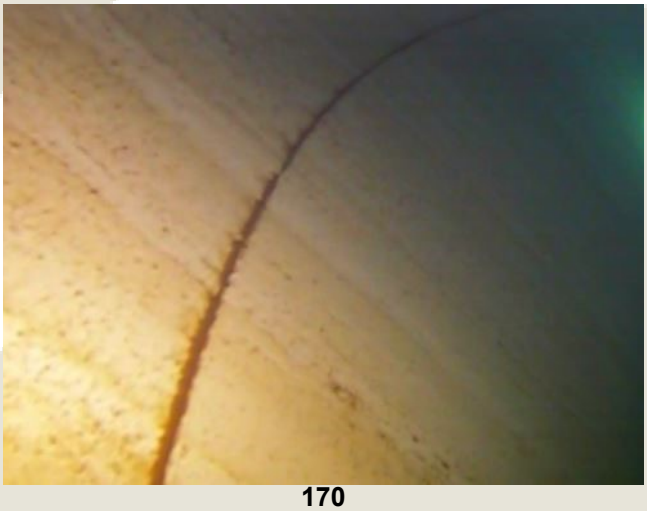

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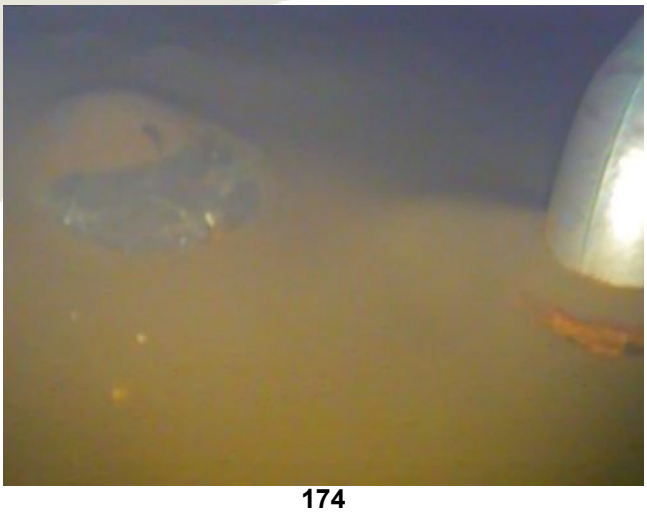

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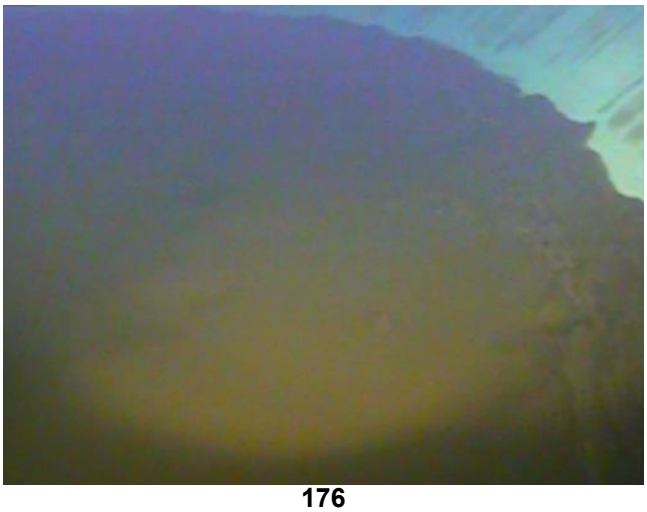

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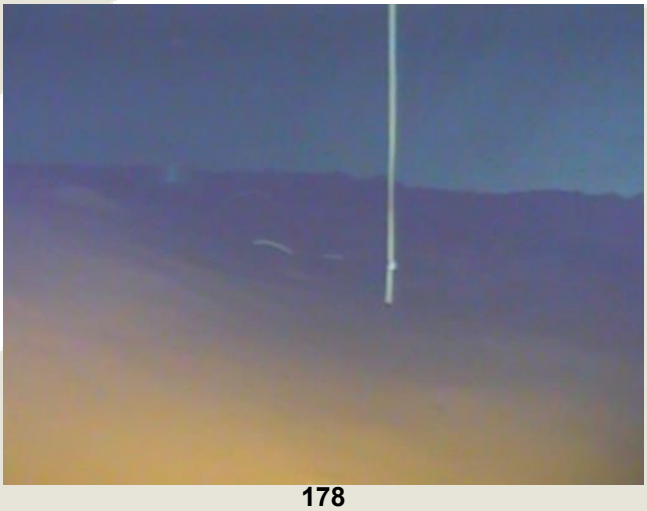

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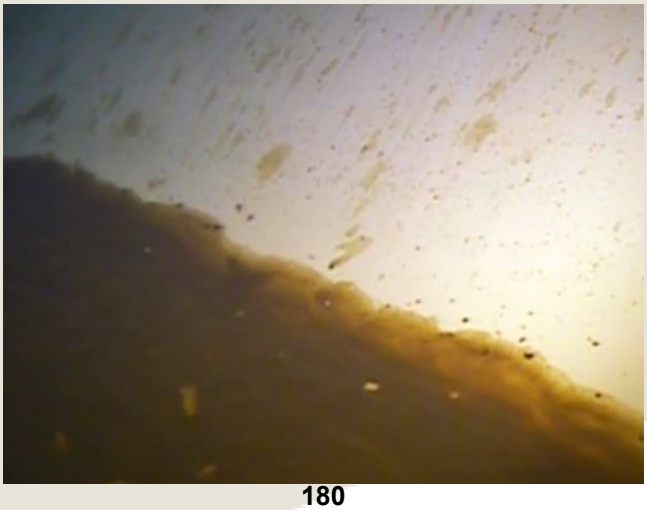

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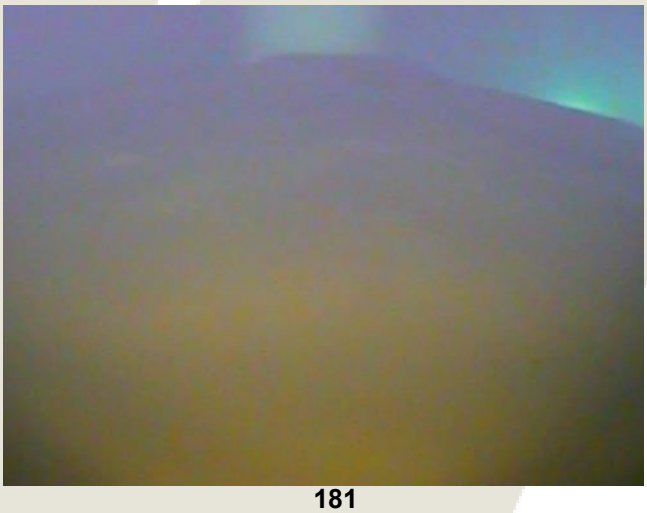

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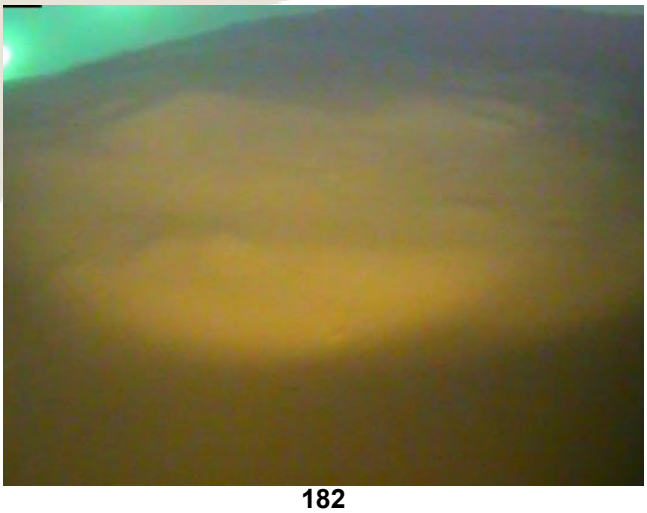

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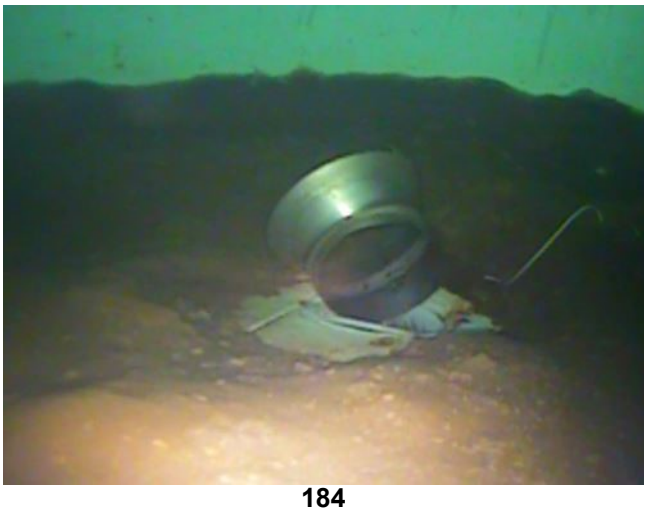

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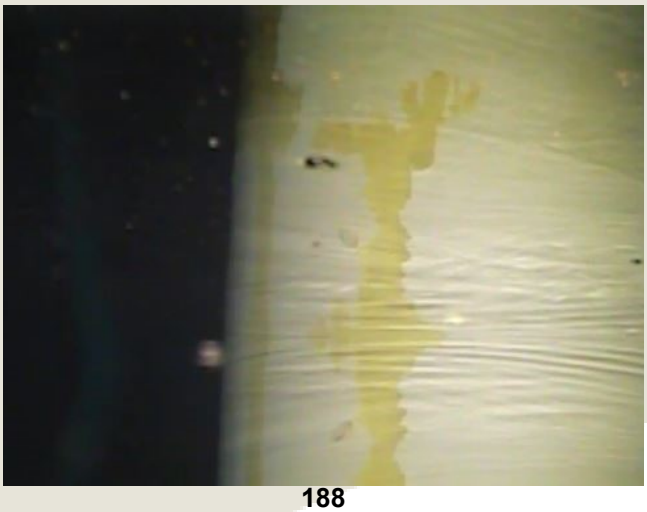

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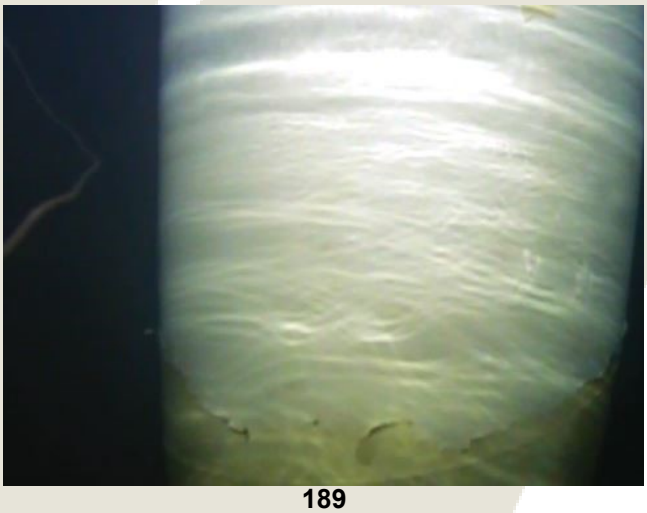

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Landmark Municipal Services

3091 Harrison Court
Burlington, ON CAN L7M 0W4
905.319.7700 Phone
905.319.7706 Fax

www.teamlandmark.com

August 23, 2018

Ontario Clean Water Agency – Kawartha hub
123 East Street South
PO Box 279
Bobcaygeon, ON K0M 1A0

Att: **Mr. Geoff Reddin**
greddin@ocwa.com

Tel: 705.738.9737

Re: **LMS Job #LM18041**
Remote Inspection & Report - Bobcaygeon Composite Elevated Tank;
Protective Coatings & Linings Report

Mr. Reddin,

An ROV underwater camera tank inspection was performed at the above mentioned potable water storage facility on July 16, 2018. The ROV unit and tether cable were disinfected in accordance with AWWA-C652-11 Method #2 guidelines (200ppm solution) prior to entry into the tank interior. Landmark's ROV equipment is designated for potable water use only.

Note: Possible issues and defects can only be visually assessed with the ROV.

This letter is a summary of my findings and recommendations for the above noted water storage tank and the exterior and interior coatings.

Exterior

This exterior of this tank is covered in a fluorocarbon coated steel cladding that is in fair condition. The sheen is fairly good on the sides and cone, but on the roof it is much duller. There are some corroded fasteners on the roof around some of the flashings and openings. The paint on part of the roof handrail and the grab bars has weathered away and the exposed steel is corroded.

Dry Film Thickness (DFT) readings were taken as follows:
Access Tube - Dry: 7 - 12 mils DFT

Interior

The interior of this tank is lined with what appears to be an epoxy, which is in poor condition. There are many corrosion cells on the shell and cone, as well as the osmotic blisters that lead to them. The ceiling is corroded at many of the stiffener edges and on weld seams, and the painter's rails are extremely corroded. The sediment level is very heavy, with buildup of up to 20 inches deep, and appears to consist of very fine sediment and flocking material.

Dry Film Thickness (DFT) readings were taken as follows:
Interior Roof: 7 - 14 mils DFT

Recommendations - Exterior

The exterior cladding of this tank is not in need of any maintenance at this time, but the roof handrail and other appurtenances should be mechanically cleaned and re-painted with an epoxy / urethane system.

We recommend removal of some cladding panels to inspect the protective coating system.

Interior

Within the next 1 to 2 years the interior lining of this tank should be completely removed via abrasive blast cleaning to SSPC-SP10 Near-White Metal Clean, then re-lined with an AWWA D102 ICS-3 or ICS-4 system. Any corrosion pits measuring more than 25% of the total thickness of the steel should be repaired by pool welding or welding in patch plates. If too much time goes by the corrosion cells on the interior walls will become leaks, which can be catastrophic in the winter months.

Yours Sincerely,
Landmark Municipal Services

David Baker,
NACE Certified Coating Inspector –Level 2, CIP #329173

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August 23, 2018

Ontario Clean Water Agency
123 East Street South, PO Box 279
Bobcaygeon, ON K0M 1A0

Att: **Mr. Geoff Reddin**
greddin@ocwa.com

Tel: 705.738.9737

Re: **LMS Job #LM18041**
Remote Inspection & Report - Bobcaygeon Composite Elevated Tank;
Quote #18144

Landmark Municipal Services is pleased to provide budgetary pricing for the following repairs & upgrades at the above mentioned potable water storage facility: **H.S.T. not included*

Security

1) Install 'City of Kawartha Lakes' keyed padlocks on roof hatches to tank interior **$ No Charge**

Support Structure

2) Apply anti-graffiti coating on first 8 feet of pedestal **$ 12.500**

Accessories

3) Install anti-slip tape on smooth ladder rungs **$ 3,000**

4) Kickplate required on roof handrail (120ft) **$ 6,000**

5) Surface prep and paint roof handrail **$ 5,500**

6) Supply and install messenger cable system and relocate cables from ladder siderails **$ 3,800**

Fall Arrest System

7) Fall Arrest System Replacement recommendations: **$ 9,000**

- Remove and replace Aluminum TS Rail on ladder to top landing
- Remove and replace Aluminum TS Rail on ladder to tank floor manhole
- Remove and replace Aluminum TS Rail on ladder to tank roof (access tube dry side)

Fall arrest trolleys are available for $675 ea

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Confined Space & Rescue

8)	Supply and install rescue port base beneath top landing grating	**$ 3,500**

Coatings and Linings – (refer to Protective Coating and Lining Report)

9)	Tank Interior: Full removal and replacement	**$ 195,000 - $300,000**
10)	Remove sections of exterior cladding and inspection coating system	**$ 17,500**
11)	Remove and replace paint rail system	**$ 40,000**

Ontario
MINISTRY OF LABOUR

Print This Page

Fixed Rail Ladder (FRL) Fall Protection System

Issued: May 20, 2014

Content last reviewed: May 2014

Disclaimer: This resource has been prepared to help the workplace parties understand some of their obligations under the Occupational Health and Safety Act (OHSA) and regulations. It is not legal advice. It is not intended to replace the OHSA or the regulations. FOR FURTHER INFORMATION PLEASE SEE FULL DISCLAIMER

Hazard summary

A worker descending a vertical ladder on a water tower in 2014 was critically injured after falling five metres while properly using a Class Frontal-Fixed Rail Ladder (Class FRL) Fall Protection System. A Class FRL Fall Protection System is a type of vertical fall protection using a permanently installed metal rail anchoring system with an automatic fall arresting device called the "trolley" or "carriage".

The investigation revealed a weakness in the design of some Class FRL Fall Protection Systems, which may not adequately protect workers who fall backward or who squat and roll backwards into a fall while connected by a body harness to the trolley which slides along the vertical rail. If a worker leans back, the trolley's internal braking system can be pulled off the rail, allowing the trolley to slide down the rail. If a worker falls backwards or squats and rolls backward into a fall (as opposed to falling straight down or inwards towards the ladder) the trolley may not lock, allowing a worker to fall freely. In the 2014 incident, the worker fell from a water tower ladder as shown in Figure 1.

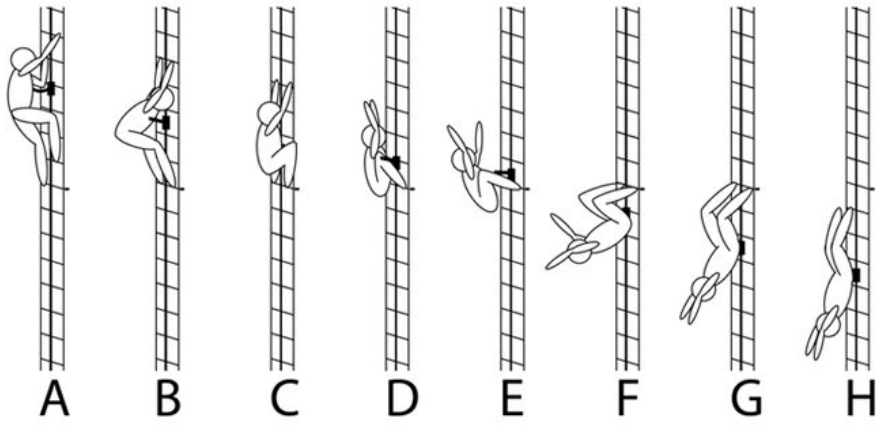

Figure 1: How the water tower worker fell

A. The worker is descending properly using the fall protection system.
B. The worker bends at the waist.
C. The worker's legs fold into a squat position while the worker's hands catch the next rung. The squat position allows the trolley to travel below the height of the worker's knees.
D. As the worker begins to roll backward their hands release from rung, and the tension in the trolley connection increases enough to remove all the slack out of the full body harness and slide the chest D-ring towards the waist.
E. This tension in the connection to the trolley forces the worker into a tight squatting position while rotating around the rung that the worker's feet are on.
F. The trolley connection remains in tension as the trolley travels below the rung that the worker's feet are on.
G. The connection to the trolley, now in tension between the worker's legs prevents the engagement of the braking mechanism that would stop the workers motion.
H. The worker, with back to the ladder, continues to fall head first while still attached to the fall protection system.

In 2010, the Ministry of Labour published a similar Alert, Class Frontal Fixed Rail Ladder (FRL) Fall Protection System, Alert #26/0510, after a worker was injured after falling back, then down 20 metres from a ladder attached to a tower while using a Class FRL Fall Protection System. In 2010, the investigation determined that the Class FRL Fall Protection System might not adequately protect workers who fall backward in a standing position.

Locations and sectors

Class FRL Fall Protection Systems are used on vertical access ladders which normally do not have a cage, such as the ladders on communication towers, chimneys and water tanks (towers).

Precautions

Even though a Class FRL Fall Protection System may be currently certified to CSA standards and/or have a CSA standards stamp on the side of the trolley unit, this should not be interpreted to guarantee worker safety and employers should not rely on such a stamp. Further investigations into the system are needed to ensure the system protects against a squatting position/rollback fall or a fall backwards.

Class FRL Fall Protection Systems whose design characteristics require the connection between the worker and the trolley to be in tension and where the trolley remains disengaged regardless of the tension force applied should not be used. Employers must take reasonable precautions to protect workers in these circumstances. This may include using alternative fall protection or access systems, as appropriate, for the adequate protection of the health and safety of workers using vertical access ladders.

Employers who own or rent structures which have a Class FRL Fall Protection System installed must ensure that the Class FRL Fall Protection System is capable of protecting a worker in the case of a squatting position/rollback fall or a fall backwards. The Ministry recommends that employers contact the manufacturer to ensure that the particular Class FRL Fall Protection System is capable of protecting a worker from any type of fall (including a backward fall and falling from a squatting position) before it is used.

Note: This Alert replaces the Class FRL Fall Protection System, Alert #26/0510 published in 2010 by the Ministry of Labour.

Resources

For more information contact:

Infrastructure Health and Safety Association
www.ihsa.ca

Or contact the Ministry of Labour Health & Safety Contact Centre toll-free at 1-877-202-0008.

For further reference see also:

Ministry of Labour
Ontario.ca/labour

ServiceOntario e-laws
www.e-laws.gov.on.ca

Remember that while complying with occupational health and safety laws, you are also required to comply with applicable environmental laws.

Please photocopy Ministry of Labour Alerts, distribute them widely and post them where people will see them.

ISSN: 1195-5228

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Municipal Services

Storage Tank Maintenance
Extend Service Life
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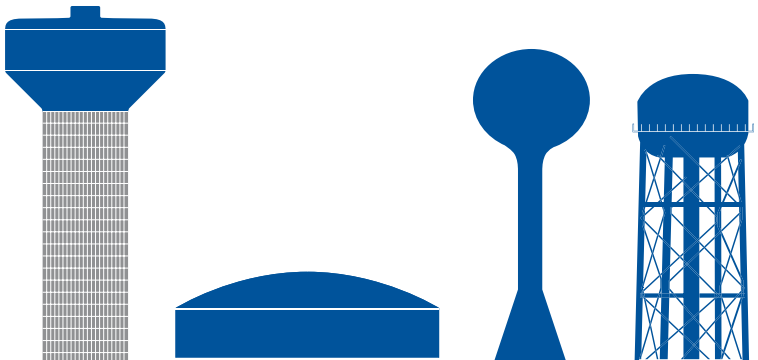
Expert Inspection, Maintenance And Repairs
For All Types Of Water Storage Tanks



Expert inspection, maintenance, and repairs for all types of water storage tanks

- Safe, efficient, issue-free operation of your water storage infrastructure
- Full compliance with all applicable regulations across Canada

Landmark Municipal Services (LMS) brings more than 30 years of insight and innovation in water storage to owners and operators of tanks and systems of all types. Our complete range of services and packages provide predictability, continuity and flexibility for this essential function of municipal governments.

Inspections

Regular, scheduled inspections are critical for long-term efficiency. LMS conducts various types of inspections, all with comprehensive reports detailing repairs performed or recommended and upgrade requirements, with photo documentation and related cost estimates.

CIR: **Clean, Inspect & Report:** AWWA (American Water Works Association) recommends that water storage tanks be washed out and inspected on a minimum three-year cycle.

SIR: **Safety Inspection & Report:** A thorough interior and exterior review of structure and operations for compliance with applicable government regulations.

ROV: **Remotely Operated Vehicle:** ROV inspections eliminate the inconvenience and expense of taking your tank out of service. LMS provides real-time, in-water evaluations with a remotely operated vehicle.

LMS inspections provide a complete review of all critical factors:

- Site works
- Foundations
- Support structure
- Ladders/landings
- Accessories
- Valves and piping
- Metal conditions
- Exterior coatings
- Interior linings
- Antenna and communications equipment
- Safety and rescue equipment

Safety Upgrades and Training

LMS can provide safe access and rescue systems that meet or exceed the requirements of the Occupational Health & Safety Act for "vessel entry and rescue" as well as "fall arrest."

Tank Modifications

Skilled LMS professionals provide practical, proven and fully engineered modifications for all types of storage tanks, leveraging experience as one of the leading tank builders in North America. Our vertical integration adds design, fabrication and coatings expertise when needed, with single source management and responsibility.

Coatings and Linings

LMS services include all surface preparation and recoating of all interior and exterior areas. Options range from spot preparation to total blast cleaning with full containment for environmental protection. All lining materials applied to interior surfaces are ANSI and NSF 61 approved.

Safety is the Key

Inspections:

- Clean, Inspect & Report (CIR)
- Safety Inspection & Report (SIR)
- Remotely Operated Vehicle (ROV)

Safety:

- Confined space
- Fall arrest
- Training

Maintenance:

- Tank Asset Management Program (TAMP)
- Annual programs
- Coatings/linings

Lightning Protection:

- Design
- Installation
- Inspection

Antenna and Communications Systems

- Design
- Structural fabrication & installation
- Inspection

Demolition

- Partial
- Total

Modifications

- Engineering
- Tank hydrodynamic mixing systems
- Site works
- Balconies/handrails
- Manholes
- Hatches
- Venting and vacuum relief
- Welding and fabrication
- Electrical/instrumentation
- Heat trace
- Insulation and cladding
- Security systems

Landmark delivers consistent, high quality results.

Contact us today to discuss the best solution for your next project.

LANDMARK
Elevating Expectations

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Landmark Coatings

Specialty Mobile Operations

Uncompromising commitment to safety. World class technical skill. Go-anywhere mobility. Landmark delivers factory applied quality to your site.

Developed and refined throughout 25 years of storage tank coatings and lining work, Landmark's specialty crews work wherever you need them…on projects that we design, fabricate and build, or on existing infrastructure requiring repair and recoating. The Society for Protective Coatings (SSPC) has recognized our technical skills and processes with their prestigious QP-1 certification, so you can rely on thoroughly tested multi-craft services on the most demanding jobs, with the added benefits of uncompromising safety and nationwide mobility.

We work in a wide range of applications for the private sector, the military and municipal authorities:

- Industrial facilities
- Terminals
- Petrochemical plants
- Water and wastewater
- Oil and gas exploration and production
- Aircraft fueling facilities
- Lead abatement

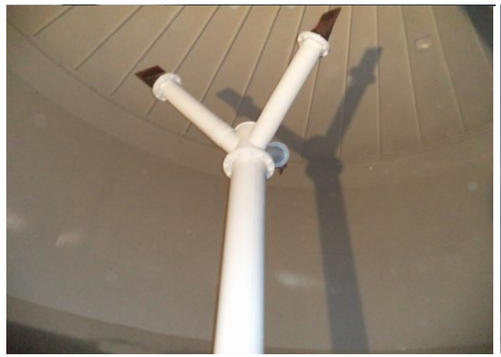
Safety

Safety is the Key

Landmark's uncompromising commitment to safety protects people, property and the environment. We apply equally rigorous standards for all locations, require ongoing training and testing for all crews, and utilize site evaluations, Hazard Identification and Risk Assessments (HIRA) and root cause analysis to continually drive performance improvement. Landmark employs the best available safeguards for the job, such as advanced, self-contained respiratory equipment on many applications. And we stay at the forefront of best practices and efficient reporting with our membership in ISNetworld. Core values and comprehensive safety and health programs, along with SSPC C-3 accredidation for de-leading steel structures, safeguards against environmental impact.

Skill

Landmark's technical capabilities start with specification assistance, based on in-depth knowledge of industry suppliers and their latest products, and insights from our own operations. Our crews are fully equipped to perform surface preparation and coatings work on virtually any type of steel structure, utilizing a broad array of coatings including polyurethanes, 100% solids and fiberglass reinforced systems. Our crews perform all coatings work in accordance with the Landmark Quality Assurance Manual for Surface Preparation and Coating. They are trained to implement all of the required process controls and conduct workmanship inspections to meet or exceed all applicable standards and client expectations.



Routine quality evaluations include but are not limited to:

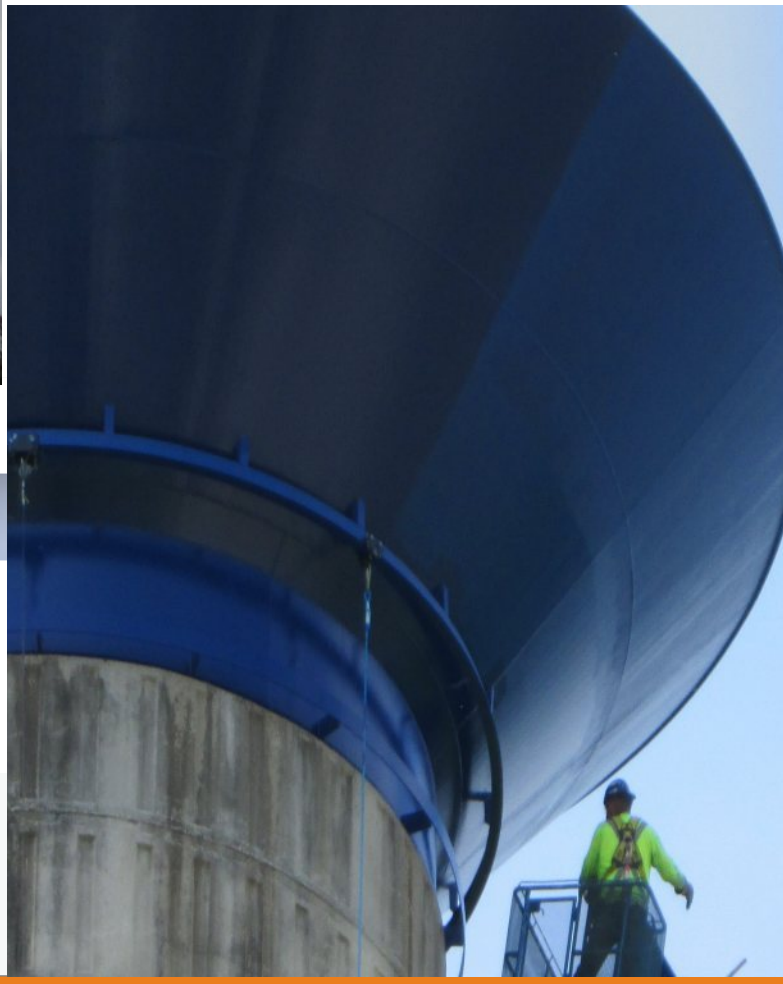
- Measurement of environmental conditions
- Verification of surface cleanliness prior to coating or lining
- Wet and dry film thickness measurement
- Holiday testing (low or high voltage, depending on lining thickness)

Daily logs track all inspection activity, and are available upon request.

Specialized equipment enables Landmark to manage dehumidification on work in enclosed spaces such as tank lining and recoating, and to protect the environment with blast media recycling and a full or partial containment on exterior surface preparation and coating. In addition, site specific plans for environmental monitoring, hazardous material management, and disposal of wastes are developed for all tank rehabilitations where existng coatings contain toxic metals. And for high-profile projects with community impact, Landmark has perfected the art of translating even the most intricate graphics to the public stage with precise reproduction. The utilization of dust collection systems ensures complete extraction of dusts for not only a cleaner surface prior to paint application, but as well as containment of dusts generated. This provides necessary air exchanges for confined space work.

Mobility

Landmark capabilities are completely mobile for deployment nationwide or beyond, without limitations. Specially outfitted trailers move containerized equipment to the project site, and then serve as mobile command centers for the crews. All required assets are at hand, coordinated with local supply lines as appropriate.



You can count on Landmark Mobile Specialty Coatings to reliably protect your investment and extend the life of critical infrastructure. Contact us today to discuss the best solution and a quote on your next project.

LANDMARK
Elevating Expectations

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