TANK EXTERIOR MAINTENANCE
General Guidelines

4146

a five page issue

September 2005

Introduction

This section describes methods and systems to carry out maintenance for the exterior protection of the storage tank asset. The available systems (sheets 4147-4149) vary from high solids to solvent free primer/buildcoat application providing a choice of finishes offering long term durability.

In the Oil & Gas sector the corrosion protection coats and the aesthetic/protective topcoats do not fail simultaneously, after a significant number of years of service. Typical behavior will find that the topcoat may be replaced one to three times before the corrosion protection requires replacement. Even so, it is likely that some corrosion protection will fail prematurely in small areas and require treatment.

Because the cost of surface preparation for painting can easily exceed the cost of coating materials and coating application, any corrective action that does not require significant preparation to bare metal may be cost effective. To achieve the most timely and cost-effective actions, maintenance painting must be planned and accomplished systematically, using the latest available technologies. There are many examples of dramatic coating failures resulting from good intentions that were improperly planned or executed. The most notable failures are those caused by coating incompatibility.

Condition assessment

Specific information required for developing a painting program for existing structures is generally acquired by a survey that is sufficiently detailed to provide for the appropriate decisions. Surveys range from simple walk-through inspections, intended to establish general painting needs, to detailed itemizations of painted components with an assessment of the type and condition of coatings present on each. The varying levels of surveys, when used in an iterative process of identifying defects and prescribing priorities, provide an efficient and effective methodology for developing a maintenance coating plan.

An overview survey consists of a visual assessment of the overall conditions of substrates and coatings on plant structures. It is a relatively fast and inexpensive method to prepare general information on the overall conditions and establish times when maintenance actions can be anticipated. A simple numerical rating system (e.g., priority ratings of 1 through 5 as shown in Table 1) can establish work priorities if limited funds do not permit all of the desired work to be done.

This method may also provide data for establishing a logical approach to subdividing the facilities into smaller units for a systematic collection of data in more detail.

Table 1 Priority Rating System for Maintenance Painting.

Rating	Rust grade	Condition evaluation
1	< 0.5 %	Slight or no damage to coating or substrate, requiring no maintenance in near future
2	< 1 %	Slight localized damage to coating or substrate, requiring localized maintenance within one year
3	< 3 %	Moderate localized damage to coating or substrate, requiring localized maintenance within one year
4	< 5 %	Thin coating from erosion or application, requiring additional thickness for corrosion protection, often with slight or moderate localized coating or substrate damage, requiring overcoating within one year. This may also identify aesthetic requirements
5	>10 %	Extensive coating or substrate damage, requiring total coating replacement, often with substrate repair.

The following actions regarding the identified rust grade should be taken:

- Rating 1: small spot repair
- Rating 2: spot repair
- Rating 3: spot repair and full coat
- Rating 4: spot repair and full coat
- Rating 5: full coat

In a physical inspection survey, the individual components are further subdivided, and actual physical tests are conducted on the coatings, notably dry film thickness and adhesion. These values are critical in establishing whether the existing coating has adequate properties for localized repair rather than total replacement.

Deterioration including film erosion, blistering, rusting, chalking, checking, cracking, peeling, flaking, and dirt and mildew accumulation should be identified and quantified using ISO 4628 rating standards. In some cases, it may be necessary to inspect the surface for contaminants including grease, oil, and soluble salts. The inspection should determine the types, quantities, and locations of contaminants.

If appearance is important, the extent of color fading, discoloration, loss of gloss, etc., should be measured using standard ISO or ASTM procedures. Should the generic type of the existing coating be unknown, it may be necessary to submit a sample for analysis to find a compatible repair material.

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There are two approaches to maintaining a structure in satisfactory condition:

1-Spot repair (rating 1 to 3)
After high pressure water cleaning to remove loose paint and contamination
Damaged and corroded areas; consisting of steel to min ISO Sa2 or SPSS-Pt2 and primed

2-Refurbishment (rating 4 to 5)
After high pressure water cleaning, complete removal of old paint system (if applicable), derusting of steel to min. ISO Sa2 on SPSS-Pt2.

To carry out proper maintenance, all parts of a facility shall be made accessible for maintenance painting operations. This shall include the removal of U-bolts and the lifting of piping from their supports. Coated surfaces when in contact shall be protected with Teflon straps or as otherwise agreed with the owner. Such protection shall be applied when coatings are fully cured.

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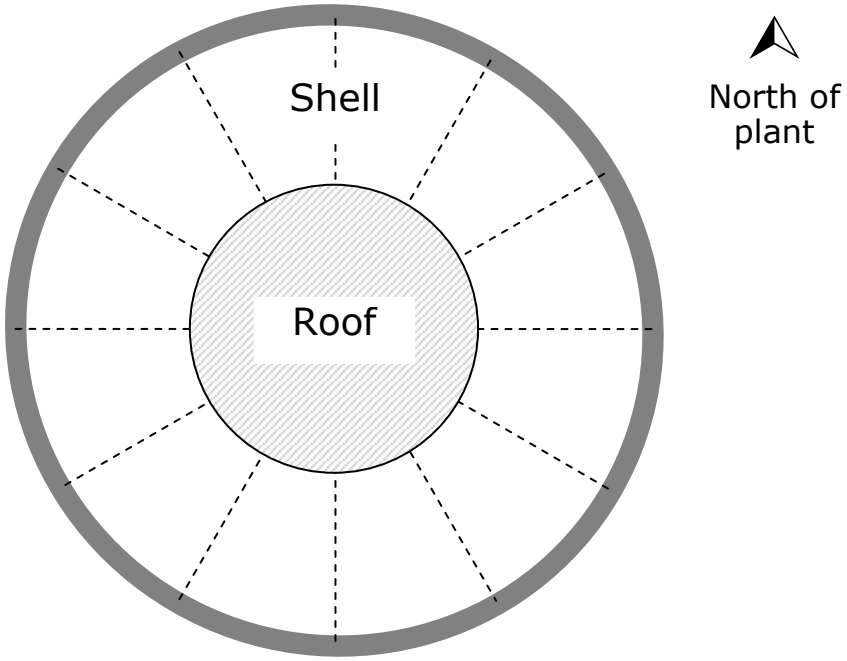
For the assessment of the condition of the storage tank the following table can be used.

Table 2 Assessment of condition of exterior of land storage tank

		Corrosion				**Film thickness**			
		Re scale		% local	Approx. Area In m^2 (total)	Min. dft	Av. dft	Adhesion crosscut test	Contamination/ other comment
		Local	Overall						
Plating	Roof								
	Shell								
Miscellaneous	Staircase								
	Platforms								
	Railings								
	Piping								
	Other								
Remarks:									

The results of the assessment could be graphically represented by figure 1.



Graphical representation of land storage tank

For the coating systems see sheets 4147-4149.