

OGP Coating standards workshop

Coating standards and specifications in StatoilHydro

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Contents

1. Company experience
2. Main standards and in-house specifications
3. NORSOK standard(s)
4. Strategy work with standards and specifications

Company experience – Success criteria for good surface protection

- Establish relevant design premises.
- Design and construct to avoid corrosion traps and such that coating and coating maintenance can be performed.
- Good planning
- Qualified personnel in all positions
- Suitable facilities and equipment.
- Good preblasting preparation (degreasing, rounding of edges etc.).
- Comply with specified requirements.
- **Products** that provide good long term corrosion protection.
- **Products** that are robust with respect to application and curing conditions.
- **Products** that are maintainable.
- Establish maintenance philosophy and plan.
- Perform maintenance.

Company experience in short

- Products;
 - Have had major problems with the two coat polysiloxane based systems (that passed the prequal. test). and fast curing coating systems (used although they failed the prequal. test).
 -but for most conditions, we can find coating systems that are adequate.
 - Due to SHE restrictions, we do not use PU's. This is a challenge.
 - Coating suppliers are not consistent in their advise in different markets or countries.
 - The new EU directive on VOC's and other SHE requirements will put new products in to the market. "Turnover" in products will increase and importance of prequal will become more important.
- Risk management:
 - New coating systems/products/technology should be implemented in a controlled and small scale in order to build experience before taking it into use in a large scale.
 - Prequalification in the lab is not adequate as documentation for field performance.
- Procedures and workmanship – the main challenge;
 - Performance of work in compliance with specified requirements.
 - Get skilled operators.

Main standards and specifications

- All work refer to Norsok M-501 "Surface preparation and protective coating"
- Has one additional document (specification) with some supplementary requirements regarding HSE and paint performance requirements)
- This has in large been the case since Norsok M-501 rev 1 was issued in 1994.
- Norsok M-501 functions as a complete specification and is a bridging document between international standards and the procedures.

NORSOK Standards

International standards as supplement to company requirements.

- Principal question:
 - do we need specific company or project specifications, and
 - can international standards/industry sector standards replace these (totally or partly).
- Prior to Norsok standards,
 - oil companies in Norway had a large number of individual technical specifications.
 - Some variations in contents and requirements without very well founded reasons.
 - Cost driving lack of standardization among the suppliers and within the industry.
 - Engineering companies consumed considerable resources in producing specific project specifications for each project without adding much value to the project.
- The original Norsok process accomplished a standardization of common requirements.

The next ambition was **and still is**, to reduce the Norsok specific requirements to a minimum through added engagement in international standardization work.

NORSOK Standards

- First issued in 1994 after a joint government/industry initiative to standardize requirements within the Norwegian oil industry.
- Covers most technical disciplines.

STANDARDS

A-Administration
C-Civil/Architect
D-Drilling
E-Electrical
G-Geotechnology
H-HYAC
I-Instrumentation
I-Metering
I-SCD-Syst Contr Diag
J-Marine Operation
L-Piping / Layout
M-Material
N-Structural
O-Operation
P-Process
R-Lifting Equipment
R-Mechanical
S-Safety (SHE)
T-Telecommunication
U-Subsea
U-Underwater Op.
WF-Well fluids
Y-Pipelines
Z-E&I Instalation
Z-MC & Preservation
Z-Regularity & Criticality
Z-Risk analyses
Z-Stand. Cost Coding
Z-Technical Info.
Z-Temporary Equipm.



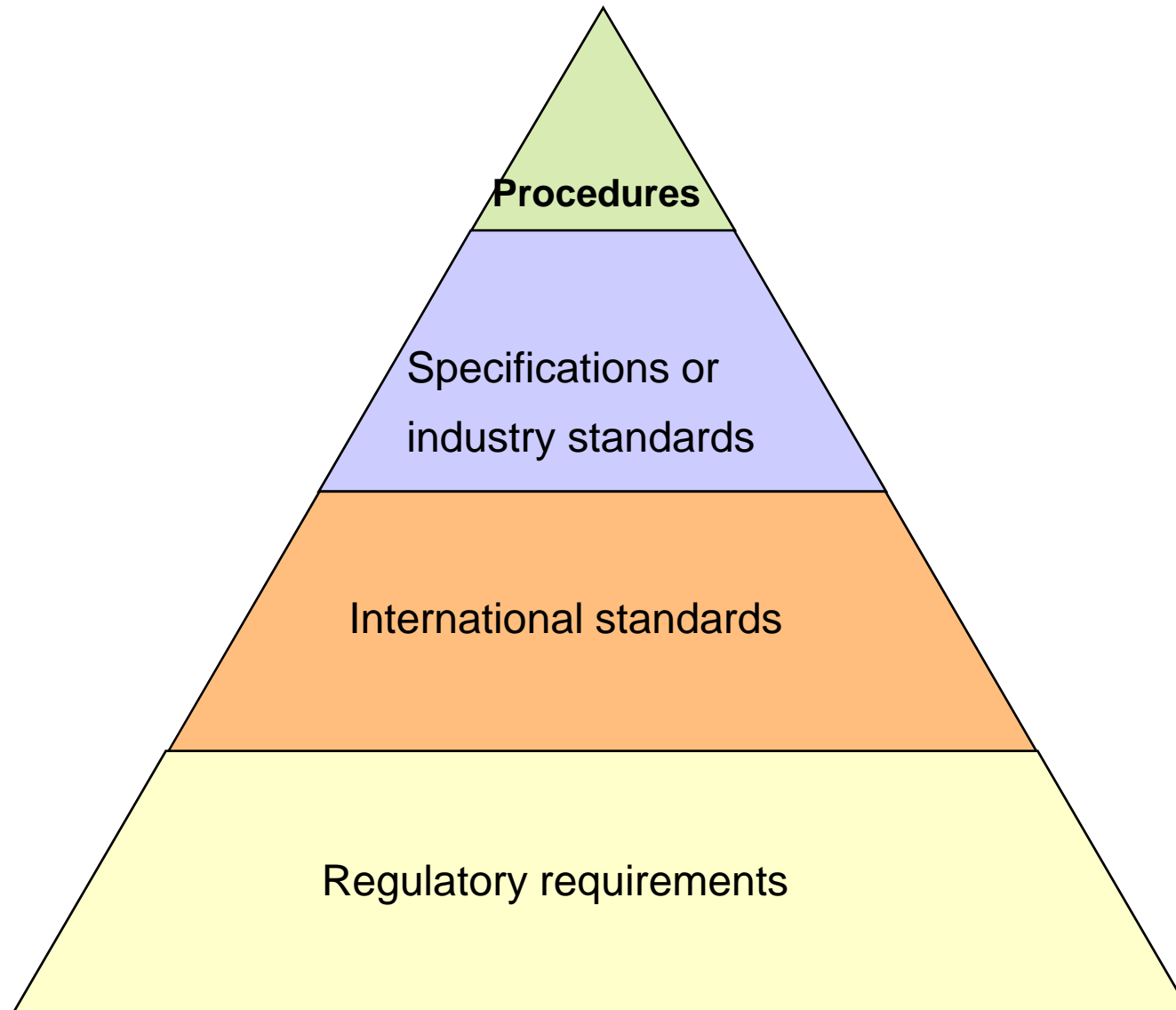
Is there any reason to have different basic requirements to coating of these installations?

Standardization of requirements

FIELD SPECIFIC REQUIREMENTS CAN BE DUE TO:

- Design life
- Submerged/atmospheric
- Hot/cold process and atmosphere
- Maintainability

.....but basically, all installations can use the same fundamental set of requirements for selection and application of corrosion protective coating systems.



First.....What is Norsok standard M-501?

- Title: Surface preparation and protective coating
- Industry sector standard for the oil industry.
- Deals with surface preparation and protective coating
- Shall cover the normal requirements when constructing a new oil installation for offshore use or use in coastal areas.
- Does not cover subsea pipelines.
- Contains requirements to performance and qualification of personnel, coating systems and facilities.

ISO

- For NORSOK M-501, the engagement has been focused towards the work within ISO.
- Main international standard for surface protection:
 - ISO 12944 “Paints and varnishes – Corrosion protection of steel structures by protective paint systems”.
- ISO 12944 includes requirements for:
 - classification of environments
 - design considerations
 - surface preparation
 - paint systems
 - laboratory performance testing
 - execution and supervision
 - development of specifications.
- Main weakness; Requirements became quite “political”

Use of 12944 in projects

- ISO 12944 covers corrosion protection of steel structures for all applications, not only marine and offshore environments.
- Contains a series of options and method descriptions for different
 - work,
 - environments and
 - quality requirements

This must be considered and decided among by the user.

- To use this standard in an actual contract, an overall **project specification** must be prepared.
- Specification must call off the relevant options in ISO 12944.

Use of 12944 in projects

- NORSOK M-501:
 - Considered to base the last revision of M-501 entirely on ISO 12944.
 - Would result in an extensive cross reference to various parts of ISO 12944.
 - The final product would then be less accessible to the readers.
 - Decided not to do this, and NORSOK M-501 remains as a quite self-contained standard.
- ISO 12944 Still;
 - should be considered as an essential standard to companies performing corrosion protection of steel structures by protective paint systems
 - should expect that the requirements in this standard is well known and fulfilled by the suppliers and contractors.
- Apart from the above mentioned standard, M-501 is based on generally accepted and recognized international standards for surface preparation and protective coating. These have been used by both the offshore industry and the shipping industry for many years.

Performance testing of coating systems

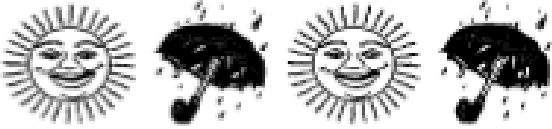


- Performance qualification of coating systems: essential part of the selection process for coating systems in Norsok M-501.
- M-501 allows the contractor to select the main coating systems rather freely, as long as the coating system has passed the pre-qualification test.
- M-501 contained specifically designed requirements for performance testing of coating systems. Has generated extensive test experience.
- ISO 12944 Part 6: Laboratory performance test methods” contains test requirements, but these are inadequate for qualification of heavy duty coating systems for offshore service.
- Published in 2003: ISO standard 20340; Paints and varnishes – Performance requirements for protective paint systems for offshore and related structures”, and is currently in the final process to be issued in rev 2.

Paints and varnishes — Performance requirements for protective paint systems for offshore and related structures

Peintures et vernis — Exigences de performance relatives aux systèmes de peinture pour la protection des structures offshore et structures associées

Pre-qualification of coating systems.

- ISO 20340 Paints and varnishes – Performance requirements for protective paint systems for offshore and related structures

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
UV/condensation — ISO 11507			Salt spray — ISO 7253			Low-temp. exposure at $(-20 \pm 2) ^\circ\text{C}$
						

Cathodic disbonding of coating systems for use sub sea:

- 6 months test in compliance with ISO 15711.

Conclusion

- References to international standards alone will normally not provide adequate definition of the quality requirements for corrosion protective coating of steel structures and equipment.
- International standards normally have several options or various elements that needs to be defined or called off by the client.
- Norsok M-501, represents the bridge between international standards and relevant technical contract requirements for the offshore industry.
- A direct reference to Norsok M-501 will in most cases be adequate contract requirements for corrosion protective coating and application of spray-on passive fire protection.
- As such, Norsok M-501 has made company specifications for surface protection of new installations obsolete.

NORSOK M-501



International standards

