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Corrosion control engineering life cycl — General requirements

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Foreword

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee *[for Project Committee]* ISO/TC *156*, *[corrosion of metals and alloys]*, Subcommittee SC 1, *[corrosion control engineering life cycle]*.

Introduction

0.1 Overview

Corrosion Control Engineering Life Cycle standardization is expected to develop the corresponding requirements and the control standards for all elements influencing the entire chain of Corrosion Control Engineering Life Cycle. The elements include: corrosion sources, materials, technology, research and development, design, manufacturing, construction, storage and transportation, installation and commissioning, acceptance, operation, maintenance, repair, lifetime extension, scrapping and disposal, documents and records, resource management, comprehensive assessment of the corrosion control engineering life cycle.

0.2 The relevance to other relevant Standardization Committee

Adopt corresponding existing technologies, professional management standards to achieve the systemic life cycle via optimizing each other in coordination. If there is a professional technical or professional management standard that needs to be further developed, it will be recommended to the corresponding standardization committee to develop, select, adopt and implement. Meanwhile, it should identify procedurally all elements in the implementation and submit traceable and supportive documentation and records to demonstrate that the requirements of this standard have been carried out for all elements.

0.3 Standard development guiding ideology

The completeness and verifiability of the program is emphasized. The lack of holistic, systematic, and comprehensive control in the entire corrosion control life cycle is precisely the shortcoming that is the important reason for the major insecurity that continue to be caused by corrosion and urgent need to solve. This document is to propose the control requirements for the entire process and all elements from system engineering and the whole life cycle perspective to achieve the optimal benefits of safety, economy, long-term operation and environmental protection.

0.4 System planning

Corrosion Control Engineering Life Cycle standard system planning is divided into three levels (see Figure 1), as follows

a) First level standards

1) Main standard: Corrosion control engineering life cycle-General requirements.

2) Supplement standards: basic terms, standard system guide, risk assessment, economy assessment, intelligent technical specification, general requirements of corrosion control electrochemical protection engineering life cycle.

b) Second level standards

Develop the standards for the typical corrosion control engineering areas which have serious corrosion, safety related problems and involve a wide range, such as power plants (nuclear power, thermal power, hydropower, wind, photovoltaic), chemical plants, reinforced concrete, pipelines, etc. According to the model of main standards' development, develop the corresponding specific standards for the life cycle of professional corrosion control engineering in the corresponding industries.

c) Third level standards

According to the first level standards or second level standards, develop corresponding third level standards that can be implemented specifically for the corrosion control to a specific project, program or even a certain point in the main program.

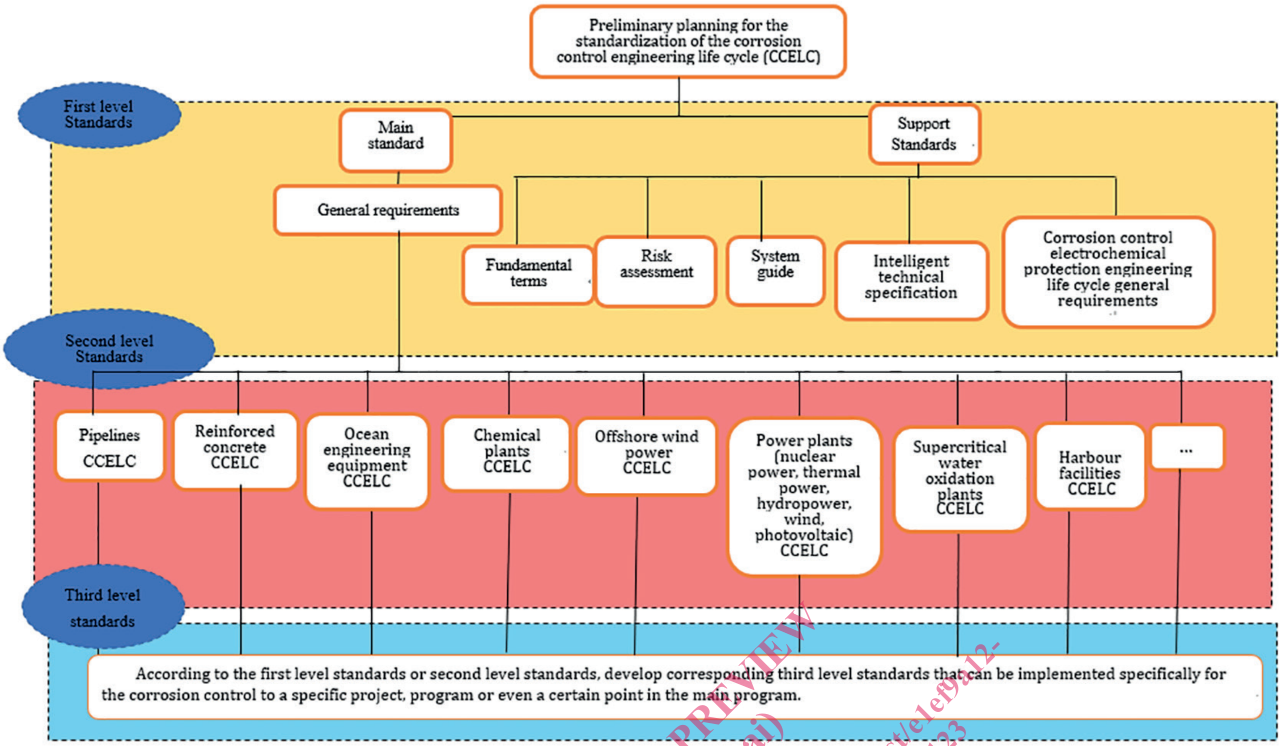

Figure 1 — Corrosion Control Engineering Life Cycle standardization framework

0.5 The positioning of this document

This standard is the first-level standard of the whole "Corrosion control engineering life cycle" standard series. As the basic standard of whole corrosion standards, the positioning of this document should be most general. This is because, the corrosion exists every industry and the subjects to be protected have different corrosion environment, condition and different corrosion control requirements. It should not position to specific corrosion environment and condition to make corrosion technical requirement (these standards have been under development by related standard committees). Above has been stressed again in the committee proposal reason and working scope, and it is also the difference between other corrosion related corrosion committee. The key is still the elements in corrosion life cycle (these elements must be considered in whole corrosion control engineering life cycle, any lack, loss or inappropriate controlled element may cause failure of corrosion control, even lead to disaster). This document is for all the corrosion control engineering life cycle to all the industry, so it should be general.

Corrosion control engineering life cycl — General requirements

1 Scope

This document specifies the general requirements for control elements in the life cycle of corrosion control engineering. It aims to address the current industry-wide existing issues of "only focusing on single, isolated corrosion stage approach", and gives a systematic approach to solve existing corrosion problems. It aims to link the gaps between different stages of the corrosion control.

It is applicable to all types of corrosion control engineering programs.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

The list below is always included after each option:

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
Corrosion Source
General term for various factors that may cause corrosion.

3.2
Corrosion control engineering life cycle
The entire life cycle of the corrosion control engineering defines the links, nodes and key elements during the whole process of lifespan. And it defines all the elements in the corrosion engineering control chain.

3.3
Pre-control
Precautions should be taken, and counteractions should be prepared against possible deviation of the expected objectives or corresponding standards, etc., during the entire life cycle of the corrosion control engineering.

3.4
Control
The process and behaviour that influences and manages the conditions and objectives given throughout the entire life cycle of a corrosion control engineering.

3.5
Forewarning
Giving emergency signal and taking appropriate measures in advance before a disaster or other dangers that need to be monitored, so to prevent the occurrence of the hazard without awareness or preparation, thereby minimizing or avoiding the damage caused by the disaster or danger.

3.6
Green plan
The corresponding measures for environmental protection, resource consumption, engineering waste disposal and recycling of in the design stage.

3.7
Components
Any sub-part, assembly, portion, process that is a part of, or contributes to the final assembly.

3.8
Optimal
Based on life cycle design life, with optimal cost for reaching that timeline.

4 General Principles

4.1 This document defines the corrosion control activities conducted the entire engineering life cycle, as well as regulates all the elements like the objectives, corrosion sources, materials, technology, design, research and development, manufacturing, construction, storage and transportation, installation and commissioning, acceptance, operation, maintenance, repair, scrapping and disposal, documents and records, resource management, comprehensive assessments, etc. This document is specified to meet overall, systematic, coordinated, and optimized principles, and to achieve the optimum benefits of economy, long-term operation and environmental protection on the basis of the operation of economic society which shall ensure human health, people's life and property safety, national security and ecological environment safety (hereinafter referred to as safety).

4.2 This document does not formulate corresponding specific professional technology, professional management standards, specifications and test methods which are in relation to the links, nodes and elements;

4.3 All components during the corrosion control process shall be identified and have corresponding procedures.

5 Objective

5.1 Corrosion control engineering efforts shall aim at improving the integrity, systematization, mutual coordination and optimization of the main life cycle, so that corrosion can be effectively controlled, and to achieve the optimum benefits of safety, economy, long-term operation and environmental protection.

5.2 Corrosion control engineering efforts shall be composed of separated parts based on specific components and technologies. and implemented in all elements of the life cycle, and they shall be communicated, implemented, and maintained in all aspects of the life cycle. The objectives shall make the life cycle of the corrosion control engineering be adapted to the life cycle of the protected main program, and the objectives shall be regularly reviewed and improved to ensure their suitability. In general, the service life of serviceable or replaceable materials and equipment can be shorter than that of the main program. The service life of non-serviceable materials and equipment shall be consistent with the life cycle of the main program.

6 Corrosion sources

6.1 Corrosion sources shall include the followings:

a) Internal corrosion sources. For example, the corrosion by internal medium;

b) External corrosion sources. For example, the corrosion by external environment;

6.2 All the corrosion sources shall be found out systematically, comprehensively and accurately according to the life cycle requirements of the main program, including new corrosion sources unexpectedly developed during the construction processes

6.3 Identifying the corrosion source should take into consideration the working conditions of the main program and corrosion control engineering effort.

6.4 The corrosion source shall be subject to the acceptance of the corresponding procedures to prevent omission or wrong judgment.

7 Materials

7.1 Select the optimal corrosion-resistant materials that achieved the optimum performance of the equipment life cycle requirements regarding safety, economy, long-term operation and environmental protection. For example, the atmospheric corrosion may refer ISO 11303.

7.2 The selected materials shall have the corresponding inspection standards, etc. as the basis, for the basis of acceptance and use. This methodology assumes proper compliance with standards and specifications. For example, the corrosion of metals and alloys may refer ISO6509-1.

7.3 The selected materials shall have corresponding specific achievements and supporting implementation cases as references to ensure that they shall be adapted to other elements, links and nodes and meet the requirements of the main program.

7.4 The selected materials shall be optimized in coordination with other elements in the program.

7.5 The selected materials shall be subject to the acceptance of the corresponding procedures and shall be documented and archived.

8 Technology

8.1 The appropriate technique or multiple techniques including but not limited to, electrochemical protection, corrosion inhibitor, or other etc. shall be used in implemented for the corrosion control according to the different corrosion prevention goals degree of the main program. For example, cathodic protection may refer to ISO12696.

8.2 The selected technologies shall consider the influence of other elements and shall be optimized in coordination with other elements, and achieve the optimum benefits of safety, economy, long-term operation and environmental protection.

8.3 There shall be corresponding technical standards or inspection methods for adapted technology.

8.4 The selected corrosion control technologies shall have corresponding specific achievements and supporting implementation cases under the condition of meeting the requirements of the main program.

8.5 The selected technologies shall be subject to the assessment and verification of the corresponding procedures and meet the requirements of the main program.

9 Design

9.1 All elements, links, nodes and corresponding corrosion risks in the entire life cycle of the corrosion control engineering shall be systematically designed.

