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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Corrosion of metals and alloys - Guidelines for assessing the significances of stress corrosion cracks detected in service

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1.Structure and Drafting Rules of Standardization Documents"

Drafting.

The translation method used in this document is equivalent to ISO 21601.2013 ``Corrosion of metals and alloys detected in service of stress corrosion cracks"

Importance Assessment Guidelines.

The Chinese documents that have a consistent correspondence with the international documents of the normative reference documents in this document are as follows.

---GB/T 15970.6-2007 Corrosion stress corrosion test of metals and alloys Part 6.Constant load or constant displacement

Preparation and application of pre-crack specimens (ISO 7539-6.2003, IDT)

---GB/T 15970.9-2007 Corrosion stress corrosion test of metals and alloys Part 9.Incremental load or incremental

Preparation and application of pre-crack specimens under displacement (ISO 7539-9.2003, IDT)

1 Scope

This document provides guidelines for appropriate steps when stress corrosion cracks are detected during equipment service and the impact on structural integrity is assessed.

When the consequences of failure are recognized, appropriate risk management-based methods should be used for this assessment. This document is only a guideline,

The specific application is not explained in detail.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations

Only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to

This document.

ISO 7539-6 Corrosion stress corrosion test of metals and alloys Part 6.Pre-cracked specimens under constant load and constant displacement

Preparation and application (Corrosionofmetalsandaloys-Stresscorrosiontesting-Part 6.Preparationanduseof

precrackedspecimensfortestsunderconstantloadorconstantdisplacement)

ISO 7539-9 Corrosion of metals and alloys. Stress corrosion test. Part 9.Pre-crack under incremental load or incremental displacement

Sample preparation and application (Corrosionofmetalsandaloys-Stresscorrosiontesting-Part 9.Preparationand

useofprecrackedspecimensfortestsunderrisingloadorrisingdisplacement)

3 Principle

When a crack is detected during the regular inspection plan of the equipment, in most cases, repair will be initiated within a short period of time, removing the component or

Remove the damaged part and re-soldering. However, sometimes the opportunity for repair is limited, and it is necessary to keep the system running normally until the next shutdown to reduce

Production loss, in some applications, as long as the work plan is to predict the evolution of cracks, determine the inspection interval, and evaluate the possibility of failure,

It can also be considered to allow cracks to exist. This assessment can be combined with the failure result assessment to form a risk-based inspection method. Short-term with cracks

Or the challenge for long-term coexistence is to determine when the crack starts, and to establish its relationship with service conditions including transients (that is, to assess whether the crack will

Continuous expansion or just a little response to special fluctuations in service conditions), evaluate the driving force of mechanics, and characterize the origin and propagation of cracks.

Material state, evaluate laboratory database, and use fracture mechanics or other concepts to transform it into recognizable service operating conditions.

When there is a risk of explosive or catastrophic failure, a leak before breaking (leakbeforebreak, LBB) assessment may also be required. but

In practice, it is usually for the reasons of operational reliability to check and repair stress corrosion.

The purpose of this document is to provide guidelines for the development of a damage assessment technique that includes guidelines for crack growth rate control measures.

4 Characterization of the nature and origin of cracks

The first is to conduct a complete physical evaluation of the crack to determine its shape and size. Pay attention to the uncertainty of the defect size evaluation.

Because these values are used for finite element/fracture mechanics analysis. This should include the location of cracks and their local stress concentration, welding points, gaps

(Such as fasteners and flange parts) correlation, and the evaluation of the details of the crack path. If more than one crack is shown, pay attention to the crack

Density, spacing between cracks and possible future connections of cracks. In addition, it is advisable to make uniform corrosion or pitting damage on the surface condition.