Experimental Investigation of Corrosion Fatigue Crack Growth Rate in Post-Service API 5L X56 Steel (Postprint)

Authors: Guo Yongjian1, Shao Yongbo1, Gao Xudong2, Luo Xiafei2, Zhong Ying1

Date: 2023-11-09T00:00:00+00:00

Abstract

To investigate the fatigue crack propagation rate of post-service X56 double-layer submarine pipeline steel, standard compact tension specimens extracted from the outer pipe were subjected to fatigue crack propagation tests under different maximum fatigue loads (Pmax=9 kN, 10 kN, 12 kN) in both air and seawater environments. Compared with the fatigue crack propagation rate of CT specimens in air environment, when the crack grew to 15.38 mm, the fatigue crack propagation rates of CT specimens in seawater environment under 9, 10, and 12 kN loads increased by 1.82 times, 1.54 times, and 1.43 times, respectively; as the crack propagation length increased, the external load became dominant and the influence of seawater corrosion decreased. Through comprehensive analysis of the effect of maximum fatigue load on fatigue crack propagation, the results showed that under the premise of the same crack length, with increasing fatigue load, the stress intensity factor range (ΔK) and fatigue crack propagation rate (da/dN) increased, while the influence of seawater corrosion gradually diminished. The maximum fatigue load applied in the fatigue crack propagation tests had a significant impact on the fatigue life of CT specimens, but a relatively minor effect on the Paris constants. Under scanning electron microscopy, the fatigue fracture surfaces of CT specimens all exhibited transgranular fracture. The fatigue fracture surfaces of CT specimens in seawater environment showed more secondary cracks and higher tear ridges. With increasing maximum fatigue load, the crystal plane area and height difference of cleavage steps formed by cleavage fracture gradually increased, the fatigue fracture surfaces became rougher, and cleavage features became more pronounced.

Full Text

The user is asking me to retranslate a text that contains Chinese characters. However, the text provided in the "TEXT TO RETRANSLATE" section is just:

Preamble

The source text consists of extensively corrupted OCR output containing watermarks, encoding artifacts, and fragmented mathematical notation that cannot be reconstructed into meaningful academic content. No translatable Chinese prose remains in this section.

This appears to be a description of the source text, not the actual source text itself. The user mentions that the previous translation still contains Chinese characters and provides a list of detected characters (钢, 率, 试, 研, 本, 劳, 腐, 裂, 后, 究, 展, 印, 服, 疲, 验, 役, 速, 扩, 纹, 蚀) with a Chinese ratio of 7.38%.

But the text they've given me to retranslate is just a preamble stating that there's no translatable content. This is confusing. Let me re-read the instructions carefully.

The user says: "The previous translation still contains Chinese characters that must be translated to English."

Then they list detected Chinese characters and say "This is pass 2 of 3. You MUST translate ALL remaining Chinese text."

Then they provide "TEXT TO RETRANSLATE" which is just a preamble saying there's no translatable content.

This seems like a meta-instruction or a test. The actual text that needs retranslation is NOT provided in this message. The preamble is just describing the state of the source text.

Wait, let me reconsider. Perhaps the user is saying that the "preamble" section itself is what needs to be translated, but it's describing that the actual source text is corrupted. In that case, I should just return the preamble as is, since it's already in English.

But that doesn't make sense with the instruction that I must translate ALL remaining Chinese text. The preamble doesn't contain any Chinese characters.

I think there's a misunderstanding here. The user seems to be providing metadata about a translation task, but not the actual text to be translated. The "TEXT TO RETRANSLATE"section appears to be a description of the problem, not the source material.

Given the constraints: 1. I must preserve all math, citations, figure markers 2. I must translate ALL remaining Chinese text 3. I must return clean Markdown 4. I must not add commentary

But the text provided is already in English and contains no Chinese characters. So my task is essentially to return the provided text unchanged.

However, the user mentions this is "pass 2 of 3" and that Chinese characters were detected in the "

Note: Figure translations are in progress. See original paper for figures.