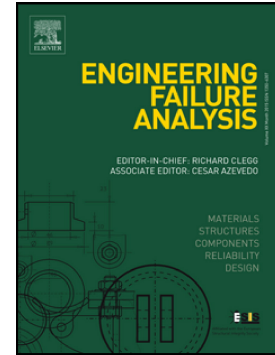


Accepted Manuscript

Corrosion fatigue of phosphor bronze reinforcing tapes on underground power transmission cables - Failure analysis

Maurizio Foresta, Sivashangari Gnanasambandam, David Weston, Fan Li, Jingzhe Pan, Michelle Le Blanc



PII: S1350-6307(16)30815-9
DOI: <https://doi.org/10.1016/j.engfailanal.2018.02.006>
Reference: EFA 3372
To appear in: *Engineering Failure Analysis*
Received date: 22 September 2016
Revised date: 5 May 2017
Accepted date: 9 February 2018

Please cite this article as: Maurizio Foresta, Sivashangari Gnanasambandam, David Weston, Fan Li, Jingzhe Pan, Michelle Le Blanc , Corrosion fatigue of phosphor bronze reinforcing tapes on underground power transmission cables - Failure analysis. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Efa(2017), <https://doi.org/10.1016/j.engfailanal.2018.02.006>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Corrosion fatigue of phosphor bronze reinforcing tapes on underground power transmission cables - Failure analysis

Maurizio Foresta^a, Sivashangari Gnanasambandam^{a*}, David Weston^a, Fan Li^b, Jingzhe Pan^a,
Michelle Le Blanc^b

^a*Mechanics of Materials, University of Leicester, Leicester, United Kingdom LE1 7RH*

^b*Electricity Transmission Asset Management, National Grid, United Kingdom CV34 6DA*

* sg405@le.ac.uk, University of Leicester, Engineering Building, University Road, Leicester, LE1 7RH, United Kingdom, +44 (0)116 252 1873

Abstract

This paper is an investigation on the failure mechanism involved in underground power transmission cables with their life limited by corrosion of phosphor bronze reinforcing tapes. In the present work, a detailed analysis of failed bronze tapes in an ammonium free environment has been undertaken and corrosion fatigue failure mechanism has been identified. A detailed examination of the tape samples is carried out using 2D and 3D optical microscopy and SEM. It follows a mechanical approach that confirms corrosion fatigue as the failure mechanism. SEM images reveal that the pits present on the surface could be the starting point for the crack that eventually leads to failure. Stress calculation shows that the tape could fail only if corrosion pits are present on the tape surface. Presence of corrosion pits, multi cracks and striations on the fractured surface demonstrates corrosion fatigue cracking as the failure mechanism across the tape samples.

Keywords: Corrosion Fatigue, Pitting, Phosphor bronze, Underground Power Transmission Cables, Failure Analysis

Download English Version:

<https://daneshyari.com/en/article/7167252>

Download Persian Version:

<https://daneshyari.com/article/7167252>

[Daneshyari.com](https://daneshyari.com)