



# Guide to MSSA abstracts

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# Abstracts are returned because...

- The content is unacceptable
  - No order, poor spelling, illogical, unscientific, incomplete, incomprehensible
- The format is incorrect
  - Does not follow instructions given to authors

# Scientific organization

- Four distinct components of the abstract:
  - What was the problem?
    - Introduction
  - How did you study the problem?
    - Methods and materials
  - What did you find?
    - Results
  - What do these findings mean?
    - Discussion

# Introduction

- Supply sufficient background information to allow the reader to:
  - Understand the rationale of the study
  - Evaluate previous results without having to refer to other publications
  - Clearly define aim

# Introduction

The use of galvanised coatings on steel wire for structural ropes and cables has become standard practice as unprotected steel is prone to corrosion degradation. Galvanised coatings increase service lifespan by providing barrier and cathodic corrosion protection to the underlying steel<sup>1</sup>. Zinc (Zn) and zinc-aluminium (Zn-Al) alloys<sup>1</sup> are the most commonly used metallic coatings on steel wire. Zn-Al coatings outperform Zn coatings, most notably in marine environments, as they combine the highly insulating oxide film associated with Al corrosion and the cathodic protection of Zn to the underlying steel<sup>2</sup>.

Rationale of the study

In this study, the corrosion of Zn-10Al (10% weight Al content) alloy coating on low carbon steel wire is investigated. Accelerated corrosion tests are performed in order to understand and quantify the mechanism by which such corrosion occurs.

Clearly defined aim

# Methods

- How the study was carried out
- Three main points of interest:
  - Subjects
    - What were they?
    - How many?
    - How were they selected?
  - Apparatus
    - Equipment
    - Reagents
  - Procedure
    - Specimen preparation
    - Measurements taken
    - Data collection
    - Statistical manipulation

# Methods

## Subjects

Samples of 3mm diameter low carbon steel wire coated with  $300\text{g/m}^2$  of Zn-10Al were subjected to 2,016hrs of the ASTM B117 salt spray test<sup>3</sup>. These experiments were conducted in a Q-FOG cyclic corrosion tester. Corrosion products were removed from the surface of the samples at the end of the salt spray test, after which samples were sectioned, mounted and polished for metallography. Microstructural evaluations of the Zn-10Al coating before and after the salt spray test were performed using scanning electron microscopy (SEM) in a Nova NanoSEM 230 using the backscattered electron (BSE) detector.

## Procedures

## Apparatus

# Results

- Presents the findings
- Draws attention to the points of interest
- Displays summarised and analysed data
  - Micrographs, table, graphs, stats
    - Be sure that these are correctly labelled and identified



# Results

Displays analysed data

Draws attention to the points of interest

The BSE image in Fig. 1 reveals the nature of the Zn-10Al microstructure. The microstructure consists of a mixture of  $\beta$  (Al-rich) and  $\eta$  (Zn-rich) phases, represented by dark and light regions respectively, as determined by energy dispersive spectroscopy in the SEM. A distinct intermetallic layer of Fe-Zn-Al (A) was observed between the low carbon steel wire (B) and the Zn-10Al coating. Numerous cracks were observed within the Zn-10Al coating after the ASTM B117 salt spray test as shown in Fig. 2. These cracks are a clear indication of corrosion damage to the coating.

# Discussion

- Discuss results in context of aims
  - Did you find what you expected?
  - Compare results with previous studies?
  - Why were your results un/expected?
- Avoid unimportant, unconstructive and negative arguments

# Conclusion

- Main findings summarised
- Suggestions made for further research

# Discussion and Conclusion

Explaining the results

Conclusion

A potential difference exists between  $\beta$  (Al-rich) and  $\eta$  (Zn-rich) phases in the Zn-10Al coating<sup>4</sup>. This leads to preferential corrosion of the  $\eta$  (Zn-rich) phase along grain boundaries of  $\eta$  (Zn-rich) primary crystals and  $\beta$  (Al-rich) primary crystals when the coating is exposed to a corrosive environment<sup>4,5</sup>. The extensive crack formation can possibly be explained by the volume expansion arising from the internal corrosion products. Consequently, it may be concluded that although Al enhances the outer oxide layer protection, the micro-galvanic effect associated with the two-phase microstructure can accelerate corrosion in harsh environments.

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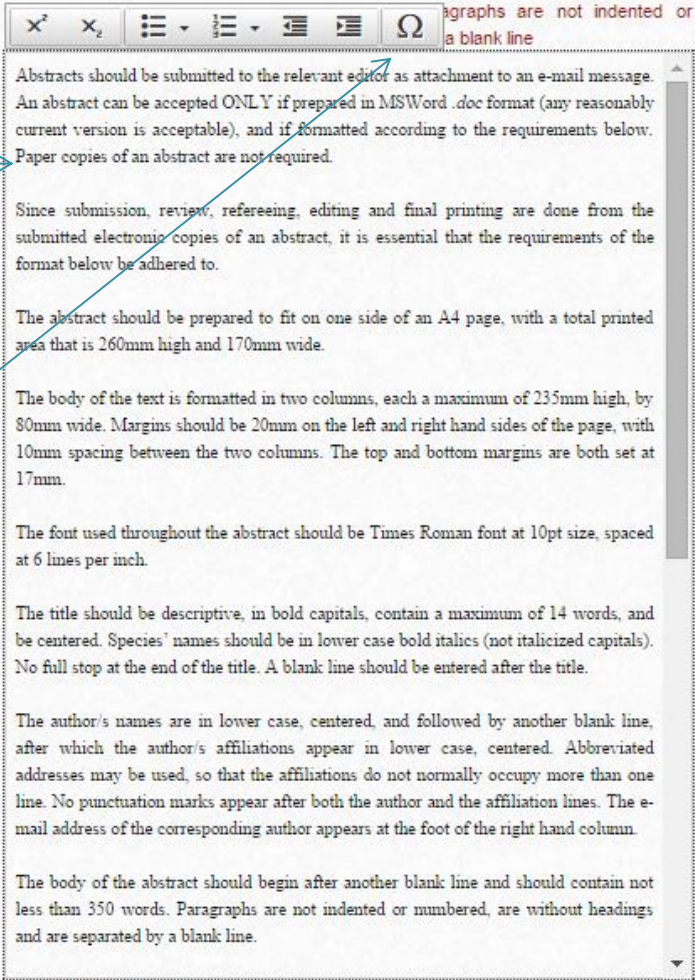


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The font used throughout the abstract should be Times Roman font at 10pt size, spaced at 6 lines per inch.

The title should be descriptive, in bold capitals, contain a maximum of 14 words, and be centered. Species' names should be in lower case bold italics (not italicized capitals). No full stop at the end of the title. A blank line should be entered after the title.

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1. Sato, T., Iwatsuki, M. and Tochiara, H. (1999) J. Electron Microsc. 48(1), 1. (Journal)

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The body of the abstract should begin after another blank line and should contain not less than 350 words. Paragraphs are not indented or numbered, are without headings and are separated by a blank line.

The text should describe the aim of the work and should provide a brief introduction, sufficient to orientate the non-specialist reader. A brief description of the techniques employed, a discussion of the results, and a mention of the most important conclusions should follow this.

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Figure 1. Transverse section of a lily stem with concentric rings of vascular bundles

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