

## Accepted Manuscript

Title: Corrosion and corrosion products of hot dipped galvanized steel during long term atmospheric exposure at different sites world-wide

Authors: D. Persson, D. Thierry, O. Karlsson



PII: S0010-938X(16)31469-X  
DOI: <http://dx.doi.org/doi:10.1016/j.corsci.2017.06.025>  
Reference: CS 7129

To appear in:

Received date: 23-12-2016  
Revised date: 26-6-2017  
Accepted date: 27-6-2017

Please cite this article as: D.Persson, D.Thierry, O.Karlsson, Corrosion and corrosion products of hot dipped galvanized steel during long term atmospheric exposure at different sites world-wide, Corrosion Science <http://dx.doi.org/10.1016/j.corsci.2017.06.025>

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 and corrosion products of hot dipped galvanized steel during long term atmospheric exposure at different sites world-wide.

D.Persson<sup>1</sup>, D. Thierry<sup>2</sup>, O. Karlsson<sup>1</sup>

<sup>1</sup>Swerea KIMAB, Isafjordsgatan 28A, 114 28 Stockholm, Sweden,

<sup>2</sup>Institut de la Corrosion, 220 Rue Pierre Rivoalon, F-29200 Brest, Franc

### Research highlights

- Atmospheric corrosion of zinc coated steel after world wide exposure
- Localised corrosion attack with pitting of zinc coating
- Sulfate and chloride containing corrosion products in corrosion pits
- Zinc hydroxy carbonate at cathodic areas outside the pits.

### Abstract

The atmospheric corrosion of hot dipped galvanized steel was studied in a wide-world exposure in Europe, East Asia and USA. The corrosion product composition, morphology and surface distribution was investigated after 0.5, 1 and 2 years exposure. The corrosion was localised for all exposure conditions with sulfate and chloride containing corrosion products ( $\text{Zn}(\text{OH})_2)_3 \cdot \text{ZnSO}_4 \cdot n\text{H}_2\text{O}$ ,  $\text{NaZn}_4(\text{SO}_4)(\text{OH})_6\text{Cl} \cdot 6\text{H}_2\text{O}$  and  $\text{Zn}_5(\text{OH})_8\text{Cl}_2 \cdot \text{H}_2\text{O}$  formed at the anodic sites in corrosion pits and  $\text{Zn}_5(\text{OH})_6(\text{CO}_3)_2$  mainly in the outer parts of the corrosion products and cathodic areas outside the pits. The content of the sulfate containing corrosion products increased in the order marine < marine/urban, marine / industrial < industrial / urban.

### 1. Introduction

Zinc coatings have greatly contributed to improve the corrosion resistance of steel products exposed to corrosive environments and zinc coated steel can reach lifetimes of several decades. Continuous hot dipped galvanized steel sheet for building or automotive applications are coated with zinc containing a small amount of aluminum to suppress the formation a layer of Zn-Fe phases which are formed during galvanizing steel from pure

Download English Version:

<https://daneshyari.com/en/article/5439872>

Download Persian Version:

<https://daneshyari.com/article/5439872>

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