UNITRUNK

TOTAL CABLE MANAGEMENT SOLUTIONS

UNITRUNK CELEBRATING 50 YEARS OF SERVICE

UNITRUNK RIS

Understanding the material selection process.

CIBSE CPD

Total Cable Management Solutions

UNITRUNK

- Over 50 years experience
- 2 UK Manufacturing sites covering an area of 9300m² and 5000m².
- 7 UK Depots each carrying around £500k of stock
- Our own fleet of 7.5 & 13 tonne lorries
- Sales Team of 12 Business Development Managers and Sales Executives
- RIS (Rapid Installation Systems)
- Focus on innovation and providing engineered solutions
- Project support & site deliveries
- Presentation and Training Programmes
  - CPD Accredited Presentations
  - Value engineering presentations
  - Certificated Product Training

Content

- The objective of the presentation
- The factors applicable to the selection process
- The galvanising process
- The material available for selection
- Understand the performance of each material
- Bi-Metallic Corrosion
- The prevention of Zinc Whiskers
- FAQ’s
- The benefits of making the right selection
- Summary

The objective of the presentation

1) To provide knowledge of material finishes to prevent the wrong material being installed.

2) To ensure that engineers and designers have sufficient understanding of the performance of each of the available materials to be able to specify with confidence

3) To appreciate the practical and commercial benefits of selecting the correct material

The factors applicable to the selection process

Inside or Outside Installation ?

Inland, Coastal or Offshore ?

Clean or Polluted Atmosphere?

Maintenance Period

Duration of performance

Environmental Impact.

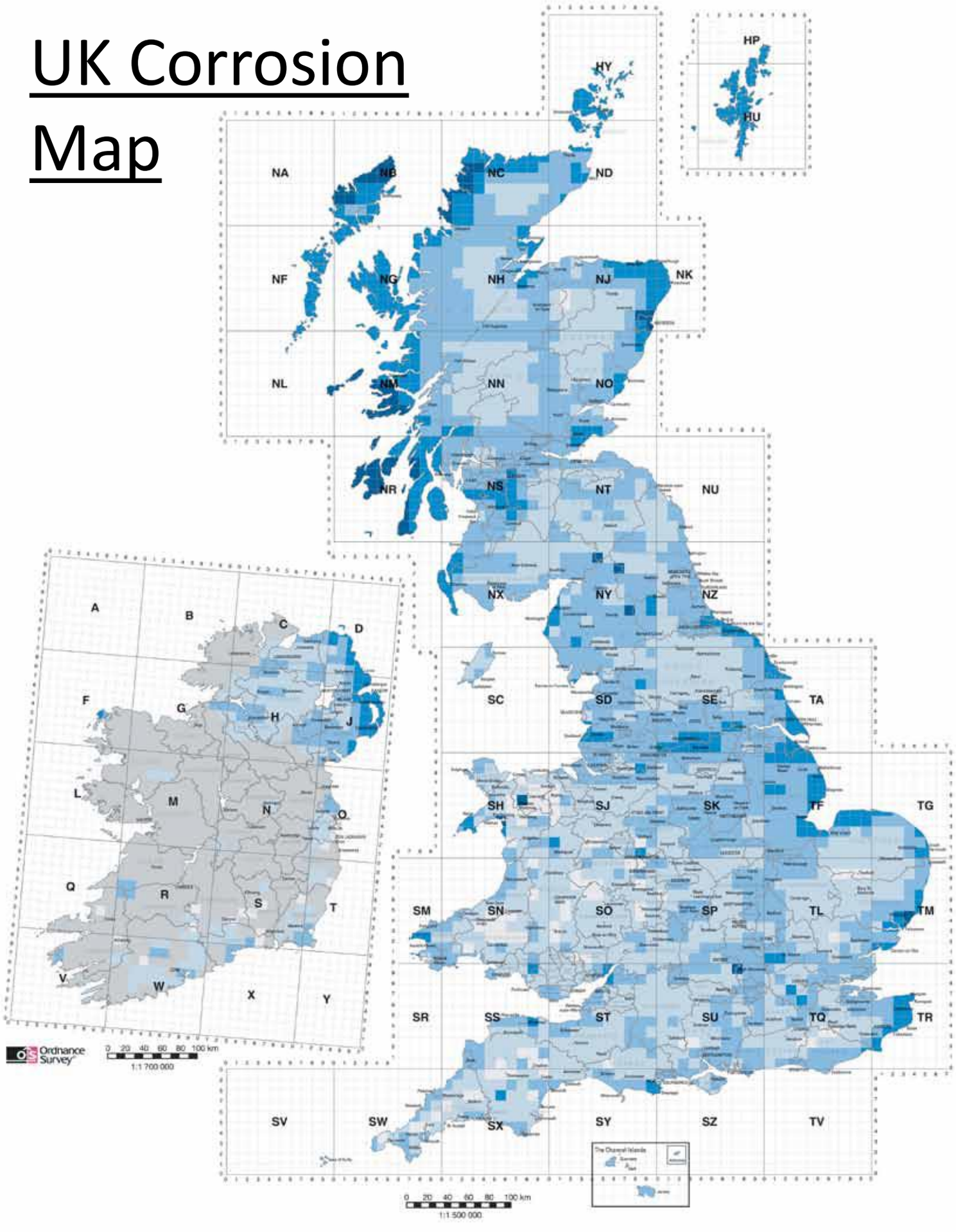
Further environmental conditions may need to be considered:-

We are all familiar with rust ?

Category C Corrosion Rates of Zinc

Corrosion risk category	Zinc loss in first year (µm)	Examples of typical environments	
		External	Internal
C1 (very low)	Less than 0.1	-	Insulated building. Relative humidity less than 60%.
C2 (low)	0.1 to 0.7	Slightly polluted atmosphere, dry climate (for example, rural areas).	Non-insulated building with temporary water condensation such as a warehouse or sports hall.
C3 (medium)	0.7 to 2.1	Urban or industrial atmosphere with low levels of SO_2 pollution or coastal areas with low salinity.	Buildings with high relative humidity and impurities in the air such as breweries, laundries or dairies.
C4 (high)	2.1 to 4.2	Industrial or coastal environments with low salinity.	Swimming pools, chemical factories.
C5I (very high – industrial)	4.2 to 8.4	Industrial environments with considerable humidity and an aggressive atmosphere.	Buildings or areas with almost constant water condensation and high levels of pollution.
C5M (very high – maritime)	4.2 to 8.4	Coastal areas with high salinity.	

UK Corrosion Map



If you need a product that will last for a specified period of time under certain climatic conditions, you need to know what the rate of degradation is for that area to be able to specify the correct finish.

To ensure that the containment will last it is crucial to ensure that the fixings will also.

Visit the British Galvanisers website for more information.

http://www.galvanizing.org.uk/

The Galvanising Process

The coating of steel using zinc, either before manufacture (Pre-Galvanised) or after manufacture (Post-Galvanised) is a cost effective and practical method of protecting steel from corrosion. Galvanising protects the steel in three ways:-

1) Firstly the zinc coating weathers at a very slow rate giving a long and predictable life.

2) Secondly the zinc coating corrodes preferentially to provide sacrificial protection of any small areas of steel exposed through cutting, drilling or accidental damage. Scratches and small areas of damage are sealed by weathering products from the zinc.

3) Thirdly if the damaged area is larger the sacrificial protection provided by the surrounding zinc prevents “creepage” which is typically associated with other protective finishes such as paint coatings.

The Hot Dipped Galvanising Process

Removing the ambiguity

The term pre-galvanised refers to sheet steel that has been through a hot dipped galvanised process at the point of manufacture. The thickness of galvanising applied is typical 8 - 20µ (BS 10346:2009)

This is not what the industry interprets as hot dip galv.

Hot dipped galvanised refers to a product that has been made from “black” material at the factory, e.g. formed into cable tray or cable ladder and then completely immersed in a molten bath of zinc. This process applies around 55 – 85µ (BS1461 known as - Hot Dipped Galv, Galv After or Post Galv)

Material is loaded onto jigs, before being immersed in a bath of molten zinc at a temperature of around 450 degrees until the temperature of the work is the same as the zinc. During this process the molten zinc reacts with the surface of the steel to form a series of zinc/iron alloys. As work is removed from the zinc, the zinc on its surface will begin to solidify, as this happens excess zinc is removed to ensure a smooth finish.

Cable Management Products – Standard Material Finishes

	PG	GA	SS	ST	EZ
Product	Pre- Galvanised	Galvanised After	Stainless Steel 316l	Stainless Steel 304l	Electro-Zinc
	BS 10346:2009	BS1461			BS 2081 :2008
Trunking	YES	NO	YES	YES	NO
Floor Trunking	YES	YES	YES	YES	NO
Ltg. Trunking	YES	NO	YES	YES	NO
Cable Tray	YES	YES	YES	YES	NO
Cable Ladder	YES	YES	YES	YES	NO
Cable Basket	YES	YES	YES	YES	YES
Channel	YES	YES	YES	YES	NO

The above is indicative and may vary from manufacturer to manufacturer.

The material symbols may also vary with each manufacturer

Other Symbols which may be seen are:

BS EN10349 :2009

- Sheet steel zinc 8-20µ
- Punching holes for cable tray exposes base metal
- Cutting or forming on site exposes base metal
- Suitable for indoor, dry environments.
- If installed externally will degrade quickly.
- Smooth finish
- Aesthetically good
- Cheapest of the available finishes.
- The finishes can vary in brightness or matt but still be in accordance with the BS for the process.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BS EN 1461

- Product formed and then immersed in a bath of molten zinc.
- Complete encapsulation of product to 55 – 85µ
- Base material is exposed when cut on site, but is easily coated with a galvanised paint.
- Suitable for external use

- Product has a very “industrial” look to it.
- Excess zinc can block slots and create a rough finish.
- More expensive than pre-galvanised product. The additional level of protection accounts for this
- Standard trunking cannot be hot dipped as the thickness of the material means that it deforms during the process.

304l or 316l

Stainless Steel 304l

- Suitable for brewery, dairy, food and pharmaceutical production
- L denotes that it is the low carbon version of standard 304 stainless. This provides better weldability

Stainless Steel 316l

- In addition to all of the installations that 304l can be used, the addition of Molybdenum provides 316l with greater corrosion resistance to chloride.
- Often referred to as “Marine” grade, although warm sea water can cause pitting and crevice erosion.


VANTRUNK

ISO 2081:2008

Zinc Electroplating is one of the most common forms of electroplating and popular because of its relatively low cost, protective nature and attractive appearance.

The coating applied through this process gives corrosion protection to ferrous components and it can give colours like gold, black or olive drab finish, by post treatment.

Zinc is a bluish-white deposit, which serves as a decorative and inexpensive protective metal with the following advantages: Acts as a coating against atmospheric corrosion of iron and steel parts Zinc coatings prevent oxidation by forming a barrier and acting as a sacrificial anode when the barrier is damaged. Zinc oxide is a fine white dust that prevents the breakdown of the substrate's surface integrity as it forms.

This basket product clearly indicates the bluish white finish that the zinc provides

Certain projects stipulate that the materials are suitable for extended life , 50 – 60 years. Crossrail being a current example of this.

To achieve this the thickness of the galvanising needs to be increased.

To achieve this a thicker base steel with a higher silicon content is required. This will allow the metal to attract more molten zinc in the galvanising bath.

Contact the cable management company to discuss specific project requirements.

White Rust – (Wet Storage Stain)

What is white rust ?

Wet storage stain is a white, powdery porous substance, more commonly known as white rust, it is a type of zinc corrosion.

It is called wet storage stain because it occurs when a fresh zinc surface is stored in a wet environment with limited oxygen and carbon dioxide sources.

The restriction in air is usually due to the items being stacked on one another or otherwise stored in close quarters.

This type of corrosion does not usually occur to zinc surfaces that have had time to form their normal layers of corrosion protection.

Is it detrimental to the performance of the product

Underneath the white coating the surface is usually dark grey in colour.

The corrosion product is approximately 100 times greater in volume than the zinc consumed.

Because of this the corrosion is not usually detrimental to the usability of the item.

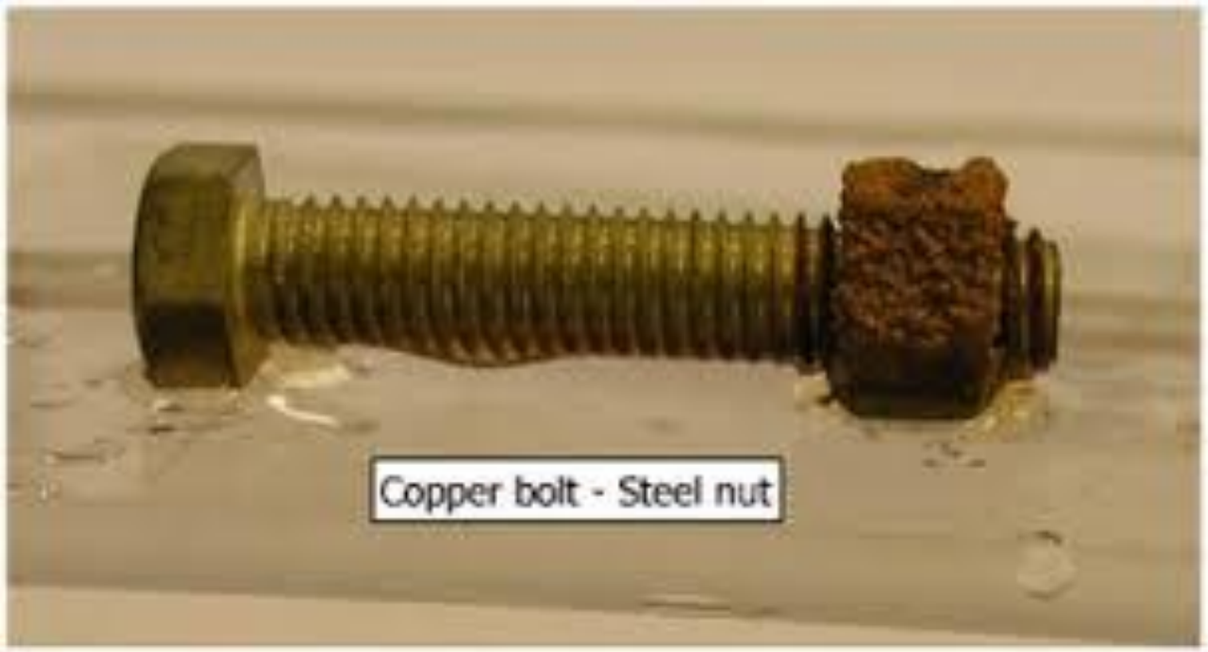
However if the zinc surface is only a thin coating, such as electro-zinc or pre-galvanised then some damage may occur

Remedial work is not always required. In light deposits of white rust a hard brush will remove the deposits.

For heavier deposits more aggressive action may be required.

Prevention is better than cure.

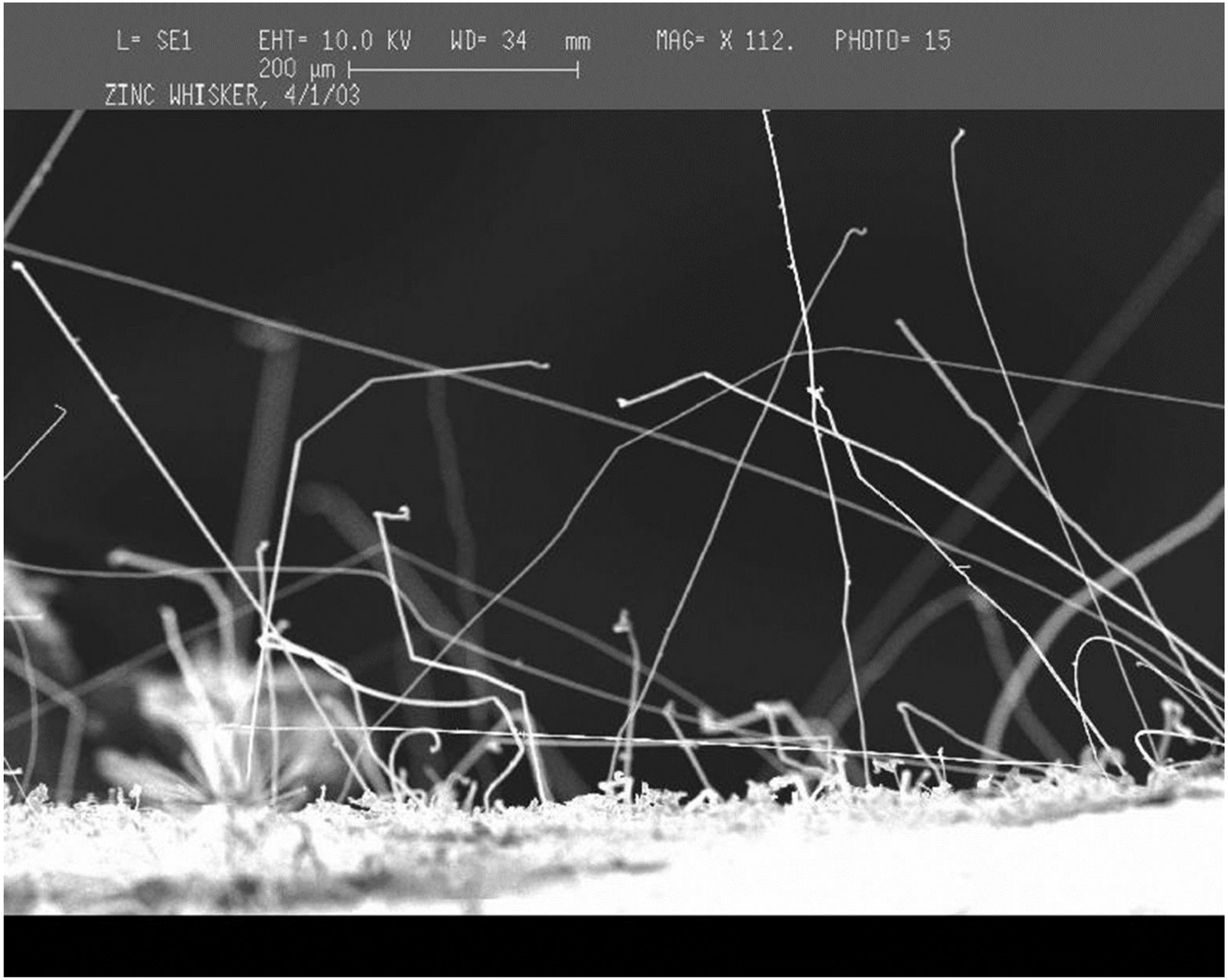
Bi-Metallic Corrosion



Galvanic or bimetallic corrosion occurs when two dissimilar metals are immersed in a conductive solution and are electrically connected. One metal (the cathode) is protected, whilst the other (the anode) is corroded.

The rate of attack on the anode is accelerated, compared to the rate when the metal is uncoupled.

What is a zinc whisker



A naturally occurring crystalline metallurgical phenomenon where metal grows fine filiform hairs. Although primarily found on galvanised (electroplated) surfaces they can also occur on alloys.

5. Action to minimise or eliminate the risk of zinc whiskers

1) The single most sensible way to prevent zinc whiskers from striking is to reduce or eliminate the amount of whisker-producing galvanised steel used in, under, and above any server room or data centre.
2) Raised floor tiles can be replaced with newer styles that do not rely on zinc coating for longevity,
3) Pre-Galvanised, hot dipped galvanised or electro-zinc cable management systems ***cable baskets/trays, can be changed to powder-coated or stainless steel alternatives.***

4) ***Stainless Steel will eliminate the risk.***

The excess molten zinc which has dried and formed over the holes in the cable tray can become detached these are known as zinc flakes. They are large enough to be picked up in a deep clean process.

Commercial and Practical Benefits

- (1) Pre-Galvanised and Electro-zinc are the cheapest option.
- (2) Hot dipped galvanised product will be 35-40% more expensive than (1)
- (3) Stainless Steel will be 40% more expensive than (2)
- (4) Corten Silicon rich can be a similar cost to stainless.

- Only for use internally in dry environments
- Suitable for external use to use internally would not be cost effective
- Food or pharmaceutical, marine or offshore
- Project specific to meet operating life cycle requirements

Frequently Asked Questions

- Can you supply hot dipped galvanised standard trunking ?
- Is pre-galv suitable for external installations ?
- Will this white rust prevent me from installing the product
- I have got electro-zinc products and the finish is totally different, why?
- Will pre-galvanised product prevent zinc whiskers from forming?
- How much dearer is hot dipped galv. Than pre-galv.

Summary

1)Selecting the correct material will ensure that it lasts for the duration specified

2)Selecting the incorrect material may result in replacement of the material in a shorter time frame

3)Could increase the cost due to the remedial work

4)At tender stage quoting the wrong material may lose you the job

5)At procurement stage ordering the cheaper material may create a problem

6)Early engagement with the cable management manufacturer can prevent any issues.

Thank You

Any

Questions ?