**NEWS ARTICLE**

Galvanized steel comes into its own in the mining industry

**23 February 2023:** Galvanized steel plays a critical role in infrastructure in the mining industry. This ranges from steel shaft structures (buntons, station steelwork, headgear) to stope structures (roof supports, pipe hangers), haulway structures (ore transfer stations, electrical stubbies) as well as surface structures (plant buildings, tank supports, pipe gantries, conveyor belts, stacks, stockpile structures, stairways, railings).

The environmental conditions in the mining industry can often be aggressive and the service demands on steel extreme, subjecting it to maximum demands. These conditions include water immersion, impact and abrasive conditions, extended surface wetness, variable temperatures, and corrosive underground atmospheres.

The primary mine environments are underground, at surface minerals beneficiation process plants, and on transportation equipment such as conveyors. Hot dip galvanized coatings have a good track record in protecting many structural steel parts in these environments.

South Africa’s deep gold and shallower coal mines have ever present corrosive water, which is where hot dip galvanized (duplex coated) steel really comes into its own. Thus, a cost-efficient, long-lasting, and maintenance-free protection system for steel should be specified, which means a duplex coated galvanized steel system, explains **Simon Norton**, Executive Director of the [International Zinc Association (IZA) Africa](http://www.zinc.org).

Galvanizing provides a tough and abrasion-resistant coating as well as long-term corrosion protection of steel in two ways: As a physical barrier to corrosive atmospheres, and by means of galvanic or sacrificial protection, which is unique to zinc, significantly extending the service life of steel in even the most challenging environments.

**Underground**

With increasing depth and distance from the shaft towards the working area, the corrosion severity and incidence of mechanical damage increases substantially. Underground workings are often wet. This water tends to be corrosive due to pick-up of blasting fumes and ingress of acidic waters into the working areas. Shaft areas can become aggressive to steelwork due to water, falling objects, and dust, resulting in poultice formation that allows corrosion to continue underneath the poultice, thus attacking the steel.

**Surface**

Atmospheric environments are classified into different categories of severity by ISO 9223, which also provides a range of lifetimes for steel and zinc in these environments. There is a specific relationship between galvanized zinc coating thickness and expected coating life, defined as the time that can pass before coating maintenance is required to restore protection to the base metal.

**Added corrosion protection: The duplex system**

Organic (paint) coatings can be added for improved corrosion protection. If hot dip galvanized mine shaft steel is then overcoated with a tough organic paint system, the resultant duplex coating has an extended lifetime, saving the mine owner millions of dollars.

On the other hand, continuous galvanized sheet is generally pre-painted in the same facility in which a thin zinc galvanized coating is applied. This allows for precise preparation of the galvanized surface prior to coil coating. Painted galvanized sheet can be roll-formed to give profiles as specified by the customer for roofing and cladding of surface plant.

Combining paint coatings with galvanized coatings is referred to as a duplex system. Duplex systems benefit from a synergistic effect that enables the combined life of the painted galvanized steel to be longer than the sum of the individual lives of the paint and galvanized coatings in the same environment. The synergy multiplier ranges from 1.8 to 2.7, depending on the severity of the corrosion conditions.

Hot dip galvanizing provides superior corrosion protection to steel. It is easily and swiftly applied and covers the entire surface of the steel article, even in inaccessible areas, provided the component is designed properly. Hot dip galvanized coatings offer a unique dual protection that prevents corrosion even if the coating is damaged.

Maintenance painting is often impossible in mining environments, meaning the only option with paint-only structures is complete replacement. Hot dip galvanized coatings, however, are hard and abrasion resistant. They provide long lasting and maintenance-free corrosion protection to steel even in aggressive mine environments, and provide significant savings compared with other protection systems that require maintenance.

**REFERENCE**

<https://www.zinc.org/wp-content/uploads/sites/4/2015/01/Hot-Dip-Galv-in-Mining-Brochure-36pp.pdf>.

**Pull quote**

“Hot dip galvanized coatings offer a unique dual protection that prevents corrosion even if the coating is damaged.” – **Simon Norton**,Executive Director, International Zinc Association Africa

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Galvanized steel plays a critical role in maintaining essential infrastructure in the mining industry, says the #International Zinc Association Africa.

***Ends***

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**About the International Zinc Association**

The IZA is the only global industry association dedicated exclusively to the interests of zinc and its users. Operating internationally and locally (Africa Desk: [zinc@iafrica.com](mailto:zinc@iafrica.com)) through its regional affiliates, the IZA helps sustain the long-term global demand for zinc and its markets by promoting such key end uses as corrosion protection for steel and zinc as being essential in human health and crop nutrition. IZA’s main programmes are Sustainability & Environment, Technology & Market Development and Communications.

In South Africa, the IZA plays a vital role in establishing the basis for the successful revitalisation of the zinc industry by increasing awareness of zinc and its applications and benefits in key sectors and markets, which will ultimately translate into the increased uptake of zinc.

**International Zinc Association Contact**   
Simon Norton

Executive Director  
IZA Africa  
Phone: (021) 788 9980

Cell: 082 831 2924  
Email: [zinc@iafrica.com](mailto:zinc@iafrica.com)   
Web: [www.zinc.org](http://www.zinc.org)

**Media Contact**  
Rachel Mekgwe

Account Executive  
NGAGE Public Relations   
Phone: (011) 867-7763  
Fax: 086 512 3352  
Cell: 074 212 1422  
Email: [rachel@ngage.co.za](mailto:rachel@ngage.co.za)  
Web: [www.ngage.co.za](http://www.ngage.co.za/)

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