



News

Events

Awards

Webinars

Leaders Speak

Brand Solutions

More ▾



Roads and Highways · Railways · Aviation · Ports and Shipping · Urban Infrastructure · Urban Transportation · More ▾

WhatsApp Channel

Tune in to know the latest
updates on the infra industry

ETInfra Newsletters

Explore and Subscribe to our
Daily Newsletters

Follow Us

Get updates of events and
latest news from ETInfra on...

Construction · 5 Min Read

The pivotal role of zinc in India's development journey: Making steel more sustainable

This investment in extensive steel infrastructure also brings significant challenges related to corrosion, which undermines the longevity, effectiveness, and safety of these structures.

ETInfra

Updated On Dec 24, 2024 at 05:47 PM IST



India's journey from a developing nation to a developed economy is heavily reliant on robust public infrastructure, where steel serves as a fundamental material in this transformation. With the

recent surge in steel production, India witnessed the highest growth in terms of percentage increase and in 2024 became the 2nd largest steel producer globally as per Ministry of Steel, Government of India.

This investment in extensive steel infrastructure also brings significant challenges related to corrosion, which undermines the longevity,

effectiveness, and safety of these structures.

Protecting Infrastructure:

Advt



Steel structures are inherently vulnerable to corrosion, specifically in India's diverse climatic conditions. The country's extensive coastline, warm temperatures, and high humidity expose steel to rain, salt-laden air, and pollutants, leading to accelerated corrosion attacks.

As per a report published by the National Association of Corrosion Engineers (1), a staggering 5% of India's GDP is lost annually due to corrosion, highlighting the urgent need for effective solutions to mitigate these losses. Without protective measures, steel can suffer significant degradation within just a few years, resulting in costly repairs and safety concerns.

By comparison, in Japan, the Middle East and Australia, this cost is less than 1.5% of GDP. This disparity is largely due to the widespread use of zinc-coated steel in construction, automotive and infrastructure projects in these countries.

India's 7,800 km-long coastline indicates that a substantial portion of the country is highly susceptible to corrosion. The coastal belt is considered an extremely corrosive zone, where steel and other ferrous metals are particularly prone to chloride ion-induced corrosion from sea salts.

During the 2023 Global Zinc Summit (2), the Ministry of Steel highlighted that zinc (galvanized) structures can help eliminate losses exceeding ₹1,000 crore annually in coastal areas. Zinc's protective layer

is indispensable in these regions, where high humidity, salt and moisture rapidly accelerate corrosion and compromise structural integrity.

Advt



In a technical report by the International Zinc Association (3) issued in 2023 and entitled, “New Corrosion Map of India”, testing of zinc-coated (galvanized) steel sheets over 8 years was conducted across five major Indian cities. The results revealed that India’s climate is quite aggressive towards steel compared to other countries.

How Zinc Protects Steel:

Zinc galvanization is the most effective solution for protecting steel structures from corrosion. Galvanization, is a continuous process involving the application of a zinc coating to steel, creating a metallurgical bond that protects steel, and provides a solution that is both pragmatic and essential.

Zinc sacrifices itself in preference to the underlying steel, effectively shielding it from red rust. In harsh environments, galvanized steel can last over 50 years. This process extends the lifespan of steel structures, yielding substantial economic benefits, including reduced maintenance costs, increased asset life, and improved structural reliability.

The zinc coating also acts as a barrier between the harsh environment and the steel, making it more resistant to mechanical damage during transport and installation. Additionally, galvanized steel's versatility and design flexibility allow for customization and efficient construction, making it a cost-effective and practical choice for various projects.

Zinc galvanization offers superior performance advantage over painted steel. The zinc coating offers cathodic or sacrificial protection, which

means it will protect the steel even if the coating is scratched or damaged.

Zinc Protects Over a Wide Range of Environments:

The graph below illustrates how zinc outperforms aluminium in that it provides better protection over a much wider range of environments. This means that zinc will protect steel across the entire country and will play a critical role in protecting public infrastructure, railways, roadways, bridges and power transmission. The galvanization process serves as a durable protective shield, effectively preventing corrosion and prolonging the lifespan and safety of the structures.

As India continues to invest heavily in infrastructure like highways, railways, bridges, airports, and smart cities, the use of galvanized steel translates into long-lasting, reliable infrastructure, with fewer repairs and lower maintenance costs.

The use of mild steel in these projects is prone to corrosion and using zinc galvanization creates a long-lasting barrier that is resistant to external factors such as heat, pollution, moisture, and water among others. This also ensures that public infrastructure remains functional and secure for decades, safeguarding investments made by the government, taxpayers and private sectors alike.

Beyond its applications in traditional infrastructure, zinc-coated steel is vital for renewable energy infrastructure. Wind turbines and solar panels require durable materials that can withstand harsh environmental conditions. Zinc galvanization not only protects these structures but also enhances their overall performance and longevity. As India moves towards its net-zero goals with an increased focus on renewable energy sources, the importance of zinc will grow exponentially.

As India accelerates its infrastructure development to create sustainable, world-class cities at par with developed nations, the adoption of zinc galvanization will play a pivotal role. While perceived cost sensitivity often deters initial investment in galvanization, a sharp reduction in recurring repair and maintenance expenses provides quick and substantial payback, thus safeguarding these long-term investments.

Recognizing this, the Indian government has launched several initiatives aimed at transforming the nation's infrastructure landscape. Programs

like the National Infrastructure Pipeline and Gati Shakti Yojana emphasize the need for long-lasting materials like zinc.

These initiatives are critical for ensuring that infrastructure projects are built to withstand the test of time while meeting international standards of quality. As part of the Aatmanirbhar Bharat initiative, India is focusing on reducing its dependence on imported materials that may not be suited to local conditions. By promoting the use of domestically sourced zinc solutions, India enhances local manufacturing capabilities while creating employment opportunities, using its abundant natural resources.

Zinc's high recyclability aligns with sustainable development goals and circular economy principles. By adopting zinc galvanization across various sectors like public infrastructure, construction, automotive, pipes & tubes, India can significantly reduce its carbon footprint while promoting sustainable practices.

As India strives to become a \$5 trillion economy by 2025, the use of zinc to protect infrastructure projects will be instrumental in achieving this vision. As the world observes India's transformation into a developed economy with world-class infrastructure, the role of zinc will be pivotal in shaping this future; a future built on strong foundations that ensure safety, reliability, and prosperity for all its citizens.

(This article is written by *Kenneth M D'Souza, Technical Director and Corrosion Specialist, International Zinc Association*)

Published On Dec 19, 2024 at 12:38 PM IST



Be the first one to comment.

[Comment Now](#)

Join the community of 2M+ industry professionals

Subscribe to our newsletter to get latest insights & analysis.



Your Email

[Subscribe For Free](#)

[national infrastructure pipeline](#)[national association of corrosion engineers](#)[ministry of steel](#)[international zinc association](#)[global zinc summit](#)[india](#)[corrosion specialist](#)[middle east](#)

News →

See whats happening in Infrastructure sector right now

Leaders Speak →

Business leaders sharing their insights

Events →

Explore and discuss challenges & trends in India's leading B2B events

Awards →

Recognise work that not only stood out but was also purposeful

Webinars →

Join leaders & experts for roundtables, conferences, panels and discussions



Join the community of 2M+ industry professionals

Subscribe to our Daily Newsletter

Subscribe For Free

By continuing you agree to our [Privacy Policy](#) & [Terms & Conditions](#)

Advertise With Us

We have various options to advertise with us including Events, Advertorials, Banners, Mailers, etc.

Get in Touch

Get updates on your preferred social platform

Follow us for the latest news, insider access to events and more.



About Us
Newsletters

Contact Us

Guest-Post
Guidelines

RSS Feed

Sitemap

RSS Feed

Sitemap

Guest-Post
Guidelines

ET The Economic Times Business Verticals

Auto	Retail	Health	Telecom	Energy	CIO
Real Estate	Marketing & Advertising	CFO	IT Security	BFSI	Government
Hospitality	HR	Legal	ET TravelWorld	B2B	CIOSEA
HRSEA	HREMEA	Education	EnergyWorldMEA	Manufacturing	Pharma