



G·SAVE

In-site galvanizing of oxidation-corroded (aged) hot-dip galvanized guardrail

Eco-friendly plate-like zinc metal paint on a molten galvanized metal that has been corroded the zinc restoration technology with G·SAVE



Room temperature curing zinc flake coating

In-site galvanizing of oxidation-corroded (aged) hot-dip galvanized guardrail

Reduce national treasury
75.7% reduction




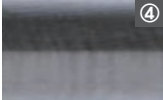



Reduce carbon emissions
99% reduction

Secure
Serious Injury prevention

G·SAVE Product Use

- G·SAVE is a process that extends the life of guardrails by galvanizing the corroded and reduced zinc with eco-friendly metallic paints on site.
- Road structures such as guardrails are protected by forming hot-dip galvanizing (KS D 8308) on the iron. At this time, **zinc is reduced every year by the sacrificial anode method to $0.7\sim 2.1\mu\text{m}/\text{year}$ in general areas and $2.1\sim 4.2\mu\text{m}/\text{year}$ in high corrosion environments**, limiting the service life of the guardrail.

Corrosion Flow in Hot-Dip Galvanizing

Division	Eta(η) layer				Zeta(ζ) layer	Delta(δ) layer	Iron
Zinc Residual	100%	80%	70%	Best time to repair 65~50%	30~40%	10~20%	0%
Corrosion Flow							

①Initial high glossy texture maintained → ②Gloss disappears → ③Blackening/whitening progresses → ④Whitening of the entire surface → ⑤Localized red rust corrosion occurs as the zinc is continuously oxidized, exposing the iron alloy layer → ⑥Rust deepens → ⑦Red rust occurs on the entire surface as the zinc is completely lost, exposing the iron

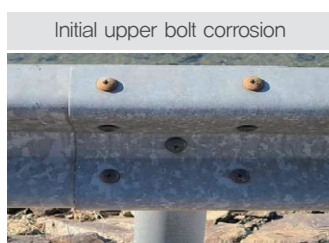
- As the zinc is sacrificially rusted in the eta layer, the zinc is gradually lost and when the zeta layer is exposed, red rust begins to develop and spreads from the delta layer, ending the anticorrosion life.

Best Time to Repair Hot-Dip Galvanizing Guardrail

The optimal time for maintenance is when 50 to 65% of the zinc remains before the zinc is lost and red rust corrosion occurs.

- Installation period** : 7~10 years old in high corrosion environment, 15~20 years old in normal corrosion environment
- Appearance** : Guardrail with red rust corrosion on guardrail bolts ($50\mu\text{m}$) and guardrail ($77\mu\text{m}$)
- Structural judgment** : Guardrail with structural reinforcement such as post reinforcement and rail reinforcement
- Customer judgment** : Guardrails that require urban aesthetic restoration purposes such as discoloration and blackening of the exterior.

Real-Field Red Rust Flow of Hot-Dip Galvanizing Guardrails



- Guardrail top fastening bolts develop red rust corrosion first
- Front guardrail top red rusting progresses
- Entire front guardrail rail is red rusted

※ Guardrails with red rust on the bolts are recommended for repair.

G·SAVE Characteristics

Technical history	2019 [Ministry of SMEs and Startups] Successful new product development project under purchase condition
	2021 [Ministry of Land, Infrastructure, and Transport] Selected as an excellent technology by Iksan Local Land Management Agency
	2022 [Korea Expressway Corporation] Registered as a new technology in the Road Technology Market



AI Detection Technology

Determine the extent of exterior corrosion on structures with on-board AI vision to predict service life and detect safety issues



On-site Repair Without Removing

Room temperature curing process restores zinc on-site without removing the guardrail to achieve performance equal to or better than new guardrail



SST 1,000hr Excellent Corrosion Resistance

High corrosion resistance with an average film thickness of 20μm, maintaining appearance without corrosion for a long period of time



Superior Durability

Supplemented with reduced zinc rather than simple shielding to resist long-term outdoor exposure to moisture, salt, UV, and more



99.4% Carbon Emissions Reduction

Construction method that can improve environmental issues such as carbon and fossil fuel use generated by the production and replacement of new guardrails



77% Treasury Savings

Guardrails are bulky, installed in a row, difficult to dismantle and replace, and costly to install new



Hazardous Chemical-Free Metal Paint

No toluene, xylene, or other hazardous chemicals
RoHS and safety-checked household chemicals certified



Worker Safety Reduces Risks

Reduce musculoskeletal strain on workers and the risk of accidents by eliminating dismantling and reinstallation

G·SAVE Process

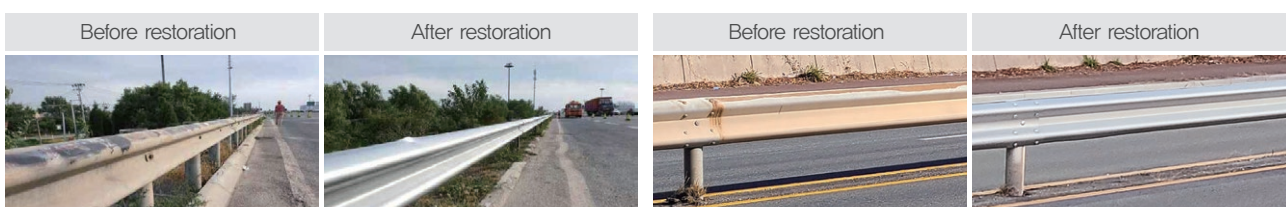


G·SAVE Corrosion Performance Comparison with New Hot-Dip Galvanizing

KTR KOREA TESTING & RESEARCH INSTITUTE

Salt Spray Test(SST) 1,000hr				Cyclic Corrosion Test(CCT) 40cycle			
Hot-dip galvanizing		G·SAVE		Hot-dip galvanizing		G·SAVE	
Before	After	Before	After	Before	After	Before	After

G·SAVE References





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