



ZINGA

Film Galvanising

www.zinga.eu





Zingametall Company

Presents

“Cathodic Protection on Zinganised Bridges”



ZINGA

BRIDGES

Main characteristics



What is Zinga?

- ZINGA is a **one-component** liquid zinc coating.
- The zinc content in the dried film has a minimum zinc content of 96%
- The zinc purity is 99.995%, giving it a high level of conductivity
- ZINGA is not a paint, but it can be spray-applied like a paint
- It is fast drying and can be walked on after one hour
- ZINGA behaves exactly like hot dip galvanising, and depletes with age
- It can be re-loaded at any time
- It is totally compatible with hot dip galvanising, and repairs it extremely well
- Easier to work with than zinc thermal spray
(it does not have to be sealed with epoxy sealers).

Main characteristics



What is Zinga?

- Unlimited shelf life and an unlimited pot life
- Fast drying – second coat applied after only one hour
- Contains no toxic or carcinogenic solvents
- Can be used under water on new bridge components that are to be immersed
- Will take any impact and never crack or flake off
- Fully weldable and certified to BS 6853: 8.4 (smoke emissions)
- Fully weldable and certified to BS 6853: B2 (toxic emissions)
- Product quality warranty against corrosion for 25 years +
- Replaces, repairs or builds-up hot dip galvanising and zinc thermal spray coatings

Cathodic Protection



Zinga provides strong Cathodic Protection to steel:

- Steel has a natural electrical potential range of -600 to -700 mV
- Zinga has an electrical potential of -1124 mV
- The minimum driving voltage = 424 mV (0.42 volts)
- The maximum driving voltage = 606 mV (0.60 volts)

Cathodic Protection



Zinga provides strong Cathodic Protection to stainless steel:

- Stainless steel has a electrical potential range of - 460 to - 580 mV
- Zinga has an electrical potential of -1124 mV
- The minimum driving voltage = 466 mV (0.47 volts)
- The maximum driving voltage = 664 mV (0.66 volts)

Cathodic Protection



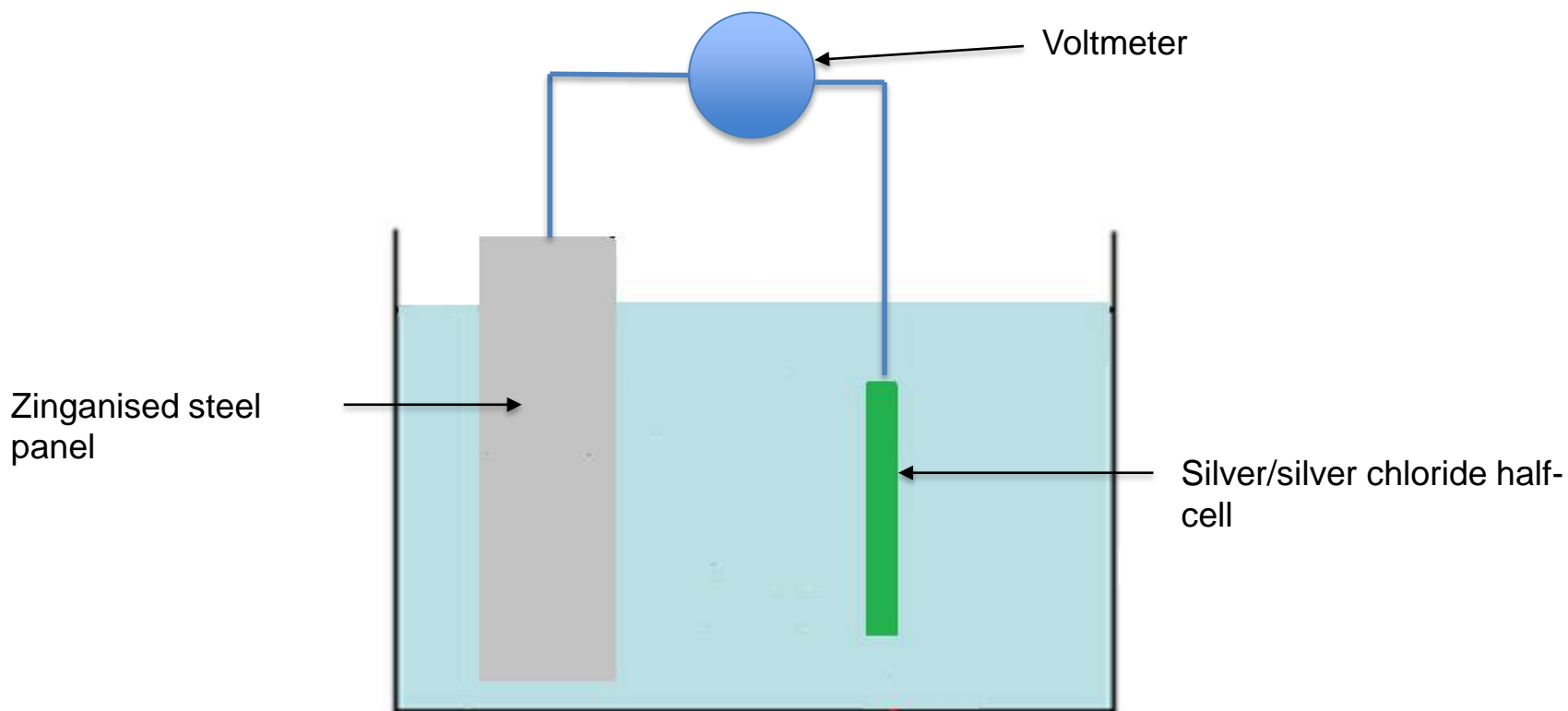
Zinga provides Cathodic Protection to aluminium alloy (5000 series):

- Aluminium alloy has an electrical potential of -600 to -750 mV
- Zinga has an electrical potential of -1118 mV
- The minimum driving voltage = 374 mV (0.37 volts)
- The maximum driving voltage = 524 mV (0.52 volts)

Cathodic Protection



Measuring the Cathodic Protection to steel:



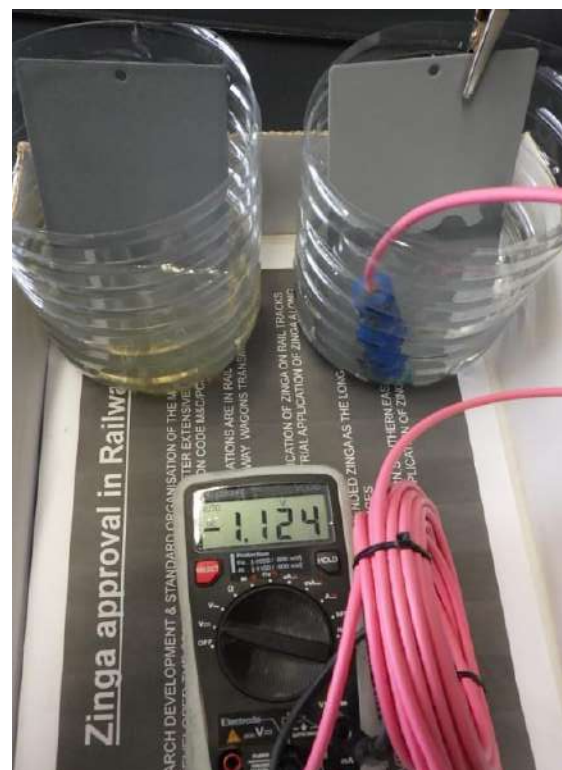
Cathodic Protection



Measuring the Cathodic Protection to steel:



Zinc rich paint: 759 mV



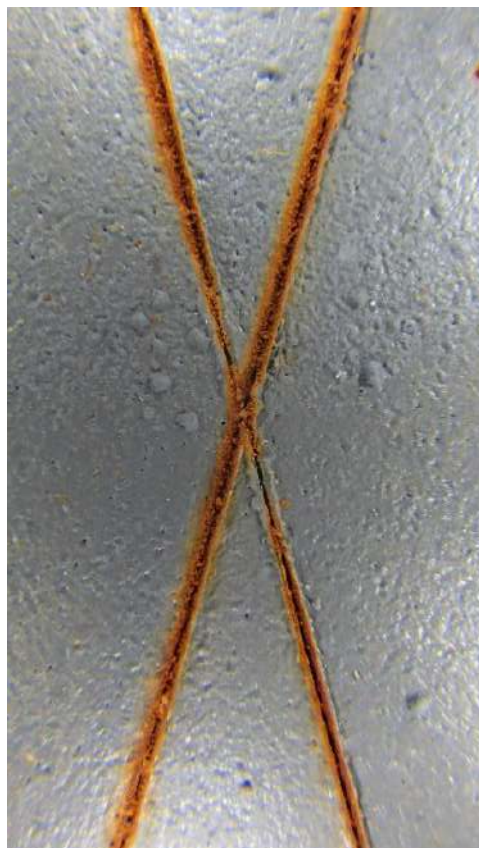
Zinga: 1124 mV

Voltage measurement
in salt water
(electrolyte) with an
Ag/AgCl reference
electrode

Cathodic Protection



Level of Cathodic Protection to steel:



Zinc rich paint



Zinga

7 days exposure to salt water

Main characteristics

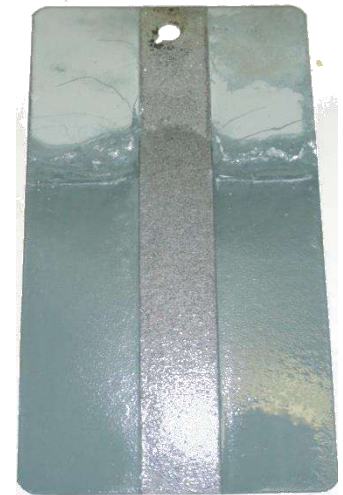
- **Active**, cathodic, galvanic protection
→ Very high zinc content (96%)
~ Hot-dip, metallisation
- **Passive** barrier protection
→ Zinc salts on top of surface
~ Protective paints
- One component organic Zinc coating

ZINGA:

- is NOT a paint
- does not form a closed film
- will never peel off
- will never flake



Untreated



Treated except
for 2cm strip

Main characteristics

- It is safe and easy to use
- It is a one-component product
- Zinga has unlimited pot-life and shelf-life
- Protects longer than hot-dip galvanizing in marine environments
- Can be applied in a paint-shop or on site
- Can be used to re-coat existing galvanizing
- Existing layers of Zinga can be re-coated
- Rust under-creeping is physically impossible



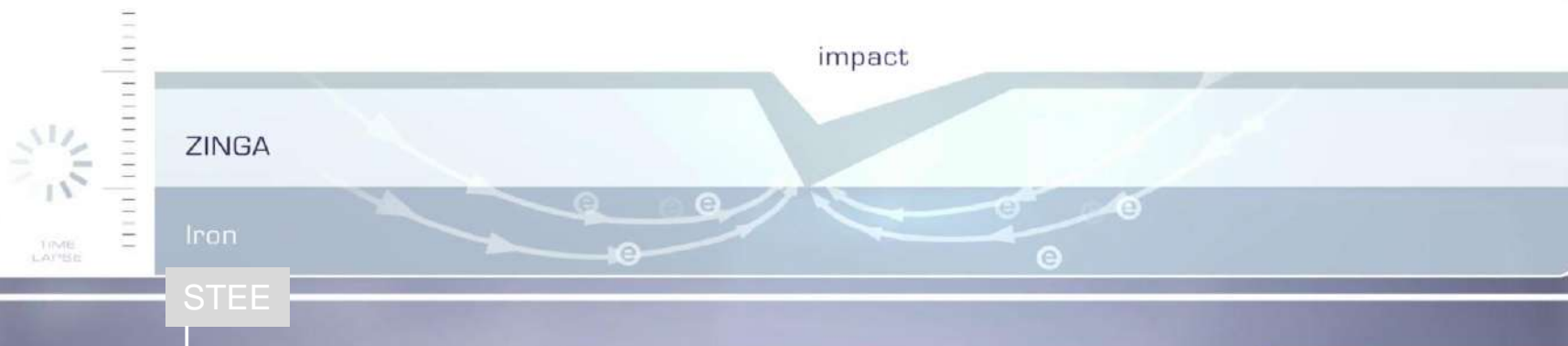
Kalvoya Bridge, Norway

Working principle



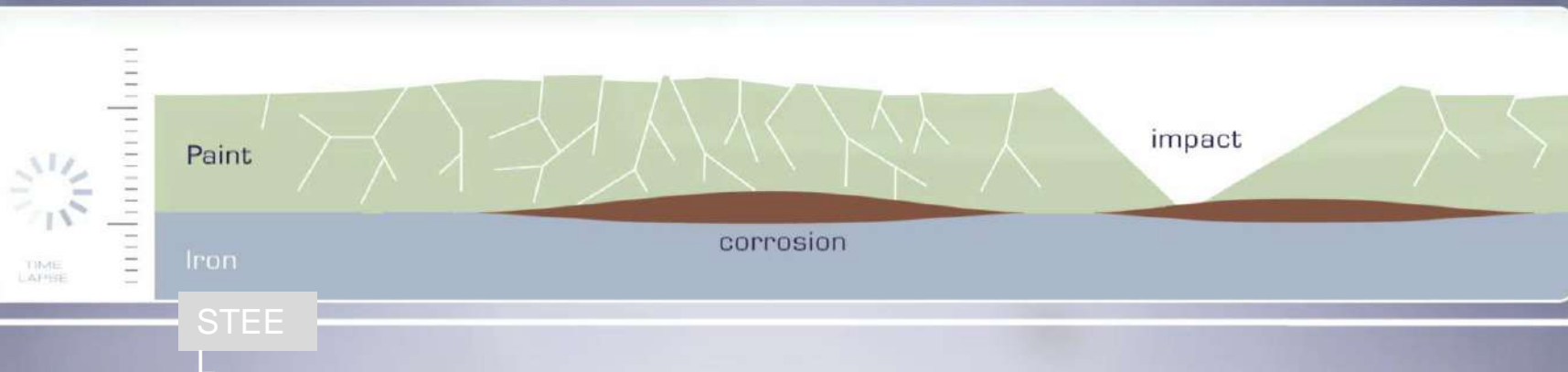
ZINGA

ACTIVE & PASSIVE PROTECTION



PASSIVE PROTECTION

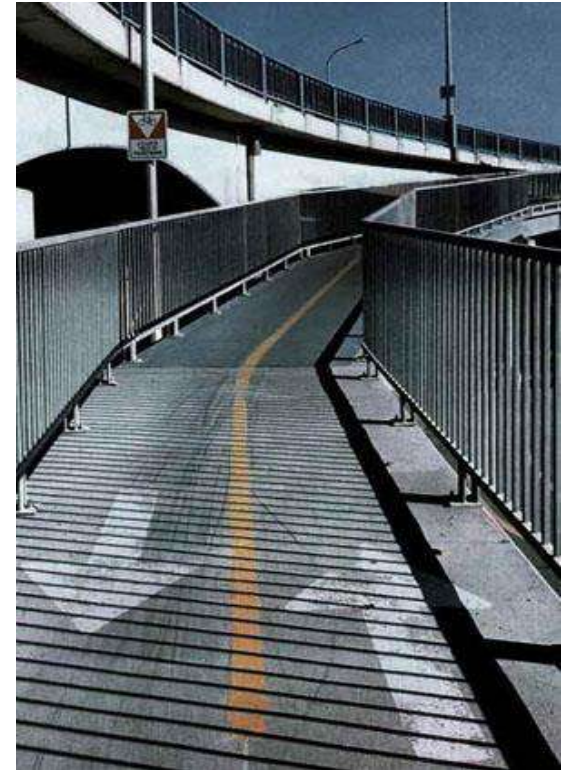
PAINT



Advantages



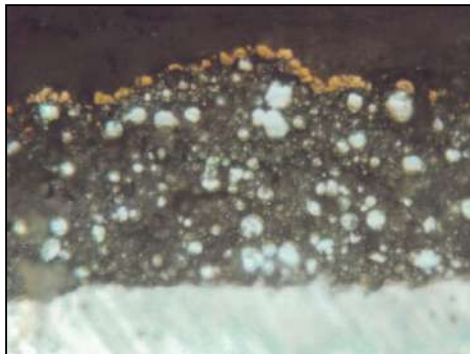
- Quick drying times: touch-dry in 10 min (20° C)
- ZINGA second layer: 1 hour after touch-dry
- Coated with other paints after 6 to 24 hours
- Will never peel off and it is not brittle
- Can be heavily compressed or squashed
- Does not crack under heavy impact
- Local damages can be repaired easily
(e.g. after transport or heavy mechanical impact)



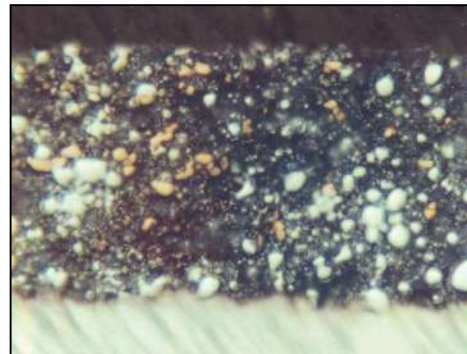
Welland Bridge, Canada

Advantages

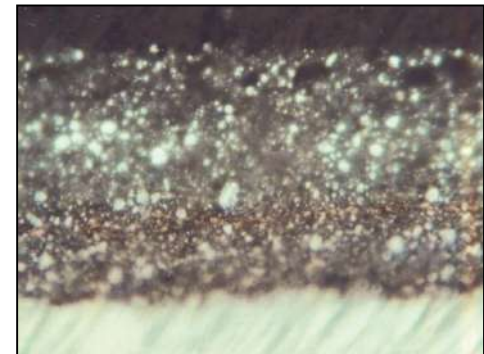
- Galvanised structures can be *recharged or reloaded* with ZINGA
 - ZINGA on ZINGA
 - ZINGA on Hot dip galvanizing
 - Zinga on Metallising
- Each new layer of ZINGA blends perfectly with the previous one.
Additional layers all blend to one single, homogeneous ZINGA layer



Gold particles on top of ZINGA

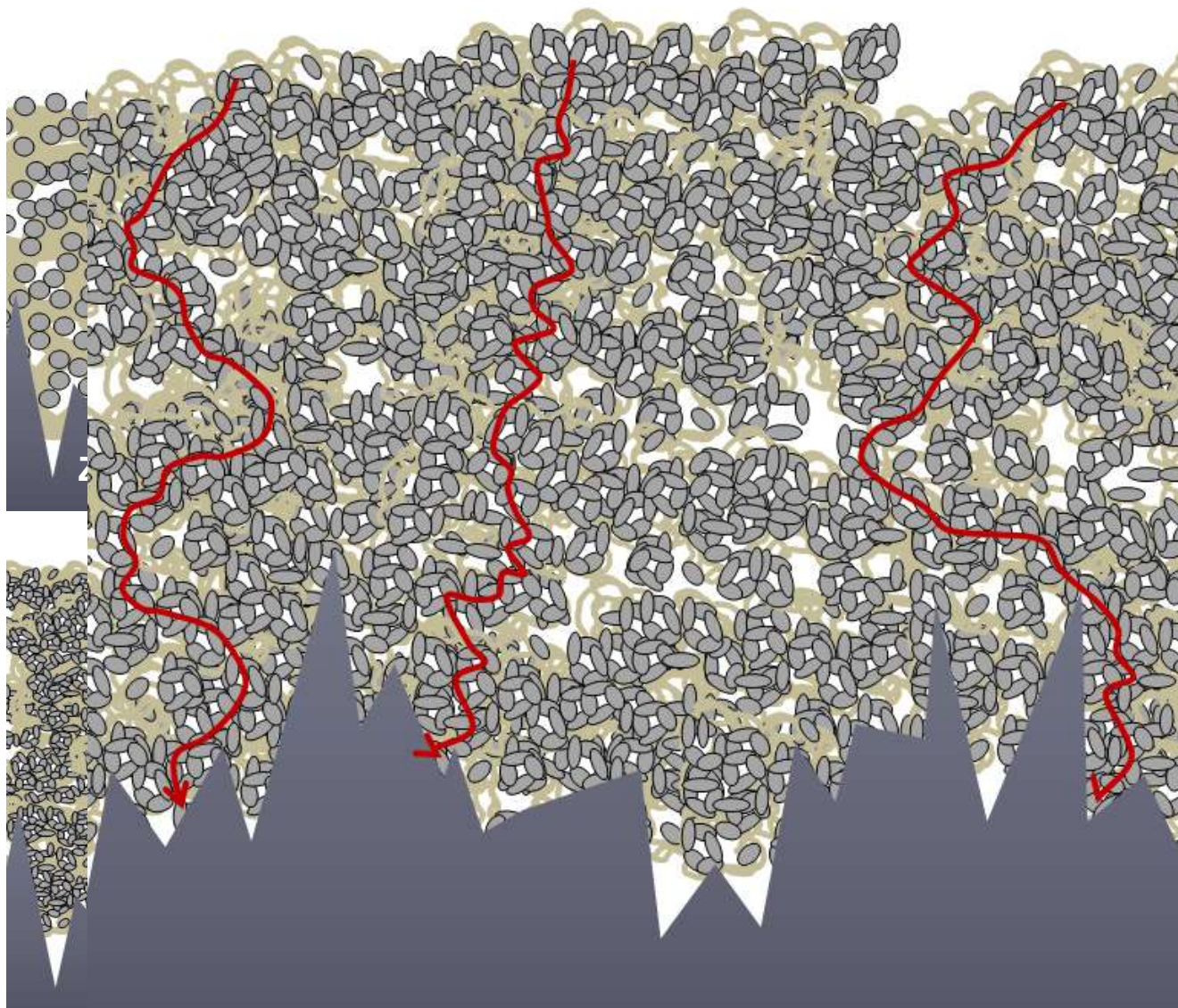


Gold particles blend
in the two layers of ZINGA



Gold particles in between
the two layers of epoxy paint

ZINGA vs Zinc rich paint



Comparisons

- Reduced layer thickness for equal protection = **reduced application costs**
 - ISO 12944 tested: high resistance in C5 – Very High environment
 - Comparable resistance from traditional systems (acc. ISO 12944):

ZINGA system	Metallisation	Hot-dip	Paints
ZINGA	Metallisation (Zn) 100 µm	Hot-dip 80 µm	Zn-Epoxy / PUR
ZINGA	Epoxy tie-coat	Epoxy / PUR	Epoxy / PUR
	Epoxy / PUR	Epoxy / PUR	Epoxy / PUR
	Epoxy / PUR	(Epoxy / PUR)	Epoxy / PUR
120 - 180 µm	340 µm	320 µm	360 µm
< 1 day	Min. 3 days	Min. 4 days	Min. 3 days

- This means that 2 coats of ZINGA with a total of 120-180 µm DFT gives a **performance equivalent to a 320 to 360 µm DFT traditional coating system !**
- **ZINGA can be applied in less than 1 day = less shutdown costs !**



4546



Bridge References

ZINGA

Bridges



Kalvoya Bridge: Norway. Coated in 1985 and when it was inspected in 2014 after 29 years it was still in excellent condition. System used: 2 x 60 μ m DFT

Zinga

Bridges



Burdekin River Bridge, Australia



The Burdekin River Bridge is the longest steel bridge in Australia
System: Zinga 2 x 90um

Bridges



Biloxi Bridge in Mississippi, USA

- One of the largest steel bridges in the USA
- Required five blasting and coating teams on the bridge at one time

- Zinga applied in humidity of 80% +
- Normal paints cannot be applied above 70%
- System: 2 x 90 μm DFT of Zinga



Bridges



Haussmans Bridge, Oslo. Norway

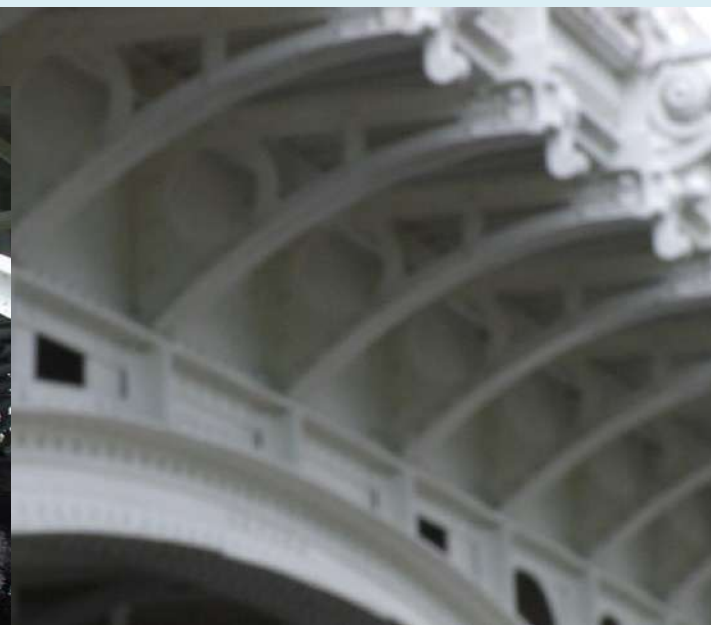


System:

Zinga: 60 – 80

Zingalufer 100 – 110

Zingaceram PU 60-80



Bridges



Haussmans Bridge, Oslo. Norway



The whole bridge is made of cast iron, and all components are rivetted together. There is no welding on this entire structure.



Bridges



Humber Bridge, UK



When it was opened, at 2.2 kms in length, this was the longest bridge of its type in the world; until 1998, with the completion of the Akashi Kaikyō Bridge in Japan.

Bridges



Stallarhomen Bridge, Sweden



Bridges



Stallarhomen Bridge

This is the bridge on the border of Norway and Sweden, and it is a rotating swing bridge to allow ships to pass through.

Following two years of testing, this is the first Swedish bridge to coated using the Zinga system.



Before



After

Bridges



Stallarhomen Bridge

Coating of main bridge beams



Zinga being applied - no mist or any mess being created



Zinga layer drying

Bridges

Ranasfoss Bridge, Norway



. This is a well-known suspension bridge with a good history



Suspension tower on the east bank

Bridges



Ranasfoss Bridge:



Beams on the bridge deck were all blasted to SA2.5, and every rivet was blast-cleaned and coated perfectly



Scaffolding went up 8 stages to give blasting access on the steel support cables.

Bridges



The famous **Cape Town Swing Bridge**



System:

Zinga: 80
Zingalufer: 100
Polyurethane: 70



Bridge support cables



Bridge support cables are protected with Zinga, and due to its high coefficient of distortion (17%) the coating system on the steel cables can expand and contract with the heat of the sun, and under heavy traffic loads or high winds.



Coating cables using a paint mitt

Bridge support cables



Inspection of bridge cables after the coating application is completed and the zinc is still drying. Checking WFT's is very important.



Bridge bearings



Moving pivot bearing



Corroded bridge bearing

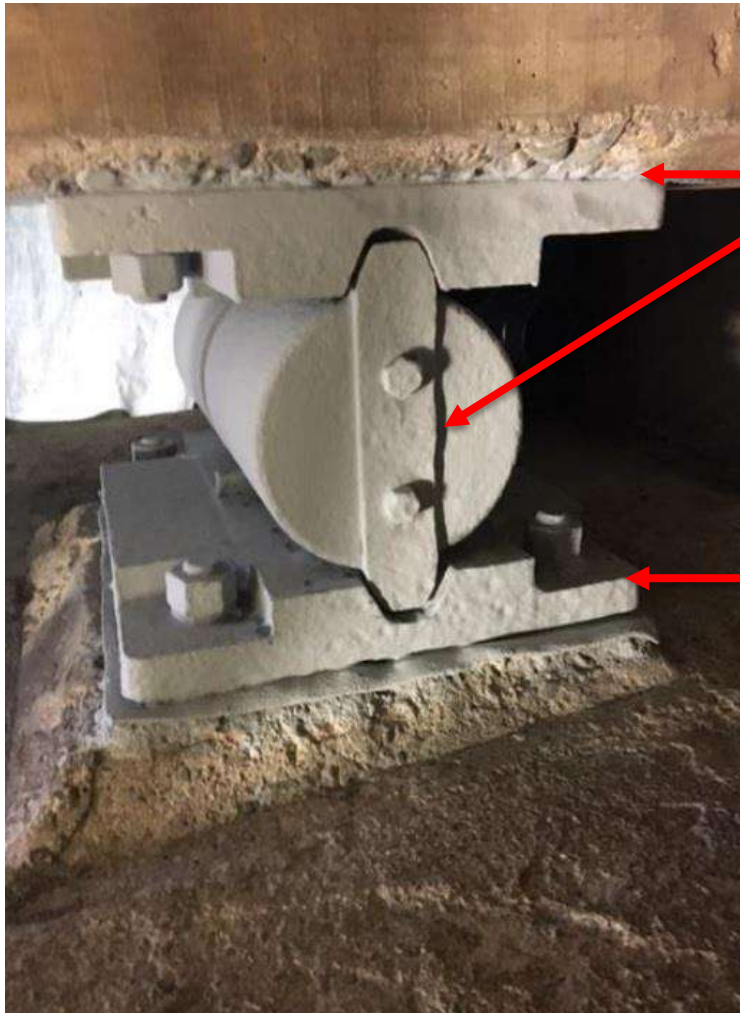


Wet-blasted to SA 2.5



Coated with Zinga 2 x 90 µm

Bridge bearings



Stripe-coating is done on all crevice joints.

Stripe-coating done on all edges

Full coated with Zinga 1 x 90 μm after 30 minutes

Second coat of Zinga after 60 minutes

Railing stanchion repairs



Stanchions arrowed in
red

Railing stanchion repairs



A new project about to commence
has 7500 corroded stanchions!!



Concrete removed to depth of 70 mm



Stanchion base is blast-cleaned

Railing stanchion repairs



Heavy rain after Zinga application

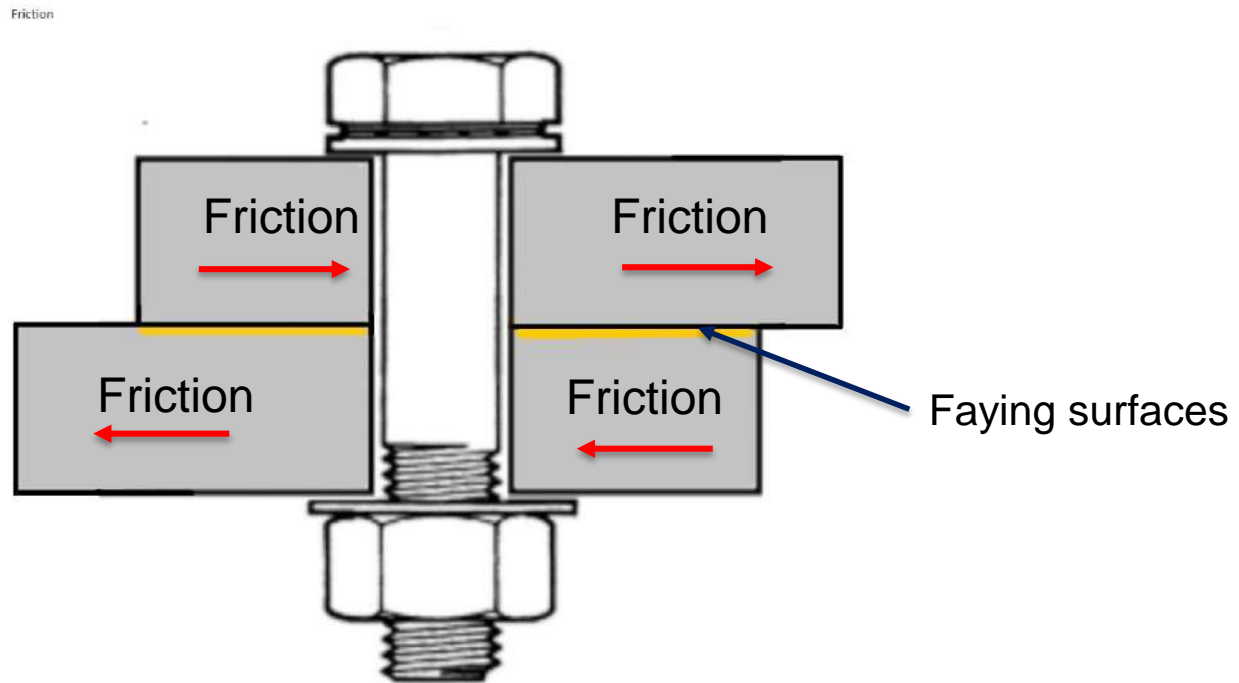


New concrete applied after only one hour

Nuts and bolts on bridges



Slip-critical bolted



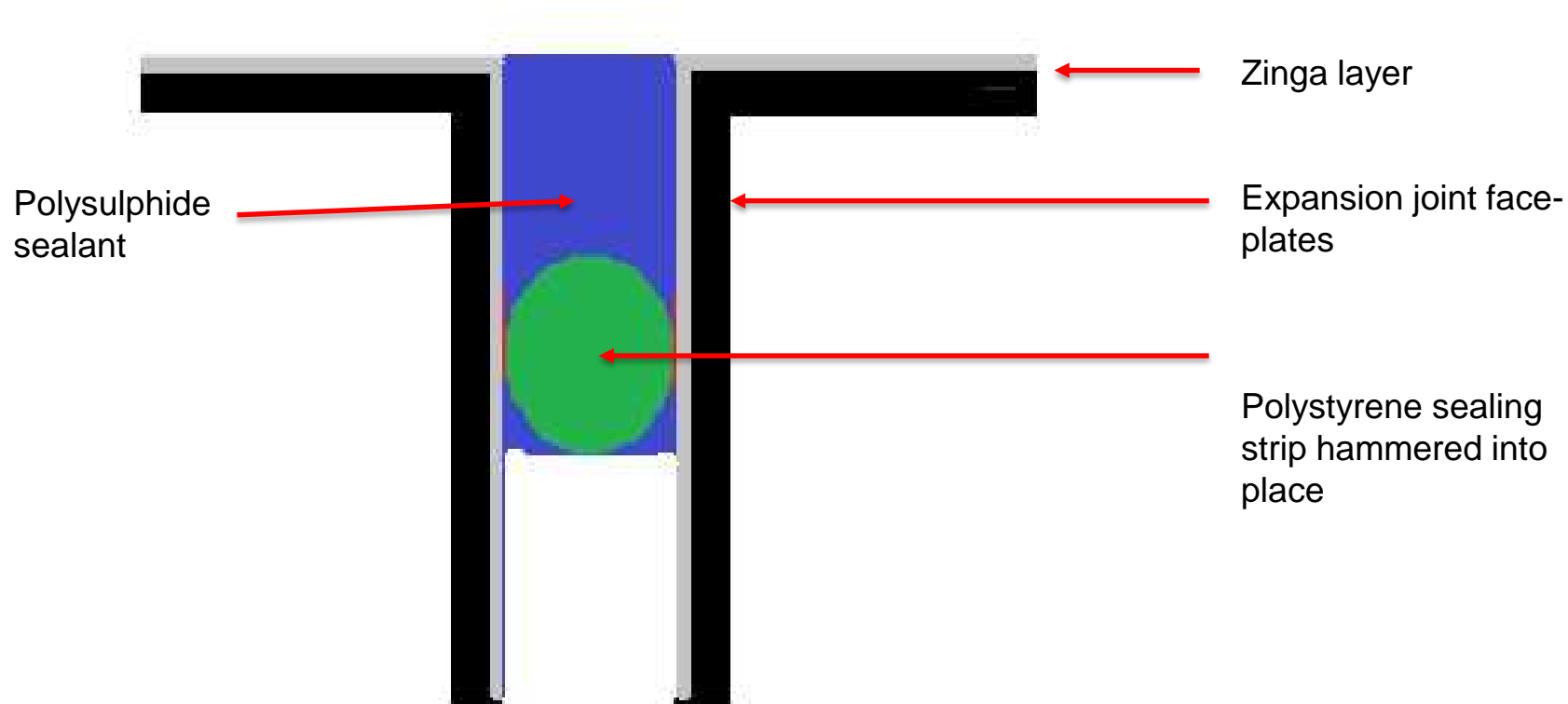
Slip coefficients: minimum requirement = 0.50

Hot dip galvanising: 0.31 = Class 'A'

Blast-cleaned steel: 0.50 = Class 'B'

Zinga: 0.52 = Class 'B'

Expansion joints on bridge decks





Thank you for your attention!!

Any questions?