

## RATHDOWNEY BRIDGE - AUSTRALIA

There are several steel bridges on the standard Gauge line running from Sydney to Brisbane through the Rathdowney region ranging from 1 to 6 spans. These bridges would have been built around the 1930's. In 2003 **Queensland Rail** allocated AU\$ 500,000 to blast and repaint as many of the bridges in the region as possible with 2 coats of **ZINGA** to a DFT of between 120 and 150  $\mu\text{m}$ . The expectation (based on historic costs of existing systems) was that they would manage to paint 6 or 7 bridges. The project team completed 11 bridges within the allocated budget, due in a large part to the project efficiencies gained using **ZINGA**. In October 2012, an inspection revealed staining from the tannins from the transoms as well as some rust staining from un-treated steel above the deck, however a quick wash removed the stains revealing **ZINGA** in perfect condition. Several DFT readings were taken on 3 bridges revealing a consistent average of 126  $\mu\text{m}$ .



System:  
Min. ZINGA 2 x 60  $\mu\text{m}$  DFT

An inspection was carried out by **Queensland Rail** approximately **10 years after the application of ZINGA**. It was agreed to control 5 bridges (out of 11) which would be representative since all the bridges treated are in the same region and in the same environment.

Report: Inspection of the Paint Coating - Standard Gauge Bridges Contract of 2003

On 31st October 2013, the coating on five bridges was inspected by Glenn Duggan and Andrew Weatherburn from **ZINGA**, and Juanita Taylor (Design Engineer) and Laurie Kathage (Civil Engineer) from Queensland Rail. This inspection was to determine the condition of the **ZINGA** after 10 years, with no touch-up work having been performed during that time. The inspection was performed using visual methods and by sampling DFT readings taken through the full depth of the girders at random cross-sections. The **ZINGA** was examined for cracking, crazing, peeling, oxidization, as well as for signs of rusting of the substrate, including the return of rust in previously badly rusted areas (pits, crevices).



Sample Report on 1 Bridge at km 892.849 – 3 spans

- Coating condition – sound. No touch-up work required.
- No sign of rusting on bolts, nuts, threads or around rivets.
- The DFT of **ZINGA** on the underside of bottom flange is typically 150  $\mu\text{m}$ , indicating no weathering has occurred in these areas and that the original **ZINGA** was in excess of the specified minimum of 120  $\mu\text{m}$ .
- The min. DFT of the **ZINGA** on the lower part of the web (outside face) is typically 180  $\mu\text{m}$ , indicating either no weathering has occurred on this vertical surface or that the original coating was in excess of the specified minimum of 120  $\mu\text{m}$ .
- The min. DFT of the **ZINGA** on the upper surface of the bottom flange (outside) is typically 160  $\mu\text{m}$ , indicating that approx. 20  $\mu\text{m}$  of **ZINGA** has weathered away over 10 years, i.e. 2  $\mu\text{m}$  per year, assuming that the original DFT was approx. 180  $\mu\text{m}$  as on the adjacent area of the web. This area is the fastest weathering on the girders. If this rate of weathering were to continue, it is expected that partial cover of **ZINGA** will be required 25 years after the initial contract (full clean and paint).

### Conclusions and Recommendations

Given that no maintenance painting has been performed on the bridges since the cleaning and coating with **ZINGA** 10 years ago, it is an extraordinarily good result that no touch-up work is required on any parts of the bridges at this time. The **ZINGA** is 100% sound, including the potential problem areas of edges, old pitting, defined edge of the coating adjacent to rust, sharp laminations and bolt threads.

- Based on an assumed weathering rate of 2  $\mu\text{m}$  per year, it is expected that only partial cover coating would be required when the coating weathers down to 70  $\mu\text{m}$  at 25 years after the initial contract (full clean and paint), i.e. in 15 years' time. Because of the guesswork in this assumption, it is recommended that good maintenance practice would require checks of coating thickness on the most exposed sections of the spans in 5 years and then every 2 years.
- It is suggested that **ZINGA** repeat the inspection of the same bridges in 5 years.