

**FRP – BRIDGE DECK NEW OREGON ROAD BRIDGE INSTALLATION****What the innovation is:**

Wagners FRP (Fibre Reinforced Polymer) Bridge decks - designed to provide superior, long term performance as compared to typical steel or concrete bridges. A Wagners FRP Bridge deck is a bridge deck made of non-corrosive elements. It is designed to utilise the lightweight nature of composite fibre components, allowing fast installation times to occur.

**Why is it innovative:**

At a fraction of the weight, the fibre composite components of Wagners FRP bridge decks are up to six times stronger than steel and concrete and are made from polymers (plastics) reinforced with carbon, glass and/or aramid (Kevlar) fibres. The benefits of Wagners FRP Bridge decks being:- high strength to weight and stiffness to weight ratios, corrosion and fatigue resistance, tailorability, reduced ongoing maintenance costs, longer life spans and rapid construction resulting in significant installation cost savings. Fundamental in the easy to assemble, the decks provide the necessary flexibility and durability, required in highly corrosive environments. It should be noted that this particular bridge from time of order was designed, engineered to AASHTO Standards, fatigue & destruction tested, constructed in Australia, shipped to the US and installed inside, 10 months. The onsite installation period of the superstructure was completed in 4 hours. This is attributed in part to the extensive optimization of the initial hybrid concept that was co-developed in Australia in 2001. In this time Wagners have reduced the cost of manufacture (10 fold) to a price that is comparable with conventional, 'in situ' bridge designs.

**What it changed or replaced:**

The unique structural and chemical characteristics, particularly in civil and structural engineering applications of fibre composites, will increasingly challenge the supremacy of conventional building materials such as steel, timber and concrete, particularly in weight sensitive applications and in environments that are corrosive or environmentally sensitive. The New Oregon Rd Bridge replaced an aging and corroded steel reinforced concrete bridge. Erie County uses 96,000 tonnes of de-icing salt, annually, on its 1200 lane miles of road, creating a very corrosive environment for steel and/or concrete structures. The results of testing demonstrate that advanced fibre composites and concrete can be combined effectively to produce a new variety of composite bridge. The structural behaviour of the resulting structure has proven to be predictable and consistent with bridges made from conventional materials. The design of the composite deck concept is deflection controlled. There are large strength reserves in the structure. This combined with the load sharing, redundancy in the system and resulting robustness mean that the system is suitable for a range of deck applications where safety and durability are paramount.

**Where and when it originated, has been used, and is expected to be used in the future:**

Composite Fibre materials are not revolutionary. Wagners methods of application have been developed as a result of an extensive Research & Development Program which began in 2001.

**Bridge Decks** - This program continues to fine tune the fundamentals of our bridge decks. It is envisaged that fibre composites will play a major role in the construction of wharves particularly in ocean precincts where in the past the concrete structures have been subjected to and failed due to the highly corrosive environment.

**Cross-Arms** - The current decay rates of timber cross-arms, along with the shortage of hardwood timbers suitable for use in electrical distribution networks, has seen Wagners embark on a program to commercialise composite fibre cross-arms. Wagners composite fibre cross arms are: 1/3 the weight of timber, inert, non-conductive, durable, eliminate Pole Top fires and are UV and humidity tested. Rigorous 'on-line' testing has resulted in cross-arms being installed by Energex into distribution networks in south east Queensland, Australia.

**Others** - Wagner's CFT continues to research engineering solutions. These include:

- Railway Sleepers
- Girders for Timber bridge rehabilitation
- Complete flatbed Semi Trailer - Chassis and deck

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# Oregon Road Bridge Installation – Duration 4 hours



(1) Installation Site



(2) Arrival of Bridge Decks to site



(3)

Placement of Decks



(4)



(5) Completed Structure



(6) Guard Rail Installation

