Composite Fibre Technologies (CFT)

CAPABILITY STATEMENT

NEWCASTLE MEMORIAL WALK BOARDWALK,
NEWCASTLE, NSW, AU

WAGNERS WAS ACKNOWLEDGED BY THE PREMIER OF QUEENSLAND AT THE SMART BUSINESS AWARDS IN 2009.

LISTED ON THE AUSTRALIAN STOCK EXCHANGE (ASX) IN 2017.

INDUCTED INTO THE QUEENSLAND BUSINESS LEADERS HALL OF FAME IN RECOGNITION OF THEIR INTREPID ENTREPRENEURSHIP IN SUCCESSFULLY COMPLETING HIGHLY CHALLENGING INFRASTRUCTURE PROJECTS NATIONALLY AND INTERNATIONALLY IN 2018.

WAGNERS IS ISO 9001, ISO 14001 AND ISO 45001 CERTIFIED, ACCREDITED BY SAI GLOBAL.

Certified System Quality ISO 9001 SAI GLOBAL
Certified System Environment ISO 14001 SAI GLOBAL
Certified System OHS ISO 45001 SAI GLOBAL

WAGNERS IS A DIVERSIFIED AUSTRALIAN CONSTRUCTION MATERIALS AND SERVICES PROVIDER.

From a foundation as an independently owned company over 30 years ago in Toowoomba, Wagners is now an ASX-listed operator in domestic and international markets and one of Queensland's largest construction materials and mining services companies.

A LONG AND STRONG HISTORY

Established in 1989 in Toowoomba, Queensland by Henry, John, Denis, Neill, and Joe Wagner; Wagners has a reputation for delivering high quality products and services both within Australia and internationally. Starting with three trading divisions - Wagners Concrete, Quarries and Transport and from there, rapidly expanded to include cement, flyash and lime, reinforcing steel, on-site concrete supply, contract crushing and bulk transport, as well as lightweight composite fibre products since 2002.

Celebrating more than 30 years of operations, Wagners is constantly striving for innovative, effective and economic solutions, when supplying for the construction and mining industry both within Australia and internationally.

WAGNERS COMPOSITE FIBRE TECHNOLOGIES

COMPOSITE MATERIALS HAVE PROVEN TO BE A MATERIAL OF CHOICE INCREASINGLY USED BY CIVIL ENGINEERS IN RECENT YEARS.

As the use of composite materials becomes more common, their performance advantages have been well received by the aerospace and marine industries. Additional performance advantages such as high strength, low weight and a long service life are achieved as Wagners composite products do not corrode, rot or shrink. In certain applications, composite materials are superior to traditional construction materials such as steel and wood, ensuring a practical investment for the future of the asset.

> **WAGNERS HAS PIONEERED THE USE OF COMPOSITE MATERIALS BOTH IN AUSTRALIA AND INTERNATIONALLY, EXPORTING PRODUCTS FROM TOOWOOMBA, QUEENSLAND TO LOCATIONS SUCH AS THE UNITED STATES, UNITED KINGDOM, NEW ZEALAND, UAE, RUSSIA, MALAYSIA AND BRAZIL.**

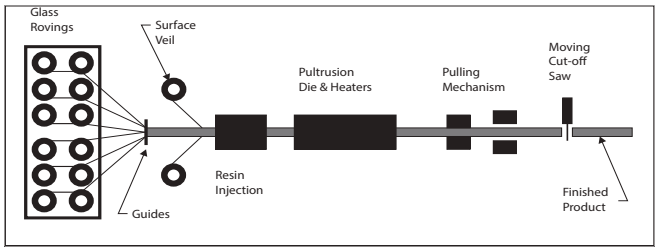
We are credited with the manufacture, design, and installation of the world's first composite road bridge (Coutts Crossing, NSW, AU in 2003) on a public road network. Our continued research and development ensures we remain a leader in the design and implementation of this exciting building material.

Wagners composites have been used in transportations, marine and electrical applications, amongst many others; with our experienced staff building these structures. Many years of research and development have resulted in the successful application of composite fibre technology to a number of products including wharves, road bridges, electrical crossarms and pedestrian structures.

WAGNERS COMPOSITE BRIDGE INSTALLATION

PULTRUSION

Wagners use the 'pultrusion process' to fabricate the structural fibreglass sections. These sections are traditional in geometry and shape to that of rolled hollow section steel but are manufactured from fibreglass reinforcements and vinyl ester resins. The material combination has been chosen by Wagners to optimise the structural system as well as maximise cost efficiency.



PULTRUSION PROCESS

While the structural products are generally manufactured by our in-house designed pultrusion machine, there are other FRP products supplied by Wagners which are manufactured using other processes appropriate to the product. Some of these processes include hand layup, injection moulding and filament winding.

WAGNERS FIBRE REINFORCED POLYMER

Fibre Reinforced Polymer (FRP) offers high strength, low weight, and long service lives as they are not prone to corrosion, rot or shrinkage unlike other materials more traditionally used by the construction industry. Wagners is expanding the use of fibre reinforced polymers in Australia and throughout the world, exporting products from Toowoomba, Queensland to locations such as the United States, UAE, Russia, and Malaysia.

PULTRUSION

Using the 'pultrusion process', Wagners manufacture structural FRP sections that are similar in geometry and shape compared to traditional cold-formed steel 'Rectangular Hollow Section' (RHS). These sections are made from glass fibres and vinyl ester resins. The material combination has been chosen by Wagners to provide the best structural solution for an economical cost.

Electrical-Corrosion Resistant (ECR) type glass has been selected as the initial building block for all Wagners FRP products. This high grade material has been selected for its impressive strength performance and workability. ECR type glass is also widely reported as having excellent chemical resistant characteristics.

To bind the glass fibres together, Wagners uses Vinyl Ester (VE) resin. VE resin has been selected over unsaturated polyester and epoxy resins because it provides strength and chemical resistant properties similar to epoxy resin to a significant cost advantage. In general, Wagners does not recommend the use of polyester resins for structural applications.

Fibre Reinforced Polymers performance advantages include durability, pest resistant, electrical insulation and design and manufacturing flexibility. These advantages further increase tensile strength to the products.

Because Wagners' pultruded FRP products have different properties to other materials such as steel, allowance needs to be made in design for greater flexibility in bending, concentrated transverse loads and bearing of bolts in holes.

MOOLOOLABA PEDESTRIAN BRIDGE, SUNSHINE COAST, QLD, AU

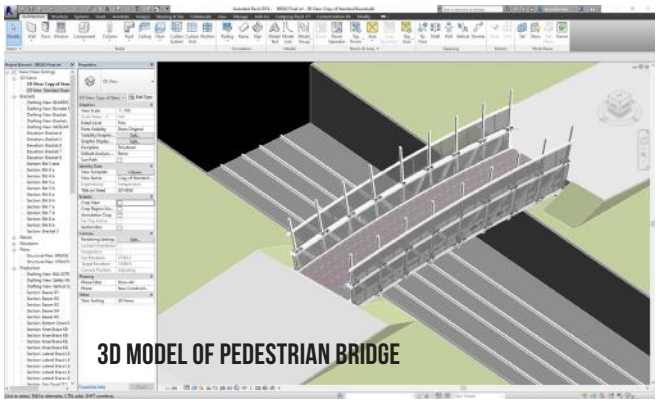
DRAFTING AND DESIGN

WAGNERS PROVIDES A COMPREHENSIVE RANGE OF DRAFTING AND DESIGN SERVICES FOR ITS CLIENTS FROM CONCEPTUAL TO ON-SITE ASSISTANCE.

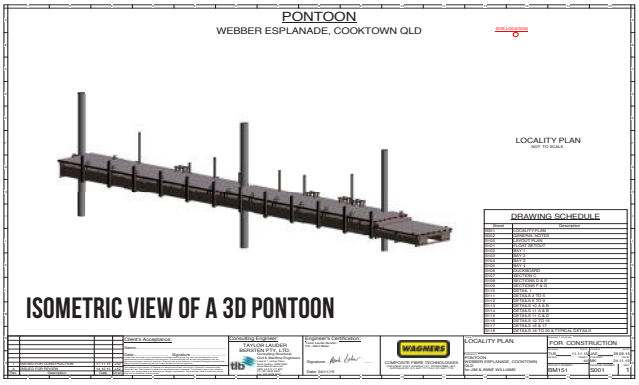
DRAWINGS

Wagners uses Autodesk Revit, to develop all its drawings and firmly believes in the positive impact 3-D Building Information Modeling (BIM). Revit allows Wagners to model its designs in a full 3-dimensional world to ensure the designs that we develop are free of duplication errors often found in other 2-dimensional drafting packages, as all plans, elevations, sections, details & materials lists we develop come from the same 3-D model.

Revit is also a useful tool in investigating clash detection, as everything can be loaded into the models from the ground terrain with the help of survey data to existing structures using point cloud data to minimize risks on-site during construction.



3D MODEL OF PEDESTRIAN BRIDGE

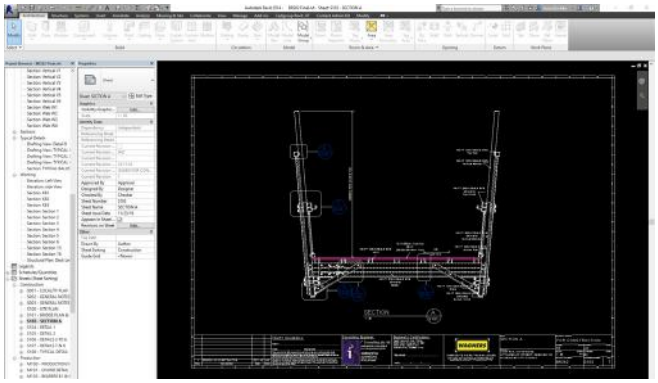


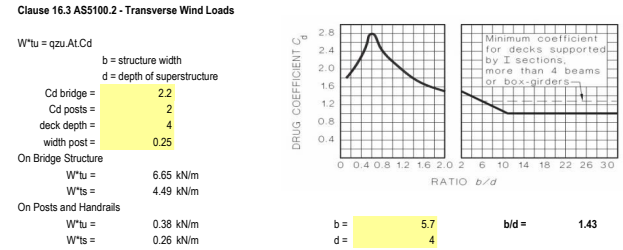
ISOMETRIC VIEW OF A 3D PONTOON

THIRD-PARTY DESIGNS AND CERTIFIERS

We have collaborated with many third-party engineers and certifiers over the years, from large companies like GHD and BECA to smaller local engineering firms and have multiple engineers and certifiers on permanent standby to help develop our designs.

Due to Wagners commitment to testing engineers are able to use the same sophisticated computer modelling programs such as Strand, Microstran and Space Gass to explore the engineering behaviour of our structures.





CALCULATION PACKAGE BY WAGNERS ENGINEERS

DRAFTING AND DESIGN SERVICES

- Conceptual design
- Rendering and walk-throughs
- Site investigations through a range of local contractors
- Detailed design and documentation for tendering and construction
- Construction site reviews
- Access to design model on-site through the A360 App (available through Android, Apple and A360 Desktop website)

RESEARCH, DEVELOPMENT AND TESTING

Wagners has always had a strong commitment to research, development and testing to strive to stay at the forefront of cutting edge composite fibre materials and remain an industry leader.

With extensive on-site testing facilities and a dedicated team of engineers and technicians, Wagners prides itself on its inhouse design, development and validation capabilities.

WAGNERS HAS PERFORMED ENVIRONMENTAL TESTING TO PROVE THE CAPACITY OF OUR PRODUCTS TO WITHSTAND ENVIRONMENTAL EFFECTS.

In the case of UV, we have performed our own UV testing with a UVB lamp (much more aggressive than a UVA lamp) to validate paint suppliers claims. We have performed temperature and acid/alkali and distilled/salt water testing in accordance with recognised international standards. The conclusion that we have reached to date is that a 100-year design life is viable on Wagners products.

Our current works look to perform further testing and investigate the appropriateness of extrapolation of results to correlate with a design life in years. Our project is leading the world in the definition of design life and establishment of test and analysis procedures for FRP materials.

THE SCIENCE OF FRP DURABILITY WITH WAGNERS

Wagners is considered a leader in the field of fibre composites engineering and has worked closely with Australian Government Research Institutions to ensure that the information contained is both relevant and reliable. Wagners design in accordance with either the Eurocomp Design Code (European) or the ASCE Pre-Standard for Load and Resistance Factor Design of Pultruded Fibre Reinforced Polymer Structures (American Society of Civil Engineers – ASCE). Both documents refer to service life in different ways. Wagners aims to utilise a slightly modified ASCE Pre-standard approach for the durability component of the design.

ASCE PRE-STANDARD:

SECTION 1.3.4 – DURABILITY AND ENVIRONMENTAL EFFECTS

Materials shall be selected in design so that structural components and systems can tolerate long-term environmental effects during the service life of the structure if they are not protected against such effects.

PERFORMANCE CRITERIA FOR THE STRUCTURE

This is generally provided by the loading code (i.e. AS5100 for bridges, 1170 for wind etc.) We factor loads to ensure a 70-year design life is achieved. Additionally, we limit stress in members at sustained loads to prevent fatigue and creep.

EXPECTED ENVIRONMENTAL CONDITIONS

This can be a project by project proposition, however Wagners have been supplying structures and electrical crossarms in harsh environmental conditions for over 13 years. Over this period, Wagners products have been subjected to UV, saltwater, alkali (in proximity to concrete), acidity and thermal cycling.

ULTRA VIOLET RADIATION

Wagners employ 'protective measures' in the form of a fluoropolymer paint system for pedestrian structure projects. We perform rigorous testing with the paint systems in a QUV test machine undergoing exposure to UVB lamps for 22,000 hours. Results from these tests show the fluoropolymer paint system retains gloss and colour fastness. This paint system allows us to provide our clients with a range of colours to suit their design while 'blocking' UV from the surface of our FRP sections. This paint comes with an expectation to reach 40 years before the first maintenance is required, after which an inspection regime is recommended.

SALT WATER

The ASCE Pre-standard requires a composite fibre element to retain 85 per cent of its strength after 1,000 hours of immersion in distilled water. Wagners has performed this test for both distilled and salt water in excess of 3,300 hours and has had no loss of strength.

CORROSION RESISTANCE

Wagners uses vinyl resins which have an extensive amount of published data on their resistance to a range of chemical environments where traditional materials such as steel, timber or concrete would fail.

THERMAL CYCLING

The ASCE standard requires 100 accelerated cycles of freezing and thawing and no more than 15 per cent maximum loss of strength. Wagners takes this test above and beyond what is expected and not only apply the freeze/thaw cycle but use an elevated temperature. We applied the following cycling to coupons which were tested in flexure; (i) three hours at room temperature, (ii) three hours at 60 degrees Celcius (in oven), (iii) three hours at room temperature, (iv) 15 hours in freezer (overnight).

This was repeated over a 13-week period (approximately 1,000 hours in the freezer) and again, no loss of strength was observed.

WAGNERS PRODUCTS AND SERVICES

PEDESTRIAN STRUCTURES


MERCY BRIDGE, DALBY, QLD, AU

Our pedestrian bridges and boardwalks are prefabricated to withstand even the harshest environment, while promising longevity to the local urban and suburban community.

These composite structures are precision-engineered and manufactured in the controlled environments of our factories with precise tolerances and fabrications – with a premium finish quality.


PINE OAKS WETLAND BRIDGE, OCALA, FLORIDA, USA


JUBAIL MANGROVE PARK, ABU DHABI, UAE

ROAD TRAFFIC INFRASTRUCTURES

Wagners has designed and manufactured composite road bridges ranging from single-span light road to multi-span heavy load quarry bridges.

Our structures are manufactured and prefabricated in Australia, allowing for quick and simple installation in a quality assured setting. In addition to full prefabrication, Wagners can also provide members for on-site assembly or sectional replacement.


KRIEDERMAN BRIDGE, BRISBANE, QLD, AU

Due to the development of a modular methodology used to create a variety of sections, Wagners composites can be tailored to specific client requirements, and provide a low maintenance structure to fit any transport need. We also offer installation options to prioritise cost, time and labour of the product. Wagners are specified in the TMR Standard Drawings 2285 and 2286 for the replacement of timber girders in aging road bridges. We provide I-Beam and U-Girder sections as well as composite piles for complete rehabilitation of aging timber bridges and new road bridges.

STREET AND PARK STRUCTURES

LIGHT POLES

Our composite light poles are uniquely suited to provide a long lasting, aesthetic lighting solution to any residential, commercial or industrial project.

The lightweight, rust-proof nature of using a Wagners composite light pole results in quicker, safer and more efficient installation.

TOOWOOMBA, QLD, AU

SHELTERS

Made with composites, the shelters will not rust, rot or corrode — with a durability rating of 'Extra-Long Term' as defined in AS2312 for the paint, our client's shelters will last for generations to come.

GLADSTONE, QLD, AU

OUR SHELTERS ARE TAILORED TO SUIT YOUR NEEDS WITH VARIOUS CONFIGURATIONS AVAILABLE ACROSS AUSTRALIA INCLUDING CYCLONIC REGIONS IN THE FAR NORTH. ALL SHELTERS ARE DESIGNED TO WITHSTAND CYCLONES WITH FULL AS1170 COMPLIANCE MAKING IT SUITABLE FOR COASTAL AND TROPICAL AREAS.

VIEWING PLATFORMS

Our long-lasting, durable, and lightweight street and park structures are built to last with materials that are ideal for coastal, marine and environmentally-sensitive areas.

From tidal flood plains and protected mangrove swamps, to alkaline desert and corrosive mining facilities — our viewing platforms have proven time and again of their unique durability and strength.

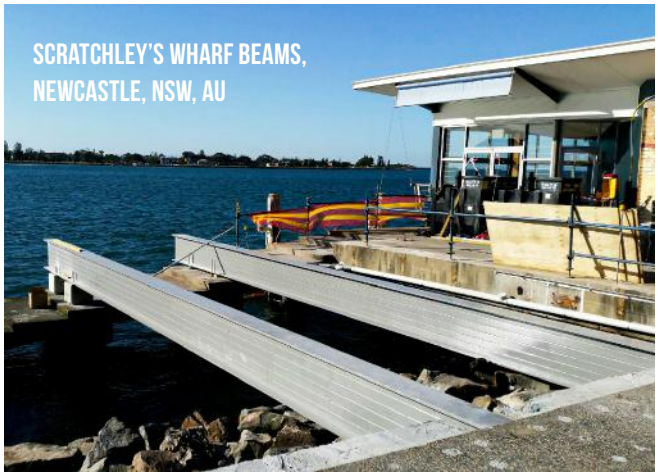
CAMERON ROCKS FISHING PLATFORM, HAMILTON, QLD, AU

MARINE INFRASTRUCTURES

Marine infrastructure built by Wagners provides quality, durable structural solutions for marine projects around the world. From small boat pontoon floats to large jetty repairs or replacements, Wagners provides flexible design options, ease of installation and high durability.

This ensures the best possible project outcome in the face of harsh marine environments, with minimal maintenance requirements.

MCLOUGHLINS JETTY,
MCLOUGHLINS BEACH, VIC, AU



SCRATCHLEY'S WHARF BEAMS,
NEWCASTLE, NSW, AU

COOGEE BEACH STAIRS, PERTH,
WA, AU

CROSSARMS

Presently, Wagners currently supply crossarms for low and high voltage, distribution, transmission and sub-transmission.

WAGNERS CROSSARMS

WAGNERS CROSSARMS

WAGNERS HAS PRODUCED A LARGE RANGE OF ELECTRICAL CROSSARMS AND FITTINGS FOR UTILITY COMPANIES AROUND THE WORLD, WITH OVER 200 DESIGNS CURRENTLY DEPLOYED AND AN EXPERT IN-HOUSE DESIGN TEAM.

CROSSARM INSTALLATION

CAPABILITY STATEMENT

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