

# POLYbridge™

BRIDGES AND BOARDWALKS THAT PUT THE ENVIRONMENT FIRST

**NOT A TIMBER BRIDGE**



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## POLYbridge™ and POLYboardwalk™

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POLYplank™ products are manufactured from structural FRP with a recycled bottle core. This product does not deform and deflect like products made from 100% recycled plastic materials.

Indistinguishable from wood POLYplank™ products have the same feel to the touch and different wood colours are available.



# LET'S CHANGE THE WAY WE DESIGN

The expectations of the built environment to solve the urgent challenges facing our infrastructure, buildings, communities, and planet have never been greater. POLYdeck™ are finding solutions for these challenges, creating a more resilient business, society and planet.

Our parent company GENUIT PLC are committed to making the environment more sustainable. POLYdeck™ are fully on board with this philosophy. We do this by becoming a sustainable, low-carbon business ourselves as well as delivering sustainable solutions at scale.

POLYbridge™ manufactures planks, posts and rails utilising structural FRP with a recycled plastic bottle core, with the average bridge removing 3000

plastic bottles out of landfill. Combined with a design life of over 75 years (7x a timber bridge, 4x a hardwood bridge) means less carbon impact from multiple installation and replacement of bridges/boardwalks.

Steel, recycled consumer plastic waste and other composite bridges look industrial making them stand out in an otherwise natural environment.

POLYbridges™ and POLYwalks™ are hard to distinguish from natural timber, with a range of shades and colours to effortlessly blend into the natural environment.

For more information on our recycled bottle core get in contact with us.



Highly Aesthetic



Long Life



3000 bottles removed from Landfill per bridge

# FEATURES AND BENEFITS

## Compliance



Complies with BS4592-0:2006+A1:2012 5kN/m<sup>2</sup> loading requirements. Complies with all Euro Codes and British Standards including deck and parapet loading requirements (see standards pages). POLYbridge™ also excels in UK SLV anti slip resistance with results between of SRV60 and SRV84 for all deck products (UK HSE/HSL (UK Health and Safety Laboratories) requirement is SRV36).

## Environmentally friendly



Wood preservatives can be very harmful to the environment and toxic to many animals and plants, but above all else, they only work in preserving wood for a short time, resulting in further negative environmental impact when they need regular replacement.

With no leaching of contaminants and a core that contains 140 recycled 500ml plastic bottles per square metre, POLYbridge™ is great for the environment in many ways. POLYwalk™ is also root friendly and will not compact soil which then impacts the nutrients required by the surrounding trees and vegetation.

## Installation service



As POLYbridge™ and POLYwalk™ are so simple to install, why wouldn't we offer this service?

## Durable



With a design life in excess of 75 years, POLYbridge™ is highly impact resistant, will not rot like wood or rust like steel and will keep its good looks long after traditional alternatives have needed to be replaced.

Unlike fully recycled plastic profiles, the glass reinforced thermoset outer skin means units will not warp and twist through thermal expansion in the sun. Slip resistance of the GRIPfast finish is class leading, resin infused and therefore has a greater longevity than other materials.

## Lightweight



Factory pre-made bridges and walkways are easy to handle and carry. As such, they can be taken to sites that are often hard to access and lifted into place & then fixed. This leads to drastically reduced installation times when compared with wood or steel. A typical 11m bridge was recently installed in one day including all parapets and deck panels.

## Highly Aesthetic



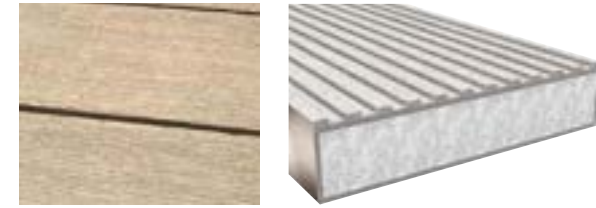
Steel, recycled consumer plastic waste and other composite bridges look industrial making them stand out in an otherwise natural environment.

POLYbridges™ and POLYwalks™ are hard to distinguish from natural timber, with a range of shades and colours to effortlessly blend into the natural environment.

# POLYbridge™

POLYbridge™ is the most cost-effective solution for budget sensitive local authorities and other asset owners.

Softwood is proving to have a life-span under 10 years. Even hardwood oak structures are only just reaching a 20 year life expectancy. FRP will become the choice for many infrastructure products due to the life expectancy, and POLYbridge™ and POLYwalk™ are readily available meeting all relevant standards.



Deck Planks of 200mm wide, diamond hard, wear resistant, surface (SRV60-84). Castellated or timber effect. Dark or light brown, oak or various other colours.

Parapets start with 2no rails and are available with infill panels. Bespoke designs are available.

Available in 1.15m high as standard, 1.4mt for cyclists, 1.8mt for Equestrian. Manufactured in 75mm x 75mm or 100mm x 100mm profile. Bespoke sizes available.

FRP structural outer skin and 100% recycled PET bottle core for all parapet details.

UK pultruded structure for all main beams and cross members. Manufactured to EN 13706 grade E23 Designed to meet all relevant standards pertaining to your requirement.

Lengths up to 15ms currently.



# PARAPET OPTIONS

Other bespoke options available



Typical rail parapet. 2no rails, 3no rails and 4no rails. Please call with your requirements.



Infill panels. Utilising POLYbridge™ rails and pultruded FRP infill tubes.



# ABUTMENT OPTIONS

We have numerous materials for abutments if we are required to get involved in the design or construction of these.



Existing abutments can be used. They may not always be concrete. Soil may need to be retained.



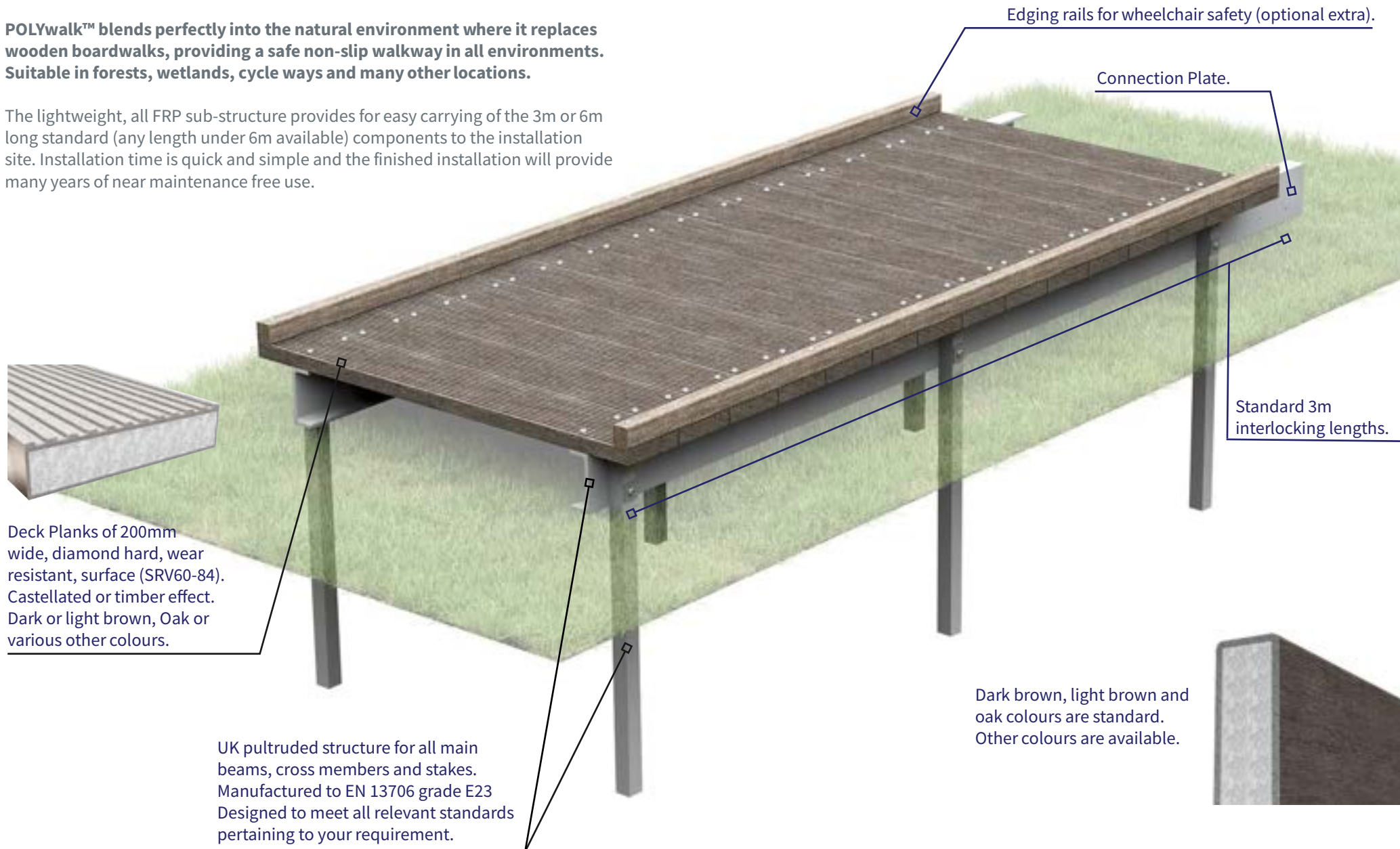
Other methods of abutment can be incorporated. This includes posts, screw piles, gabion baskets and stabilised soil methods.



# POLYwalk™

**POLYwalk™ blends perfectly into the natural environment where it replaces wooden boardwalks, providing a safe non-slip walkway in all environments. Suitable in forests, wetlands, cycle ways and many other locations.**

The lightweight, all FRP sub-structure provides for easy carrying of the 3m or 6m long standard (any length under 6m available) components to the installation site. Installation time is quick and simple and the finished installation will provide many years of near maintenance free use.



Edging rails for wheelchair safety (optional extra).

Connection Plate.

Standard 3m interlocking lengths.

Deck Planks of 200mm wide, diamond hard, wear resistant, surface (SRV60-84). Castellated or timber effect. Dark or light brown, Oak or various other colours.

UK pultruded structure for all main beams, cross members and stakes. Manufactured to EN 13706 grade E23. Designed to meet all relevant standards pertaining to your requirement.

Dark brown, light brown and oak colours are standard. Other colours are available.



# “OUR REQUIREMENT IS JUST FOR REFURBISHING AN EXISTING BRIDGE OR A LONGER STRUCTURE”

## Refurbished Bridge

In some instances, it may not be financially viable to purchase a full bridge. POLYdeck™ are happy to supply deck panels and fixings only. We have also supplied new FRP parapets onto existing bridges. We would always suggest that the question asked should be “if I replace the deck with a product that will last over 75 years, but continue with a steel or wooden sub-structure that will be at the end of its life much sooner, do I need to reassess my plans”?

## Longer Structures

POLYbridge™ was originally intended for small public rights of way structures. As we started to learn more about the material and its inherent versatility and strength, we have been able to increase spans to 14ms (15m bridge). This will undoubtedly increase.

If you require a bridge that is in excess of this span, or you need to refurbish a longer span bridge, why not incorporate a long lasting deck? Using steel beams and FRP deck panels is a great “composite” bridge construction method, offering numerous benefits over a timber or steel deck.



# POLYPlank™

**POLYplanks™ have been designed to replace traditional timber planks which can be slippery when wet and are subject to rotting and failure at fixing holes.**

POLYplank™ are made from a structural composite of FRP and recycled PET (bottles) with a design life in excess of 75 years, and incorporate the class leading, resin infused GRIPfast slip resistant finish.

Castellated finish planks provide channels along the length that allow water to drain from the surface to stop icing in cold conditions.

POLYplanks™ are 'structural' and will provide a safe walking surface on support bearers that are set no greater than 1200mm apart. See Technical Details.

For wider areas, POLYdeck™ can offer design help for the most effective construction layout.



POLYplanks™ are designed to be fixed to timber supports with countersunk stainless steel screws.

When fixing to steel, please use POLYplank™ resin bearers which are bolted to the top flange of the steel beam. Planks are then fixed into the resin bearers with drill screws. This reduces the number of drill holes into the steel which protects the structural integrity of the steel and also speeds up installation.

Your scheme may benefit from introducing UK manufactured FRP 'C' or 'I' sections offering longevity to the scheme and reducing on-going maintenance costs. Please contact sales for more information.

The ends of each plank can be cut on site using a small hand-held angle grinder with a diamond-tipped blade. The cut ends do not need to be resealed but can be painted if visible.

# TECHNICAL DETAILS

## Weight Per Plank

2850mm long x 197mm wide x 45mm thick	14kg
2000mm long x 197mm wide x 45mm thick	11kg
1500mm long x 197mm wide x 45mm thick	8.5kg

## Load-bearing Properties:

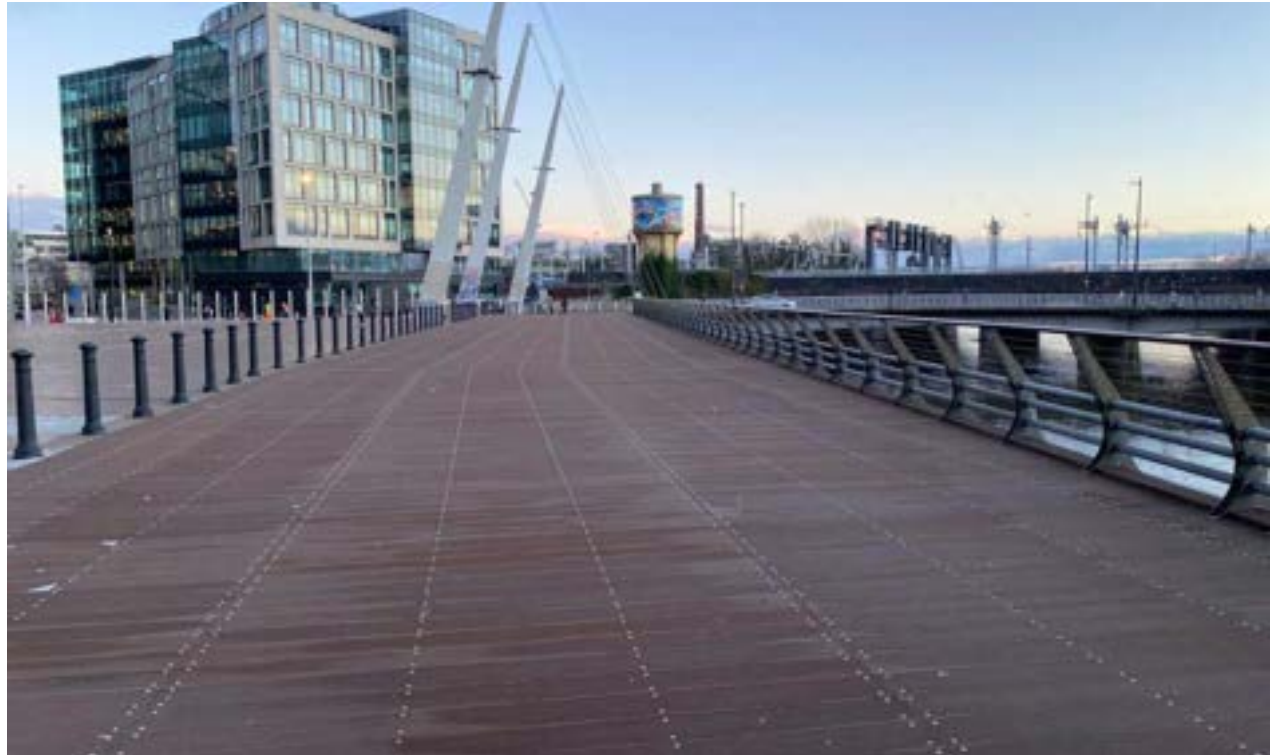
Clear Span	Load	Deflection
1200mm	5kN Uniform Distributed Load	3.8mm
965mm	2kN Point Load	4.8mm
965mm	10kN Point Load	27mm

## GRIPFAST Slip Resistance Values

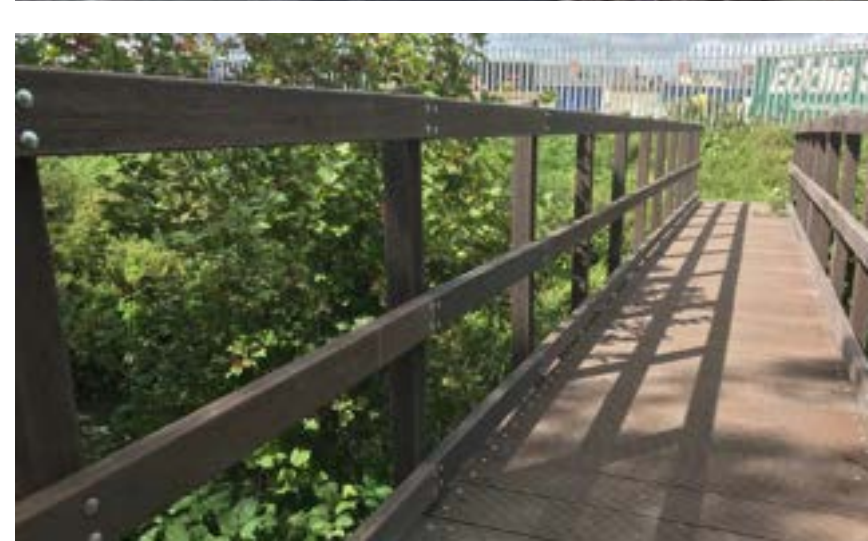
Pendulum Test Value Dry	76 (Low Slip Potential)
Pendulum Test Value Wet:	74 (Low Slip Potential)

## UK Slip Resistance Group Guidelines:

Pendulum Test Value	Slip Potential
<25	High
25-35	Moderate
>35	Low







# POLYbridge™ STANDARD SPECIFICATIONS

1.0m Clear Width		
Length (m)	No. Main Girders	Main Girder
2.0	2	280x70x12
3.0	2	280x70x12
4.0	2	280x70x12
5.0	2	280x70x12
6.0	2	280x70x12
7.2	2	280x70x12
8.4	2	360x108x18
9.6	2	360x108x18
10.8	2	360x108x18
12.0	3	360x108x18

1.2m Clear Width		
Length (m)	No. Main Girders	Main Girder
2.0	2	280x70x12
3.0	2	280x70x12
4.0	2	280x70x12
5.0	2	280x70x12
6.0	2	280x70x12
7.2	2	360x108x18
8.4	2	360x108x18
9.6	2	360x108x18
10.8	2	360x108x18
12.0	3	360x108x18

1.5m Clear Width		
Length (m)	No. Main Girders	Main Girder
2.0	2	280x70x12
3.0	2	280x70x12
4.0	2	280x70x12
5.0	2	280x70x12
6.0	2	280x70x12
7.2	2	360x108x18
8.4	2	360x108x18
9.6	3	360x108x18
10.8	3	360x108x18
12.0	4	360x108x18

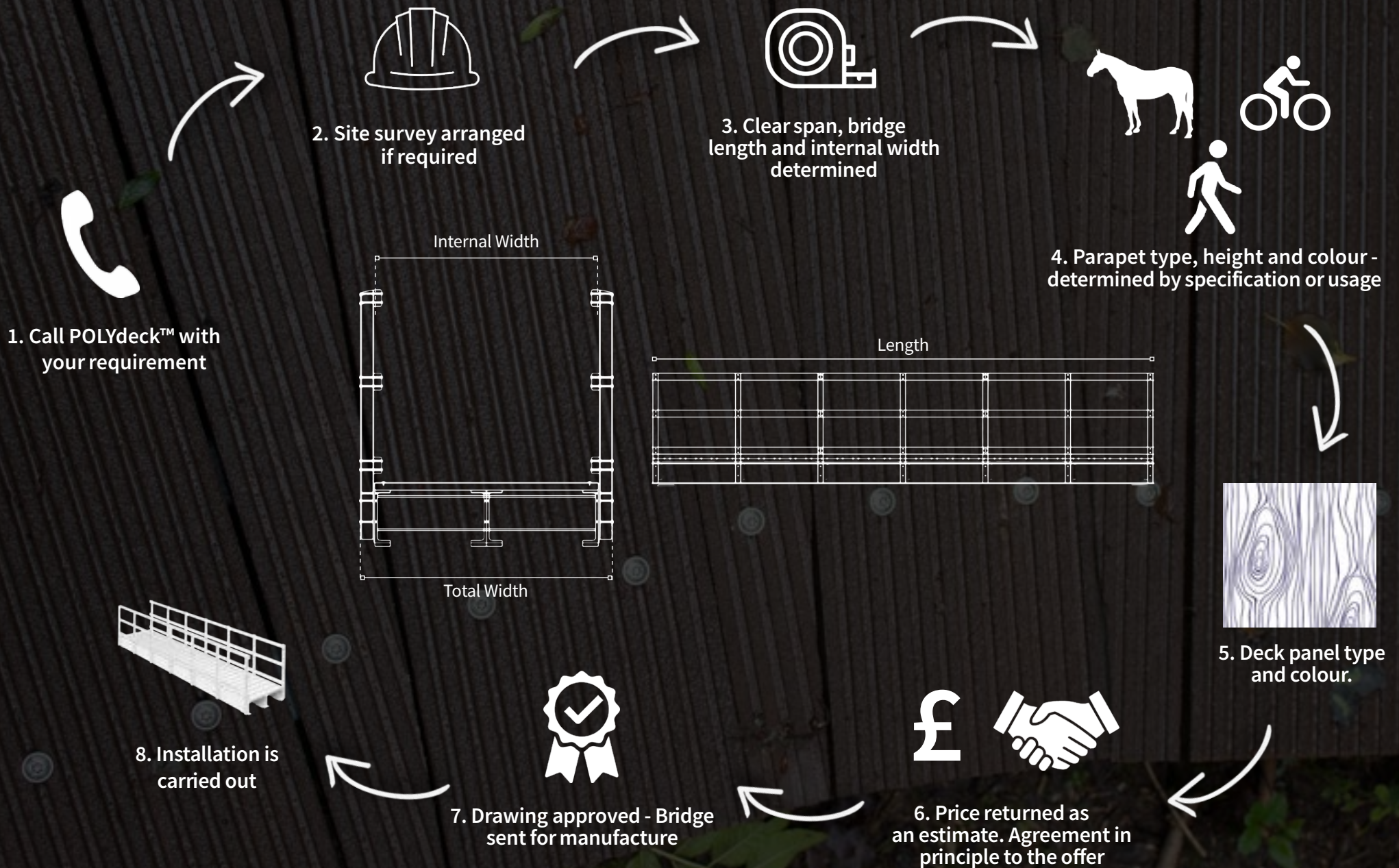
2.0m Clear Width		
Length (m)	No. Main Girders	Main Girder
2.0	2	280x70x12
3.0	2	280x70x12
4.0	2	280x70x12
5.0	2	280x70x12
6.0	2	280x70x12
7.2	2	360x108x18
8.4	3	360x108x18
9.6	4	360x108x18
10.8	4	360x108x18
12.0	5	360x108x18

2.4m Clear Width		
Length (m)	No. Main Girders	Main Girder
2.0	2	280x70x12
3.0	2	280x70x12
4.0	3	280x70x12
5.0	4	280x70x12
6.0	4	360x108x18
7.2	3	360x108x18
8.4	4	360x108x18
9.6	5	360x108x18
10.8	5	360x108x18
12.0	6	360x108x18

3.0m Clear Width		
Length (m)	No. Main Girders	Main Girder
2.0	2	280x70x12
3.0	2	280x70x12
4.0	3	280x70x12
5.0	4	280x70x12
6.0	4	360x108x18
7.2	3	360x108x18
8.4	4	360x108x18
9.6	5	360x108x18
10.8	6	360x108x18
12.0	7	360x108x18

**OTHER BESPOKE SIZES ARE READILY AVAILABLE. PLEASE CALL WITH ALL YOUR REQUIREMENTS.**

# DESIGNING YOUR POLYBridge™



# DESIGN SPECIFICATION

A structural GRP (Glass Reinforced Polyester) outer in a 'wood effect' finish with a 100% recycled PET bottle core. Structural beams and channels are pultruded FRP. All manufactured in the UK. Supplied fully assembled or in kit form to customers' requirements.

## Outer Structure

FRP is strong, durable, requires no maintenance and offers a design life of over 75 years. It is anti-corrosive, 40% of the weight of steel, non-conductive, and through coloured. Properties for FRP pultrusions comply with BS EN 13706 grade E23, with the exception that longitudinal modulus to be 28 GPA. Carbon fibre pultruded strip to have longitudinal modulus of 139 GPA.

## Inner Core of Planks, Posts and Rails

POLYbridge™ utilises an inner core of 100% recycled PET. (Polyethylene Terephthalate)- utilising 140no recycled bottles per metre squared of deck. This is around 2800no recycled bottles for an average bridge.

## Deck Planks

Deck planks are usually supplied with a castellated top with our class-leading "resin-infused" finish of GRIPfast Aluminium Oxide. Slip resistance values of SRV60 to SRV84 in wet and dry conditions. The UK Slip resistance Group requirement is above SRV35. Recycled plastic, timber and steel decks are known to be slippery in wet conditions and would therefore require a post-manufacture coating to meet the SRV standards.

## Why not use 100% Recycled plastic?

Recycled materials are not structural and therefore not fit for deck panels or bridge loading requirements requiring a minimum of 5kn/m<sup>2</sup>.

Unlike 100% recycled post-consumer plastic waste, the FRP outer structure has a much higher slip resistance and is not affected by sunlight or heat which leads to recycled equivalents to warping and deforming.

## Loadings of Bridge

Our bridges are typically designed to BS4592-0:2006 + A1:2012 5kn/m<sup>2</sup>. All parapets are designed to BS-7818 : 1995 Class 2 for a 0.7KN/m loading.

## Fire Specification

All FRP section complainant to BS476 Part 7 Class 2 - Classification of spread of flame Fire tests on building materials and structures.



# CODES AND DESIGN STANDARDS

## Structural Design

- BS EN 1993-1-1 General Rules and Rules for Buildings • BS EN 1993-1-1 UK NA Published on Dec 2008
  - BS EN 1991-1-1 General Rules
  - BS EN 1991-1-1 UK NA General Rules
  - BS EN 1993-2 Bridges (for guidance only)
- BS EN 1993-2 UK NA Bridges (for guidance only)
  - PD 6695-2 Design of bridges
  - SCI P185 Best Practice in Bridge Design
  - SN003\_NCCI\_Elastic critical moment for LTB
  - SN004\_NCCI\_Calculation of  $\alpha_{cr}$
- CD 368 Design of fibre reinforced polymer bridges and highway structures
  - CIRIA C779 Fibre reinforced polymer bridges
- BS EN ISO 3506 Fasteners Mechanical properties of corrosion-resistant stainless steel fasteners
  - PD CEN/TS 19101:2022 – Design of Fibre-polymer composite structures.

## Global and Geometric Design

- Bridleway Bridge Specification – British Horse Society
  - LTN 1/20 Cycle Infrastructure Design – Sustrans
- Design Standards for Accessible Railway Stations, V04 – Department for Transport
  - CD 143 Designing for walking, cycling and horse-riding
- CD 353 Design criteria for footbridges – Highways England

# BEFORE AND AFTERS

POLYbridge™ products improving the environment with 75 year design life.



Before



Before



Before



Before



After



After



After



After

# CHARMOUTH BRIDGE

## Project Aim and Challenges

POLYdeck™ were approached by Devon County Council to replace timber planks on an existing bridge over a waterway. These needed replacing due to deterioration and failure of the timber panels. Due to the location of the bridge and being in close proximity to water, POLYplank™ was the perfect replacement.

The new bridge deck needed to be durable with none of the issues of timber, and have a high level of slip resistance because the bridge inclines down to the beach. Timber had been used previously on other projects within the area, but proved to have a very limited life span. To avoid further maintenance and replacements, the council required a long-life cycle, timber effect, high slip resistance product. With the added benefit of a 100% recycled core, surrounded by a stable GRP outer 'skin', the chosen POLYplank™ offers a non-warping, non slip, long life-span and aesthetically pleasing surface to the walkway on the bridge.

Kevin Davis of Devon County Council told us “After 10 years the original timber we used had rotted and, having used POLYdeck™ planks many times, we didn't hesitate in using them again. This time with a timber finish – due to safety concerns. These planks can be easily cut to size on site and deliver the 'wow factor' with minimal maintenance.”



# THE PRINCIPALITY STADIUM

## Project Aim and Challenges

The original large timber walkway access around the Millennium Stadium in Cardiff started to show signs of deterioration in not only the overlay planks, but also the structural beams that the planks were attached to. As the planks were taken out, it was obvious that there was considerable deterioration to all elements. With this in mind, the client wanted to ensure that any replacement product had longevity, incorporating built-in slip resistant and had the appearance of timber. In addition, the structural beams needed to have a similar longevity, no deterioration and be easily installed.

The finished scheme fits in perfectly with the surrounding environment and has the exact appearance of timber with a design life in excess of 75 years, without the obvious disadvantages of a high maintenance material. Replacing the original hardwood timber after less than 20 years of life.

**1,300,000 plastic bottles saved from landfill**



# COLDEN COMMON BOARDWALK

## Project Aim and Challenges

Colden Common Parish Council had worked with Housing Developer Taylor Wimpey to establish a public right of way in local woodlands. Due to the wet environment with a high level of tree cover, it was agreed that a standard timber walkway would become very slippery in a short space of time and then subsequently, timber deterioration was inevitable.

Both Taylor Wimpey and the Parish Council recognised that any legacy of the House build had to offer longevity, a viable long term slip resistance, be considerate to the existing environment and offer a genuine cost-effective solution to the problem. The total length of 500 meters of Boardwalk and turning areas including all structural beams, POLYplank™ Boards, posts for piers and installation were supplied by POLYdeck™.

For more information on this exciting scheme, please ask our sales team for the Project Profile video.

**300,000 plastic bottles saved from landfill**



# KINGERBY BRIDGE

## Project Aim and Challenges

Lincolnshire County Council contacted POLYdeck's™ technical sales team to discuss the potential replacement of an existing footbridge constructed from a combination of structural steel beams and timber decking which had deteriorated over the years and was now not fit for purpose.

POLYdeck™ initially surveyed the site to ascertain all site measurements and abutment requirements prior to providing design calculations and general arrangement drawings for approval. It is key to our supply chain that POLYdeck™ are able to carry out all calculations, GA drawings and installation if required.

Any new structure had to be designed to accommodate a 10KN point loading for equestrian use and incorporate a 1.8m high parapet handrail as per the British Horse Society requirement. The colour chosen was dark brown to blend in to the surroundings.

Given the remote location of the bridge, the lightweight FRP structure ensured a speedy installation with the removal of the existing bridge and installation of the POLYbridge™ being executed within two days.



# LLANDRINDOD WELLS PIER

## Project Aim and Challenges

Powys Council approached POLYdeck™ to provide a new viewing platform, giving access to all members of the public, to the beautiful views of the Llandrindod Wells reservoir. Due to its location, being semi-submerged, the materials used could not be susceptible to degrading in water.

The viewing platform had to be both extremely water resistant and accessible for all members of the public. Timber had been used previously, on other projects within the area, but proved to have a very limited life span. The council, therefore, were looking for a product with a long-life cycle, high slip resistance and could be submerged in water. A POLYbridge™, with a design life of in excess of 75 years, was the perfect solution!

Steve Gealy of Powys County Council told us “We have used a number of POLYdeck™ product over the years. Their products have shown that they cannot be damaged by harsh weather conditions in the depths of the Welsh countryside such as snow, freezing or hot temperatures, wetlands bogs, lakes, or just muddy damp/wet woodlands. Other similar recycled products or even wooden oak products can be destroyed in such conditions over several years”.



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