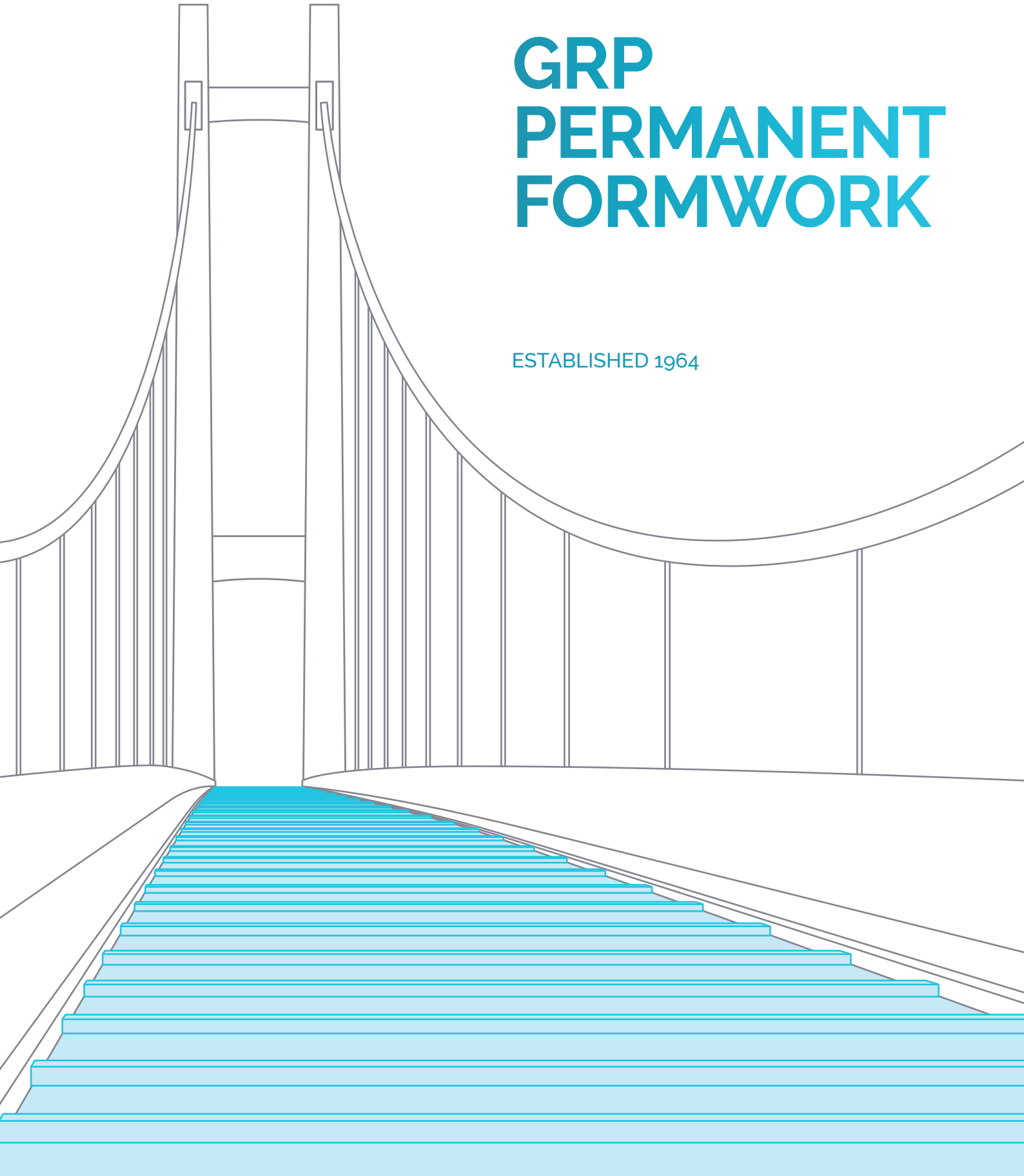
PERMADEC

SAFE | LIGHTWEIGHT | DURABLE

GRP PERMANENT FORMWORK

ESTABLISHED 1964



UK LEADERS IN GRP PANELS, USED GLOBALLY

EMJ Permadec Formwork Panels are primarily used as permanent bridge beam infill shuttering.

In addition the many advantages of the strong, lightweight, durable, steel reinforced glass fibre panels extend its range of uses to include the construction of:

- Platforms
- Ramps
- Floors
- Sewage Treatment Plants
- Culvert's
- Jetty's
- Tanks
- Capping Slab/Roof

...and many other applications

The ease of installation and lightweight nature of Permadec enables customers to make savings on site labour from reduced handling costs. As the panels are custom built and delivered ready for use, minimal on-site cutting is required.

Access to the underside of the panel is unnecessary, eliminating the need for expensive scaffolding or staging. As the panels are a permanent fixture, the requirement for stripping after casting is eliminated. EMJ has supplied Permadec panels to over 5,500 structures worldwide.

EMJ has exported panels across the world, and has supplied projects in the UK, Ireland, Czech Republic, Poland, Norway, Sweden, Uganda, Trinidad, Cayman Islands, Jamaica, Sri Lanka and Australia. The makeup of the panels lends itself ideally to international shipping as it is relatively light in weight and stackable, therefore maximising the use of available space on container loads.

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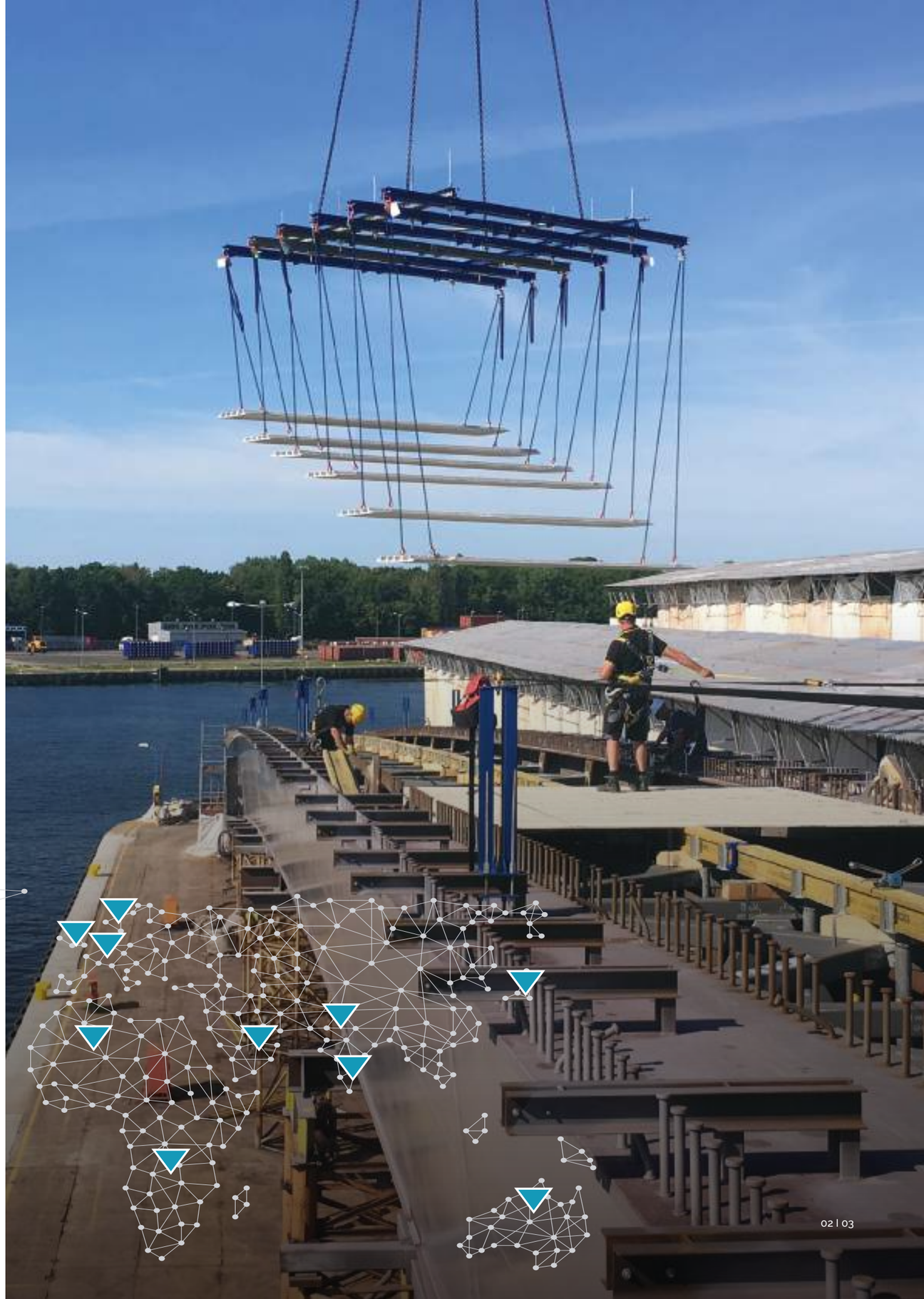

DESIGNED AND PRODUCED IN GREAT BRITAIN

If you are constructing or designing a concrete deck you may save time and money with the EMJ Permadec formwork system.

Permadec offers all the advantages of a lightweight, versatile permanent formwork system, some of which are listed below. It is capable of spanning up to 5.7metres with loads in excess of a 700mm concrete deck. EMJ Permadec Panels comply with all relevant design standards including Design Standard CD359. Further information is available online at: www.emjplastics.com

Lightweight & very strong

Large span capability

Safe working platform

Designed to suit application

Quick manufacturing & laying times

Minimise on craning with offsite installation

120 years durability

Safe site cutting & easy installation

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PANEL RANGE

EMJ's Permadec range includes various panel types to suit our clients requirements.

EMJ Standard Panel Range		1	3	3A	3B	3C	4	4A	4B	4C	5A	5B	5C	6
T = Soffit Thickness	mm	6	8	8	8	8	8	8	8	8	8	8	8	8
H = Overall Height inc. rib	mm	38	38	50	63	75	38	50	63	75	63	75	105	90
L = Length (maximum)	mm	1200	1400	2100	2800	3700	1500	2300	3100	3800	3300	4200	5300	5100
Cs = Clear Span (maximum)	mm	1100	1300	2000	2700	3600	1400	2200	3000	3700	3200	4100	5200	5000
B = Breadth	mm	1220	750	750	750	750	875	875	875	875	700	700	700	700
W = Weight	kg/m²	16-20	24-29	29-40	37-57	43-64	26-33	32-46	42-65	49-74	53-82	58-89	94-116	97-108
C = Centre of Ribs	mm	229	150	150	150	150	125	125	125	125	100	100	100	100
P = Position of End Ribs	mm	38	75	75	75	75	62	62	62	62	50	50	50	50
N = Number of Ribs	mm	6	5	5	5	5	7	7	7	7	7	7	7	7

Bespoke Design & Modelling

We pride ourselves on producing bespoke panels to suit the clients individual requirements, whether it be size, type or any other preference.

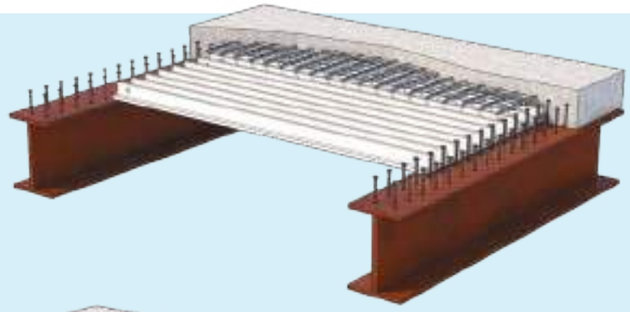
GRP Composite Panels

If you are constructing or designing a concrete deck with short span requirements between beams our Value Engineered GRP Composite Permadec Panel will save you even more time and money. Permadec Composite panels offer all the advantages of a lightweight, versatile permanent formwork system, capable of spanning up to 1.5 metres.

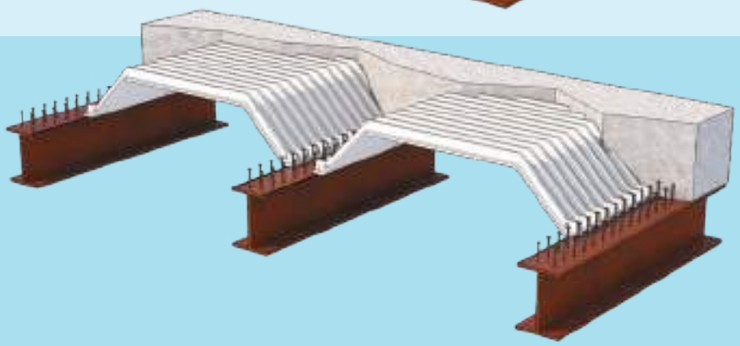
PANEL CHARACTERISTICS

EMJ can offer panels not only to suit the soffit but also the diaphragm, bottom flange and vertical elements as shown. Saving time and cost on site when compared to traditional temporary methods. Off-site installation is also possible in certain scenarios.

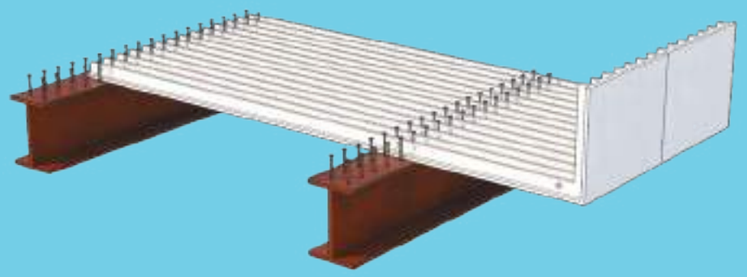
Typical EMJ Permadec Standard panel installed on steel beams



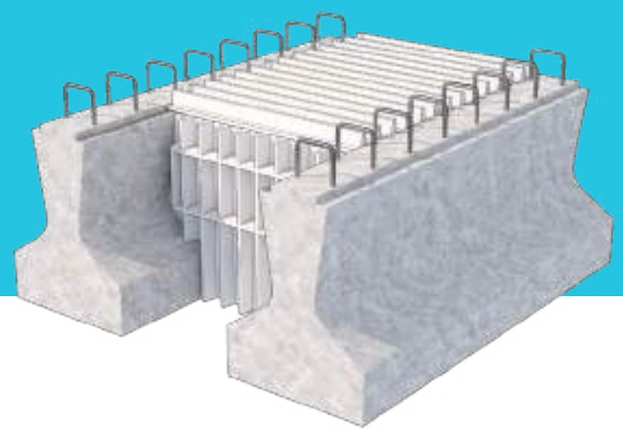
Typical EMJ Permadec Haunched panel installed on steel beams



Typical EMJ Permadec Cantilever panel installed on steel beams



Typical EMJ Permadec Diaphragm panel installed on concrete beams



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LOW IN WEIGHT

Varies from 15 to 104kg/m² dependent on span.

A487 Caernarfon to Bontnewydd, Wales

Sydney Gateway – Sydney, Australia

LARGE SPAN

EMJ has supplied panels to span 5.7m carrying 1.2m of wet concrete and has the capability to handle much greater spans.

DESIGN

EMJ offers a complete design service for all of its Permadec panels to ensure our customer requirements are accommodated

HS2 North & South Roundabout – UK

Bridge Tabor, Czech Republic

FINISH

May be supplied with a variety of permanent finishes to soffit, such as standard textured, smooth matt or smooth high gloss with various colours upon request. Standard panels are supplied in Light Grey to British Standard 4800 10-A-03.

HANDLING

Prior to lifting, the contractor is advised to check the weight of a typical panel against its company policy for the maximum weight any one operative is permitted to lift. This will then indicate the number of general operatives required to lay any one panel. This is generally limited to 25kg per man lift in the UK.

Important Notice: The installation information given is provided only as general guidance for trade contractors. This document does not form a specification. The responsibility for the installation of the panels rests wholly with the contractor and not with EMJ Plastics.

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SEALANT / INSTALLATION GUIDANCE

Sealants should be applied to steel soffits or concrete rebates once the formwork has been made available locally. EMJ recommends 10 to 20 linear metres to be laid at once, depending on conditions applicable at the time of laying. This can be increased once fluency has been established from the repetitive nature of the work.
The formwork panels are to be lifted into position and rested on the sealant. Care should be taken to ensure the adequate bearing to the ends of the formwork panel.

The sealant positioned between the panels at the point where the panels butt up against each other should be applied at any point prior to pouring concrete and after positioning. It should be noted that a nominal gap of an average 2mm may appear between the panels, this is anticipated.

Once the panel is correctly positioned it is capable of supporting the live weight of the operative and can be walked upon. Caution should be observed working near the edges of panels, especially at heights.

EMJ Butyl 2 x 6mm Ø Twin-track adhesive butyl bead x 8mtr

This provides the seal between the panel and the bearing component i.e. concrete/steel beam. This sealant arrives on a roll of 8m in length and is applied to the bearing surface; the backing is then removed prior to laying of panel.

This sealant has been specially designed to stop ingress of water during the life of the structure and also to prevent any grout loss when pouring. It has being tested to prove excellent adhesion against two substrates, the maximum force required to remove the panel after sealing is equivalent to 6.15kN/m run of panels.

EMJ Grey adhesive butyl tape with polyester backing 50mm wide x 35mtr length

This is used to seal the adjacent panels.
This arrives on a 35m roll and is applied firmly to the butt joint between panels on the top side surface prior to fixing rebars and pouring concrete.

CUTTING OF PANELS

Permadec panels can be cut using a standard Stihl saw (or similar). A steel blade should be used; bearing in mind the panel has a stone like texture with steel content.

For personal safety, please ensure suitable protective clothing, goggles, respiratory mask, leather gloves etc. as standard to be worn for all cutting operations.

Should you cut though the ribs of the panels, please note that both ends of each rib still need to be supported prior to concreting. On the cut edges this can normally be supported either off the diaphragm shutter, alternatively by using the shutter to cast a rebate into the concrete to provide a supporting edge. Cutting through a rib will also expose the steel inserts; these should be painted with cold zinc metal paint such as 'Galvafroid' or others for protection prior to pouring concrete.

If you are cutting more than 2 ribs from a panel or plan to cut for openings, then please check with EMJ that this is suitable.

PLEASE NOTE: The responsibility for the implementation of health and safety regulations lies solely with the Contractor once the formwork has been delivered.

Panels should be free of all traces of oil and grease at the time of concreting. Any damaged panels should be rejected prior to installation. When placing panels, ensure that the bearing cover is equal on both sides. A minimum bearing of 30mm to Ideally a min bearing of 30mm is required on the surface of the concrete rebate or the steel beam flange.

Concrete should be placed and compacted in accordance with the requirements of local codes and should not accumulate in heaps or be dropped from heights greater than the code allows.

HEALTH AND SAFETY

EMJ stress the enforcement of Contractor Health and Safety Policy in respect to:-

- Manual Lifting
- COSHH
- Working with hand held tools
- First Aid at work
- Working Around Dust
- Working at Heights
- Good Housekeeping practices

EMJ recommends the use of hard hats, safety glasses, safety boots, quality rigger gloves and safety vests for general work with formwork. With work involved cutting or drilling of the formwork, please see notes above.

DESIGN CODE GUIDANCE

As of March 2020, the CD359 standard replaces the original BA36/90 standard and the IAN (Interment Advice Notice). Despite this new standard, the deflection of permanent soffit formwork can sometimes be misinterpreted. It is important to note that the allowable deflection refers specifically to the creep deflection of the formwork occurring between the completion of concreting and four hours later. This deflection should not exceed 1/300 of the span. For more detailed information, please refer to section 2.5.1 within CD359.

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EMJ Permadec panels fully meet this criteria as they do deflect during concrete pour but do not creep during concrete setting.

For safety reasons panels are recommended to be made long enough so that they can never drop out, if accidentally dislodged during rebar fixing. This can be done by specifying a panel length which if dislodged will butt up to the shear studs on a steel beam, but still have the minimum recommended bearing at the opposing end, therefore preventing possible dislodgement. In 2006 BS8500 was updated with regard to rebar cover, minimum cover between GRP interface and nearest reinforcement bars was reduced to only 20mm. This now makes it much easier to accommodate the GRP panels into the deck design.

Spacer blocks can be used supported from bearing beam or GRP Permadec panels themselves. Typical spacer block information is available upon request.

TRANSPORT AND PACKAGING

EMJ offers various packaging methods to suit our client requirements. Our Permadec panels are typically loaded on standard pallets, as individual packs. Each of these packs is clearly marked with panel type and dimensions.

They are banded and shrink wrapped ready for transportation. We apply a stick on label formwork pack to state as follows:

- Receiving Contractor
- Reference Number
- Project Name
- Project Address

Permadec panels are packed singularly with soffit face down to avoid the requirement turning during installation. The bottom panel in all packs has the rib face down.

We also offer a crating service that allows containers for shipping worldwide.

For distribution overseas EMJ use pallets which meet the International Standards for Phytosanitary Measures No. 15 (ISPM 15) for exporting.

DESIGN PRINCIPLES

Engineering Theory of Bending

The design of the panels is based on Engineering Elastic Theory of Bending where the plane of the section will remain plane after bending.

Design Standard

CD359

Design Load

Loads to be considered in the design are as follows:

Self-weight of the panels

Wet concrete of the insitu deck

Live load

Section Design

Stress analysis of the section is carried out with a view that the stresses shall remain within the linear elastic limit of the material. We also utilise the advantages of composite section in our design. Thus in stress analysis, a converted section based on their relative modulus of elasticity (GRP & Steel) is used.

The section will then be designed based on the ultimate capacity with the aim of a minimum of 2.0 safety factor to allow for any unforeseen events. The permanent formwork is designed, executed and maintained with application of appropriate degrees of reliability to:

- **Perform adequately under all expected loads**
- **Withstand all loads with adequate durability**

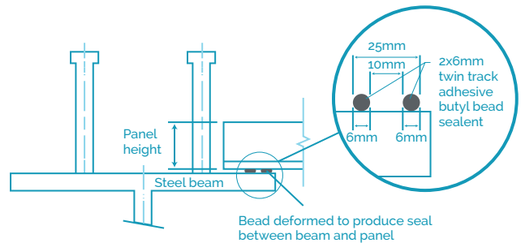
Level of reliability has direct relationship with certainty of the design. With an accurate approach reflecting a realistic execution situation, an appropriate safety factor is used. The validity of use of the design principles are assured because:

- **Panels are designed by appropriately qualified and experienced personnel.**
- **We ensure that the execution is carried out by personnel having necessary skill and experience.**
- **Products are produced under a highly monitored and controlled environment. EMJ employ and maintain a Quality Management System which is BE EN ISO9001 Certified.**
- **A quality control policy is in place to ensure the products are checked prior to delivery.**

Taking all the above facts into account, with the use of the technical guidance of the advice note, reviewing all available relevant codes of practice and our engineering judgment, we are confident that our design with allowance for appropriate degrees of safety factor, results in the production of a high quality product suitable for use in the project. As an additional step, at request we can carry out a load test on a panel to demonstrate the site condition.

SEALANT DATA

EMJ Butyl 2 x 6mm Ø Twin-track adhesive butyl bead x 8mtr



EMJ Butyl 2 x 6mm Ø Twin-track adhesive butyl bead x 8mtr for sealing between EMJ Permadec panel and steel beam flange, or concrete rebate. This acts as a long term seal to stop moisture travelling from the soffit of the panels to the beam flange, therefore cannot reach past this to concrete or onto studs/rebar.

Description

High performance strip-bead sealants based on new technology which includes high strength rubber compounded with selected fillers and plasticisers to give very good movement accommodation and adhesion to most building materials.

For use where strong jointing sealants is required which offers good bonding characteristics. Good joint performance requires good initial contact between the strip and both surfaces of the joint.

Typical uses: Air, dust, water seal in construction and automotive industry. High performance bonding of plastic damp proofing and barrier membranes. Industrial roofing lap & cover joint sealing. Marine, Telecommunications. Sealing water retaining structures. Approved by: Water Research Council, Nat, Fed Roofing.

Performance: Quality Assured to ISO9001:2000

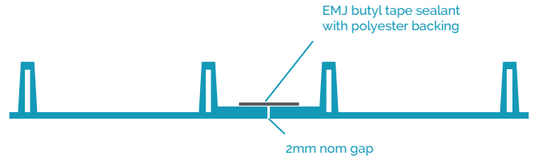
Movement accommodation +/- 15%

Tensile Strength: 98 kPa

Shear Strength: 46 kPa

Outdoor service temperature: -40˚C to +90˚C

EMJ Grey adhesive butyl tape with polyester backing 50mm wide x 35mtr length



EMJ Grey Adhesive Butyl Tape with polyester backing 50mm wide x 35mtr strips with clear polyester backing to one side for sealing joints between butt joints of panels. This stops grout loss and also acts as a long term seal to stop moisture ingress to concrete or rebar.

Application

Surface preparation: All surfaces should be clean, dry and free from frost, grease and loose materials. Apply directly from the reel onto one surface pressing to give adequate initial adhesion. Push firmly to ensure good contact with full area of strip along the length of the joint.

Application temperature: +5˚C to +30C

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