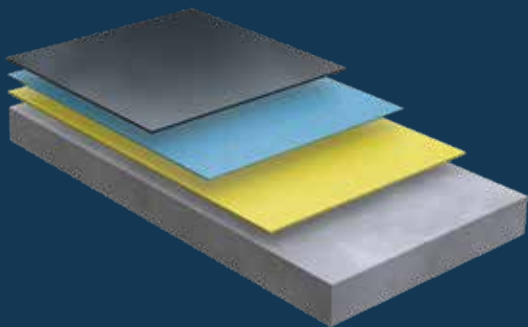




# STRUCTURAL WATERPROOFING

## PMB & URADECK BC SYSTEMS

SPRAY APPLIED  
WATERPROOFING



[www.uslekspan.com](http://www.uslekspan.com)

# Introduction

## The Need For Effective Waterproofing Solutions.

Bridges are under constant stress as water, chlorides, acid rain, de-icing salts and freeze-thaw cycles act on them. Extreme weather cycles, the impact of traffic and vibration place bridges under further stress. As steel reinforcing bars corrode and expand, concrete can crack and deteriorate. The costly disruption caused by resulting repair work impacts on both traffic and safety.

Bridge repairs can often amount to 10-30% of the updated construction cost, and large repairs may even exceed this and still be the preferred option when compared to the cost of traffic interruption and demolition. As moisture is the most significant factor in concrete deterioration, incorporating sufficient waterproofing at the design stage is by far the most cost-effective option.

### Prevention methods

- Bridge expansion joints
- Bridge deck waterproofing systems



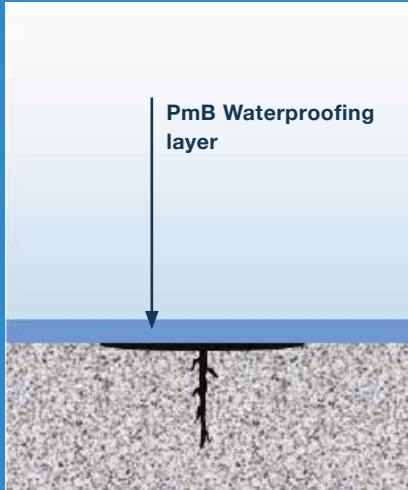
## WHY WATERPROOF STRUCTURES?

### THE EFFECTS OF STRUCTURAL CORROSION

- Constant repair & maintenance
- Reduction in the service life of structures
- High cost of remediation
- Operational shut down cost caused by water ingress & repairs

### KEY ENGINEERING CONSIDERATIONS

- **Crack Bridging**
  - New cracks require infinite elongation
  - Tensile strength
  - Bond to substrate
- **Typical Design Life**
  - 120 years
  - Non-degradable
  - Durable & robust
- **Resistance To Chemicals & Chlorides**



### CONSIDERATIONS



Resistance To Abrasion



Crack Bridging



Rapid Installation



Weather Resistance



Adhesion



Resistance To Fire



Water Tightness

### CHOOSING THE RIGHT SPECIFICATION

#### UK History of Bridge Deck Waterproofing Policy

**1945** | Ministry of Transportation stipulate waterproofing as being beneficial to bridge stock

**1945** | Waterproofing concrete bridges becomes mandatory

**1975** | UK National standard BE27 Introduced for concrete bridge deck waterproofing requiring BBA testing and certification

**1986** | UK DoT Appoints TRL to carry out study after premature failures causing issues with existing bridge stock

**1975** | TRL study defective systems and recommend improvements in specifications

**1986 - 1989** | Introduction of BD47 standard to replace BE27 improving performance criteria

**1999** | Formal introduction of BD47 to UK market is made mandatory. DoT reduced systems approved from twenty five under BE27 to two approved in UK. Only liquid spray systems that meet BD47 and HAPAS used in the UK

**2007** | IAN 96/07 published surfacing and tack coat guidelines

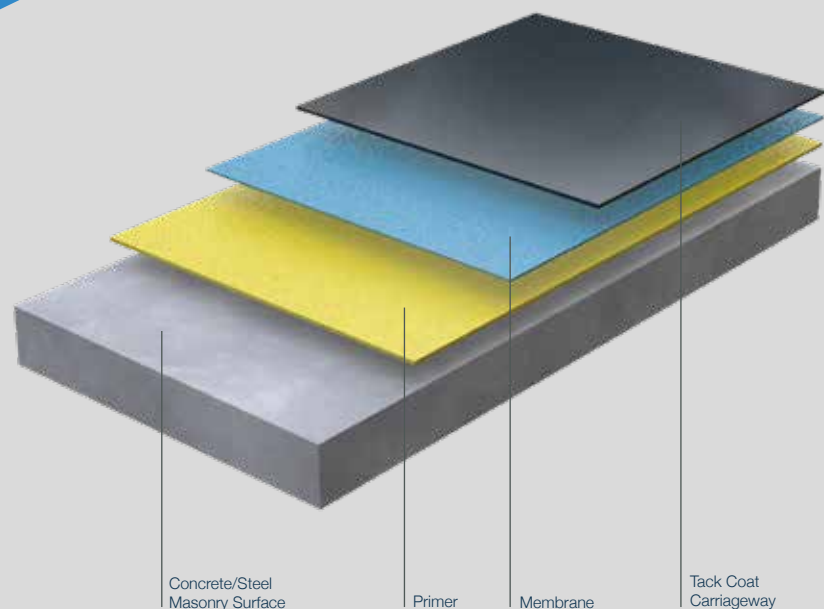
**2010** | HAPAS provides additional testing to enhance performance and products

**2011** | Installer accreditation BDWA led scheme to ensure all applicators are fully trained

**2016** | European Standard ETA for Liquid applied systems



# The System



**System Benefits:**

- Spray applied - rapid curing
- Excellent global track record
- Seamless membrane
- Excellent crack bridging properties
- Quality assured - including pin hole survey
- Durable, corrosion protection waterproofing
- BBA / HAPAS certified
- Longevity in service life

**Applications:**

- Bridges
- Footbridges
- Culverts
- Tunnels
- Walkways

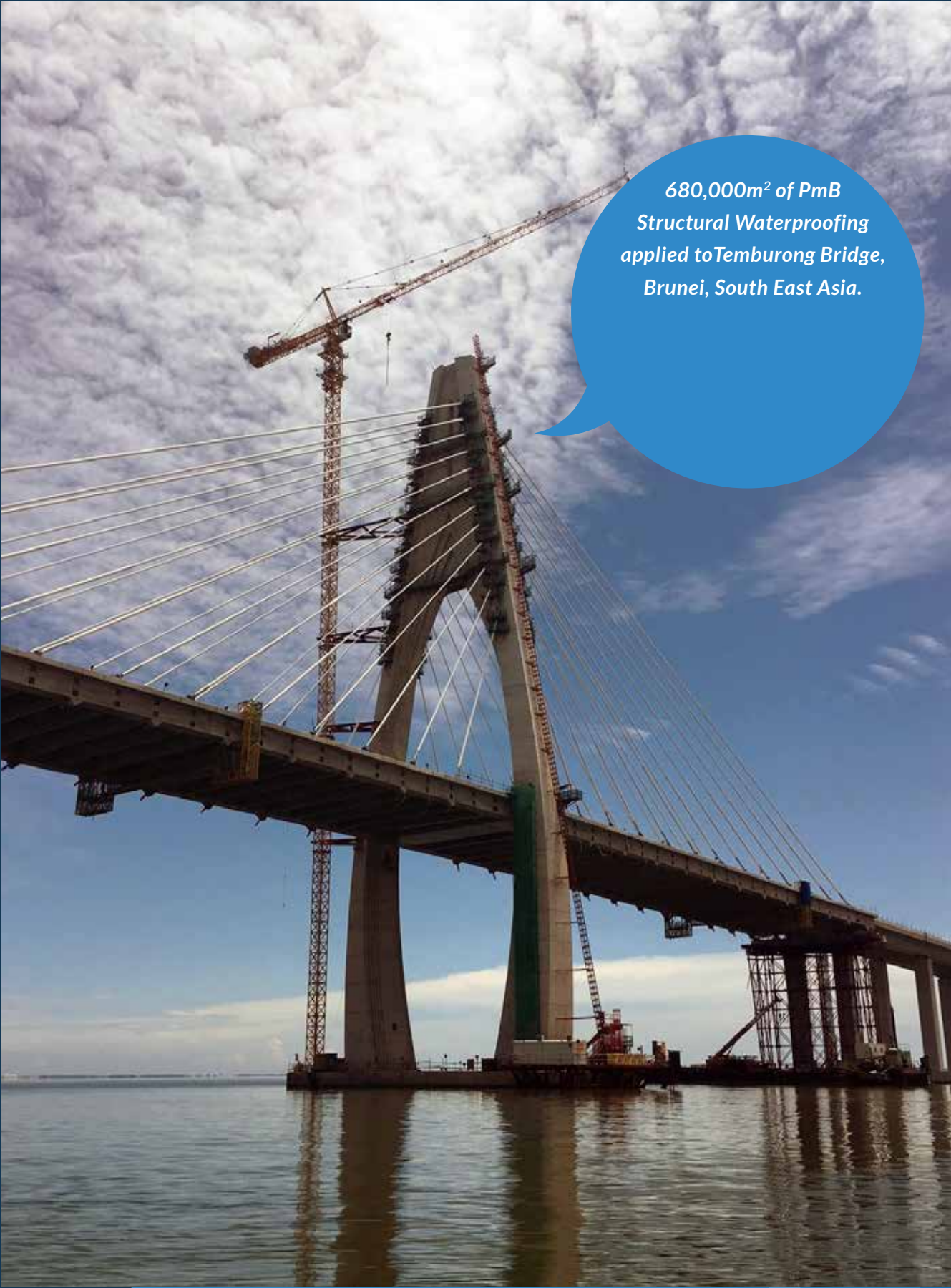


## WHAT IS PmB?

- Two component PUR spray system
- 100% solids reactive resin content
- Solvent free
- No fillers / extender loading
- Rapid setting – 5-8 seconds gel time
- Tack free after approximately 1 minute
- Can be walked on after approximately 10 minutes
- Elastic after approximately 45 minutes

## SPRAY APPLIED, SEAMLESS BRIDGE DECK WATERPROOFING

PmB forms a flexible, chemically resistant seamless membrane tough enough to outlast the design of many structures. PmB has exceptional bond strength to all commonly used substrates, has excellent crack bridging capability, a life expectancy in excess of 30 years and holds British Board of Agrément approval. Tested and approved throughout the world to the highest standards, the PmB system now adds Network Rail and London Underground (LUL) approvals to its ever growing list of accreditations.



680,000m<sup>2</sup> of PmB Structural Waterproofing applied to Temburong Bridge, Brunei, South East Asia.





### Pre Installation Checks

### Surface Preparation

- No system will perform if preparation is not carried out satisfactorily
- Clean, dry and free of contamination

### Primer

Applied by airless spray or roller



### Application Layer

### Tackcoat

- Polymer modified
- 95°C Softening point Bitumen emulsion
- Applied by squeegee over sanded key layer

### Primer

1. Primer PMCS/01
  2. 1-3mm Silica sand
- Provides enhanced bonding to overlay layer



### Membrane

- PmB two part Polyurethane spray applied elastomer
- Installed using computerised two component spray machines

### Spray Technology

- Versatile to suit access, application area and clients programmes and productivity requirements

### QA/QC Application



### Application QA/QC – inhole Check

### QA/QC Quality Testing

### QA/QC Quality Thickness



# Case Studies



**NEW SPIRE BRIDGE, UK**

9,000m<sup>2</sup> of PmB waterproofing was applied to the concrete bridge deck.



**FORTH ROAD BRIDGE, UK**

12,000m<sup>2</sup> of **PmB** waterproofing inclusive of the Hotmelt tack coat system was applied to accommodate the shallow asphalt which was to be laid on top.



# Case Studies



**SECOND SEVERN RIVER, UK**

Application of 176,000m<sup>2</sup> of PmB spray applied waterproofing.

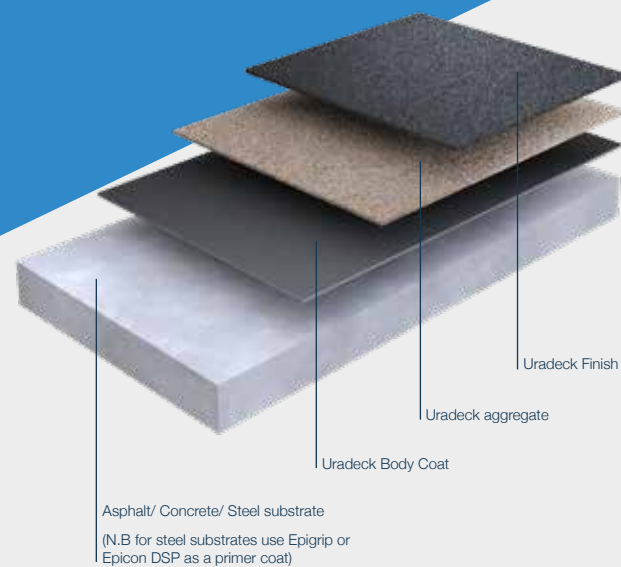


**TINSLEY VIADUCT, UK**

8,400m<sup>2</sup> of PmB structural aterproofing, aggregated key coat and hot melt applied to bridge deck.  
2,000m<sup>2</sup> combined waterproofing and high friction surfacing was applied to the steel walkway plates







URODECK BC

**Combined Waterproofing and Wearing System**  
A two component polyurethane body coat characterised but its inbuilt flexibility, even at low temperatures. **UraDeck BC** provides excellent adhesion to a variety of substrates. By broadcasting slip resistant aggregate into the surface of the wet resin a highly durable anti-slip system can be produced.

The application of a decorative sealer coat is achieved with **UraDeck** Finish.

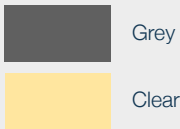
System Benefits

- Excellent adhesion
- Inbuilt flexibility
- Good chemical and abrasion resistance
- Excellent weathering characteristics
- Fast setting for early trafficking
- Decorative finish
- Formulated to comply with the requirements of EN 1504 Part 2
- Manufactured in accordance with ISO 9001

APPLICATIONS

- Waterproof coating for silos, tanks & bunds
- Footbridges & Stair Treads
- Rail, Air & Marine Ports
- Ramps & Pedestrian Footways
- Stadiums & Warehouses
- Industrial Storage Yards

Standard Colours UraDeck Finish



The System

Technical Information

BS 7976-2:2002 Pendulum Testers, method of operation (using Slider 96)  
UK Slip Resistance Group Guidelines for Horizontal Surfaces

	CONDITION	AVERAGE SLIP MEASUREMENT (PTV)
URODECK SYSTEM	DRY & WET (WATER)	36+ LOW SLIP POTENTIAL
URODECK BC		

QUALITY AND TESTING SERVICES

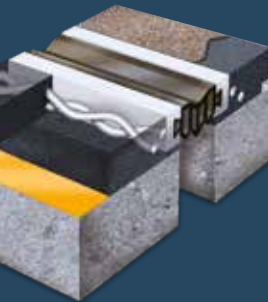
Pot Life:	20 minutes @ 20°C
Overcoating Time:	2 hours @ 20°C
Adhesion (Concrete/asphalt):	Greater than substrate strength
Adhesion (Steel):	>5 N/mm <sup>2</sup>
Coverage:	5kg: 4.2m <sup>2</sup> per pack @ 1mm
	25kg: 21m <sup>2</sup> per pack @ 1mm

UraDeck Finish	
S.G:	1.4
Pot Life:	20 minutes @20°C
Hardness:	70 (Shore D)
Tensile Strength:	>10 N/mm <sup>2</sup>
Coverage:	0.5kg/m <sup>2</sup> (approx. 2m <sup>2</sup> /kg)

All above pot life & hardening times vary at different temperatures

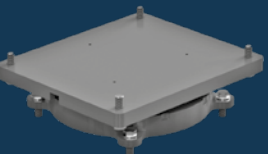


# USL EKSPAN PRODUCT RANGE



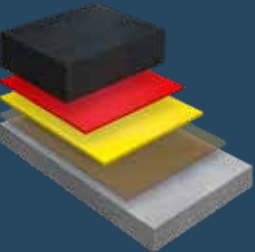
**EXPANSION JOINTS - CD 357**

- |   |   |                             |
|---|---|-----------------------------|
| <b>Uniflex</b> - Buried                   | <b>Brittflex BEJ</b> - Modular          | <b>Finger Joint</b>         |
| <b>BP1</b> - Buried                       | <b>Brittflex MEJS</b> - Modular         | <b>Roller Shutter Joint</b> |
| <b>FEBA</b> - Flexible Plug               | <b>LJ</b> - Longitudinal Joint          |                             |
| <b>Brittflex NJ</b> - Nosing              | <b>ES</b> - Joint Seal                  |                             |
| <b>EC &amp; EW</b> - Joint Seal           | Aqueduct/Immersed Joint                 |                             |
| <b>Transflex &amp; Transflex HM</b> - Mat | <b>Open Type Joint</b> - Rail Joint     |                             |
| <b>T-MAT</b> - Mat                        | <b>Brittflex UCP</b> - Footbridge Joint |                             |



**STRUCTURAL BEARINGS**

- |  |   |                                 |
|--|---|---------------------------------|
| <b>EKE</b> - Elastomeric (EN1337-3)      | <b>D</b> - Line Rocker (BS5400-9)       | <b>Link Bearing</b> (BS5400-9)  |
| <b>KE</b> - Pot (EN1337-5)               | <b>F</b> - Restraint & Guide (BS5400-9) | <b>EA</b> - Sliding Bearing     |
| <b>DE</b> - Line Rocker (EN1337-6)       | <b>G</b> - Spherical (BS5400-9)         | <b>EKR</b> - Rubber Pad & Strip |
| <b>GE</b> - Spherical (EN1337-7)         | <b>J</b> - Roller (BS5400-9)            | <b>EQF</b> - Sliding Bearing    |
| <b>FE</b> - Restraint & Guide (EN1337-8) | <b>K</b> - Pot (BS5400-9)               | <b>Bespoke Bearings</b>         |



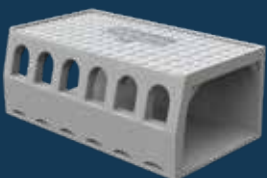
**STRUCTURAL WATERPROOFING - CD 358**

- |  |   |
|--|---|
| <b>Pitchmastic PmB</b><br>Polyurethane (Pu) Waterproofing System     | <b>Britdex CPM Tredseal</b><br>Combined Waterproofing and Anti Skid Surfacing (MMA) |
| <b>Britdex MDP</b><br>Methyl Methacrylate (MMA) Waterproofing System | <b>Uradeck BC</b><br>Combined Waterproofing and Anti Skid Surfacing (Pu)            |



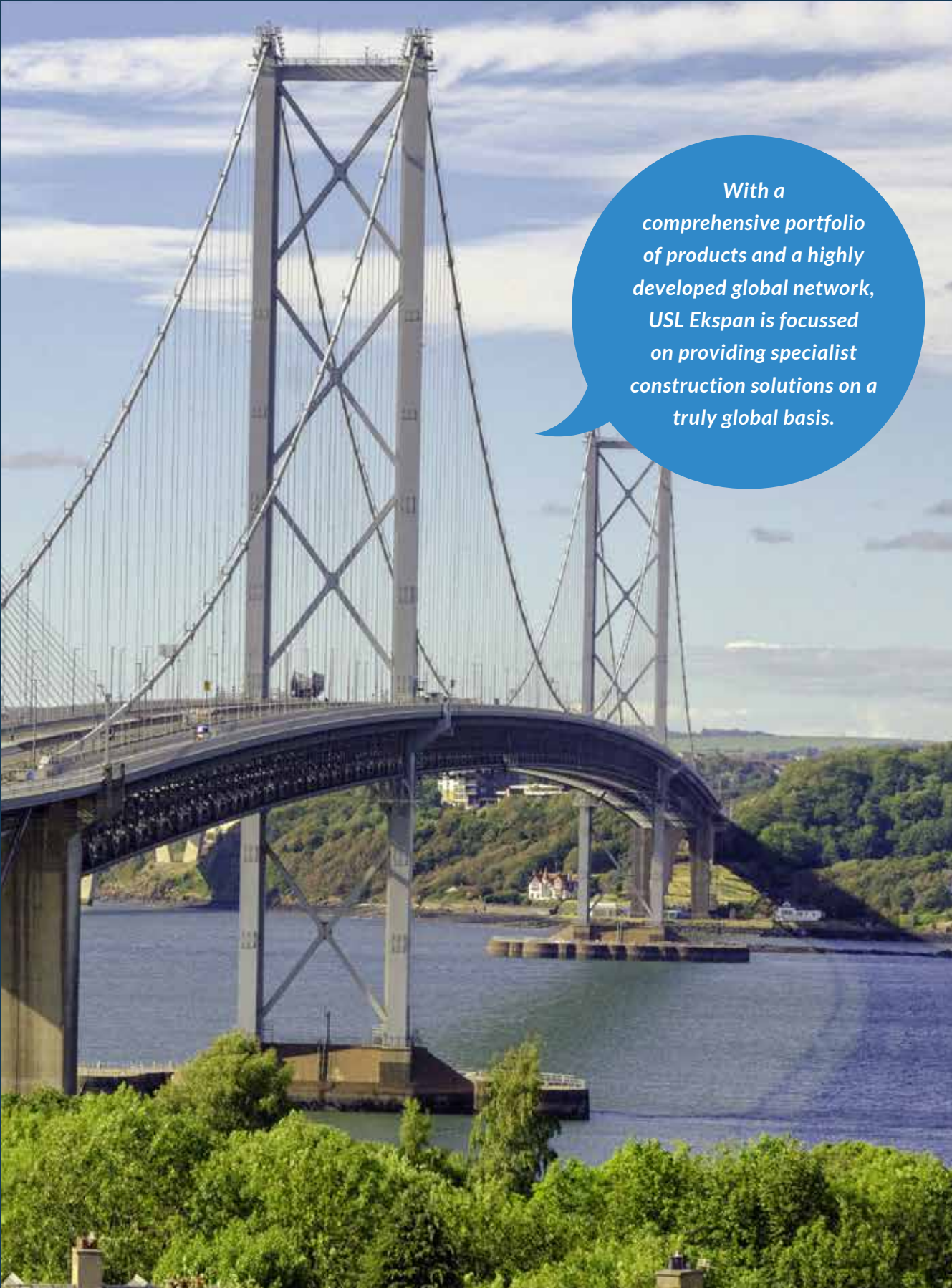
**SUB-SURFACE BRIDGE DRAINAGE**

- Ekspan 325 Channel**  
**Ekspan 302 System**  
**ES Seal System**  
**DriDeck**



**SURFACE BRIDGE DRAINAGE**

- Envirodeck**



With a comprehensive portfolio of products and a highly developed global network, USL Ekspan is focussed on providing specialist construction solutions on a truly global basis.



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