TSG Marine

Bridge Asset Maintenance Solutions with SPS

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LoBEG AGM

Victoria Conference

SPS

tsgmarine.co.uk

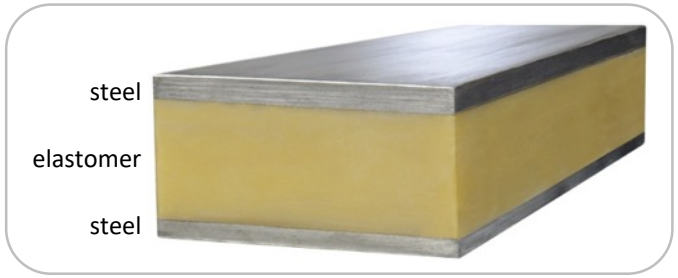
SPS®

A better way to build

Bridges

SPS - sandwich plate system

- structural composite material
- superior to stiffened steel and reinforced concrete
- impact, fire, blast and ballistic protection
- civil, military, maritime and industrial applications
- newbuild and in-situ repair/upgrade
- competitive economics
- approved globally
- low carbon - fully re-usable
- 520+ projects, 30 countries



SPS floor plates

SPS ship deck

Construction and Civil Engineering

SPS Terraces

SPS Floors

SPS Bridges

SPS Protection

- 75% lighter than concrete changes structural options
- prefabricated and very fast to erect
- extended service life
- re-usable

Steel Deck Repair

Maritime

Bridge Decks

- existing steel decks stiffened in-situ
- fast process with no structural removal
- strengthening of existing deck/shell
- minimizes downtime

Maritime New Build

SPS Hatch Covers

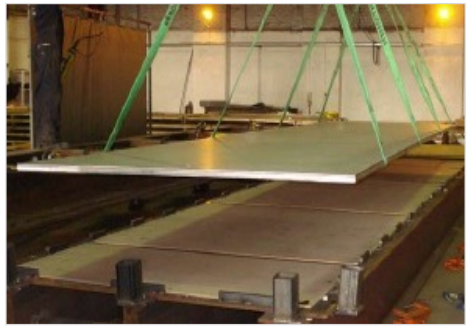
SPS Citadel Protection

- elements of a ship/maritime structure
- faster to build and easier to maintain
- built-in additional performance
- more benefits for military structures

Blue Chip Working Partners and Customers





- parametric CAD modules
- dedicated production line
- automated production
- CNC driven manufacturing
- fast efficient fabrication
- excellent dimensional tolerances
- adaptable geometry
- climatic control conditions
- maximum integration of details

Summary

- delivered on a flat-bed transport vehicle or 12.19m (40’) open top containers
- delivery vehicle shall be placed close to the bay in which the SPS panels will be installed to minimize the movement of the load
- shipping load sequence and container contents are specified in method statements
- special care shall be taken to ensure that the units are handled in accordance with the method statement on lifting
- for storage of the SPS units, select a flat unobstructed area in a location that is not susceptible to damage from other construction activities
- the storage area must be kept secure to prevent vandalism or contamination of the coated surfaces (by dirt, grease, or other chemicals)

Material Characterisation

- mechanical properties, thermal properties, physical characteristics, production

Composite Performance

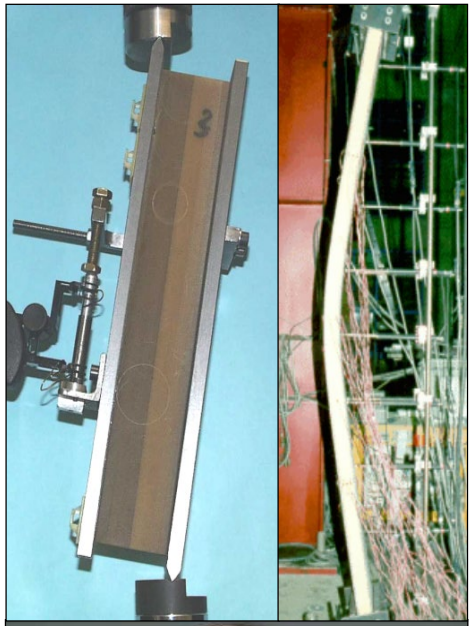
- bond test programs (performance & longevity)
- limit state performance at full-scale
- fire and toxicity tests (SOLAS, BRE, UL, CABR)

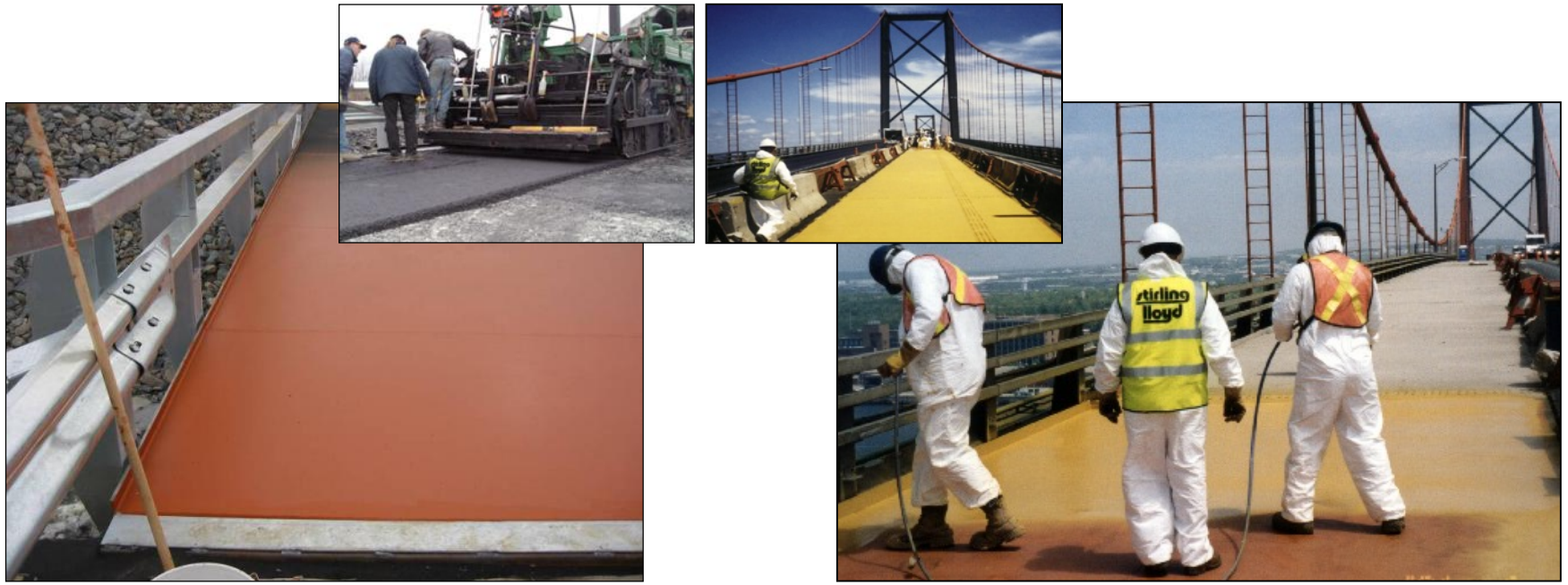
Speciality and Application Specific Testing

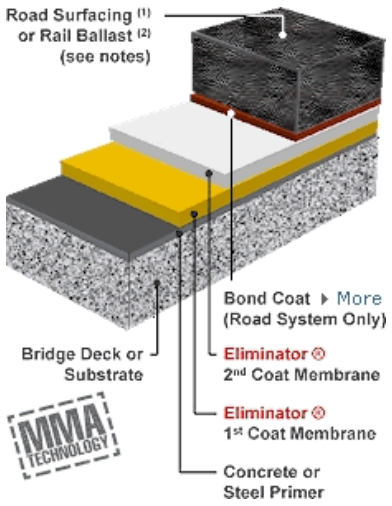
- blast, ballistic, high energy impacts, dynamics, acoustics, low temperature

University & Research Institute Tests

- USA, Canada, UK, Germany, Netherlands, China, Korea



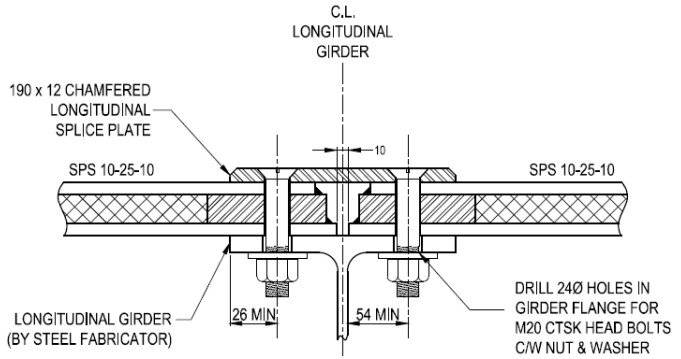


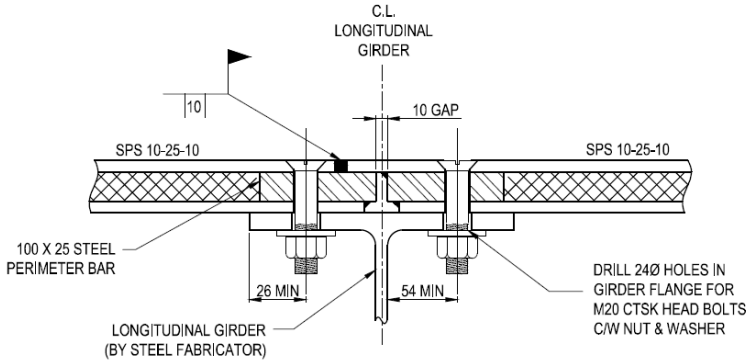


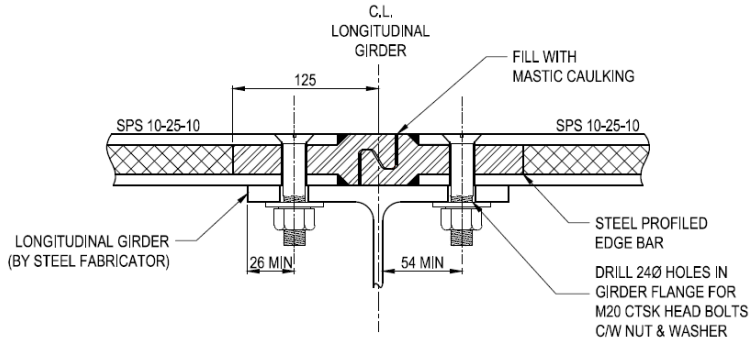
Thick or thin wearing surface options:

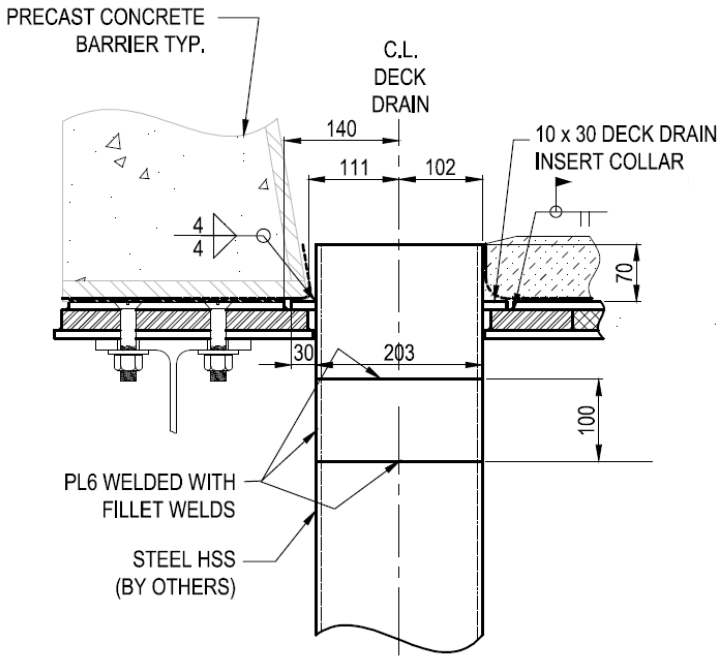
- asphalt + Stirling Lloyd membrane
- thin wearing surface – polyurethane + bauxite grit (RSClare Bimagrip 6mm thick, 2kg/m^2, 2hr cure)
- increased life due to reduced curvatures
- easy repair and replacement as required

- integrated standard details for deck-girder connections, drains, expansion joints, guardrails, abutments, curbs
- SPS bridge decks bolted to top flange of girders (composite action)
- top splice plate provides continuity between adjacent SPS deck plates
- field weld provides a sealed joint and flush surface suitable for lightweight wearing surfaces
- coupler joint provides flush surface with no field welding required
- material interface is the same (steel-to-steel connections)

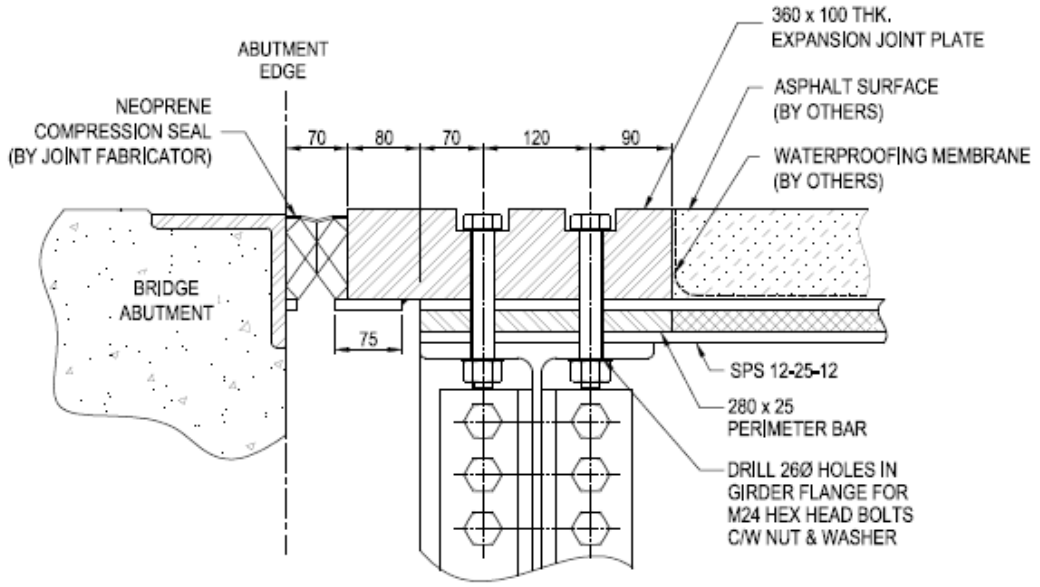






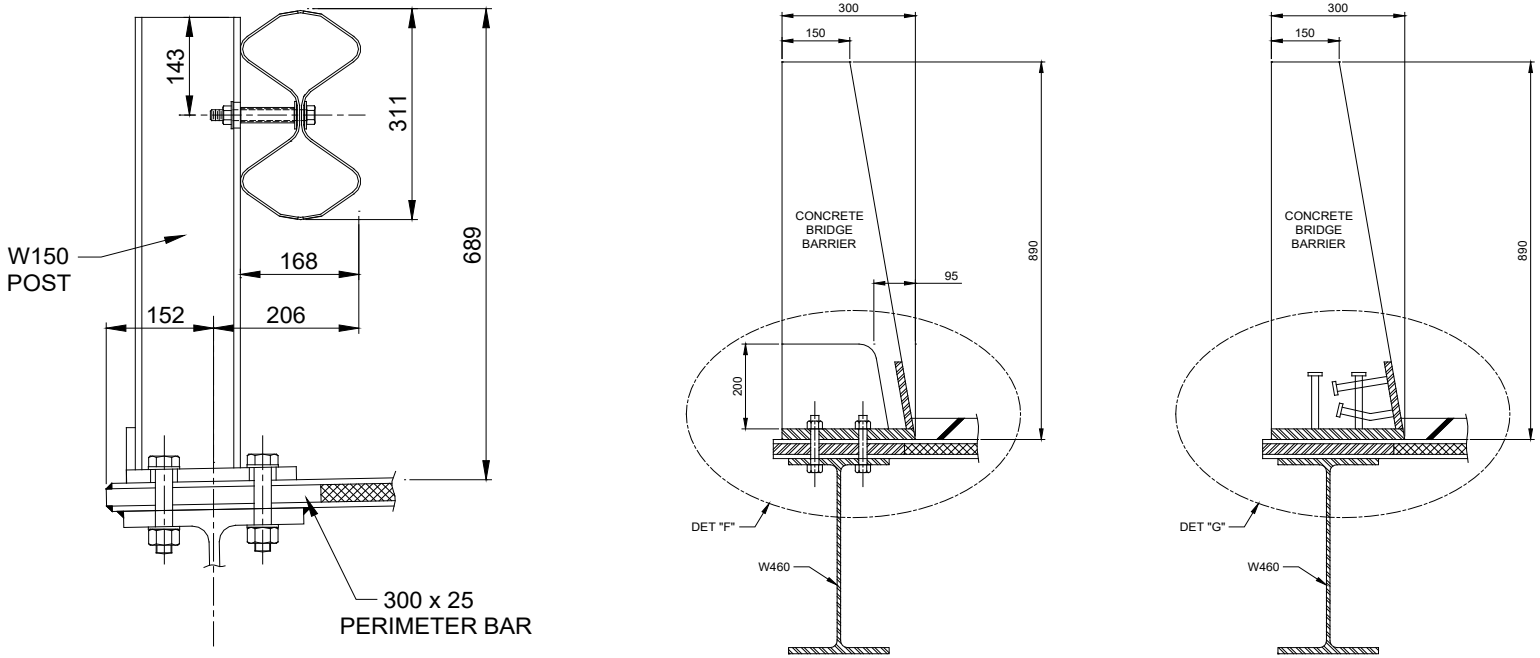


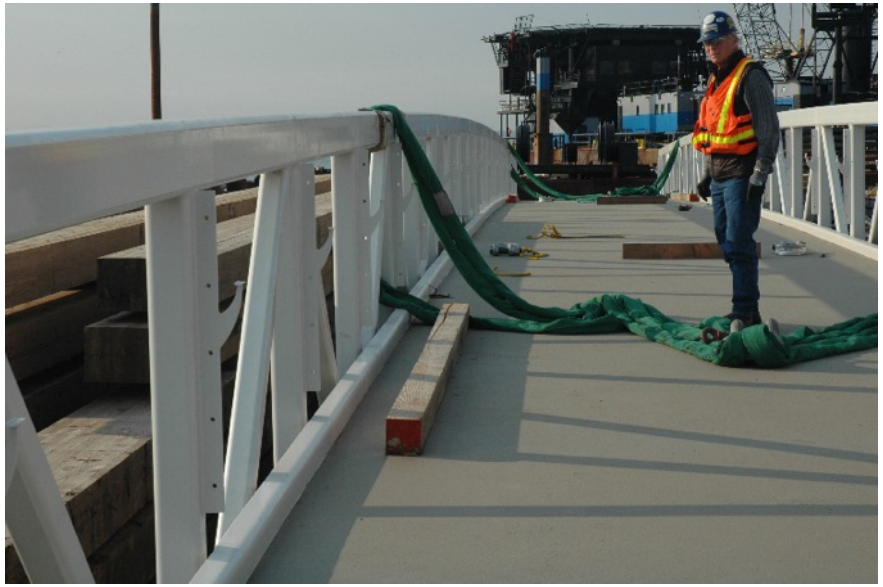
Deck Drain



Expansion Joint

- crash barrier connections: Meet CHBDC: performance level 2 and NCHRP 350 test level 4 (Posts bolted to the edge or centre of the SPS deck)
- attached through girder or edge section supported by discrete cantilever
- all typical bridge attachments possible, such as crash barriers, signs and lamps
- attached using industry standard steel connection techniques





Owner: Washington State DOT
Engineers: Washington State DOT
Contractors: Hoffman Construction
Bridge Fabricators: Jesse-Co Metal Fabrication and Machinery
SPS Fabricators: US Bridge

- Over 157’ long bridge, part of Seattle waterfront re-development (Coleman Dock)
- Harbour key for Seattle to islands from where many commute on a daily basis to Downtown and hub for visitors to Victoria BC and San Juan Islands
- SPS deck panels delivered to bridge fabricators on one truck
- Light wearing surface factory applied
- Complete bridge shipped via barge to Coleman Dock
- Lifted into position by 250,000 lb crane and bolted down in just 35 minutes

Owner: Ohio DoT
Engineers: Muskingum County
Contractors: US Bridge

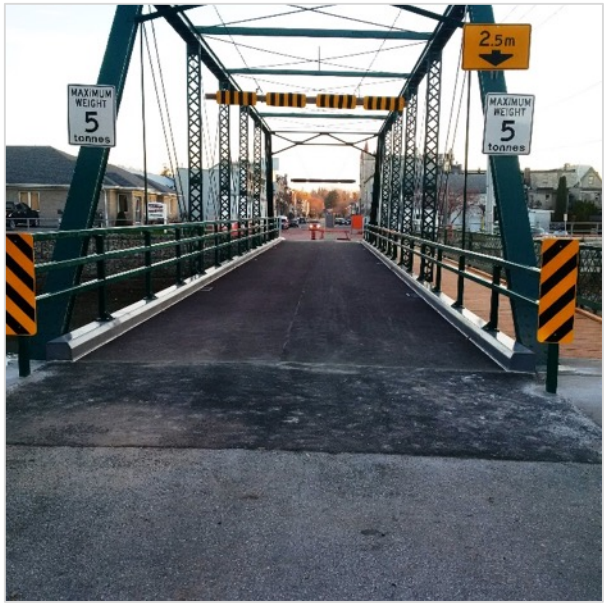
- A new 52’ 6” bridge, with a 100 year service life, installed in just 29 days
- Integrated SPS bridge deck
- Two vehicle lane modular prefabricated bridge, arrived on site on two trucks
- Each section located onto the abutments in 10 minutes
- Bridge funded by the FHWA AID programme, the aim of which, was to identify a competitive alternative superstructure to address their ageing bridge inventory

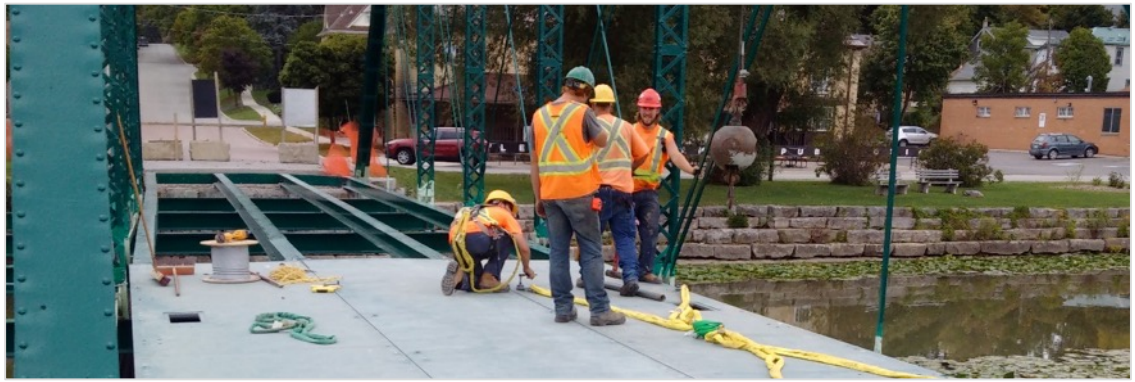
- Rehabilitation of an historic structure - built in 1890 - new SPS deck and retain all of its original features
- SPS deck arrived on the back of just one truck
- two days to install the new SPS bridge deck

Owner: Town of St Mary's, Ontario

Engineer: BM Ross and Associates

Contractor: Maclean Taylor





Owners: Northumberland County Council/ Sheffield City Council

Structural Engineers: Northumberland County Council/SPS/Amery

Wark Tyne

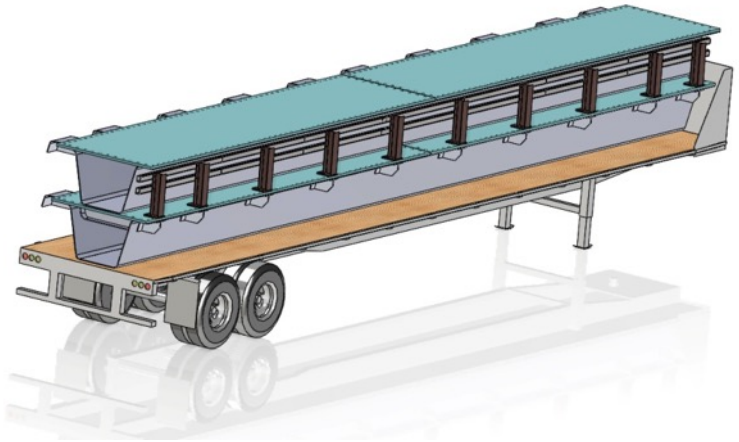
Owner: Northumberland County Council
Structural Engineers: Northumberland County Council/SPS
Construction Manager: Carillion
Fabricator/Steel Erector: DMJ Engineering

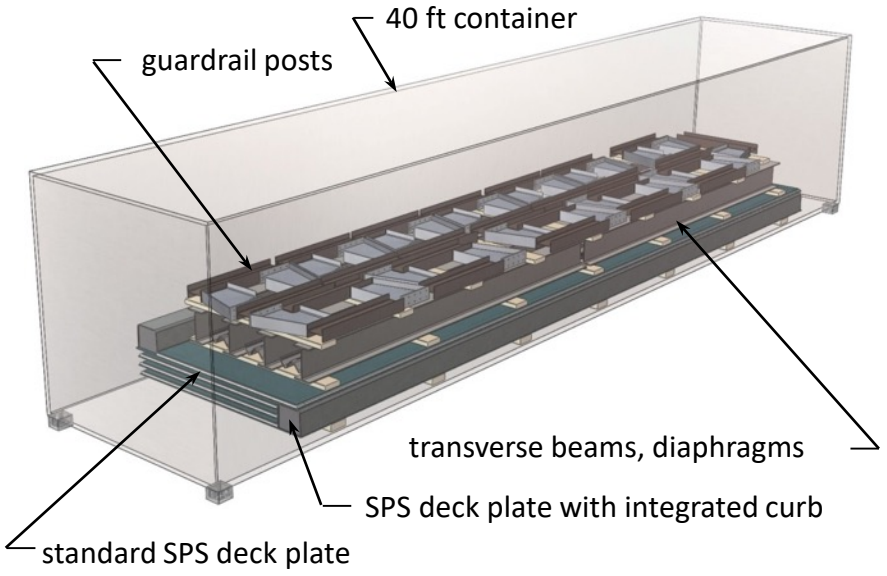
Bamfords Farm

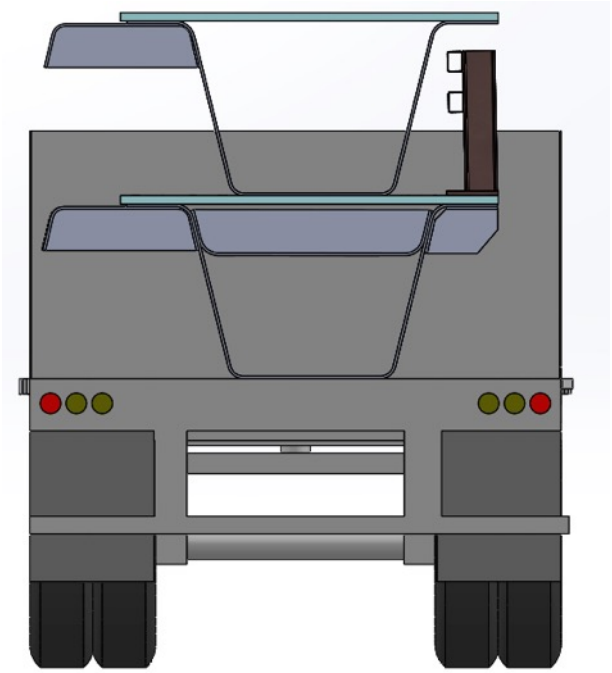
Ducketts Bridge


Slankste brugconcept ter wereld:
ThorcaBridge® en ThorcaBridge Deck®
Nieuwe generatie composiet bruggen en brugdekken
Wereldprimeur InfraTech 2013
ThorcaBridge
HAASNOOT BRUGGEN
SPS
BASF
Qlabs

- bridge components shipped via container (24 tonne capacity for standard 40 ft container) or flat bed truck
- transform construction site into an assembly site of prefabricated components
- different wearing surfaces easily accommodated







Gatwick

Architect: Capita Symonds
Engineers: WSP Group
Erector: Fisher

Owner:	Network Rail
Engineer:	Atkins
Contractor:	Mace
Steel Erector:	Severfield
Date:	2012 & 2013

- SPS installed on the north access ramp located on the concourse level
- SPS provided a solution that was light weight, easy to handle and install given no access from below

Architect: Angus Meak
Contractor: John Sisk & Sons

"SPS Floors were key to meeting the challenges of rebuilding on an old and damaged structure with limitations on weight, restricted access and a demanding schedule. Intelligent Engineering has gone the extra mile in supporting us from design to installation to ensure the success of the project."
Andy McGoldrick, Project Director, John Sisk & Sons Ltd

TSG Marine

Thank You

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