SPS Technology
Terminology and History

Structural Composite
- two steel plates bonded to a solid elastomer core
- continuous elastomer support to steel precludes local buckling
- SPS 8-25-8: expresses the sandwich elements thickness in mm

History
- developed in 1993
- over 450 projects & 3 million ft$^2$ in service in 30 countries
- used in ships, bridges, stadium and buildings
- approved by major global regulators
Carnegie Hall - Floors

Dawson Bridge - Deck

Georgia Tech - Terraces

Stratford Edge - Floors

Martin Branch Bridge - Deck

London Olympics - Terraces
What are SPS Bridge Decks?

SPS Bridge Deck
• a composite deck made of two steel plates, a solid polyurethane core and a steel perimeter bar
• deck made composite with steel girders through continuous longitudinal bolting
• asphalt or light-weight wearing surfaces possible
• TL-4 crash tested barrier
• AASHTO Innovation Initiative – TxDOT Experience

Detail "A"
SPS Bridge Decks
Polyurethane Core

General
• elastomer supplied as two separate components (polyol, isocyanate)
• characteristics guaranteed by BASF Elastogran in partnership with SPS

Design
• sufficient modulus of elasticity to prevent local buckling of steel faceplates
• operating temperature range from -40°F to 248°F (-40°C to 120°C)
• fatigue insensitive bond and core demonstrated by laboratory testing

Quality Assurance
• Positest used to measure bond strength
• injection overseen by qualified injection engineer accredited by IE

Positest
## SPS Bridge Decks
Typical Panel Dimensions and Weight

### Typical Length
20’ to 40’

### Typical Width
5’ to 8’

<table>
<thead>
<tr>
<th>Deck Type</th>
<th>Metric (Approximate)</th>
<th>Girder Spacing</th>
<th>Weight(^1) (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPS 5/16”-1”-5/16”</td>
<td>SPS 8-25-8</td>
<td>5’ to 6’</td>
<td>37</td>
</tr>
<tr>
<td>SPS 3/8”-1”-3/8”</td>
<td>SPS 10-25-10</td>
<td>6’ to 7’</td>
<td>41</td>
</tr>
<tr>
<td>SPS 1/2”-1”-1/2”</td>
<td>SPS 13-25-13</td>
<td>7’ to 8’</td>
<td>51</td>
</tr>
</tbody>
</table>

\(^1\)Based on the smaller girder spacing and a panel length of 30’ with 1” x 4” perimeter bars
### SPS Bridge Decks
Comparison with Concrete Bridge Decks

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Concrete Deck</th>
<th>SPS Deck</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>100 to 113 psf</td>
<td>37 to 51 psf</td>
</tr>
<tr>
<td>Deck Thickness</td>
<td>8&quot; to 9&quot;</td>
<td>1-5/8&quot; to 2&quot;</td>
</tr>
<tr>
<td>Weather Sensitivity During Installation</td>
<td>Weather dependant</td>
<td>Less weather dependant</td>
</tr>
<tr>
<td>Deck Durability</td>
<td>Deck may need to be replaced during its service life due to shrinkage cracking, reinforcement corrosion</td>
<td>Minimum deck life of 100+ years achieved by panel metallization. Protected against de-icing salts and chemicals</td>
</tr>
</tbody>
</table>
SPS Bridge Deck Fabrication Process

- 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

Fabrication of SPS Bridge Deck Plates for Dawson Bridge

- blasted plate with perimeter bars
- drain detail
- countersunk bolt holes drilled
- vacuum lift
- elevated casting bed
- elastomer injection
- vent funnels and restraint
- stacking and delivery
AASHTO hosted a webinar as part of SPS Innovation Initiative Award in 2015

Benefits of SPS Bridge Decks
Prefabrication and Modular Construction

- Accelerated Bridge Construction
- Staged Construction - Single Lane
- Prefabricated Deck-to-Girder
- Full-Span Bridge Module
- Integrated Deck-to-Tub Girder
- Prefabricated Sidewalk Panels
Benefits of SPS Bridge Decks
Construction

- Efficient Transportation
- Lightweight Equipment
- Reduced Site Congestion
- Immediate Load Carrying Capacity
- Single Trade
- All Steel Construction
Benefits of SPS Bridge Decks
Typical Bridge Details

Asphalt Wearing Surface

Lightweight Wearing Surface

Deck Mounted TL-4 Guardrail Post

Steel Curb

Drain Insert

Standard Expansion Joint Seal

January 2017
Benefits of SPS Bridge Decks
Typical Bridge Details Continued

- Longitudinal Camber
- Crossfall - Crowned SPS Panels
- Crossfall - Sloped Bearing Plates
- Weathering Steel
- Factory Applied Paint
- Metallized Panels
SPS Bridge Decks  
ABC Opportunities

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>SPS Value / Attributes / Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deck Weight</strong></td>
<td>• SPS bridge deck is 50% to 70% lighter than an equivalent concrete deck</td>
</tr>
</tbody>
</table>
| **ABC / Schedule**   | • **Light Weight Deck**  
  • lighter superstructure allows for innovative construction methods  
  • existing abutments can be reused without strengthening (minimize bridge closures)  
  • **Modular Construction**  
  • transforms construction to onsite assembly  
  • preassembled deck-on-girder sections readily erected and assembled  
  • staged construction can be readily accommodated |

Mettlach Bridge (Germany)  
one month to re-instate each lane

“Lightweight composite steel plate and elastomer deck shaves months off project schedule and millions off budget.” – Modern Steel Construction, March 2011

Dawson Bridge (Canada)
## SPS Bridge Decks
Deficient Bridges, Constructability and Durability Opportunities

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>SPS Value / Attributes / Benefits</th>
</tr>
</thead>
</table>
| **Deficient Bridges** | • elimination of traffic load restrictions; increase vehicle capacity (posted bridge)  
• elimination of superstructure strengthening of historical bridges; bridge life extension  
• reduces pier, abutment and foundation costs  
• additional pedestrian and cycling capacity |
| **Constructability** | • lighter cranes can be used  
• reduced number of trucks for transportation (particularly remote sites)  
• immediate load carrying capacity  
• all steel construction erected by single trade simplifying site logistics  
• eliminates wet work (no concrete closure pours)  
• reduces site congestion; reduces staging area |
| **Durability** | • designed for 100+ year design life  
• infinite fatigue resistance  
• watertight deck; water management details incorporated  
• industry standard coatings provide a protective barrier |

![Mettlach Bridge (Germany)](image1.png)
Mettlach Bridge (Germany)
increased traffic load capacity

![Pont Rouge (Luxembourg)](image2.png)
Pont Rouge (Luxembourg)
deck life extension; staged construction; increased load capacity
## Bridge Applications

### SPS Bridge Decks: Key Benefits

<table>
<thead>
<tr>
<th>Muskingum County Bridge (tub girder)</th>
<th>Brazos River Bridge (deck truss bridge – design complete for 2018)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• superstructure installation complete in 3 to 5 days</td>
<td>• lightweight deck; no truss strengthening</td>
</tr>
<tr>
<td>• reduce road closures</td>
<td>• increased speed of erection</td>
</tr>
<tr>
<td>• weather-independent; eliminate concrete closure pours</td>
<td>• roadway width for phased construction accommodated</td>
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**Muskingum County Bridge (tub girder)**

- superstructure installation complete in 3 to 5 days
- reduce road closures
- weather-independent; eliminate concrete closure pours

**Brazos River Bridge (deck truss bridge – design complete for 2018)**

- lightweight deck; no truss strengthening
- increased speed of erection
- roadway width for phased construction accommodated

**Bascule Bridge Case Study Grand Duchess Charlotte Bridge (orthotropic steel deck bridge)**

<table>
<thead>
<tr>
<th>Bascule Bridge Case Study</th>
<th>Grand Duchess Charlotte Bridge (orthotropic steel deck bridge)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• lightweight deck; reduced load on trunnion</td>
<td>• lightweight solution; increased speed of erection</td>
</tr>
<tr>
<td>• weather independent</td>
<td>• strengthening of existing orthotropic bridge deck plating</td>
</tr>
<tr>
<td>• improved fatigue life; skid resistance; acoustic performance and vibration control</td>
<td>• eliminates fatigue problems</td>
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<tr>
<td></td>
<td>• interrupts the propagation of existing fatigue cracks</td>
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**Bascule Bridge Case Study Grand Duchess Charlotte Bridge (orthotropic steel deck bridge)**

- lightweight deck; reduced load on trunnion
- weather independent
- improved fatigue life; skid resistance; acoustic performance and vibration control

**Grand Duchess Charlotte Bridge (orthotropic steel deck bridge)**

- lightweight solution; increased speed of erection
- strengthening of existing orthotropic bridge deck plating
- eliminates fatigue problems
- interrupts the propagation of existing fatigue cracks
Project Description

- ODOT and Muskingum County awarded an AID Demonstration grant in 2016
- replace existing bridge with steel tub girders with SPS deck
Site Description

- existing bridge: concrete deck composite with steel beams spanning 38'-0"
- new bridge: SPS deck composite with steel tub girders spanning 52'-6"

Site Constraints

- minimize road closures
- hydraulic restrictions led to minimizing girder depth
- minimize approach buildup

SPS Bridge Deck Benefits

- reduce road closures with superstructure replacement completed within 3 to 5 days; includes application of waterproof membrane and asphalt wearing surface
- weather independent with immediate load-carrying capacity; eliminate concrete closure pours
- shallow tub girder depth to respect hydraulic constraints
SPS Bridge Deck for ABC Application
Tub Girder Bridge for Muskingum County, Ohio

Span

Roadway Width = 24’-0”

Exterior Module = 6’
Interior Module = 6’

SPS 8-28-8

January 2017
Prefabricated and Preassembled Large Modular Components

- exterior and interior modules assembled in shop with pre-attached lifting beams
- weight of combined modules (incl. pre-attached guardrails, posts, stiffeners) ≈ 31 tons

Erection Sequence

Transportation of Single Preassembled Girder Modules (Alternative Method)
Prefabricated and Preassembled Large Modular Components

- SPS deck can also be shop bolted to beams to form bridge modules
- Infill plates are erected and bolted onsite

Assembly of Prefabricated SPS Plate-on-Beam
SPS Bridge Deck for ABC Application
Streamlined Process for Tub Girder Construction

Pre-engineered Design
- bridge spans up to 60'
- standard bridge details (guardrails, abutment)
- parametric Tekla model (MTO and match-fit)

Fabrication
- material order
- press-brake tub girders
- fabrication of SPS panels
- assembly of girders and panels

Delivery
- one to two modules per truck
- stable module with built-in pick points

Erection
- placement of modules
- bolting modules together
- application of wearing surface

Time Estimate Breakdown
- 3 to 5 days
- 8 weeks
- 1 day
- 3 to 5 days

90 days to complete bridge installation after signing contract:
- 60 days to build SPS deck-tub girder superstructure in-shop
- 30 days for road closure (removal of existing bridge, construction of new abutments, erection of superstructure, application of wearing surface)
SPS Bridge Deck for ABC Application
Pre-engineered SPS Deck Plate

- designed and detailed in accordance with AASHTO LRFD 2012
- SPS 8-28-8 deck is pre-engineered and satisfies the criteria for ULS, SLS and FLS
- SPS plate width and sandwich element thicknesses remain constant for all bridge spans
- bond strength and core material is fatigue insensitive
- fatigue performance governed by connection details, not SPS deck plate

\[ \Delta \leq \frac{L}{300} \]

Fatigue Test (Virginia Tech)
SPS Bridge Deck for ABC Application
Pre-engineered Tub Girder Design with SPS Deck Plates

- Girder depth and plate thickness readily determined using design tables for bridge spans up to 59’
- Muskingum bridge span = 52’-6”
  - Minimum girder depth is 24” using a 1/2” thick plate
  - Girder depth of 22” selected using a 5/8” thick plate (hydraulic constraints)
SPS Bridge Deck for ABC Application
Tub Girder Fabrication Process

- shop drawings created using parametric Tekla component model with minimum inputs
- maximum tub girder that can be press-braked is 60'
- competitive bidding: several fabricators of tub girders and SPS bridge decks across the US

Courtesy of Maico Industries
SPS Bridge Deck for ABC Application
Longitudinal Connection Details

- prefabricated SPS panels are made composite with tub girders through bolting
- infinite fatigue resistance in accordance with AASHTO LRFD
- flush and water-tight deck surface to receive wearing surface

Longitudinal Connection
• standard DOT guardrails are easily accommodated
• deck- or side-mounted guardrails are available
• plastic deformations are limited to the crash barriers with supporting structure undamaged
Crash Barrier Performance
Pendulum Tests

- pendulum tests by Texas Transportation Institute (TTI) 2005
- crash barriers on SPS achieved TL-4 performance level
- SPS deck undamaged
Corrosion Protection

- SPS panel will be zinc metallized to achieve a design life of 100+ years
- Spray metallization done in accordance with AWS C2.23M/C2.23:2003, NACE NO. 12, SSPC-CS 23 averaging 7-12 mil coating thickness with a maximum of 20 mils
- All other bridge components including the tub girders will be hot-dipped galvanized

Wearing Surface

- Waterproof membrane to be applied over metallized SPS deck
- Asphalt wearing course to be applied over waterproof membrane
Brazos River Bridge
Bridge Description and Rehabilitation Requirements

Bridge Description
• located in Hill County, Texas
• state highway (SH) 174 crossing over Brazos River
• original construction completed in 1950
• three-span continuous deck truss bridge
• composite steel-concrete deck (6¼” thick deck)
• structurally deficient, functionally obsolete

Rehabilitation Requirements
• design complete for 2018 construction schedule
• truss strengthening
• phased construction sequence
• roadway width extension
Brazos River Bridge
Comparison Between Concrete and SPS Bridge Deck

Concrete Bridge Deck
- 8” thick, 100 psf
- gusset plate strengthening or replacement required
- rivet replacement required
- ready-mix concrete availability may be problematic
- longer construction schedule

SPS Bridge Deck
- SPS ½”-1”-½” (2” total thickness), 50 psf
- no truss strengthening required
- adaptable to any cross-slope
- shorter construction schedule
Brazos River Bridge
Phased Construction Sequence

Phase I

- required roadway width for phased construction sequence easily accommodated by varying plate widths that meet fabrication and delivery constraints

- stringers elevated to match elevation of roadway approach and to accommodate difference in deck thicknesses
Brazos River Bridge
SPS Plate Connection Details

Typical Longitudinal Connection at Stringer

Typical Transverse Connection at Splice Plate

Typical SPS Plate Connection at Bridge Crown
Brazos River Bridge
Guardrail and Barrier Details

Bolted Connection of Curb and Guardrail
(TxDOT T1F guardrail, TL-3 rated)

Zoneguard Steel Barrier
(temporary TL-3 rated barrier)
Brazos River Bridge
Deck Drain and Expansion Joint Details

Deck Drain Detail

Expansion Joint Detail
**Multi Layer Polymer Overlay (MLPO)**

(TxDOT Standard Specification Item 439, “Bridge Deck Overlays”)

- epoxy with aggregate “overlay”
- typical thickness is 3/8”
- reinstatement (overtop of existing) at ~ 10 years (depending on product)
- temperature range 32°F to 104°F

**Ease of Application**

- clean surface to product specifications
- apply primer
- apply resin (pot life of 15 to 20 minutes)
- broadcast aggregate
- apply sealant (depends on product)
Bascule Bridge Case Study
Bridge Description and Design Concept

Bridge Description
• double leaf bascule bridge
• located in Portland Oregon
• six traffic lanes, one bike path and two pedestrian walkways
• aluminum deck was considered but discarded as an option
• two options: light-weight concrete filled steel grid deck and SPS deck

SPS Design Concept
• 84 prefabricated SPS 8-25-8 bridge deck panels (area = 14,600 ft²)
• SPS bridge decks are bolted to the supporting structure and the top faceplates of adjacent SPS panels are field welded to provide a continuous deck system
### SPS Bridge Deck Replacement for Moveable Bridges

#### Deck Options

**Most Common - Open Grid Steel Deck**
- low fatigue life - requires regular maintenance
- low skid resistance; high noise level; susceptible to vibrations
- dirt, debris and salts fall through and corrode supporting structure

**Solid Deck Replacement Options**
- light-weight concrete filled steel grid deck, exodermic deck, orthotropic steel deck, SPS
- all bridge decks are designed in accordance with AASHTO LRFD Bridge Specifications
- satisfies the relevant design criteria: strength, service and fatigue limit states

**Main Design Considerations**
- maintaining the same overall weight and balance of the structure
- maintaining the same road elevation

#### Deck Weight

<table>
<thead>
<tr>
<th>Open Grid Steel Deck</th>
<th>Light-Weight Concrete Filled Steel Grid Deck</th>
<th>Exodermic Deck</th>
<th>Orthotropic Steel Deck</th>
<th>SPS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 - 35 psf</td>
<td>55 - 60 psf</td>
<td>40 - 80 psf</td>
<td>45 - 50 psf</td>
<td>32 - 40 psf</td>
</tr>
</tbody>
</table>

*based on SPS 6-25-6, SPS 8-25-8 and SPS 10-25-10
Bascule Bridge Case Study
Weight Savings

- existing stringers and FRP with overlay estimated to be 30.7 lb/ft²
- net weight = additional weight over existing FRP deck structure

<table>
<thead>
<tr>
<th>Component Weight (lb/ft²)</th>
<th>SPS Deck</th>
<th>Light-Weight Concrete Filled Steel Grid Deck (5” Thk. ρ = 95 lb/ft³)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deck</td>
<td>36.8</td>
<td>54.6</td>
</tr>
<tr>
<td>Stringers</td>
<td>9.2</td>
<td>9.7</td>
</tr>
<tr>
<td>Wearing Surface</td>
<td>4.2</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>50.2</td>
<td>64.3</td>
</tr>
<tr>
<td>Net</td>
<td>19.5</td>
<td>33.6</td>
</tr>
</tbody>
</table>

*based on lightest possible open steel grid deck (15 lb/ft²) and light-weight concrete density (90 to 115 lb/ft³)

- SPS provides a **42% decrease** in additional **net-weight** over alternative system
- **42% less** load on the trunnion
- **42% less** counterweight per leaf
Bascule Bridge Case Study
Final Arrangement

• new W21x48 stringers with bolt holes (match fit to SPS) are spaced and oriented to:
  • optimize SPS deck plate
  • achieve required cross-fall and elevation
  • eliminates field drilling for SPS bolted connection ~ 9630 bolt holes
  • saves time and de-risk schedule (weather independent)
Bascule Bridge Case Study
Construction Stage Schedule

- field steel erection, welding and wearing surface crews are independent of each other
- not including enabling works between stages

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Task Description</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (East Leaf)</td>
<td>1 Installation of New Stringers</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2 Installation of SPS Deck Panels</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3 Field Welding of SPS Deck Panels</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4 Application of Wearing Surface</td>
<td>1</td>
</tr>
<tr>
<td>B (West Leaf)</td>
<td>1 Installation of New Stringers</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2 Installation of SPS Deck Panels</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3 Field Welding of SPS Deck Panels</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4 Application of Wearing Surface</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Time = 61 days

<table>
<thead>
<tr>
<th>Stage 2</th>
<th>Task Description</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (East Leaf)</td>
<td>1 Installation of New Stringers</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2 Installation of SPS Deck Panels</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3 Field Welding of SPS Deck Panels</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4 Application of Wearing Surface</td>
<td>1</td>
</tr>
<tr>
<td>B (West Leaf)</td>
<td>1 Installation of New Stringers</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2 Installation of SPS Deck Panels</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3 Field Welding of SPS Deck Panels</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4 Application of Wearing Surface</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Time = 25 days

<table>
<thead>
<tr>
<th>Stage 3</th>
<th>Task Description</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>East or West Leaf</td>
<td>1 Installation of New Stringers</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2 Installation of SPS Deck Panels</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3 Field Welding of SPS Deck Panels</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4 Application of Wearing Surface</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Time = 13 days

Bikepath Area = 2122 ft²

South Roadway Area = 6216 ft²

North Roadway Area = 6264 ft²
Bascule Bridge Case Study
Construction Stage Panel Placement

- light-weight equipment required; stackable -> minimizes staging area
- standard bolting and welding techniques; single trade; steel erection (no special training)
- weather independent

One SPS Panel
Weight = 6320 lbs.
Length = 31’-3”

Placement of Typical Panel with Telehandler (Stage 2)

Lifting of Typical Panel
(Lifting Locations Included)
Bascule Bridge Case Study
Durability

Steel Grade and Coatings (Oregon Standard Specifications):
- AASHTO M 270 Grade 50 with coating specs. as per Section 00594
- or AASHTO M 270 Grade 50W

Water Management Details:
- top faceplate welding and closely-spaced countersunk bolts-> watertight deck
- waterproofing membrane specified between wearing surface and deck
- vertical transverse profile collects water in existing stormfilter catchbasins

Vertical Transverse Profile
Bascule Bridge Case Study
Light Weight Wearing Surface

- epoxy with aggregate “overlay”
- reinstatement (overtop of existing) at ~10 years (depending on product)
- application rate of 40,000 ft²/day possible
- successfully used by TxDOT on Martin Branch Bridge in 2008
Grand Duchess Charlotte Bridge
Bridge Description

- orthotropic steel deck bridge, constructed in 1965
- located in Luxembourg City, Luxembourg
- 1165 ft long by 87 ft wide
- 6 traffic lanes; sidewalks on each side
- rehabilitation using SPS Overlay initiated October 2015
- completion in 2017
• **SPS Overlay**: strengthens existing orthotropic deck; eliminates fatigue problems; interrupts propagation of fatigue cracks

• **prefabricated SPS plates**: form new sidewalks; offer lightweight solution that is fast to erect; allow bridge life extension with limited through-life maintenance
Phased Construction Sequence

- bridge can remain open with reduced lane widths
  (not a reduced number of lanes)
- maintain minimum maximum speeds of 90km/hr in the direction of work and no reduction in the speed limit in the opposite direction

Narrow Rigid Enclosures

- provide weather-independent work area
- no quality problems due to poor climate conditions
- reduced risks to public and worker safety
- seamless work flow: repair of existing fatigue cracks is integrated with the steel work for SPS Overlay
Grand Duchess Charlotte Bridge
Prefabricated SPS Sidewalk Panels

- total of 86 prefabricated SPS sidewalk panels
- typical panel dimension of 8’-10” by 32’-10”
# SPS Bridge Decks

Proven Performance, Schedule/Constructability Benefits, Longevity, Quality

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Attributes / Benefits / Reduced Risk</th>
</tr>
</thead>
</table>
| **Schedule (ABC)** | • shorter and predictable schedule  
• weather independent  
• traffic disruption, site congestion and environmental contamination are minimized  
• staged construction readily accommodated                                                                                       |
| **Constructability** | • lifting locations built into panels  
• light-weight equipment (telehandler) can be used to move plates  
• plates are easily stackable -> increases site safety and reduces staging area  
• single trade for deck and superstructure  
• immediate load-carrying capacity (construction loads, light-weight lifting equipment)                              |
| **Durability**   | • designed for 100+ year design life  
• infinite fatigue resistance  
• watertight deck  
• water management details incorporated  
• industry standard coatings provide a protective barrier                                                              |
| **Maintenance**  | • weathering steel can be specified eliminating the need for coating maintenance  
• topside of bridge deck is coated using industry standard methods to provide a protective barrier against standing water as required for weathering steel  
• in case of accidental or extreme load events, damaged panel can be easily removed and replaced                             |
| **Rideability**  | • solid deck provides smooth riding surface  
• asphalt and light-weight wearing surfaces readily accommodated                                                                                                               |
| **Quality Assurance** | • factory quality construction production (independent of weather conditions)  
• excellent dimensional accuracy  
• high quality finishes                                                                                                              |
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