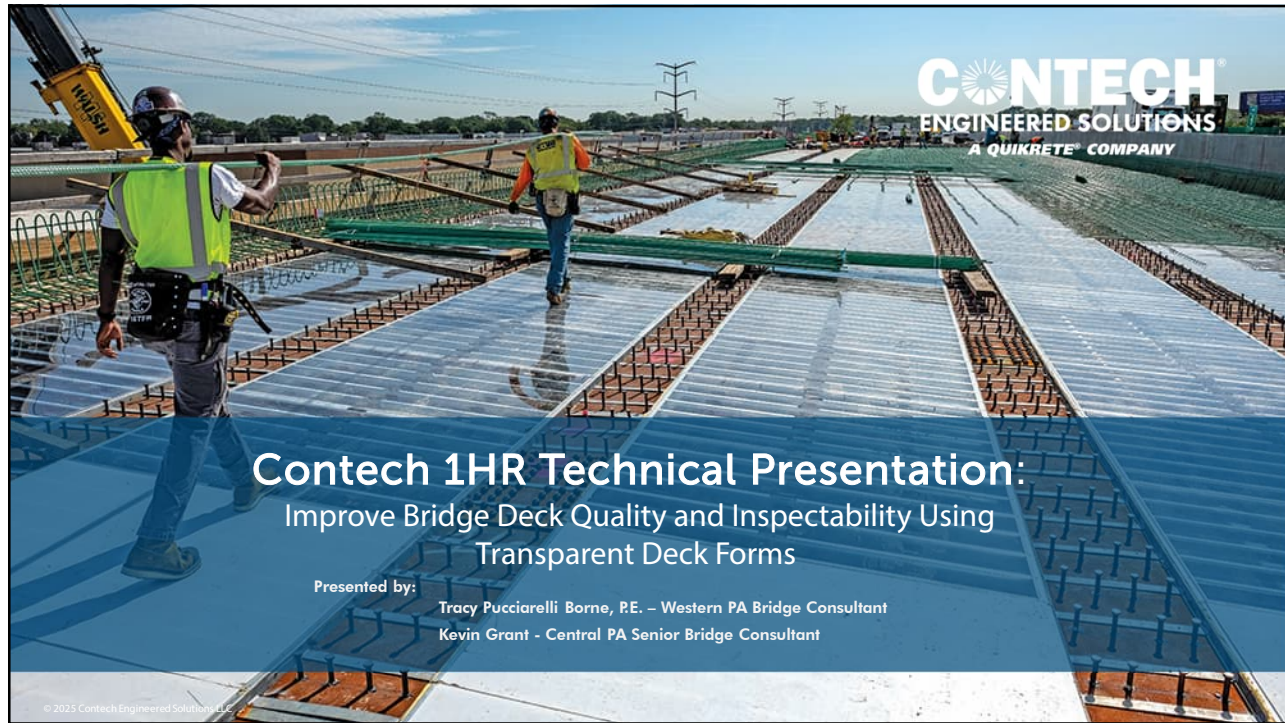
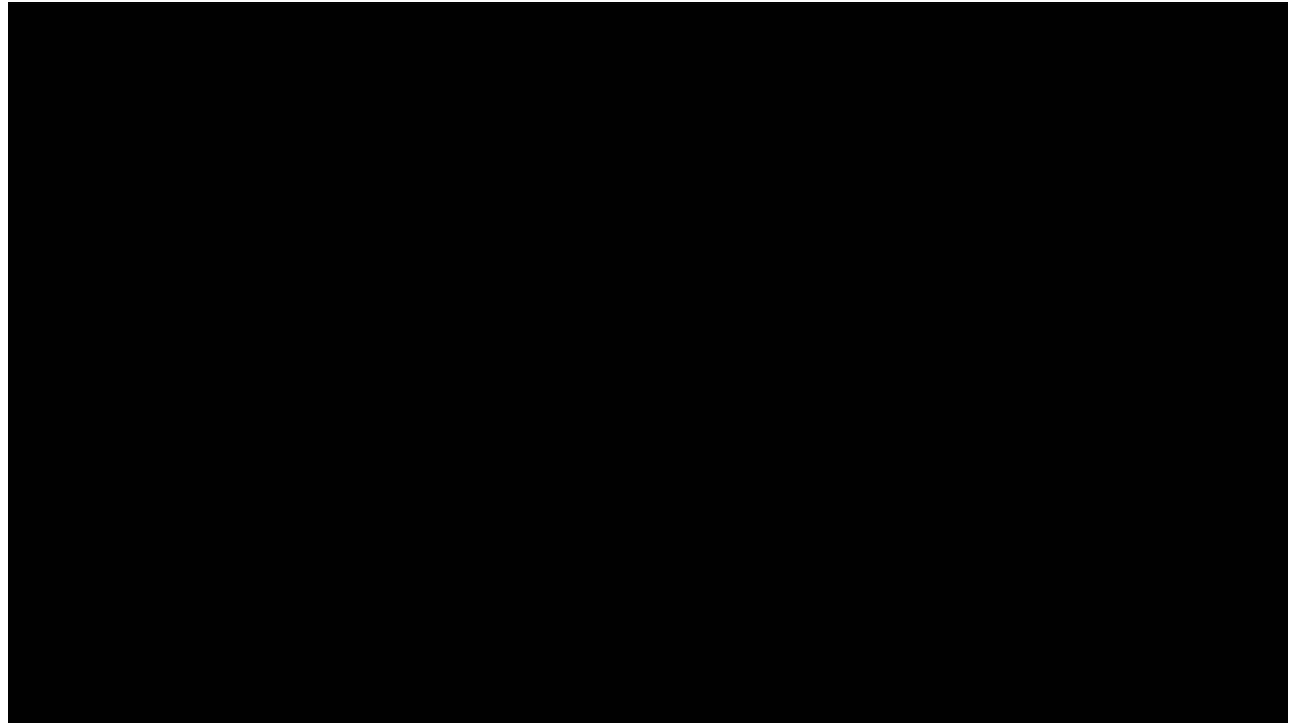




1



2



3

## State Preferences in Deck Forming

Legend:

- ORANGE: STATES - TERRITORIES PREFERRING VISIBILITY TO BOTTOM OF DECK
- GRAY: STATES - TERRITORIES OPEN TO USE OF STAY-IN-PLACE FORMS

States preferring visibility to bottom of deck (Orange): Alaska, Washington, Oregon, California, Nevada, Arizona, Idaho, Utah, Montana, Wyoming, Colorado, New Mexico, Texas, Oklahoma, Kansas, Nebraska, South Dakota, North Dakota, Minnesota, Iowa, Missouri, Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina, Virginia, West Virginia, Maryland, Delaware, Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, Maine, and Hawaii.

States open to use of stay-in-place forms (Gray): Montana, Wyoming, Colorado, New Mexico, Texas, Oklahoma, Kansas, Nebraska, South Dakota, North Dakota, Minnesota, Iowa, Missouri, Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina, Virginia, West Virginia, Maryland, Delaware, Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, Maine, and Hawaii.

4

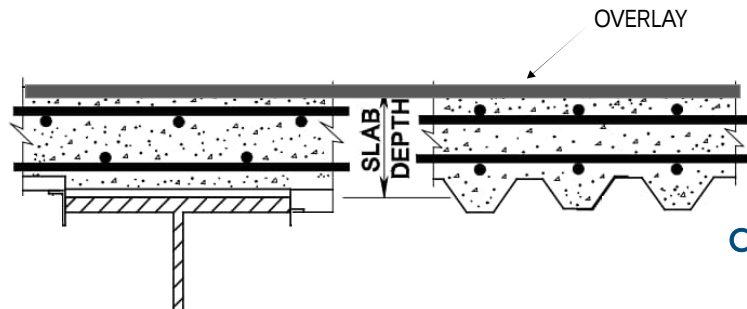


5



6

## Deck Inspection with Overlay



CONDITION RATING?

REMAINING ASSET  
LIFE?

SECTION THROUGH  
STRINGER

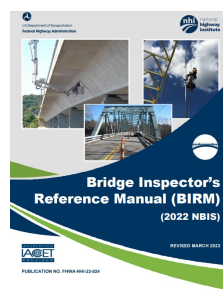
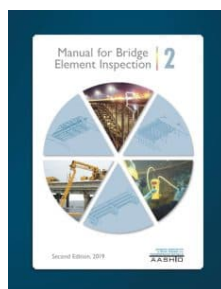
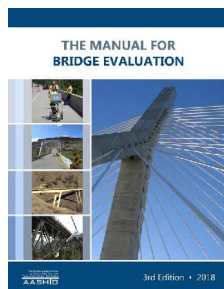
SLAB SECTION

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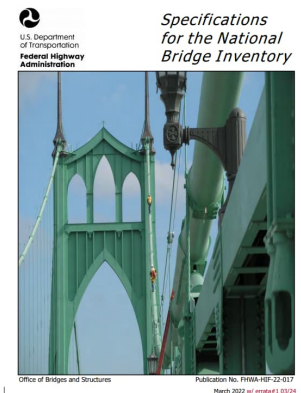
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## Bridge Inspection & Inventory Specifications



National Bridge  
Inspection Standards  
(23 CFR 650)



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# Changes to Inspection & Inventory Specs

## National Bridge Inspection Standards (NBIS)

### § 650.311 Inspection Interval

Made changes and classified requirements under two methods

- Method 1: simplified assessment of risk
  - Uses similar approach to prior practice (1988 FHWA Technical Advisory 5140.21)
  - Allows up to 48 months interval for routine & **NSTM** inspections
  - Allows up to 72 months for underwater inspections
  - Requires agencies to develop their own criteria for intervals less than 24 months
  - Requires agencies to develop a policy and FHWA notification prior to implementation of extended intervals (longer than 24 months)



16

### § 650.311 Inspection Interval

- Method 2: rigorous assessment of risk
  - Uses approach outlined in NCHRP Report 782
  - Allows up to 48-month interval for NSTM inspections
  - Allows up to 72-month interval for routine & underwater inspections
  - Requires FHWA approval



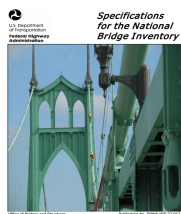
17

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## Bridge Deck Condition Rating



### 7.1 – COMPONENT CONDITION RATINGS

#### Deck Condition Rating

| Format<br>AN (1)                                                                                                                                                                                                                                                                                                                                   | Frequency<br>EI                                                                                                                    | Item ID<br>B.C.01 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Specification                                                                                                                                                                                                                                                                                                                                      | Commentary                                                                                                                         |                   |
| Report the deck component condition rating using one of the codes in <i>Table 20</i> .                                                                                                                                                                                                                                                             | This item represents the condition of the deck as determined from the inspection of all deck surfaces (top, underside, and edges). |                   |
| Report N when Item B.SP.09 ( <i>Deck Material and Type</i> ) is 0.                                                                                                                                                                                                                                                                                 | Visual assessments may be supplemented with non-destructive or destructive testing results.                                        |                   |
| Commentary Continued                                                                                                                                                                                                                                                                                                                               |                                                                                                                                    |                   |
| Use destructive or non-destructive testing results or visual condition indicators of materials covering the surfaces being assessed when top, underside or both surfaces are not visible for assessment. Past inspection reports and repair records may also provide supplemental information to aid in the determination of the condition rating. |                                                                                                                                    |                   |
| Do not consider the condition of non-monolithic wearing surfaces (i.e. overlays), stay-in-place deck forms, joint assemblies, expansion devices, bridge rails, or scuppers when determining the condition rating code for this item, except insofar as they indicate the condition of the deck itself.                                             |                                                                                                                                    |                   |

Use Table 20 to determine condition rating codes for the bridge component items in this section (Items B.C.01 through B.C.07). The entire code description must be satisfied for the code to apply.

Table 20. Codes and descriptions for component condition ratings.

| Code | Condition        | Description                                                                                                                                                                                        |
|------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N    | NOT APPLICABLE   | Component does not exist.                                                                                                                                                                          |
| 9    | EXCELLENT        | Isolated inherent defects.                                                                                                                                                                         |
| 8    | VERY GOOD        | Some inherent defects.                                                                                                                                                                             |
| 7    | GOOD             | Some minor defects.                                                                                                                                                                                |
| 6    | SATISFACTORY     | Widespread minor or isolated moderate defects.                                                                                                                                                     |
| 5    | FAIR             | Some moderate defects; strength and performance of the component are not affected.                                                                                                                 |
| 4    | POOR             | Widespread moderate or isolated major defects; strength and/or performance of the component is affected.                                                                                           |
| 3    | SERIOUS          | Major defects; strength and/or performance of the component is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions.        |
| 2    | CRITICAL         | Major defects; component is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open. |
| 1    | IMMINENT FAILURE | Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.                                                                                 |
| 0    | FAILED           | Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.                                                                          |

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# Bridge Deck Inspection & Inventory

7.1 – COMPONENT CONDITION RATINGS

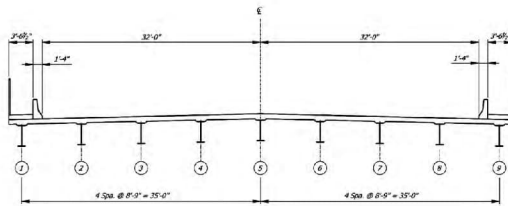


Figure 159. Cross-section view, looking north, indicating steel beam numbering in spans five to seven for Bridge Number 15558X. (Source: Missouri DOT)

**Deck Condition Rating:** The top surface has pattern cracking typical throughout. Medium width cracks (0.03" to 0.05" wide) spaced 1' to 3' (Figure 160). There are medium width (0.03" to 0.05" wide) diagonal cracks at the corners.



Figure 163. Closer view of cracking in wearing surface for Bridge Number 15558X.

The deck is characterized as having widespread minor defects. Report 6 for Item B.C.01 (Deck Condition Rating).



Figure 160. Transverse cracking in top of RC deck for Bridge Number 15558X.

The underside has medium width (0.02" to 0.04" wide) transverse cracks spaced at 3' throughout with surface white efflorescence and no rust staining (Figure 161). Typical on steel beam spans.



Figure 161. Transverse cracking with efflorescence on underside of RC deck for Bridge Number 15558X.

There are medium width (0.03" to 0.05" wide) longitudinal cracks in the microsilica modified concrete overlay spaced 1' to 3' (Figure 162 and Figure 163). Typical on RC voided slab spans.

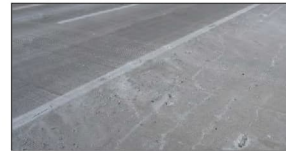


Figure 162. Longitudinal cracking in wearing surface for Bridge Number 15558X.

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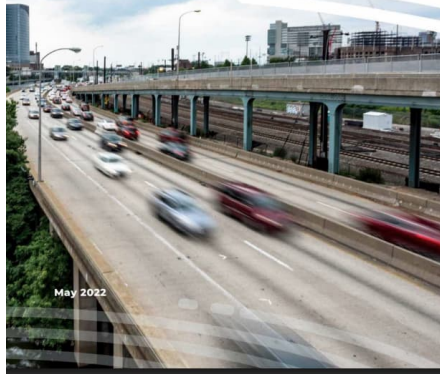
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## Asset Management Plan



### TRANSPORTATION ASSET MANAGEMENT PLAN



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#### Measuring Performance

PennDOT and its state, regional, and local partners recognize the importance of maintaining all roads and bridges appropriately to minimize life-cycle cost. Maintaining the existing complete network to its current condition requires adequate funding for all business plan networks.

Whether based on age, condition, level of service, or simply frequency of repair, a performance measure is critical to actively managing the preservation of an asset. In the Pennsylvania TAMP, asset performance is reported based on the percentage of the asset classes in Good, Fair, and Poor condition.

PennDOT uses state measures of asset condition for state-owned assets and performance measures established by FHWA to calculate asset condition for NHS assets. PennDOT uses both state and federal measures because they serve distinct purposes.

#### PennDOT Performance Measures

PennDOT's performance measures for state-owned assets are the measures used to manage the system, drive decision-making, and track progress on state goals.

PennDOT tracks a variety of measures across the six goal areas defined in its LRTP (Safety, Mobility, Equity, Resilience, Performance, and Resources). The TAMP includes two Performance measures, one each for pavement and bridge conditions.

#### Why We Measure

PennDOT manages the state-owned system using these measures. Asset condition is a key input to the capital decision-making process.

#### What We Measure

- All state-owned pavements and bridges
- Four business plan networks (BPNs)

#### How We Measure

##### PAVEMENT

% linear miles by condition

Good Fair Poor

Based on roughness

##### BRIDGE

% deck area by condition

Good Fair Poor

Minimum component rating

#### Federal Performance Measures

Federal performance measures for NHS pavements and bridges are required for use by state DOTs to carry out the National Highway Performance Program (NHPPI).

The NHPPI is a core federal-aid highway program that provides support for the condition and performance of the NHS and the construction of new facilities on the NHS. The NHPPI also ensures that investments of federal-aid funds in highway construction support progress toward performance targets for the NHS established in a state's TAMP.

#### Why We Measure

Federal measures are used to compare performance across states and to determine federal funding flexibility.

#### What We Measure

- All NHS pavements and bridges (regardless of owner)

#### How We Measure

##### PAVEMENT

% lane miles by condition

Good Fair Poor

Based on roughness and three distress metrics

##### BRIDGE

% deck area by condition

Good Fair Poor

Minimum component rating

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## Asset Management Plan

### Inventory and Conditions for Pennsylvania Pavement and Bridges

The NHS represents 25 percent of PennDOT's pavements by lane mile, but 66 percent of the bridge deck area that PennDOT owns and maintains. In Pennsylvania, 75 different entities own portions of the NHS pavement network and 45 different entities own portions of the NHS bridge network, but make up just 10% of the overall total.



### State-Owned Performance Projections

| Pavement                   | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|----------------------------|------|------|------|------|------|------|------|------|------|------|
| <b>BPN 1 (IRI Measure)</b> |      |      |      |      |      |      |      |      |      |      |
| Good %                     | 85.9 | 83.2 | 77.3 | 73.7 | 69.0 | 67.1 | 62.6 | 59.3 | 57.9 | 56.5 |
| Fair %                     | 12.7 | 14.3 | 18.4 | 20.0 | 22.8 | 22.7 | 23.4 | 23.4 | 23.4 | 23.1 |
| Poor %                     | 1.4  | 2.5  | 4.2  | 6.4  | 8.2  | 10.2 | 14.1 | 17.3 | 18.6 | 20.3 |
| <b>BPN 2 (IRI Measure)</b> |      |      |      |      |      |      |      |      |      |      |
| Good %                     | 69.4 | 68.4 | 67.3 | 66.3 | 66.8 | 64.5 | 60.7 | 58.1 | 54.5 | 52.6 |
| Fair %                     | 22.5 | 24.0 | 25.1 | 26.6 | 27.0 | 28.7 | 31.5 | 34.0 | 36.5 | 37.4 |
| Poor %                     | 8.1  | 7.6  | 7.6  | 7.0  | 6.2  | 6.8  | 7.7  | 7.9  | 9.1  | 10.0 |
| <b>BPN 3 (IRI Measure)</b> |      |      |      |      |      |      |      |      |      |      |
| Good %                     | 72.3 | 71.9 | 71.9 | 71.3 | 71.7 | 71.3 | 71.2 | 70.1 | 69.8 | 68.9 |
| Fair %                     | 19.0 | 20.5 | 21.5 | 22.9 | 23.3 | 23.8 | 24.1 | 24.9 | 25.2 | 25.6 |
| Poor %                     | 8.7  | 7.5  | 6.5  | 5.8  | 5.0  | 4.9  | 4.7  | 5.0  | 5.0  | 5.5  |
| <b>BPN 4 (IRI Measure)</b> |      |      |      |      |      |      |      |      |      |      |
| Good %                     | 45.1 | 47.1 | 48.6 | 49.8 | 50.7 | 52.0 | 53.1 | 54.3 | 54.4 | 55.4 |
| Fair %                     | 24.4 | 23.9 | 23.6 | 23.8 | 23.6 | 23.5 | 23.0 | 22.0 | 21.4 | 20.8 |
| Poor %                     | 30.6 | 29.1 | 27.7 | 26.4 | 25.6 | 24.5 | 23.9 | 23.7 | 24.2 | 23.8 |
| <b>Bridge</b>              |      |      |      |      |      |      |      |      |      |      |
| <b>State-Owned Bridge</b>  |      |      |      |      |      |      |      |      |      |      |
| Good %                     | 30.5 | 31.7 | 31.0 | 30.3 | 28.8 | 27.2 | 24.9 | 23.4 | 21.3 | 19.3 |
| Fair %                     | 64.1 | 63.1 | 62.8 | 62.6 | 63.1 | 63.2 | 63.9 | 64.1 | 65.4 | 66.9 |
| Poor %                     | 5.4  | 5.3  | 6.2  | 7.1  | 8.1  | 9.6  | 11.2 | 12.5 | 13.3 | 13.8 |

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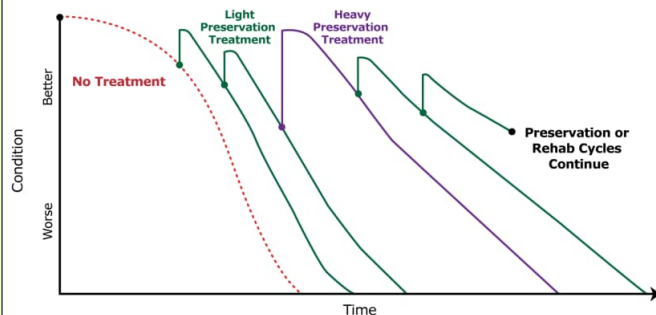
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## Asset Management Plan

### Life Cycle Planning at PennDOT

**Life cycle planning** recognizes that applying the right treatment at the right stage in an asset's life cycle can have a profound effect on the total cost to maintain an asset in a state of good repair over its whole life. It is almost always more cost-effective to perform multiple, lower cost maintenance and preservation treatments than to allow an asset to deteriorate to the point of requiring a major rehabilitation or even complete replacement.



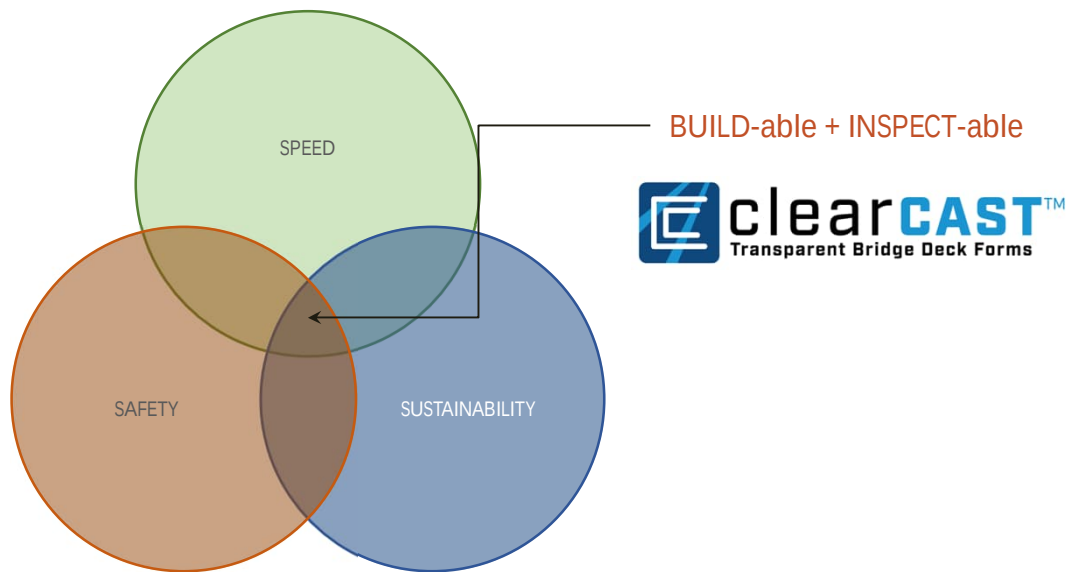
#### Benefits of LLCC

- Extend life of bridge/pavement assets
- Lower annual cost over the life of assets
- More effective use of resources
- Assets are in better overall condition

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## Where Do Transparent Forms Fit?



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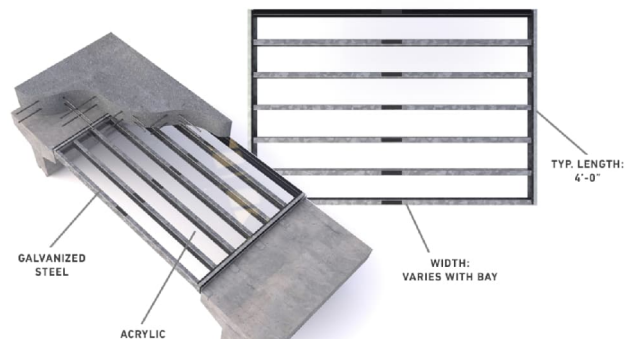
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- 1 Proven speed & safety of SIP forms
- 2 Lightweight, Easy to Handle & Install
- 3 Inspect Concrete During Placement, Confirm Quality
- 4 Comply with Inspection & Inventory Requirements
- 5 Allows for data-driven, condition-based treatments
- 6 Owners can better sustain and preserve deck
- 7 Durable Materials / No Maintenance

With similar installation to SIP forms and the ability to inspect during and after the deck pour, owners and contractors have adopted the system quickly.



The only stay-in-place form offering visibility for inspection and safely speeding bridge deck construction.

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## Deck Inspection



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## How SIP Metal Forms Corrode



Figure 1, clockwise from upper left: (a) Corrosion at concrete through-crack locations; (b) Corrosion at lower corrugation valleys; (c) Corrosion at connections. All images reproduced from MDOT report [2].

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## Improving on What Hasn't Worked



- Acrylic Protects Steel Members
- No Corrugations
- Transverse Joint Every 4 Feet Allows For Moisture to Escape
- Heavier HDG Steel Supports at Girder



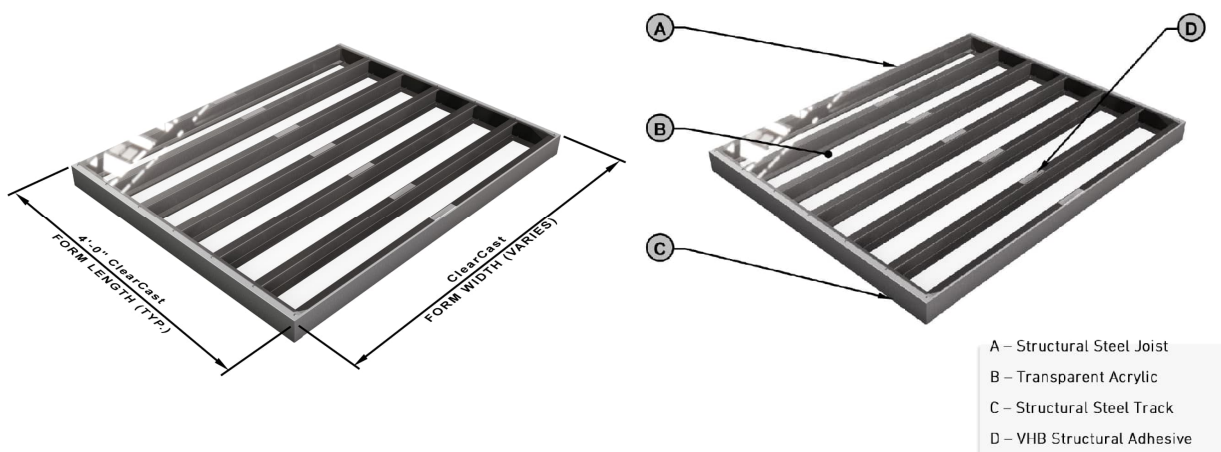
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## ClearCast Forms

- Prefabricated – Custom to Bridge
- Weight : 40 to 125 lbs. Each (3-5 PSF DL)
- Bay Widths: Up to 8 FT\* (Contact Contech beyond 8 FT\*)

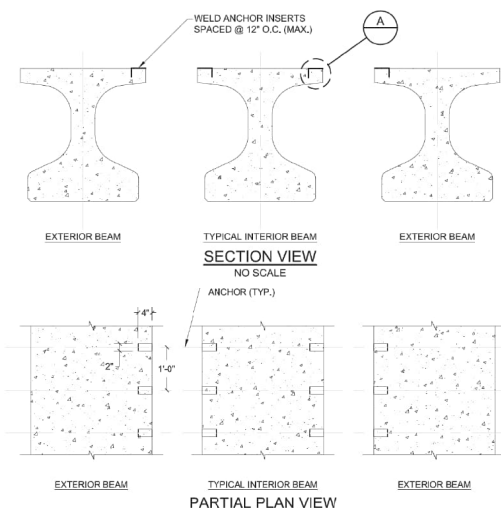


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## ClearCast Installation Details - Precast



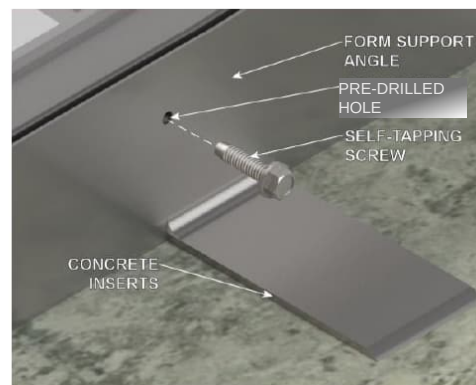
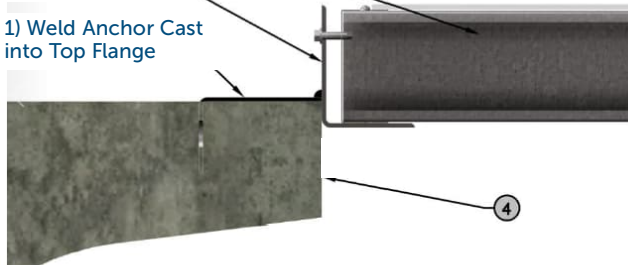
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## ClearCast Installation Details - Precast

- 3) Set ClearCast
- 2) Support Angle Welded to Anchor
- 1) Weld Anchor Cast into Top Flange

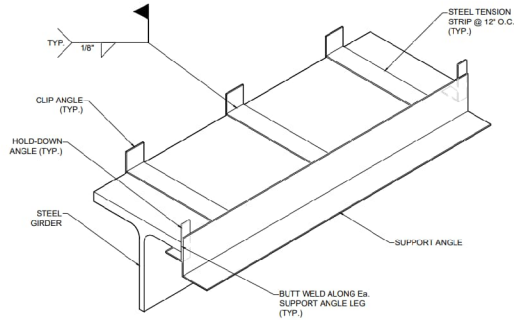


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## ClearCast Installation Details - Steel



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## PennDOT Bulletin 15 QPL for Construction



### BULLETIN 15 (Publication 35) Qualified Products List for Construction

Posted:  
5/11/2026 9:55:44AM

#### Section 1001: Cement Concrete Structures

##### 1001.2(h)2 Metal Bridge Deck Forms

Last Revised: 10/5/2021

Steel Products Procurement Act applies. See Standard Drawing BC-732M, [Publication 219M](#)

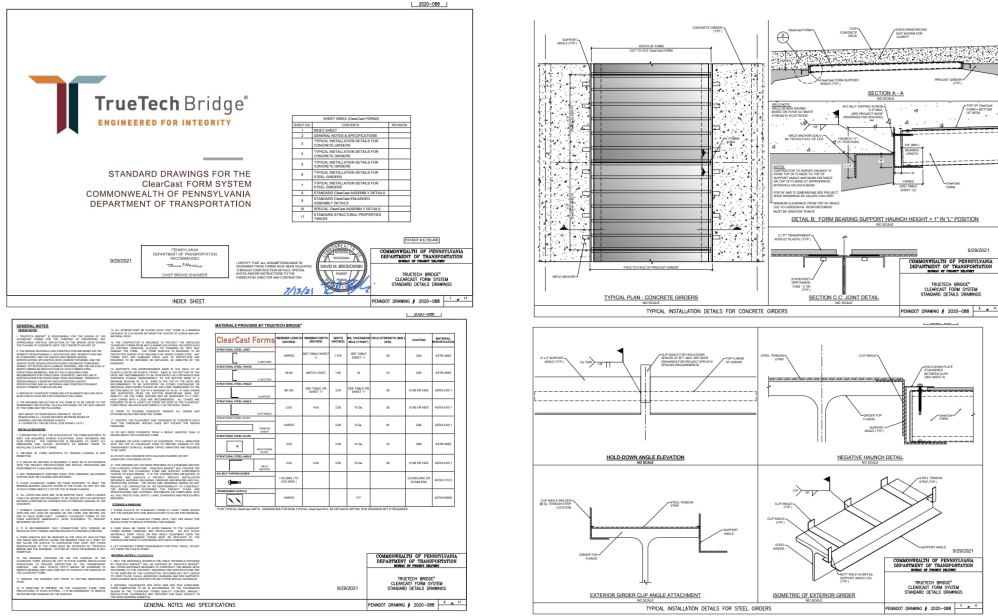
| Product                | Name                                                                                                                                                                                                                                                 | Grade                 | Ref. No.  |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------|
| NMBS1 15               | New Millennium Building Systems, 4900 Hungerford Rd., Memphis, TN 38118 <a href="https://www.newmill.com/">https://www.newmill.com/</a>                                                                                                              |                       |           |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | Structural Steel (SS) | 1989-125  |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | 33                    |           |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | Structural Steel (SS) | 1989-125  |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | 37                    |           |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | Structural Steel (SS) | 1989-125  |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | 40                    |           |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | Structural Steel (SS) | 1989-125  |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | 50, Class 1           |           |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | Structural Steel (SS) | 1989-125  |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | 80                    |           |
| SIPDE 15               | SIP Inc. of Delaware, 2204 Chestnut Street, Gadsden, AL 35904 <a href="https://wmsi.com/subs/s-i-p-inc-of-delaware/">https://wmsi.com/subs/s-i-p-inc-of-delaware/</a>                                                                                |                       |           |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | Structural Steel (SS) | 2012-152Q |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | 33                    |           |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | Structural Steel (SS) | 2012-152Q |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | 37                    |           |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | Structural Steel (SS) | 2012-152Q |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | 40                    |           |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | Structural Steel (SS) | 2012-152Q |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | 50, Class 1           |           |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | Structural Steel (SS) | 2012-152Q |
| Metal Bridge Deck Form |                                                                                                                                                                                                                                                      | 80                    |           |
| TTB-1 15               | Contech Engineered Solutions, A Quikrete Company, 9100 Centre Pointe Drive, West Chester, OH 45069 <a href="https://clearcastbridge.com/">https://clearcastbridge.com/</a>                                                                           |                       |           |
| Facility               | Formerly TrueTech Bridge, LLC                                                                                                                                                                                                                        |                       |           |
|                        | Alternate Transparent Stay-in-Place Form                                                                                                                                                                                                             | ClearCast Form System | 2020-088Q |
|                        | This is an approved alternate to metal bridge deck forms as outlined on the Approved Bridge and Structure Products website, including the PennDOT approved drawing #2020-088 dated 9/29/2021. <a href="#">Approved Bridge and Structure Products</a> |                       |           |

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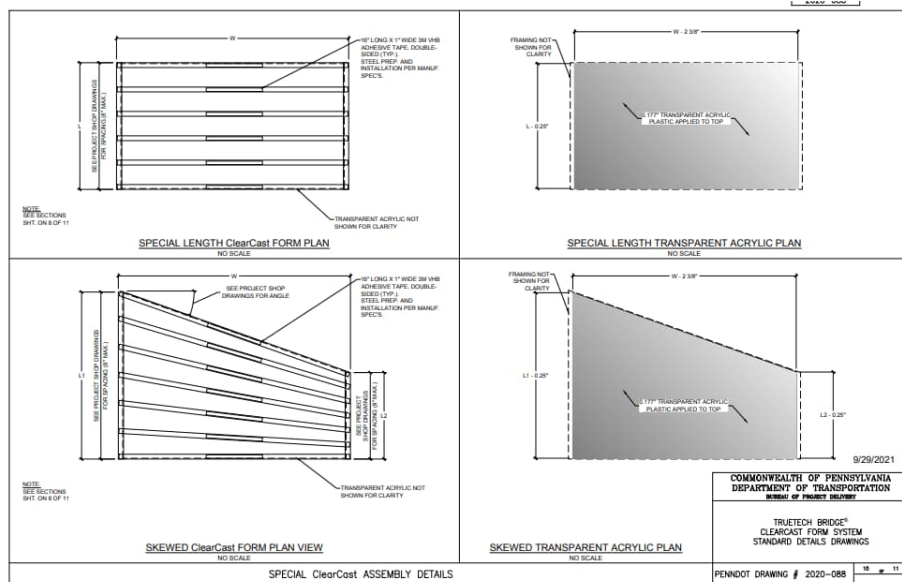
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# PennDOT Bulletin 15 QPL for Construction



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# PennDOT Bulletin 15 QPL for Construction



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# PennDOT Bulletin 15 QPL for Construction

| CLEARCAST FORM TYPE (JOIST DEPTH) |                        |                           |           |                    | STRUCTURAL JOIST PROPERTIES |                        |                      |                          |                                   |                                   |                                   |                                   |                                   |                                   |                     |                       |       |                |       |
|-----------------------------------|------------------------|---------------------------|-----------|--------------------|-----------------------------|------------------------|----------------------|--------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|---------------------|-----------------------|-------|----------------|-------|
| MAX. DESIGN SPAN (FT.)            | MAX. FORM WEIGHT (PSF) | MAX. SLAB THICKNESS (IN.) | MEMBER ID | JOIST HEIGHT (IN.) | FLANGE WIDTH (IN.)          | DESIGN THICKNESS (IN.) | F <sub>y</sub> (KSI) | W <sub>e</sub> (LBS/FT.) | I <sub>x</sub> (IN <sup>4</sup> ) | I <sub>y</sub> (IN <sup>4</sup> ) | J <sub>x</sub> (IN <sup>3</sup> ) | J <sub>y</sub> (IN <sup>3</sup> ) | S <sub>x</sub> (IN <sup>3</sup> ) | S <sub>y</sub> (IN <sup>3</sup> ) | r <sub>x</sub> (IN) | r <sub>y</sub> (IN)   | Δ     | C <sub>u</sub> |       |
| 2.50                              | 5                      | 3.25                      | 8.5       | 200105-04          | 2.50                        | 1.25                   | 0.0868               | 50                       | 0.80                              | -0.856                            | 0.280                             | 0.277                             | 0.222                             | 1.278                             | 0.478               | 0.286x10 <sup>3</sup> | 0.086 |                | 0.086 |
| 3.62                              | 6                      | 3.42                      | 8.5       | 302010-03          | 3.625                       | 1.375                  | 0.0901               | 50                       | 1.04                              | -0.961                            | 0.308                             | 0.316                             | 0.230                             | 1.601                             | 0.497               | 0.309x10 <sup>3</sup> | 0.090 |                | 0.090 |
| 4.00                              | 7                      | 3.75                      | 10        | 400010-04          | 4.00                        | 1.375                  | 0.0966               | 50                       | 1.36                              | -0.940                            | 0.401                             | 0.363                             | 0.477                             | 1.87                              | 0.484               | 0.402x10 <sup>3</sup> | 0.096 |                | 0.096 |
| 4.00                              | 8                      | 4.20                      | 9.5       | 400010-06          | 4.00                        | 1.375                  | 0.0713               | 50                       | 1.68                              | -0.922                            | 0.407                             | 1.160                             | 0.383                             | 1.85                              | 0.479               | 0.402x10 <sup>3</sup> | 0.070 |                | 0.070 |
| 6.00                              | 8                      | 4.30                      | 10        | 600010-04          | 6.00                        | 1.375                  | 0.0868               | 50                       | 1.70                              | -0.764                            | 0.314                             | 2.318                             | 0.839                             | 2.363                             | 0.482               | 0.546x10 <sup>3</sup> | 0.086 |                | 0.086 |

| SUPPORT SYSTEM STANDARD PROPERTIES |                             |                               |             |                   |                   |                                   |
|------------------------------------|-----------------------------|-------------------------------|-------------|-------------------|-------------------|-----------------------------------|
| CLEARCAST FORM TYPE (JOIST DEPTH)  | VERTICAL LEG OF ANGLE (IN.) | HORIZONTAL LEG OF ANGLE (IN.) | ANGLE GAUGE | STEEL STRAP GAUGE | WELD ANCHOR GAUGE | MAX. STRAP OR WELD ANCHOR SPACING |
| 2.50                               | 3                           | 4                             | 7           | 8                 | 10                | 12                                |
| 3.62                               | 4                           | 3                             | 7           | 8                 | 10                | 12                                |
| 4.00                               | 4                           | 3                             | 7           | 8                 | 10                | 12                                |
| 6.00                               | 6                           | 3                             | 7           | 8                 | 10                | 12                                |

NOTES

TABLE SHOWN IS BASED ON DESIGN OF TRANSPARENT FORMS TO CARRY DEAD LOAD OF DECK SLAB PLUS 50 PSF FOR CONSTRUCTION LOADS. JOIST SPACING = 8" MAX. MAX SUPERELEVATION OF 5% MAX LONGITUDINAL SLOPE OF 5%.  
CONTACT TRUTECH BRIDGE FOR SLOPE, SPAN, AND/OR CONCRETE SLAB THICKNESS OUTSIDE OF THE RANGES SHOWN.  
ALLOWABLE DEFLECTION UNDER THE WEIGHT OF THE FORM, PLASTIC, CONCRETE AND REINFORCEMENT IS LIMITED TO L/180 OF THE "MAX. DESIGN SPAN" OR 0.5 IN. WHICHEVER IS LESS.  
IN NO CASE IS THE LOADING FOR THE DEFLECTION CALCULATION TO BE LESS THAN 120 PSF TOTAL.  
SHOW THICKNESS, SIZE, SPACING OF THE SUPPORTING ELEMENTS INCLUDING I AND W DIMENSIONS ON THE SHOP DRAWINGS ALONG WITH THE LENGTH, SIZE AND SPACING OF WELDS.

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF TRANSPORTATION  
BUREAU OF PROJECT DELIVERY

TRUTECH BRIDGE®  
CLEARCAST FORM SYSTEM  
STANDARD DETAILS DRAWINGS

9/29/2021

STANDARD STRUCTURAL PROPERTIES TABLES

PENNDOT DRAWING # 2020-088

11 of 11

# Butler County Installation – Keister Road Bridge



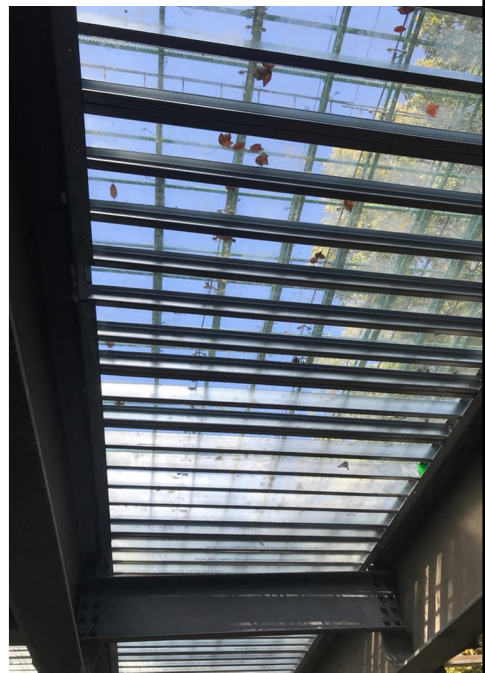
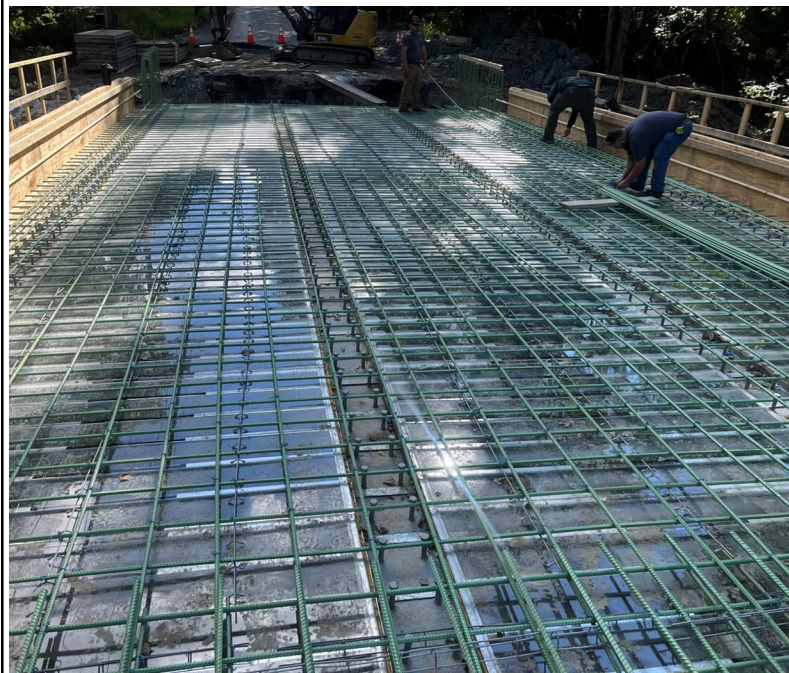
## Butler County Installation – Keister Road Bridge



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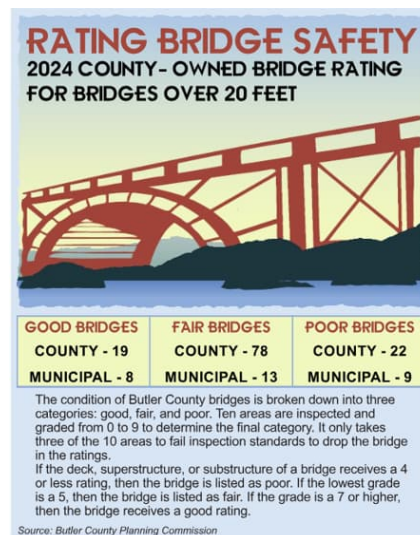
30



31

## Butler County Inspection Protocol

- Butler Co. inspects their bridges:
  - Every 2 years if > 20' span
  - Every 5 years if < 20' span
- After inspection, each bridge gets placed in one of three categories:
  - Good
  - Fair
  - Poor
- Category of bridge is determined based on a safety rating procedure that consists of ten (10) different components graded on a scale from 0 to 9 (0 = worst, 9 = best)
- Butler County uses these results to prioritize bridge replacements and rehabilitations



Source: Berg, Sheri, "Bridges Carefully Maintained," *Butler Eagle*, 3 June 2025, p. 1-4

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## Infrastructure Owners



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## AASHTO TSP2 Bridge Preservation Partnership

# TSP2

## TRANSPORTATION SYSTEM PRESERVATION TECHNICAL SERVICES PROGRAM

# AASHTO

# BRIDGE PRESERVATION

### ITD Partners



Manufacturer



Consultant



Owner/DOT



TSP2 Bridge



Academia

### Owner:

Indiana Department of Transportation  
Jeremy Hunter, P.E.

### Consultant:

HNTB, Indianapolis  
Seth Schickel, P.E. & Erica Haas, P.E.

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## AASHTO TSP2 Bridge Preservation Partnership

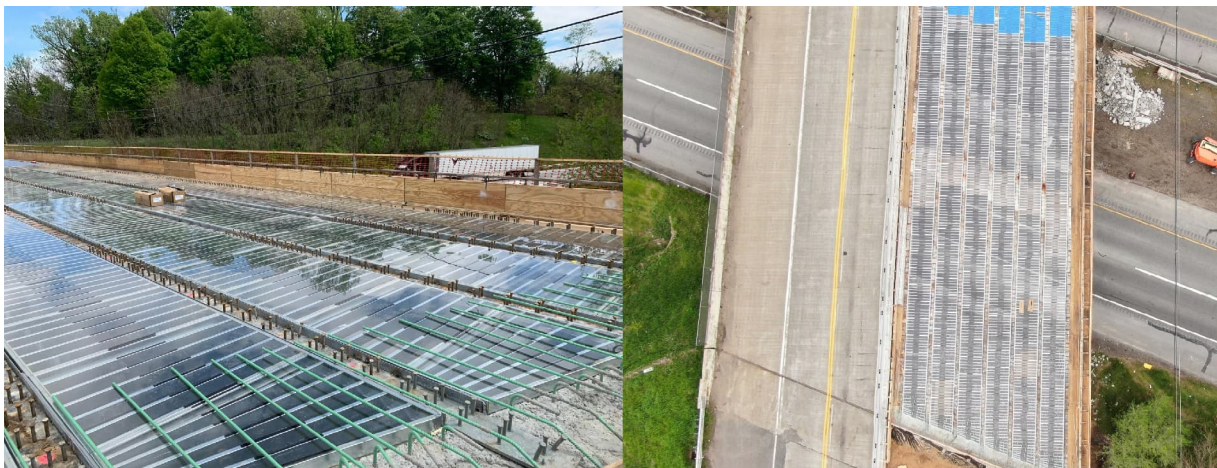


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## Stage 1 Installation Of Clearcast



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## Stage 1 Deck Pour



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## AASHTO TSP2 Bridge Preservation Partnership

### TSP2 TRANSPORTATION SYSTEM PRESERVATION AASHTO BRIDGE PRESERVATION

Home Technical Bridge Special Provisions Research Legislative Training Library Industry Bridge News Site Map

#### ITD Program: Transparent Stay-in-Place Forms –

#### LET'S BE CLEAR...

Better data leads to better decisions. With improved inspection data, you can better manage your bridge assets and direct resources where they matter most. ClearCast Forms provide visibility to the underside of the deck, reducing the risks related to aging bridge decks.

**SPEED. SAFETY. SUSTAINABILITY.**  
truetechbridge.com

**TrueTech Bridge**  
ENGINEERED FOR INNOVATION

#### TSP2 HOMEPAGE

- ITD – Innovative Technology Demonstration Working Group
- Transparent Stay-in-Place Forms – ITD Program
- Epoxy/Slane Multi-Coat System – ITD Program
- Hybrid Composite Synthetic Concrete (HCSC) – ITD Program
- Integral Grit Widespreading System – ITD Program
- Maintainable Weep Hole Fillers – ITD Program
- M.A.P. Concrete – ITD Program
- PoreShield CME/PS – ITD Program

#### Description of Demonstration:

While stay-in-place forms have been used to improve productivity for bridge deck construction for nearly 50 years in the United States, the primary disadvantage is the inability to inspect the bottom of the deck. Inspection is important during the deck pour for quality assurance, but also for routine and element level inspections over time in accordance with National Bridge Inspection Standards. Transparent Stay-in-Place Forms (TSIPFs) improve safety and speed of construction without sacrificing inspection. This is beneficial in helping bridge owners preserve the deck and protect the underlying elements, extending the service life of the entire bridge.

#### Documents:

Program Application: [TSIPF True Tech – ITD Application](#)

#### Reports:

- [ITD Report Phase 2 Construction – Transparent Stay-in-Place Forms](#)
- [ITD Report Transparent TSIPFs – 1 of 2 Inspection Cycles \(Report 3\)](#)

#### Contact Info:

TrueTech Bridge, LLC  
[truetechbridge.com](http://truetechbridge.com)  
855.200.8304  
David Brodowski, P.E.  
[brodowskid@inventure-group.com](mailto:brodowskid@inventure-group.com)

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## ClearCast Applications – Railroad Crossings

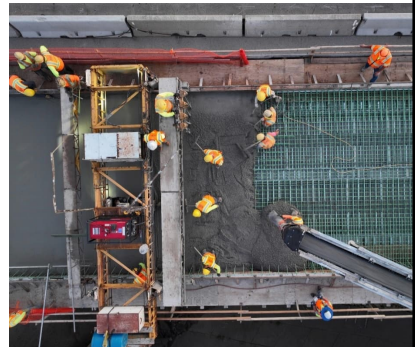


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## KDOT Wichita North Junction

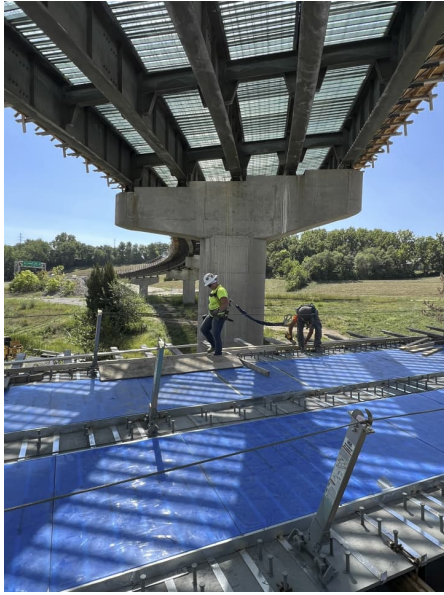


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## ClearCast Applications – Flyovers



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## KDOT I-635 Over K5 Bridge Deck Replacements



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## ClearCast Applications – Utility Conflicts

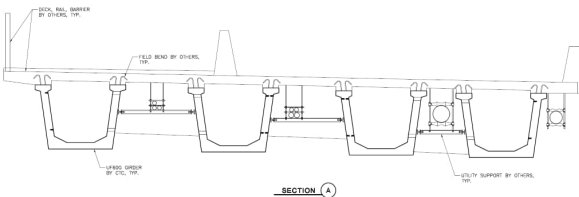


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## ClearCast Applications – Limited Accessibility

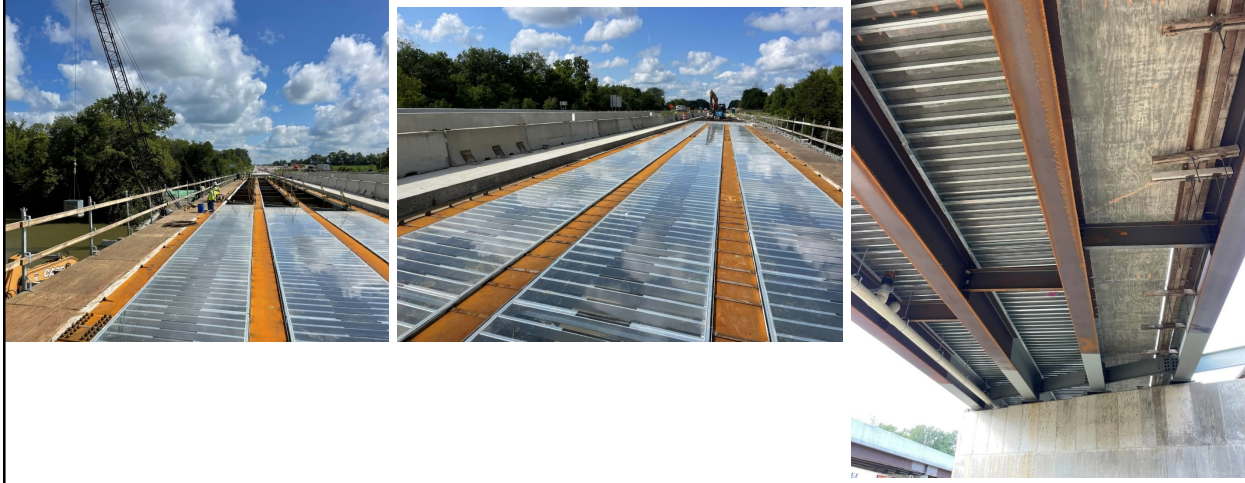


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## INDOT I-69 Over the Salamonie River



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## ClearCast Installation Details – Drainage

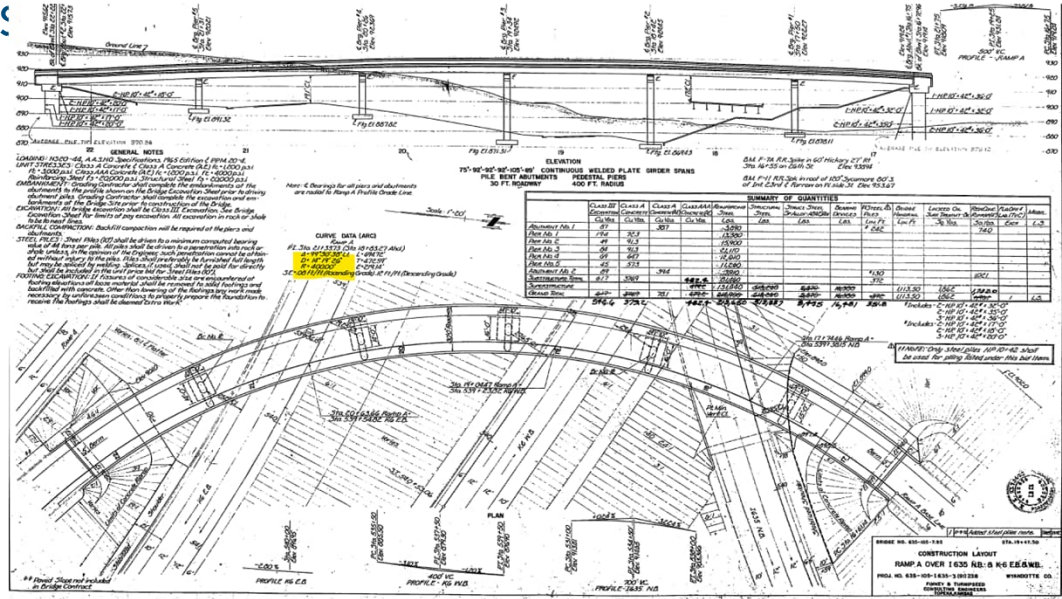


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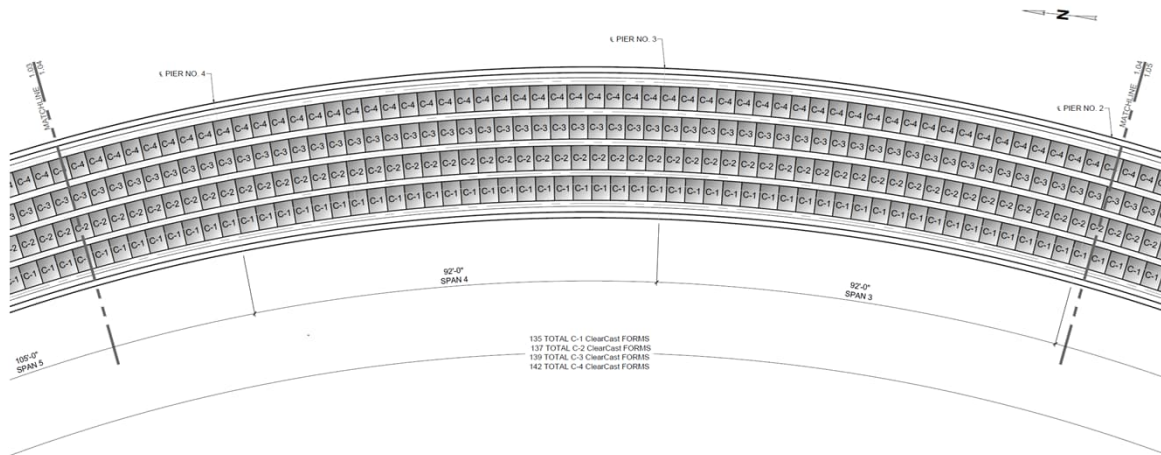
46

## ClearCast Installation Details – Curved Alignment &



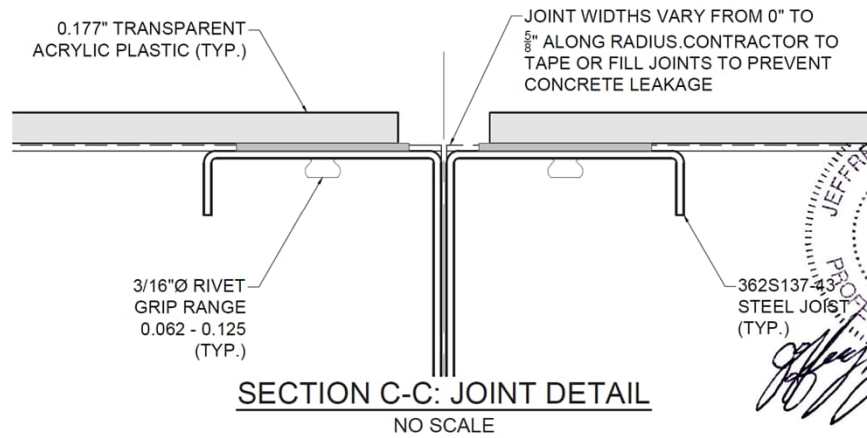
47

## ClearCast Installation Details – Curved Alignment & Skews



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## ClearCast Installation Details – Curved Alignment & Skews

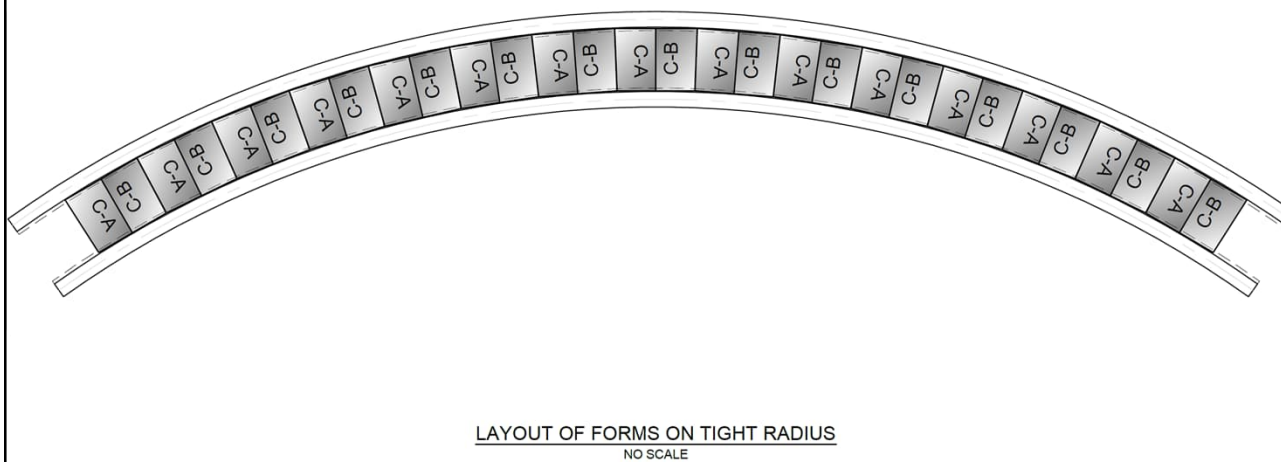


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## ClearCast Installation Details – Curved Alignment & Skews

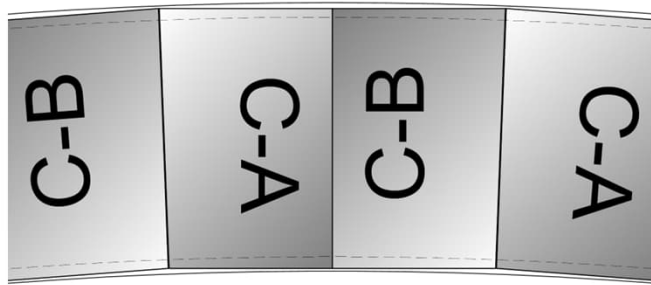


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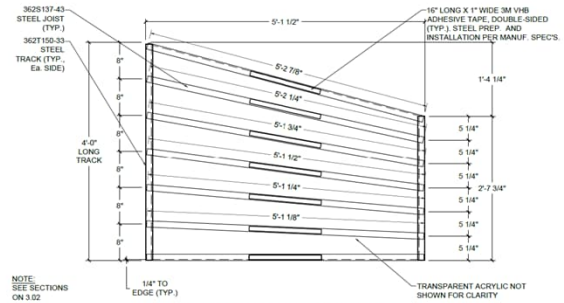
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## ClearCast Installation Details – Curved Alignment & Skews



ENLARGED VIEW  
NO SCALE



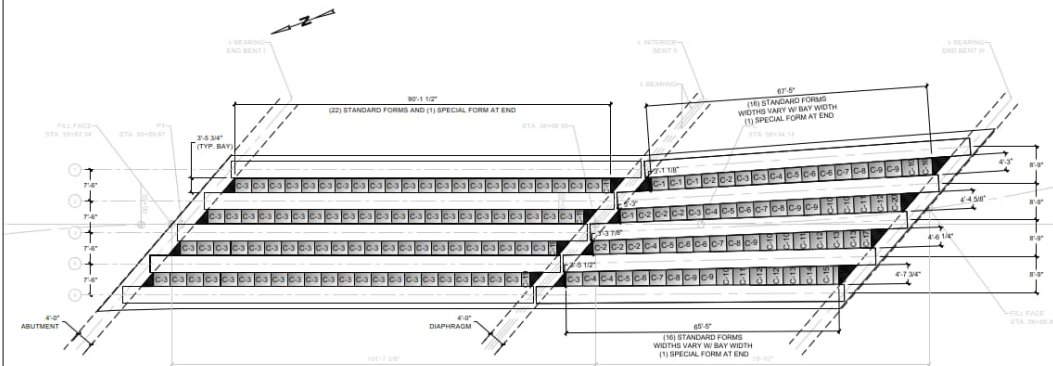
SKEWED ClearCast FORM PLAN: C-2  
NO SCALE

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## ClearCast Installation Details – Tapered Bays



NOTE:  
CONTRACTOR TO VERIFY BEAM SPACING, BAY WIDTHS, AND NOTIFY  
TRUETECH BRIDGE OF ANY PLAN DEVIATIONS PRIOR TO FORM FABRICATION.  
CONTRACTOR TO CONVENTIONALLY FORM AND STRIP AREAS OUTSIDE OF  
ClearCast® FORM LIMITS SHOWN.

BRIDGE A9104  
NO SCALE

BRIDGES A9019 & A9104  
BROADWAY OVER EB I-44 AND  
BROADWAY OVER WB I-44

ClearCast Forms

BRIDGE PLAN VIEW  
CONCRETE GIRDER

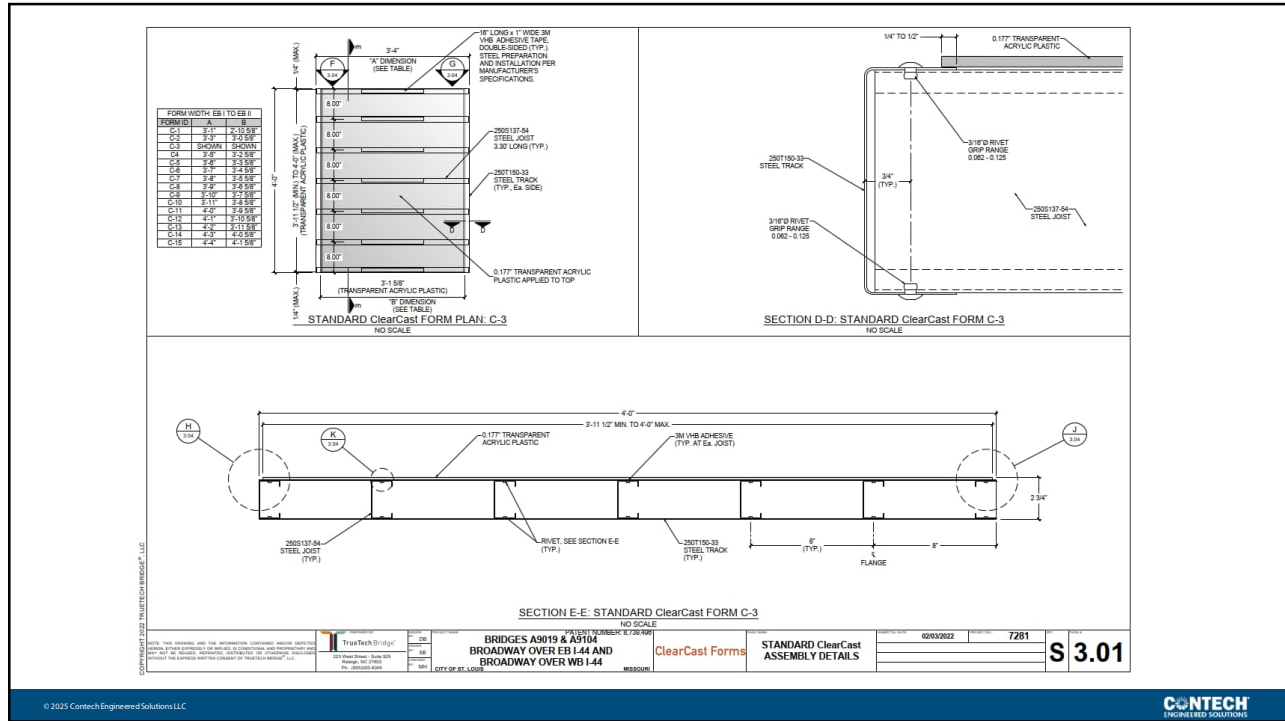
8/29/2022

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S 1.01

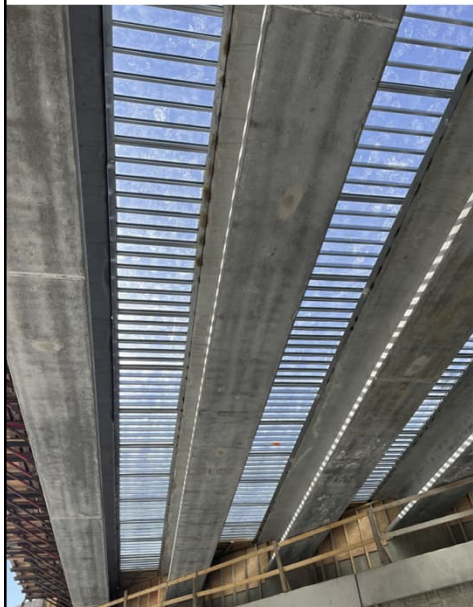
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## ClearCast Installation Details – Tapered Bays



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# MoDOT Engineering Policy Guide (EPG)

## 751.10.2.4 Transparent Forms

### General Guidelines

Transparent forms may be used on steel and prestressed girder, voided slab, and box girder beam structures.

Transparent forms are preferred to corrugated steel forms for bridges that carry a minimum of 10,000 AADT. Transparent forms should also be considered for bridges spanning railroads, rivers, or roadways with traffic volumes greater than 10,000 AADT.

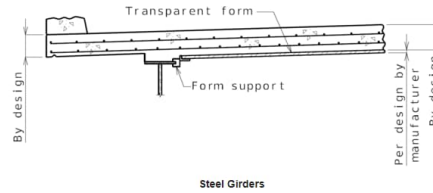
Use of transparent forms shall be based on the approval of the Structural Project Manager, Structural Liaison Engineer or owner's representative.

Use of transparent forms should be based on the final expected conditions of operation and expected in-service performance which should include reviewing the type of crossing, AADT under, salt spray under, surrounding bridge structure conditions, staged construction, etc.

When a barrier is permanently required over a girder bay, stay-in-place transparent forms are preferred in the bay underneath the barrier to allow for inspection of the bottom of deck after barrier collisions.

Design loading for bridge design shall include an allowance for the dead weight of the transparent forms. Use 5 psf dead loading for form spans up to 8 feet. The maximum form span for transparent forms is 8 feet.

Design of transparent forms is the responsibility of the contractor in accordance with Sec 703.



[https://epg.modot.org/index.php/751.10\\_General\\_Superstructure#751.10.2.4\\_Transparent\\_Forms](https://epg.modot.org/index.php/751.10_General_Superstructure#751.10.2.4_Transparent_Forms)

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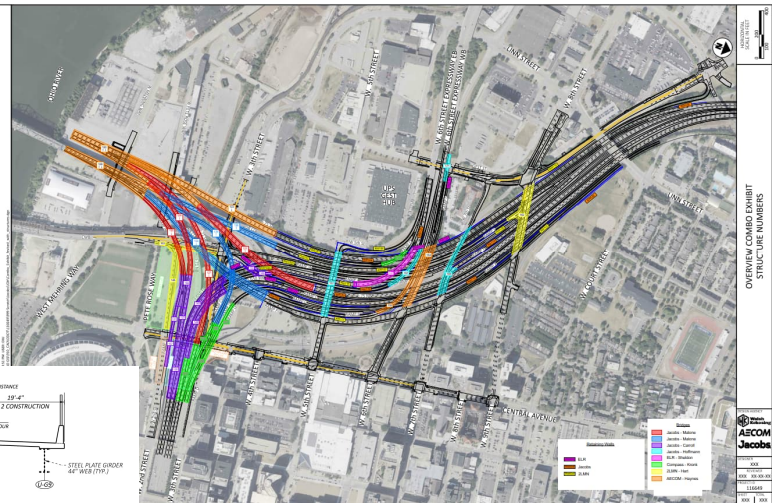
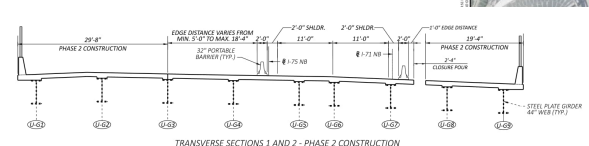
## Ohio DOT



### The Brent Spence Bridge Corridor Project.

BRENT SPENCE  
BRIDGE  
WEBSITE

ODOT'S  
WEBSITE



Decking Area: 180,000SF (34 Bridges)

5,724 Forms

Bay Widths: 4.0FT – 11.58FT

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## Design Build, CMGC, & P3's

### BENEFITS OF TRANSPARENT SIP FORMS:

- SCALE
  - Large volumes reduce material cost & increase contractor productivity
- QUALITY
  - Ensure deck concrete is placed & consolidated per specifications.
  - For long-term maintenance contracts, allows for performance evaluation via inspection
- INNOVATION
  - Use of a new technology offering speed of construction and the ability to inspect and preserve the deck
- DBE
  - Multiple DBE options, but high % of DBE participation available

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## Big R Rolled Girders & ClearCast



**Big R Bridge Modules - Fabrication**



**Installed ClearCast Decking on Big R Rolled Girder**

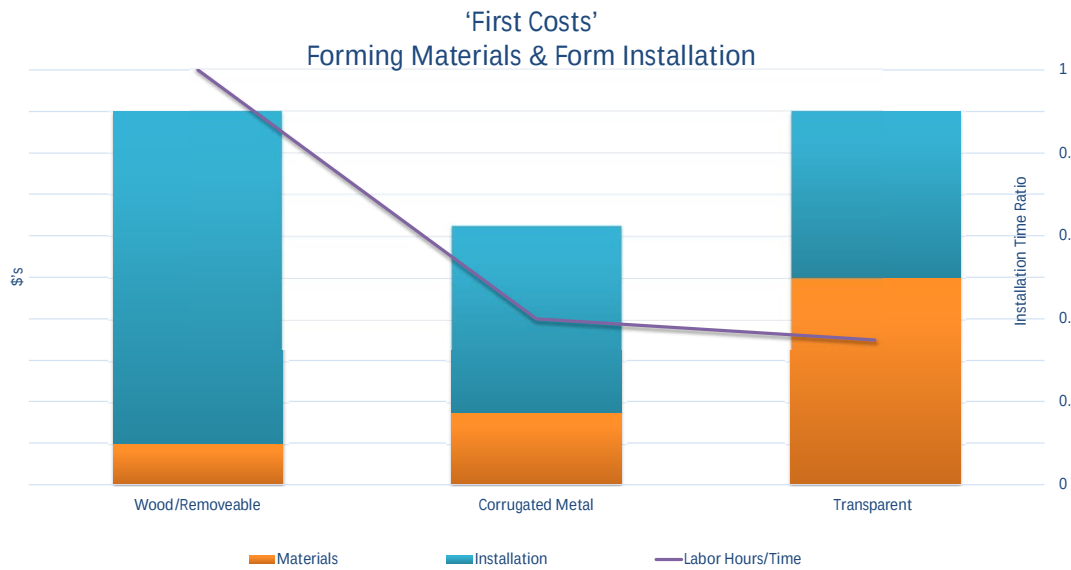
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## Cost Differences



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## Cost Differences

PN XXXX  
Keller Const. Lead

 **clearCAST™**  
Transparent Bridge Deck Forms

|                                             |                  |                |                  |
|---------------------------------------------|------------------|----------------|------------------|
| Net Deck Area (SF)                          | 10,989           |                |                  |
| **input fields in blue**                    |                  |                |                  |
|                                             | Wood Falsework   | ClearCast Form |                  |
| <b>Materials</b>                            |                  |                |                  |
| Design & Material Cost/SF                   | \$3.00/SF        | \$18.00/SF     |                  |
| Freight Costs (Lump Sum)                    | \$1,000          | \$0            |                  |
| <b>Total Material Cost:</b>                 | <b>\$33,967</b>  | <b>\$</b>      | <b>197,802</b>   |
| <b>Labor</b>                                |                  |                |                  |
| Installation Rate (SF/MH)                   | 12.0             |                | 20.0             |
| Stripping Rate (SF/MH)                      | 15.0             |                |                  |
| Total Man-Hours                             | 1,648            |                | 549              |
| Loaded Labor/Hr.                            |                  | \$125.00       |                  |
| <b>Total Labor Cost:</b>                    | <b>\$206,044</b> |                | <b>\$68,681</b>  |
| <b>Time</b>                                 |                  |                |                  |
| Average Crew Size                           | 4                |                |                  |
| Installation Days                           | 26               |                | 16               |
| Stripping Days                              | 21               |                | 0                |
| <b>Total Days</b>                           | <b>47</b>        |                | <b>16</b>        |
| <b>Scheduling</b>                           |                  |                |                  |
| Lane Closure Cost \$/Day                    |                  | \$1,000        |                  |
| Lane Closure Days                           | 0                |                | 0                |
| Incentive \$/Day                            | \$0              | \$0            | 0                |
| #Incentive Days Earned                      |                  |                |                  |
| <b>Schedule Costs(Bonus)</b>                | <b>\$0</b>       |                | <b>\$0</b>       |
| <b>Equipment, Access, &amp; Overhead</b>    |                  |                |                  |
| Protective Shield (\$/SF)                   | \$4              |                |                  |
| Stripping Platform                          | \$0              |                |                  |
| Manlifts for Stripping                      | \$3,000          |                |                  |
| Railroad Costs (flaggers, track time, etc.) | \$12,500         |                |                  |
| Water Access (barges, berms, boats, etc.)   | \$0              |                |                  |
| Fab Shop Expense                            | \$1,000          |                |                  |
| Overhead \$/Day                             |                  | \$500          |                  |
| <b>Total</b>                                | <b>\$83,956</b>  |                | <b>\$8,000</b>   |
| <b>Total Estimated Landed Cost</b>          | <b>\$323,967</b> |                | <b>\$274,483</b> |
| <b>Total Estimated Landed Cost Per SF</b>   | <b>\$29.48</b>   |                | <b>\$24.98</b>   |

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## Will Acrylic Remain Clear?



2009 Sound Barrier Installation (I-71 and Morse Road in Columbus, Ohio)

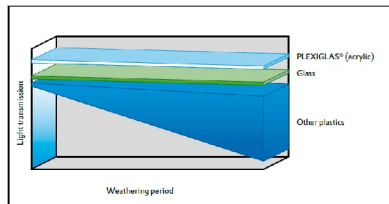
One reason for the use of acrylic plastics is its superior weatherability (i.e., resistance to yellowing due to UV exposure), over and above most other plastics. This is due to acrylic's chemical makeup that allows for UV absorbers/stabilizers to be incorporated into the plastic substrate, a feature not possible with other plastics.

As a result, our acrylic products can meet the weathering requirements of codes such as ICC-ES AC-16 (Skylights), Miami-Dade County Product Control Section/Florida Building Code (Plastics), SAE J576 (Lenses and Reflex Reflectors of Motor Vehicle Lighting Devices), and New York DOT Specification Item 607.9202-09 (Transparent Acrylic Noise Barrier System).

### No Yellowing

Many plastics yellow visibly in the course of time. PLEXIGLAS® does not. Even after 30 years, the absolute yellowness indices are among the lowest possible for plastics at the present time. PLEXIGLAS® complies with the guaranteed values listed in the table throughout the world.

We give you our guarantee that sunlight will not visibly change the appearance, brilliance and surface of clear-transparent PLEXIGLAS® in the course of 30 years.



Based on our understanding of TrueTech Bridge's ClearCast application, our impact modified acrylic sheet product will experience low UV exposure (sheltered from direct sunlight); therefore, our acrylic sheet product in this application should maintain its clarity over the long term.



Aircraft cabin windows made of PLEXIGLAS® protect passengers from strong UV light, substantial differences in pressure and extreme cold.



Since automotive taillights must retain their color even after many years of service, many car manufacturers rely on PLEXIGLAS®.



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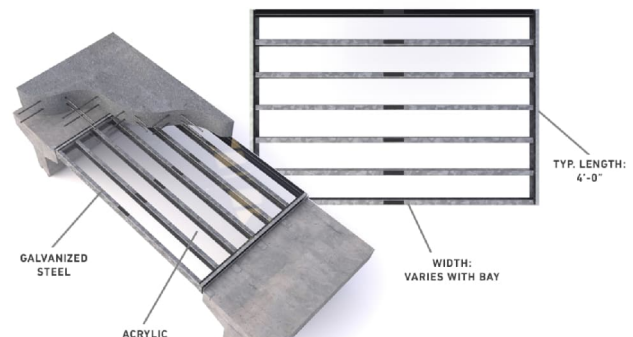
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- Higher-quality inspection data directly strengthens PennDOT's Bridge Management System (BMS2) and BridgeCare forecasting tools.
- ClearCast aligns with FHWA and PennDOT preservation strategies by reducing hidden deterioration risk and extending service life at the lowest total lifecycle cost.
- ClearCast materially improves PennDOT's long-term risk management, treatment prioritization, and funding justification capabilities.

With similar installation to SIP forms and the ability to inspect during and after the deck pour, owners and contractors have adopted the system quickly.



The only stay-in-place form offering visibility for inspection and safely speeding bridge deck construction.

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**IDOT Crews Work To Repair Overpass After Concrete Falls On Car in Oak Park**

CHICAGO (CBS)– The Illinois Department of Transportation crews were on the scene Monday morning at the Oak Park Avenue overpass on the Eisenhower after Illinois State police said a piece of concrete fell from the overpass and landed on a driver's windshield.



**CONCRETE FALLS FROM BRIDGE, HITS SUV**

LIVE. LOCAL. LATEBREAKING. WBALTY

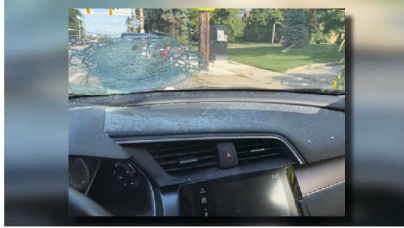


**KELLY GOODALL**  
CAR HIT BY CONCRETE BLOCK

Mysterious, falling concrete chunks damage cars near railway bridge, drivers say

**Concrete smashes car windshield on I-90 in Cleveland**

ODOT inspector checks bridges following latest incident



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- Lumber restricts visibility to the deck
- Inspection/Maintenance staff exposed to dark, confined space
- Over time, wood rots, or harmful molds and fungi lead to degradation and risk to people and property.

### LUMBER PROTECTIVE SHIELDING



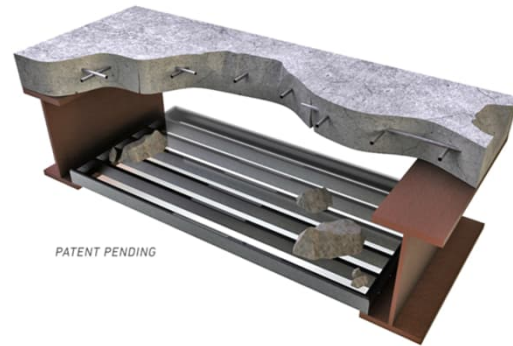
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Prefabricated panels, load tested for high impact, install fast and will not deteriorate or rot over time like lumber.

- 1 Impact Resistant, 100% Coverage
- 2 Allows for Inspection of Deck From Below
- 3 Prefabricated Panels Install Fast, Reducing MOT
- 4 Durable Materials / No Maintenance
- 5 Eliminates Dark, Confined Spaces
- 6 Keep In Place During Deck Demo, Re-Use Panels



PATENT PENDING

Offers visibility for inspection of bridge decks that are spalling over people or property.

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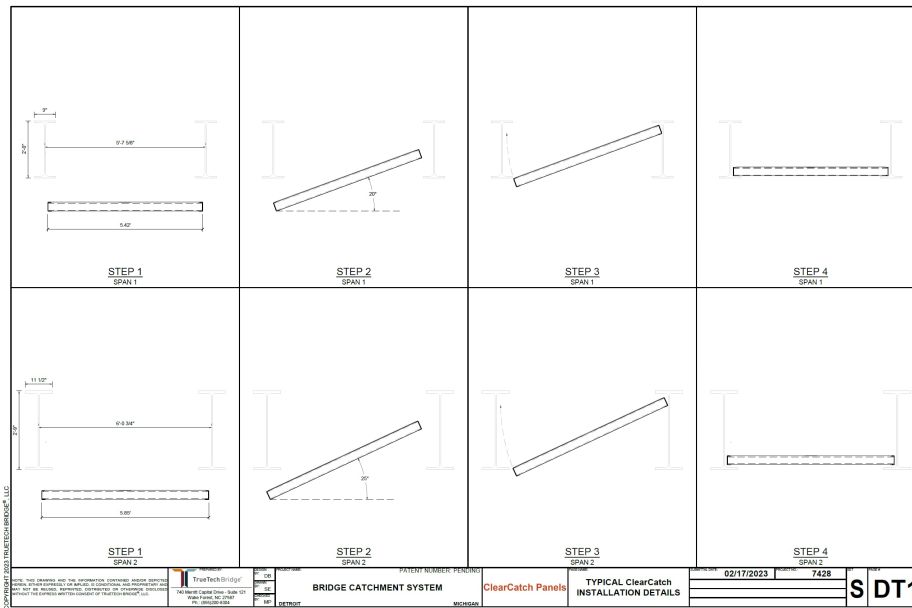
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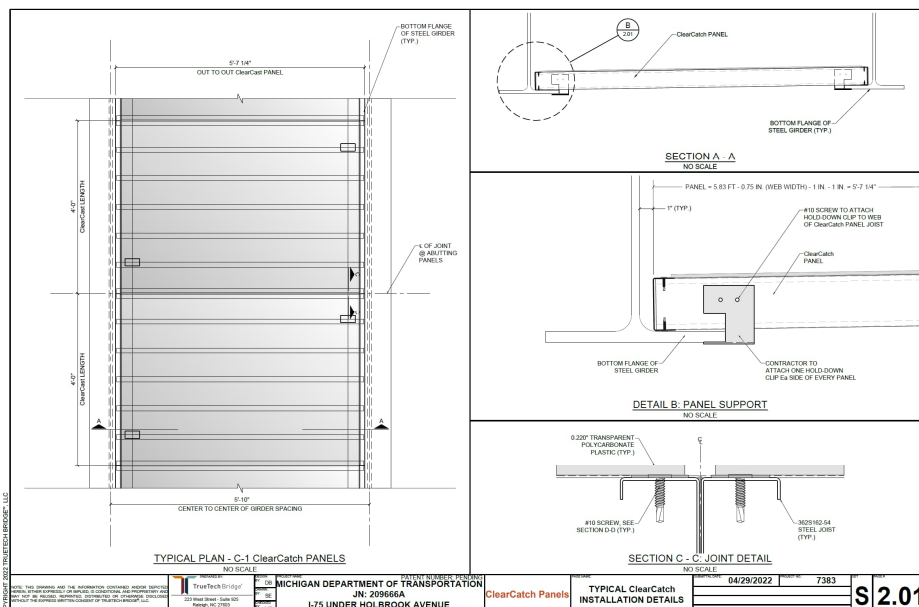


## MDOT – I-75 Under Holbrook Avenue



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## MDOT – I-75 Under Holbrook Avenue



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## ClearShield Installation – Steel Girders



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## MnDOT – Target Field/North Loop Green

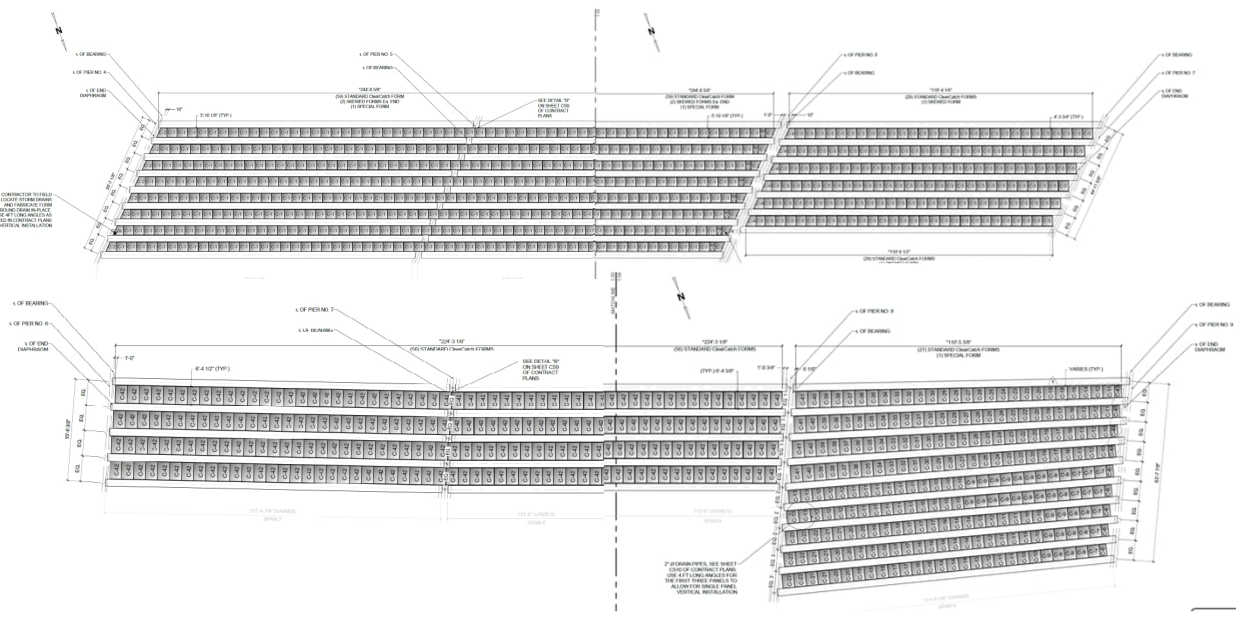


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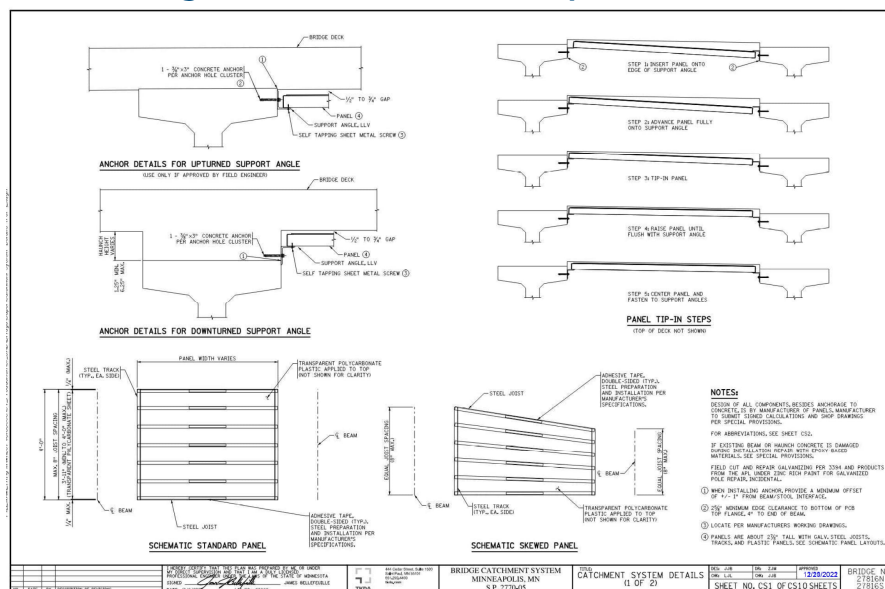
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## MnDOT – Target Field/North Loop Green



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## MnDOT – Target Field/North Loop Green



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## ClearShield Installation – Precast Girders



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## ClearShield Installation – Precast Girders



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## Building Blocks to a Successful Project

| Solution Development                                                                                                                                                                | Design Support                                                                                                                                                                | Installation                                                                                                                                                                           |                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>DYO ALBC</b><br/>Design your own ALBC project.<br/>Products:<br/>Aluminum Box Culvert</p> |  <p><b>DYO PRECAST</b><br/>Design your own Precast project.<br/>Products:<br/>CON/SPAN</p> |  <p><b>DYO TRUSS</b><br/>Design your own Truss project<br/>Products:<br/>Steadfast Continental</p> |  <p><b>DYO MODULAR ROLLED GIRDER</b><br/>Design your own Modular Rolled Girder<br/>Products:<br/>Big R EXPRESS Modular Rolled Girder</p> |

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## Sample Plan Notes – Big R Rolled Girder & CLEARCAST

### Example Plan Note:

Transparent stay-in-place forms shall be used for forming the concrete. Bridge deck formwork shall allow for a minimum of **70% visibility** to the underside of the concrete deck to allow for future condition ratings in accordance to the Specifications for the National Bridge Inventory Section 7.1 and Table 20. The stay-in-place form shall be designed to **support all dead loads** plus an additional 50 psf for construction loads. Deflection of the stay-in-place form under all dead loads shall not exceed 1/180 of the form span or 1/2-inch, whichever is less, for form spans less than or equal to 10 feet. **Deflection** of the stay-in-place form under all dead loads shall not exceed 1/240 of the form span or 3/4-inch, whichever is less, for form spans greater than 10 feet. The Bridge Manufacturer is responsible for the design of the stay-in-place forms. Stay-in place forms shall be shop installed by the Bridge Manufacturer as much as possible to minimize field installation.

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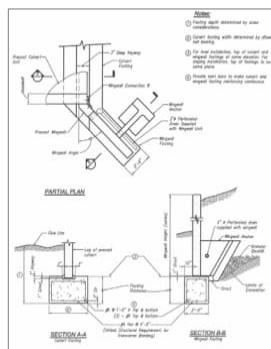
## Building Blocks to a Successful Project

Solution  
Development

Design Support

Installation

- Horizontal and vertical reactions
- Foundation sizing
- Foundation design calculations
- Foundation drawings



| SAMPLE BRIDGE FOOTING CALCULATIONS                                                              |           |                                |           |
|-------------------------------------------------------------------------------------------------|-----------|--------------------------------|-----------|
| JOB #                                                                                           |           | DATE                           |           |
| SAMPLE Foundation Design Example                                                                |           | 10/1/2025                      |           |
| Note: Engineer of Record (EOR) is responsible for accuracy of calculations in this spreadsheet. |           |                                |           |
| DESIGN DATA                                                                                     |           | ASSUMPTIONS                    |           |
| Bridge span                                                                                     | 100.00 ft | Design Load per Neg. $R_1$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_2$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft |                                |           |
| FOOTING DATA                                                                                    |           | UNREINFORCED BRIDGE DATA       |           |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_1$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_2$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_3$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_4$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_5$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_6$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_7$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_8$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_9$     | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{10}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{11}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{12}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{13}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{14}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{15}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{16}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{17}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{18}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{19}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{20}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{21}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{22}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{23}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{24}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{25}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{26}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{27}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{28}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{29}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{30}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{31}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{32}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{33}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{34}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{35}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{36}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{37}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{38}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{39}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{40}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{41}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{42}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{43}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{44}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{45}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{46}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{47}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{48}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{49}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{50}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{51}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{52}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{53}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{54}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{55}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{56}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{57}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{58}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{59}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{60}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{61}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{62}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{63}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{64}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{65}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{66}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{67}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{68}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{69}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{70}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{71}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{72}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{73}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{74}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{75}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{76}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{77}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{78}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{79}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{80}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{81}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{82}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{83}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{84}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{85}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{86}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{87}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{88}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{89}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{90}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{91}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{92}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{93}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{94}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{95}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{96}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{97}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{98}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{99}$  | 10.0 k/ft |
| Design Load                                                                                     | 10.0 k/ft | Design Load per Neg. $R_{100}$ | 10.0 k/ft |

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## Building Blocks to a Successful Project

Solution  
Development

*Design Support*

Installation

- Attending Pre-Bid Meetings
- Holding Preconstruction Meeting
- Technical Support Available (FC on all Precast Installations)



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## Questions?

**CROSSINGS. CULVERTS. BRIDGES. CONTECH.**

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