# Index 21600 Series Temporary Detour Bridge

## Design Criteria

***AASHTO Standard Specifications for Highway Bridges,*** 17th Edition (superstructure); ***AASHTO LRFD Bridge Design Specifications*** (substructure); ***Structures Design Guidelines (SDG)***; ***Acrow Panel Bridging Series 300 Technical Handbook***

## Design Assumptions and Limitations

**These Standards apply to non-limited access facilities with design speeds of 45 mph and less. A variation is required otherwise.**

These Standards are based on the FDOT current inventory of temporary bridge components which are manufactured in accordance with Acrow Series 300 Double Wide design. Details presented in these Standards are for a Triple Single (three panels per side, one panel high) configuration and incorporating the Double Wide Light Transom (two-lane). Refer to "***Acrow Panel Bridging Series 300 Technical Handbook***" for temporary bridge dimensions, capacities and component designations. Contact the Structures Design Office to obtain a copy of this handbook.

The Acrow Panel Bridging with the Triple Single configuration with two lanes of traffic is designed to meet a HS25-44 loading at the Inventory Level for spans up to 50 feet(ref. page 86 of the Technical Handbook).

The FDOT Office of Maintenance maintains the inventory of FDOT owned temporary bridge components. Contact the Office of Maintenance to coordinate the availability of temporary bridge components that are required for a given project.

Establish temporary bridge length to accommodate project geometric needs, environmental permits, drainage requirements, etc., using the following span length and arrangement criteria.

Details presented in the standards assume one single span or the use of continuous spans for multiple span bridges. Limit continuous length of bridge to 360' in accordance with these standard details. If a total bridge length in excess of 360' is required, supplemental details are required for the mid-bridge expansion joint(s) and associated intermediate bent support(s).

Vary span lengths in increments of 10' with 30' minimum and 50' maximum span lengths. 60' continuous span lengths may be permitted with concurrence from the State Bridge Maintenance Office. For continuous spans the ratio of adjacent span lengths shall not be less than 6:10 to prevent the shorter span from lifting off its bearings under live load. Specify Distributing Beams at all intermediate supports for all span lengths.

The Approach Span and Ramp Span are to be simple spans, each 5' -0" in length, to eliminate Live Load uplift at the backwall bent and grade beam support.

Do not place the temporary bridge on a vertical curve. A constant grade is acceptable. Do not use the temporary bridge on a horizontal curve. Refer to "***Acrow Panel Bridging Series 300 Technical Handbook***" for maximum grade and elevation tolerance from constant grade (Bent to Bent and Cross-Slope) for final cap elevations.

The temporary bridge is to have a zero cross-slope. Provide asphalt buildup transitions to a zero cross slope outside the limits of the temporary bridge.

To accommodate debris drift clearances, set Low Member Elevation as follows:

For single span bridges, at the bottom of the Transom.

For multiple span bridges, at the bottom of the Distributing Beam.

Design the pile cap connection to pile assuming the truss reaction with a minimum of 3" eccentricity. Design of this connection detail is the responsibility of the Engineer of Record.

Select the pile type considering the driving capacity requirements of the production piles on the permanent bridge, free standing height, water levels if present and soil conditions.

Design the substructure according to current ***AASHTO LRFD Bridge Design Specifications*** Strength Limit States III & V and Service Limit State I:

For open-grate deck Triple Single dead load reactions, approximate the superstructure dead load as 1.42 Kip/Ft.

Calculate wind force on superstructure (WS) using basic wind force of 0.45 Kip/Ft. Ratio the above loading using wind pressures in Table 3.8.1.2.2-1 of ***AASHTO LRFD Bridge Design Specifications***.

Example-

For wind skew of 30°

W Lateral = 0.45 (0.065/0.075) = 0.39 Kip/Ft.

W Longitudinal = 0.45 (0.028/0.075) = 0.17 Kip/Ft.

The 10 Gauge Thrie-Beam Guardrail panels are attached to the temporary bridge with bolts placed between vertical truss members at 10'-0" spacing. This specific type of mounted traffic railing to the temporary bridge is not based on crash tested design; however, will improve the crashworthiness of the system and provide a degree of protection to the bridge trusses from vehicular impact.

The treatment of the approach and trailing ends shall consist of the Thrie-Beam (or Type K Barrier Unit) Approach Transition and Trailing End Transition, respectively, as shown on this Standard. The appropriate guardrail treatments beyond the Approach and Trailing End Transitions shall be determined by the Roadway Engineer. As a minimum, if no other hazards are present, an End Anchorage Assembly Type II shall be provided on the trailing end. On approach ends utilizing the Thrie-Beam Approach Transition, a Transition Block or Curb is required at the end of the bridge. A Transition Block is not required on trailing ends of bridges having no opposing traffic; however, a curb may be

required due to drainage needs. An Index 300, Type D Concrete Curb is generally suitable for this application.

A Thrie-Beam Expansion Section must be installed at the bridge deck expansion joint as shown in the Standard. The Structures Engineer shall identify the locations in the Plans (if any are required) where a Thrie-Beam Expansion Section is to be included in the guardrail.

## Plan Content Requirements

Plans for temporary bridge shall, as a minimum, cover the following:

1. General Note Sheet.
2. Simple span bearing details if non-continuous spans are selected.
3. Grade change details at the extremities of the bridge.
4. Plan and elevation sheets with span lengths, stationing, alignment, grade and boring locations.
5. Foundation layout sheet including pile spacing & bent stationing.
6. Temporary Bridge Pile Data Table as shown below in accordance with ***SDG*** 3.5 and ***SDM*** 11.4 included in the contract plans with the Foundation Layout sheets. Modify table and notes as required to accommodate the required number of piles and bents. When not enough space is available on one plan sheet, continuation of the Data Table is acceptable. See Introduction I.3 for more information regarding use of Data Tables.
7. Bent detail sheet.
8. A parts list as required for shipping purposes.
9. Show the appropriate site specific approach and trailing end treatments in the Plans.

| TEMPORARY BRIDGE PILE DATA TABLE | | | | | | | | | | | | Table Date 07/01/13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INSTALLATION CRITERIA | | | | | | DESIGN CRITERIA | | | | | | |
| BENT NUMBER | PILE SIZE and TYPE (in.) | NOMINAL BEARING RESISTANCE (tons) | MINIMUM TIP ELEVATION (ft.) | REQUIRED JET ELEVATION (ft.) | REQUIRED PREFORM ELEVATION (ft.) | FACTORED DESIGN LOAD (tons) | DOWN DRAG (tons) | TOTAL SCOUR RESISTANCE (tons) | NET SCOUR RESISTANCE (tons) | DESIGN SCOUR ELEVATION (ft.) | Ø COMPRESSION (0.45 = default) | PILE CUT-OFF ELEV. |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

$$\frac{\text{Factored Design Load} + \text{Net Scour Resistance} + \text{Down Drag}}{\text{Ø}} \leq \text{Nominal Bearing Resistance}$$

TOTAL SCOUR RESISTANCE – An estimate of the ultimate static side friction resistance provided by the scourable soil.

NET SCOUR RESISTANCE – An estimate of the ultimate static side friction resistance provided by the soil from the required preformed or jetting elevation to the scour elevation.

DESIGN SCOUR ELEVATION – Estimated elevation of scour due to the design storm event.

PILE INSTALLATION NOTES:

Contractor to verify location of all utilities prior to any pile installation activities.

Minimum Tip Elevation is required for lateral stability.

When a required jetting elevation is shown, the jet shall be lowered to the elevation and continue to operate at this elevation until the pile driving is completed. If jetting or preforming elevations differ from those shown on the table, the Specialty Engineer shall be responsible for determination of the required driving resistance.

No jetting will be allowed without the approval of the Engineer.

The Contractor should not anticipate being allowed to jet piles below the design scour elevation or required jet elevation, whichever is deeper.

At each Bent, pile driving is to commence at the center of the Bent and proceed outward.

## Payment

| Item number | Item description | Unit Measure |
|---|---|---|
| 102-2-AA | Special Detour | LS |
| 102-71-14 | Barrier Wall, Temporary, F&I, Type K | LF |
| 102-71-24 | Barrier Wall, Temporary, Relocate, Type K (if required) | LF |
| 102-73 | Temporary Guardrail | LF |