Synopsis:

Washington County DPW began fabricating and installing precast bridge panels with three goals in mind:

1. Reduce the length of bridge closures.
2. Stretch the construction season.
3. Conduct short-span superstructure replacements within the limitations of our maintenance budget.

To date the county has completed three separate spans configured as a simple span slab bridge, and transverse panels set on existing beams. This presentation will cover the design and construction of these three spans.

About the Presenters:

Willy Grimmke is the Superintendent of Public Works for Washington County. He has been with Washington County since 1997. He provides general supervision of the Department and manages the County's Federal Aid projects.

Prior to joining the County, Mr. Grimmke managed transportation design and construction projects with a local engineering firm. He has also worked for the Connecticut Department of Transportation.

Kyle Vandewater is the Public Works Manager for Washington County. He has been with Washington County since 2001. He provides general supervision for the Solid Waste Division and manages construction performed by county forces in the Highway Division.

Mr. Vandewater also has worked as a project manager for Stonebridge Iron and Steel, and the Chazen Companies.
Design, Fabrication, and Erection of Precast Concrete Deck Panels

Willy F. Grimmke, P.E. Superintendent
Kyle M. Vandewater, Deputy Superintendent

Washington County Department of Public Works

27 October 2004
Division of Highways

- 60 men staffing 8 maintenance substations.
- 116 County bridges, spans > 20’-0”
- 120 County bridges, spans < 20’-0”
285 miles of County highways.
Washington County DPW
Division of Solid Waste

20 men staffing 5 transfer stations.
Washington County DPW

Engineering Division

Staff of 3 provide surveying and engineering services.
Washington County DPW

Bridge Repair Crew

Bridge Welder, Carpenter, Flagger.
Washington County DPW

Bridge Crew

Foreman, 2 Carpenters & 1 Laborer.
Washington County DPW

Emergency Back-up Bridge Crew

Foreman, 2 Carpenters & 1 Laborer.
Washington County DPW Bridge Program
Why Precast?

PROS

- Reduce the length of bridge closures.
- Stretch the construction season.
- Address short span construction within our maintenance budget.

CONS

- Limited by weight.
- Construction joints.
Design

- Maximum panel weight: **12.5** tons.
- H2O loading.
- Designed from a maintenance standpoint.
- Developed spreadsheet model.
# Design

## Reinforced Concrete Slab Bridge

<table>
<thead>
<tr>
<th>Bridge No.:</th>
<th>C206</th>
<th>Exterior panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Carried:</td>
<td>CR12</td>
<td></td>
</tr>
<tr>
<td>Political Unit:</td>
<td>Town of Whitehall</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Span:</td>
<td>11.75 ft</td>
</tr>
<tr>
<td>Slab Thickness:</td>
<td>1.08 ft</td>
</tr>
<tr>
<td>Unit wt. concrete:</td>
<td>145.00 pcf</td>
</tr>
<tr>
<td>Effective span:</td>
<td>12.83 ft</td>
</tr>
<tr>
<td>Clear width:</td>
<td>30.00 ft</td>
</tr>
<tr>
<td>Wearing Surface:</td>
<td>30.00 psf</td>
</tr>
<tr>
<td>Railing:</td>
<td>70.00 psf</td>
</tr>
<tr>
<td>Future Overlay:</td>
<td>30.00 psf</td>
</tr>
<tr>
<td>Dead Load:</td>
<td>190.99 plf</td>
</tr>
<tr>
<td>Dead Load Moment:</td>
<td>3.93 kip ft</td>
</tr>
<tr>
<td>Live Load (HS25):</td>
<td>25.00</td>
</tr>
</tbody>
</table>

Impact: Impact allowance is a fraction of live load stress, and shall not exceed 30% (1.3) **AASHTO 3.8.2**

\[
I = \frac{1 + (50 \text{ ft})/(S_c + 125 \text{ ft})}{1.3}
\]

Live Load Moment:

- \( M_{LL} = 900 \times S \) (Spans up to and including 50 ft.)
- \( 1000 \times (1.3 \times S - 20) \) (Spans 50 ft. to 100 ft.)

\[
M_{LL} = 14.43 \text{ kip ft}
\]

with factored impact:

\[
M_{LL(I)} = 18.76 \text{ kip ft}
\]
Panel Loading & Shipping

- John Deere 644 loader.
- Gradall.
Bridge C89; County Route 74 over Marshall Brook, Village of Greenwich

- Existing bridge constructed 1939.
- Concrete parapet rail system.
- Erosion/scour issues.
- Concrete deck in failure.
- That pesky water main.
Bridge C37; County Route 16 over Mount Hope Brook, Town of Fort Ann

- Original bridge constructed 1930’s.
- Existing bridge re-constructed 1994.
- A588 beams with CCA PT wood deck.
- Premature corrosion of beams.
Bridge C206; County Route 12 over unnamed stream, Town of Whitehall

- Existing bridge re-constructed and widened under the Erwin Plan, 1952.
- Severe deterioration of abutments and fascia girders.
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Questions?

Washington County Department of Public Works

27 October 2004