Alaska’s Bridge Section

Who we are:

- ~ 25 staff members
- > 80% of design & inspection in house
- ~ 10-12 new designs and rehabs yearly
- ~ $75-100 million in annual construction dollars
- Work with DOT&PF Marine Highway engineers
Alaska’s Bridges

Only…
• ~1,000 bridges
• ADTs from 10 to 60,000

But…
• Spread over area of 1/5 of contiguous US
• ~20% of bridges are remote (i.e. not accessible on road system)
• NO detours available in many places
• “Engaged” oil and trucking industries
Alaska’s Bridges
Why bridges can’t be closed
“Minor” Constraint

- Usually just 3 months of good weather and daylight
- + Fish window limits
Typical *Highway* Work Zone
ABC that fits our needs...

May 10, 2012

September 1, 2012
Temporary Bridges
Build Ahead of Time

- Prefabricated Bridge Elements and Systems (PBES) such as:
  - Precast Decked Bulb-Tee Girders
  - Precast Deck Panels (steel bridges)
  - Precast Pier Caps
  - Precast Soldier Pile Lagging
  - Precast Backwalls (past practice)
Decked Bulb-Tee Girders

- High strength ($\geq 8,000$ psi)
- Quality control
- Cost-effective (made in Anchorage)
- Design for zero tension
Decked Bulb-Tee Girders

- Still require 7 days for rail curb pour/cure
- Require crane(s), heavy to transport
Precast Deck Panels

- Remote jobs
- Grout keys used
Concrete-Filled Pipe Pile Pier

- Minimal in-water work, no cofferdams
- Can be driven outside weather window
- Extensive seismic testing
Precast Pile Caps

- First use with our bent system
- Concerns: Tolerances and seismic behavior
Polyester Concrete

- Experimental Features project
- Minimize flagger or one-way signal times from 7 days to 1 day
- Inconclusive Results
Alternate Contracting Methods

- Design-build = ~10-12 projects
- Construction Manager/General Contractor (CMGC) = 1 almost finished + 1 in planning
Design-Build Experiences

- Poor quality products
- Lack of seismic/local knowledge
- “Hand holding” costs State time/money
- Local contractors not set up for many innovative methods
CMGC Experiences

- Better than Design-Build
- Validated current design/construction practices
- Offered knowledge transfer
CMGC Experiences - Cost

- DOT&PF, ICE, and Contractor develop Guaranteed Maximum Price (GMP)
  - Agreement reached = proceed to construction
  - No agreement reached = proceed to competitive bid

<table>
<thead>
<tr>
<th>Organization</th>
<th>50% Design</th>
<th>75% Design</th>
<th>100% Design</th>
<th>GMP</th>
<th>Percent Change from 50% Design to GMP</th>
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</thead>
<tbody>
<tr>
<td>DOT&amp;PF (Engineer’s Estimate)</td>
<td>$11,946,036</td>
<td>$10,380,355</td>
<td>$11,714,376</td>
<td>$11,714,376</td>
<td>-2%</td>
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<tr>
<td>Hamilton Construction Company</td>
<td>$13,622,225</td>
<td>$10,543,432</td>
<td>$11,183,230</td>
<td>$10,727,261</td>
<td>-21%</td>
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<td>Stanton Constructability Services (ICE)</td>
<td>$17,321,540</td>
<td>$11,063,780</td>
<td>$9,019,069</td>
<td>$10,110,029</td>
<td>-42%</td>
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</tbody>
</table>
CMGC Experiences - Cost

- No Change Orders
- Cost Certainty
  - Added extra 400-ft of paving at 75%
- Construction Staging
  - Upfront coordination allowed for use of NPS parking lot as staging area
- Time Savings = $$ Savings
  - Reduced construction season from 2 years to 1 year
  - Reduced design level of effort
  - Improved internal & external timelines
When to Use CMGC

- Constructability issues
- Innovations in schedule, cost, risk mitigation, materials & technologies
- Early or accelerated construction
  - Example: Early construction of frontage roads in access control project
- Risk of project changes due to unknowns
  - Example: Bridge foundations
- Complicated/high profile permitting or traffic control issues
- Fixed funding
  - Example: GO Bond projects
Questions/Answers