



Alaska Department of Transportation & Public Facilities Accelerated Bridge Construction in Alaska

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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

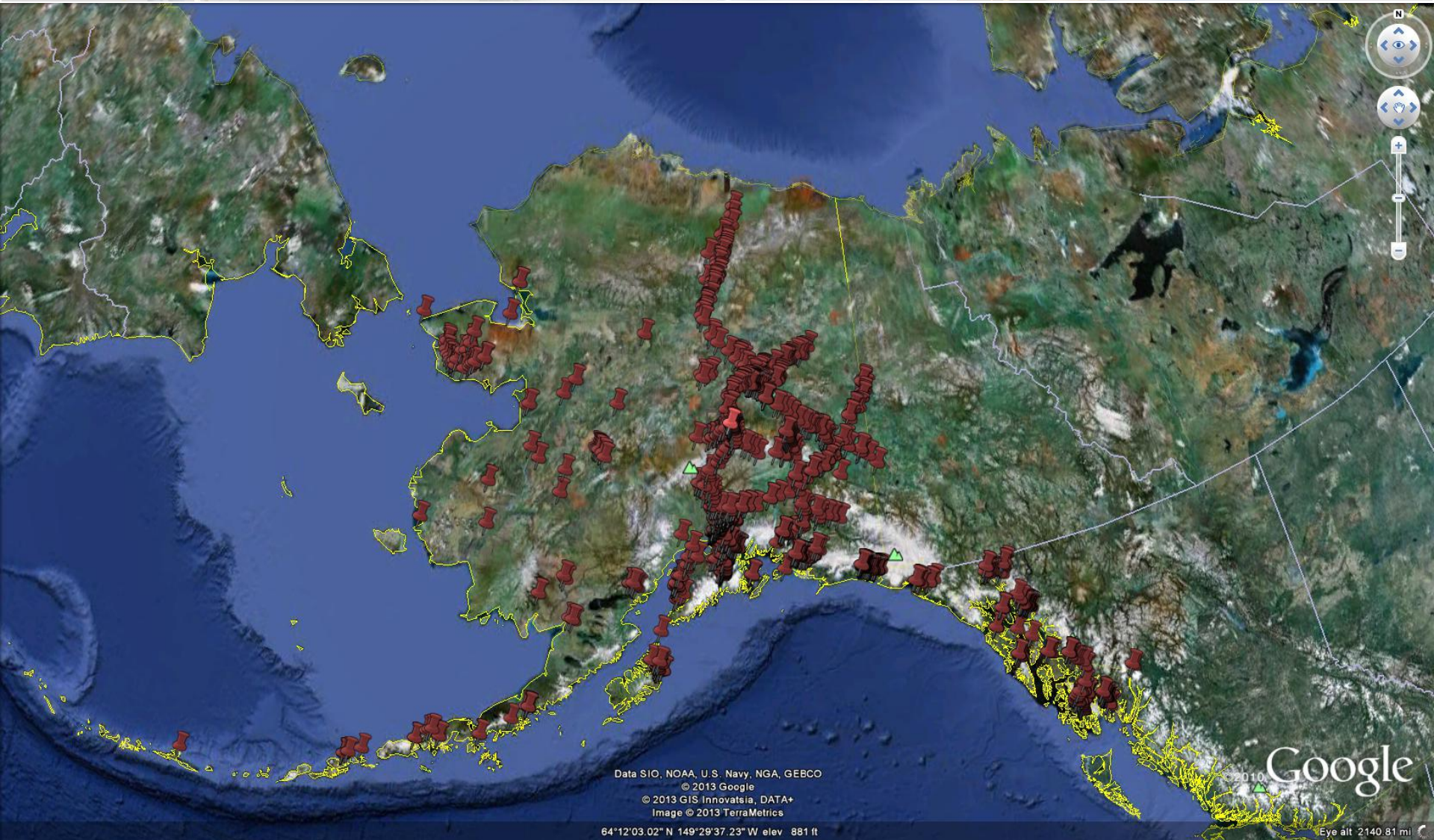
Only...

- ~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



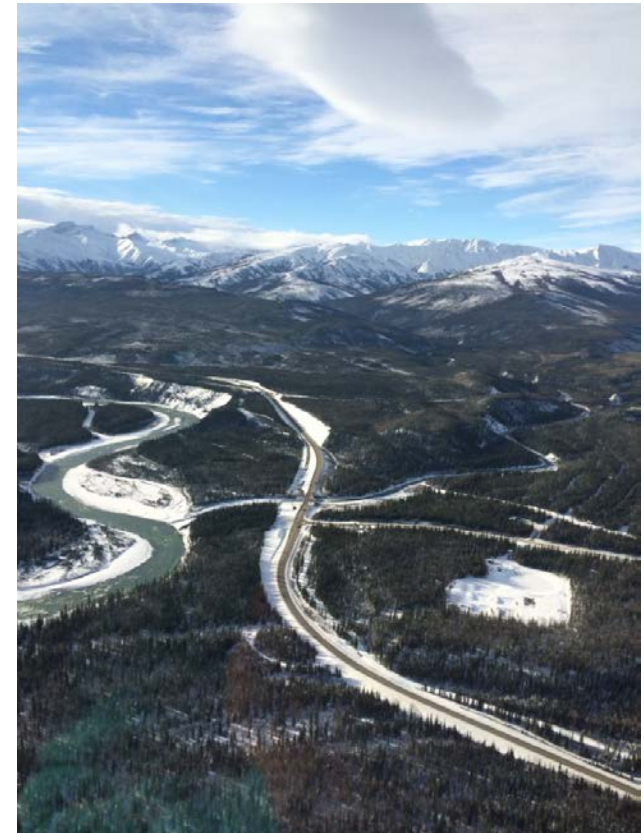


Design-Build Experiences

- 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

Organization	Total Basic Bid				Percent Change from 50% Design to GMP
	50% Design	75% Design	100% Design	GMP	
DOT&PF (Engineer's Estimate)	\$11,946,036	\$10,380,355	\$11,714,376	\$11,714,376	-2%
Hamilton Construction Company	\$13,622,225	\$10,543,432	\$11,183,230	\$10,727,261	-21%
Stanton Constructability Services (ICE)	\$17,321,540	\$11,063,780	\$9,019,069	\$10,110,029	-42%

A collage of four images: a surveyor with a tripod, a boat on a road, a boat on water, and a building.

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

