



Ductal® Mixing / Batching

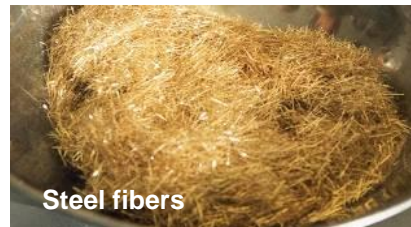
 A member of
LafargeHolcim

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UHPC Premix and Constituents

- Premix
 - cement, silica sand, quartz flour and supplementary cementitious material
 - largest “aggregate” grain of sand < 1 mm in dia.
- Admixture
- Water
 - w/c ratio range of 0.20
- Fibers
 - Steel (structural)
 - PVA (architectural)



Ductal® Bridge Projects

	Canada	US
1997	1 st UHPC bridge in the world, pedestrian bridge, Quebec	
2005		1
2006	1 st joint fill project	
2007	3	
2008	2	2
2009	2	2
2010	5	
2011	7	5
2012	5	10
2013	12	26
2014	22	9
2015	24	14
total	84	69

Ductal® Bridge Projects

as of end 2015

States	# projects
New York	45
Pennsylvania	6
Iowa	5
Massachusetts	2
Illinois	1
DC (Wash.)	1
Delaware	1
Montana	1
Nebraska	1
New Jersey	1
Ohio	1
Oregon	1
Virginia	1
Utah	1
Washington	1

Ductal® Bridge Projects

for 2016 working on over 30 projects

New States
California
Florida
Georgia
Hawaii
Idaho
Maine
Minnesota
South Carolina
Vermont

Joint fill applications – typical Ductal® formulations

JS1000

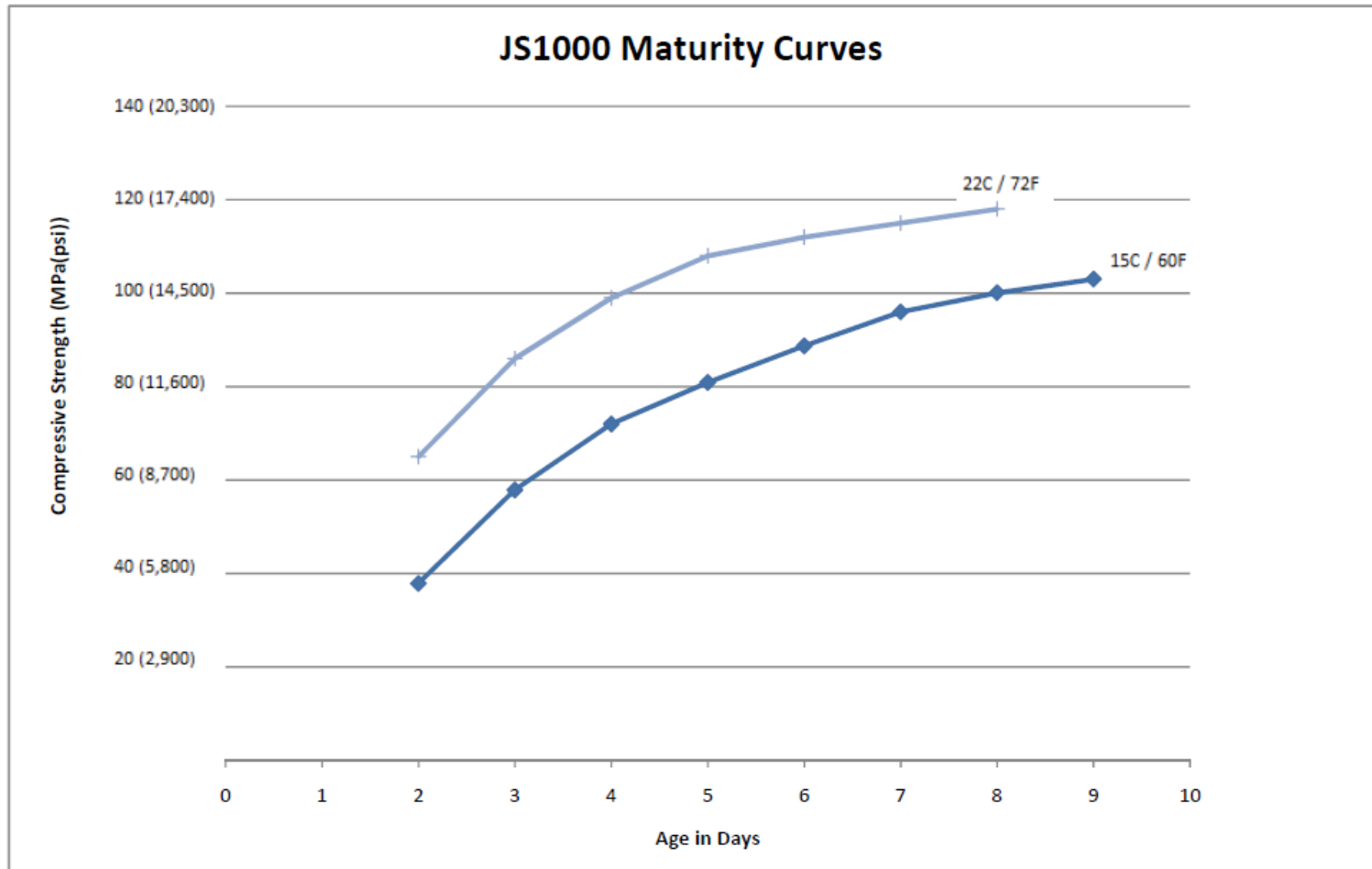
- 12 to 14 ksi in 4 days @ 70F
- Slow setting, can handle hot (90F) batching temperatures



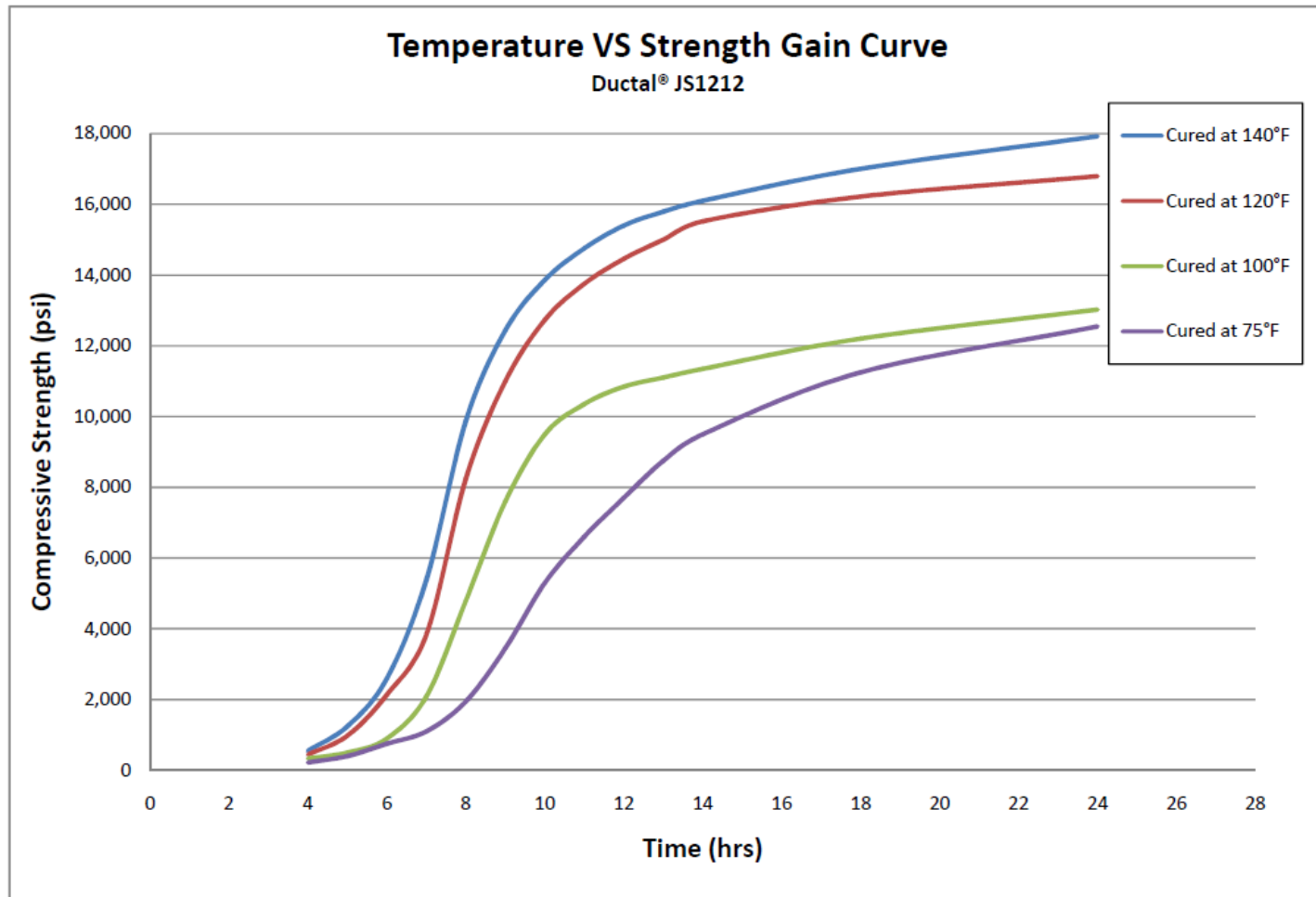
JS1212

- 12 ksi in 12 hours @ 120F
- Fast setting - to maintain workability, the batch temperatures are kept below 70F (use ice instead of water, if needed)

JS1000 – strength curves



JS1212 – strength curves



Field batching of UHPC

UHPC may be mixed in any type of mixer with proper mixer adjustments and optimization, but best performance is achieved in high shear mixers.

Most precast plant mixers work fine.



0.2 yd³ batches (0.8 yd³ per hour)



0.65 yd³ batches (2.6 yd³ per hour)



6 yd³ batches

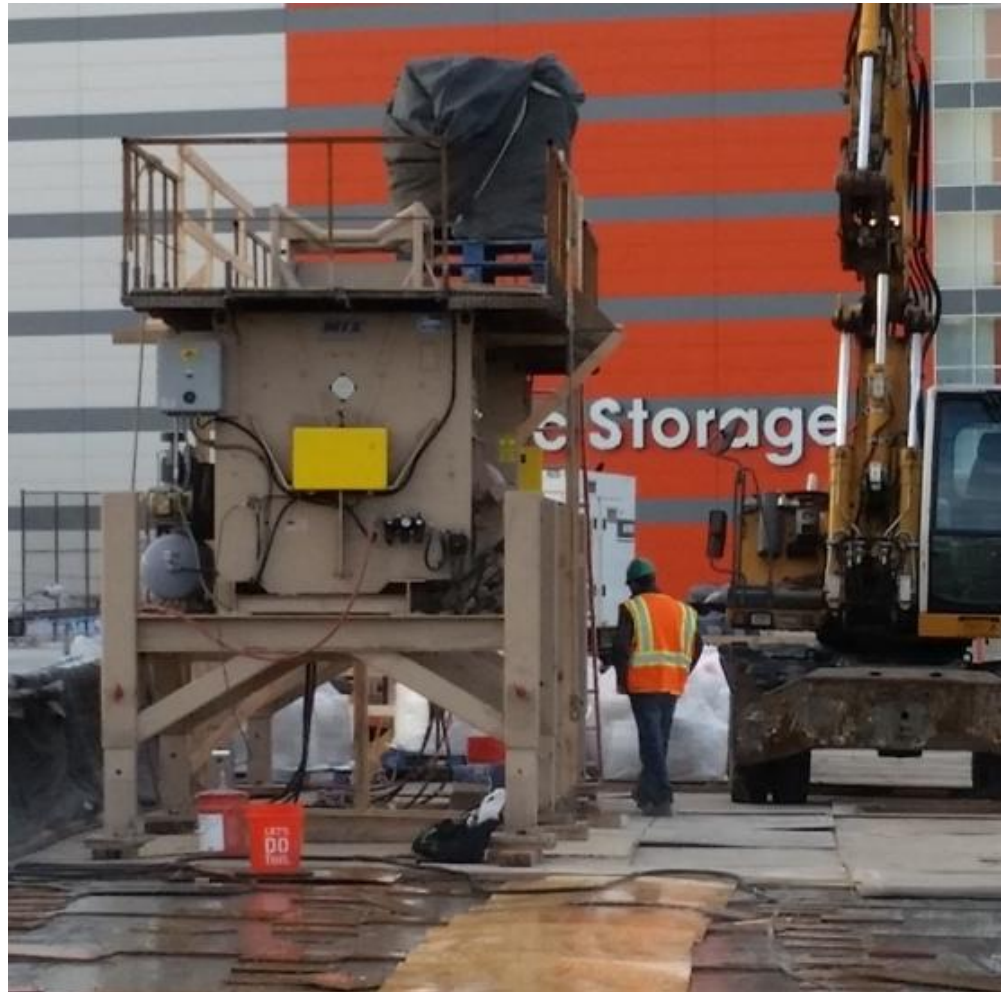
2/3 yd³ – pan mixers



2/3 yd³ mixers – horizontal shaft



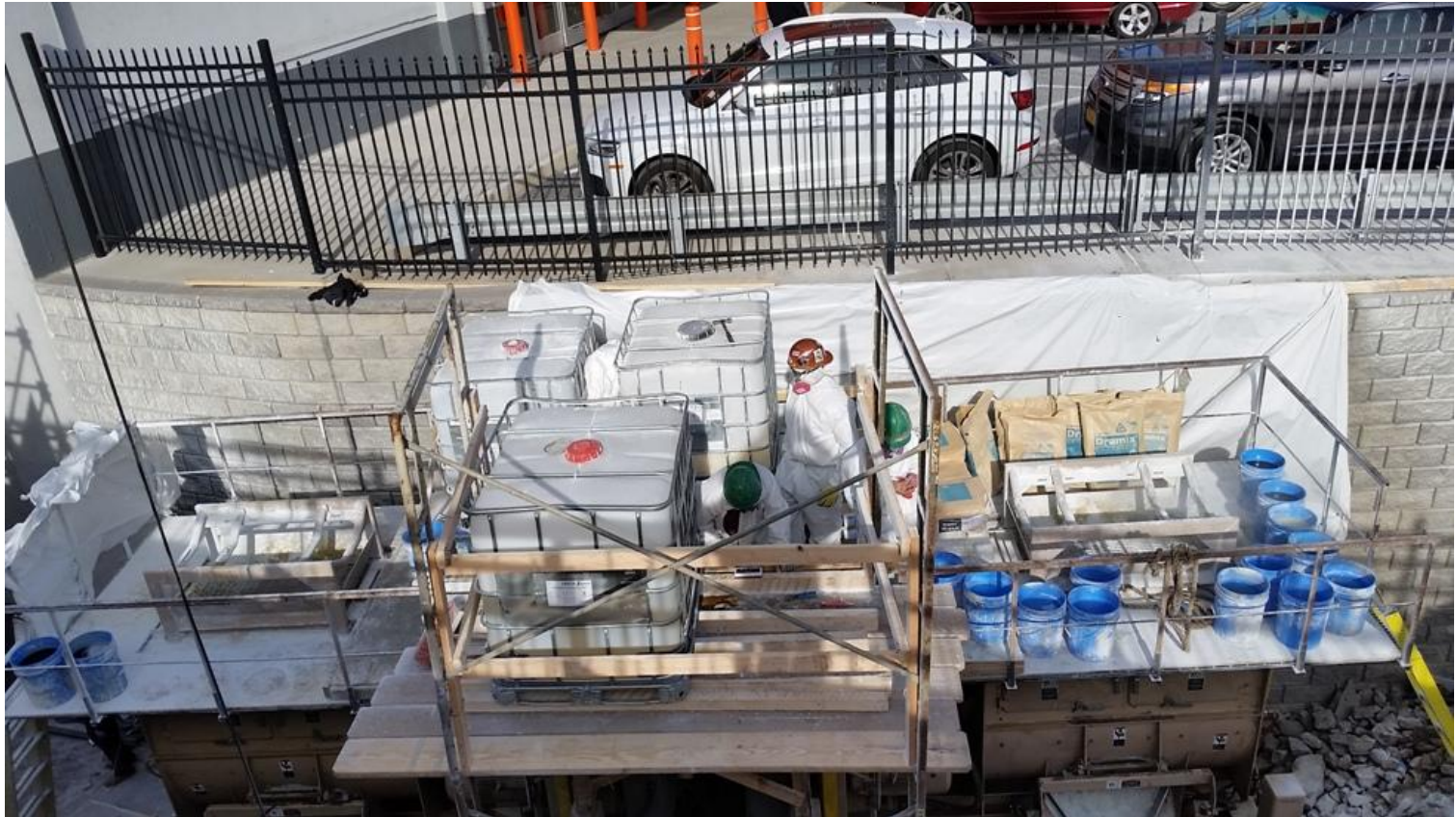
1.25 yd³ mixers – horizontal shaft



1.25 yd³ mixers – horizontal shaft



1.25 yd³ mixers – horizontal shaft



Quality Control on site

Slump Flow

Mini-slump cone

Flow – 7" to 10"



Compressive Strength

3" x 6" Cylinders

Ends cut to length & machined to $<0.5^\circ$



Casting



Chillon Viaducs, Switzerland 2014-15

Use of portable plant on site



Hydro demolition



On site portable batching plant – 2 mixers



Material brought to the concrete machine with motorized buggies



Concrete paver with customized dispensing system at the front

Mission Bridge, British Columbia, Canada

Use of ready mix trucks to batch and deliver to site



Loading and batching in ready-mix truck at Lafarge plant



Delivery to the site (total of 4 trips)



Hoisting and casting from the top of the formwork



Completed project

Contact info

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