



COLORADO READY MIXED CONCRETE ASSOCIATION

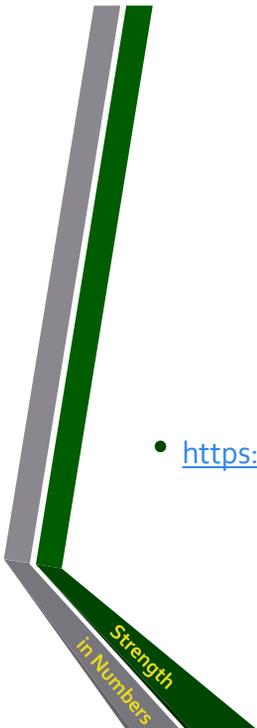
Concrete Testing Adherence Program

Annual Conference

November 17, 2017

United-Oldcastle Testing Video (Nov 2017)

- https://www.youtube.com/watch?v=d4_er_jiev8



What is the Issue in the Field?

- Inconsistencies
- Short cuts
- Misconceptions
- Errors
- Use of different tools/equipment
- Steps skipped to speed testing
- Standards read differently
- Knowingly performing any of the above



Strength
in Numbers

What is the Concrete Testing Adherence Program?

- Collection of observations of field testing procedures
 - Technician certification
 - Sampling
 - Physical properties testing
 - Initial curing
- Observations submitted to central database
- Evaluation of data
 - Summary reports shared to public and individual company
 - Each company can only see their data compared to ALL companies, including company employee information



Strength
in Numbers

The Beginning of Development (2015)

- Goal: **Fair and Consistent Assessment of Ready Mixed Concrete**
 - Minimize/eliminate the effects of false negative/positive concrete tests on producers, and the concrete construction industry
- ASTM and ACI have established standards and guidelines to evaluate the performance of concrete, but not consistently followed or monitored:
 - What is RM Producer's Role?
 - What is Testing Laboratory's Role?

Improper concrete testing procedures in the field have a huge impact on construction projects:

- Timelines
- Project owner satisfaction

Producers are "Guilty, 'til proven innocent" if breaks are low.

- Sometimes this is from problems with the concrete
- However, many times these breaks are the result of improper field sampling and cylinder care

Labs may be accredited and technicians certified, but doesn't mean ALL criteria is followed.



Strength in Numbers

Adherence Per Question, Program Start to 2016



Initial Data Results (2016)

- Total of 1,113 Assessments
- 2015-2016 data evaluation
- 95% of physical properties tests performed properly
 - (Questions 4 through 8)
- Sampling and initial curing identified as "issues"

Strength in Numbers

Q1- Is the testing technician currently ACI Field I certified to test concrete ?
 Q2, Q3 & Q10 - Sampling
 Q4-Q8 - Physical properties testing
 Q9- Initial curing



Improving Today (2017)

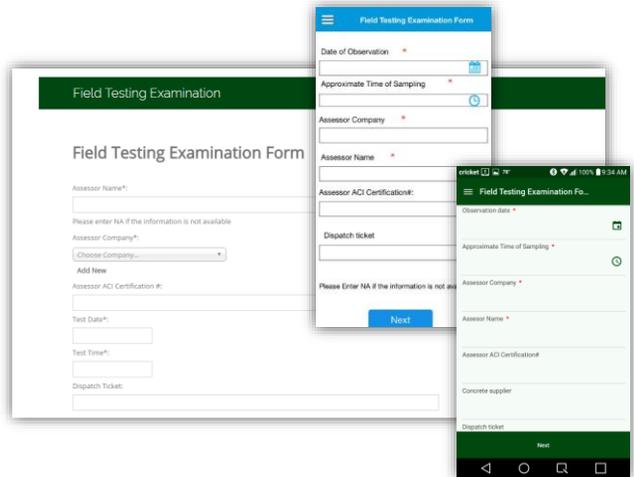
1. Updated questionnaire
 - Developed using data collected in 2015-2016
 - Existing and future data combined for reporting
 - Revamped mobile apps (Android and Apple)
2. Comparisons based on situations
 - Example: *How often was specific curing environments used on Commercial projects?*
3. Improvement Based on Results
 - Analysis and Reporting to Industry
 - Laboratory/Engineering Firm access to variable reporting for own employees
 - Producer access for own employees and assessments performed on their product

Strength
in Numbers



Where We Are Now...

- Data Collection
 - Who?
 - Producers & Laboratories
 - QA/QC
 - Engineers & Inspectors
 - Why?
 - Find faults in the system
 - Improve testing to validate results
 - Everyone on the same page
- Meant to assist concrete producers, testing agencies, and contractors



Strength
in Numbers



NOT a "finger pointing" device!

Report Summary

- Seven (7) companies currently participating (assessing)
 - 818 assessments submitted in 2017 thru October
 - 790 submitted in 2016 total (513 in 2015)
- Public Publications
 - Limited information of overall program results
 - Updated on www.crmca.org/assessment-program/ monthly
- Individual Company Evaluation
 - Company comparison & individual employees
 - Based on assessor (observing testing), producer/supplier (material tested), or laboratory (performing testing)
 - Sent to individual company as requested
- Dynamic reporting system still in development



Yearly Comparisons

OVERALL ASSESSMENT RESULTS		2015	2016	2017	Change in Current Year vs. Previous Year
(percentage answering "yes")					
Question 1	Is the testing technician currently ACI Field I certified to test concrete?	85.7%	86.8%	84.3%	-2.5%
SQ1.2	What type of project/site is concrete testing observed at?				
	Federal/State	N/A	N/A	12%	--
	Local/Municipality	N/A	N/A	18%	--
	Commercial/Industrial	N/A	N/A	61%	--
	Residential	N/A	N/A	9%	--
	Private	N/A	N/A	0%	--
	Other	N/A	N/A	1%	--

OVERALL ASSESSMENT RESULTS		2015	2016	2017	Change in Current Year vs. Previous Year
(percentage answering "yes")					
Question 2	concrete sampled in accordance with ASTM C172?	68.4%	53.6%	71.9%	18.3%
SQ2.1	Where was the sample(s) collected from?				
	At point of placement; end of mixer truck	N/A	N/A	48%	--
	At point of placement; end of pump/belt	N/A	N/A	8%	--
	At end of mixer truck discharge; prior to	N/A	N/A	43%	--
	Other	N/A	N/A	3%	--
SQ2.2	Which of the following was observed?				
	Incorrect sample size	N/A	N/A	3%	--
	Exceeding sample time	N/A	N/A	1%	--
	Incorrect portions	N/A	N/A	10%	--
	Incorrect location	N/A	N/A	3%	--
	Other	N/A	N/A	13%	--

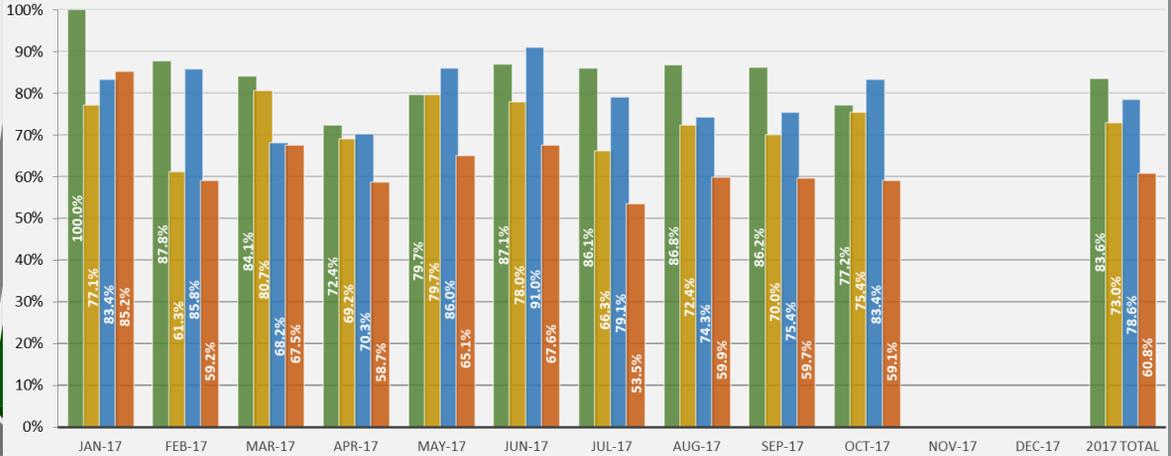
OVERALL ASSESSMENT RESULTS		2015	2016	2017	Change in Current Year vs. Previous Year
(percentage answering "yes")					
Question 3	Were physical property tests completed and strength specimens molded (if required to cast) in accordance with the appropriate ASTM procedure?	82.5%	83.4%	77.2%	-6.2%
SQ3.1	Which procedure was not followed?	(percentage meeting requirements)			
	Temperature	N/A	N/A	97%	--
	Slump	90%	90%	87%	-3.1%
	Air Content	93%	94%	93%	-0.7%
	Density (unit weight)	90%	89%	96%	6.9%
	Casting concrete strength specimens	89%	90%	96%	6.0%
	Time requirement	93%	95%	96%	0.6%

OVERALL ASSESSMENT RESULTS		2015	2016	2017	Change in Current Year vs. Previous Year
(percentage answering "yes")					
Question 4	Were the concrete specimens (if required to cast) stored in an initial curing environment following ASTM C31, section 10.1.2?	68.1%	65.7%	59.8%	-5.9%
SQ4.1	Which of the following was utilized?				
	Nothing	N/A	N/A	5%	--
	Fabricated curing box or storage area	N/A	N/A	23%	--
	Water bath	N/A	N/A	20%	--
	Cooler or buckets	N/A	N/A	26%	--
	Insulation	N/A	N/A	2%	--
	Earthen burial	N/A	N/A	0%	--
Other	N/A	N/A	11%	--	
SQ4.2	Which type of temperature monitoring device was utilized in the curing environment?				
	Continuous record	N/A	N/A	15%	--
	Min/Max	N/A	N/A	19%	--
	Instant read only	N/A	N/A	2%	--
	Thermostatic control (heat)	N/A	N/A	14%	--
	Thermostatic control (cool)	N/A	N/A	7%	--
Nothing	N/A	N/A	42%	--	

Public Publications

CRMCA Concrete Testing Assessment Program

Percentage of Each Question Meeting Requirements in 2017



Q1 - Is the testing technician currently ACI Field 1 certified to test concrete?

Q2 - Excluding preliminary check tests, was the concrete sampled in accordance with ASTM C172?

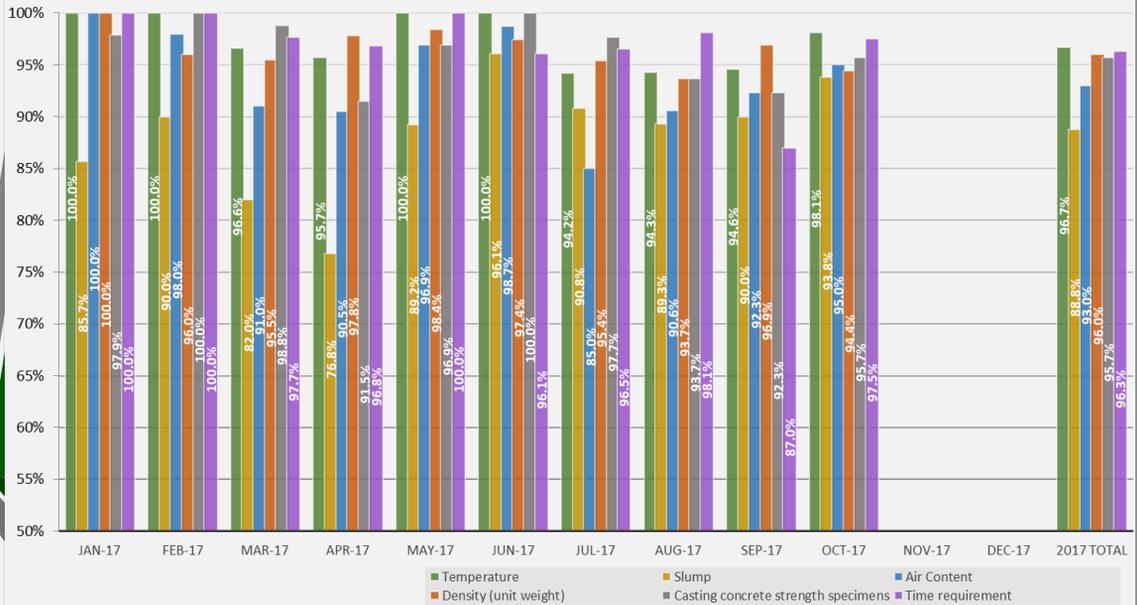
Q3 - Were physical property tests completed and strength specimens molded (if required to cast) in accordance with the appropriate ASTM procedure?

Q4 - Were the concrete specimens (if required to cast) stored in an initial curing environment following ASTM C31, section 10.1.2?

■ Question 1 ■ Question 2 ■ Question 3 ■ Question 4

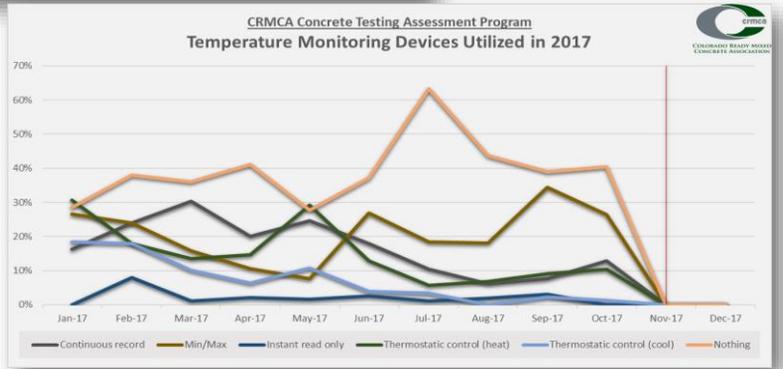
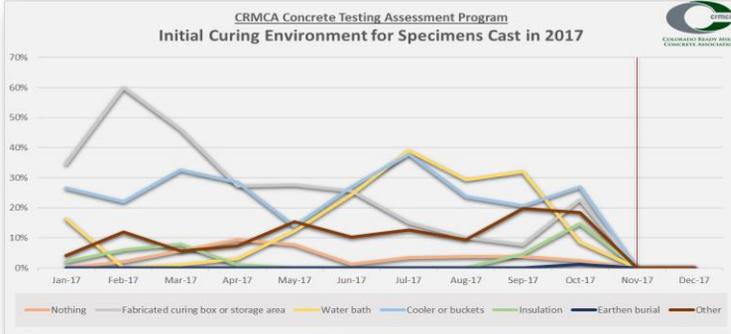
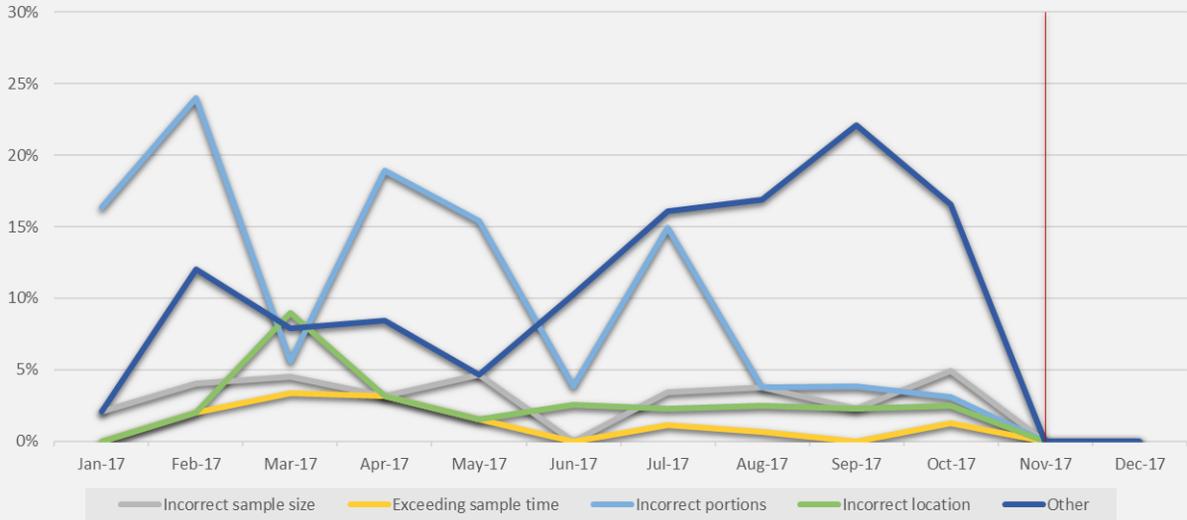
CRMCA Concrete Testing Assessment Program

Percentage of Each Test Procedure Meeting Requirements in 2017



■ Temperature ■ Slump ■ Air Content
 ■ Density (unit weight) ■ Casting concrete strength specimens ■ Time requirement

CRMCA Concrete Testing Assessment Program Sample Collection Not Meeting Requirements in 2017

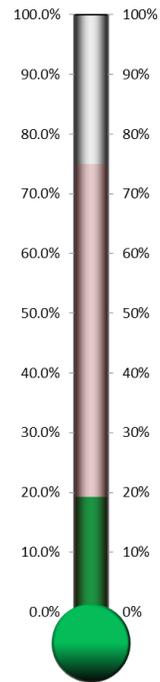


Strength
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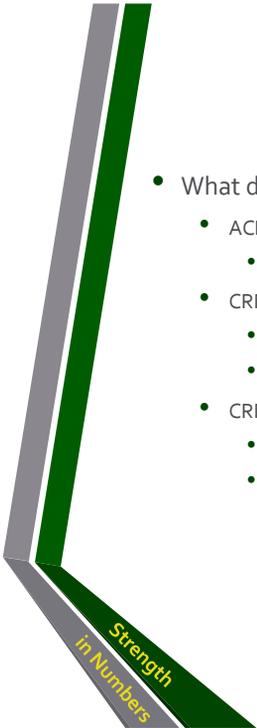
Where we are GOING...

- *Long Term industry problem*
- *Will not work unless members participate*
 - *Producers, laboratories, governmental agencies*
- Where are the faults? (specifications not being met)
 - Already know general idea (sampling and initial curing)
 - Need validation from larger collection
 - Continue data collection through 2018



Change the Perception of Testing

- What do we do to improve?
 - ACI-ASTM eLearning Modules
 - CRMCA Members access to ASTM Compass Portal
 - CRMCA training courses
 - ACI Certification "Training Package"
 - University/College Partnership
 - CRMCA Seminars
 - Solutions, tips & tricks, etc.
 - Develop through Committees
- Additional data collection
 - Regional / location
 - More detailed ASTM standards variables
 - Test results / TestFest data
- Continued evolution of questionnaire, data collection, and evaluation





The Future...

- Improvement and expansion to Adherence Program
 - Not like anything in the industry in the U.S.
 - Expansion of Program
 - Procedure and result comparisons
 - Develop correlation
 - Quality-based system of evaluation of concrete industry
 - Starts with concrete test procedures



Strength
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QUESTIONS?

COMMENTS?

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Annual Conference – November 17, 2017

Colorado Ready Mixed Concrete Association

JT Mesite, P.E.
jt@coloradocaa.org

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