
Standards in Education

Concrete Industry

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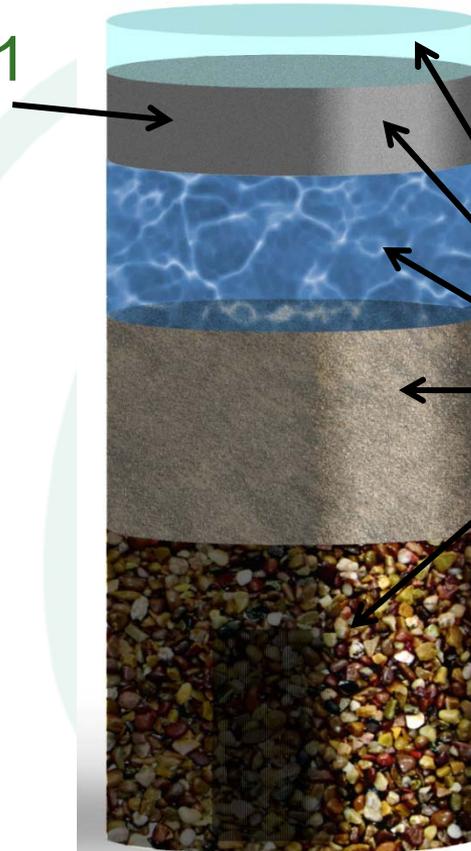
National Ready Mixed Concrete Association



ASTM Standards – Cement and Concrete

Committee C01

- Cement
- 52 Standards



Committee C09

- Concrete and ingredients
- 160 Standards

Relationships

ASTM International

- Specifications for Materials
- Test Methods
- Practices



American Association for State Highway Officials (AASHTO)

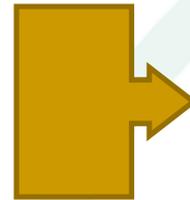
- Specifications for Materials
- Test Methods
- Practices
- Construction Specifications

[Transportation Infrastructure](#)

American Concrete Institute

- Codes
- Construction Specifications
- Guidance Documents
- Technician certification

[Building Infrastructure](#)



Why learn about standards?

- Bottom-line business implications
- Impact global trade, innovation and competition
- Used by individual companies, research labs, government agencies, consumers
- Guide product design, development, market access
- Means to establish compliance with codes
 - Public Safety
- Owner gets what he pays for



Standards Impact

- Owners
- Design Professionals
- Material Suppliers
 - Ingredients for Concrete
 - Concrete
- Contractors
- Conditions in Contracts
 - Quality Control
 - Quality Assurance



Standards in Education

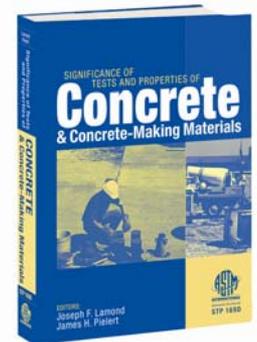
- **Educators**
 - Include standards in curriculum
 - Performance of standard tests
 - Research to support standards development
- **Educate future design professionals**
 - Writing project specifications
 - Conditions of contracts
 - Implications of standards to project team

Civil Engineering Education

- Focus on analysis and design
- Minimal coursework on materials (6 CH)
 - Applicable to standards for materials
- Few schools conduct research on materials

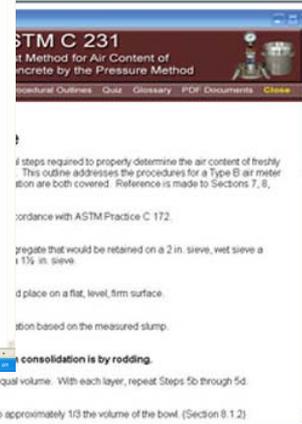
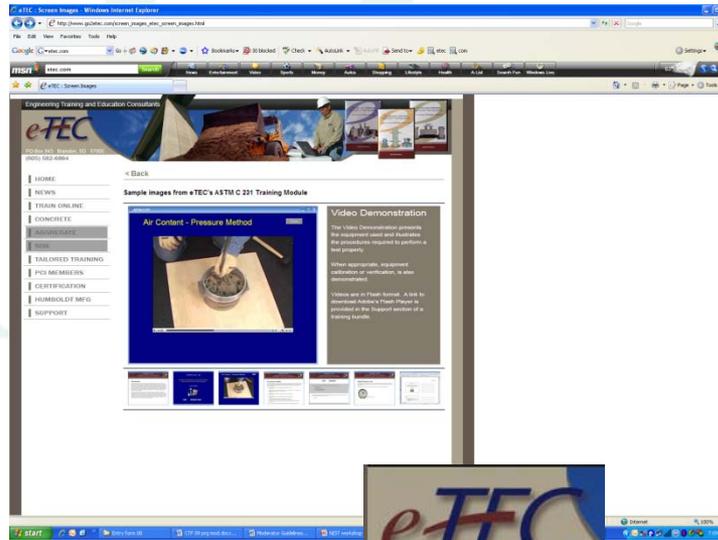
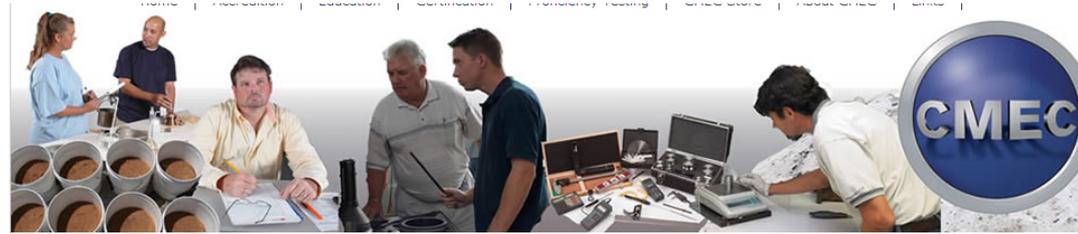
ABET Engineering Standards Education Requirement

- In 2000, ABET established the following standards education requirement for “engineering standards”:
- Criterion 4: Professional Requirements
 - The curriculum must prepare students for engineering practice culminating in a major design experience based on the knowledge and skills acquired in earlier coursework and incorporating engineering standards and realistic constraints that include most of the following considerations: economic, environmental, sustainability, manufacturability, ethical, health and safety, social, and political.



Standards Education

- Videos
- Training books
- Online
- Spanish



Procedural Outline

The Procedural Outline is a simple step-by-step checklist for performing a test.

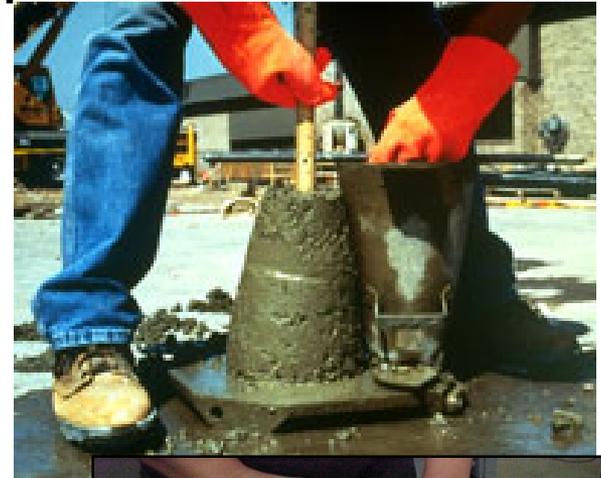
Industry Education

- Inspectors
- Testing technicians – for acceptance testing
 - Laboratory
 - Field
- Quality Control technicians and managers
- Plant operators
- Concrete mixer drivers
- ...

Certification Programs

- ACI, NICET, various local groups
 - 90,000 people certified

- Testing Laboratory Technicians
- Quality Control Personnel
- Project Inspectors
- Ready Mixed Concrete Personnel
- Supplier Sales
- Specialty work



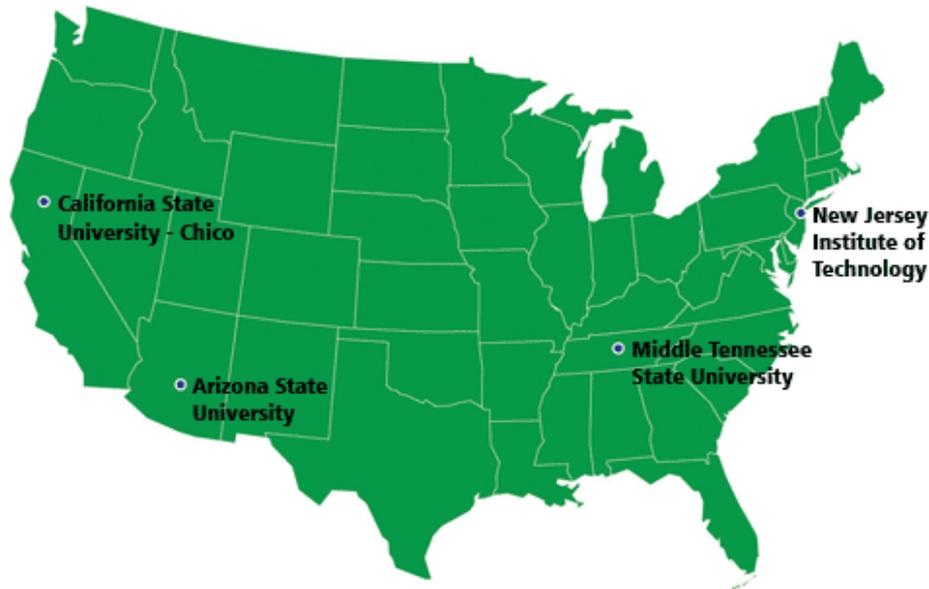
Certification Programs

- NRMCA
 - Concrete production facilities
 - 2000 plants and 20,000 trucks
 - In accordance with ASTM C94
 - Concrete Technologists Levels 2, 3, 4
 - Plant operators
 - Drivers



Concrete Industry Management (CIM)

- Engineering and Business courses
- Takes concrete education to the next level
- Strong industry support



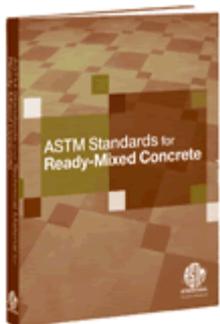
“Standard” Practices In CIM



- ❑ Compilation of 44 ASTM Standards pertaining to concrete masonry.



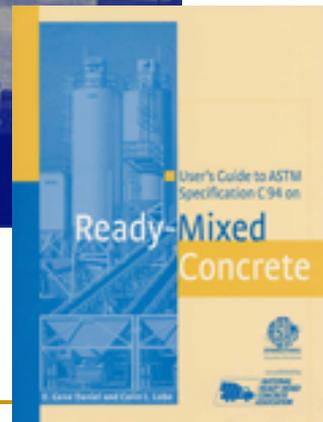
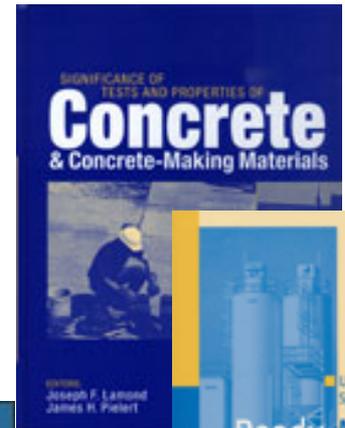
- ❑ Compilation of 38 ASTM Standard pertaining to ready-mixed concrete



Senior Concrete Research



- Perform laboratory testing utilizing an ASTM standard
- Write a technical report referencing ASTM standards
- Significance of Tests and Properties of Concrete and Concrete-Making Materials (STP 169D)
- Journal ASTM International
 - Literature review resources



Other Education Efforts

- College faculty involved in standards
 - ACI and ASTM
- Membership for students
 - No charge or discounted
- Required courses on construction materials
 - Hands on testing
 - Required certification
 - Specification writing
 - Understanding risk - statistics

Conclusion

- Standards are essential
 - Trade
 - Infrastructure construction
- Should be a mandatory part of engineering education
- Cost implications of unawareness are HUGE

Standards in Education

Concrete Industry

Questions

