Pre-Construction Conference for Concrete Construction

Alabama Concrete Industries Association

www.alconcrete.org

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National Ready Mixed Concrete Association CLP 32 "Concrete Pre-Construction Conference"

Concrete in Practice

what, why, how?

Concrete Pre-Construction Conference

All info in this document is taken from the CIP32 document distributed by NRMCA

What is a Pre-Construction Conference?

Prior to the start of a job, especially for major projects, a concrete preconstruction conference (sometimes called a pre-pour meeting) should be held to define and allocate responsibilities of the entire construction team. It is imperative that all members of the team meet to establish the responsibilities of the ready mixed concrete supplier, owner, architect, structural engineer, general contractor, sub contractor, testing agencies, and inspectors. This meeting should be held well in advance of the project to insure that there is sufficient time fro all parties to absolutely clear on what their responsibilities would entail.

Why have a Pre-Construction Conference?

Every construction projects brings together different companies, personnel and procedures, who may or may not have worked together before. Two jobs are never the same, even when working with the same companies, as personnel changes can realign the perception of individual responsibilities. Pre-Construction conferences are needed to sort out the details of how a job will be executed, identify the authorized contacts for various aspects, and what should be done if things do not go as planned. In far too many cases, projects are started without a clear understanding of assigned responsibilities resulting in extra work, lost time and major expenses. In some cases a simple pre-construction conference could have prevented some, if not all these problems from occurring. Having this meeting serves to document the chain of responsibilities, which can be referenced when needed.

How to Conduct Pre-Construction Conference?

The pre-construction conference should contain the following to ensure that all details are addressed prior to concrete placement

Purpose: To define and allocate individual responsibilities of the concrete construction team

Subject: Pre-construction agenda, concrete mix designs, placement, inspection and testing

Project Name and Location: Establish the project name and address

Personnel to Attend: Contractor's project manager, owner's representative, concrete subcontractor, architect, engineer, testing lad supervisor, pumping contractor, concrete producer's quality control director, inspector and construction manager, if applicable, and any one else with the need to know.

Minutes of the Meeting: Assign someone to take minutes. Establish a meeting distribution list.

Concrete Mix Design and Specifications: Have the mix designs been approved and what is the approval process? Are there any special concrete performance requirements or conditions? Are value-added admixtures approved for use and who can authorize them?

Ordering Concrete and Scheduling Deliveries: Ensure that concrete delivery schedules are in place. Establish the lead-time needed to place the order, especially for large placements or special order concrete, and establish links of communication for last minute cancellations. Establish who had the authority to place and cancel concrete orders. Establish truck staging areas and location to wash out trucks and disposing of excess concrete.

Plant Inspections: Are plant inspections required? If so, who will do the inspections and what will it entail. Will an NRMCA certification be accepted?

Job Inspections: Who is responsible for inspection and approval of forms and rebar prior to concrete placement? Who is responsible for approving adequacy of subgrade preparation for concrete slabs on grade? Who is responsible for placing and consolidation of concrete? Who will ensure that proper methods of finishing and curing are employed? What method will be used and for how long will concrete be cured? What is the minimum concrete strength required for stripping form? Will there be a formal report form for stripping forms? Will there be any in-place strength testing? Who is responsible to authorize form removal? Where will field-cured cylinders be stored and for what purpose will they be tested?

Sampling and Testing: What procedure will be followed for acceptance samples? What is the frequency for sampling and testing concrete? Will concrete be sampled as it is discharged from the truck mixer or at another location? What tests will be performed? Who will conduct the testing and who will verify that the technicians are certified? How many test cylinders will be made, how will they be cured, and at what ages will they be tested? What procedure is followed for nonconformance to specification?

Acceptance and Rejection Responsibilities for Fresh Concrete: Who has the authority to add water to the concrete on site? Who has the authority to reject concrete delivery? For what reasons can concrete be rejected? What are the tolerances for slump, air content, unit weight, and temperature? Establish re-test procedures for concrete prior to rejection.

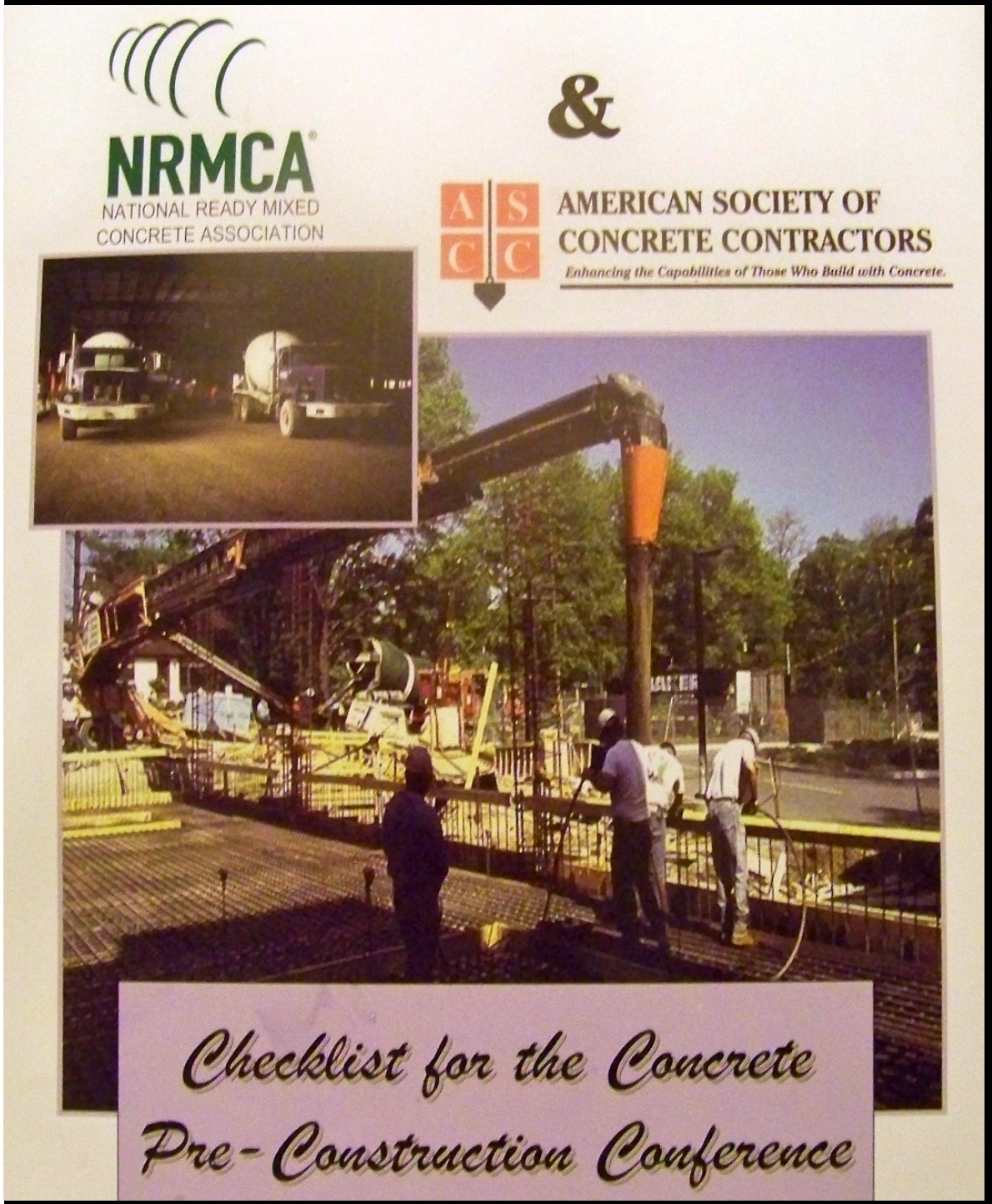
Specimen Handling: How will cylinders be stored at the jobsite? Who is required to provide the initial curing environment test for the test cylinders and how will controlled temperature and moisture be maintained? How will test cylinders be transported on weekends or non-workdays and who will arrange for access on to the site? What curing procedure is used at the testing facility? Verify that the cylinders will be handled, transported and cured in accordance with ASTM C 31, or other applicable standards.

Report Distribution and Acceptance Criteria: Define the time frame for the report distribution and who will get the copies of test reports. What will be on the reports and what will be the strength acceptance criteria: ACI 318, ASTM C 94 or other?

Testing of In-Place Concrete: The meeting should address what situations will require additional testing. How will the test results be evaluated, and by whom? Who incurs the expense for additional evaluations? The items listed above are examples of some of the issues that should be discussed a pre-construction conference. It also provides the opportunity for all the involved parties to thoroughly review the specification and contract documents and if necessary make changes and improvements to them. It will also provide and understanding of responsibilities, which should be documented, for future reference.

Suggested Pre-Construction Conference Agenda Items

- Project Information
- Project Participants
- Construction Sequence and process
- Bass/subgrade construction and acceptance
- Site access
- Power, lighting, water
- Formwork and removal
- Placing concrete – equipment and procedures
- Vapors retarders/barriers
- Consolidation
- Finishing
- Requirements for surface finishes
- Jointing
- Curing and sealing
- Protection of concrete
- Hot and old weather precautions
- Concrete materials and mixtures
- Specification requirements for concrete
- Jobsite adjustments
- Special Materials
- Ordering and scheduling concrete delivery
- Quality control/Quality Assurance
- Report distribution
- Corrective actions
- Test specimen storage, transportation and testing
- Accpetance/rejection of fresh and hardened concrete
- In-place concrete strength evaluation
- Dispute resolution and cost assignment
- Jobsite environmental management
- Jobsite safety



National Ready Mixed Concrete Association

www.nrmca.org

American Society of Concrete Contractors

www.ascconc.org

Pre-Construction Meeting

A pre-construction meeting for concrete has many advantages in providing a platform for the successful concrete construction on the project.

Avoiding conflicts at the right time, before the start of the project when the cost is relatively low is a prime objective of the pre-construction meeting.

Enhancing the quality of the concrete on a project is a partnership of all the parties associated with the project;

- The owner
- The design team
- The contractor
- The production of concrete
- The testing and inspection agency

Pre-Construction Meeting

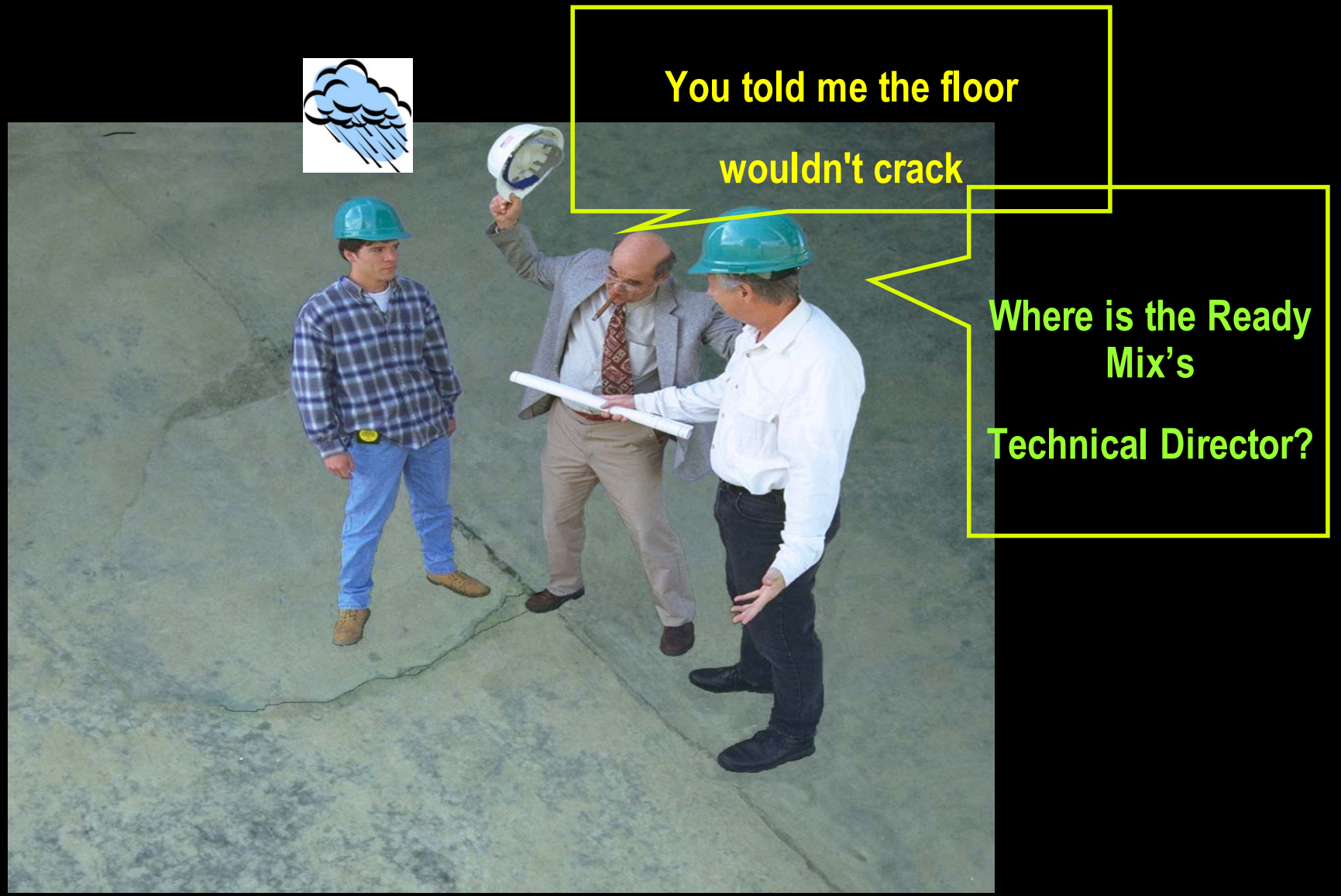
A separate meeting is recommended to be scheduled just for concrete construction.

In a general pre-construction meeting sometimes the concrete construction gets put on the agenda, but way down the agenda.

Agenda
Pre-construction Meeting
Earth Work
Mechanical
Utilities
Permits
Etc.
Etc
Concrete
Testing

Note: All subcontractors must be at the meeting

By the time meeting gets to concrete portion of the agenda there is not enough time.



Don't Want any Unanticipated *Surprises that* Generate Unwanted Discussion

The Goal

Pre-Construction Meeting for Concrete Construction

The meeting should include at least the following;

- Copies of the Specifications & Drawings
- Project Participants Critical to the Success of Concrete Construction
- Contractor's Construction Schedule and Operations
- Reports of the Approved Mix Designs
- Phone Numbers of Personnel Associated with the Concrete Construction
- Concrete Production and Transportation
- Ordering and Scheduling Concrete
- Testing and Inspection Requirements
- Reporting of Findings of Tests and the Findings of Inspections
- Procedures for Testing and Re-Inspection of Reported Deficiencies

I. Specifications & Drawings

I. Specifications and Drawings

- The participants should have a copy of the concrete specifications at the meeting.
- A set of the drawings should be available for the participants for review during the meeting.
- If there are differences between the specifications and drawings they should be addressed.
- If there have been any changes in the drawings and specifications they should be addressed.

II. Project Participants

II. Project Participants

Representatives of the following should attend the meeting;

The Owner

Architect

Structural Engineer

General Contractor and / or Construction Manager

Concrete Contractor

Concrete Producer

- Admixture Supplier
- Concrete Pumper
- Concrete Finisher
- Testing Laboratory
- Inspection Agency
- Other

The participants should sign in on a provided document.

Don’t leave any one out of the meeting that would contribute to the success of the concrete construction.

III. Contractor's Schedule & Operations

III. Contractor's Schedule & Operations

- It is important to present the construction schedule, the sequence of construction and milestones dates that are critical to the success of the project.
  - Foundations
  - Walls
  - Structural slabs
  - Slab-on-grade interior
  - Slab-on-grade exterior
  - Pavement

III. Contractor's Schedule & Operations

Base/Subgrade Protection & Repair

- **It is important to maintain prepared foundations for concrete construction and is critical to the success of the project.**
  - Protection of the base or subgrade or both under construction traffic
  - Protection of the base and/or subgrade from weather damage
  - Protection of the prepared foundation during concrete construction
  - Re-compaction and testing of the base and / or subgrade that may been damaged.

Base Preparation

- less than 1/4 in depression (without pumping)

III. Contractor's Schedule & Operations

Access for Trucks

- The access for concrete trucks to and from the project is critical to the success of the project.
  - Site access route
  - Restrictions on entrance to site and exits from the site
  - Ready mix truck washout area.
  - Traffic control

III. Contractor's Schedule & Operations

Access for Personnel & Vehicles on the Project

- The personnel and vehicle access requirements to and from the project are critical to the success of the project.
  - Safety meetings required
  - Drug testing requirements
  - Personnel badges and vehicle identification requirements
  - Vehicle safety equipment requirements

III. Contractor's Schedule & Operations

Form Inspection

- Responsibility for form inspection is important to the success of the project.
  - Reinforcement (location & spacing)
  - Embedded items
  - Water stops
  - Drains
  - Frames for openings
  - Final inspection prior to placing concrete

Who will perform the form inspection ?

III. Contractor's Schedule & Operations

Placing Concrete

- Equipment and procedures for concrete placement is critical to the success of the project.
  - Deposit from truck
  - Power buggies
  - Belt conveyor
  - Crane and bucket placement
  - Pumping
  - Other

III. Contractor's Schedule & Operations
Placing Concrete

III. Contractor's Schedule & Operations

- Performing floor flatness and floor levelness tests (F-numbers, F_F & F_L) ASTM E 1155M are important to the success of the project. State specified F numbers in meeting.
  - Perform measurements within 72 hours, ACI 117
  - Report local F-numbers time frame
  - Report overall F-numbers time frame
  - Procedures for improving performance
  - Procedures for correcting concrete surfaces that d specified F-numbers

Who will perform the floor flatness & floor levelness tests ?

III. Contractor's Schedule & Operations

Jointing & Sealing Joints

- Review and verifications of contraction, isolation, expansion, and construction joints is important to the success of the project.
  - Walls (locations or width of joint)
  - Slabs (location, spacing, depth of joint)
  - Types of joints (formed, tooled, or early-entry saw)
  - Sealing of joints for slabs required? When to seal? Sealing material?
  - Sealing of vertical joints (with of joints, backer rods, sealing material)

Who will perform the inspection of jointing and sealing of joints?

III. Contractor's Schedule & Operations
Form Removal

The required strength level of the concrete for form removal is important to the success of the project.

- Minimum strength required to remove forms ___ psi.
- Formal report required?
- Type of field or in-place strength tests to be used to determine the strength.
- Who is authorized to approve form removal ?

III. Contractor's Schedule & Operations

Construction Equipment Traffic on Slabs

The required strength level of the concrete for allowing construction equipment on floor slabs and pavement is important to the success of the project.

- Minimum strength required to allow construction equipment on slabs and pavement ___ psi.
- Formal report required?
- Type of laboratory, field or in-place strength tests to be used to determine the strength.
- Who is authorized to approve construction equipment on slabs and pavement ?

III. Contractor's Schedule & Operations

Hot & Cold Weather Construction

Hot and cold weather concreting equipment and procedure are important to the success of the project

- ACI 305, Hot Weather Concreting
- ACI 306 Cold Weather Concreting

- Plans to concrete at night (early morning or late afternoon) in hot weather ?
- Can batch plant provide hot & chilled water, heated & cooled aggregates ?
- Are insulation materials available to cover & protect the concrete ?
- Are wind break materials available to shield concrete from wind and rain ?

Contractor's Scheduling & Operations

Concrete Pour Authorization Card

Pour Location _____

Item	Approved	Date	Signature
Sub-Grade	_____	_____	_____
Base Course	_____	_____	_____
Bearing Capacity	_____	_____	_____
Plumbing	_____	_____	_____
Electrical	_____	_____	_____
Communications	_____	_____	_____
Opening Frames	_____	_____	_____
Embedded Items	_____	_____	_____
Steel Reinforcement	_____	_____	_____
Approved for Construction		_____	_____

Attitude

IV. Materials and Mix Designs

IV. Materials & Concrete Mix Designs

Concrete mix designs are developed by two methods according to ACI

1. Based on field experience where statistical evaluations of the mixes meets specified statistical requirements.
2. Designed from water/cementitious ratio curve developed from trial mixes.

- In the past, most of the mixes designed from water/cementitious ratio curves were designed by independent testing laboratories.

- Today, most of the mixes designed from water/cementitious ratio curves are designed by the ready mix producer.

- Ready mix producers have traditionally maintained records of mix design performance and submitted mixes developed from field experience.

IV. Materials & Concrete Mix Designs

- Concrete Mix Designs
  - List of the approved materials and mix designs
  - The mixes should incorporate all the requirements as required by the specifications
  - The mix design codes for each design
  - Materials certifications and the back-up data that substantiates the development of the mixes.

IV. Materials & Concrete Mix Designs

A Summary sheet with all the mix designs is desirable

[redacted]

10/04/99

Cumming

Order at 770-889-5183

Customer: [redacted]

Project: [redacted]

Location:

Concrete Mix Design(s)

Please use mix code numbers for ordering concrete.

MIX CODE		304-1	303-2	404-1	403-5
STRENGTH(PSI)		3000	3000	4000	4000
MAX COARSE(")		1.00	1.00	1.00	1.00
AIR%	: LOWER %	0.0	4.5	0.0	4.5
	: UPPER %	3.0	7.5	3.0	7.5
SLUMP:(")		3-5	3-5	3-5	3-5
BAG FACTOR:		5.30	5.80	6.30	6.70
CEMENT(LBS)	TYPE I	498	545	592	630
FLYASH(LBS)	Type F	0	0	0	0
SAND 1(LBS)	MFG.(QTZ)	944	792	1255	1046
SAND 2(LBS)	M-10	415	349	0	0
STONE(LBS)	57	1858	1858	1873	1873
STONE(LBS)	7	0	0	0	0
STONE(LBS)	Lwt	0	0	0	0
ADMIX 1(OZ)	Water Reducing	***	***	***	***
ADMIX 2(OZ)	Air Entraining	0.0	as req	0.0	as req
OTHER:		0.0	0.0	0.0	0.0
WATER(GAL)		36.0	35.0	36.0	35.0
WATER/CMT.:		0.60	0.53	0.51	0.46
LOCATION:		NON-EXP.	EXPOSED	NON-EXP.	EXPOSED

*** Per Admixture Dosage Chart

All the backup data and submittals are presented with the cover sheet

IV. Materials & Concrete Mix Designs

A Summary sheet with all the mix designs for ALDOT

READY MIX PRODUCER LOGO

ALDOT- 170 Mix Design Submittal
ACI 211.1 Design Method

Date :	

Portland Cement Concrete Producer:		**Vendor Code:**	
Address of Main Office:			
Contact:		**Phone Number:**	
Plants Producing the Concrete Mixes:			

MIX DESIGN MATERIALS and PROPERTIES	**PROPORTION TABLE, ONE CUBIC YARD PROPORTIONS**							
CONCRETE CLASS	**Class A**	**Class B**	**Class C**	**Class D**				
CEMENT , (lbs)								
FLY ASH (lbs)								
GGBFS (lbs)								
WATER (gallons)								
WATER - CEMENTITIOUS RATIO								
FINE AGGREGATE (lbs)								
COARSE AGGREGATE (lbs)								
ENTRAINED AIR, DESIGN (%)								
ENTRAINED AIR, RANGE (%)	2.5 - 6	2.5 - 6	2.5 - 6	2.5 - 6				
SLUMP, DESIGN (inches)								
SLUMP, RANGE (inches)	1 - 3	1 - 3.5	1- 3	7				
CONCRETE CHEMICAL ADMIXTURES								
1-AIR ENTRAINING (oz/c.y.)								
2-WATER REDUCER (oz./c.y.)								
3- PLASTICIZER (oz./c.y.)								
MIX DESIGN COMPRESSIVE STRENGTH (PSI)								
SPECIFED 28-DAYS	3000	4000	3000	3000				
TARGET 28 DAYS	4200	5200	4200	4200				
ACTUAL 28 DAYS								
			BASIS of the MIX DESIGN					
MAXIMUM WATER - CEMENTITIOUS RATIO								
ACI OVER-DESIGN								

CONCRETE MATERIALS in the MIX DESIGN	**ASTM CODE**	**TYPE or SIZE**	**SOURCE of the CONCRETE MATERIALS**	**VENDOR CODE**	**SPECIFIC GRAVITY**	**ABSORPTION PERCENT**
Cement	C 160				3.15	
Fly Ash	C 618					
GGBFS	C 929					
Fine Aggregate	C 33					
Coarse Aggregate	C 33					
1- Air Entraining	C 260				N/A	N/A
2-Water Reducer	C 494				N/A	N/A
3-Plasticizer	C 494				N/A	N/A

Note: The maximum slump is increased to 5.5 inches when a type "F" mid-range water-reducing admixture is subsituted for the normal water-reducing admixture.

Respectfully Submitted, _____

IV. Materials & Concrete Mix Designs

Changes in approved mix designs

Changes in the mix designs in regards to materials and performance are important to the success of the project.

ACI 301 Structural Concrete – Allows changes in the mix design materials as long as there is either field data , new trial mixes or other evidence that show that the changes do not adversely affect the performance of the concrete.

ACI 301 Structural Concrete – Allows changes in the mix design proportions for over-performance based on the results of at least 15 consecutive sets of field test data.

All changes must approved prior using the mixes.

IV. Materials & Concrete Mix Designs

Deviation from ACI 301 for Floor Slabs

Changes in the mix designs in regards to minimum cementitious materials are important to the success of the project.

Table 4.2.2.1—Minimum cementitious-materials content requirements for floors

Nominal maximum size of aggregate, in.	Minimum cementitious material content, lb/yd^3
1-1/2	470
1	520
3/4	540
3/8	610

Note: When fly ash is used, quantity shall not be less than 15% nor more than 25% by weight of total cementitious material.

4.2.2.1 *Cementitious-material content*—The cementitious-material content shall be adequate for concrete to satisfy the specified requirements for strength, water-cementitious material ratio, durability, and finishing ability. For concrete used in floors, cementitious-material content shall not be less than indicated in Table 4.2.2.1 unless otherwise accepted. Acceptance of a lower cementitious-material content will be contingent upon verification that concrete mixtures with the lower cementitious-material content will meet the specified strength requirements and will produce concrete with equal finish quality, appearance, durability, and surface hardness. When a history of finishing quality is not available, evaluate the proposed mixture by placing concrete in a slab at the project site using project materials, equipment, and personnel. The slab shall be at least 8 x 8 ft and have an acceptable thickness. Slump shall not exceed the specified slump. Submit evaluation results for acceptance.

ACI 301 4.2.2.1 – Cementitious material content – ACI allows a lower cementitious content in the mix design.

IV. Materials & Concrete Mix Designs

Copies of approved mix designs submitted by the ready mix producer

- Owner
- Architect
- Structural Engineer
- Construction Manager or General Contractor
- Concrete Contractor
- Concrete Pumping Contractor
- Concrete Finisher
- Testing Laboratory
- Inspection Agency

V. Contacts of Personnel

V. Contacts of Personnel

Personnel Associated with Concrete Construction

Name Area of Work Office Phone Cell Phone E-Mail _

Develop a list of all personnel associated with the concrete construction.

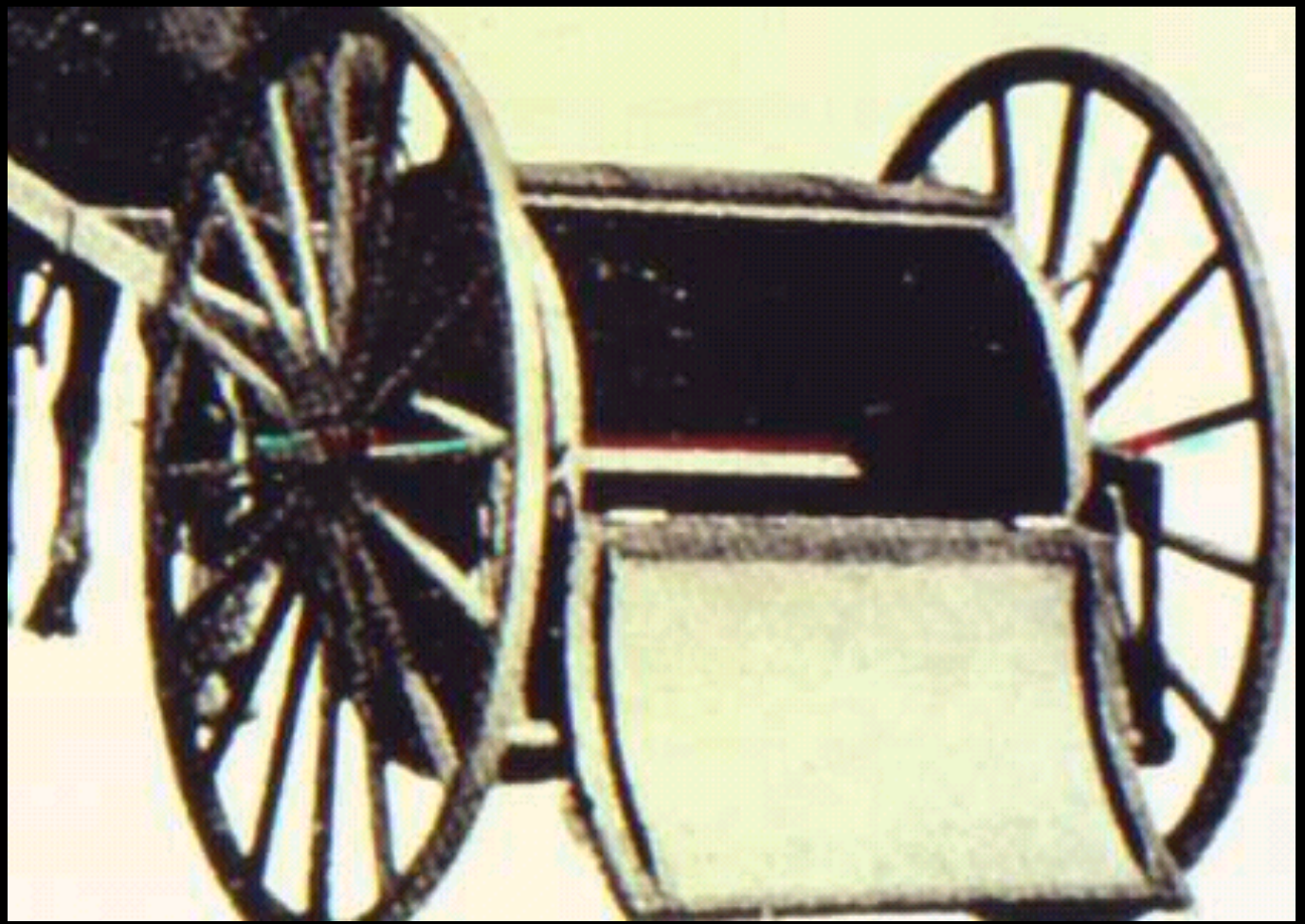
- On-Site Personnel
- Off-Site Personnel

VI. Concrete Production & Transportation

VI. Concrete Production & Transportation
Batch Plant Certification Required?

Certification of the Ready Mix Producer

VI. Concrete Production & Transportation



Mixing and Transportation is Important

VI. Concrete Production & Transportation
Batch Plant Facilities & Technical Personnel

The concrete ready mix's batch plant facilities and technical personnel are important to the success of the project.

- The location of the plant from the site.
- Back-up plants available and the location of the plant?
- Capacity of the plants in cubic yards/hour.
- Number of trucks available at the plant.
- Will all concrete be batched from one plant?
- Plant equipped to provide heated water?
- Plant equipped to provide chilled water or add ice to concrete?
- Plant equipped to provide documentation of the batch weights of each load of concrete?
- Plant equipped to provide sprinkler water system to the coarse aggregate?
- Technical personnel available at the plant and/or at the job site during concreting?

VI. Concrete Production & Transportation
Concrete Slump Adjustments at the Site

Concrete adjustments at the site for slump are important to the success of the project.

ACI 301 Structural Concrete – Concrete arriving at the job site with slumps below that which can be placed, adjust slump not to exceed the water/cementitious ratio or the maximum specified slump. After the addition of plasticizer do not add water.

ASTM C94 Ready Mixed Concrete – One time addition of water (may be added in allotments) within a 15 minute time limit followed by a minimum of 30 revolution at mixing speed as long as; 1-1/2 hours have not elapsed or 300 revolutions of the mixer have been occurred.

If slump is permitted to be adjusted at the site, what is the material to be used to adjust the slump?

VI. Concrete Production & Transportation
Concrete Air Content Adjustments at the Site

Concrete adjustments at the site for air are important to the success of the project.

ACI 301 Structural Concrete – Does not address the situation of concrete arriving at the site with low air content.

ASTM C94 Ready Mixed Concrete –Air entraining admixture can be added followed by a minimum of 30 revolution at mixing speed as long as; 1-1/2 hours have not elapsed and 300 revolutions of the mixer have occurred.

If air content is permitted to be adjusted at the site, what are the requirements for adjusting the air content?

VI. Concrete Production & Transportation
Concrete Temperature, Hot Weather

The temperature of the concrete delivered to the job site is important to the success of the project.

ACI 301 Structural Concrete - The maximum temperature of the concrete is 90º F. If the steel, embeds or forms are greater than 120º F, then fog and remove any standing water.

ASTM C94 Ready Mixed Concrete – In hot weather, the producer will deliver concrete at concrete temperatures as low as possible.

Who is responsible for requiring and approving special measures to meet concrete temperature requirements?

Adding ice, special cooling systems or admixtures is usually an added cost of the concrete.

VI. Concrete Production & Transportation
Concrete Temperature, Cold Weather

The temperature of the concrete in cold weather is important to the success of the project.

ACI 301 Structural Concrete – Average highest and lowest temperature is expected to drop below 40º F for more than three days deliver concrete at the following minimum temperature:

Minimum Temperature, ºF	Concrete Thickness, Inches
55	< 12
50	12-36
45	36-72
40	> 72

ASTM C94 Ready Mix Concrete has the same table. The producer has to be informed of the type of concrete which the concrete is intended.

Who is responsible for requiring and approving special measures for concrete temperature adjustments ?

VI. Concrete Production & Transportation
Concrete Batch Time Limit

The time limit from batching to concrete placement is important to the success of the project.

ACI 301 Structural Concrete – The maximum time limit is 90 minutes or 300 revolutions. If discharge is permitted beyond 90 minutes, verify that the air content, slump and concrete temperature requirements are met.

Who is responsible for monitoring the time limit and who will authorize the use of the concrete beyond 90 minutes or 300 revolutions.

VI. Concrete Production and Transportation

Environmental Aspects

- Wash out area at the jobsite
- Clean up of the wash-out area
- Environmentally sensitive areas around the project
- Availability of spill response kits on site
- On site emergency contact person
- Responsibility and method for removing curing liquids

VII. Ordering & Scheduling Concrete

VII. Ordering & Scheduling Concrete

Ordering and scheduling concrete is important to the success of the project.

Person(s) responsible for ordering and scheduling concrete and phone numbers.

- Concrete Contractor
- General Contractor
- Ready Mix Producer
- Testing & Inspection Agencies

VII. Ordering & Scheduling Concrete

Ordering and scheduling concrete is important to the success of the project.

Procedures for ordering concrete and scheduling concrete.

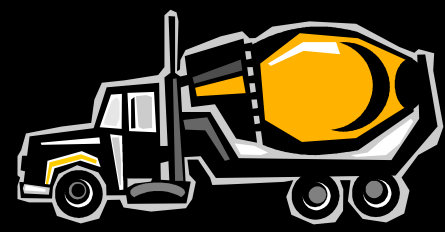
- Minimum notice for ordering concrete
- Large orders
- Canceling orders
- Revised orders
- Will-call orders

VII. Ordering & Scheduling Concrete

Ordering and scheduling concrete is important to the success of the project.

Delivery schedules for concrete placements.

- Location of concrete placement.
- Start time and dates for concrete placement.
- Volume of concrete to be placed.
- Minimum and/or maximum volume per truck.
- Anticipated concrete placements rates.
- Method of concrete placement.
- Traffic restrictions at or near the site.
- Traffic routes to the concrete placement areas.



VIII. Testing and Inspection

VIII. Testing and Inspection

Certifications of the technicians performing tests and inspections in the field and laboratory are important to the success of the project.

- Certification of
  - Lab testing technicians
  - Field testing technicians

VIII. Testing and Inspection
ASTM C 94

Qualifications and Certification of the testing agency is important to the success of the project.

- Testing laboratory meets requirements of Practice C 1077.
- Laboratory reports indicate conformance or deviations from the test procedures (Note 17).
  - Report states any part of the test methods not performed by the laboratory

VIII. Testing and Inspection

Who the testing agency is employed by and what building codes are specified for the project are important to the success of the project.

The testing agency is employed by which of the following:

- Owner
- Structural Engineer
- General Contractor
- Subcontractor(s)
- Other

The Buildings codes referenced for testing and inspection:

- Southern Building Code
- National Building Code
- International Building Code
- Others

VIII. Testing and Inspection

The method of work contracted with the testing agency for the project is important to the success of the project.

The testing agency is contracted to the following method of work:

- Part-time, On-Call Service
- Full-Time Service
- On-site Testing Laboratory with Full-Time Service
- Other

VIII. Testing and Inspection

The method of scheduling the testing agency for the concrete tests and inspections is important to the success of the project.

The scheduling tests and Inspections for concrete work are:

- Posted Project Schedule
- Written Work Order Request
- Requests by phone or Email
- Other

VIII. Testing and Inspection
Sampling and Testing

Sampling fresh concrete frequency, number of specimens made per set, test age and specimen size are important to the success of the project.

- Sampling frequency, sets per cubic yard
- Sampling location of test specimens
  - Discharge of the concrete from the trucks
  - Point of placement of the concrete
- Cylinder size, number of specimen per set & the test ages
  - 4” diameter x 8” long
  - 6” diameter x12” long
- Beams size for flexural strength test, number of specimens per set & the test ages
  - 6” square x 20” long Length = Min 20 inches: refer to ASTM C 31
  - Other sizes

VIII. Testing and Inspection
Sampling and Testing

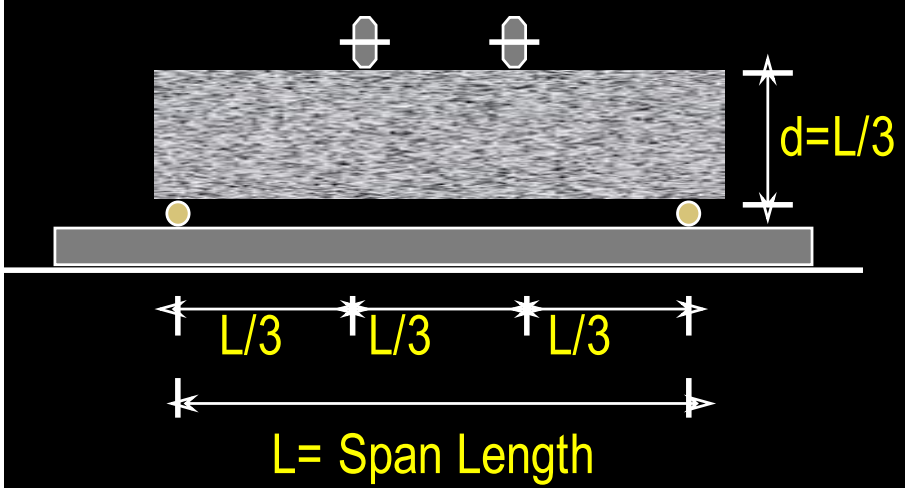
Laboratory Testing Procedures

- Compression of Cylindrical Concrete Specimens - ASTM C 39
- Capping Cylindrical Concrete Test Specimens – ASTM C617
- Use of Un-bonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders – ASTM C1231
- Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading) – ASTM C78
- Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading) - ASTM C293

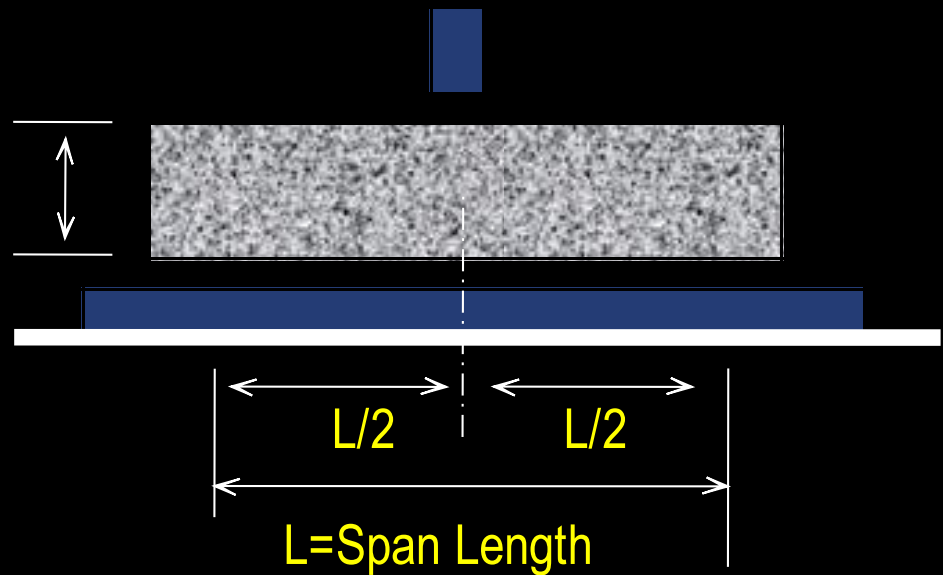
Specified Strength - Modulus of Rupture (MOR)

Note: there is a difference in the modulus of rupture obtained between the two tests .

ASTM C 78 Third-Point Loading



ASTM C 293 Center-Point Loading



Beam size usually 6” square by 20” long

VIII. Testing and Inspection
Cylinder Storage & Transportation

- Responsibility for providing initial curing environment of test cylinders
- Responsibility to maintain initial curing requirements
- Procedure to maintain initial curing temperature
- Weekend cylinder transportation arrangements
- Access to construction site on non-work days
- Responsibility for final curing of cylinders

VIII. Testing and Inspection
Acceptance/Rejection of Fresh Concrete

- Authority to reject concrete delivery
  - **A 2nd person for FINAL rejection**
- Reasons for rejections
  - Slump
  - Air content
  - Unit weight
  - Temperature
  - Time limit
  - Other
- Retest provisions and procedure
- Yield evaluation basis

VIII. Testing and Inspection
Acceptance of Hardened Concrete

- Acceptance criteria
  - ACI 301/318
  - ASTM C 94
  - Other_____
- Report distribution
- Early reporting of potential deficiencies
- Potential concrete deficiencies
  - Target cylinder strength earlier than 28-days
  - Producer and contractor shall immediately receive lab reports to remedy potential problems

VIII. Testing and Inspection

Testing of Hardened In-Place Concrete

- In what situations is additional (or referee) testing required?
  - Running average of any three consecutive strength tests is less than?
  - Individual strength test (average of two cylinders) is 500 psi less than specified
  - Other

VIII. Testing and Inspection
Testing of Hardened In-Place Concrete

Investigation of suspected low strength concrete is important to the success of the project

- Evaluation of low strength tests
  - Review test results, testing procedures – including laboratory operations
  - Non-destructive testing
  - Involve structural engineer
  - Core testing and evaluation per ACI 318
  - Load testing per ACI 318 or other
  - Remove and replace

VIII. Testing and Inspection

Testing of Hardened In-Place Concrete

- How do the project specifications handle additional testing?
- If additional testing is required, WHO will notify the parties involved:
- Investigative procedure
- Selection of the evaluators
- How will the test results be evaluated ?
- Costs of additional testing by ?

Recommend that whomever is evaluating core test results read and understand: ASTM 214.4R “Cores and Interpreting Results”

VIII. Testing and Inspection
Testing of Hardened In-Place Concrete

ASTM C42 "Obtaining and Testing Drilled Cores and Sawed Beams of Concrete"

- Obtain Cores at least 3 cores in each area of concern
  - Wipe dry allow surface to dry.
  - Before 1 hour seal in plastic bags or non-absorbent containers.
- Curing of the cores
  - Cured in sealed plastic bags or non-absorbent containers.
  - Cured a minimum of 5 days from last wetting before testing
  - Test in a moist condition.
- ACI 318, Concrete is structurally adequate if;
  - average of 3 cores is equal to at least 85% of f'_C and
  - no single core is less than 75 % of f'_C.
- ACI 318, Additional testing of cores with erratic results .
  - obtain & test additional cores.

Safety

- Personal protection equipment required.
  - Hard hats
  - Safety boots
  - Eye protection
  - Hearing protection
  - Safety vests
  - Specific clothing
  - Respirators
  - Other



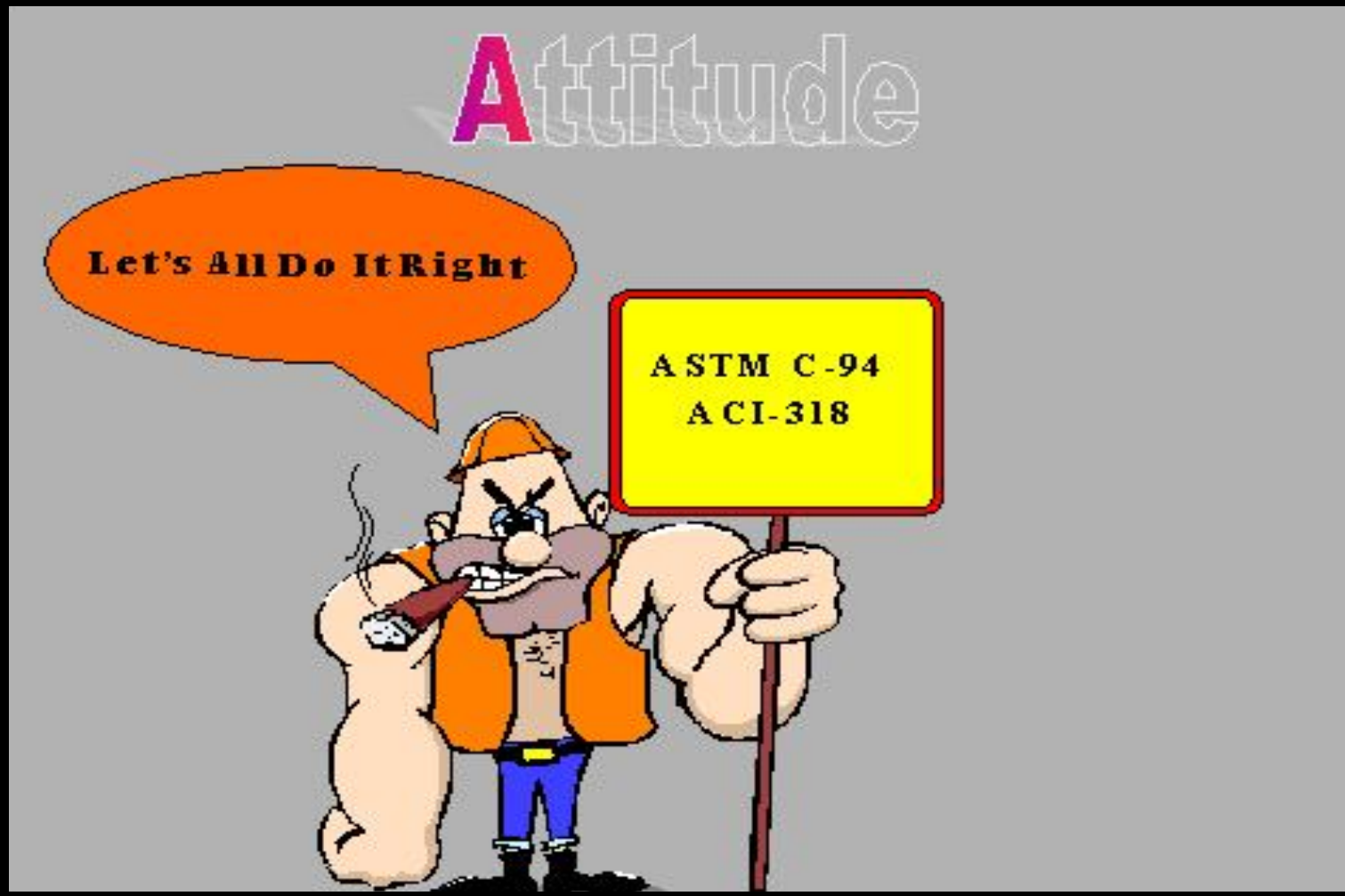






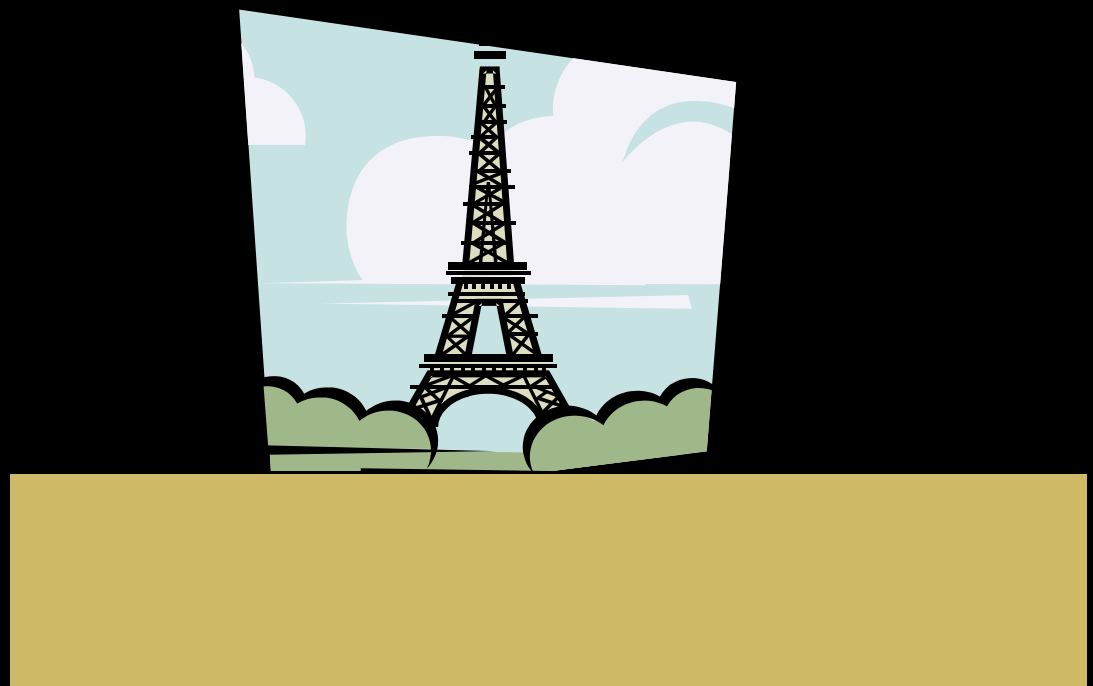
Safety

- Responsibility for
  - First aid supplies
  - MSDSs
  - Fall protection
  - Safety inspections
  - Safety meetings
- Emergency contacts


Attitude
Let's All Do It Right
ASTM C-94
ACI-318

Roman Concrete Specification

The Concrete Shall Be Good Concrete
The Materials Shall Be Good Materials
And if the Building Fails,
The Contractor Shall be Killed



This Completes the Presentation on Concrete Pre-Construction Meetings

Thank You