Louisiana Department of Transportation and Development

APPLICATION OF QUALITY ASSURANCE SPECIFICATIONS FOR PORTLAND CEMENT CONCRETE AND STRUCTURES

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APPLICATION OF
QUALITY ASSURANCE SPECIFICATIONS
FOR
PORTLAND CEMENT CONCRETE AND STRUCTURES

Developed by

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CREDITS

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The material contained herein was approved for publication by the Department's Construction Division and the DOTD Chief Engineer.

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PREFACE

This manual is designed to standardize Department policies and procedures with reference to applicable areas (Part VI - Part X) of the 2016 *Standard Specifications for Roads and Bridges*. It is specifically written for routine DOTD cast-in-place portland cement concrete construction operations. It is not designed for application in areas requiring specialized techniques, such as concrete overlays, pavement rehabilitation, concrete recycling, etc. This manual details the responsibilities of the contractor and the Department with reference to the areas of certification, design, production, transportation, placement, quality control, inspection, and acceptance of pavements and structures built of portland cement concrete. It is to be used in conjunction with the following:

- CONTRACT DOCUMENTS – the legally binding written agreement between the DOTD and the Contractor setting forth obligations for the performance of work for a specific project.
- 2016 EDITION OF THE LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES – (known as "*Standard Specifications*") the terms and stipulations for providing materials, services, and the finished constructed product. (From the DOTD Intranet, Go to Publications/Manuals, to *Standard Specifications*, to 2013 Standard Spec…)
- MATERIALS SAMPLING MANUAL – (known as "MSM") will be generated by Site Manager Materials arranged by Contract Item #, this includes the purpose, method of sampling, minimum frequency of sampling, sample quantity (size), sampling procedures, certificate requirements, and distribution of documentation. (http://www.dotd.la.gov/highways/construction/lab/sitemap.asp , Go to 2015 Specs…)
- SAMPLING PLAN – will be generated using Site Manager Materials; a project-specific document denoting the minimum number of samples and certificates required for each contract item to ensure adequate representation and quality of all materials incorporated into the project. This is reviewed by the District Lab Engineer and/or the Project Engineer and is based upon the *Materials Sampling Manual*. (Sampling Plan is not on web site)

- SITE MANAGER MATERIALS MANUAL – User manual for completing and submitting the required documentation to accompany samples. (From the DOTD Intranet, go to Construction, then SiteManager Materials, Materials Documentation…)
- TEST PROCEDURES MANUAL – all standardized DOTD test procedures, which are denoted, "DOTD TR-xxx". (http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Materials_Lab/Pages/default.aspx , Go to Test Procedures Manual)
- ENGINEERING DIRECTIVES AND STANDARDS MANUAL – (known as "EDSM") establishes policies and procedures for DOTD Design, Construction, and Maintenance. An example is "haul truck certification". (From the DOTD Intranet, go to Publications/Manuals, to EDSMs (Engineering Directives and Standards.)
- APPROVED MATERIALS LIST (Quality Brand Name) (Formally known as "QPL") – a listing of materials which have been prequalified by DOTD. This does not necessarily eliminate the requirement for testing. (http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Materials_Lab/Pages/Menu_QPL.aspx , Go to Approved Materials List)
- DOTD CONSTRUCTION MEMORANDA – The DOTD's internal office documentation to explain various construction issues. (From the DOTD Intranet, go to Construction Home Page, to Construction Memos)
- CONSTRUCTION CONTRACT ADMINISTRATION MANUAL – Instructions for DOTD Project Engineers and their representatives which include procedures for change orders, estimates, diaries, and field book entries. (From the DOTD Intranet, go to Construction, to Construction Contract Administration Manual)
- AASHTO TEST PROCEDURES – a set of nationally recognized test procedures and specifications published by the American Association of State Highway Transportation Officials. (Available at http://www.transportation.org)

- ASTM TEST PROCEDURES – a set of nationally recognized test procedures published by the American Standards for Testing and Materials. (Go to http://www.astm.org, Go to Standards, and then search. DOTD personnel may contact the District Lab Engineer.)
- ADMINISTRATIVE MANUAL FOR CONSTRUCTION TECHNICIAN TRAINING AND CERTIFICATION – certification and training requirements for performing construction inspection. (http://www.ltrc.lsu.edu/pdf/2008/admin_manual_final08.pdf)

These publications are used together to ensure that portland cement concrete operations are performed in accordance with all DOTD specifications, policies, and procedures. For precast-prestressed plant operations, refer to the DOTD *Application of Quality Assurance Specifications for Precast-Prestressed Concrete Plants* manual.

For the purposes of this manual the term "certified technician" is the authorized representative of the contractor. The term "certified inspector" is the Department's authorized representative.

Examples of forms and specification requirements in this booklet are based on the 2016 *Standard Specifications for Roads and Bridges.* Relevant specifications are referenced throughout this manual. Specifications may be repeated in order to further detail or demonstrate how they are applied. **All specifications, manuals, forms, and spreadsheets are subject to change. Therefore, it is imperative that contract documents for each project be reviewed for any specific change, update, and/or addition**.

SPECIFICATION CHANGES

This manual is referenced in those areas of the *Standard Specifications*, which are concerned with cast-in-place portland cement concrete; therefore, it must be consulted for elaboration of areas of specification change and DOTD construction techniques and procedures which are presented in more detail than is possible in the *Standard Specifications*. The English System for units of measure is the standard for this manual.

The primary changes regarding portland cement concrete pavement and structural concrete construction are:

- Three Classes of Structural Concrete (A, A2, A3)
- Three Classes of Prestressed Concrete (P1, P2, P3)
- Three New Classes for Mass Concrete (MASS A1, MASS A2, MASS A3)
- Longitudinal Surface Tolerance Requirements will be measured by IRI (See DOTD TR644)
- Surface Resistivity testing is now required for all structural class concretes (See DOTD TR 233)
- The hot and cold weather limitations have significantly changed. (See Section 901.11)
- Substitutions of cementitious materials has significantly changed
- The percent air content by volume requirements have changed
- There is no minimum cementitious material requirement

The payment adjustment schedules were not developed for the benefit of the contractor, but as a mechanism by which the Department can accept the product and pay the contractor on those rare occasions when the portland cement concrete product does not meet all Department requirements. The payment adjustment schedules included in the *Standard Specifications* are to be considered as a method of payment to the contractor for a substandard product. Under these specifications, the production of portland cement concrete at less than 100 percent payment will not be allowed on a continuous basis. If test results demonstrate that payment adjustments are necessary, or other specification requirements are not being met, satisfactory control adjustments shall be made or production shall be discontinued.

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APPLICATION OF QUALITY ASSURANCE SPECIFICATIONS FOR PORTLAND CEMENT CONCRETE PAVEMENT AND STRUCTURES

APPENDIX A

FINENESS MODULUS OF FINE AGGREGATE

The fineness modulus is calculated by obtaining the sum of the cumulative percentages retained on specific sieves and dividing it by 100. The specified sieves for the calculation of the fineness modulus of a fine aggregate are: 3/8 in., No. 4, No. 8, No. 16, No. 30, No. 50, and No. 100. The complete set of sieves used to calculate the fineness modulus of coarser aggregate is specified in AASHTO Test Method T27. The following example illustrates the calculation process.

EXAMPLE

The first step will be to determine the gradation of the fine aggregate using test method DOTD TR 113. The cumulative percent retained is calculated for each sieve, but only the sieves listed above are used to calculate the fineness modulus (FM) of the fine aggregate.

Aggregate Gradation Worksheet

Sieve Size In(mm)	Aggregate Wt., g	Percent Retained on Sieve	**Cumulative Percent Retained**	Percent Passing
3/8 (9.5)	0.0	0.00	**0.00**	100
No.4 (4.75)	20.0	4.02	**4.02**	96
No.8 (2.36)	31.0	6.23	**10.25**	90
No.16 (1.18)	81.4	16.35	**26.60**	73
No.30 (.600)	103.4	20.77	**47.37**	53
No.50 (.300)	100.9	20.27	**67.64**	32
No.100 (.150)	139.6	28.04	**95.68**	4
No.200 (.075)	19.0	3.82	99.50	0.5
Pan(-.075)	2.5			
Sum of Agg. Wts	497.8			

Equation:

$$\text{Fineness Modulus} = \frac{\sum \text{Cumulative Percentages Retained}}{100}$$

Sieve Size In(mm)	Cumulative Percent Retained	
3/8 (9.5)	0	
No.4 (4.75)	4	
No.8 (2.36)	10	
No.16 (1.18)	27	
No.30 (.600)	47	
No.50 (.300)	68	
No.100 (.150)	96	
Sum of Cumulative % Retained	**252**	**÷ 100 = 2.52**
	Fineness Modulus	
	2.52	

MIX PROPORTION CALCULATION

PLAIN PORTLAND CEMENT

The following is an example design of a Class A mix using the required air entrainment and water-reducing admixture.

Example 1

This example utilizes the absolute volume method for proportioning concrete mixtures. The calculations are presented in Standard units.

Given:

Cement Content	560 lb
Maximum Water-Cement Ratio	0.45
Air Content	5.0 %
Maximum Size of Aggregate	3/4 in.
Dry-Rodded Unit Weight of Coarse Aggregate	100 lb/ft^3
Specific Gravity of Coarse Aggregate (SSD)	2.55
Absorption Factor of Coarse Aggregate	1.5 %
Fineness Modulus of Fine Aggregate	2.69
Specific Gravity of Fine Aggregate (SSD)	2.62
Absorption Factor of Fine Aggregate	0.5 %
Specific Gravity of Cement	3.15
Admixtures:	
Water Reducer	38.50 oz*
Air Entrainment	2.92 oz*

* These quantities are already included in the maximum allowed water.

The maximum water-cement ratio and the total air are determined from the Master Proportion Table for Portland Cement Concrete, *Standard Specifications* Table 901-3. The maximum aggregate size was determined by a gradation analysis from the stockpile. Note that the quantities for all of the components to be included in the mix are listed with the exception of the coarse and fine aggregate. These quantities must be determined to complete the design of the concrete mixture.

Determination Of Mix Proportion Of Coarse Aggregate

The following table may be used to determine the volume of dry-rodded coarse aggregate required for one cubic yard of concrete. This is Table 901-1 in the *Standard Specifications*. The values for the fineness modulus of the fine aggregate and the maximum coarse aggregate size must be known in order to use this table. Interpolation might be necessary when the fineness modulus of the fine aggregate falls between the values of the table.

Table 901-1
Volume of Coarse Aggregate per Unit of Volume of Concrete

Maximum Size of Aggregate, Inches (mm)	Volume of Dry-Rodded Coarse Aggregate Per Unit Volume of Concrete for Different Fineness Moduli of Fine Aggregate[1]				
	2.20	2.40	2.60	2.80	3.00
3/8 (9.50)	0.52	0.50	0.48	0.46	0.44
1/2 (12.5)	0.61	0.59	0.57	0.55	0.53
3/4 (19.0)	0.68	0.66	0.64	0.62	0.60
1 (25.0)	0.73	0.71	0.69	0.67	0.65
1 1/2 (37.5)	0.77	0.75	0.73	0.71	0.69
2 (50.0)	0.80	0.78	0.76	0.74	0.72
3 (75.0)	0.84	0.82	0.80	0.78	0.76

[1] Volumes are based on aggregates in dry-rodded condition as described in AASHTO T19, Unit Weight of Aggregate. These volumes are selected from empirical relationships to produce concrete with a degree of workability suitable for usual reinforced concrete construction. For less workable concrete such as required for concrete pavement construction, they may be increased up to 10 percent. For more workable concrete, as may be required for pumping, they may be reduced up to 10 percent.

In this example, the fine aggregate has a fineness modulus of 2.69 and the maximum size aggregate is 3/4 inch. For this aggregate size, the table provides a value of 0.64 for a fineness modulus of 2.60 and 0.62 for a fineness modulus of 2.80. Interpolation is required to determine the volume of coarse aggregate for this mix. The following equation can be used to interpolate the required value from the table:

$$V_R = \left(\frac{FM_R - FM_1}{FM_2 - FM_1} \right) \times (V_2 - V_1) + V_1$$

Where:

V_R = percent volume of coarse aggregate required for mix
FM_R = fineness modulus provided for mix
V_1 = percent volume of coarse aggregate required for lower fineness modulus
V_2 = percent volume of coarse aggregate required for higher fineness modulus
FM_1 = lower fineness modulus
FM_2 = higher fineness modulus

Substituting the corresponding values into the equation,

$$V_R = \left(\frac{2.69-2.60}{2.80-2.60}\right)\times(0.62-0.64)+0.64 \ = \ 0.631$$

The weight of dry-rodded coarse aggregate required for one cubic yard (27.00 ft^3) of concrete is calculated in the following step,

$$\text{Coarse Aggregate Weight (dry)} = 0.631\times 27\ \text{ft}^3/\text{yd}^3 \times 100\ \text{lb/ft}^3 = 1{,}704\ \text{lb/yd}^3$$

Therefore, 1,704 pounds of dry coarse aggregate will be required for one cubic yard. This weight needs to be converted to saturated surface dry condition (SSD) using the Absorption Factor taken from the Approved Materials List,

$$\text{Coarse Aggregate Weight (SSD)} = \text{Coarse Aggregate Weight (dry)} \times \left(1+\frac{\text{Absorption Factor}}{100}\right)$$

$$=1{,}704\ \text{lb/yd}^3 \times \left(1+\frac{1.5}{100}\right) = 1{,}730\ \text{lb/yd}^3$$

Determining the Absolute Volume of Other Components

The following formula can be used to calculate the absolute volume of cement, water, and coarse aggregate for one cubic yard (27 ft^3) of concrete:

$$\text{Absolute Volume} = \frac{\text{Weight of Component}}{\text{Specific Gravity} \times \text{Unit Weight of Water}}$$

$$\text{Cement Absolute Volume} = \frac{560\ \text{lb/yd}^3}{3.15 \times 62.4\ \text{lb/ft}^3} = 2.85\ \text{ft}^3/\text{yd}^3$$

To calculate the absolute volume of the water required it is first necessary to find the maximum weight of water using the water-cement ratio that is provided by the specifications.

$$\text{Weight of Water} = 560\text{lb/yd}^3 \times 0.45 = 252.0\ \text{lb/yd}^3$$

$$\text{Gallons of Water} = \frac{252.0\ \text{lb/yd}^3}{8.34} = 30.2\text{gal}$$

$$\text{Water Absolute Volume} = \frac{252.0\ \text{lb/yd}^3}{1.00 \times 62.4\ \text{lb/ft}^3} = 4.04\ \text{ft}^3/\text{yd}^3$$

To calculate the absolute volume of coarse aggregate in SSD condition, take the SSD weight of coarse aggregate previously calculated and the specific gravity for the aggregate in SSD condition and substitute in the absolute volume formula,

$$\text{Coarse Aggregate Absolute Volume (SSD)} = \frac{1{,}730\ \text{lb/yd}^3}{2.55 \times 62.4\ \text{lb/ft}^3} = 10.87\ \text{ft}^3/\text{yd}^3$$

To calculate the absolute volume of air, multiply the total volume (27.00 ft^3) times the percent of air required per design, in this case 5.0%,

$$\text{Air Absolute Volume} = 0.05 \times 27.00\,\text{ft}^3/\text{yd}^3 = 1.35\,\text{ft}^3/\text{yd}^3$$

The absolute volume of fine aggregate is obtained by subtracting the sum of all the components from the absolute volume of a cubic yard (27.00 ft^3),

$$\begin{aligned}\text{Fine Aggregate Absolute Volume (SSD)} &= 27.00\,\text{ft}^3 - (2.85 + 3.95 + 10.87 + 1.35)\,\text{ft}^3 \\ &= 7.89\,\text{ft}^3/\text{yd}^3\end{aligned}$$

Once the absolute volume of fine aggregate is known, the absolute volume formula can be used to determine the weight of fine aggregate in SSD condition,

$$\text{Fine Aggregate Weight (SSD)} = 7.89\,\text{ft}^3/\text{yd}^3 \times 2.62 \times 62.4\,\text{lb/ft}^3 = 1290\,\text{lb/yd}^3$$

The batch weights, based on the saturated surface dry conditions of the aggregate, for one cubic yard of concrete mixture for this design are transferred to the *Portland Cement Concrete Mix Design: 03-22-0735* form presented below:

Mix Proportions for one Cubic Yard of Concrete

Cement			5	6	0	lb
Fly Ash						lb
Slag						lb
Fine Aggregate (SSD)		1	2	9	0	lb
Course Aggregate 1 (SSD)		1	7	3	0	lb
Course Aggregate 2 (SSD)						lb
Water		2	9	.	5	gal
Water Reducer	3	8	.	5	0	oz
Air Entrainer		2	.	9	2	oz

These proportions will require adjustment to take into consideration the moisture present on the aggregates and batch size. Adjustments may be necessary based on field experience with the mixture.

Moisture Adjustments

More than likely the aggregates will not be at SSD condition at the time of preparing the mixture. If the previously calculated batch weights are used with aggregated at any condition other than SSD, the mixture proportions will not be maintained. In addition, if the aggregates are too dry there will not be sufficient water to react with the cement. On the other hand, if the aggregates are too wet there will be additional water not required by the specifications that might introduce other problems, such as reduced compressive strength and shrinkage cracking, to the concrete. An example of calculating free moisture is located in the *Calculating Batch Weights from Mix Design Proportions* section of this appendix.

FLY ASH AS PARTIAL REPLACEMENT OF PORTLAND CEMENT

The following is an example of the design of a Class A mix using an air entrainment and water reducing admixture. The specification for this mixture allows the use of fly ash as pound for pound substitution of cement up to 30% fly ash by weight of cement. This example utilizes the absolute volume method for proportioning concrete mixtures. The calculations are presented in U.S. customary units. The same example in international system (SI) units is shown in the Appendix C.

Example 2

Given:

Total Cementitious Material Content	560 lb
Fly Ash Substitution by Weight	15%
Maximum Water-Cementitious Materials Ratio	0.45
Air Content	5.0 %
Maximum Size of Aggregate	3/4 in.
Dry-Rodded Unit Weight of Coarse Aggregate	100 lb/ft^3
Specific Gravity of Coarse Aggregate (SSD)	2.55
Absorption Factor of Coarse Aggregate	1.5 %
Fineness Modulus of Fine Aggregate	2.69
Specific Gravity of Fine Aggregate (SSD)	2.62
Absorption Factor of Fine Aggregate	0.5 %
Specific Gravity of Cement	3.15
Specific Gravity of Fly Ash	2.58
Admixtures:	
Water Reducer	38.50 oz*
Air Entrainment	2.92 oz*

* These quantities are already included in the maximum allowed water.

The maximum water-cement ratio and the total air are determined from the Master Proportion Table in the *Standard Specifications*. The maximum aggregate size was determined by a gradation analysis from the stockpile. Note that the quantities for all of the components to be included in the mix are listed with the exception of the coarse and fine aggregate. These quantities must be determined to complete the design of the mixture.

Determination of Mix Proportion of Coarse Aggregate

The following table may be used to determine the volume of dry-rodded coarse aggregate required for one cubic yard of concrete. The values for the fineness modulus of the fine aggregate and the maximum coarse aggregate size must be known in order to use this table. Interpolation might be necessary when the fineness modulus of the fine aggregate falls between the values of the table.

Table 901-1 Volume of Coarse Aggregate per Unit of Volume of Concrete					
Maximum Size of Aggregate, Inches (mm)	Volume of Dry-Rodded Coarse Aggregate Per Unit Volume of Concrete for Different Fineness Moduli of Fine Aggregate[1]				
	2.20	2.40	2.60	2.80	3.00
3/8 (9.50)	0.52	0.50	0.48	0.46	0.44
1/2 (12.5)	0.61	0.59	0.57	0.55	0.53
3/4 (19.0)	0.68	0.66	0.64	0.62	0.60
1 (25.0)	0.73	0.71	0.69	0.67	0.65
1 1/2 (37.5)	0.77	0.75	0.73	0.71	0.69
2 (50.0)	0.80	0.78	0.76	0.74	0.72
3 (75.0)	0.84	0.82	0.80	0.78	0.76

[1] Volumes are based on aggregates in dry-rodded condition as described in AASHTO T19, Unit Weight of Aggregate. These volumes are selected from empirical relationships to produce concrete with a degree of workability suitable for usual reinforced concrete construction. For less workable concrete such as required for concrete pavement construction, they may be increased up to 10 percent. For more workable concrete, as may be required for pumping, they may be reduced up to 10 percent.

In this example, the fine aggregate has a fineness modulus of 2.69 and the maximum size aggregate is 3/4 inch. For this aggregate size, the table provides a value of 0.64 for a fineness modulus of 2.60 and 0.62 for a fineness modulus of 2.80. Interpolation is required to determine the volume of coarse aggregate for this mix.

The following equation can be used to interpolate the required value from the above table:

$$V_R = \left(\frac{FM_R - FM_1}{FM_2 - FM_1}\right) \times (V_2 - V_1) + V_1$$

Where:

V_R = percent volume of coarse aggregate required for mix

FM_R = fineness modulus provided for mix

V_1 = percent volume of coarse aggregate required for lower fineness modulus

V_2 = percent volume of coarse aggregate required for higher fineness modulus

FM_1 = lower fineness modulus

FM_2 = higher fineness modulus

Substituting the corresponding values into the equation,

$$V_R = \left(\frac{2.69 - 2.60}{2.80 - 2.60}\right) \times (0.62 - 0.64) + 0.64 = 0.631$$

The weight of dry coarse aggregate that is required for this mix can be calculated as follows,

$$\text{Coarse Aggregate Weight (dry)} = 0.631 \times 27.00\text{ft}^3/\text{yd}^3 \times 100\text{lb/ft}^3 = 1{,}704\text{lb/yd}^3$$

Therefore, 1,704 pounds of dry coarse aggregate will be required for one cubic yard of this mix. This weight needs to be converted to saturated surface dry condition (SSD),

$$\text{Coarse aggregate Weight (SSD)} = \text{Coarse Aggregate Weight (dry)} \times \left(1 + \frac{\text{Absorption Factor}}{100}\right)$$

$$= 1{,}704 \text{ lb/yd}^3 \times \left(1 + \frac{1.5}{100}\right) = 1{,}730 \text{ lb/yd}^3$$

Determination of Mix Proportions for Cement and Fly Ash

The weight of fly ash is a percentage of the cement weight. In this case, it is 15% and it can be calculated as follows,

$$\text{Fly Ash Weight} = \text{Cement Weight} \times \text{Fly Ash Substitution Percent} =$$

$$560 \text{ lb/yd}^3 \times \frac{15\%}{100} = 84 \text{ lb/yd}^3$$

To determine the proportion of cement for this mixture it is necessary to calculate the weight of cement with the adjustment for the fly ash substitution.

$$\text{Adjusted Cement Weight} = \text{Cement Weight} - \text{Fly Ash Weight} =$$

$$560 \text{ lb/yd}^3 - 84 \text{ lb/yd}^3 = 476 \text{ lb/yd}^3$$

Determination of Mix Proportions for Fine Aggregate

To determine the proportion of fine aggregate to be used in one cubic yard of concrete, it is necessary to calculate the absolute volumes of the other components. The sum of these absolute volumes subtracted from the total 27 ft^3/yd will provide the absolute volume of fine aggregate. Once the absolute volumes of the components have been determined, they can be converted to weight.

The following formula can be used to calculate the absolute volume of the components,

$$\text{Absolute Volume} = \frac{\text{Weight of Component}}{\text{Specific Gravity} \times \text{Unit Weight of Water}}$$

$$\text{Cement Absolute Volume} = \frac{476\ \text{lb/yd}^3}{3.15 \times 62.4\ \text{lb/ft}^3} = 2.42\ \text{ft}^3/\text{yd}^3$$

$$\text{Fly Ash Absolute Volume} = \frac{84\ \text{lb/yd}^3}{2.58 \times 62.4\ \text{lb/ft}^3} = 0.52\ \text{ft}^3/\text{yd}^3$$

To calculate the absolute volume of the water required it is first necessary to find the maximum weight of water using the water-cement ratio and the total cementitious material content,

$$\text{Water Weight} = 560\ \text{lb/yd}^3 \times 0.45 = 252.0\ \text{lb/yd}^3$$

$$\text{Gallons of Water} = \frac{252.0\ \text{lb/yd}^3}{8.34} = 30.2\text{gal}$$

$$\text{Water Absolute Volume} = \frac{252.0\ \text{lb/yd}^3}{1.00 \times 62.4\ \text{lb/ft}^3} = 4.04\ \text{ft}^3/\text{yd}^3$$

To calculate the absolute volume of coarse aggregate in SSD condition, take the SSD weight of coarse aggregate previously calculated and the specific gravity for the aggregate in SSD condition and substitute in the absolute volume formula,

$$\text{Coarse Aggregate Absolute Volume (SSD)} = \frac{1{,}730\ \text{lb/yd}^3}{2.55 \times 62.4\ \text{lb/ft}^3} = 10.87\ \text{ft}^3/\text{yd}^3$$

To calculate the absolute volume of air, multiply the total volume (27.00 ft^3) times the percent of air required per design, in this case 5.0%,

$$\text{Air Absolute Volume} = 0.05 \times 27.00\,\text{ft}^3/\text{yd}^3 = 1.35\,\text{ft}^3/\text{yd}^3$$

The absolute volume of fine aggregate is obtained by subtracting the sum of all the components from the absolute volume of a cubic yard, (27.00 ft^3).

$$\text{Fine Aggregate Absolute Volume (SSD)} = 27.00\text{ft}^3 - (2.42 + 0.52 + 4.04 + 10.87 + 1.35)\,\text{ft}^3$$
$$= 7.80\,\text{ft}^3/\text{yd}^3$$

Once the absolute volume of fine aggregate is known, the absolute volume formula can be used to determine the weight of fine aggregate in SSD condition,

$$\text{Fine Aggregate Weight (SSD)} = 7.80\,\text{ft}^3/\text{yd}^3 \times 2.62 \times 62.4\,\text{lb/ft}^3 = 1{,}275\,\text{lb/yd}^3$$

The batch weights for one cubic yard of concrete mixture for this design are the following:

Mix Proportions for One Cubic Yard of Concrete

Cement			4	7	6	lb
Fly Ash				8	4	lb
Slag						lb
Fine Aggregate (SSD)		1	2	7	5	lb
Course Aggregate 1 (SSD)		1	7	3	0	lb
Course Aggregate 2 (SSD)						lb
Water		3	0	.	2	gal
Water Reducer	3	8	.	5	0	oz
Air Entrainer		2	.	9	2	oz

These proportions will require adjustment to take into consideration the moisture present on the aggregates and batch size. Adjustments may be necessary based on field experience with the mixture. Moisture adjustment calculations are located in the *Calculating Batch Weights from Mix Design Proportions* section of this appendix.

GROUND GRANULATED BLAST-FURNACE SLAG (GGBFS) AS PARTIAL REPLACEMENT OF PORTLAND CEMENT

The following is an example of the design of a Class A mix using an air entrainment and water reducing admixture. The specification for this mixture allows the use of ground granulated blast-furnace slag (GGBFS) as pound for pound substitution of cement up to 50% GGBFS by weight of cement. This example utilizes the absolute volume method for proportioning concrete mixtures. The calculations are presented in both U.S. customary units.

Example 3

Given:

Total Cementitious Material Content	560 lb
GGBFS Substitution By Weight	50%
Maximum Water-Cement Ratio	0.45
Air Content	5.0 %
Maximum Size of Aggregate	3/4 in.
Dry-Rodded Unit Weight Of Coarse Aggregate	100 lb/ft^3
Specific Gravity of Coarse Aggregate (SSD)	2.55
Absorption Factor of Coarse Aggregate	1.5 %
Fineness Modulus of Fine Aggregate	2.69
Specific Gravity of Fine Aggregate (SSD)	2.62
Absorption Factor of Fine Aggregate	0.5 %
Specific Gravity of Cement	3.15
Specific Gravity of GGBFS	2.88
Admixtures:	
Water Reducer	38.50 oz*
Air Entrainment	2.92 oz*

* These quantities are already included in the maximum allowed water.

Since this example differs from Example 2 only in the use of GGBFS instead of fly ash, the only proportions that need to be recalculated are for the cement, GGBFS and fine aggregate.

Determination of Mix Proportions of Cement and GGBFS

Calculate the weights of GGBFS and cement in the same way as Example 2.

$$\begin{aligned}\text{GGBFS Weight} &= \text{Cementitious Content} \times \text{GGBFS Substitution} \\ &= 560\ \text{lb/yd}^3 \times \frac{50}{100} = 280\ \text{lb/yd}^3\end{aligned}$$

$$\begin{aligned}\text{Cement Weight} &= \text{Cementitious Content} - \text{GGBFS Weight} \\ &= 560\ \text{lb/yd}^3 - 280\ \text{lb/yd}^3 = 280\ \text{lb/yd}^3\end{aligned}$$

$$\text{Absolute Volume} = \frac{\text{Weight of component}}{\text{Specific Gravity} \times \text{Unit Weight of Water}}$$

$$\text{Cement Absolute Volume} = \frac{280\ \text{lb/yd}^3}{3.15 \times 62.4\ \text{lb/ft}^3} = 1.42\ \text{ft}^3/\text{yd}^3$$

$$\text{GGBFS Absolute Volume} = \frac{280\ \text{lb/yd}^3}{2.88 \times 62.4\ \text{lb/ft}^3} = 1.56\ \text{ft}^3/\text{yd}^3$$

Determination of Mix Proportions of Fine Aggregate

The absolute volume of fine aggregate is obtained by subtracting the sum of all the components from the absolute volume of a cubic yard (27.00 ft^3).

$$\text{Fine Aggregate Absolute Volume (SSD)} = 27.00\ \text{ft}^3 - (1.42 + 1.56 + 4.04 + 10.87 + 1.35)\ \text{ft}^3$$
$$= 7.76\ \text{ft}^3/\text{yd}^3$$

Once the absolute volume of fine aggregate is known, the absolute volume formula can be used to determine the weight of fine aggregate in SSD condition,

$$\text{Fine Aggregate Weight (SSD)} = 7.76\ \text{ft}^3/\text{yd}^3 \times 2.62 \times 62.4\ \text{lb/ft}^3 = 1{,}269\ \text{lb/yd}^3$$

The batch weights for one cubic yard of concrete for this design are the following:

Mix Proportions for one Cubic Yard of Concrete

Cement			2	8	0	lb
Fly Ash						lb
Slag			2	8	0	lb
Fine Aggregate (SSD)		1	2	6	9	lb
Course Aggregate 1 (SSD)		1	7	3	0	lb
Course Aggregate 2 (SSD)						lb
Water		3	0	.	2	gal
Water Reducer	3	8	.	5	0	oz
Air Entrainer		2	.	9	2	oz

These proportions will require adjustment to take into consideration the moisture present on the aggregates and batch size. Adjustments may be necessary based on field experience with the mixture. Moisture adjustment calculations are located in the *Calculating Batch Weights from Mix Design Proportions* section of this appendix.

TERNARY MIXTURES

The following is an example of the design of a Class A mix using an air entrainment and water reducing admixture. The specification for this mixture allows combinations of ground granulated blast-furnace slag (GGBFS) and fly ash as pound for pound substitution of cement up to 70% by weight of cement. This example utilizes the absolute volume method for proportioning concrete mixtures. The calculations are presented in U.S. customary units.

Example

Given:

Total Cementitious Material Content	560 Lb
Class C Fly Ash Substitution By Weight Ggbfs Substitution By Weight	30% 30%
Maximum Water-Cementitious Materials Ratio	0.45
Air Content	5.0 %
Maximum Size of Aggregate	3/4 In.
Dry-Rodded Unit Weight of Coarse Aggregate	100 Lb/Ft^3
Specific Gravity of Coarse Aggregate (Ssd)	2.55
Absorption Factor of Coarse Aggregate	1.5 %
Fineness Modulus of Fine Aggregate	2.69
Specific Gravity of Fine Aggregate (Ssd)	2.62
Absorption Factor of Fine Aggregate	0.5 %
Specific Gravity of Cement	3.15
Specific Gravity of Class C Fly Ash	2.58
Specific Gravity of Ggbfs	2.88
Admixtures:	
Water Reducer	38.50 oz*
Air Entrainment	2.92 oz*

* These quantities are already included in the maximum allowed water.

Since this example differs from Example 2 with the use of GGBFS and fly ash, the proportions that need to be recalculated are for the cement, GGBFS, fly ash, and fine aggregate.

Determination of mix proportions of cement and GGBFS

Calculate the weights of GGBFS and cement in the same way as Example 2.

$$\text{Fly Ash Weight} = \text{Cementitious Content} \times \text{Fly Ash Substitution}$$
$$= 560\ \text{lb/yd}^3 \times \frac{30}{100} = 168\ \text{lb/yd}^3$$

$$\text{GGBFS Weight} = \text{Cementitious Content} \times \text{GGBFS Substitution}$$
$$= 560\ \text{lb/yd}^3 \times \frac{30}{100} = 168\ \text{lb/yd}^3$$

$$\text{Cement Weight} = \text{Cementitious Content} - \text{Fly Ash Weight} - \text{GGBFS Weight}$$
$$= 560\ \text{lb/yd}^3 - 168\ \text{lb/yd}^3 - 168\ \text{lb/yd}^3 = 224\ \text{lb/yd}^3$$

$$\text{Absolute Volume} = \frac{\text{Weight of component}}{\text{Specific Gravity} \times \text{Unit Weight of Water}}$$

$$\text{Cement Absolute Volume} = \frac{224\ \text{lb/yd}^3}{3.15 \times 62.4\ \text{lb/ft}^3} = 1.14\ \text{ft}^3/\text{yd}^3$$

$$\text{Fly Ash Absolute Volume} = \frac{168\ \text{lb/yd}^3}{2.58 \times 62.4\ \text{lb/ft}^3} = 1.04\ \text{ft}^3/\text{yd}^3$$

$$\text{GGBFS Absolute Volume} = \frac{168\ \text{lb/yd}^3}{2.88 \times 62.4\ \text{lb/ft}^3} = 0.93\ \text{ft}^3/\text{yd}^3$$

Determination of mix proportions of fine aggregate

The absolute volume of fine aggregate is obtained by subtracting the sum of all the components from the absolute volume of a cubic yard, (27.00 ft^3).

$$\text{Fine Aggregate Absolute Volume (SSD)} = 27.00\,\text{ft}^3 - (1.14 + 1.04 + 0.93 + 4.04 + 10.87 + 1.35)\,\text{ft}^3$$
$$= 7.63\,\text{ft}^3/\text{yd}^3$$

Once the absolute volume of fine aggregate is known, the absolute volume formula can be used to determine the weight of fine aggregate in SSD condition,

$$\text{Fine Aggregate Weight (SSD)} = 7.63\,\text{ft}^3/\text{yd}^3 \times 2.62 \times 62.4\,\text{lb/ft}^3 = 1{,}247\,\text{lb/yd}^3$$

The batch weights for one cubic yard of concrete for this design are the following:

Mix Proportions for one Cubic Yard of Concrete

Cement			2	2	4	lb
Fly Ash			1	6	8	lb
Slag			1	6	8	lb
Fine Aggregate (SSD)		1	2	4	7	lb
Course Aggregate 1 (SSD)		1	7	3	0	lb
Course Aggregate 2 (SSD)						lb
Water		3	0	.	2	gal
Water Reducer	3	8	.	5	0	oz
Air Entrainer		2	.	9	2	oz

These proportions will require adjustment to take into consideration the moisture present on the aggregates and batch size. Adjustments may be necessary based on field experience with the mixture. Moisture adjustment calculations are located in the *Calculating Batch Weights from Mix Design Proportions* section of this appendix.

PLAIN PORTLAND CEMENT TYPE B MIX

The following is an example of the design of a Type B mix using an air entrainment and water reducing admixture. As in previous examples, this exercise utilizes the absolute volume method for proportioning concrete mixtures. However, in comparison with other examples, a third aggregate is required to meet the specifications.

Example 4

Given information:

Cement Content	475 lb
Maximum Water-Cement Ratio	0.53
Air Content	5.0 %
Maximum Size of Aggregate	1 1/2 in.
Dry-Rodded Unit Weight of Coarse Aggregate	100 lb/ft^3
Specific Gravity of Coarse Aggregate (SSD)	2.69
Absorption Factor of Coarse Aggregate	1.0 %
Specific Gravity of Intermediate Aggregate (SSD)	2.52
Absorption Factor of Intermediate Aggregate	2.5 %
Fineness Modulus of Fine Aggregate	2.42
Specific Gravity of Fine Aggregate (SSD)	2.62
Absorption Factor of Fine Aggregate	0.5 %
Specific Gravity of Cement	3.15
Admixtures:	
Water Reducer	38.50 oz**
Air Entrainment	2.92 oz**

** These quantities are already included in the maximum allowed water.

Also given are the gradations for the aggregates, which are shown in Table 1 as percent passing and percent retained of oven-dry weight.

Table A1 - Aggregate Gradations

Sieve Size	Fine Aggregate		Intermediate Aggregate		Coarse Aggregate	
	Percent Passing	Percent Retained	Percent Passing	Percent Retained	Percent Passing	Percent Retained
2”						
1 ½”					100.0	0.00
1”					97.0	2.74
3/4”			100.0	0.00	64.0	33.08
1/2”			100.0	0.21	21.0	43.08
3/8”	100.0	0.00	97.0	2.68	6.0	14.55
No. 4	99.0	0.70	71.0	26.08	0.0	5.89
No. 8	90.0	8.70	27.0	43.52	0.0	0.17
No. 16	78.0	11.80	1.0	25.98	0.0	0.23
No. 30	64.0	14.39	0.0	1.21	0.0	0.11
No. 50	22.0	41.72	0.0	0.04	0.0	0.08
No. 100	2.0	20.06	0.0	0.05	0.0	0.03
No. 200	0.0	2.43	0.0	0.04	0.0	0.02
Pan	0.0	0.20	0.0	0.19	0.0	0.02
Totals :		**100.00**		**100.00**		**100.00**

Determination of Volume Percentages of Aggregate Portion

Some trial and error will be involved in order to determine the proportions of aggregates that will meet the specifications. Table 2 shows the initial iteration (effort) for this example. Column (H) shows the percent retained gradation resulting from the combination of the aggregates in the ratio of 30-10-60 (percent by volume of fine-intermediate-coarse) of oven dry material. The values for Column (H) are obtained by using the following equation,

$$H = (B \times C) + (D \times E) + (F \times G)$$

Where :

H = Combined Percent Retained

B = Fine Aggregate Percent Mix by Volume

C = Fine Aggregate Percent Retained

D = Intermediate Aggregate Percent Mix by Volume

E = Intermediate Aggregate Percent Retained

F = Coarse Aggregate Percent Mix by Volume

G = Coarse Aggregate Percent Retained

For example, to calculate the combined percent retained for the No.8 sieve size,

$$H = \left(\frac{30}{100} \times 8.7\%\right) + \left(\frac{10}{100} \times 43.5\%\right) + \left(\frac{60}{100} \times 0.2\%\right) = 7.1\%$$

Table A2 - Initial Iteration for Pavement Mix Design

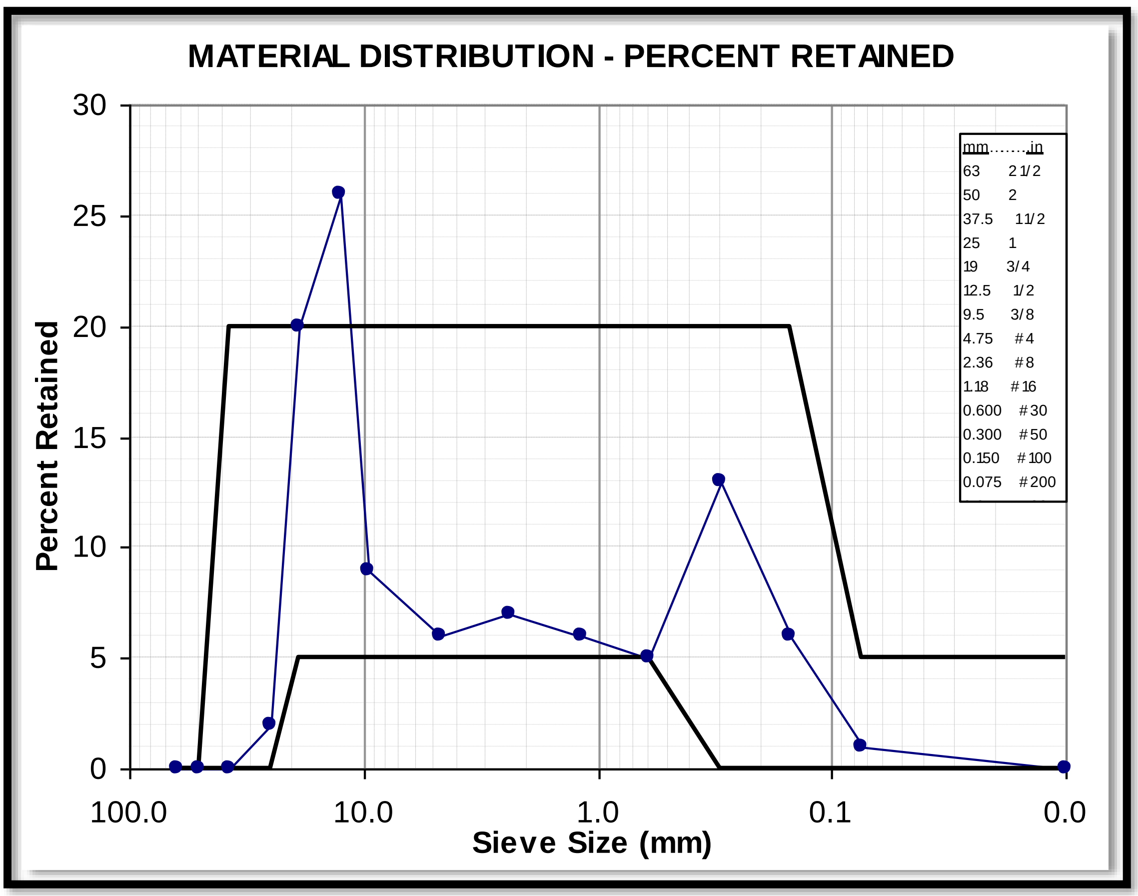
Sieve Size (A)	Fine Aggregate (C)	Intermediate Aggregate (E)	Coarse Aggregate (G)	Combined Percent Retained (H)	Sum of Consecutive Sieves (I)
Percent Mix by Volume	(B) **30.00%**	(D) **10.00%**	(F) **60.00%**		
	Percent Retained				
2 ½”	0	0	0	0	
2”	0	0	0	0	
1 ½”	0	0	0	0	
1”	0	0	2.74	2	
3/4”	0	0	33.08	20	
1/2”	0	0.21	43.08	26	46
3/8”	0	2.68	14.55	9	35
No. 4	0.7	26.08	5.89	6	15
No. 8	**8.7**	**43.52**	**0.17**	**7**	13
No. 16	11.8	25.98	0.23	6	13
No. 30	14.39	1.21	0.11	5	11
No. 50	41.72	0.04	0.08	13	
No. 100	20.06	0.05	0.03	6	
No. 200	2.43	0.04	0.02	1	
Pan	0.2	0.19	0.02	0	
Totals :	**100**	**100**	**100**	**100**	

From examination of Column (H) in Table 2 or by looking at Figure 1, it can be determined that this combination of aggregates do not meet the specification for a Type B concrete pavement mixture.

The specification for this pavement mixture requires the combined percent retained curve to be between a 5% and a 20% low and upper limits. In addition, the sum of two consecutive sieve sizes needs to be equal to or greater than 13%.

There is an excess of material retained on the 1/2" sieve, not enough material retained on the #30 sieve and the sum of material retained on sieves #16 and #30 is less than 13%. Additional iterations are required to find a combination that meets the specifications. Based on this data the adjustments to be done in the next iterations could be reducing the coarse aggregate proportion, and increasing the fine and intermediate aggregate proportions.

Figure A1 - Plot of First Iteration



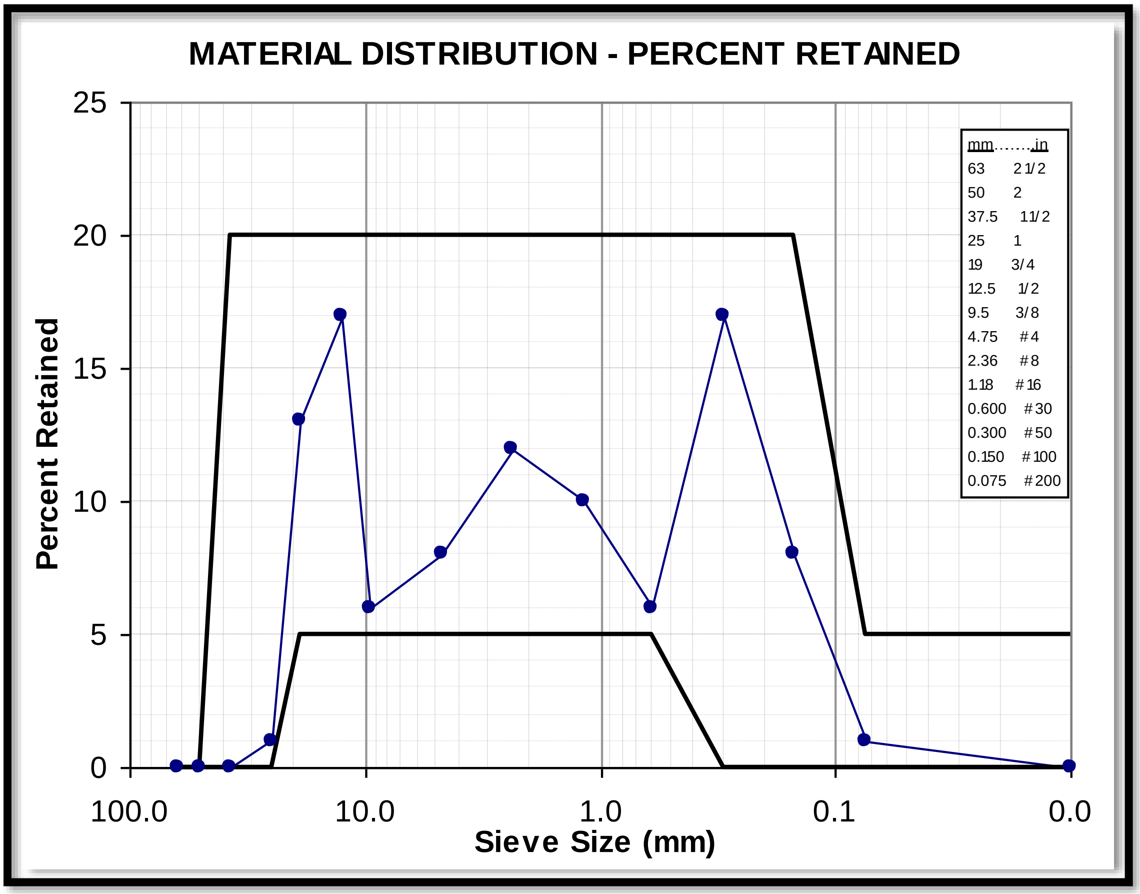
Notice the peak at the 1/2" sieve and the dip at #30 sieve.

After a few iterations, the ratio of 40-20-40 fine-intermediate-coarse was found to meet the specifications. It can be seen from Table 3 and Figure 2 that this gradation meets the specification requirements, both the 5-20% limits and the sum between consecutive sieves.

Table 3. Final Iteration of Aggregate Combination

Sieve Size (A)	Fine Aggregate Percent Retained (C)	Intermediate Aggregate Percent Retained (E)	Coarse Aggregate Percent Retained (G)	Combined Percent Retained (H)	Sum of Consecutive Sieves (I)
Percent Mix by Volume	(B) **40.00%**	(D) **20.00%**	(F) **40.00%**		
2 ½"	0	0	0	0	
2"	0	0	0	0	
1 ½"	0	0	0	0	
1"	0	0	2.74	1	
3/4"	0	0	33.08	13	
1/2"	0	0.21	43.08	17	46
3/8"	0	2.68	14.55	6	35
No. 4	0.7	26.08	5.89	8	15
No. 8	8.7	43.52	0.17	12	13
No. 16	11.8	25.98	0.23	10	13
No. 30	14.39	1.21	0.11	6	11
No. 50	41.72	0.04	0.08	17	
No. 100	20.06	0.05	0.03	8	
No. 200	2.43	0.04	0.02	1	
Pan	0.2	0.19	0.02	0	
Totals :	**100**	**100**	**100**	**100**	

Figure A2 - Plot of Final Iteration



Determination of Batch Weights for Mixture

After showing that this combination of aggregates meets the specifications, the next step will be to calculate the required aggregate volumes for this mixture. First, it necessary to convert the known components into volume using the following formula,

$$\text{Absolute Volume} = \frac{\text{Weight of component}}{\text{Specific Gravity} \times \text{Unit Weight of Water}}$$

$$\text{Cement Absolute Volume} = \frac{475\ \text{lb/yd}^3}{3.15 \times 62.4\ \text{lb/ft}^3} = 2.42\ \text{ft}^3/\text{yd}$$

To calculate the absolute volume of the water required it is first necessary to find the maximum weight of water using the weight of the cement and the water-cement ratio,

$$\text{Weight of Water} = 475\ \text{lb/yd}^3 \times 0.53 = 251.75\ \text{lb/yd}^3$$

$$\text{Gallons of Water} = \frac{251.75\ \text{lb/yd}^3}{8.34} = 30.2\,gal$$

$$\text{Water Absolute Volume} = \frac{251.75\ \text{lb/yd}^3}{1 \times 62.4\ \text{lb/ft}^3} = 4.03\ \text{ft}^3/\text{yd}^3$$

To calculate the absolute volume of air, multiply the total volume, 27.00 ft^3, times the percent of air required per design, in this case the air content is 5.0%,

$$\text{Air Absolute Volume} = \frac{5.0}{100} \times 27.00\ \text{ft}^3/\text{yd}^3 = 1.35\ \text{ft}^3/\text{yd}^3$$

The absolute volume of the aggregate component is obtained by subtracting the sum of all the components from the absolute volume of a cubic yard (27.00 ft^3),

$$\text{Agg. Comp. Absolute Vol.} = 27.00\ \text{ft}^3 - (2.42 + 4.03 + 1.35)\ \text{ft}^3 = 19.20\ \text{ft}^3/\text{yd}^3$$

Now the volumes for the individual aggregates can be calculated,

$$\text{Coarse Aggregate Absolute Volume} = 19.20\ \text{ft}^3/\text{yd}^3 \times \frac{40.0\%}{100} = 7.68\ \text{ft}^3/\text{yd}^3$$

$$\text{Intermediate Aggregate Absolute Volume} = 19.20\ \text{ft}^3/\text{yd}^3 \times \frac{20.0\%}{100} = 3.84\ \text{ft}^3/\text{yd}^3$$

$$\text{Fine Aggregate Absolute Volume} = 19.20\ \text{ft}^3/\text{yd}^3 \times \frac{40.0\%}{100} = 7.68\ \text{ft}^3/\text{yd}^3$$

To calculate the aggregate batch weights in Saturated Surface Dry condition (SSD), using the SSD specific gravity, the absolute volume equation can be rearranged in the following form,

$$\text{Weight of Component} = \text{Absolute Volume} \times \text{Specific Gravity} \times \text{Unit Weight of Water}$$

$$\text{Coarse Aggregate Weight (SSD)} = 7.68\ \text{ft}^3/\text{yd}^3 \times 2.69 \times 62.4\ \text{lb/ft}^3 = 1{,}289\ \text{lb/yd}^3$$

$$\text{Intermediate Aggregate Weight (SSD)} = 3.84\ \text{ft}^3/\text{yd}^3 \times 2.52 \times 62.4\ \text{lb/ft}^3 = 604\ \text{lb/yd}^3$$

$$\text{Fine Aggregate Weight (SSD)} = 7.68\ \text{ft}^3/\text{yd}^3 \times 2.62 \times 62.4\ \text{lb/ft}^3 = 1{,}399\ \text{lb/yd}^3$$

The following are the batch weights at SSD condition required for one cubic yard or one cubic meter of concrete:

Mix Proportions for one Cubic Yard of Concrete							
Cement			4	7	5	lb
Fly Ash						lb
Slag						lb
Fine Aggregate (SSD)		1	3	9	9	lb
Course Aggregate 1 (SSD)		1	2	8	9	lb
Course Aggregate 2 (SSD)			6	0	4	lb
Water		3	0	.	2	gal
Water Reducer	3	8	.	5	0	oz
Air Entrainer		2	.	9	2	oz

These proportions will require adjustment to take into consideration the moisture present on the aggregates and batch size. Adjustments may be necessary based on field experience with the mixture. Moisture adjustment calculations are located in the *Calculating Batch Weights from Mix Design Proportions* section of this appendix.

Calculation of Oven-Dry Weight of Materials

If the oven-dry weight of the aggregates is desired then the following equation can be used to convert SSD weight into oven-dry weight,

$$\text{Aggregate Weight (dry)} = \frac{\text{Aggregate Weight (SSD)}}{\left(1 + \frac{\text{Absorption Factor}}{100}\right)}$$

$$\text{Coarse Aggregate Weight (dry)} = \frac{1{,}289 \text{ lb/yd}^3}{\left(1 + \frac{1.0}{100}\right)} = 1{,}276 \text{ lb/yd}^3$$

$$\text{Intermediate Aggregate Weight (dry)} = \frac{604 \text{ lb/yd}^3}{\left(1 + \frac{2.5}{100}\right)} = 589 \text{ lb/yd}^3$$

$$\text{Fine Aggregate Weight (dry)} = \frac{1{,}399 \text{ lb/yd}^3}{\left(1 + \frac{0.5}{100}\right)} = 1{,}392 \text{ lb/yd}^3$$

CALCULATING BATCH WEIGHTS FROM MIX DESIGN PROPORTIONS

The proportions calculated for design purposes (earlier examples) must be modified, for actual production, into batch weights based on the amount of total water in the fine and coarse aggregate determined by DOTD Designation: TR 106. These adjustments must be performed at least once per day prior to starting operations to account for changes in free moisture in the aggregate stockpiles.

The maximum allowable water for design purposes is the amount of water that may be used, not the amount of water that must be used. Only enough water to produce concrete within the correct slump range should actually be used; however, in this example, for convenience, calculations will be based on using maximum allowable water.

Cement used in making concrete is dry; therefore, no moisture corrections need to be made for cement. However, the fine and coarse aggregate sand and gravel will normally contain a different amount of moisture than the moisture content of the saturated surface dry condition (SSD). Therefore, the wet weight of each (fine and coarse aggregate) (sand and gravel), must be adjusted so that the quantity charged into the mixer will be the equivalent of the saturated surface dry quantity.

DETERMINE THE FREE MOISTURE IN AGGREGATES

For this example, the total moisture contents of the stockpiled aggregates for a Class A mix as determined by DOTD Designation: TR 403 are 4.4% for the fine aggregate and 0.3% for the coarse aggregate. The Absorption Factors are taken from the *Approved Materials List.*

Aggregate Tests	Test 1	
	Fine	Coarse
Time of Test	6:30AM	6:30AM
A: tare mass, g (lb)	300.0	(2.12)
B: Wet mass (A+sample), g(lb)	863.0	(12.90)
C: Dry mass (A+ sample), g (lb)	839.3	(12.87)
D: Mass of Water (B-C), g (lb)	23.7	(0.03)
E: Dry mass of sample	539.3	(10.75)
F: Percent total moisture (D/E)%	**4.4**	**0.3**
G: Absorption factor, %	0.5	1.5
H: Percent free moisture (F-G), %	**3.9**	**-1.2**
I: Aggr. (SSD) from mix design, lb/Cu yd	1305	1730
J: Corrected mass (1+(H/100)) I, lb	1356	1709

The following equation can be used to determine the free moisture or additional water on the aggregates:

$$\text{Aggregate Free Moisture (\%)} = \text{Aggregate Moisture} - \text{Absorption Factor of Agg.}$$

$$\text{Fine Agg. Free Moisture (\%)} = 4.4\% - 0.5\%$$
$$= 3.9\%$$

$$\text{Coarse Agg. Free Moisture (\%)} = 0.3\% - 1.5\% = -1.2$$

It can be seen that the fine aggregate contains 3.9% of water above the SSD condition (free water for mixing), while the coarse aggregate needs an additional 1.2% of water to get to SSD condition (water that will be absorbed from the mixing water). These percentages are now converted into weights.

Correct the Aggregate Weights

The aggregate weights corrected for moisture content are determined by the following equation:

$$Corrected\ Agg.Weig = Agg.SSD\ Weight\ \times \left[1 + \frac{Free\ Moisture\%\ in\ Agg.}{100}\right]$$

$$Corrected\ Fine\ Agg.Weight = 1{,}305\ lb\ \times \left[1 + \frac{3.9\%}{100}\right] = 1{,}356\ lb$$

$$Corrected\ Coarse\ Agg.Weight = 1{,}730\ lb\ \times \left[1 + \frac{-1.2\%}{100}\right] = 1{,}709\ lb$$

Correct the Allowable Water

The free water in the aggregates can be found by subtracting the SSD weight from the corrected weight:

I: Aggr. (SSD) from mix design, lb/Cu yd	1305	1730
J: Corrected mass (1+(H/100))1, lb	1356	1709
K: Free Water (J-I), lb	51	-21
L: Free Water (K/8.34), gal	6.1	-2.5

$$Free\ Water\ =\ Corrected\ Agg.Weight\ -Agg.SSD\ Weight$$

$$Free\ Water\ in\ Fine\ Agg. =\ 1{,}356\ lb\ -\ 1{,}305\ lb\ =\ 51\ lb$$

$$Free\ Water\ in\ Coarse\ Agg. =\ 1{,}709\ lb\ -\ 1{,}730\ lb\ =\ -21lb$$

Note: 1 gallon of water = 8.34 lb

$$\text{Free Water in Gallons in Fine Agg.} = \frac{51\ lb}{8.34}\ =\ 6.1\ gallons$$

$$\text{Free Water in Gallons in Coarse Agg.} = \frac{-21\ lb}{8.34}\ =\ -2.5\ gallons$$

The correction for the mixing water is then done by subtracting the free water and the total admixtures in gallons from the water calculated for the SSD condition mix design:

M: total admixture from mix design, (oz/128) gal	2
N: Total free water (L for fine and coarse aggr. +M), gal	20
O: Maximum allowable water (from mix design), gal	146
P: Maximum allowable water to be added (O-N), gal	126
Q: Minimum allowable water to be added (.75P), gal	94

$$Total\ Admixtures\ = \frac{38.50oz\ +\ 2.92oz}{128\ oz/gal}$$

$$Total\ Free\ Water\ =\ 6.1gal\ +\ -2.5gal\ +\ 0.3gal\ =\ 3.9gal$$

$$Adjusted\ Water\ =\ 29.5gal\ -3.9gal\ =\ 25.6gal$$

$$Minimum\ Allowable\ Water\ to\ be\ Added\ * =\ 25.6\ gals.x\ .75\ = 19.2\ gals$$

**Specifications require that a minimum of 75% of the maximum allowable mixing water must be added at the plant during batching.*

Determine the Corrected Batch Weights

The batch weights, based on the adjustments made above for the corrected weights of aggregates and the total free water, are the actual quantities of the components to be batched for one cubic yard.

For the example above the batch weights are below:

Cement	560 lb
Minimum Water to Be Added	19.2 gal
Fine Aggregate (Corrected Mass)	1,356 lb
Coarse Aggregate (Corrected Mass)	1,709 lb
Water Reducing Admixture	38.50 oz
Air Entrainment Admixture	2.92 oz

It is seldom that exactly one cubic yard batches are used in the field. To adjust the quantities above (adjusted batch weights, stockpile condition) for the field to any size batch, multiply the values for one cubic yard by the number of cubic yards in one batch. For example, if an 8 cubic yard batch is desired, multiply each component by 8:

R: Batch Size, cu yd	8
S: Cement (R x mix design mass), lb	4,480
T: Fly Ash (or) Slag (R x mix design mass), lb	-
U: Fine Aggregate (R x J), lb	10,848
V: Coarse aggregate (R x J), lb	13,672
W: Maximum water to be added (R x P), gal	204.8
X: Minimum water to be added (R x Q), gal	153.6
Y: Water Reducing admixture (R x mix design mass), oz	308.00
Z: Air entraining admixture (r x mix design mass), oz	23.36

$$Cement\ 560\ x\ 8\ =\ 4{,}480\ lb$$

$$Fine\ Aggregate\ 1{,}356\ x\ 8\ =\ 10{,}848\ lb$$

$$Coarse\ Aggregate\ 1{,}709\ x\ 8\ =\ 13{,}672\ lb$$

$$Max.Water\ 25.6\ x\ 8\ =\ 204.8\ gal$$

$$*\ Min.Water\ 19.2\ x\ 8\ =\ 153.6\ gal$$

$$Water\ Reducer\ 38.50\ x\ 8\ =\ 308.00\ oz$$

$$Air\ Entertainer\ 2.92\ x\ 8\ =\ 23.36\ oz$$

*Specifications require that a minimum of 75% of the maximum allowable mixing water must be added at the plant during batching.

HOT WEATHER ADJUSTMENTS

Concrete production shall be controlled to ensure that the internal temperature of the plastic concrete does not exceed 90°F throughout placement. The addition of ice to the batch is one method of controlling the temperature of the concrete. Whenever ice is added to a batch of concrete, the amount of mixing water must be reduced by a comparable quantity of ice converted to gallons. The following conventional rule can be used to determine the amount of ice to be added in order to lower the temperature. For each degree °F reduction, add approximately 5 pounds of ice per cubic yard of concrete.

Example

To reduce a cubic yard batch from 85°F to 83°F, approximately 10 pounds of ice would be necessary. These values are converted to gallons and then multiplied by the batch size. Additionally, the maximum and minimum water to be added must be adjusted so that maximum water/cement ratio is not exceeded.

$$85° - 83° = 2°F$$

$$2° \ x \ 5 \ lb \ = \ 10 \ lb \ ice/cu \ yd$$

$$Batch \ Size \ = \ 8 \ yd^3$$

$$Gallons \ of \ Water \ = \frac{10 \ lb/yd^3 \ x \ 8yd^3 \ / \ batch}{8.34 lb \ / \ gal} = 9.6 \ gal$$

$$Adjusted \ Maximum \ Water \ to \ be \ Added \ 204.8 \ gal \ - \ 9.6 \ gal \ = \ 195.2 \ gal$$

$$Adjusted \ Minimum \ Water \ to \ be \ Added \ 153.6 \ gal \ - \ 9.6 \ gal \ = \ 144.0 \ gal$$

MIX ADJUSTMENTS BASED ON SLUMP

Adjustments to the slump can be made prior to placement or in successive batches in order to meet specification requirements, or for workability within the specification ranges. A "Rule of Thumb" of ± one gallon per cubic yard will increase or reduce the slump by one inch. Examples are presented below.

Increase in slump of 2 inches for an 8 cubic yard batch:

$$1 \text{ gal.} \times\ 2 \text{ in.} \times\ \ 8 \text{ yards}\ =\ 16 \text{ gallons added to the batch}$$

For adjustments to the slump, water may be added to a batch at the jobsite at a maximum of two increments. A range of 20-30 revolutions at mixing speed is allowed for each increment. Specifications require a minimum of 70 revolutions at mixing speed prior to any job site adjustments for each batch, up to a maximum of 300 total revolutions.

THEORETICAL AND ACTUAL YIELD

The theoretical yield determines how much area a cubic yard of concrete ***should*** cover on a roadway based on plan width, plan thickness and the length of the section to be paved. The actual yield tells you how much area was ***actually*** covered with the quantity of cubic yards of

AA: Ice added, (lb/yd.^{3})	10
BB: Ice, gal [AA x R/8.34 = gal/batch]	9.6
CC: Adjusted maximum water to be added (W - BB), gal	195.2
DD: Adjusted minimum water to be added (X - BB), gal	144.0

concrete used. If the actual yield is less than the theoretical yield, it may take more concrete than anticipated to complete the entire project if it continues consistently. If the actual yield is greater than theoretical yield, less concrete will be needed to complete the project if it continues consistently. Some factors that affect the actual yield are under and over thicknesses or widths, insufficient or excessive cross slope, deficiencies in the base course that affect grade and variations in the composition of the concrete during batching operations.

Below are examples of the calculations for theoretical and actual yield:

Example

$$\textbf{Theoretical yield}\ (\text{sq yd/cu yd}) = \frac{\text{Area in square yards to be paved}}{\text{Volume in cubic yards using Plan Thickness}}$$

Plan Width = 24' Length to be poured= 500' Plan Thickness= 10"

$$\text{Theoretical Yield} = \frac{[(24 \text{ x } 500)/9]}{[(24 \text{ x } 500) \text{ x } (10/12)\ /27]} = 3.6001 = 3.60 \text{ Sq Yd/Cu Yd}$$

$$\textbf{Actual yield}\ (\text{sq yd/cu yd}) = \frac{\text{Area in Square Yards covered}}{\text{Actual total Cubic Yards used based on Batch Tickets}}$$

Width Paved= 24' Length Paved= 500' Total Cubic Yards Used= 376

$$\text{Actual yield (sq yd / cu yd)} = \frac{[(24 \text{ x } 500)/9]}{376} = \frac{[12{,}000.0000/9]}{376} = \frac{[1{,}333.3333]}{376} = 3.5460$$
$$= 3.55 \text{ sq yd / cu yd}$$

COMPRESSIVE STRENGTH

When computing the average compressive strength for a lot under the *Standard Specifications,* both high and low critical strengths for a set of cylinders must be identified. The critical strengths are defined as those values greater than fifteen percent above and below the average for the three cylinders. When the compressive strength of an individual cylinder is outside of the range of the critical strengths, that cylinder is considered as an Outlier. Outliers are not to be used in the batch average. Should this be the case, the batch average shall be recalculated using the remaining cylinders. If two cylinders are outside of the critical strengths, the compressive strength of the one remaining cylinder shall be used to determine the average strength of the lot. If all three cylinders are outside of the critical strength, an investigation should be made.

Example without Outlier

Class AA - Structural Concrete - Lot 028

Batch #1

Sample No.	Strength (PSI)
001-A	3950
001-B	4180
001-C	4120

$$Batch\ Average\ =\ \frac{3950+4180+4210}{3}\ =\ 4113$$

$$Critical\ Strength\ Low\ =\ 4113\ x\ 0.85\ =\ 3496$$

$$Critical\ Strength\ High\ =\ 4113\ x\ 1.15\ =\ 4730$$

No individual cylinders are outliers; therefore, the batch average for this set is 4113 psi.

Example with Outlier

Batch #8

Sample No.	Strength (PSI)
008-D	4520
008-E	4780
008-F	3430

$$Batch\ Average = \frac{4520 + 4780 + 3430}{3} = 4243$$

$$Critical\ Strength\ Low = 4243\ x\ 0.85 = 3607$$

$$Critical\ Strength\ High = 4243\ x\ 1.15 = 4879$$

Sample 008-F, 3430 is an outlier and outside of the low critical strength value of 3607. Therefore, a new batch average must be calculated for the set using the two valid remaining cylinders. The outlier shall be indicated in the "Remarks" field.

$$The\ New\ Batch\ Average = \frac{4520 + 4780}{2} = 4650$$

The average strength for the lot is then calculated using the batch average from the first set and the new batch average for the second set.

$$Average\ Strength\ for\ Lot = \frac{4113 + 4650}{2} = 4328$$

PAYMENT BASED ON COMPRESSIVE STRENGTH

Cores will be taken and tested in accordance with the requirements of DOTD Designation: TR 225. The results of the test will be used in calculating the average compressive strength of the lot and in determining the percent pay.

When the Department determines that any pavement area(s) represented by a core(s) with a compressive strength of less than 3000 psi will be left in place, payment will be calculated by averaging the percent payment for each of the five portions of the lot, even though the lot average is above 3000 psi. Therefore, individual core results below specifications limits will result in the payment for that lot being adjusted, even if the lot average meets the requirements of Table 601-3, Subsection 601.21 of the specifications.

Example

Compressive strength results of Lot 7, **with** air entrainment, are:

	psi
Core 1	4230
Core 2	4550
Core 3	3750
Core 4	4740
Core 5	2870

The average compressive strength for the lot is 4028 psi, which meets specification requirements for 100% pay.

However, 20% of the lot or one segment (represented by Core 5) is below specification limits for an individual core. **If** it is allowed to remain in place, that 20% of the lot will be paid at 50% of the contract unit price. Payment for Lot 7 for compressive strength will be calculated as follows:

	psi
Core 1	4230
Core 2	4550
Core 3	3750
Core 4	4740

The average compressive strength is recalculated for Cores 1, 2, 3 and 4 which is 4317 psi which according to Table 601-1, makes them eligible for 100% pay although they account for only 80% of the lot.

Hence,

$$\frac{100\% + 100\% + 100\% + 100\% + 50\%}{5} = 90\%$$

Payment for Lot 7 for compressive strength will be made at 90% of the contract unit price.

If two cores for a lot are below 3000 psi, and average compressive strength for the lot meets the requirements for 100% payment, the lot will be paid at 80%.

Example

Compressive strength results for Lot 8 are:

	psi
Core 1	4500
Core 2	4350
Core 3	3720
Core 4	2980
Core 5	2920

The average compressive strength for the lot is 3694 psi, which, according to Table 601-1, makes the lot eligible for only 95% payment of the contract unit price.

However, 40% of the lot or two segments (represented by Cores 4 and 5) are below specification limits for individual cores. If the pavement area is allowed to remain in place, that 40% of the lot which is unacceptable will result in the lot being paid for at 80% of the contract unit price. Payment for Lot 8 for compressive strength will be calculated as follows.

	psi
Core 1	4500
Core 2	4350
Core 3	3720

The average compressive strength is recalculated for Cores 1,2, and 3 which is 4190 psi, which according to Table 601-1, makes them eligible for 100% pay although they account for only 60% of the lot.

Hence,

$$\frac{100\% + 100\% + 100\% + 50\% + 50\%}{5} = 80\%$$

Final payment adjustments for lot averages resulting in other payment adjustments will be calculated in the same manner.

PAYMENT BASED ON THICKNESS

If any pavement area represented by a core found to be deficient in thickness by more than one inch is to be left in place, payment will be calculated by averaging the percent payment for each of the five lot portions, even though the lot average for thickness is within the tolerance allowed by Table 601-3.

Example

Plan thickness is 9 inches (230 mm). Thickness measurement results for Lot 10 are:

Core 1	9.40 inches
Core 2	9.20 inches
Core 3	9.15 inches
Core 4	7.85 inches
Core 5	9.20 inches

The lot average is 8.93 inches. To calculate the lot average, the thickness of Core 1, 9.40 inches, is reduced to 9.25 inches, because for averaging computations, a core is allowed excess thickness of only 0.25 inches.

The lot average is only 0.07 inch deficient, which meets the requirements of Table 601-1 for 100% payment. However, Core 4 is more than 1 inch deficient in thickness. If the segment of Lot 10 represented by Core 4 is allowed to remain in place, a 50% payment adjustment will be assessed for the 20% of the lot that is not satisfactory. Payment for Lot 10 will be calculated as follows:

$$\frac{100\% + 100\% + 100\% + 50\% + 100\%}{5} = 90\%$$

Payment for Lot 10 for average thickness will be made at 90% of the contract unit price.

Lots for which a payment adjustment is applicable based on the lot average of thickness results and which also have a core(s) with a thickness ***deficiency*** greater than 1.00 inch will be assessed an additional payment adjustment for the unsatisfactory thickness represented by the failing cores, if that segment of the lot is allowed to remain in place. Calculations for this payment adjustment will be the same as for lots which qualify for 100% payment based on lot average.

Example

The plan thickness is 9.00 inches. Thickness results for Lot 12 are:

Core 1	9.00 inch
Core 2	7.90 inch
Core 3	8.60 inch
Core 4	7.80 inch
Core 5	9.25 inch

The average thickness of the lot is 8.51 inches, a deficiency of 0.49 inch, which, according to Table 601-3, is eligible for only 80% payment of the contract unit price. However, Core 2 and Core 4 show a deficiency of more than 1.00 inch. If these segments are allowed to remain in place, that 40% of the lot which is below the specification limits for an individual core will result in the lot being paid at 80% of the contract unit price. Payment for Lot 12 will be calculated as follows:

Core 1	9.00 inch
Core 3	8.60 inch
Core 5	9.25 inch

The average thickness is recalculated for Cores 1, 3 and 5 which is 8.95 inches, which according to Table 601-3, makes them eligible for 100% pay although they account for only 60% of the lot.

Hence,

$$\frac{100\% + 50\% + 100\% + 50\% + 100\%}{5} = 80\%$$

Final payment adjustments for lot averages resulting in other payment adjustments will be calculated in the same manner.

APPENDIX B

DOTD 03-22-0800
Rev. 11/03

Louisiana Department of Transportation and Development

SAMPLE IDENTIFICATION

UNIT [ ] E / M *(English or Metric)* **SPEC YEAR ...** [| | |] *(2000 or 1992)*

PROJECT NUMBER .... [| | | - | | - | | | |]

MATERIAL ______________ .... [| |] *code*

Product Name ______________

LAB NO. .... [| | - | | | | | |]

F.A.P. No. ______________

DATE SAMPLED .... [| | - | | - | |]

SUBMITTED BY ______________ *project engineer* .... [| | | |] *code*

Inspector - Name ______________

Inspector - Phone ______________

Address ______________

____

QUANTITY __________ __________ .... [| | | | | |] [| |] Unit *(For Misc Only)*

PURPOSE CODE *(codes listed on back)* .... [ ]

MATERIAL SOURCE ______________ .... [| | | |] *code*

Address ______________

____

SPECIFICATION CODE *(codes listed on back)* .... [ ]

P.O. No. .... [| | | | | | |]

Independent Testing Lab Code .... [L | | | |]

DATE TESTED .... [| | - | | - | |]

Sample Ident. .... [| | | | | |]

Materials Sampled From .... [| | | | | |]

Date Transported to Dist / Mat'ls Lab .... [| | - | | - | |]

Date Sample Rec'd @ Dist Lab .... [| | - | | - | |]

Date Sample Rec'd @ Mat'ls Lab .... [| | - | | - | |]

District...... ______________

Use.......... ______________

Remarks 1 *(Header)* [| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |]

Note: *When applicable, include the **BATCH NO. / LOT NO.** in Remarks1.*
Remarks1 has 108 available characters for 'Misc' subsystem. All other subsystems have a max.of 54 characters.

Remarks 2 [ ] ***For Disposition of Failing Tests***

ITEM NO. [| | | | | | | | | | | | | | | | | | | | | | | | | | | | |]

Sampling / Testing Comments [| | | | | | | | | | | | | | | | | | | | | | | | | | |]

Approved By: ______________

Sample Identification Form - Front

UNIT
E = English M = Metric

SPEC YEAR
1992 = Standard Specs. *(Silver Book)* 2000 = Standard Specs. *(Red Book)*

PURPOSE CODES	
CODE	**DESCRIPTION**
1	Quality Control
2	Verification
3	Acceptance
4	Check
5	Resample
6	Source Approval
7	Design
8	Independent Assurance
9	Preliminary Source Approval

SPECIFICATION CODES	
CODE	**DESCRIPTION**
1	Standard Specifications
2	Project Specifications (Supp.Specs., Sp. Provs)
3	None
4	Pass
5	Fail

Sample Identification Form - Back

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Louisiana Department of Transportation and Development

PORTLAND CEMENT CONCRETE PLANT CERTIFICATION REPORT

I. GENERAL INFORMATION

District Name: ________________________ District Number: ____________________
Plant Name: ________________________ Plant Code: ______________________
Plant Make: ________________________ Model/Serial No.: ____________________
Location: ________________________ Parish: ______________________
Mailing Address: ____

Plant Type: ☐ Batch Plant ☐ Dry Batch

☐ Central Mixer ☐ Site Mixer

Date Inspected: ______________________ Capacity: __________ yd^3/hr
Date Insp. For Certification: ______________________ Approved: ____________________
Remarks: ______________________ Approved: ____________________

II. MATERIAL STORAGE AND HANDLING

A. Aggregates – Handling and Equipment

1. Stockpiles Building Method: ☐ Dozer ☐ Loader ☐ Excavator
Other (describe): ____
Remarks: ____
____

Material Approved Producer/Supplier (Code)	Approved Source		Satisfactory Drainage		Separation						Contamination		Segregation	
					Adequate		Spacing		Partition					
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No

Portland Cement Concrete Plant Certification Report

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2. Storage Bins (Holding Hoppers)

Method of Loading ☐ Excavator ☐ Loader ☐ Belt Conveyor
Other (describe):______________________________

Bin partitions extended 1 ft above bins:	☐yes	☐no
Individual bin for each size aggregate:	☐yes	☐ no
Number of bins sufficient for operation:	☐yes	☐ no
Bins designed for efficient discharge:	☐yes	☐ no
Bins designed so that material does not accumulate in corners:	☐yes	☐ no
Bins in acceptable condition (no holes):	☐yes	☐ no

Type of discharge gate: ☐ clam shell ☐ other ____________________ (describe)

Operating properly with no leakage:	☐yes	☐ no
Equipped with vibrators:	☐yes	☐ no
Batch control sufficient to add batch quality slowly and to positively shut off flow with precision:	☐yes	☐ no
Bins designed so that material has minimum segregation during discharge:	☐yes	☐ no
Inspection platforms and ladders safe and adequate for inspection:	☐yes	☐ no

Remarks:______________________________

3. Conveyor System

Adequately transports aggregates for batching operations:	☐yes	☐ no
Condition is satisfactory with no spillage:	☐yes	☐ no
Belts free of holes and tears:	☐yes	☐ no

Remarks: ______________________________

4. Temperature Control

Provisions for cooling aggregate:	☐yes	☐ no
Provisions for heating aggregate:	☐yes	☐ no

Method(s) (describe): ______________________________

Remarks:______________________________

Portland Cement Concrete Plant Certification Report (cont'd.)

B. Cement – Handling and Equipment

1. Storage Bin

Individual bin for cement storage :	☐yes	☐ no
Sufficient for operations:	☐yes	☐ no
Bin in acceptable condition with no holes:	☐yes	☐ no
Bin designed to eliminate accumulation of material in corners:	☐yes	☐ no
Bin designed to discharge efficiently and freely into weight hopper:	☐yes	☐ no
Equipped with vibrators:	☐yes	☐ no
Batching control sufficient to add batch quantity slowly and positively shut off flow at desired weight	☐yes	☐ no
Connection between storage bin and weight hopper free of leaks:	☐yes	☐ no
Excessive dusting during batching:	☐yes	☐ no
Inspection platform and ladders safe and adequate for inspection:	☐yes	☐ no

Remarks:____

2. Source

Approved source:	☐yes	☐ no
Cement in storage from more than one source:	☐yes	☐ no
Cement in storage all one type:	☐yes	☐ no

Remarks:____

C. Fly Ash – Handling and Equipment

1. Storage Bin

Individual bin for fly ash storage:	☐yes	☐ no
Number of Silos: ____________ Capacity:_________ tons		
Sufficient for operations:	☐yes	☐ no
Weatherproof:	☐yes	☐ no
Bin in acceptable condition with no holes:	☐yes	☐ no

Portland Cement Concrete Plant Certification Report (cont'd.)

Fly Ash Storage Bin – continued

Bin designed to eliminate accumulation of material in corners:	☐yes ☐ no
Bin designed to discharge efficiently and freely into weight hoppers:	☐yes ☐ no
Equipped with vibrators:	☐yes ☐ no
Batching control sufficient to add batch quantity slowly and positively shut off flow at desired weight:	☐yes ☐ no
Connection between storage bin and weight hopper free of leaks:	☐yes ☐ no
Excessive dusting during batching:	☐yes ☐ no
Inspection platform and ladders safe and adequate for inspection:	☐yes ☐ no

Remarks:____
____

2. Source

Approved source:	☐yes ☐ no
Fly Ash in storage from more than one source:	☐yes ☐ no
Fly Ash in storage all one type:	☐yes ☐ no

Remarks:____
____

D. Ground Granulated Blast - Furnace Slag - Handling and Equipment

1. Storage Bin

Individual bin for Ground Granulated Blast Furnace Slag storage:	☐yes ☐ no
Number of Silos: ____________ Capacity:_________ tons	
Sufficient for operations:	☐yes ☐ no
Weatherproof:	☐yes ☐ no
Bin is in acceptable condition with no holes:	☐yes ☐ no
Bin designed to eliminate accumulation of material in corners:	☐yes ☐ no
Bin designed to discharge efficiently and freely into weight hoppers:	☐yes ☐ no
Equipped with vibrators:	☐yes ☐ no
Batching control sufficient to add batch quantity slowly and positively shut off flow at desired weight:	☐yes ☐ no
Connection between storage bin and weight hopper free of leaks:	☐yes ☐ no

Portland Cement Concrete Plant Certification Report (cont'd.)

Ground Granulated Blast -Furnace Slag-Handling and Equipment- Storage Bin – Continued

Excessive dusting during batching: ☐yes ☐ no

Inspection platform and ladders safe and adequate for inspection: ☐yes ☐ no

Remarks:____

____

2. Source

Approved source: ☐yes ☐ no

Ground Granulated Blast Furnace Slag in storage from more than one source: ☐yes ☐ no

Ground Granulated Blast Furnace Slag in storage all one type: ☐yes ☐ no

Remarks:____

____

E. Water – Handling and Equipment

Water from an approved source: ☐yes ☐ no

(describe): ____________________________

Provisions for cooling water:

☐ Ice ☐ Other: ______________________ ☐yes ☐ no

Provisions for heating water: ☐yes ☐ no

Method(s) (describe):____

Remarks:____

____

F. Admixtures – Handling and Equipment

Admixtures from an approved source: ☐yes ☐ no

Admixtures dispensed with the mixing water: ☐yes ☐ no

Manner of dispensing admixture satisfactory: ☐yes ☐ no

All admixtures used in batch from same manufacturer: ☐yes ☐ no

If more than one admixture is being used are they compatible: ☐yes ☐ no

Do admixtures being used require agitation: ☐yes ☐ no

Provisions for agitation in storage tanks: ☐yes ☐ no

Storage such that no contamination occurs: ☐yes ☐ no

Admixtures protected from freezing: ☐yes ☐ no

Remarks:____

____

Portland Cement Concrete Plant Certification Report (cont'd.)

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III. BATCHING EQUIPMENT

A. Weight Hoppers

1. Aggregate	2. Cement
Provisions for overload……………….. □yes □ no Describe: ______________________________ ______________________________________	Provisions for overload…………….. □ yes □ no Describe: ______________________________ ______________________________________
Separate from cement weigh hopper… . □yes □ no Acceptable condition - no holes……….. □yes □ no Discharge completely………………… □yes □ no Type of discharge gate: □clam shell □ other* *Describe:______________________________ Operating Properly – no leakage or excessive dusting ……………….……………….□yes □ no Equipped with vibrators……………….. □yes □ no Inspection platforms & ladders safe & is adequate for inspection…..…………..□yes □ no Remarks ______________________________ ______________________________________	Separate from aggregate weigh hopper .. □yes □ no Acceptable condition - no holes …….. □yes □ no Discharge completely………………… □yes □ no Type of discharge gate: *Describe:______________________________ Operating Properly – no leakage or excessive dusting………………………………….□yes □ no Equipped with vibrators……………….. □yes □ no Inspection platforms & ladders safe & is adequate for inspection……………….□yes □ no Remarks: ______________________________ ______________________________________
3. Fly Ash	**4. Ground Granulated Blast – Furnace Slag**
Provisions for overload………………… □yes □ no Describe: ______________________________ ______________________________________	Provisions for overload………………… □yes □ no Describe: ______________________________ ______________________________________
Separate from aggregate weigh hopper...□yes □ no Acceptable condition - no holes……… □yes □no Discharge completely………………... □yes □no Type of discharge gate: *Describe ______________________________ Operating properly – no leakage or excessive dusting ……………….……□yes □ no Equipped with vibrators……………….. □yes □ no Inspection platforms & ladders safe & is adequate for inspection…………..…...□yes □ no Remarks:______________________________ ______________________________________	Separate from aggregate weigh hopper…□yes □ no Acceptable condition - no holes.……. ... □yes □ no Discharge completely………………….. □yes □ no Type of discharge gate: *Describe______________________________ Operating properly – no leakage or excessive dusting ……………………□yes □ no Equipped with vibrators……………… □yes □ no Inspection platforms & ladders safe & is adequate for inspection……………..□yes □ no Remarks:______________________________ ______________________________________
5.Water	**Additional Comments**
Is water weighed …..………………… □yes □ no Weigh hopper functioning properly with no leakage …………………□yes □ no	______________________________________ ______________________________________ ______________________________________

Portland Cement Concrete Plant Certification Report (cont'd.)

B. Scales

1. General

Separate scale system for each type component that is weighed:	☐yes ☐ no
All scale parts including knife edges and supports clean and functioning properly:	☐yes ☐ no
Does wind influence the weights recorded on the scales:	☐yes ☐ no
Do all scales zero:	☐yes ☐ no
Scale heads and beams protected from the weather and dust:	☐yes ☐ no
Scale heads and beams readily visible to the operator:	☐yes ☐ no
If scales are tied to a remote terminal, is the weight visible:	☐yes ☐ no
Do the terminal and scale weights coincide:	☐yes ☐ no
Are the scales accurate to 0.4% of the net applied load:	☐yes ☐ no
Are the max. graduations on the scale 0.1% of the rated scale capacity:	☐yes ☐ no
Are aggregates weighed accumulatively:	☐yes ☐ no
Is scale is used to weigh the water for batching:	☐yes ☐ no
Is the scale accurate to 1% at ½ the max. allowable water per batch:	☐yes ☐ no

Remarks:____

____

2. Beam Scales

	Aggregate	Cement	Fly Ash	Slag	Water
Make					
Graduation					
Capacity					
Date Calibrated					
Maximum Error	%	%	%	%	%

Separate beam for each ingredient:	☐yes ☐ no
Scales provided with zero balance beam:	☐yes ☐ no
Scales provided with a tell-tale device:	☐yes ☐ no
Dust cover intact:	☐yes ☐ no
Poises can be locked:	☐yes ☐ no

Remarks:____

____

Portland Cement Concrete Plant Certification Report (cont'd.)

3. Dial Indicating Scales

	Aggregate	Cement	Fly Ash	Slag	Water
Make					
Graduations					
Capacity					
Date Calibrated					
Maximum Error	%	%	%	%	%

Separate beam for each ingredient: ☐yes ☐ no

Dial glass sealed against dust and weather : ☐yes ☐ no

Remarks:____

C. Metering Device

1. Water Meters

Make		**Date Calibrated**	
Min. Graduation		**Maximum Error, %**	

Dispensing method: ☐ Automatic ☐ Manual

Accurate to 1% at ½ the max. allowable water per batch: ☐yes ☐ no

Maximum graduation, 1 gal: ☐yes ☐ no

Any leakage: ☐yes ☐ no

Meter readily visible to the batcher: ☐yes ☐ no

Remarks:____

1. Admixture Dispensers

	Air Entrainment	Water Reducer		Superplasticizer	Other
		Normal Set	Set Retarder		
Make					
Min. Graduation					
Capacity					
Date Calibrated					
Maximum Error	%	%	%	%	%

Separate device for each admixture: ☐yes ☐ no

Dispensing method: ☐ Automatic ☐ Manual

Any leakage: ☐yes ☐ no

Accuracy sufficient to ensure the correct vol. of admix. in the batch with 3%: ☐yes ☐ no

Device protected from weather and contamination: ☐yes ☐ no

Remarks:____

Portland Cement Concrete Plant Certification Report (cont'd.)

IV. TICKET SYSTEM

Automatic Printer: ☐ Applicable ☐ Not Applicable

System tamper proof:	☐yes ☐ no
Does the system print the following:	
a. Time of batching to the nearest minute	☐yes ☐ no
b. Water quantity added to batch	☐yes ☐ no
c. Batch weights for each component:	☐yes ☐ no
d. Moisture content of aggregate:	☐yes ☐ no
e. Quantities of admixture:	☐yes ☐ no
f. Batch number:	☐yes ☐ no
g. Day, month, and year	☐yes ☐ no
h. Maximum quantity of water to be added to job site:	☐yes ☐ no
Are moisture content of aggregate or quantities of admixtures placed on ticket by batcher in lieu of printing:	☐yes ☐ no

NOTE: *Form 03-22-4028, Batch Certification of Portland Cement Concrete must be attached to the automatic system printer ticket.*

Form 03-22-4028, Batch Certification of PCC: ☐ Available ☐ Not Available

Remarks:____

V. MIXING

A. ☐ **Truck Mixer** ☐ **Shrink-Mixed** ☐ **Central Mixer** Make:________________

Batch Size: ________________yd^3 Capacity________________yd^3/hr

Timing device which automatically locks the discharge lever when the drum has been charged and releases it at the end of mixing cycle:	☐yes ☐ no
Uniformly mixes the batch components:	☐yes ☐ no

B. Water Storage and Dispensing

Adequate water storage and an accurate, automatic dispensing device meeting the following requirements:

Water meter accurate to 1% at ½ the allowable water per batch:	☐yes ☐ no
Maximum graduation is 1 gal	☐yes ☐ no
Any leakage:	☐yes ☐ no
Meter readily visible to the batcher:	☐yes ☐ no

C. Manufacturer's Plate

Manufacturer's plate listing:

a. Capacity of drum:	☐yes ☐ no
b. Mixing speed:	☐yes ☐ no
Blades meet manufacturer's requirements:	☐yes ☐ no

Portland Cement Concrete Plant Certification Report (cont'd.)

Dotd.la.gov
DOTD 03-22-4030
Page 10 of 10
Rev 4/14

D. Admixture Dispensers

Admixture dispensers meet the following specifications:

Separate device for each aggregate:	☐yes	☐ no
Dispensing method:	☐yes	☐ no

☐ Automatic ☐ Manual

Any leakage:

Accuracy sufficient to ensure the correct volume of admixture in the batch within 3%:	☐yes	☐ no
Device protected from weather and contamination:	☐yes	☐ no
General condition satisfactory:	☐yes	☐ no
Is mixture completely discharged in satisfactory manner:	☐yes	☐ no

Remarks:____

VI. PLANT SITE LABORATORY

Building

Building dedicated only for testing purposes:	☐yes	☐ no
Site convenient and otherwise acceptable:	☐yes	☐ no
Floor space a minimum of 160ft^2	☐yes	☐ no
Weatherproof:	☐yes	☐ no
Secured by suitable locks and catches:	☐yes	☐ no
Air conditioned:	☐yes	☐ no
Heated:	☐yes	☐ no
Ventilation adequate/All fumes vented (fume hood):	☐yes	☐ no
Sink with running water:	☐yes	☐ no
Adequate lighting and power outlets:	☐yes	☐ no
Minimum of one outside door:	☐yes	☐ no
Sufficient, sturdy benches and tables for work surfaces:	☐yes	☐ no
Sanitary facilities:	☐yes	☐ no

Remarks:____

General remarks on plant certification:______________________________

Certified Inspector	Date	District Lab Representative	Date
Project Engineer	Date	District Lab Engineer	Date

Portland Cement Concrete Plant Certification Report (cont'd.)

DOTD 03-22-3065
Rev. 10/93

State of Louisiana
Department of Transportation and Development

CERTIFICATION REPORT FOR SCALES AND METERS

Plant Name: ______________________ Location: __________________ Date: ________________

Plant Type: ☐ Portland Cement Concrete ☐ Asphaltic Concrete ☐ Other ____________________

Type Measurement Device: ☐ Springless Dial ☐ Load Cell ☐ Beam ☐ Platform
☐ Belt ☐ Meter ☐ Other ______________________________

Material Measured: ☐ Asphalt ☐ Anti-Strip ☐ Water ☐ Aggregate: ☐ Coarse ☐ Fine
☐ Cement ☐ Filler ☐ Admix ☐ Other ____________________________

Make of Device: _________________Capacity: _______________ Minimum Gradations: _____________

Serial No. (Identification): ____________________________________ Electronic Readout: ☐ Yes ☐ No

Actual Amount	Reading Amount	Percent Error	Actual Amount	Reading Amount	Percent Error	Actual Amount	Reading Amount	Percent Error

Maximum Error ______________________%

I certify that this measuring device meets the certification requirements of the Louisiana DOTD.

Certifying Company: ______________________________ ______________________________

LA State License No: ______________________________ Technician and LA License No.

*Expiration Date: ______________________________

All scales and other measuring devices utilized at plants supplying materials to DOTD are to be certified by an independent company every 90 days or as required by the engineer. This report is to be completed by the certifying company's representative for each measuring device for each material.

Copies:

One copy is to be filed in plant records readily available to department personnel.
One copy is to be sent to the DOTD District Laboratory Engineer.

Certification Report for Scales and Meters

DOTD 03-22-4045
Page 1 of 4
Rev. 12/97

Louisiana Department of Transportation and Development

PORTLAND CEMENT CONCRETE TRUCK CERTIFICATION REPORT

I GENERAL INFORMATION

District Name: ______________________________ District Number: ____________________

Plant Name: ______________________________ Plant Code: ____________________

Location: ______________________________ Parish: ____________________

Mailing Address: ____

Truck Identification No.: ______________________ Make: ____________________

Truck Type: ☐ Truck Mixer ☐ Agitator ☐ Non Agitator ☐ Dry Batch

Date Inspected for Certification ______________ Date Approved: ____________________

Is Truck Weight Certified Under EDSM III.1.1.12: ☐ yes ☐ no

Certifying Authority: ______________________ Date Certified: ____________________

Remarks: ____

____

A. Truck Mixer

Capacity: _________ m³ (yd³)

Revolving drum type:	☐ yes	☐ no
Watertight:	☐ yes	☐ no
Uniform distribution of components throughout mix:	☐ yes	☐ no
Supplied with tank to carry mixing water:	☐ yes	☐ no
Exact quantity measured and placed into tank:	☐ yes	☐ no
Is tank the type that can be calibrated and the quantity dispensed exactly measured:	☐ yes	☐ no
Equipped with revolution counters:	☐ yes	☐ no
a. Mechanical:	☐ yes	☐ no
b. Electrical:	☐ yes	☐ no
c. Counters located for safe and convenient inspection:	☐ yes	☐ no

Portland Cement Concrete Truck Certification Report

DOTD 03-22-4045
Page 2 of 4
Rev. 12/97

Manufacturer's plate in prominent place and state:

a. Uses of the equipment:	☐ yes	☐ no
b. Capacity of drum in terms of concrete volume:	☐ yes	☐ no
c. Agitating speed of drum:	☐ yes	☐ no
d. Mixing speed of drum:	☐ yes	☐ no
Blades meet the requirements of the manufacturer:	☐ yes	☐ no
General condition of the mixer unit satisfactory:	☐ yes	☐ no
Buildup in drum excessive:	☐ yes	☐ no
Charging hopper clean without holes:	☐ yes	☐ no
Discharge chute clean without holes:	☐ yes	☐ no
Attached properly:	☐ yes	☐ no
Discharge of concrete rapid and complete:	☐ yes	☐ no
Adequate platform for inspection of truck and material being discharged:	☐ yes	☐ no

Remarks: ____

____

B. Agitator

Capacity: _________ m^3 (yd^3)

Bed watertight:	☐ yes	☐ no

Mixing blade type *(describe)* ______________________________

Blades meet manufacturer's recommendations:	☐ yes	☐ no
Buildup in drum excessive:	☐ yes	☐ no
Discharge of concrete rapid and complete:	☐ yes	☐ no
General condition of unit satisfactory:	☐ yes	☐ no
Discharge concrete is uniform:	☐ yes	☐ no

Remarks: ____

____

Portland Cement Concrete Truck Certification Report (cont'd.)

C. Non Agitator

Capacity: _________ m^3 (yd^3)

Bed watertight: ☐ yes ☐ no

Buildup excessive: ☐ yes ☐ no

Discharge of concrete rapid and complete: ☐ yes ☐ no

General condition of unit satisfactory: ☐ yes ☐ no

Discharge concrete is uniform: ☐ yes ☐ no

Remarks: ____

____

D. Dry Batch Transports

Type of Bed: ☐ batch box ☐ partition dump

☐ other *(describe)* ______________________________

Capacity: _________ m^3 (yd^3)

Partitions between batches: ☐ yes ☐ no

Lock securely: ☐ yes ☐ no

No leakage between batches: ☐ yes ☐ no

Partitions high enough to separate batches: ☐ yes ☐ no

Beds leakproof: ☐ yes ☐ no

No excessive buildup in bed: ☐ yes ☐ no

General condition of truck satisfactory: ☐ yes ☐ no

Remarks: ____

____

Portland Cement Concrete Truck Certification Report (cont'd.)

DOTD 03-22-4045
Page 4 of 4
Rev. 12/97

General remarks on truck certification: ______________________________

____

____

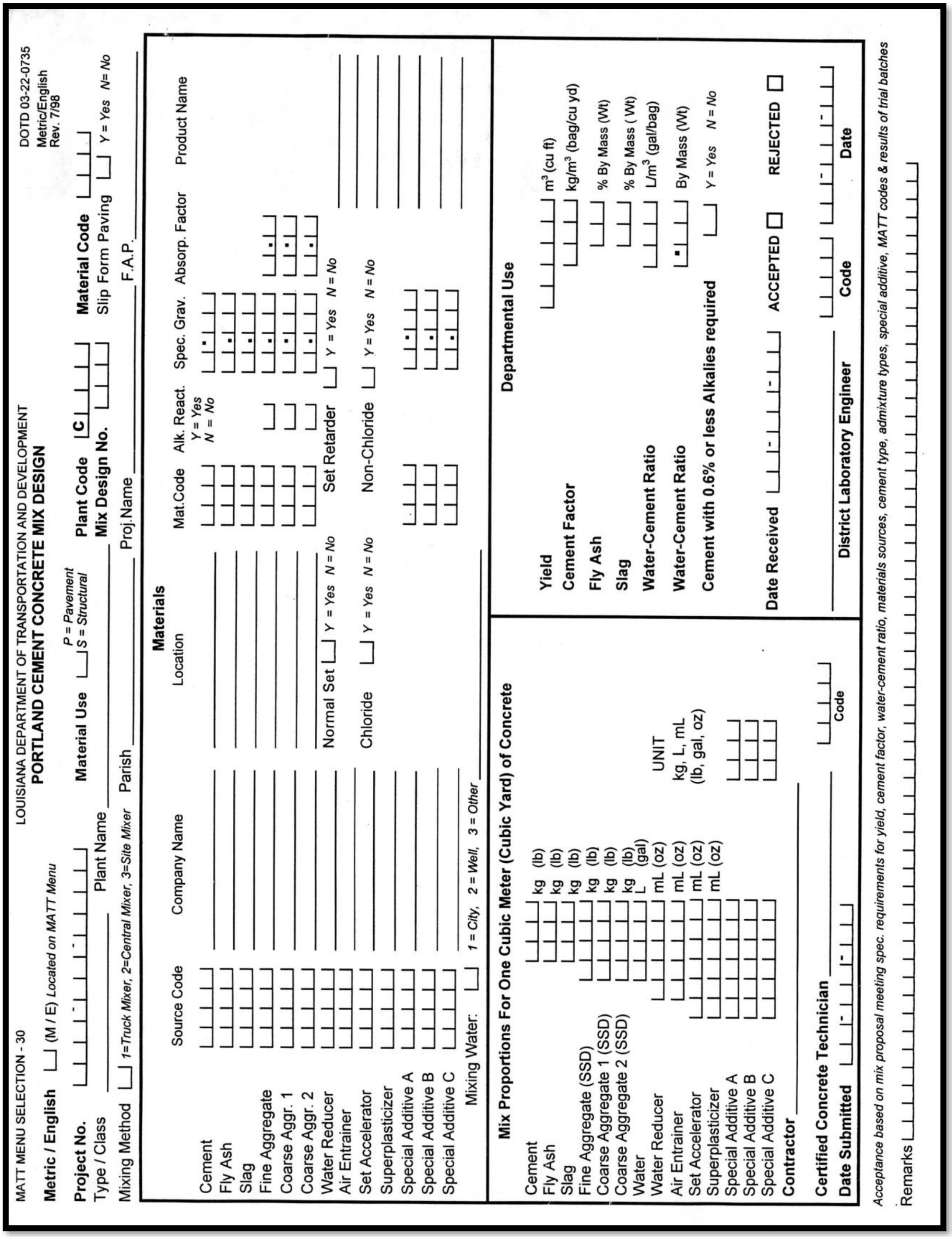
____

____

____

Certified Inspector	**Date**	**District Lab Representative**	**Date**
Project Engineer	**Date**	**District Laboratory Engineer**	**Date**

Portland Cement Concrete Truck Certification Report (cont'd.)



MATT MENU SELECTION - 30

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

PORTLAND CEMENT CONCRETE MIX DESIGN

DOTD 03-22-0735
Metric/English
Rev. 7/98

Metric / English ☐ (M / E) *Located on MATT Menu*

Project No. ____ **Material Use** ☐ *P = Pavement S = Structural* **Plant Code** C ____ **Material Code** ____

Type / Class ____ Plant Name ____ **Mix Design No.** ____ Slip Form Paving ☐ *Y = Yes N= No*

Mixing Method ☐ *1=Truck Mixer, 2=Central Mixer, 3=Site Mixer* Parish ____ Proj.Name ____ F.A.P. ____

Materials

	Source Code	Company Name	Location	Mat.Code	Alk. React. (*Y = Yes N = No*)	Spec. Grav.	Absorp. Factor	Product Name
Cement								
Fly Ash								
Slag								
Fine Aggregate								
Coarse Aggr. 1								
Coarse Aggr. 2								
Water Reducer			Normal Set ☐ *Y = Yes N = No*	Set Retarder ☐ *Y = Yes N = No*				
Air Entrainer								
Set Accelerator			Chloride ☐ *Y = Yes N = No*	Non-Chloride ☐ *Y = Yes N = No*				
Superplasticizer								
Special Additive A								
Special Additive B								
Special Additive C								

Mixing Water: ☐ *1 = City, 2 = Well, 3 = Other* ____

Mix Proportions For One Cubic Meter (Cubic Yard) of Concrete

		UNIT kg, L, mL (lb, gal, oz)
Cement	kg (lb)	
Fly Ash	kg (lb)	
Slag	kg (lb)	
Fine Aggregate (SSD)	kg (lb)	
Coarse Aggregate 1 (SSD)	kg (lb)	
Coarse Aggregate 2 (SSD)	kg (lb)	
Water	L (gal)	
Water Reducer	mL (oz)	
Air Entrainer	mL (oz)	
Set Accelerator	mL (oz)	
Superplasticizer	mL (oz)	
Special Additive A		
Special Additive B		
Special Additive C		

Contractor ____

Certified Concrete Technician ____ Code ____

Date Submitted ____

Departmental Use

Yield		m^3 (cu ft)
Cement Factor		kg/m^3 (bag/cu yd)
Fly Ash		% By Mass (Wt)
Slag		% By Mass (Wt)
Water-Cement Ratio		L/m^3 (gal/bag)
Water-Cement Ratio		By Mass (Wt)
Cement with 0.6% or less Alkalies required	☐	*Y = Yes N = No*

Date Received ____ **ACCEPTED** ☐ **REJECTED** ☐

____ **District Laboratory Engineer** **Code** **Date**

Acceptance based on mix proposal meeting spec. requirements for yield, cement factor, water-cement ratio, materials sources, cement type, admixture types, special additive, MATT codes & results of trial batches

Remarks ____

Portland Cement Concrete Mix Design Form

Specific Gravity (SSD)	Water Absorption Factor
SAND	
2.62	0.5
GRAVEL	
2.45	4.0
2.46	4.0
2.47	3.5
2.48	3.5
2.49	3.5
2.50	3.0
2.51	2.5
2.52	2.5
2.53	2.2
2.54	1.7
2.55	1.5
2.56	1.2
2.57	1.0
2.58	1.0
2.59	1.0
2.60	1.0
2.61	0.8
2.62	0.8
2.63	0.8

Specific Gravity and Water Absorption Factors for Sand and Gravel – AML

State of Louisiana
Louisiana Department of Transportation and Development

DOTD 03-22-4040
ENG/MET
Rev. 04/08

PORTLAND CEMENT CONCRETE PLANT REPORT

Project No: ____________ Date: ________ Lot No. ________ Mix Design No: ________

Plant Name: ____________ Location: ____________ Concrete *(Class/Type)* : ________

Min. Cement: ________ lb./cu yd (kg/m^3) Max. Water-Cement Ratio: ________ lb./lb. (kg/kg)

Total today: cu yd (m^3) ________ Scales Balanced: Times a. ________ b. ________ c. ________

Mix Proportions from Mix Design					
Cement	lb (kg)	Fine Aggr. (SSD)	lb (kg)	Superplasticizer	oz (mL)
Fly Ash (or) Slag	lb (kg)	Water Reducer	oz (mL)	Special Additive A	lb, gal, oz (kg, L, mL)
Coarse Aggr 1 (SSD)	lb (kg)	Air Entrainment	oz (mL)	Special Additive B	lb, gal, oz (kg, L, mL)
Coarse Aggr 2 (SSD)	lb (kg)	Set Accelerator	oz (mL)	Special Additive C	lb, gal, oz (kg, L, mL)

Moisture and Batch Computations of One cu yd (m^3)

	Aggregate Tests		Test 1 Fine	Test 1 Co. Aggr 1	Test 1 Co. Aggr 2	Test 2 Fine	Test 2 Co. Aggr 1	Test 2 Co. Aggr 2
	Time of Test							
A	Tare Wt., lb, (g)							
B	Wet Wt., lb (g)	(A + Sample)						
C	Dry Wt., lb (g)	(A + Sample)						
D	Wt. of Water, lb (g)	(B - C)						
E	Dry Wt. of Sample	(C - A)						
F	Percent Total Moisture %	(D / E) 100						
G	Absorption Factor, %							
H	Percent Free Moisture, %	(F - G)						
I	Aggr. (SSD) lb/cu yd (kg/m^3)	*(from mix des)*						
J	Corrected Wt , lb (g)	(1+ (H / 100)) I						
K	Free Water, lb (kg)	(J - I)						
L	Free Water, gal (L)	(K/ 8.34) (1kg = 1L)						
	Allowable Water Calculations for One cu yd (m^3)							
M	Total Admixtures, Special Additives	(oz/128)gal (mL/1000)						
N	Total Free Water, gal (L)	(L for fine & co aggr + M)						
O	Max Allowable Water, gal (L)	*(from mix des)*						
P	Max Allowable Water to be Added, gal (L)	(O-N)						
Q	Min Allowable Water to be Added (.75P), gal(L)							
	Total Batch Calculations							
R	Batch Size, cu yd (m^3)							
S	Cement, lb (kg)	(R x Mix Design Wt.)						
T	Fly Ash (or) Slag, lb (kg)	(R x Mix Design Wt.)						
U	Fine Aggregate, lb (kg)	(R x J)						
V_1	Coarse Aggregate1, lb (kg)	(R x J)						
V_2	Coarse Aggregate2, lb (kg)	(R x J)						
W	Max Water to be Added, gal (L)	(R x P)						
X	Min Water to be Added, gal (L)	(R x Q)						
Y	Water Reducing Admixture, oz (mL)	(R x Mix Design Wt.)						
Z_1	Air Entraining Admixture, oz (mL)	(R x Mix Design Wt.)						
Z_2	Special Additivies, lb, gal, oz (kg, L, mL)	(R x Mix Design Wt.)						
	Batch Water Adjustment for Ice							
AA	Ice Added, lb/cu yd (kg/m^3)							
BB	Ice, gal (L), [AA x R = L/batch], (1 kg = 1L)	(AA x R/8.34 = gal/batch)						
CC	Adjust. Max Water to be Added, gal (L)	(W - BB)						
DD	Adjust. Min Water to be Added, gal (L)	(X - BB)						

Remarks: ____

______________________ Certified Concrete Technician

______________________ Department's Certified Inspector

Portland Cement Concrete Plant Report

DOTD 03-22-4028
Rev. 05/06

State of Louisiana
Department of Transportation and Development

BATCH CERTIFICATION FOR PORTLAND CEMENT CONCRETE

Plant Data

Project No: ______________________ Time Batched: __________ AM / PM Date: ______________

Plant Name: ______________________ Batch No: ______________ PCC Mix Des. No: ________

Location: ______________________ Batch Size: __________ cu yd (m^3) Concrete *(Class/Type)*: ______

Truck No: __________ Legal Load: ________ lb (kg) / ________ cu yd (m^3) Ambient Air Temp: ________ ^{0}F (^{0}C)

Batch Weights

Cement	lb (kg)	Coarse Aggr 2 (SSD)	lb (kg)	Set Accelerator	oz (mL)
Fly Ash	lb (kg)	Coarse Aggr 3 (SSD)	lb (kg)	Superplasticizer	oz (mL)
Slag	lb (kg)	Water Reducer	lb (kg)	Special Additive A	lb, gal, oz (kg, L, mL)
Fine Aggr. (SSD)	lb (kg)	Normal Set ☐ Set Retarder ☐		Special Additive B	lb, gal, oz (kg, L, mL)
Coarse Aggr 1 (SSD)	lb (kg)	Air Entrainment	oz (mL)	Special Additive C	lb, gal, oz (kg, L, mL)

Maximum Allowable Water to be Added	gal (L)
Ice Added	gal (L)
Water Added	gal (L)
Maximum Water that can be Added at Jobsite	gal (L)
Revolutions at Mixing Speed	

____
Qualified Concrete Batcher

Job Site Data

Slump	in (mm)
Air Content	%
Temp. of Concrete	^{0}F (^{0}C)

____
Authorized Concrete Field Tester / Cert PCC Tech.

Department Use Only

Lot No: ____________ Mix Use: ☐ Structural ☐ Major ☐ Minor ☐ Pavement Item No. ____________________

This Lot: ______________ cu yd (m^3)

Time Truck Emptied: __________ AM / PM Allowed Elapsed Time: ☐ 45 Min. ☐ 90 Min. Elapsed Time: ____________ Min.

Water Added: ____________ gal (L) Total Water in Batch: __________ gal (L) No. of Water Additions: _________

Revolutions at Mixing Speed: ________________ Total Revolutions at Mixing Speed: ____________

Temperature of Concrete: ________________ ^{0}F (^{0}C) Location Placed: ______________________

Remarks: ____

____

______________________________ ______________________________
Inspector (DOTD) **DOTD Certified Inspector**

Batch Certification for Portland Cement Concrete

DOTD 03-22-0023
Rev. 1/15

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
MATERIALS & TESTING SECTION
5080 FLORIDA BLVD., BATON ROUGE, LA 70806

CERTIFICATE OF COMPLIANCE
FOR
FLY ASH

CONTRACT NAME______________________________________ **P.O. NUMBER**________________________________

CONTRACT NUMBER__________________________________ **CONTRACTOR**________________________________

CONCRETE PLANT____________________________________ **PLANT LOCATION**____________________________

PRODUCER/SUPPLIER NAME	PRODUCER/ SUPPLIER CODE	PRODUCT
	APS	

FLY ASH CLASS	INTENDED USE	MODE OF SHIPPING	VEHICLE NO.	SEAL NO.	DATE SHIPPED	QUANTITY MG (tons)

Note: Alkali content calculated in accordance with DOTD TR 531 shall not exceed 2.5 percent by weight (mass). Fly ash with alkali content greater than 1.5 percent may only be used with innocuous (non-reactive) aggregates.

The undersigned certified that the fly ash in this shipment has been manufactured under strict quality control and complies with the Louisiana Department of Transportation and Development specifications for the intended use and class of fly ash indicated above.

This certificate is invalid unless signed by an authorized representative of the company.

COMPANY:____

BY:____
(Authorized Company Representative Signature)

Copies:
One copy shall accompany all shipments (rail, truck, or barge) of the above listed materials for each project. One copy shall be mailed to the Materials Engineer Administrator, Louisiana Department of Transportation and Development, 5080 Florida Blvd., Baton Rouge, LA 70806.

FOR DOTD USE:

Approved:____ **Date:**____________________

Remarks:____

____

Shipments will be accepted only when accompanied by this official DOTD certificate form.

Certificate of Compliance for Fly Ash

DOTD 03-22-0032
Rev. 10/07

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
MATERIALS & TESTING SECTION
5080 FLORIDA BLVD., BATON ROUGE, LA 70806

CERTIFICATE OF COMPLIANCE FOR GROUND GRANULATED BLAST - FURNACE SLAG

PROJECT NAME ______________________ P. O. NUMBER ______________________

PROJECT NUMBER ______________________ CONTRACTOR ______________________

CONCRETE PLANT ______________________ PLANT LOCATION ______________________

MANUFACTURER	MFG. LOCATION	PRODUCT SOURCE CODE	SUPPLIER	SUPPLIER LOCATION

GRADE	INTENDED USE	MODE OF SHIPPING	VEHICLE NO.	SEAL NO.	DATE SHIPPED	QUANTITY Tons (Mg)

Note: *LA DOTD specifications require an alkali content of 0.60% or less.*

The undersigned certifies that the ground granulated blast-furnace slag in this shipment has been manufactured under strict quality control and complies with the Louisiana Department of Transportation and Development specifications for the intended use and grade of ground granulated blast furnace slag indicated above.

This certificate is invalid unless signed by an authorized representative of the company.

COMPANY: ______________________

BY: ______________________
(Authorized Company Representative Signature)

Copies:
- One copy shall accompany all shipments *(rail, truck, or barge)* of the above listed materials for each project.
- One copy shall be mailed to the Materials Engineer Administrator, LA DOTD, 5080 Florida Blvd., Baton Rouge, LA 70806.

For DOTD Use:

Approved: ______________________ Date: ______________________

Remarks: ______________________

____

Shipments will be accepted only when accompanied by this official DOTD certificate form.

Certificate of Compliance for Ground Granulated Blast – Furnace Slag

DOTD 03-22-0024
Rev. 10/07

Mill Shipment: ________________
Terminal Shipment: ____________

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION & DEVELOPMENT
MATERIALS & TESTING SECTION
5080 FLORIDA BLVD., BATON ROUGE, LA 70806

CERTIFICATE OF COMPLIANCE FOR PORTLAND CEMENT, PORTLAND-POZZOLAN CEMENT AND PORTLAND BLAST - FURNACE SLAG CEMENT

PROJECT NAME ______________________ P. O. NUMBER ______________________

PROJECT NUMBER ______________________ CONTRACTOR ______________________

CONCRETE PLANT ______________________ PLANT LOCATION ______________________

[1]Cement Type	QPL 7 Cement Company	One-Time Foreign Shipment Non-QPL Code	Mill Location	Source of Clinker
	Name:		Domestic:	Domestic:
	Product Source Code:		Foreign:	Foreign:
[1] Cement Types: I, IB, IC, IP, II, III, IS			1-Time Foreign Ship:	

Mode Of Shipping	Vehicle No.	Seal No.	Date Shipped	From Silo No.	Quantity, tons (Mg)

***Note:** LA DOTD specifications require an alkali content of 0.60% or less.*

The undersigned certifies that the cement in this shipment has been manufactured under strict quality control and complies with the Louisiana Department of Transportation and Development specifications for the cement type indicated above.

This certificate is invalid unless signed by an authorized representative of the company.

COMPANY: ______________________

BY: ______________________
(Authorized Company Representative Signature)

The undersigned certifies that the cement in this shipment is the same cement identified above; that the Company has certified conformance of this cement with Louisiana Department of Transportation and Development specifications; and that no other brand or type of cement has been added.

This certificate is invalid unless signed by an authorized representative of the company.

Terminal Name: ______________________ ______________________
(Authorized Terminal Representative)

Terminal Location - City : ____________ State: ________

Copies: One copy shall accompany all shipments *(rail, truck, or barge)* of the above listed materials for each project. One copy shall be mailed to the Materials Engineer Administrator, LA DOTD, 5080 Florida Blvd., Baton Rouge, LA 70806.

For DOTD Use:

Approved: ______________________ Date: ____________
Remarks: ______________________
____

Shipments will be accepted only when accompanied by this official DOTD certificate form.

Certificate of Compliance for Portland Cement, Portland-Pozzolan Cement, etc.

DOTD 03-22-0040
Rev. 10/07

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
MATERIALS & TESTING SECTION
5080 FLORIDA BLVD., BATON ROUGE, LA 70806

CERTIFICATE OF COMPLIANCE FOR SILICA FUME

PROJECT NAME ____________ P.O. NUMBER ____________

PROJECT NUMBER ____________ CONTRACTOR ____________

CONCRETE PLANT ____________ PLANT LOCATION ____________

MANUFACTURER	MANUFACTURER LOCATION	PRODUCT SOURCE CODE	SUPPLIER	SUPPLIER LOCATION

INTENDED USE	MODE OF SHIPPING	VEHICLE NUMBER	SEAL NUMBER	DATE SHIPPED	QUANITY TONS (Mg)

The undersigned certifies that the silica fume in this shipment has been manufactured under strict quality control and complies with Louisiana Department of Transportation and Development specifications for the intended use of silica fume indicated above.

This certificate is invalid unless signed by an authorized representative of the company.

Company: ____________

By: ____________
(Authorized Company Representative Signature)

Copies:

- One copy shall accompany all shipments (rail, truck or barge) of the above listed materials for each project.
- One copy shall be Mailed to: Materials Administrator
  Louisiana Department of Transportation and Development
  5080 Florida Blvd.
  Baton Rouge, LA 70806

FOR DOTD USE:

Approved: ____________ Date: ____________

Remarks: ____________

Shipments will be accepted only when accompanied by this official DOTD Certificate form.

Certificate of Compliance for Silica Fume

DOTD 03-22-0025
Rev. 8/03

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
MATERIALS & TESTING SECTION
5080 FLORIDA BLVD., BATON ROUGE, LA 70806

CERTIFICATE OF DELIVERY
FOR
JOINT SEALANTS

PROJECT NAME ______________________ P. O. NUMBER ______________________

PROJECT NUMBER ______________________ CONTRACTOR ______________________

MATERIAL ABBREV. (SEE BELOW)	MANUFACTURER	QUANTITY	MANUFACTURER LOT NUMBER	PROD. SOURCE CODE	DOTD LOT NUMBER *(EX:61-PU-0001)*	REPRESENTED BY DOTD LAB. NUMBER

List of Materials with Material Abbreviation:

(PU) Polyurethane Polymer Joint Sealant (QPL 5)
(SI) Silicone Polymer Joint Sealant (QPL 42)
(RU) Rubberized Asphaltic Type Joint Sealant (QPL 67)

This is to certify that the materials listed above have been shipped to the referenced project. We certify that random samples taken from the lot or batch of the materials listed above have been previously tested by the Materials & Testing Section under the above referenced lab numbers and have met all specification requirements for the designated project. ***This certificate is invalid unless signed by an authorized representative of the company.***

COMPANY: ______________________

Date Shipped to Jobsite: ______________ BY: ______________________
(Authorized Company Representative Signature)

Copies:
One copy shall accompany all shipments of the above listed materials for each project .
One copy shall be mailed to the Materials Engineer Administrator, Louisiana Department of Transportation and Development, 5080 Florida Blvd., Baton Rouge, LA 70806.

For DOTD Use:

Approved: ______________________ Date: ______________

Remarks: ______________________

____

Shipments will be accepted only when accompanied by this official DOTD certificate form.

Certificate of Compliance for Joint Sealants

DOTD 03-22-0030
REV. 2/11

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
MATERIALS AND TESTING SECTION
5080 FLORIDA BOULEVARD, BATON ROUGE, LA 70806

CERTIFICATE OF COMPLIANCE
FOR
CONCRETE ADMIXTURES

PROJECT NAME ____________________________ P. O. NUMBER ____________________________
PROJECT NUMBER ____________________________ CONTRACTOR ____________________________
CONCRETE PLANT ____________________________ PLANT LOCATION ____________________________

MATERIAL ABBREV. (SEE BELOW)	MANUFACTURER	QUANTITY	MANUFACTURER LOT NUMBER	PRODUCT SOURCE CODE

List of Materials with Material Abbreviation:
(AE) Air Entraining Concrete Admixture (QPL 58)
(WN) Water-Reducing, Normal Set Concrete Admixture (QPL 58)
(WS) Water-Reducing, Set Retarding Concrete Admixture (QPL 58)
(HN) High Range Water-Reducing, Normal Set Concrete Admixture (QPL 58)
(HS) High Range Water-Reducing, Set Retarding Concrete Admixture (QPL 58)
(SA) Set Accelerating Concrete Admixture (QPL 58)
(SM) Special Modifying Admixture (QPL 58)

This is to certify that the materials listed above comply with LADOTD Specifications for the type admixture indicated above. ***This certificate is invalid unless signed by an authorized representative of the company.***

Date Shipped to Plant : ____________________________

COMPANY: ____________________________
BY: ____________________________
(Authorized Company Representative Signature)

Copies:
One copy shall accompany all shipments of the above listed materials for each project.
One copy shall be mailed to the Materials Engineer Administrator, Louisiana Department of Transportation and Development, 5080 Florida Blvd., Baton Rouge, LA 70806

FOR DOTD USE:
Approved: ____________________________ DATE: ____________________________
REMARKS: ____
____

Shipments will be accepted only when accompanied by this official DOTD certificate form.

Certificate of Compliance for Concrete Admixtures

DOTD 03-22-0050
Rev. 08/08

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
MATERIALS & TESTING SECTION
5080 FLORIDA BLVD., BATON ROUGE, LA 70806

CERTIFICATE OF COMPLIANCE
FOR
LIQUID MEMBRANE - FORMING COMPOUNDS (QPL 65)

PROJECT NAME ______________________ P. O. NUMBER ______________________

PROJECT NUMBER ______________________ CONTRACTOR ______________________

PROD. SOURCE CODE	PRODUCT TRADE NAME	TYPE	MANUFACTURER	MANUFACTURER LOT NUMBER	QUANTITY

The undersigned certifies that the liquid membrane forming compounds comply with the Louisiana Department of Transportation and Development specifications for the type indicated above. ***The certificate is invalid unless signed by an authorized representative of the company.***

COMPANY: ______________________

Date Shipped to Jobsite: ______________________ BY: ______________________
(Authorized Company Representative Signature)

Copies:
One copy for each project shall accompany all shipments of the above listed materials.
One copy shall be mailed to the Materials Engineer Administrator, Louisiana Department of Transportation & Development, 5080 Florida Blvd., Baton Rouge, LA 70806.

For DOTD Use:

Approved: ______________________ Date: ______________________

Remarks: ______________________

____

Shipments will be accepted only when accompanied by this official DOTD certificate.

Certificate of Compliance for Liquid Membrane – Forming Compounds

DOTD 03-22-0749
Adp. 04/06

Louisiana Department of Transportation and Development

AGGREGATES FOR PCC PAVEMENTS (TYPES B & D)

Project No .... **Material Code** ... 6 7 2

Sampled By *(signature)*

Lab No ....

Date Sampled ...

Submitted By ....

Quantity .... **Unit** ....

Purpose Code 2

Plant Code .... C **Spec Code** .....

P. O. No. ....

Independ. Testing Lab Code L

Date Tested ....

Sample Ident ....

Materials Sampled From: *(Belt, Hopper)*........

Date Transport to Dist/Matls Lab ...

Date Rec'd @ Dist Lab ....

Date Rec'd @ Matls Lab ....

Remarks 1

Remarks 2

Item No. ....

Sampling / Testing Comments

(Attach any additional worksheets used in determination)

		PASS or FAIL P / F
AGGREGATE TYPE *(B or D)*		XXXX
PCC MIX DESIGN NO		XXXX
% RETAINED COMBINED AGGREGATE:	XXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXX
SIEVES SIZES: *(DOTD TR 112 & 113)*	XXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXX
2 1/2 in (63 mm)		
2 in (50 mm)		
1 1/2 in (37.5 mm)		
1 in (25.0 mm)		
3/4 in (19.0 mm)		
1/2 in (12.5 mm)		
3/8 in (9.5 mm)		
No 4 (4.75 mm)		
No 8 (2.36 mm)		
No 16 (1.18 mm)		
No 30 (600 μm)		
No 50 (300 μm)		
No 100 (150 μm)		
No 200 (75 μm)		
	XXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXX
SUM OF ADJACENT SIEVES:	XXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXX
1 in - 3/4 in (25.0 - 19.0 mm)		
3/4 in - 1/2 in (19.0 - 12.5 mm)		
1/2 in - 3/8 in (12.5 - 9.5 mm)		
3/8 in - No 4 (9.5 - 4.75 mm)		
No 4 - No 8 (4.75 - 2.36 mm)		
No 8 - No 16 (2.36 - 1.08 mm)		
No 16 - No 30 (1.18 - 600 μm)		

(Over)

Aggregate Test Report for Type B & D Portland Cement Concrete Pavements

AGGREGATES FOR PCC PAVEMENTS (TYPES B & D)

Project No.		**Mat Code**	672
Lab No.		**Mix Des No.**	

Notes:

___

___

___

___

___

___

___

___

___

(Attach any additional worksheets used in determination)

Tested By: ______________________ Date: ______________________

Checked By: ______________________ Date: ______________________

APPROVED BY: ______________________ **DATE:** ______________________

Aggregate Test Report for Type B & D Portland Cement Concrete Pavements (cont'd.)

MATT MENU SELECTION - 2

Louisiana Department of Transportation and Development

AGGREGATE TEST REPORT

DOTD 03-22-0745
Metric / English
Rev. 11/98

Metric / English ___ *(M or E – Located on MATT Menu)*

Project No. ___ **Material Code** ___ **Lab No.** ___

Date Sampled ___ **Submitted By** ___ Quantity ___

Purp Code ___ **Source Code** ___ **Spec Code** ___ P.O. No. ___

Date Tested ___ Ident ___ **Plant Code** ___ Frict. Rating ___ (1 – 4)

Item No. ___ Date Rec'd (lab) ___ Sampled By: ___

Remarks 1 ___

Tested By ___ Date ___ Checked By ___ Date ___

DOTD TR 102, 112, 113 & 309

Unit ___ 1 = grams 2 = pounds

Sieve mm	Sieve In.	Mass (Wt) Retained	% Retained	% Coarser	% Passing
63	2 1/2				
50	2				
37.5	1 1/2				
31.5	1 1/4				
25.0	1				
19.0	3/4				
16.0	5/8				
12.5	1/2				
9.5	3/8				
4.75	No. 4				
Mass (Wt) Matl.in Pan					
Accum. Total					

Initial Dry Total Mass, (Wt) ___ % Diff:

Unit ___ 1 = grams 2 = pounds

Sieve mm/µm	Sieve No.	Mass (Wt) Retained	% Retained	% Coarser	% Passing
2.36	8				
2.00	10				
1.18	16				
600	30				
425	40				
300	50				
180	80				
150	100				
75	200				
53	270				
Mass (Wt) Matl.in Pan					
Decant Loss					
Accum. Total					

Initial Dry Total Mass, (Wt) ___ % Diff:

Dry Mass (Wt) After Wash ___

Remarks 2:

DOTD TR 428

Liquid Limit ___ **Plastic Limit** ___

Liquid Limit		Plastic Limit	
No. Blows		Mass cup + Wet Soil, g	
Mass Cup + Wet Soil, g		Mass cup + Dry Soil, g	
Mass Cup + Dry Soil, g		Mass Water	
Mass Water		Cup No.	
Factor		Mass Cup, g	
Cup No.		Mass Dry Soil	
Mass Cup, g		% Moisture	
Mass Dry Soil			
% Moisture		**Plasticity Index**	

Absorption, % (T84 or T85)
Spec Grav SSD (T84 or T85)
Spec Grav APP (TR 300)
Effective Spec Grav (TR 300)
Opt Moist Content, % (TR 418)
Maximum Density (TR 418) kg/m³ (lb/ft³)
Lab Comp Method (TR 418)
Cement, % (TR 432 or SPECIFIED)
Lime, % (TR 416 or SPECIFIED)
Other (Additive) Code ___ **%** ___
Clay Lumps, % (TR 119)
Friable Particles, % (TR 119)
Clay Lumps & Friable Particles %(TR 119)
Flat or Elongated Part, %(TR 119)
Coal & Lignite, % (TR 119)
Glassy Particles, % (TR 119)
Iron Ore, % (TR 119)
Wood, % (TR 119)
Total (Clay Lumps, Fri.Part.,Iron Ore, Coal & Lignite, Wood),%(TR 119)
Foreign Matter, % (TR 109)
Clam Shell, % (TR 110)
Soundness, % Loss (T 104)
Abrasion, % Loss (T 96)
Colorimetric Test (1=Pass, 2=Fail) (T 21)
Asphalt Content, % (TR 307)
Retained Asphalt Coating, % (TR 317)
Percent Crushed (TR 306)
Retained Marshall Stability (TR 313)
Resistivity, ohm – cm (TR 429)
pH (TR430)
Organic Content, % (TR 413)
Sand Equivalent (TR 120)

Approved By: ___ **Date:** ___

Aggregate Test Report

APPARENT SPECIFIC GRAVITY (DOTD TR 300)

Tested By:______________ Date:__________

Coarse Aggregate			
Mass in Air	a		
Mass in Water	b		
Difference	c	a - b	
Apparent Specific Gravity	D	a/c	
Fine Aggregate			
Flask No.			
Mass of Flask & Dry Sand	a		
Mass of Flask	b		
Mass of Dry Sand	d	a - b	
Mass of Flask + Sand + Water	c		
Apparent Specific Gravity	E	d/(498.6 – c + a)	
Combined Coarse and Fine Aggregates			
% Passing 4.75mm (No. 4) Sieve	F		
Coarse Spec Grav Portion	G	(100 – F) D	
Fine Spec Grav Portion	H	(F) E	
Apparent Spec Grav	I	G + H	

EFFECTIVE SPECIFIC GRAVITY (DOTD TR 300)

Tested By:______________ Date:__________

Mass of Aggregate	A		
Mass of Mix	B		
% Asphalt in Mix	C	$\frac{B-A}{B} \times 100$	
Mass of Jar + Water	D		
Mass of Jar + Water + Mix	E		
Spec Grav of Mix	F	$\frac{B}{D+B-E}$	
% Aggregate in Mix	X	100 - C	
Specific Gravity of Asphalt Cement	H		
Effective Specific Grav of Aggregate	G	$\frac{X}{\frac{100}{F} - \frac{C}{H}}$	

SPECIFIC GRAVITY AND ABSORPTION OF COARSE AGGREGATE
(AASHTO T85)

Tested By:______________ Date:__________

Mass of Oven Dry Test Sample in Air, g	A		
Mass of Saturated Surf-Dry Test Sample in Air, g	B		
Mass of Saturated Test Sample in Water, g	C		
Bulk Spec Grav (Saturated-Surf-Dry)		$\frac{B}{B-C}$	
Absorption, %		$\frac{B-A}{A} \times 100$	

PERCENT FOREIGN MATTER (DOTD TR 109)

Tested By:______________ Date:__________

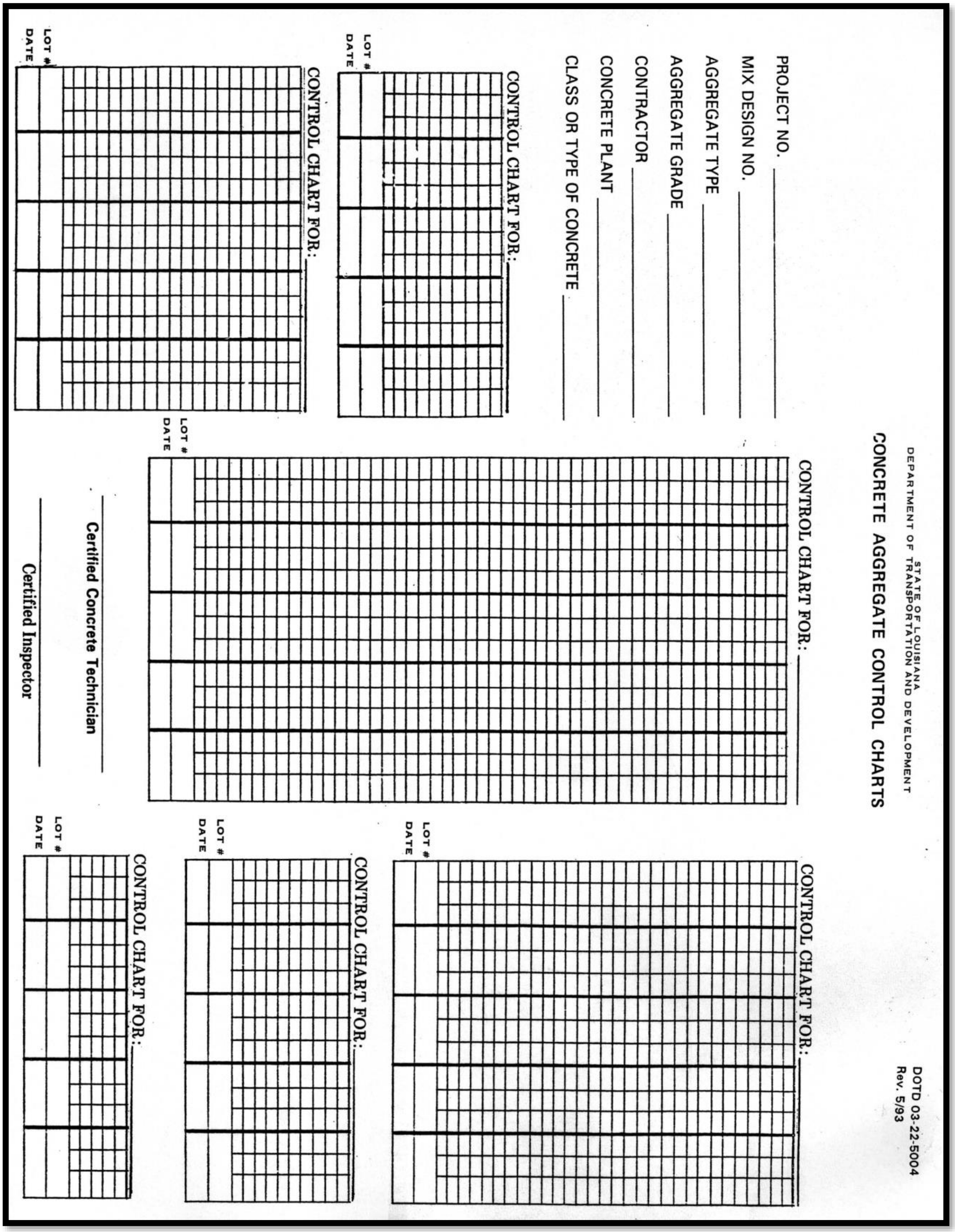
Mass of Material Removed by Hand	A		
Mass of Dried Portion	D		
Mass Total Sample	B	A + D	
Mass of Portion After Wash, Dry	E		
Mass of Material Removed by Wash	C	D – E	
Foreign Matter, %	F	$\frac{A+C}{B} \times 100$	

PERCENT CLAM SHELL (DOTD TR 110)

Tested By:______________ Date:__________

Mass Retained 4.75 mm (No. 4)	A		
Mass Clam Shell	B		
Clam Shell, %	C	$\frac{B}{A} \times 100$	

Aggregate Test Report (cont'd.)


STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

CONCRETE AGGREGATE CONTROL CHARTS

DOTD 03-22-5004
Rev. 5/93

PROJECT NO. ______
MIX DESIGN NO. ______
AGGREGATE TYPE ______
AGGREGATE GRADE ______
CONTRACTOR ______
CONCRETE PLANT ______
CLASS OR TYPE OF CONCRETE ______

CONTROL CHART FOR: ______
LOT #
DATE

CONTROL CHART FOR: ______
LOT #
DATE

CONTROL CHART FOR: ______
LOT #
DATE

CONTROL CHART FOR: ______
LOT #
DATE

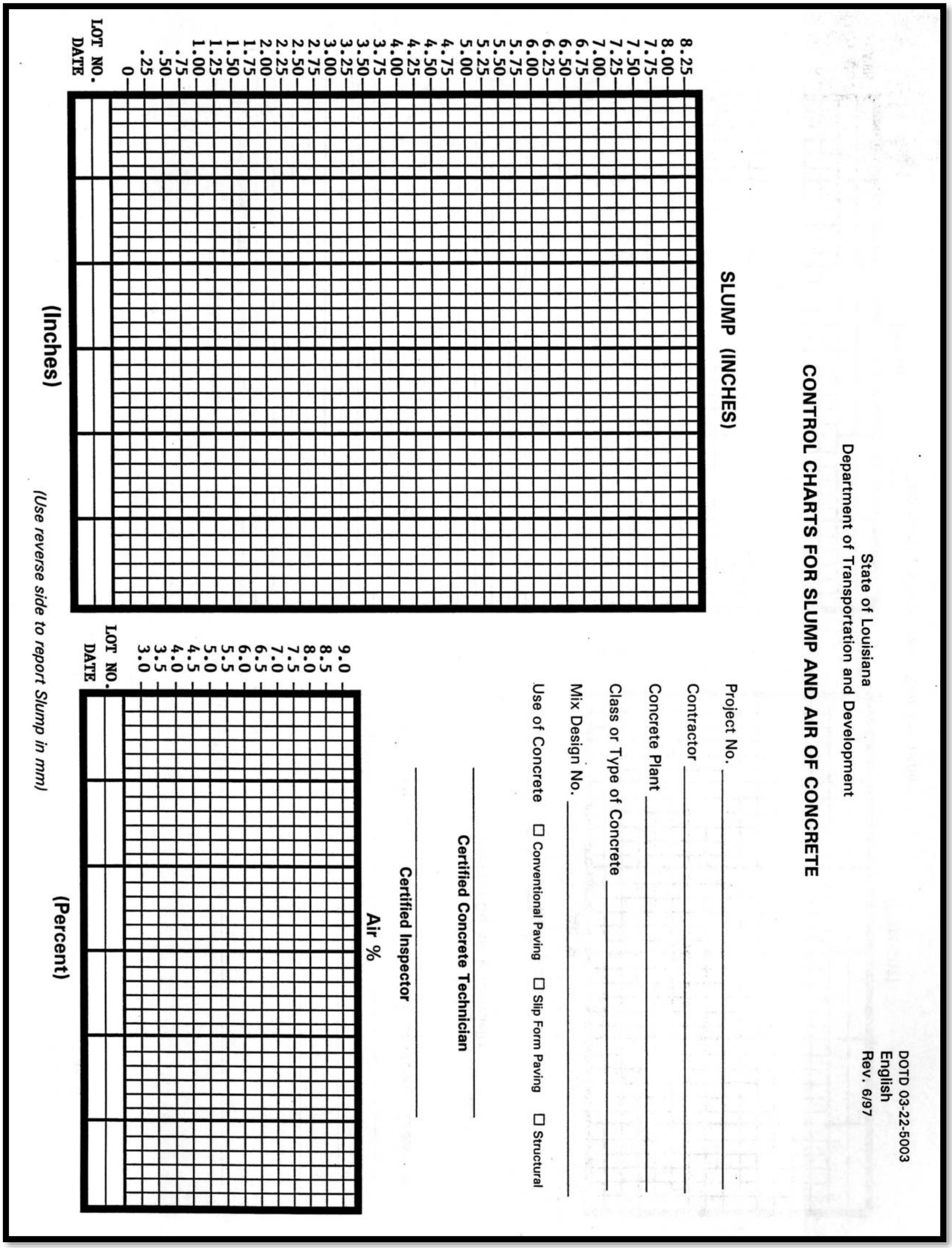
CONTROL CHART FOR: ______
LOT #
DATE

CONTROL CHART FOR: ______
LOT #
DATE

______
Certified Concrete Technician

______
Certified Inspector

Concrete Aggregate Control Charts



DOTD 03-22-5003
English
Rev. 6/97

State of Louisiana
Department of Transportation and Development

CONTROL CHARTS FOR SLUMP AND AIR OF CONCRETE

Project No. ____________

Contractor ____________

Concrete Plant ____________

Class or Type of Concrete ____________

Mix Design No. ____________

Use of Concrete ☐ Conventional Paving ☐ Slip Form Paving ☐ Structural

____
Certified Concrete Technician

____
Certified Inspector

SLUMP (INCHES)

8.25, 8.00, 7.75, 7.50, 7.25, 7.00, 6.75, 6.50, 6.25, 6.00, 5.75, 5.50, 5.25, 5.00, 4.75, 4.50, 4.25, 4.00, 3.75, 3.50, 3.25, 3.00, 2.75, 2.50, 2.25, 2.00, 1.75, 1.50, 1.25, 1.00, .75, .50, .25, 0

LOT NO.
DATE

(Inches)

(Use reverse side to report Slump in mm)

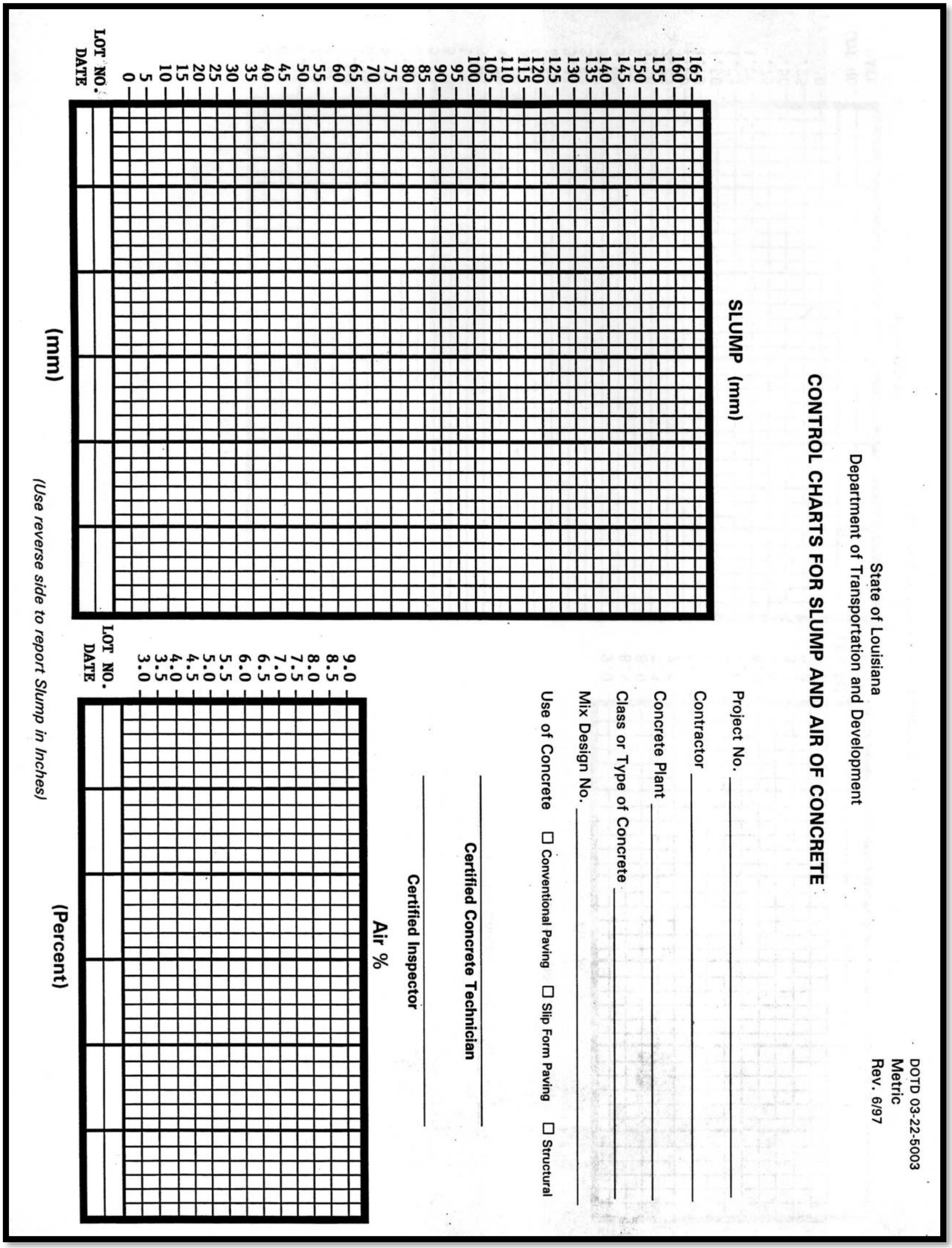
Air %

9.0, 8.5, 8.0, 7.5, 7.0, 6.5, 6.0, 5.5, 5.0, 4.5, 4.0, 3.5, 3.0

LOT NO.
DATE

(Percent)

Control Charts for Slump and Air of Concrete (English)



DOTD 03-22-5003
Metric
Rev. 6/97

State of Louisiana
Department of Transportation and Development

CONTROL CHARTS FOR SLUMP AND AIR OF CONCRETE

Project No. ____________________

Contractor ____________________

Concrete Plant ____________________

Class or Type of Concrete ____________________

Mix Design No. ____________________

Use of Concrete ☐ Conventional Paving ☐ Slip Form Paving ☐ Structural

____
Certified Concrete Technician

____
Certified Inspector

SLUMP (mm)

165, 160, 155, 150, 145, 140, 135, 130, 125, 120, 115, 110, 105, 100, 95, 90, 85, 80, 75, 70, 65, 60, 55, 50, 45, 40, 35, 30, 25, 20, 15, 10, 5, 0

LOT NO.
DATE

(mm)

Air %

9.0, 8.5, 8.0, 7.5, 7.0, 6.5, 6.0, 5.5, 5.0, 4.5, 4.0, 3.5, 3.0

LOT NO.
DATE

(Percent)

(Use reverse side to report Slump in Inches)

Control Charts for Slump and Air of Concrete (Metric)

MATT MENU SELECTION - 11

Department of Transportation and Development

DOTD 03-22-4035
Metric/English
Rev. 8/98

PORTLAND CEMENT CONCRETE PAVEMENT REPORT

Metric/English ☐ *(Located on MATT Menu)*

Project No. ____ **Material Code** ____ **Lot No.** ____ **Category** ____ *(Spec. Cat. = I, II, III)*

Submitter ____ **Plant Code** C____ **Mix Design No.** ____ **Spec Code** ☐ **Purp. Code** ☐

Const. Method ☐ *1 = Slip Form 2 = Form 3 = Split Slab 4 = Contin. Reinforced 5 = Other* Joints: Spacing ___ Configuration ☐ *1 = Transverse 2 = Skewed*

Date ____ **Item No.** ____ **Lot Complete** ☐ *Y = Yes N = No*

Remarks 1 ____

Sta: ____ + ____ To Sta: ____ + ____	Sta: ____ + ____ To Sta: ____ + ____
Location ____ Width ____ m (ft)	Location ____ Width ____ m (ft)
Thick. ____ mm (in) Area ____ . __ m^2 (yd^2)	Thick. ____ mm (in) Area ____ . __ m^2 (yd^2)

PREVIOUS ________ m^2 (yd^2) + CURRENT, m^2 (yd^2) ____ . __ = Total to Date ________ m^2 (yd^2)

CURRENT ____ m^3 (yd^3) Theoret.Yield __ . __ m^2/m^3 (yd^2/yd^3) Actual Yield __ . __ m^2/m^3 (yd^2/yd^3)

% Air _ . _ _ . _ _ . _ _ . _ Slump, mm (in) ____ ____ ____ ____

Joint Materials

Load Transfer Device:	Materials ____	Source ____	________
Adhesive Lubricant:	Materials ____	Source ____	________
Filler:	Materials ____	Source ____	________
Sealer:	Materials ____	Source ____	________

Curing

Curing Method: ☐ *1 = Burlap 2 = Paper 3 = Poly Sheeting 4 = Burlap & Poly Sheeting 5 = Curing Membrane* Curing Membrane Rate ____ m^2/L (ft^2/gal)

Surface Texture

Applied By: ☐ *1 = Manual 2 = Mechanical* *[Record Measurement to Nearest mm (1/32 in)]*

Station: ____ + ____ Location: ____ Station ____ + ____ Location: ____

1\. ___ 2. ___ 3. ___ 4. ___ 5. ___ 1. ___ 2. ___ 3. ___ 4. ___ 5. ___

Average: ___ mm (1/32 in) Average: ___ mm (1/32 in)

Surface Tolerance

Test Method: ☐ *(Codes listed on back)* Pavement Code: ☐ *(Codes listed on back)*

Measured ____ lin m (lin ft) IRI Std ____ . __ mm/km (in/mi) Avg.Prof. Ind. ____ mm/km (in/mi)

Remarks 2 ____ **% Pay** ___

____
Laboratory Authorized Evaluator

____
Department's Certified Inspector

____
District Laboratory Engineer

____
Project Engineer

Portland Concrete Cement Pavement Report

MATERIAL CODES - - 1992 Specification

Metric

Code	Description
551	Surface Tolerance for Type B Paving Concrete
552	Surface Tolerance for Class A Concrete (for Paving)
553	Surface Tolerance for Type C Paving Concrete
554	Surface Tolerance for Type D Paving Concrete

English

Code	Description
451	Surface Tolerance for Type B Paving Concrete
452	Surface Tolerance for Class A Concrete (for Paving)
453	Surface Tolerance for Type C Paving Concrete
454	Surface Tolerance for Type D Paving Concrete

TEST METHOD CODES
FOR PCC SURFACE TOLERANCE

Code	Description
2	Profilograph
3	Static Straightedge

PAVEMENT CODES
FOR PCC SURFACE TOLERANCE

Code	Description
3	Associated Pavement
5	Travel Lanes, Greater than 45 MPH
6	Urban Areas, Continuous Paving, 45 MPH or Less
7	Urban Areas, Non-Continuous Paving, 45 MPH or Less
8	Tie-in Areas, Shoulders, Turnouts or Crossovers *(1992 Specs)*

Portland Concrete Cement Pavement Report (cont'd.)

MATT MENU SELECTION - 10

Louisiana Department of Transportation and Development
DRILLED PAVING CONCRETE CORES
(DOTD TR 225 and TR 230)

DOTD 03-22-0736
Metric / English
Rev. 12/00

Metric/English ___ (M or E) *Located on MATT Menu*

Project No. ______ **Material Code** ______ **Lot Number** ______
Lab. No. ______ **Spec Code** ___ **Submitted By** ______
Purpose Code ___ Air *(Y=Yes N=No)* ___
Plan Thickness, mm (in) ______ Section Length, m (ft) ______
Section Width, m (ft) ______ Approx. Area, m^2 (yd^2) ______
From Station ______ + ______ To Station ______ + ______

Remarks 1 ______

Item No. ______

	Core Ident	Station	Position	Date Poured
1.		+		- - 20
2.		+		- - 20
3.		+		- - 20
4.		+		- - 20
5.		+		- - 20

Re-Cored *Y = Yes OR Blank*	Date Cored	Nominal Core Dia. mm (in)	Date Tested	Thickness mm (in)	Strength Mpa (psi)
1.	- - 20		- - 20		
2.	- - 20		- - 20		
3.	- - 20		- - 20		
4.	- - 20		- - 20		
5.	- - 20		- - 20		

Specification Lot Averages ______ ______

Remarks 2 ______

Percent Pay ______

Sampled By: ______

APPROVED BY: ______ **Date:** ______

Drilled Concrete Pavement Cores

Louisiana Department of Transportation and Development

DRILLED PAVING CONCRETE CORES

Project No. ______________________ Lab No. ______________________ Lot No. __________

Core Diameter and Area

	CORE IDENT.	D_1 mm (in.)	D_2 mm (in.)	D_{AVG} mm (in.)	AREA mm^2 ($in.^2$)
1.					
2.					
3.					
4.					
5.					

Core Thickness, mm (in.)

	t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8	t_9	T
1.										
2.										
3.										
4.										
5.										

Core Compressive Strength

	CappedLength, mm (in.) L	Avg. Dia., mm (in.) D_{AVG}	L/D	Corr.Factor From Chart F	Load at Failure, kN (lb) P	Cross-Sect. Area, mm^2 ($in.^2$) A	Factor for Metric Use ONLY!	Compr. Str. MPa (psi) C	Type Failure	Date Tested
1	÷	=		(×	÷		) × 1000 =			
2	÷	=		(×	÷		) × 1000 =			
3	÷	=		(×	÷		) × 1000 =			
4	÷	=		(×	÷		) × 1000 =			
5	÷	=		(×	÷		) × 1000 =			
	÷	=		(×	÷		) × 1000 =			
	÷	=		(×	÷		) × 1000 =			

Tested by: ______________________ Date: ______________

Checked by: ______________________ Date: ______________

Drilled Concrete Pavement Cores (cont'd.)

MATT MENU SELECTION - 17

DOTD 03-22-0740
Metric / English
Rev. 7/98

Louisiana Department of Transportation and Development

STRUCTURAL CONCRETE TESTS

(DOTD TR 226 & TR 230)

Metric / English ___ (M or E) *Located on MATT Menu*

Project No. ___ **Material Code** ___ **Lot No.** ___

Date Sampled ___ **Submitted By** ___ **Quantity** ___

Purpose Code ___ **Plant Code** C___ **Spec Code** ___

1. Qual. Cont. 4. Check 7. Design
2. Verification 5. Resample 8. Indep. Assur.
3. Acceptance 6. Source Appr. 9. Pre. Source Test

Mix Design No. ___ Date Rec'd.(lab) ___

Admixture: *Y = Yes N = No* **Air** ___ **WR-NS** ___ **WR-SR** ___

Remarks 1 ___

Item No. ___

Cylinders Made By ___ Acceptance Tests By ___

Batch Number ___

Date Tested ___

Acceptance Tests

Slump (TR 207), mm (in) ___ Air Content (TR 202), % ___

Sample No.	Laboratory No.	Cond.	Break	Age Days	Diam. mm (in)	Area mm^2 (in^2)	Max. Load kN(lb)	Strength MPa (PSI)

Time Made: ___ Critical Strength: Low ___ High ___ Batch Avg. ___

Batch Number ___

Date Tested ___

Acceptance Tests

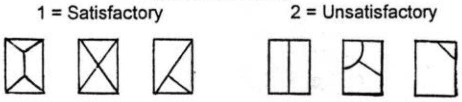
Slump (TR 207), mm (in) ___ Air Content (TR 202), % ___

Sample No.	Laboratory No.	Cond.	Break	Age Days	Diam. mm (in)	Area mm^2 (in^2)	Max. Load kN(lb)	Strength MPa (PSI)

Time Made: ___ Critical Strength: Low ___ High ___ Batch Avg. ___

Break Codes:

1 = Satisfactory 2 = Unsatisfactory



Cond. Codes:
1 = Good
2 = Improperly Made
3 = Damaged
4 = Frozen

Average Strength for Lot ___

Tested By: ___

Checked By: ___

% Pay ___

Remarks 2 ___

Approved By ___

Form for Structural Concrete Tests

CHECK LIST OF MAJOR ITEMS
TO BE DISCUSSED AT BRIDGE DECK
PRE-POUR CONFERENCE
PAGE 1 of 3

I. EQUIPMENT

	YES	NO	N.A.	REMARKS	Referance
1. READY MIX TRUCKS					
a. Certified by Lab?					901.01
b. Does each truck have accurate operating revolution counters?					901.09(c)(1)
c. Are water meters legible and operating?					901.09(c)(1)
d. Drivers instructed to discharge all washout water prior to recharging?					805.03(a)
2. BATCHING PLANT					
a. Certified by Lab?					901.01
b. Have scales, water meter, and additive dispenser been checked for accuracy?					901.09(b)(2)
c. Are material stockpiles completely separated, well-drained, free from contamination, and approved?					901.04
3. SCREED					
a. Approved by the Construction Section? Note: Baker screeds limited to slab spans and no internal vibration allowed. Razorback or similar screeds not acceptable.					805.13(d)(1)
b. Are screed rails straight and form smooth vertical curves?					805.13(d)(1)
c. Has screed been checked with string line?					
d. Have dry runs been made to check clearance with reinforcing steel and deck forms.					805.13(d)(1)
4. MISCELLANEOUS EQUIPMENT					
a. Are all required materials and equipment at the job site including, but not limited to vibrators, tine rake, misting hand water sprayer, curing compound pump and sprayer, work bridges, burlap, floats, and straight edges?					
b. Has all mechanical equipment been checked to verify proper operation?					
c. Does the contractor have a minimum of 2 work bridges available (for finisher and for curing/burlap)?					
d. If concrete pump is to be used, does the contractor have a standby pump or crane in the event of a breakdown?					
e. Can the men and equipment meet the minimum rate of pour specified?					805.03(d)
f. Has tine rake been checked for conformance to specifications?					805.13(d)(3)
g. Does contractor have sufficient vibrators? (Some pours may require 2 or more).					805.03(a)

Bridge Deck Pre-Pour Conference Checklist

PRE-POUR CONFERENCE CHECKLIST

II. MATERIALS

Item	YES	NO	N.A.	REMARKS	Referance
1. CONCRETE					
a. Approved mix design?					901.01
b Is contractor aware of the functions of the concrete technicians and concrete specifications; such as, mix design, air entrainment additives, slump, addition of water, maximum water, maximum and minimum revolutions of mixer trucks, time limits, temperature, etc.?					901.06 Table 901-3 901.10(c) 901.10(e) 901.11
c. Have the required number of cylinders samples, entrained air tests, and slump tests been determined?					MSM Section 805
d. Is contractor aware that any concrete shipped to the job site that does not meet slump, air, temperature, and other specifications will not be acceptable?					106.11
e. Have drivers been instructed not to wash discharge chutes or other parts of drum in which water will be incorporated into the mixing concrete?					805.03(a)
2. DELIVERY & POUR RATE					
a. Are Department, contractor and supplier personnel aware of the rate of pour regulations?					805.03(d)
b. Does the supplier have a sufficient number of trucks to meet the rate of pour?					901.01
c. Are additional trucks available should a breakdown in mixer trucks occur?					
d. If concrete to be pumped, is contractor aware that required priming grout mortar can not be used in placement?					805.04

III. PRE-POUR INSPECTION

Item	YES	NO	N.A.	REMARKS	Referance
1. FORMS					
a. Are concrete forms clean, tight, properly set for grade and alignment?					805.09
b. Has contractor been instructed to wet forms prior to placing concrete?					805.09(f)
2. REINFORCING					
a. Is reinforcing properly placed? (clearance, number of bars, sufficient ties and chairs.)					806.06
b. Is reinforcing free from concrete oil, grease and excessive rust?					806.06
3. CLEANLINESS					
a. Does the contractor have available a high pressure hose to remove concrete drippings from the supporting caps, girders, stringers,diaphragm and other parts under the deck?					
b. Has the contractor placed burlap or some other material to protect barrier reinforcing from concrete splatters and curing compound?					805.10
c. Has loose gravel and unsound concrete been removed from the previous pour; such as deck concrete prior to placing barrier and median rails?					805.06(b)(3)
d. Has all form oil been removed from girder flanges and other surfaces to be bonded to deck concrete?					

Bridge Deck Pre-Pour Conference Checklist (cont'd.)

PRE-POUR CONFERENCE CHECKLIST
PAGE 3 of 3

1. For pumped/conveyored concrete, test entrained air in first three truck loads delivered before and after transport by pump/conveyer to determine correction factor. Once determined, recheck every 40 CY or when significant changes in temperature, distance, or pump/conveyor arrangement occur.

2. Deposit concrete uniformly across forms and slightly above finished grade. No concrete more than 3" above finish grade for steel SIP deck forms.

3. Vibrator operators will not be assigned work other than vibrating during the placing of concrete.

4. Screed until concrete surface has a smooth even texture (a minimum of two passes of the screed). A small role of concrete will be maintained at the leading edge of the screed.

5. Float finish with a 10' half moon aluminum float or check with a 10' straight edge.

6. Apply tine finish when concrete has slightly set up. If the tine finish is too rough, refloat and retine. The deck surface from the gutterline (vertical traffic face of barrier) out to 12" shall not be tined.

7. Thoroughly mix curing compound and apply immediately after completion of tine finish.

8. Floating, tine finish, and curing compound shall be applied from work bridges.

9. Place wet burlap as soon as the tined concrete deck can support the burlap without marring the surface. Burlap is to be soaked in 55 gallon drums or other container. Initial wetting of burlap with hose is not acceptable.

10. Burlap must be kept wet for entire curing time, preferably with soaker hoses.

11. Disconnect the spacers holding the end dams plates apart immediately after initial set. Do not wait until the following day.

Project: ______________________________

Bridge: ______________________________

Date: ______________________________

____
SIGNATURE OF PROJECT ENGINEER

Bridge Deck Pre-Pour Conference Checklist (cont'd.)

CHANGE ORDER CATEGORY WORKSHEET

State Project No. ____________________________ Change Order No. _________

Revised July 22, 2015

		Category 3	Category 2	Category 1
Establishes any new funding sources and/or adds any non-participating item				
Change in Amount of Contract	up to $50,000			
	up to $250,000			
	+/- 25% of original project cost or over $250,000			
Added Days	up to 30			
	over 30			
	excess adverse weather days per contract up to 50			
	excess adverse weather days per contract over 50			
Increasing a MAJOR ITEM more than 25%				
Decreasing a MAJOR ITEM	up to 25% or $50,000 (whichever is less)			
	over 25% or $250,000			
Decreasing a MINOR ITEM (any amount)				
Changes in design / Written appr. by Design or Construction Division				
Changes in Traffic Control Plan (change in sequence)				
Change approved by Memo or Directive signed by Chief Engineer				
Work outside limits of project				
Change in structural design or geometrics				
Change in typical section				
Change in specifications				
Change in method of measurement				
Settlement of a claim or delay				
Administrative Change Order per Contractual Documents				
PAY ADJUSTMENTS	50% Pay or Remove			
	Pay adjustments as per Specifications			
Consultant Inspected Projects	up to $50,000 [1]see footnote below			
	Up to $250,000			
	over $250,000			
Force Account	up to $50,000			
	up to $250,000			
	over $250,000			
Other				

[1] All Change Orders initiated by a Constultant Project Engineer shall be approved by DOTD District Area Engineer or their designee

FHWA APPROVAL CHECKLIST

	Category 3	Category 2	Category 1
Projects of Division Interest / Projects of Corporate Interest (PoDI / PoCI)	No	Yes	Yes
NHS Routes: Claim Settlement/Contract Termination		Yes	
Waiver of Buy America on any Projects			

Change Order Category Worksheet

CHANGE ORDER REASON(S) CODE CHART (Rev 8/12/2015)

1. Plan Quantity	1A. Incorrect Quantities (LA DOTD District design). 1B. Incorrect Quantities (LA DOTD Headquarters design). 1C. Incorrect Quantities (Consultant design). 1D. Other 1E. Recoverable
2. Differing Site Conditions (unforeseeable)	2A. Dispute resolution (expense caused by conditions and/or resulting delay) 2B. Unavailable material. 2C. New development (conditions changing after Plans, Specifications and Quantities completed). 2D. Environmental remediation. 2E. Miscellaneous difference in site conditions (unforeseeable). 2F. Site conditions altered by an act of nature. 2G. Unadjusted utility (unforeseeable). 2H. Unacquired Right-of-Way (unforeseeable). 2I. Additional safety needs (unforeseeable). 2J. Other 2K. Recoverable
3. LA DOTD Convenience	3A. Dispute resolution (not resulting from error in plans or differing site conditions). 3B. Public relations improvements. 3C. Implementation of a Value Engineering finding. 3D. Achievement of an early project completion. 3E. Reduction of future maintenance. 3F. Additional work desired by LA DOTD. 3G. Compliance requirements of new laws and/or policies. 3H. Cost savings opportunity discovered during construction. 3I. Implementation of improved technology or better process. 3J. Price adjustment on finished work (price reduced in exchange for acceptance). 3K. Addition of stock account or material supplied by state provision. 3L. Revising safety work/measures desired by LA DOTD. 3M. Other.
4. Third Party Accommodation	4A. Failure of a third party to meet commitment. 4B. Third party requested work. 4C. Compliance requirements of new laws and/or policies (impacting third party). 4D. Other 4E. Recoverable
5. Contractor Convenience	5A. Contractor exercises option to change the traffic control plan. 5B. Contractor requested change in the sequence and/or method of work. 5C. Payment for Partnering workshop. 5D. Additional safety work/measures desired by the Contractor. 5E. Other.
6. Untimely ROW/Utilities	6A. Right-of-Way not clear (third party responsibility for ROW). 6B. Right-of-Way not clear (LA DOTD responsibility for ROW). 6C. Utilities not clear. 6D. Other 6E. Recoverable
7. Design Error & Omissions	7A. Design Error (LA DOTD District Design) 7B. Design Error (LA DOTD Headquarters Design) 7C. Design Error (Consultant Design) 7D. Other 7E. Recoverable
8. Final Change Order	8A. Reconciling Final Quantities Only

Change Order Reason Codes

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
CONSTRUCTION SECTION
BATON ROUGE, LA

NOTIFICATION OF ______________________________ RELEASE

PROJECT NUMBER ______________________________ Date ______________

Dear Sir:

The following Precast or Precast Prestressed Bridge Components have been inspected and stamped.

Date Manufactured	Unit No.	Quantity	Type/Size	Remarks

FORM 40-103
REV. 7/02

____
STRUCTURAL/MARINE FABRICATION ENGINEER

BY: ______________________________

Precast or Pre-Stressed Bridge Components Inspection Worksheet

PRECONSTRUCTION CONFERENCE CHECKLIST

___ LETTER BID JOB **___ MAINT. OPER. (MO) JOB**
___ CONTR. MAINT. (CM) JOB **___ CONTRACT (DOTD – HQ)**

STATE PROJECT NO.	FEDERAL PROJECT NO.	ROUTE	LENGTH
CONTRACTOR	**CONTRACT AMOUNT**	**PARISH**	**DATE**

List of People to Invite: **Present (Y/N)**

District Construction Engineer____
Project Engineer____
Lead Inspector____
Project Manager____
(Project Manager to invite other section representatives as needed)
Contractor____
(Prime Contractor to invite subcontractors)
District Utility Rep.____
(DUR to invite utility owners)
Compliance Office____
FHWA Area Engineer if required____
IF AN AIRPORT PROJECT ALSO INCLUDE FAA REPRESENTATIVE & DOTD OFFICE OF AVIATION ASSISTANT SECRETARY (PROVIDE 2 WEEKS NOTICE)
____
____

○ **1. CONTRACT TIME:** There are _______ Working Days / Calendar Days in this contract. There is a ______ day Assembly Period.

○ **2. WORK ORDER:** The Notice to Proceed or Conditional Notice to Proceed will be issued by the District Construction Engineer. The NTP will be issued no later than 30 calendar days from the date of the NOCE (______________________).

The DCE will issue the NTP effective: _________________________________.

○ **3. PARTIAL ESTIMATE:** Date for: ___________________ No preference _________

○ **4. NOTIFICATION OF UPCOMING CONSTRUCTION PROJECTS:** In accordance with Act No. 103 of the LA Legislature Regular Session 2003, DOTD must notify affected legislators, police jury presidents, sheriff, fire chiefs, state police, 911, etc. and give them 10 days prior notice before the contractor starts work. We will need the following information:

(a) Date to start work ________________________
(b) Estimated completion date ____________________
(c) Work schedule (days/hours) ____________________________________

○ **4. SPECIAL AGREEMENTS FOR RIGHT OF WAY:** ________________________________

____
____
____
____

○ **6. ENVIRONMENTAL AGREEMENTS:**

Discussion items:

- Environmental document
- Summary of mitigation, commitments & permits
- Terms & conditions of the permits
- Required additional permits for impacts to off-site wetlands
- Procedures for discovery of archeological sites during construction

____
____
____
____
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____

○ **7. UTILITIES: Complete for each Utility Company involved**

○ Utility Company	Estimate Start Date	Estimate End Date	Work Complete Yes or No

_**Notes:**____
____
____
____
____
____
____

○ **8. SAMPLING PLAN:** Was the contractor given a copy? __________

In an effort to eliminate possible delays, the contractor is asked to submit/supply any and all possible samples or mix designs as soon as possible.

Pre- Construction Conference Checklist (cont'd) 2 of 21

○ **9. PAYROLLS:** On jobs with Federal funds, the prime contractor is required to send to the P.E. two copies of his payroll, every week (whether they work or not). The subcontractors are required send to the P.E. two copies of their payroll every week that they actually work. If the subcontractor does not work, then they do not have to submit a payroll. It is very important that the contractor ensures the project number be shown on his payroll. **In accordance with DOTD Labor Compliance Procedures, all contractor payrolls submitted to the Construction Audit Section must be reviewed for completeness & accuracy, then initialed & dated by project Personnel (P.E. office).**

The P.E. will hold partial estimates (& notify the estimate section) until the prime contractor's payrolls are received. If a subcontractor fails to submit their payrolls, the estimate will not be held but payment for that sub's work will not be included in that estimate. The subcontractor will have to wait until the next partial estimate to receive payment provided all required payrolls are received at that time.

○ **10. CONSTRUCTION LAYOUT:** Who will actually do the layout? _______________________

Who will provide the template grades? _______________________

Template grades need to be submitted to the P.E. as soon as possible so they can be checked. Also, pipe order lengths cannot be provided to the contractor without the template grades. If there are height clearances shown on the project plans, then all height clearances must be checked and verified before starting work. For example, on overpasses make sure that we have the proper clearance between the road and/or railroad tracks and the overpass. The same applies for bridges over navigable streams or rivers – verify that the minimum clearance exist and document that fact.

○ **11. RIGHT-OF-WAY MONUMENTS:** R/W monuments are to be located and set by, or under the direct supervision of a Louisiana Licensed Professional Land Surveyor. A reproducible final plat reflecting the surveyor's location of the monuments in accordance with the R/W shall be prepared on standard size DOTD plan sheets and submitted to the Project Engineer for forwarding to the Location & Survey Section Administrator @ DOTD HQ. The Contractor shall record the final plat In the appropriate parish courthouse and a copy of the filing receipt shall be furnished to the Project Engineer. A copy of the final plat shall also be furnished to the appropriate parish Engineers and Planning Commissions if applicable.

○ **12. PIPE:** It will be necessary to use pneumatic tamps with smaller heads to ensure thorough compaction under the haunches or lower third of the pipe. Wackerpacker or vibratory plate compaction do not properly compact the backfill under the haunches.

○ **13.** Are you aware of the federal and state EEO & DBE provisions of the contract? ___________

○ **14.** Form CP-1A, "Contractor's Monthly DBE Participation" form must be sent to the project engineer on a monthly basis. Failure to submit this form will result in withholding of the estimate.

Pre- Construction Conference Checklist (cont'd) 3 of 21

○ **15. DBE PARTICIPATION:** This contract requires a minimum of _______ DBE participation. Who are the DBE subcontractors & what are the items of work?

____
____
____
____
____
____
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____

○ **16. SUBCONTRACTORS:** Who are your remaining subcontractor & what are the items of work? NOTE: All subcontractors must be approved by DOTD HQ before they can begin work.

____
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____

○ **17. TRAINEES**: Does the contractor plan to use trainees on this job? ___________ How many?________________________ **@ 1,000 hours/each.**

○ **18.** Are you aware of the **"BUY AMERICAN"** provisions in our contract?___________.

○ **19. PROGRESS SCHEDULE**: Submitted?_______ CPM ?_____________ Approved?_________
For CPM projects, the contractor is required to submit a Preliminary CPM at or before the preconstruction conference, in triplicate, for the first 45 calendar days of the project. Within 45 calendar days or 10% of the contract time, whichever is less, after the NTP, the contractor shall submit to the PE for approval, in triplicate, a Construction Schedule giving a proposed schedule of operations that provides for completion of the work within the contract time, a Summary of Activities tabulation, a Scheduled Earnings tabulation, and a 45 Day Look-Ahead task list.

○ **20. TRAFFIC CONTROL DEVICES**: We will require that signs in "good" condition be installed. Also, the traffic control devices (ALL of them) should be checked by the contractor & DOTD at least twice a day; that is, check them at the beginning and end of each workday. Deficiencies **SHALL** be corrected in a timely manner or work may be discontinued until they have been restored to an acceptable condition.

Pre- Construction Conference Checklist (cont'd) 4 of 21

a. The required submittals on **lights & drums** must be received by the P.E. prior to receiving your first Partial Estimate.

b. In accordance with the Special Provisions of Subsection 713.04, regarding additional acceptance criteria for traffic control devices within the Work Zone, **all traffic control devices within the work zone must be crash worthy.** Certification of crash worthiness SHALL be submitted to the Project Engineer by the contractor. Certification must be in either of two forms, according to Category.

Category 1 devices require a **Vendor certification.** Some of these devices are cones, tubular markers, flexible delineator posts, drums, drums with lights (weighing 5.3 lbs. or less), generic Type III barricades with lights (weighing 3.3 lbs. or less).

All other categories shall be certified by **FHWA letters**. These letters are unique to each specific work zone Device (each model) and are identified by "FHWA WZ-(xx)", where "xx" is the unique number specific for the individual approved device. **Category 2** devices consist of vertical panel assemblies, propriety barricades & temporary portable sign supports. **Category 3** devices consist of impact attenuators, barrier terminals, temporary or permanent longitudinal barriers, & portable signs with hard substrates (aluminum or plywood).

In accordance with instructions from the Chief of the Construction Division, the proper paperwork (from the contractor) must be received by Project Engineer prior to installation of Traffic Control Devices on the project.

[Permanent traffic signs, temporary construction signs & barricades within the work zone mounted on AASHTO approved breakaway posts are considered crash worthy. They do not require NCHRP certification. Post splices shall be AASHTO approved.]

○ **21. Section 713.08 WORK ZONE SAFETY & TRAFFIC CONTROL MANAGEMENT**

- Authorization

TCS ______________________ Most Recent Training Date ____________
(required within 4 years)
TCS ______________________ Most Recent Training Date ____________
(required within 4 years)
TCS ______________________ Most Recent Training Date ____________
(required within 4 years)
TCT______________________ Most Recent Training Date ____________
(required within 4 years)
TCT______________________ Most Recent Training Date ____________
(required within 4 years)
TCT______________________ Most Recent Training Date ____________
(required within 4 years)
Flagger____________________ Most Recent Training Date ____________
(required within 4 years)

Flagger__________________________ Most Recent Training Date _________________
(required within 4 years)
Flagger__________________________ Most Recent Training Date _________________
(required within 4 years)

• TCS Duties - responsibility shall be traffic control management - TCS shall be available to the engineer to address traffic control management issues as needed. The following is a listing of the TCS's primary duties:

(1) The TCS shall personally provide traffic control management and supervision services at the project site. The TCS may have other assigned duties, but shall be readily available at all times to perform TCS duties as required in the contract. A minimum of one TCT or TCS shall be required on site during working hours, except the following where a TCS shall be onsite at all times during working hours:

- freeways, expressways, and interstates
- multilane roads with posted speeds of 45 mph and greater
- other roadways with ADT equal to and greater than 25,000.

(2) The TCS shall be responsible for observing and evaluating both the day and night time performance of all traffic control devices installed on the project

(3) The TCS shall be responsible for the training of flagging personnel. Flaggers shall be re-qualified every 4 years.

(4) The TCS shall be responsible for the maintenance, cleanliness, replacement and removal of traffic control devices of the existing traffic control plan during working and non-working hours.

• Traffic Control Diary: The TCS shall maintain a project traffic control diary using the Department's Site Manager Program. The TCS shall be responsible, to keep the traffic control diary current on a daily basis and shall electronically sign each daily entry. Completion and maintaining of the daily diaries in accordance with the plans and specifications is subject to the Louisiana "Filing or Maintaining False Public Records" Law. The traffic control diary shall be available at all times for inspection by the engineer. Failure to complete the diary on a daily basis shall result in a deduction of $150 per day, from monthly estimate payments for the work, as stipulated damages for each day the diary is not completed or maintained. On days when the Department's Site Manager Program is unavailable, either due to location or operation, the TCS will be required to make arrangements with the approval of the Project Engineer to submit the TC diaries daily. Submitted diaries that indicate contemporary daily record keeping has not been maintained, as determined by the engineer, the Department's Work Zone Engineer or the Department's Statewide Traffic Control Specialist, shall result in a deduction of $150 for each calendar day from the monthly estimate payments for the work.

The contractor, with the approval of the engineer, the Department's Work Zone Engineer, or the Department's Statewide Traffic Control Specialist, may cease the requirement of a traffic control diary when:

1) the project has been partially accepted and/or no remaining work exists on the project site that impacts the traveling public or
2) when all signs and barricades are removed at the conclusion of the project.

•Inspection of Traffic Control: The TCS shall be responsible for the inspection of all traffic control devices every calendar day that traffic control devices are in use. The TCS shall provide for the immediate repair, cleaning, or replacement of any traffic control devices not functioning as required to ensure the safety of the motorist and construction personnel and/or

Pre- Construction Conference Checklist (cont'd) 6 of 21

not meeting the ATSSA standard. Inspection of the traffic control devices shall be conducted by the TCS at the beginning and end of each workday, and as scheduled or directed by the engineer during the workday. The traffic control devices shall be inspected by the TCS on weekends, holidays, or other non-work days at least once per day. Traffic control devices shall be inspected by the TCS at least once a week during nighttime periods and the same night after any modifications or changes have been made in the traffic control devices.

• Failure to Comply: The engineer, the Department's Work Zone Engineer, or the Department's Statewide Traffic Control Specialist may suspend all or part of the contractor's operation(s) for failure to comply with the approved "Traffic Control Plan" or failure to correct unsafe traffic conditions within a reasonable period of time after such notification is given to the contractor in writing. If there are major traffic control deficiencies that require immediate corrective action for the safety of the travelling public, the engineer, the Department's Work Zone Engineer, or the Department's Statewide Traffic Control Specialist may completely suspend the contractor's operations. This suspension can either be verbal or written, but shall be followed up in writing as soon as practical. The Department reserves the right to revoke or de-certify the TCS for gross neglect of his or her duties. The TCS at this point shall retake a Department approved TCS course and will be subject to a 90 day probationary period at the discretion of the Department.
If the contractor's operations are suspended, the normal assessment of contract time will not cease for the period required to correct these unsafe conditions and traffic control deficiencies. The contractor shall not be relieved of the responsibility to provide traffic control safety to the traveling public when a project is under full or partial project suspension. When a project is under suspension due to the contractor's failure to comply with this section, or when the contract is under stipulated damages, the contractor shall continue to provide traffic control management and no additional measurement or payment will be made. If suspensions or partial suspensions are requested by the contractor, the additional traffic control management costs will be at the contractor's expense.

○ **22. TRAFFIC SIGNALS**: Is the addition, removal and/or relocation of traffic signals required in this project? _________. If any of this work is to be done by DOTD forces, then this shall be discussed and coordinated with the District 61 Traffic Section (Ronnie Carter). Any request by the P.E. for work related to traffic signals (by DOTD) shall be in writing; a minimum one (1) months notice is required so DOTD forces in Baton Rouge can be notified. If any traffic signal work is to be done by the **contractor**, it shall be coordinated with the State Traffic Engineer (Charles Adams) and it is my understanding that Dan Lorio (Traffic Services) will be available to assist the P.E. in evaluation of submittals, construction phase review and final inspection.[This will be the responsibility of the Project Engineer to make these contacts] The District Construction Engineer will invite Mr. Charles Adams & Dan Lorio to the Pre-Construction Conference.

○ **22. MAINTENANCE OF TRAFFIC**: The contractor shall provide for & maintain **THROUGH & LOCAL** traffic at **ALL** times and shall conduct his operations to cause the least possible interference with traffic. The contractor shall maintain the roadway in a satisfactory condition to allow traffic to safely travel through the work zone at the posted construction speed limit. It should be noted that traffic lanes SHALL NOT be closed for the CONVENIENCE of the contractor. Other than what is shown in the plans & specifications, the P.E.shall be the only authority that can close lanes of traffic during the life of this contract. Any request by the contractor to close lanes shall be made to the P.E. and SHALL be in writing (with the reasons for the lane closure). Is a pilot car required and for which operation? ___________.

○ **23. HURRICANE EVACUATION PROCEDURES:** We should ALL be aware of our duties and responsibilities to insure and provide for the quick and safe evacuation of the motoring public through construction zones, whenever a hurricane is threatening this region. Construction projects, that are on "EVACUATION ROUTES", will be monitored closely during hurricane season [June thru November]. Upon notification of a pending hurricane, DOTD personnel will meet daily with contractor project personnel to assure that ALL lanes of traffic will be available for use by the traveling public for evacuation. [Also, Department personnel will be in contact with the local office of emergency preparedness to coordinate activities with them.] In case of lane closures, alternate routes will be evaluated and after consultation with the local office of emergency preparedness, alternate routes will be designated for use if the primary evacuation route cannot be used to its maximum effectiveness.

HOWEVER, THE DECISION TO HAVE LANE CLOSURES AND TO USE ALTERNATE ROUTES WILL BE MADE BY DOTD. It is expected that all parties will work together to provide for quick & safe evacuation of our citizens through this district and construction zones.

Evacuation routes through this district, are as follows: (update as needed)

1) I-10 2) I-12 3) I-110 4) US 61 5) US 190 6) LA1 7) LA 70
8) LA 3127 9) LA 67 10) LA 19 11) LA 415

○ **24. LIQUIDATED DAMAGES**: It is the policy of DOTD that once it has been established that liquidated damages are in effect (i.e., contract time has been exhausted) then the Project Engineer is required to deduct the amount of liquidated damages from each partial estimate until the project is completed.

○ **25. WORKING AT NIGHT**: It is the Department's responsibility to provide contract administration for this job and we will, regardless of the day or time. However, the contractor **shall NOT** be allowed to work at night or to obstruct a roadway unless they comply with subsection 107.07, Public Convenience and Safety, which says:

> When the contractor works at night, adequate artificial lighting, shall be provided in accordance with Subsection 105.20. Signs, flaggers, or other traffic controls shall be provided to protect workers, the work, and the traveling public. When such work affects traffic safety, the contractor shall submit to the engineer for approval a plan of lighting, signing, flagmen or other traffic controls. If the approved plan proves inadequate after work begins, the contractor shall make such changes as directed. If the engineer finds that the night work is so hazardous as to preclude the beginning or require the discontinuing of such work, the contractor shall immediately cease all such operations

○ **26. BORROW PITS**: The contractor must notify the P.E. [in writing] that he wants to get a borrow pit approved & provide the P.E. with the required submittals [that is, the location of the pit, is it cleared, is it staked out, a sketch of the pit & a site map]. All of this information is required several weeks in advance of using the pit. After notification & receiving the required

Pre- Construction Conference Checklist (cont'd) 8 of 21

submittals, the P.E. shall then notify the District Lab Engr. [by letter] & make arrangements to have the pit bored & approved.

○ **27. IN-PLACE CEMENT STABILIZED BASE COURSE**: We shall be enforcing the 2 mile limitation on the surface removal operation ahead of the base course operations. Also, the P.E. & the contractor need to work together to obtain the samples [for the in-place stabilization] to be turned into the lab, in a timely manner to prevent delays. The contractor will be required to patch the locations in the road where the samples were taken with either cold mix or hot mix to prevent damage to vehicles.

It is recommended that a meeting be held to discuss all the aspects of this work with the contractor, prior to starting the soil cement operation. It is strongly suggested that the contractor be represented by his Superintendent, Foreman & QC Personnel.

○ **28. ASPHALTIC CONCRETE**: Which plant will supply the mix?______________________.
Who will actually lay the mix?____
Is a MTV (Material Transfer Vehicle) required?__________.
Is Surface Preparation an item in the contract? ____ If so, what method(s) does the contractor propose to use to obtain the desired surface tolerance prior to laying hot mix?______________
____

It will be <u>required</u> that the contractor meets <u>all</u> the applicable requirements for longitudinal surface tolerance as per the specification of this contract. It is expected that the contractor will do whatever preparatory work is needed on the existing road surface to insure that he can obtain the required surface tolerance.

The contractor is responsible for obtaining smooth tie-ins at all joints, transition areas, etc. Any bumps or dips will be corrected by the contractor (at his expense) to the satisfaction of the P.E.

○ **29. TEMPORARY PAVEMENT MARKINGS**: "short-term" & "long-term" pavement markings <u>SHALL</u> be installed as required by the provisions of our contract, within the required time frame. Also, do not forget to install the "DO NOT PASS" & "PASS WITH CARE" signs in a timely manner [usually, early in the job before the passing areas are lost].

○ **30. BRIDGES/CONCRETE WORK**: Who will supply the concrete?___________
Does the contractor plan to use End-On-Construction (walking the crane out onto newly constructed bridge) on this project?______ In order to insure that no damage is done to the new structure, the contractor will be required to submit drawings & calculations to the P.E. prior to placing construction loads on the structure. The drawings shall show details of the matting system, crane size, outline dimensions, lifting loads & extension distance from crane. The calculations shall analyze the maximum construction load being applied to the structure, and they shall be stamped and signed by a Professional Engineer registered in the State of Louisiana.

Pre- Construction Conference Checklist (cont'd) 9 of 21

○ **31. PILES:** The 2000 edition of the "red book", requires the following:

(a) The contractor is required to submit a Pile Installation Plan for approval by the DOTD Chief Construction Engineer. The plan should be submitted as soon as possible; however, no later than 30 calendar days prior to driving piles. Unless shown otherwise in the plans, the approval of the pile driving system shall be made by the Wave Equation Hammer Approval Method. [When noted, the contractor may use the alternate Hammer Approval Method.]
(b) There are new requirements for pile cushions and templates for piles.
(c) There are new specifications related to pile bearing capacity requirements and detailed requirements for pile restrikes.

In general, everyone should become thoroughly familiar with the new contract requirements and they shall be complied with by all parties, on this project.

On this project, the following applies:

(1) PLAN LENGTHS are the "ORDER LENGTHS" - ________________________
____

(2) Pile lengths are to be determined by Test Piles and/or loading Test Piles - _______
____

(3) Pile lengths are to be determined by the Pile Driving Analyzer [PDA], in association with Test Piles - ____
____

(4) Pile lengths are to be determined by Electric Cone Penetrometer [ECPT] tests & the use of the Pile Driving Analyzer [PDA], in association with Test Piles - _______
____

What type of pile(s) will be used on this job? ________________________
____
____
____

○ **32. "DETOUR" BRIDGES**: What type of detour bridge will be used?____________________
____

○ **33. PRECAST CONCRETE BOX CULVERTS**: If the use of "Precast" is allowed in lieu of cast-in-place and there are no standard in the project plans and the contractor wants to use "Precast", then he must submit shop/installation drawings for approval. The contractor/supplier shall submit his submittals directly to the Project Engineer for his review and approval. No work should be started until final approval has been received. Does the contractor propose to use "PRECAST" box culverts, on this job? ____________.

Pre- Construction Conference Checklist (cont'd) 10 of 21

○ **34. STOCKPILED MATERIAL**: Payment for stockpiled or stored materials will be considered for materials anticipated to be stored for periods in excess of 90 calendar days. The request does have to be in writing and approved by the Project Engineer. Does the contractor anticipate that he will request an advancement for stockpiled material on this job ? ________________. What is the material?____

____

○ **35. SALVAGED MATERIAL**:

Type of Material	Who gets it ?	To be delivered where ?

○ **36. FORM DRAWINGS**: Subsection 801.03 requires the contractor to prepare & submit [to the P.E.] his proposed forming system for C.I.P. concrete, for review & approval. These drawings shall contain sufficient information to allow a complete evaluation of adequacy. [Drawings for deck forms shall include the type of screed to be used.] Drawings shall be submitted in a timely manner & it will take 2-3 weeks for approval.

○ **37. SHOP & WORKING DRAWINGS**: Where are the contractor's submittals required to be sent for approval?____
[The contractor shall send the P.E. a copy of his transmittal letter, when he forwards his submittals to DOTD (HQ) or a consulting engineering firm.]

○ **38. FIELD LAB**: Location?____.

○ **39. DRIVEWAYS & MAILBOXES**: The contractor & DOTD shall make an effort to work with the property owners to keep them informed about the work on these items & to minimize disruptions to these people. The contractor is required to write letters to the owners of the mailboxes, about their replacement and/or removal.

○ **40 .N.P.D.E.S. (National Pollutant Discharge Elimination System):** When construction projects disturb 5 acres or more, a NOI (Notice of Intent) and a NOT (Notice of Termination) are required. [Usually, the NOI is done by DOTD (HQ).] The NOT will be completed by the P.E. and forwarded to the contractor for his signature and then the District Administrator will sign it for DOTD. Finally, the P.E. will forward the completed form to the E.P.A. in Virginia. When construction projects disturb between 1 and 5 acres, a NOI is not required; i.e., we are automatically covered under the Storm Water General Permit for Small Construction Activities. At the completion of the project, the P.E. will complete a Small Construction Activity Completion Report (LAR200000) and send it to DEQ. {There are a significant number of additional requirements that have to be met, by the contractor and the P.E., they will be discussed in more detail before the work begins.}

○ **41. STORM WATER POLLUTION PREVENTION PLAN [SWPPP]**: In accordance with the requirements of this contract and the National Pollution Discharge Elimination System (NPDES), the contractor is required to manage discharges from the construction site to prevent pollutants from entering waters of the United States. Also, the contractor should eliminate or minimize any pollutants (including dirt, silt, etc.) leaving the project limits. Therefore, to that end, the contractor will be required to develop and submit a SWPPP to the Project Engineer for his review and approval. No work may begin, until the SWPPP has been approved. (An approved copy of the contractor's SWPPP will be posted at the work site.) The SWPPP will be prepared in accordance with good engineering practices. The plan shall identify potential sources of pollution, which may reasonably be expected to affect the quality of storm water discharges from the construction site. The plan shall describe & ensure the implementation of practices, which will be used to reduce the pollutants in storm water discharges and to assure compliance with the terms and conditions of this permit. The SWPPP should be kept current and should be amended if there is a change that will have a significant effect on the discharge of pollutants in storm water. (Additional information and handouts will be presented at this meeting, to assist the contractor.) It should be noted that the prevention of storm water pollution is a very serious matter and should be addressed in that manner by both the contractor and the Department. If the contractor does not comply with the provisions of the SWPPP, the Project Engineer is authorized to discontinue the portions of the work (which are not in compliance) until acceptable corrections have been made (by the contractor). To comply with the requirements for a completed project a minimum of 70% cover will be required on the slopes.

○ **42. LANDSCAPING WORK**: It should be noted that it is a Louisiana law [Louisiana Horticulture Commission, Laws, Rules & Regulations] that any person or firm that receive fees for performing work as a landscape contractor must hold a valid landscape contractor's license. [The license must be issued to the owner and/or an employee, of the firm, who has direct supervision over the work.] Examples of this work would be purchasing & planting shrubs & trees under our DOTD contracts. The P.E. shall verify and confirm that this provision is being complied with by our contractor, see subsection 107.01, "Laws To Be Observed". As per the directions of the Chief Engineer and Chief Construction Engineer (20 Dec.'02), final approval on all submittals, planting materials, etc. shall be received from a DOTD representative; i.e., DOTD Landscape Architect, Roy Dupuy, or his designated representative. No work should begin until the applicable submittals have been approved; nor plants installed, until the plant material has been inspected and approved by the appropriate DOTD personnel.

○ **43. SAFETY & EEO:** The contractor shall post his EEO Policy and the wage rates on his bulletin board, at the jobsite. Who is the EEO officer? ______________________. Safety Officer? ___________________________

○ **44. EMERGENCY PHONE NOS.** The contractor shall provide the P.E. with a list of names, telephone numbers, etc. of his personnel, to be contacted in case of an emergency, on this job.

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○ **45. SUPERINTENDENT**: Who will be the contractor's superintendent?____________________ ________________________ Who will be the "Project Supervisor" for the Project Engineer? ______________________________________

In accordance with the Special Provisions, subsection 105.05, Cooperation By Contractor, requires that the contractor shall have on the work at all times, as the contractor's agent, a competent representative capable of reading & understanding the plans and project specifications and experienced in the type of work being performed, who shall receive instructions from the engineer. At the pre-construction conference or upon request, the contractor shall furnish the engineer written notice of the name and home telephone number of the representative. The representative shall have authority to execute orders or directions of the engineer without delay and to promptly supply such materials, equipment, tools, labor and incidentals as required. The representative shall be furnished regardless of the amount of work sublet.

○ **46. EXTRA WORK/PLAN CHANGES**: Extra work cannot be started until a plan change has been approved by all parties involved, unless "VERBAL" approval can be obtained to expedite work.

○ **47. CONTRACT DISPUTES**: [see E.D.S.M. III.1.1.28] If there is a dispute & the contractor believes that he is due additional compensation for work or materials, the contractor must notify the P.E. in writing of his intent to make a request for more money before the work is begun. The Contractor's Notification of Contract Dispute form shall be used by the contractor to notify the P.E. of his intent to make a request for equitable adjustment [as per subsection 105.18]. (The contractor shall send copies of the form to the District Construction Engineer, the Construction Engineering Administrator & the Chief Engineer.)

IF THE CONTRACTOR DOES NOT NOTIFY THE P.E. IN A TIMELY MANNER AND IN ACCORDANCE WITH THE PROVISIONS OF THE APPLICABLE E.D.S.M., THE CLAIM MAY (AND MOST LIKELY WILL BE) DENIED ON THOSE GROUNDS.

○ **48. CONFLICT ESCALATION PROCEDURES:** In cases of conflict on the project, it is the intent of the Department to eliminate or minimize any delays associated with a final determination to resolve any outstanding issues. Therefore, the Department and the contractor have agreed to the following framework and time table to resolve problem areas:

	LA. DOTD	CONTRACTOR	TIME
Level 6			2 Week
Level 5			1 Week
Level 4			3 days
Level 3			2 days

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Level 2 Project Engineer 1 day .

Level 1 Project Supervisor 4 hours .

○ **49. VALUE ENGINEERING**: V.E. is a part of this contract (Subsection 105.19).. The purpose of V.E. is to share with the contractor costs savings generated as a result of a Value Engineering Proposal, that is approved by the Department. The purpose of V.E. is to encourage the use of the contractor's ingenuity and experience in arriving at alternative construction methods which will reduce the overall construction cost. After award of the contract, the contractor will be permitted to submit to the P.E. written Value Engineering Proposals, for modifying the plans, specifications or other requirements of the contract for the purpose of reducing the total cost of construction. The contractor will receive 50% share of the net cost savings for full compensation for implementing all changes related to the V.E. Proposal.

Does the contractor believe, at this time, that he will be submitting a V.E. Proposal,

1) In the near future?______________________.
2) Sometime later in the project?____________.
3) Not at all?_____________________________.
4) Not sure?______________________________.

The contractor has the option of submitting a CONCEPTUAL V.E. Proposal to the Department for review prior to making a formal submission. However, the contractor may submit the formal V.E. Proposal directly to the P.E. It is imperative that the contractor submit any V.E. Proposal in a timely fashion to allow sufficient time for the proposal to be reviewed (for completeness) by the district and forwarded to the Value Engineering COMMITTEE at DOTD (HQ) for review and/or approval. If the V.E. Proposal is accepted, the necessary contract modifications will be implemented by execution of a PLAN CHANGE, which will provide for equitable adjustments giving the contractor and the Department equal shares in the resulting next savings. UNTIL A V.E. PROPOSAL IS EFFECTED BY SUCH CONTRACT MODIFICATION, THE CONTRACTOR SHALL PERFORM THE WORK IN ACCORDANCE WITH THE TERMS OF THE EXISTING CONTRACT.

○ **50. ASPHALTIC SURFACE TREATMENT (AST) / CHIP SEAL**:

(1) According to the plans & specifications, this will be a TYPE _______, asphaltic surface treatment and will consist of __________ courses.

(2) What type of **asphaltic material** do you plan to use?

CRS-2P, Emulsified Polymerized Asphalt____________________

CRS-2L, Emulsified Latex Modified Asphalt_______________________

CRS-2, Cationic Emulsified Asphalt ____________________________

(3) Who will supply your asphaltic material?__________________________________

(4) What type of **aggregate** will you use for,

Size #1 (biggest), ____

Size #2 ____

Size #3 (smallest),____

(5) Who will supply your aggregate?____

Before the asphaltic surface treatment operations begins, the contractor shall calibrate and set the flow rates of his distributor and spray bar along with the aggregate spreader to the satisfaction of the engineer.

Aggregate spreading operations shall begin immediately after the application of the asphaltic materials. The P.E. will approve and adjust the actual application rates for asphaltic material and aggregates**.** Immediately after spreading the cover material, the surface shall be rolled using a minimum of two (2) pneumatic rollers. The first pass shall be made within one (1) minute. A minimum of three (3) passes shall be made over a single point. All rolling shall be completed with 1/2 hour after the cover material has been spread. [A steel wheel roller shall not be allowed.] The contractor shall NOT contaminate any maintained lawns with aggregate; i.e., by brooming or casting material during operations. If contamination occurs, the contractor shall clean up the excess aggregate as directed by the Project Engineer, at no additional pay. When multiple applications are to be placed, a minimum of 48 hours shall elapse between the application of each successive treatment of emulsions. Successive hot applications can be placed without delay. For INTERLAYERS, asphaltic concrete shall not be placed on an emulsion surface treatment for a minimum of five (5) days after application. Hot applied interlayers may be overlaid immediately.

Asphalt material shall not be applied on a wet surface nor when the air temperature or pavement surface temperature, in the shade, is less than 60 degrees F. Cold applied emulsions shall be placed within the months of APRIL thru OCTOBER. Hot applied modified asphaltic material shall be placed within the months of MAY thru SEPTEMBER.

○ **51. MICRO-SURFACING**:

(1) According to the plans & specifications, this micro-surfacing will consist of _____ _____courses. [For a two course application, the first course will consist of a "scratch" course (usually at 20 lbs/S.Y.) and the second course (usually 25 lbs/S.Y.) is the wearing course.]
(2) What type of asphaltic material will you use?_____________________________________
(3) Who will supply your asphaltic material?____
(4) What type of aggregate will you use?____
(5) Who will supply your aggregate?____

The contractor shall submit a job formula and all micro-surfacing materials to the engineer prior to use. Compatibility for the aggregates and polymer modified asphalt shall be demonstrated. Proper curing of the micro-surfacing must take place (before traffic is turned loose) or damage will occur to the surface. It is the contractor's responsibility to protect the micro-surfacing from traffic until the new surface will support traffic without damage. Sufficient flagmen, warning signs & barricades shall be provided by the contractor to properly control traffic form traveling in the freshly laid materials. It is the recommendation of the

Department that a meeting be held (with the contractor and the P.E.) to discuss all aspects of this work, prior to beginning of any micro-surfacing.

○ **52.CLEARING & GRUBBING:** Burning trees and stumps, within the project limits, may be optional in some areas; but it is always subject to burn ordinances of the local municipalities and state regulations. Therefore, burning should never be initiated without prior approval from the appropriate party. Trees and stumps may be buried within the limits of the project; i.e., provided proper notification is given to DEQ, accurate records are maintained, an annual report of disposal is filed with the DEQ, (and most importantly) with the permission of the Project Engineer**.** All trees and stumps that are removed from the project limits are to be disposed of in a Category III landfill (C & D for woodwaste). It is not acceptable for a contractor to dump trees, stumps or any other wood debris in a borrow pit.

According to DEQ,state law prohibits the burning of buildings and lumber from buildings. This type of debris must be hauled to and disposed of in a Category III landfill (C & D for wood products).

○ **53. REMOVING/RELOCATING/DEMOLISHING STRUCTURES**: All buildings scheduled for demolition are to be inspected for asbestos by a "certified asbestos inspector" prior to demolition. The actual demolition of the building is subject to the findings of the inspection. Therefore, no buildings shall be demolished until after the inspection and the necessary "notification of demolition" and approval process, through DEQ, has taken place; i.e., DEQ form AAC-2, Louisiana Department of Environmental Quality Asbestos Notification of Demolition and Renovation. In cases where certain classification of asbestos is discovered, via the inspection, it will be necessary that the asbestos be removed by a "certified asbestos abatement contractor" prior to the demolition of the building. Special attention should be paid to the removal of potentially hazardous materials, underground tanks, & the handling of contaminated soils. A joint review of the project should be made (before construction begins) by the contractor & the P.E. to verify that there are no hazardous materials, tanks, etc., that are not shown on the plans. Underground tanks shall be removed and disposed of in accordance with our specifications. [The contractor shall make every effort possible to prevent the infiltration of water into any tanks on the job.] Contaminated soil & water, the removal of these materials will be handled as directed in our contract. The contractor will be reimbursed (for this work) under the existing items in the contract or as extra work. Prior to the removal of butane or propane gas tanks, the contractor shall obtain written approval of the LA. Liquefied Petroleum Gas Commission.

○ **54. PLUGGING of ABANDONED WATER WELLS & HOLES within DOTD R/W**: State Law requires that all abandoned wells & holes be reported & sealed in accordance with the requirements of the "Water Well Rules, Regulations & Standards, State of LA." {R.S. 38:3094A.6 & 38:3098.2A.1}. Wells shall be plugged by a DOTD licensed water well contractor. Are there any wells or holes to be plugged on this job?_________How many?____

○ **55. RAILWAY – HIGHWAY PROVISIONS**: Do we have a situation on this job where we will have a road that crosses a railroad track; either at grade, an underpass or an overpass?________. If we do, then are all parties familiar with our contract provisions related to working near railroad tracks?__________. Before we go to work, the first thing we must do is verify that the minimum clearances with the tracks will be met.

(1) Who is the owner and maintains the railroad tracks? ____

(2) Is everyone (DOTD, contractor & railroad) familiar with and in agreement with the conditions & rules by Which the contractor can work adjacent to, on, or over the railroad right-of-way? _ _________________

(3) Will we be working within 25' of the centerline of the tracks? ________________ ____

(4) Will a railroad flagman be required (by the railroad) on this project? ___________ _________________

(5) Who will pay for the flagman? ________________________________

(6) Do we have a system set up & in place to be able to contact the railroad in case of an emergency? ___________ {We need to obtain a list of names & phone nos. from the railroad to be used in case of an emergency.}

○ **56. EMBANKMENT/BASE COURSE**: The latest edition of the "APPLICATION OF QUALITY ASSURANCE SPECIFICATIONS FOR EMBANKMENT AND BASE COURSE" applies to this project. This manual requires the contractor to provide "Quality Control" (QC) and DOTD personnel to provide "Quality Assurance" (QA). Prior to the Pre-Construction Conference, the contractor shall provide the P.E. with the following:

1. A list of quality control personnel & their assigned responsibilities & their prior experience in their area of responsibility.
2. The types of equipment proposed for various construction activities.
3. A proposed Quality Control program, including a basic schedule of sampling & testing & the testing equipment to be used.

The contractor will not be permitted to begin construction until the information has been given to and approved by the Project Engineer. [If changes to personnel or any other aspect of the QC program must be made, the contractor shall notify the P.E. immediately.

Quality Control (QC) Personnel: will be reviewed & approved by DOTD.

1. Embankment QC Personnel do NOT have to be "certified"; however, they must be "qualified" and have a nuclear film badge.
2. Base Course QC Personnel, when doing a Class 1 base course, are required to be "certified" when the material is coming from a pug mill, or is hot mix or PCC concrete.

It is this District's policy that contractor's QC personnel will be "approved" as follows:

1. The contractor will send the required information (as shown above) to the P.E.; the P.E. will review it & make a written recommendation to the District Lab Engineer.
2. The District Lab Engr. will review the P.E.'s recommendation & the contractor's submittal; at that time, the Lab Engr. will either approve or disapprove the contractor's QC personnel & advise the contractor & the P.E. in writing of that fact.

The contractor is to complete QC testing and make any needed corrections prior to requesting acceptance testing by DOTD. The contractor is NOT to rely on DOTD's acceptance program & acceptance test results to prevent the application of payment adjustment or delays caused by suspensions of operations due to failures or deficiencies. The contractor is to document ALL QC testing & provide copies to the P.E. as directed. ALLQC documents shall be stamped "QC" with red ink, in minimum one-inch high letters by the contractor. DOTD's results are used to determine the acceptability of the product & take precedence over any other test results. Consistent or repeated failures identified by test results or repeated deficiencies identified by inspection will result in the suspension of operations until the cause is identified & corrected & the QC program is reviewed & modified to eliminate such repeated or consistent failures.

○ **57. P.C.C. PAVEMENT & STRUCTURAL CONCRETE**: The latest edition of the "APPLICATION OF QUALITY ASSURANCE SPECIFICATIONS FOR PORTLAND CEMENT CONCRETE PAVEMENT & STRUCTURES" applies to this project. This manual requires the contractor to provide "QUALITY CONTROL" (QC) and DOTD personnel to provide "QUALITY ASSURANCE" (QA). Prior to the Pre-Construction Conference, the contractor shall provide the P.E. with the following:

1. A list of quality control personnel & their assigned responsibilities & their experience in there are of responsibility.
2. The types of equipment proposed for various construction activities.
3. A proposed "Quality Control" program, including a basic schedule of sampling & testing; also, the testing equipment to be used.

The contractor will not be permitted to begin construction until the information has been given to and approved by the Project Engineer. [If changes to personnel or any other aspect of the QC program must be made, the contractor shall notify the P.E. immediately.]

Quality Control Personnel: will be reviewed & approved by DOTD.

1. Certified Concrete Technician – be at the plant when running.
2. Authorized Concrete Batcher – batching the concrete at the plant.
3. Authorized Concrete Field Tester – takes samples & perform certain tests.*
4. Authorized Profilograph Operator – will operate the profilograph
5. Authorized Profilograph Evaluator – interpretation of the trace, etc.

*(Under the direction of the "Certified Concrete Technician

It is the District's policy that the contractor's QC personnel will be approved as follows:

1. The contractor will send the required information, on his personnel (as listed above) to the P.E.; the P.E. will review it & make a written recommendation to the District Lab Engr.
2. The District Lab Engr. will review the P.E.'s recommendation & the contractor's submittal; at this time, the Lab Engr. will either approve or disapprove the contractor's QC personnel & advise the contractor & the P.E. in writing of that fact.

The contractor is to complete QC testing & make any needed corrections prior to requesting acceptance testing by DOTD. The contractor is to document ALL QC testing & provide copies to the P.E. as directed. ALL QC documents shall be stamped "QC" with red ink, in minimum one-inch high letters by the contractor. The P.E. is responsible for checking that QC technicians are trained and/or certified as required. At the Pre-Construction Conference, the P.E. shall review the contractor's proposed QC program & provide a copy to the Lab Engr. The P.E. may require the contractor to modify the proposed program weather at the Pre-Construction Conference, before construction begins, or during construction. A certified technician is not required for the production of minor structure class concrete.

QUESTIONS OR COMMENTS:

By the PRIME CONTRACTOR or SUBCONTRACTOR: ____________________

By DOTD: ____________________

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By Other Parties:

Pre- Construction Conference Checklist (cont'd) 20 of 21

Notification of Upcoming Highway Construction/ Maintenance Project

Sent To: Date:
Fax: Parish(es) Affected:

PROJECT DESCRIPTION

Route: Nature of Work:
Project Limits:
(Milepost(s) To)
What Will Be Done:

PROJECT SCHEDULE (WEATHER PERMITTING)

Start Date:
Completion Date:
Work Schedule(Days/Hours):

TRAFFIC IMPACT

Lane(s) Closure:

Anticipated Delays:

ALTERNATE TRAFFIC ROUTE

CONTAC FOR MORE INFORMATION

Contact Person:
Telephone:
Email:
Fax:

***NOTE:** Updates Posted On **www.dotd.state.la.us**; Click On "Road Closures" Link At The Bottom Of The Homepage.*

Distribution List:

Parish President (s)	State Police Troop
Affected Legislators	Office of Emergency Preparedness
Local Sheriff	EMS Providers
Local Fire Chief	DOTD Truck Permits
Public Transportation Providers	911

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Rev. 01/06

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
PROFILER INSPECTION AND CERTIFICATION

GENERAL INFORMATION

Calibration Sticker Number:

Laptop Serial Number: ______________________ Mfg./Model: ______________________

VIN: ______________________ Processing Computer Serial Number: ______________

Laser S/N (#1): ______________________ (#2) ______________________

Owner: ______________________ Telephone #: ______________________

Address: ______________________ City/State: ______________________

Prior Inspection Date: ______________________ Test Date: ______________________

Tire Pressure, psi (Record all tires) RF: ______ RR: ______ LF: ______ LR: ______

INSPECTION AND TESTING

1. Miscellaneous Apparatus (Must be available at the time of inspection)
   - A. ______ Tire pressure gauge
   - B. ______ Air pump
   - C. ______ 3-Foot alignment bar, adjustable
   - D. ______ 100-ft minimum Measuring Tape or Measuring Wheel
   - E. ______ Transport vehicle, trailer
   - F. ______ Owner's manual
2. Field Book
   - A. ______ Available B. ______ Up-to-Date (Upgrades Recorded?) Yes ____ No ____
3. Optical Digital Sensors (ODS) ______ Clean
4. Calibration Blocks
   - A. 0.25 inch, other ______ inch, Thickness ______ (±0.01)
   - B. 0.50 inch, other ______ inch, Thickness ______ (±0.01)
   - C. 1.00 inch, other ______ inch, Thickness ______ (±0.01)
5. Data Acquisition and Reporting System
   - A. ______ IBM Compatible system
   - B. ______ USB Port
   - C. ______ High speed thermal strip plotter
   - D. ______ Omit, Event key or method
   - E. ______ Thermal Printer
   - F. ______ Calculates IRI, 0.05 mile segment
   - G. ______ Calculates PI, 0.10 mile segment
   - H. ______ Bump detection feature

STATIC TESTS

6. Vertical Calibration Check

Extensive Test					
ODS #1			ODS #2		
Block Size	Avg. Diff.	Tolerance	Block Size	Avg. Diff.	Tolerance
0.25 (other)		Less than 0.01	0.25 (other)		Less than 0.01
0.50 (other)		Less than 0.01	0.50 (other)		Less than 0.01
1.00 (other)		Less than 0.01	1.00 (other)		Less than 0.01

______ Pass ______ Fail

7. Bounce Test

______ Report Printed ______ Pass ______ Fail

Comments: ______________________

8. Horizontal/DMI Calibration
   - A. ______ 528 feet (Calibration distance)
   - B. ______ Calibration Successful
   - C. ______ Report Printed

Comments: ______________________

Odometer Mode Analysis

A. ______ Distance Traveled (528±0.528 ft) B. ______ Report Printed

Profiler Certification Report

9. Set-up Information Listed on Printed Report(s)

California Profilograph Settings:
Band Width (in.) = 0.20
Min. Scallop Width (ft) = 2.00
Min. Scallop Height (in.) = 0.030
Scallop Rounding = 0.05
Count Scallops Once = True

BUMP SETTINGS:
Bump Height (in.) = 0.3
Bump Width (ft) = 25.00
Bump Detection = on
Dip Detection = off

FILTER SETTINGS:
Low Pass Filter (ft) = 0.00
High Pass Filter (ft) = 300.00
Reduction Length = 528' English, 100 m Metric
Horizontal Scale = 300 to 1
Vertical Calibration = 1.000±0.01
Horizontal Calibration = 80±5

DYNAMIC TESTS

PROFILE INDEX FOR HIGHWAY 991		
TEST	INSIDE WHEEL PATH	OUTSIDE WHEEL PATH
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
AVERAGE		

10. Do the results generated by the alternate profilograph correlate to the results generated by the California Type Ames Profilograph to within 1.0 inch/mile for pavement surfaces which are up to 15 inches/mile in roughness? Yes _____ No _____
Were ten (10) runs performed for the determination? Yes _____ No _____

11. Does the alternate model demonstrate repeatability to within 1.0 inch/mile when testing pavements up to 15 inches/mile in roughness? Yes _____ No _____
Were ten (10) runs performed for the determination? Yes _____ No _____

IRI VALUES FOR BEN HUR ROAD		
TEST	INSIDE WHEEL	OUTSIDE WHEEL PATH
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
MEAN IRI	0.0	0.0
STD	??	??

IRI VALUES FOR HIGHWAY 991		
TEST	INSIDE WHEEL	OUTSIDE WHEEL PATH
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
MEAN IRI	0.0	0.0
STD	??	??

12. Precision: Is the standard deviation within the acceptable tolerance of the IRI? Yes _____ No _____

13. Bias: Is the mean IRI value within the acceptable tolerance of the Reference IRI Value? Yes _____ No _____

Remarks:

Inspected By: ______________________________ Date: ______________

Approved By: ______________________________ Date: ______________

Profiler Certification Report (cont'd.)

NO. 0100 ______

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

LOW PASS FILTER: ______

HIGH PASS FILTER: ______

COLLECTION FILTER: ______

IRI CERTIFICATION: ______

PI CERTIFICATION: ______

CALIBRATION DATE: ______

EXPIRATION DATE: ______

TECHNICIAN: ______

Profiler Certification Sticker