

502.5 Payment

A. Structural Metal

The quantity of structural metal (determined as described below in Subsection 502.4.A “Structural Metal”, will be paid at the Contract Price according to Subsection 501.5, “Payment” for Steel Structures.

B. Lumber and Timber

Lumber and timber will be paid for at the Contract Unit Price bid per thousand feet board measure (MBM) (cubic meter), complete in place and accepted. The payment will be full compensation for material, labor, and equipment necessary to complete the Work as shown on the Plans and as described in this Specification. Payment includes incidentals and all costs, both direct and indirect.

Payment will be made under:

Item No. 502	Bridge timber (untreated)	Per MBM (cubic meter)
Item No. 502	Bridge timber (treated)	Per MBM (cubic meter)

502.5.01 Adjustments

General Provisions 101 through 150.

Section 504—Twenty-Four Hour Accelerated Strength Concrete

504.1 General Description

This work consists of manufacturing and placing accelerated strength concrete designed to produce a compressive strength of 2,500 psi (17 MPa) within 24 hours.

Except as modified in this Specification, the provisions of Section 500 shall apply to concrete produced and placed under this Specification.

504.1.01 Definitions

General Provisions 101 through 150.

504.1.02 Related References

A. Standard Specifications

Section 109—Measurement and Payment

Section 500—Concrete Structures

B. Referenced Documents

AASHTO M 194, Type E, Table I

504.1.03 Submittals

A. Approve Chemical Admixture for Concrete

Ensure that the manufacturer submits an affidavit that the chemical admixture for concrete meets the requirements of AASHTO M 194, Type E, Table I.

B. Establish Concrete Mix Proportions

Choose one of the following two procedures for establishing concrete mix proportions for concrete placed under this Specification.

Notify the Engineer of the chosen procedure at least 45 days before placing the concrete.

1. Concrete Mix Proportions Established by the Contractor

The Contractor may propose specific concrete mix design proportions for concrete placed under this Specification. In this case, the Contractor shall meet these requirements:

- a. Ensure that all materials are from approved sources or from materials stored or stockpiled at the site.

- b. Have all materials tested before they are used.
- c. Have the laboratory verify that the proposed proportions will produce concrete that develops 2,500 psi (17 MPa) within 24 hours.
Proposed mixes may be approved without laboratory design study when they include commonly used material combinations.

2. Concrete Mix Proportions Established by the Department

The Contractor may choose to have the Department establish the concrete mix proportions. However, the Department's approval of the design mix does not relieve the Contractor of the responsibility to produce concrete with the specified compressive strength of 2,500 psi (17 MPa).

The Department will establish the proportions as follows:

- a. The Contractor shall notify the Office of Materials and Research of the proposed sources of all materials.
- b. The Department will establish the job mix proportions from materials representative of the materials proposed for use, provided all materials conform to their respective Specifications.
- c. The Office of Materials and Research will determine the following based upon materials intended for use:
 - Minimum cement content
 - Required water content
 - Quantities of aggregate
 - Addition rates of admixtures
- d. The Department will make the proportions available as public information within one month after the Contractor proposes the material sources.
- e. The Department will not allow materials to be substituted after releasing an approved design unless the Office of Materials and Research approves of the substitution.

The Department will base job mix design proportions upon the following table:

Minimum Cement cwt/cu yd (kg/ m ³)	Maximum Water Cement Ratio lbs/ lbs (kg/kg)	Minimum Compressive Strength at 24 Hours psi (MPa)	Air Content (%)	Slump Range inch (mm)
7.52 (446)	0.45	2500 (17)	3 to 6	2 to 5(50 to 125)

The Department will accept initial design admixture meeting the requirements of materials established in this Specification. However, the Department will not approve any combination of admixture and cement that produces undesirable characteristics of set time or strength development.

504.2 Materials

All materials shall meet the requirements of the following Specifications:

Material	Section
Portland Cement (Type I or Type III)	830.2.01
Air-Entraining Admixtures	831.2.01
Coarse Aggregate, Class A or B, Gravel or Stone	800.2.01
Fine Aggregate, Size No. 10	801.2.02
Chemical Admixtures	831.2.02
Calcium Chloride	884.2.01
Water	880.2.01

The concrete acceleration admixtures may be either of the following:

- Calcium chloride
- A chemical admixture

The Engineer must authorize chemical admixtures before they are used for concrete. Admixtures will be approved only if an acceptable concrete design is established in the laboratory with materials representative of those proposed for use.

Do not use accelerators containing chlorides in prestressed concrete; or, in bridges or box culverts when the concrete containing the additive will contact the reinforcement steel

504.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

504.3 Construction Requirements

General Provisions 101 through 150.

504.3.01 Personnel

A. Quantity of Personnel

Provide enough labor to place, consolidate, and screed each batch of concrete within one hour after introducing the cement and first mixing water into the mix.

Do not place concrete when there are not enough personnel to meet this requirement.

504.3.02 Equipment

A. Quantity of Equipment

Provide enough equipment to place, consolidate, and screed each batch of concrete within one hour after introducing the cement and first mixing water into the mix.

Do not place concrete when there is not enough equipment to meet this requirement.

B. Portable Mixers

The Engineer may approve portable mixers when placement quantities at a given location are less than one cubic yard (meter).

504.3.03 Preparation

General Provisions 101 through 150.

504.3.04 Fabrication

General Provisions 101 through 150.

504.3.05 Construction

A. Batch and Mix Materials

1. Transit-Mixed Concrete

When transit-mixed concrete is used for concrete containing an acceleration admixture, do the following:

- a. At the plant, mix the concrete ingredients, excluding the acceleration admixtures and 3 gal (15 L) of withheld water per cubic yard (meter) of concrete, at mixing speed for 35 revolutions of the drum.
- b. Mix the concrete enroute to the job site at an agitating speed of no more than three revolutions per minute.
- c. At the job site, add the acceleration admixture and withheld mixing water to the concrete according to these requirements:
 - 1) The Engineer will approve the method of adding the acceleration admixture and withheld mixing water.
 - 2) The Contractor shall measure the admixture into the concrete with an accuracy of plus or minus three percent.
 - 3) The Contractor shall not add accelerating admixture to concrete that has attained the age of 45 minutes as measured from the beginning of the initial mixing at the plant.
- d. Mix the concrete for 40 additional revolutions at mixing speed.

504.3.06

2. Central-Mixed Concrete

When central-mixed concrete is used for concrete containing an acceleration admixture, do the following:

- a. Shrink-mix all concrete ingredients, excluding acceleration admixture and 2 gal (10 L) of withheld water per cubic yard (cubic meter), in the central mixer.
- b. Mix the above ingredients enroute to the job site at agitating speed.

All other provisions of Subsection 504.3.05.A.1, "Transit-Mixed Concrete," shall apply for adding the acceleration admixture and mixing the concrete at the job site.

B. Cure Concrete

Cure the concrete according to Subsection 500.3.05.Z, "Cure Concrete," except that the Engineer may waive the concrete curing period when test results indicate the compressive strength exceeds 2500 psi (17 MPa).

All provisions of Subsection 500.3.05.X, "Pour Concrete in Cold Weather," shall apply except that the protection requirements in step 2 of Subsection 500.3.05.X may be suspended when test results indicate the compressive strength exceeds 2500 psi (17 MPa).

504.3.06 Quality Acceptance

A. Compressive Strength Testing

Compressive strength testing are conducted as follows:

- 1. Georgia DOT personnel will cast four test cylinders for each day of concrete placement.
- 2. Georgia DOT personnel will store the cylinders on or adjacent to the pour in a moist condition.
- 3. Minimum compressive strength shall be according to either of the following for an average of two specimens

Strength development at 24 hours	2,500 psi (17 MPa)
Strength development at 3 days	3,500 psi (24 MPa)

504.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

504.4 Measurement

Twenty-four-hour accelerated strength concrete will be measured for payment by the square yard (meter) or cubic yard (meter) as indicated on the Plans and in the Proposal.

- Square yard (meter) measurements shall be as defined in Section 109.
- For structure concrete, cubic yard (meter) measurements will be the algebraic summation of the Plan quantity and any authorized quantity changes.

504.4.01 Limits

General Provisions 101 through 150.

504.5 Payment

Twenty-four-hour accelerated strength concrete will be paid for at the Contract Unit Price bid either by the cubic yard (meter) or square yard (meter) as shown on the Plans or in the Proposal.

Payment will be made under:

Item No. 504	Twenty-Four-Hour Accelerated Strength Concrete	Per cubic yard (meter)
Item No. 504	Twenty-Four-Hour Accelerated Strength Concrete	Per square yard (meter)

504.5.01 Adjustments

General Provisions 101 through 150.