

## **5.4 MATERIAL PROPERTIES**

The designer is responsible for selecting the proper class of concrete for the degree of exposure and intended placement. The classes of concrete specified should meet the requirements of Section 502 of the Standard Specifications.

### **SCHEDULE OF CONCRETE**

Concrete placement is divided into schedules for structures that have definite superstructure and substructure elements; e.g., prestressed girder bridges. Unscheduled concrete is used for culverts, retaining walls, etc.

- Schedule Number 1 concrete is intended for placement in the substructure. Typical placement is below the beam seats at abutment and piers and at wing walls.
- Schedule Number 2 concrete is intended for placement in the superstructure. Typical placement is above the beam seats.

### **CLASS OF CONCRETE**

The class of concrete is specified in 100 psi 28-day strength. Refer to Bridge LRFD Manual Article 5.12 for additional requirements on classes of deck concrete.

<u>Class</u>	<u>Strength-psi</u>	
Seal	NA	Use for underwater placement for sealing cofferdams
15	1500	Use for a leveling course
30	3000	Not recommended for structural applications.
40	4000	Recommended for most structural members.
40A		Intended for use when high entrained air and low slump are necessary for extreme exposure and wear. Typical applications are deck slabs, curbs, and parapets.
40B		Intended for use when air entrained concrete is desirable for substructure elements. Typical applications are abutments, piers, pier caps, columns, and wing walls.

The properties for structural concrete placed underwater shall be specified by a Special Provision.

### **ALKALI SILICA REACTIVITY**

All coarse and fine aggregate for concrete shall be tested for ASR according to the Standard Specifications subsection 703.02 & 703.03. Aggregates found to be potentially reactive shall require mitigating measures. The mitigative additives may be fly ash, lithium or other additives in any combination. The proposed mix design shall be tested with the mitigative additives.

### **BID ITEMS**

Concrete should be specified as follows:

- Class 40A, Class 40B, and Seal Concrete bid items should be used.
- Do not specify concrete classes with fly ash.

### **Commentary**

Fly ash can not be produced that conforms to ITD Specifications and specifying fly ash on the contract plans will require the Resident Engineer to write a change order deleting it. The contractor may add fly ash to enhance the mix design at his option.

### **Revisions:**

- June 2006      Fly ash concrete paragraph deleted and replaced with ASR paragraph to conform to the 2004 ITD Standard Specifications.
- April 2008      Added Seal, Class 15, and Underwater structural concrete to Class of Concrete