### 403.04 ALLOWABLE STRESSES-CONCRETE (AASHTO 9.15.2)

In calculating the temporary stress in concrete before losses due to creep and shrinkage, the steel relaxation prior to release and the elastic shortening should be included.

### 403.05 LOSS OF PRESTRESS (AASHTO 9.16)

For creep of concrete, the variable $f_{cds}$, should be calculated using the total dead load applied after prestressing including the 120 kg/m$^2$ future wearing surface.

For girders with required concrete release strengths of 320 kg/cm$^2$ or less, the time of release may be assumed to be 18 hours. For specified strengths over 320 kg/cm$^2$ the time of release should be increased accordingly. For precast girders, the final losses shall include release losses.

The value of relative humidity to be used in calculating shrinkage losses, shall be the value of relative humidity at the bridge site.

### 403.06 SHEAR (AASHTO 9.20)

The value of "d" to be used in shear calculations shall equal the depth of the beam plus the effective depth of the slab with a minimum d = 0.80 times the overall depth. The shear shall be calculated assuming full continuity for composite dead load and live load plus impact.

For single span structures, use the shear design spacing at the 1/4 point for sections from the end of the beam to the 1/4 point. For continuous multi-span structures, use the shear design spacing required from the 1/4 point to the pier for the section from the 1/4 point to the abutment end to obtain a symmetrical reinforcing pattern for all girders.

### 403.07 METHOD OF ANALYSIS

The dead load shall be assumed to be unsupported and carried by the girders only. Use of masked strands for debonding shall not be allowed.

The location of the harped point of the strand should be located as required by design with the preferable locations being near the 1/10 of the span as measured from the midspan of the girder.

## 404 PRESTRESSED I-GIRDERS

### 404.01 GENERAL

Precast Prestressed I-Girder Bridges shall be designed in accordance with AASHTO specifications. Girders shall be designed by Working Stress Method and checked by the Ultimate Strength Method (Load Factor Design). The deck slab is to be designed by the Working Stress Method using a maximum allowable stress of $Fc = 110$ kg/cm², Class K 335.

The slab and diaphragm dead load is to be supported by the girders only.

The Girders are to be designed as a composite-section, simply-supported beams for Live Load and Impact and all superimposed dead loads. Negative moment reinforcement is to be designed over the intermediate supports considering span continuity and all loads.

Continuity designs will include shrinkage and creep moments as required by AASHTO Article 9.7.2.1.

### 404.02 CONCRETE

The following concrete strengths are the desired strengths to be used. Higher strengths may be used if approved by the Abu Dhabi Roads Section Project Manager.

Initial f ′ci = 280 kg/cm² minimum.
f ′ci = 350 kg/cm² maximum.

*Note:* 350 kg/cm² release strengths can be usually obtained within 18 hours, but require 4 to 6 additional hours for each additional 7 kg/cm² required above 350 kg/cm². Permission is required from the Abu Dhabi Roads Section Project Manager for release strengths above 350 kg/cm² and final strengths above 420 kg/cm².

Final f ′c = 350 kg/cm² minimum
f ′c = 420 kg/cm² maximum