PURPOSE:

This Instruction removes restrictions on the use of low relaxation strand and mandates low relaxation strand as the standard for all New York State prestressed concrete applications. It also modifies the design criteria for strand transfer length and debonding. This Engineering Instruction also transmits English Section 709-06 LOW RELAXATION PRESTRESSING STEEL GRADE 270 and Metric Section 709-06 LOW RELAXATION PRESTRESSING STEEL, GRADE 1860 of the Standard Specifications which shall supersede Section 709-06 PRESTRESSING STEEL.

BACKGROUND:

Low relaxation strand presents an opportunity for increased design efficiency compared to stress relieved strand by virtue of lower prestressing force lost to steel relaxation. Additionally, as low relaxation strand has become the industry standard, there is opportunity for economy in fabrication. Both of these factors tend to reduce cost while maintaining quality.

The current ACI/AASHTO transfer length equation reportedly underestimates the mean transfer length for Grade 270 low relaxation strands. Additionally, the AASHTO LRFD specification stresses the importance of the anchored strength of the strands in providing shear resistance of prestressed concrete beams in their end zones. Accordingly, the more conservative AASHTO LRFD strand transfer length and debonding limits have been adopted.

Standard Specification §709-06, PRESTRESSING STEEL, in addition to prohibiting the use of low relaxation strand, requires the sampling and testing of every reel of strand. This testing procedure is very cumbersome and will be replaced by manufacturer’s certification, the creation of an approved list, and random sampling and testing. An approved list of prestressing strand manufacturers will be made available by the effective date of this E.I.

IMPLEMENTATION:

The restriction on the use of low relaxation strand, as stipulated in the New York State DOT “Standard Specifications for Highway Bridges” (Blue Pages) NY 171 and NY 174, Section 709-06 of the Standard Specifications, and the first paragraph of Article C450 (page 68) of the Prestressed Concrete Construction Manual (PCCM), is hereby removed.

The Standard Specifications for Highway Bridges will be modified as follows. These changes will be incorporated in the next issuance of the New York State DOT’s "Standard Specifications for Highway
Modify second sentence of Article 9.20.2.4 of Standard Specifications for Highway Bridges to read as follows:

“The prestress force may be assumed to vary linearly from zero at the end of the tendon to a maximum at a distance from end of tendon equal to the transfer length, assumed to be 60 diameters for strand and 100 diameters for single wire.”

Modify the second sentence of the second paragraph of “Blue Page” NY 180 to read as follows:

“The number of partially debonded strands shall not exceed 25% of the total number of strands or 40% of the strands in any horizontal row.”

The following changes to the Prestressed Concrete Construction Manual (PCCM) will be made by shelf note to be inserted by DQAB:

**PCCM Page 65**


**PCCM Page 68**

§C450. First paragraph, replace the sentence reading "Only stress-relieved strand is to be used in prestress concrete, unless written permission by the D.C.E.S. is granted" with "Only low relaxation strand is to be used in prestressed concrete."

The existing Shelf Note "Prestressed Concrete Units (Structural)" has been amended to include the above changes to the PCCM. DQAB shall insert the revised Shelf Note (see attached) when items with a base number of 557 or 563M are included in the contact.

**TRANSMITTED SPECIFICATIONS**

§709-06 LOW RELAXATION PRESTRESSING STEEL, GRADE 1860. This replaces 1995 standard specification §709-06, PRESTRESSING STEEL. The attached specification will be incorporated into the next update of the standard specification. Until that time it will be an insert into contract proposals beginning with the effective date of this instruction for projects containing items with a base number of 563M.

§709-06 LOW RELAXATION PRESTRESSING STEEL, GRADE 270. This replaces 1990 standard specification §709-06 PRESTRESSING STEEL. The attached specification will be an insert into contract proposals beginning with the effective date of this instruction for projects containing items with a base number of 557.
Projects with a letting date after 7/1/97. For projects with a letting date before 7/1/97 fabricators may request the substitution of low relaxation strand for stress relieved strand. Substitution of low relaxation strand on stress relieved designs will require the approval of the D.C.E.S. based on structural analysis by the fabricator.

**CONTACT:**

Questions in this matter may be directed to D. V. Rettig of the Concrete Engineering Unit at (518) 457-4534.
PRESTRESSED CONCRETE UNITS (STRUCTURAL)

Make the following changes to the Prestressed Concrete Construction Manual (PCCM)

**PCCM Page 9**
§260.1. First paragraph, second line. *Delete* " . . . to the DCES and . . . "

**PCCM Page 9 and 10**
§260.1. Second paragraph, *Delete* entire paragraph. *Replace* with the following:

"These drawings must be received at least 30 days prior to the proposed beginning of erection. The Regional Director will review and approve, or reject, the erection procedure based upon its structural adequacy and the requirements given in §260.2 Required Information. This review will consider, but not be limited to, such things as effects on the maintenance of traffic, modifications to existing pavement, and the flow of water. The Regional Director’s Office will forward all of the comments to the Contractor for incorporation into the erection procedure."

**PCCM Page 11**
§260.2. *Add* the following as Note 13:

"13. Crane outriggers or their bearing mats, if used, shall be located no closer to the back of the substructure than a distance defined by a line projected upward from the top of the footing at a one vertical to one horizontal slope. For crane positions located inside this line the Contractor will be required to submit calculations to the Regional Director for review and approval or rejection."

**PCCM Page 65**

**PCCM Page 68**
§C450. First paragraph, replace the sentence reading "Only stress-relieved strand is to be used in prestress concrete, unless written permission by the D.C.E.S. is granted" with "Only low relaxation strand is to be used in prestressed concrete."
LOW-RELAXATION PRESTRESSING STEEL (METRIC)

Make the following changes to the Standard Specifications of January 2, 1995.

Delete §709-06 PRESTRESSING STEEL entirely and replace with the following:

"709-06 LOW-RELAXATION PRESTRESSING STEEL, GRADE 1860

SCOPE. This specification covers the material requirements for low-relaxation prestressing steel used in the fabrication of prestressed concrete units.

MATERIAL REQUIREMENTS. Low-relaxation prestressing steel shall conform to the requirements of ASTM A416M, Grade 1860. Low-relaxation prestressing steel shall be free of dirt, oil, paint, mill scale, corrosion, coatings, lubricants, or any other foreign material that may prevent an acceptable bond between the steel and the concrete.

Samples and Tests. Sampling and testing shall be conducted as directed by the Materials Bureau.

BASIS OF ACCEPTANCE. Low-relaxation prestressing steel will be considered for acceptance based on the manufacturer's certification of compliance with these specifications, and on the appearance of the manufacturer's name on the Department's Approved List for low-relaxation prestressing steel.

Manufacturers requesting to be added to the Department's Approved List shall contact the Materials Bureau."
LOW-RELAXATION PRESTRESSING STEEL

Make the following changes to the Standard Specifications of January 2, 1990.

Page 7-76

Delete §709-06 PRESTRESSING STEEL entirely and replace with the following:

"709-06 LOW-RELAXATION PRESTRESSING STEEL, GRADE 270

SCOPE. This specification covers the material requirements for low-relaxation prestressing steel used in the fabrication of prestressed concrete units.

MATERIAL REQUIREMENTS. Low-relaxation prestressing steel shall conform to the requirements of ASTM A416, Grade 270. Low-relaxation prestressing steel shall be free of dirt, oil, paint, mill scale, corrosion, coatings, lubricants, or any other foreign material that may prevent an acceptable bond between the steel and the concrete.

Samples and Tests. Sampling and testing shall be conducted as directed by the Materials Bureau.

BASIS OF ACCEPTANCE. Low-relaxation prestressing steel will be considered for acceptance based on the manufacturer's certification of compliance with these specifications, and on the appearance of the manufacturer's name on the Department's Approved List for low-relaxation prestressing steel.

Manufacturers requesting to be added to the Department's Approved List shall contact the Materials Bureau."