STRUCTURAL DESIGN OF PRESTRESSED CONCRETE SEMI PRESMATIC BRIDGE BEAMS

by

A. M. A. Krishanthi Alagiyawanna

A THESIS

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Department of Civil Engineering
University of Moratuwa
Moratuwa

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Krishanthi Alagiyawanna

University of Moratuwa

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Notation

A_c Area of the concrete section

c cover from edge of concrete to centre of tendon

COR Cantilever Overhang Ratio as defined on page 34

d Depth of section

e Eccentricity of prestressing cable (measured +ve downwards from centroid)

e_{min} Minimum eccentricity allowed considering cover limits

e_{max} Maximum eccentricity allowed considering cover limits

e_p Eccentricity of line of thrust

e_s Eccentricity of cable profile

E Young's modulus of the section

E_z Young's modulus at a height z from the bottom flange.

f_c Permissible stress of concrete in compression

f_t Permissible stress of concrete in tension

f_{temp} Temperature stresses due to direct strain and curvature

I Second moment of area about centroid

M External moment acting on the section

$M_{a\ (act)}$ Minimum applied moment at the working load without secondary moments

$M_{b\ (act)}$ Maximum applied moment at the working load without secondary moments

M_a Minimum applied moment at the working load with secondary moments

M_b Maximum applied moment at the working load with secondary moments

M_2 Secondary moment

$(M_2)_j$ Secondary moment at internal support j

N	Number of webs of a box girder
P	Horizontal component of the prestressing force in cable at transfer
P_{min}	minimum prestressing force in cable
P_{max}	maximum prestressing force in cable
R	Loss Ratio
RMR	Reactant moment ratio as defined on page 20
t_b	Thickness of bottom flange
t_t	Thickness of top flange
t_w	Thickness of web
t_z	Temperature at a height z above the bottom of the section
w_b	Width of the bottom flange
w_s	Clear spacing between webs
w_t	Width of the top flange
w_c	Width of the cantilever overhang
y_1	Position of top fiber (-ve)
y_2	Position of bottom fiber (+ve)
z	Distance measured from bottom fiber
Z_1	Elastic section modulus of top fiber (I/y_1) (-ve)
Z_2	Elastic section modulus of bottom fiber (I/y2) (+ve)
β_j	Distribution coefficient for M_2
ψ_z	Curvature due to temperature
ϵ_o	Direct strain due to temperature
γ	Cantilever overhang ratio (w_c/w_s)