DESIGN OF BUILT-UP WELDED (COMPACT/NON-COMPACT) STEEL I SECTIONS

Section Dimensions	Flanges			Web		
	tf=	1.5	cm	tw=	2	cm
	b=	30	cm	hw=	80	cm

HUNCH-L9	
Length (cm)	400

NO fly bracing

Material:	
Steel Grade	St.37

Geometry:		
Lb=	400	cm
Cb=	1.300	
Lbx=	1201.5	cm
Lby=	400	cm
L=	400	cm
Lh=	400	cm

Straining Actions:		
Mux=	106.79	t.m
Qu=	15.82	t
Nu=	0.00	t
Tu=	7.1234	t

Hint:
1st trial Sx=Mu/(.75*Fy)= 5932.78

Section Properties		
Ix	234800.833	cm4
Iy	6803.33333	cm4
rx=	30.65	cm
ry=	5.22	cm
A=	250.00	cm2
Aw=	166.00	cm2
Sx=	5657.85	cm3
Sy=	453.56	cm3
Zx=	6890.00	cm3
Zy=	755.00	cm3
rt=	6.87	cm

Mateial Properties		
Fy=	2.4	t/cm2
Fu=	3.7	t/cm2
E=	2100	t/cm2

Flexure						
(1) Local Buckling		Compact Flange		Compact Web		Compact Section
(2) LTB						
Lp=	269.386	cm				
Lr=	907.600	cm		Case B		
Mn=	165.36	t.m	≤	Mp=	165.36	t.m
Φb*Mn=	140.56	t.m	D/C=	0.760	Safe for flexure about major axis	

Axial Compression					
λx=	39.205	≤	180	OK	
λy=	76.678	≤	180	OK	
λc=	0.8251				
Fcr=	1.7726	t/cm2			
Pn=	443.14	t			
Φc*Pn=	354.51	t	D/C=	0.000	Safe for axial compression

Axial Tension					
(1) Stiffnes condition					
λ=	76.678		≤	300	OK
Lh/60=	6.667		≤	h	OK
(2) Strenght condition					
Pn=	600.00	t			
Φt*Pn=	510	t	D/C=	0.014	Safe for yielding at tension

Combined (Normal Force + Flexure)			
M+C	D/C=	0.760	Safe for combined M+C
M+T	D/C=	0.767	Safe for combined M+T

Shear Force		
Vn=	239.04	t
Φv*Vn=	203.18	t
D/C=	0.078	
Safe for Shear		

Safe