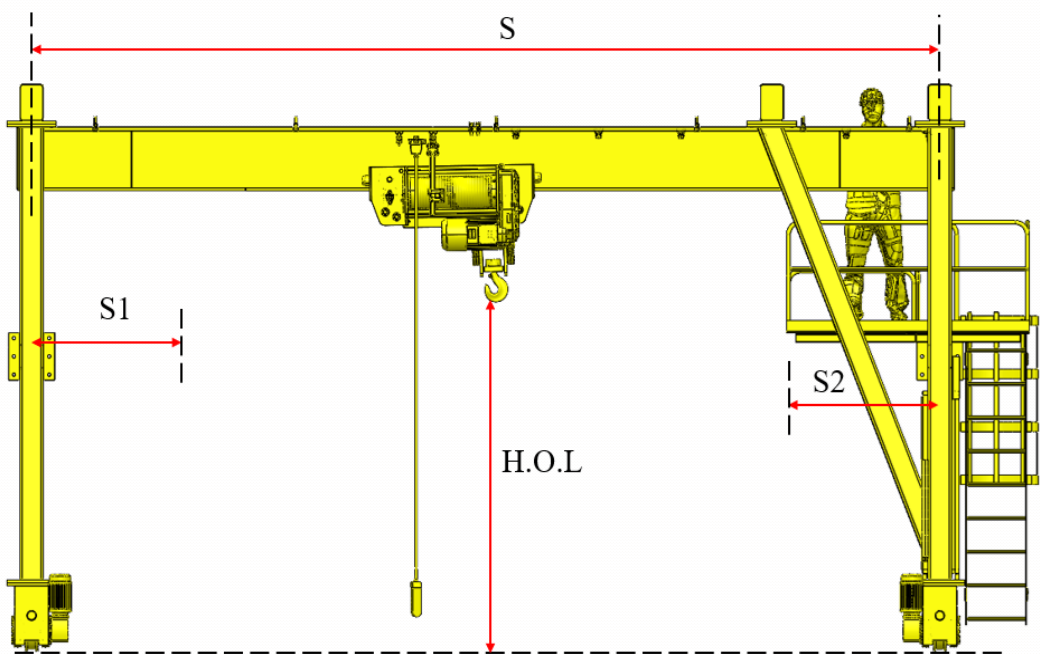


Q	5000	Load (kg)
S	10	Span (m)
ϵ	1.1	Dynamic factor
DG	M5	Working group
$H.O.L$	20000	Height Lift (mm)
$S1$	1500	Approach Side Max (m)
$S2$	1200	Approach Side min (m)

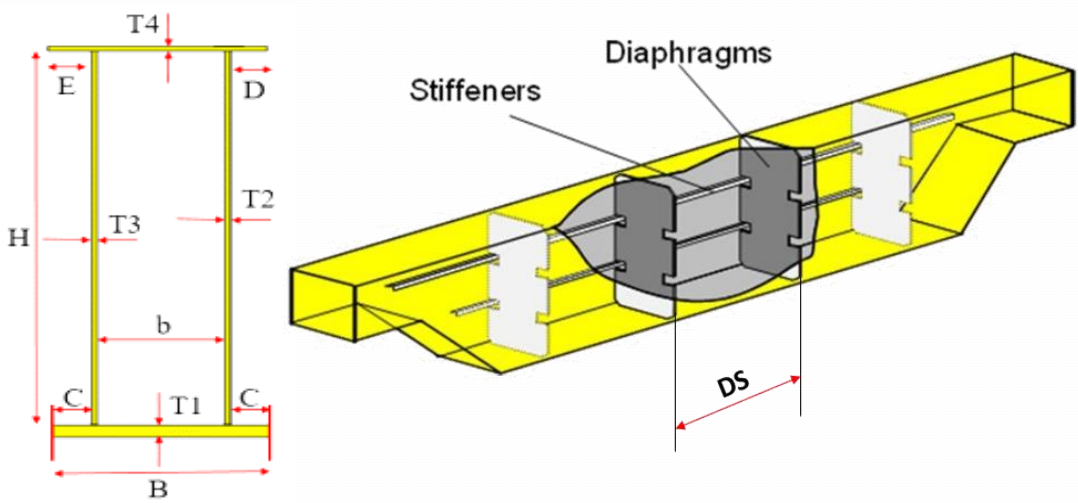


PS	500	Power Supply (kg)
CE	200	Cubicle Electrical (kg)
MLS	200	Motors (kg)



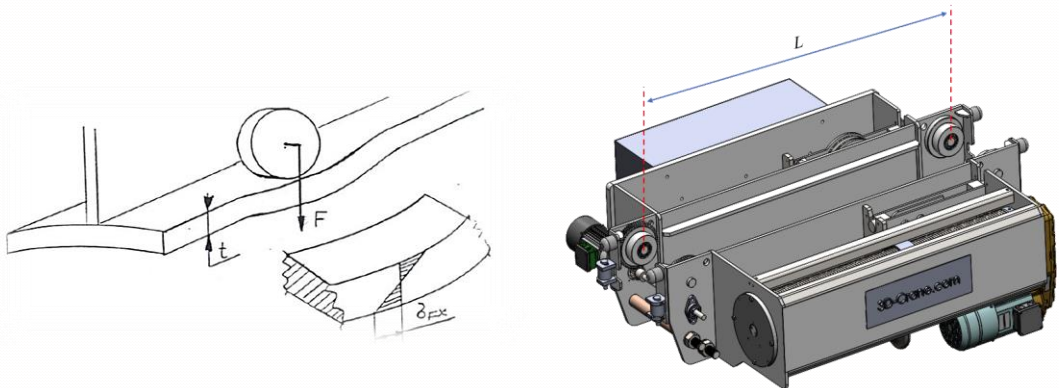
Input Main Girder Data

H	1200	mm	Height Web
B	600	mm	Width Top & Bottom Flange
$T1$	10	mm	Thickness Bottom Flange
$T2$	10	mm	Thickness Web 1
$T3$	10	mm	Thickness Web 2
$T4$	10	mm	Thickness Top Flange
C	50	mm	Space Flange
D	50	mm	Space Flange
E	50	mm	Space Flange
SF	1	---	Row Number
RN	40 X 40	mm	Size Stiffener
DS	1800	mm	Diaphragm Distance

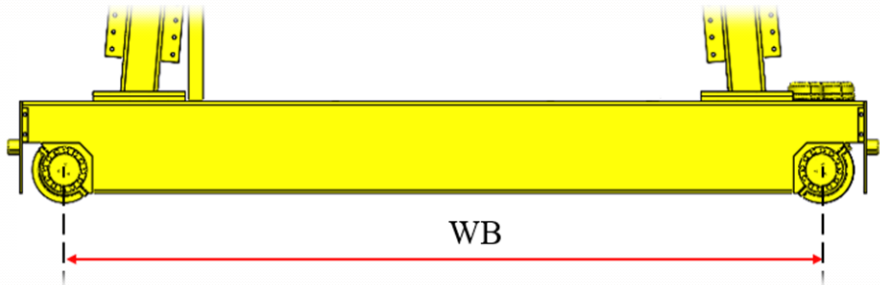


Input Trolley Data

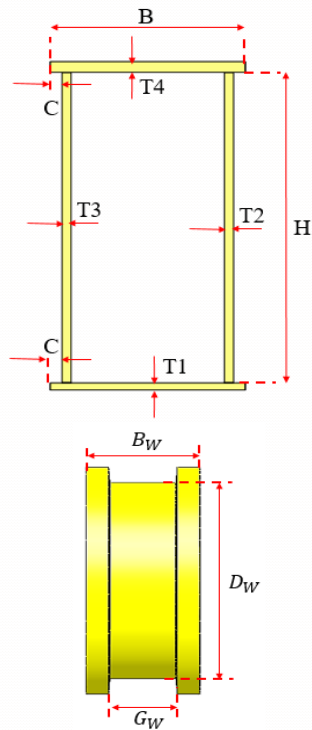
Specification Trolley		
NTw	8	No.Wheel
L	1	Wheel base Trolley (m)
DT	50	WIDTH TROLLEY (mm)
TS	20	Trolley Speed (m/min)
Wt	500	W Trolley (kg)



Input End Carriage Data



WB	2500	mm	Distance between center wheel
BS	16	m/min	Bridge Speed
WW	140	mm	Wheel Withdh
DW	200	mm	Diameter Trolley
GW	70	mm	Wheel Groove



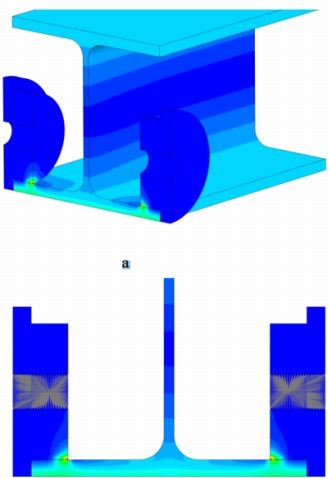
Rail End Carriage		
Rail Type	60 X 40	mm

B	250	mm
H	400	mm
$T1$	10	mm
$T2$	10	mm
$T3$	10	mm
$T4$	10	mm
C	15	mm
WELD THICKNESS		
xc	5	mm
Amplifying coefficient		
GD	A5	----
Material (Rail)		
ST	37	----
Bearing		
SKF	22216	----

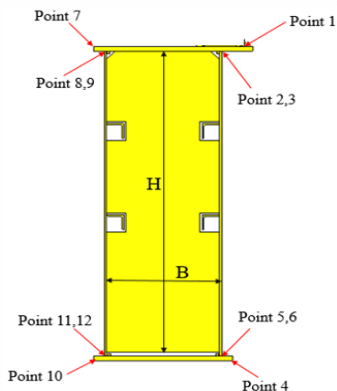
Load Combination

MDL	38895	Dead Load
MTL	11067	Trolley Load
MLL	122625	Lifting Load
MH	18394	Inertia Forces From Drives
Unit = (N.m)		

Flange stresses	
GFX	59.7895
Unit = (Mpa)	



Dimension Check Main Girder



General Check of Dimensions

$S/H < 25$	8.33333	ok	CMAA
$S/B < 65$	16.6667	ok	CMAA
$1.6 < H/B < 2.7$	2	OK	CMAA
$b/T4 < 39$	48	not ok	CMAA

Girder Section Properties

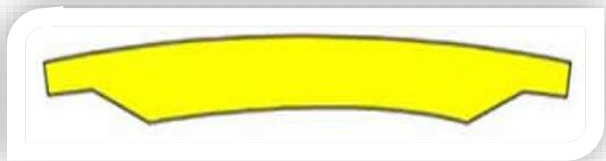
Moment of inertia		
I_x	7272400000	mm ⁴
I_y	1742600000	mm ⁴

Deflection

Live Load Deflection	Dead Load Deflection	
0.7	0.3	
CAMBER (mm)	0.6	
Y_{Max} (mm)	10	
$Y_{Max} \leq L/888$		
CMAA standard	11.2613	ok
Unit = mm		

Elastic section modulus

Point	S_x	S_y
1	11921967.21	5808667
2	12120666.67	7112653
3	12120666.67	7112653
4	11921967.21	5808667
5	12120666.67	7112653
6	12120666.67	7112653
Unit = mm ⁴		



Stress Main Girder

Point	$\sigma x1$	$\sigma x2$	$\sigma x3$	σx (total)	$txy1$	$txy2$	txy (wh)	txy (total)	σz	σeq
1	-16	-2	0	-18	0	0	0	0	0	18
2	-16	-1	0	-17	1	0	0	1	0	17
3	-16	-1	0	-17	1	0	0	1	0	17
4	16	2	68	85	0	0	0	0	35	74
5	16	1	131	148	1	0	0	1	182	168
6	16	1	131	148	1	0	0	1	182	168
7	-16	-2	0	-18	0	0	0	0	0	18
8	-16	-1	0	-17	1	0	0	1	0	17
9	-16	-1	0	-17	1	0	0	1	0	17
10	16	2	0	18	0	0	0	0	0	18
11	16	1	0	17	1	0	0	1	0	17
12	16	1	0	17	1	0	0	1	0	17

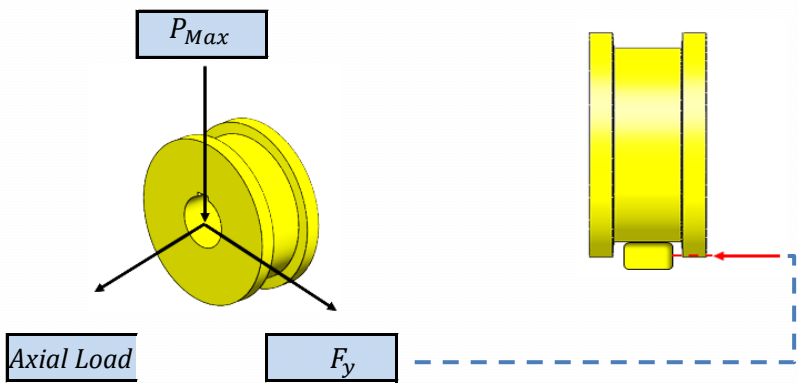
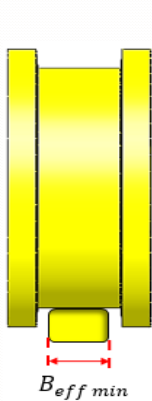
STRESS LEVEL AND CASE	ALLOWABLE COMPRESSION STRESS	ALLOWABLE TENSION STRESS	ALLOWABLE SHEAR STRESS
1	$0.60\sigma_{yp}$	$0.60\sigma_{yp}$	$0.35\sigma_{yp}$
2	$0.60\sigma_{yp}$	$0.60\sigma_{yp}$	$0.35\sigma_{yp}$
3	$0.75\sigma_{yp}$	$0.75\sigma_{yp}$	$0.43\sigma_{yp}$

STRESS LEVEL AND CASE	ALLOWABLE COMPRESSION STRESS (σ_c)	ALLOWABLE TENSION STRESS (σ_t)	ALLOWABLE SHEAR STRESS (τ_v)
1	144 Mpa	144 Mpa	84 Mpa

available

not available

Calculation Result End Carriage



Parameter	4 Wheel	Description	Unit
RPM	25.5	ANGULAR VELLOCITY OF WHEEL	Rev/min
P-MAX	-3203.8	MAX STATIC WHEEL LOAD WHEN TROLLEY IS SDE OF BRIDGE	KN
P-MIN	4053.2	MIN STATIC WHEEL LOAD WHEN TROLLEY IS SDE OF BRIDGE	KN
P-DY	-3233.0	MAX DYNAMIC WHEEL LOAD WHEN TROLLEY IS SDE OF BRIDGE	KN
RL	-1616.5	RADIAL LOAD IN BEARING	KN
AL	-404.1	AXIAL LOAD IN BEARING	KN
PB	-2942.0	THE FORCE ACTING ON THE BEARING	KN
L_10H	#NUM!	BASIC RATING LIFE (AT 90% RELIABILITY) OPERATING HOURS	hr
F-MAX	-3556.2	MAX WHEEL LOAD	KN
F-MIN	4499.0	MIN WHEEL LOAD	KN
M-MAX	-404119302.6	MAX MOMENT ACTING ON END CARRIAGE	KN.M
M-MIN	5623784237.5	MIN MOMENT ACTING ON END CARRIAGE	KN.M
Span /WB	4.0	SPAN TO WHEEL BASE RATIO < 7 NOT EXCEED 7	---
FY	-323295.4	HORIZONTAL FORCE ACTING ON END CARRIAGE	KN

TOTAL COMBINED STRESS

4 Wheel		
QT	5231.0	Mpa

End Carriage Weight

MY

-404119302.6

MOMENT DUE TO HORIZONTAL FORCE ACTING ON END CARR

KN.M

531.5

Parameter	4 Wheel	Description	Unit
V	-3556.2	MAX SHEAR FORCE	N
$Qx - Max$	-2946.3	-	Mpa
$Qx - Min$	6149.8	-	Mpa
$Qy - Min$	-441.9	-	Mpa
QMAX	-3388.3	-	Mpa
T - WELD	-2301.0	SHEAR STRESS OF THE WELD	Mpa
SFL	20500000.0	Flange section static moment	mm^3
Y - MAX	0.0	Max deflection	mm
Q - EQU	5231.0	TOTAL COMBINED STRESS	Mpa

RAIL TRAVELING

	4 Wheel	
BFM	-761.9	MIN WIDTH FOR RAIL
Rail Type	60 X 40	
B-EFF	60	
B-EFF > BFM		OK (4 Wheel)

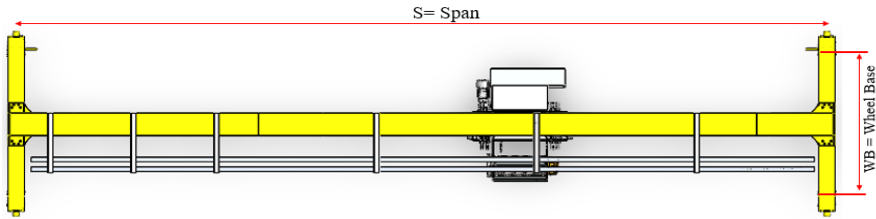
FEM-Group	1	2	3	4	5	6
ISO-Group	M3	M4	M5	M6	M7	M8
WB/S ≥	0.14	0.14	0.16	0.18	0.2	0.2

WB/S

4 Wheel

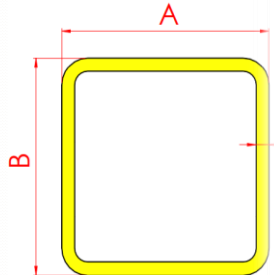
0.25

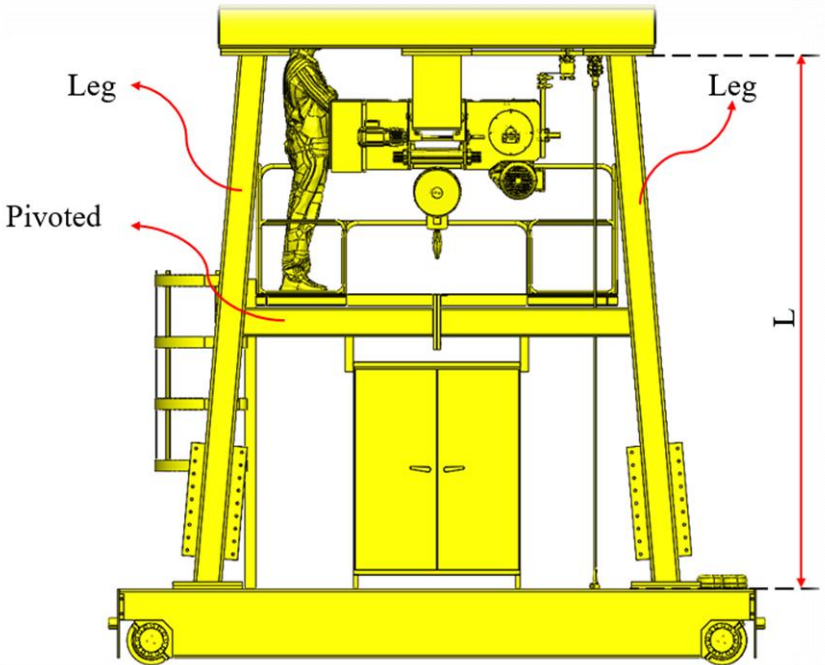
OK



A	300	Width(mm)
B	300	Height (mm)
T	10	Thickness (mm)
n	2	Column pivoted in both end
E	210000	Module Elastic (N/mm^2)
L	3000	Length Leg (mm)

Input Data





FC-S1	-4373723.0	Maximum possible applied load on each column when trolley is S1
FC-S2	-3490823.0	Maximum possible applied load on each column when trolley is S2
FCR	74900532.9	Maximum Load Critical Leg (N)
G	-377.0	Stress Leg (Mpa)

Weight Crane

Diaphragm	194	KG
Stiffener	125	KG
Box	2808	KG
Single Girder	3127	KG
EC	0	KG
Wleg	1085.76000	kg
wccooector	500	kg