



CALCULATION GANTRY CRANE DOUBLE GIRDER ((8W))

V.01

General Check

S/H	15	OK
Deflection Girder	27.0	NO
Wheel Base (4 Wheel)	4000	NO
b / T4	41.8	OK

S/B	36.48648649	OK
Stress Girder	241.6	NO
Rail Size Traversing	A55	NO
Stress EC 8Wheel	134.7	OK

H/B	2.432432	OK
Stress EC 4Wheel	256.5	NO
Rail Size Traveling	A75	NO
Wheel Base 8 Wheel	5600	OK

TOTAL WEIGHT 8W	41037	KG
TOTAL WEIGHT 4W	39212	KG
WEIGHT 2 X GIRDER	27826	KG
WEIGHT Legs	43917.12	KG
WEIGHT BRIDGES	34026	KG

H1 / T2	18.5	---	Dimension Check	NO
b / T1	5.0	---	Dimension Check	NO
b / T3	5.0	---	Dimension Check	NO
SLOPE	85.6	deg	Column cross section slope control	NO
S-SUT	26.5	Mpa	allowable stress (slenderness)	OK
S-BS	85.1	Mpa	Allowable bending stress	OK
EF	0.8	---	Column stability and resistance criterion	OK
Stress-S2	1.2	Mpa	bending stress in the larger Area	OK
Stress-S1	43.2	Mpa	bending stress in a small Area	OK

M 1	0.1	---	Resistance criterion control	OK
M 2	-1.7	---	Control of sustainability criteria	OK
Fvo - S1	53.8	Mpa	Shear stress in smaller section	OK
Fvo - S2	0.2	Mpa	Shear stress in larger section	OK
t-1	17.9	---	The required thickness for T1	OK
t-2	17.9	---	The required thickness for T2	OK
LC	5000	mm	Suitable Value	OK



COMPANY	KETAN
PROJECT NAME	PATEL
TAG NAME	KETAN PATEL
REVISION_DC	A

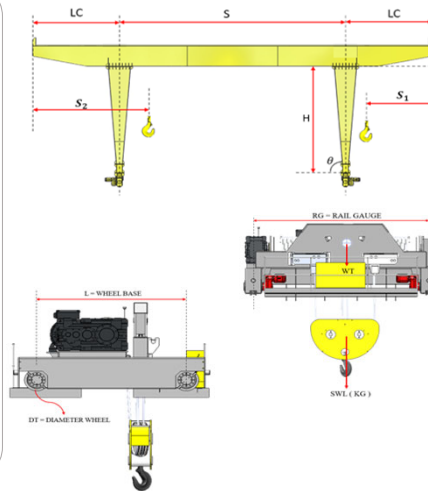
GENERAL HOIST DATA

Q	120	Load	T
S	27	Span	M
DF	1.15	Dynamic factor	---
WG	M5	Working group	ISO
H.O.L	16000	Height Lift	MM
S1	1500	Approach Side Max	MM
S2	1500	Approach Side min	MM
DFG	L/1000	Deflection Girder limit	---
Material	SS400	Material Girder	---

NTw	6	No.Wheel	---
L	2000	Wheel base Trolley	MM
DT	315	Diameter Wheel Trolley	MM
TS	20	Trolley Speed	M/MIN
Wt	4250	Weight Trolley	KG
HS	5	Hoist speed	M/MIN
RTS	A55	Rail Traversing	MM
MRTS	52	Material Rail Traversing	ST
RG	3000	Rail Gauge	MM
Drum	405	Diameter Drum Hoist	MM
Reeving	8/2	Reeving Hoist	---

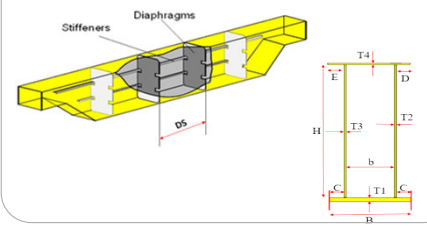
PS	1500	Power Supply	KG
CE	2000	Cubicle Electrical	KG
SP	2500	Service Platform	KG
CABIN	0	Cabin	KG

LC	5000	Distance	mm
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INPUT MAIN GIRDER

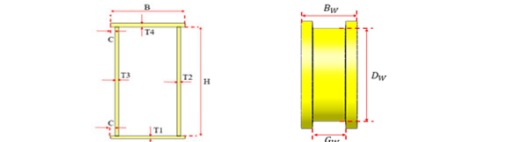
H	1800	Height Web	mm
B	740	Width Top & Bottom Flange	mm
T1	15	Thickness Bottom Flange	mm
T2	8	Thickness Web 1	mm
T3	8	Thickness Web 2	mm
T4	15	Thickness Top Flange	mm
C	50	Space Flange	mm
D	50	Space Flange	mm
E	50	Space Flange	mm
RN	3	Row Number	---
SF	70X 70	Size Stiffener	mm
DS	1800	Diaphragm Distance	mm
DF-TH	8	Diaphragm thickness	mm
Weld	5	Thickness Weld Girder	mm



INPUT END CARRIAGE

H	500	Height Web	mm
B	200	Width Top & Bottom Flange	mm
T1	15	Thickness Bottom Flange	mm
T2	10	Thickness Web 1	mm
T3	10	Thickness Web 2	mm
T4	15	Thickness Top Flange	mm
C	15	Space Flange	mm

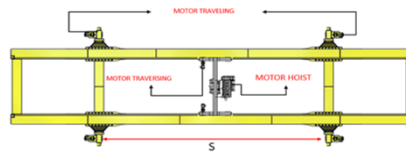
XC	4	WELD THICKNESS	mm
GD	A5	Amplifying coefficient	FEM
BS	63	Bridge Speed	m/min



MR	52	Material (Rail)	mm
SKF	22220	Bearing	---
RT	A75	Rail Type	mm

INPUT MOTOR DATA

S3	0.6	Operating mode Traveling	---
S3	0.6	Operating mode For Traversing	---
S3	0.6	Operating mode For Hoist	%
T	60	Ambient temperature	C°
H	2500	Installation altitude above sea level	m
f	Top Running	Rolling Friction of Drive	---
E	Sleeve	Mechanical efficiency Of Drive machinery	---
TM	AC Inverter	Type Of Motor	---
TC	Inverter	Type of control	---
RS	3000	Speed Range	---



Dimension Check

General Check of Dimensions :

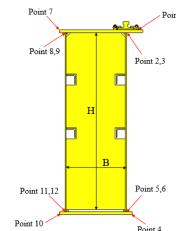
S/H < 25	10740.6	OK	CMAA
S/B < 65	13913.0	OK	CMAA
1.6 < H/B < 2.7	27826.0	OK	CMAA
b / T4 < 39	41.6	OK	CMAA

Girder Section Properties :

Ix	26059365000.0	mm^4
Iy	3889066400.0	mm^4

Elastic section modulus :

Point	Sx	Sy
1	28480180	10510990
2	28954850	12153333
3	28954850	12153333
4	28480180	10510990
5	28954850	12153333
6	28954850	12153333
7	28480180	10510990
8	28954850	12153333
9	28954850	12153333
10	28480180	10510990
11	28954850	12153333
12	28954850	12153333



Live Load Deflection :

LLD	45.7	mm
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Dead Load Deflection :

DLD	7.5	mm
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Camber :

CAMBER	30.3	mm
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Deflection Max :

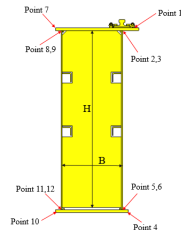
DFL	27.0	mm
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Check Dimension :

CMAA	27.0	NO
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Stress & Fatigue Main Girder

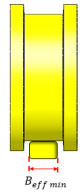
Point	σ_1	σ_2	σ_3	σ_x (total)	τ_{xy}	τ_{yz}	τ_{xy} (wh)	τ_{yz} (total)	σ_z	σ_{eq}
1	-197	-43	0	-240	0	0	0	0	0	240
2	-193	-37	0	-231	16	10	31	57	-156	227
3	-193	-37	0	-231	16	10	31	57	-156	227
4	197	43	0	240	0	0	0	0	0	240
5	193	37	0	231	16	10	0	26	0	235
6	193	37	0	231	26	14	0	40	0	241
7	-197	-43	0	-240	0	0	0	0	0	240
8	-193	-37	0	-231	16	10	0	26	0	235
9	-193	-37	0	-231	22	14	0	36	0	239
10	197	43	0	240	0	0	0	0	0	240
11	193	0	0	231	16	10	0	26	0	235
12	193	0	0	231	26	16	0	42	0	242



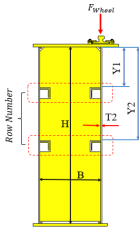
Selection Rail Size Trolley

P_{Mean}	207083.33	N
$B_{eff\ min}$	88.60	mm
B_{eff}	48.33	mm
$B_{eff} > B_{eff\ min}$	NO	

Rail Size Traversing	A55	NO
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Selection Stiffener Main Girder



Size Stiffener	70X 70
Row Number	3

Buckling Stiffener		
$H / T_2 \text{ or } T_3 < 160$	225	Need first buckling stiffener.
$H / T_2 \text{ or } T_3 < 320$	225	Don't Need first buckling stiffener

F_{wheel}	0	KN
τ_{act}	0	Mpa
Acting Shear Stress		

Row Number	Y1	Y2	Y3
1	360		
2	252	594	
3	198	432	756

Buckling Box Diaphragm

τ_{BUC}	Safety factors
17.9845	0.72498214
Mpa	

τ_{BUC}	Safety factors
49.6125	1.99950731
Mpa	

τ_{BUC}	Safety factors
20.2911	0.817963783
Mpa	

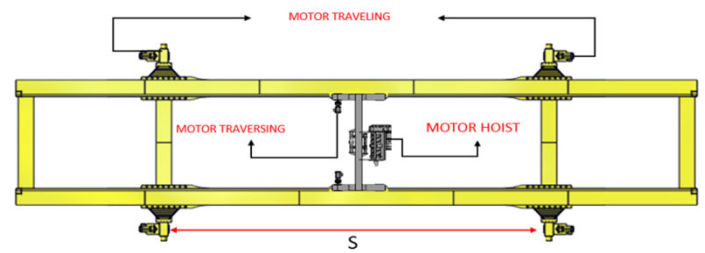
Diaphragm Welded (lowest 15% non-welded)

Diaphragm Welded to both webs down to the bottom, (lowest 15% With Double Fillet Weld)

Diaphragm Welded also to bottom flange or to a bottom stiffener of the diaphragm

Calculate End Carriage

Parameter	8 Wheel	4 Wheel	Description	Unit
RPM_{wheel}	50.2	50.2	ANGULAR VELOCITY OF WHEEL	Rev/min
P_{Max}	386.8	758.6	MAX STATIC WHEEL LOAD WHEN TROLLEY IS SDE OF BRIDGE	KN
P_{Min}	117.8	216.9	MIN STATIC WHEEL LOAD WHEN TROLLEY IS SDE OF BRIDGE	KN
P_{dyn}	297.1	653.9	MAX DYNAMIC WHEEL LOAD WHEN TROLLEY IS SDE OF BRIDGE	KN
RL	148.6	326.9	RADIAL LOAD IN BEARING	KN
AL	37.1	81.7	AXIAL LOAD IN BEARING	KN
P_b	255.5	562.3	THE FORCE ACTING ON THE BEARING	KN
L_10H	12055	00870	BASIC RATING LIFE (AT 90% RELIABILITY) OPERATING HOURS	hr
F_{Max}	415.8	842.1	MAX WHEEL LOAD	KN
F_{Min}	140.4	240.7	MIN WHEEL LOAD	KN
M_{Max}	168.4	4.2E+01	MAX MOMENT ACTING ON END CARRIAGE	KN.M
M_{Min}	96.9	1.2E+01	MIN MOMENT ACTING ON END CARRIAGE	KN.M
S / W_B	3613.5	6.8	SPAN TO WHEEL BASE RATIO < 7 NOT EXCEED 7	
F_x	40.6	110.3	HORIZONTAL FORCE ACTING ON END CARRIAGE	KN
M_x	40.6	5.52E+00	THE MOMENT DUE TO HORIZONTAL FORCE ACTING ON END CARRIAGE	KN.M



Calculate End Carriage

Parameter	8 Wheel	4 Wheel	Description	Unit
τ_{weld}	33.11	34.02	SHEAR STRESS OF THE WELD	Mpa
γ_{Max}	0.39	0.0099	Max Deflection	mm
V	415.80	842.06	MAX SHEAR FORCE	N
σ_{equ}	134.75	256.50	TOTAL COMBINED STRESS	Mpa

Total Stress 4 wheel	256.5	NO
Total Stress 8 wheel	134.7	OK

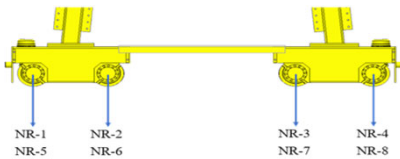
Selection Rail Traveling

Parameter	Value	Description
RAIL	A75	RAIL SIZE SELECT
$B_{eff\ min}$	106.3531	MIN WIDTH FOR RAIL
B_{eff}	64.33	WIDTH RAIL
UNIT : mm		

$B_{eff} > B_{eff\ min}$ NO

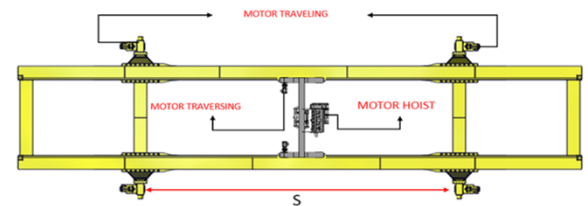
8 W

Wheel Load



Wheel	$R_{max\ Stc}$	$R_{min\ Stc}$	$R_{min\ Dyn}$	$R_{max\ Dyn}$	Unit
NR1	386.8	--	--	415.8	KN
NR2	386.8	--	--	415.8	KN
NR3	386.8	--	--	415.8	KN
NR4	386.8	--	--	415.8	KN
NR5	--	117.8	297.1	--	KN
NR6	--	117.8	297.1	--	KN
NR7	--	117.8	297.1	--	KN
NR8	--	117.8	297.1	--	KN

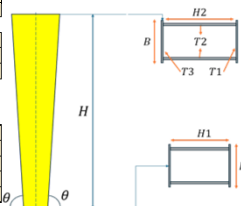
Selection Motors



Dimension check leg Gantry

A - S1	22800	Area Section 1	mm^2
Ix - S1	683361272	Vertical - Moment of Inertia x-x Section 1	mm^4
Iy - S1	50840000	Horizontal - Moment of Inertia y-y Section 1	mm^4
rx-S1	173	Radius of Gyration x-x	mm
ry-S1	47	Radius of Gyration y-y	mm

ATO-S1	5233	Pressure Area of the column	mm^2
ITO-S1	13374444	Moment of inertia compressive - XX	mm^4
rTO	51	Radius of gyration of compressive section	mm



A - S2	128000	Area Section 2	mm^2
Ix - S2	181885066667	Vertical - Moment of Inertia x-x Section 2	mm^4
Iy - S2	222666667	Horizontal - Moment of Inertia y-y Section 2	mm^4
rx-S2	1192	Radius of Gyration x-x	mm
ry-S2	42	Radius of Gyration y-y	mm

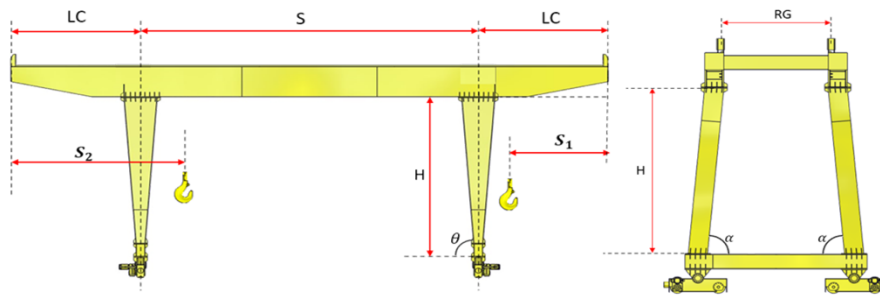
SLX	119661228	Section modulus X-X	mm^3
SLY	2226667	Section modulus Y-Y	mm^3

Parameter	Value	Description
S3 - Traveling	1.10	Cyclic duration factor
S3 - Hoist	1.10	Cyclic duration factor
f-T	0.75	Temperature factor
f-H	0.91	Sea level factor
f	15.00	Rolling Friction factor
a	0.25	acc rate traversing
a	0.40	acc rate traveling
Cr- Traversing	1.08	Rotational inertia factor
Cr- Traveling	1.10	Rotational inertia factor
kt	1.50	acc Torque Factor
ks	1.00	acc Torque Factor
E	0.93	Mechanical efficiency
nf	3000.00	Free Running
nr	2950.00	Full Load Speed

Selection Motors For Crane 8 wheel EC

Parameter	Description	Power (KW)	Round (RPM)
DHM	Hoist Motor	137.50	5.94
DTLM	Traveling Motor	65.40	50.16
DTSM	Traversing Motor	13.96	20.22

Design leg Gantry



θ	85.6	Column cross section slope control	Deg
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α	1.7	Column cross section slope control	Deg
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RG	3000	Rail Gauge	mm
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H	17000	Column Height	mm
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Fay	26	allowable compressive stress (slenderness)	Mpa	OK
Fby	85	Allowable bending stress	Mpa	OK
fF	0.76	Column stability and resistance criterion	---	OK
Fvo - S1	53.77	Shear stress in smaller section	Mpa	OK

Stress-S2	1.20	bending stress in the larger area	Mpa	OK
Stress-S1	43.21	bending stress in a smaller	Mpa	OK
M	0.15	The resistance criterion	---	OK
Fvo - S2	0.17	Shear stress in larger section	Mpa	OK