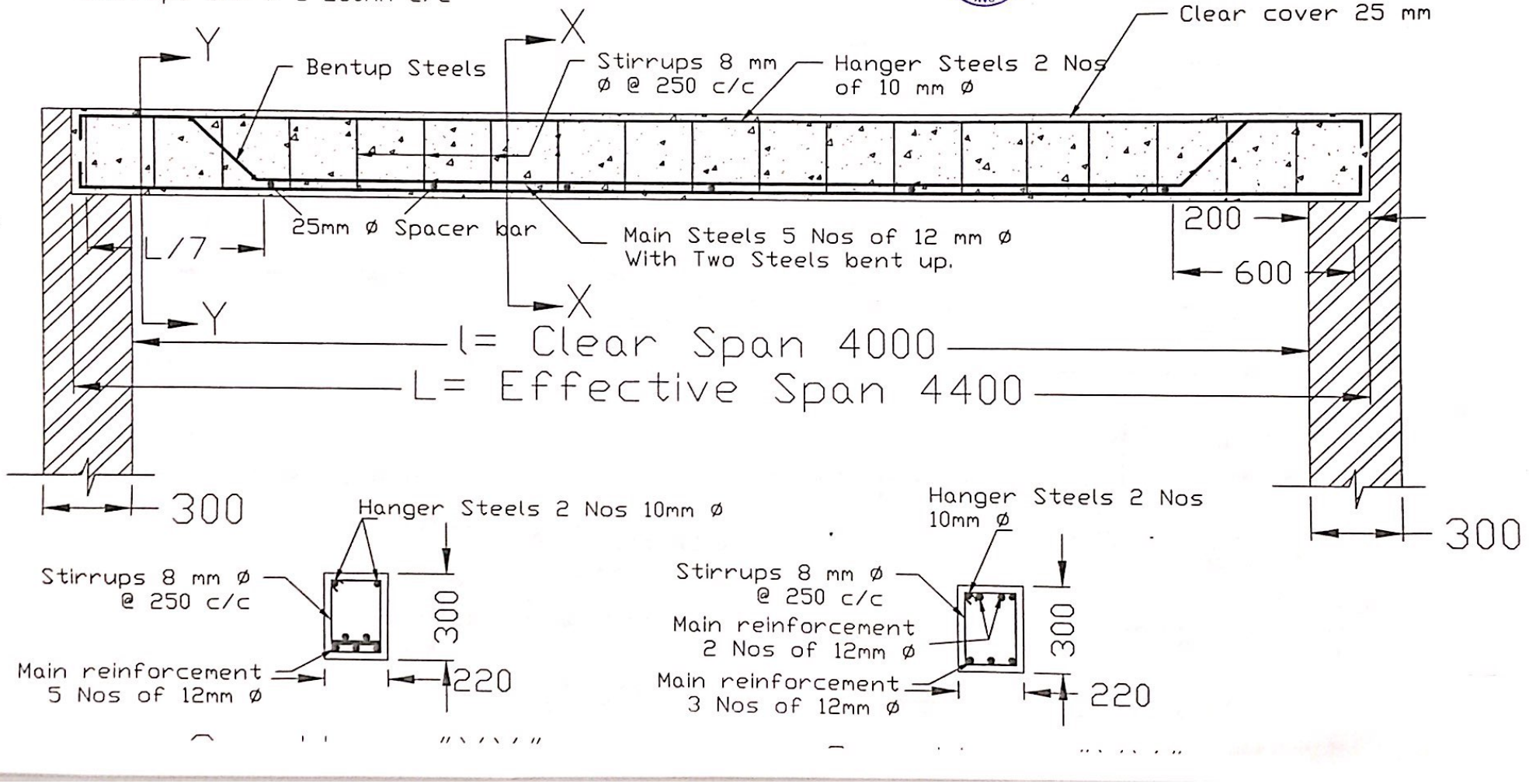
Simply supported beam

A Simply supported Singly Re-inforement beam rests on Brick masonry of 300 mm thick, overall Length of the beam is 4.4 meter beyond the face of the Support. The depth of beam is 300mm and the width of the beam is 220mm

Reinforcement details:
Tension Steels 5 Nos 12 mm ø and 2 bars are cranked of the support upto mid span.
Compression Steels (Anchor Steel) 2 Nos 10 mm ø
Stirrups 8mm ø @ 250mm c/c

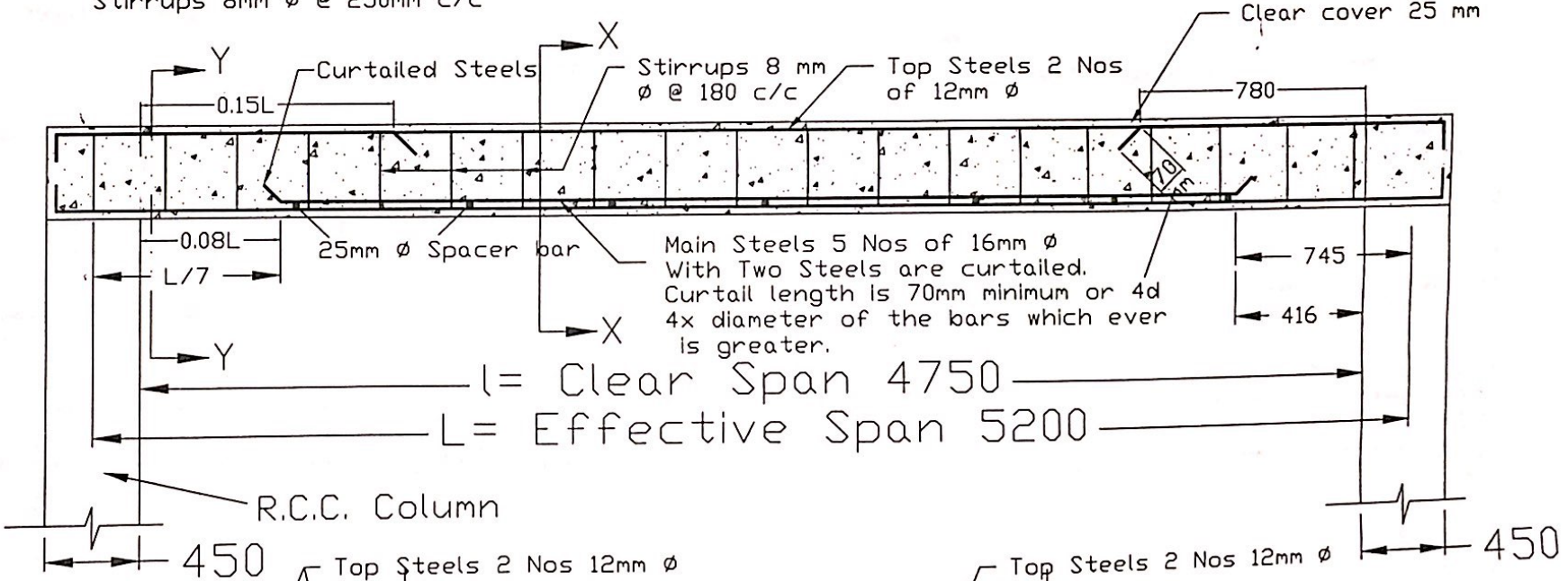


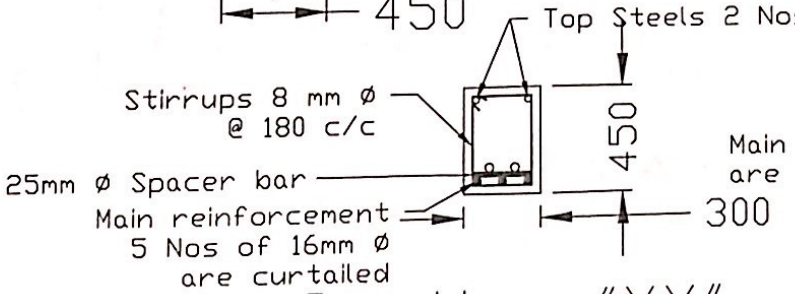
Simply supported beam (Doubly Re-inforcement)

A Simply supported Doubly Re-inforement beam rests on on R,C,C, column of size 300x450mm, overall Length of the beam is 5.650 meter upto the outer face of the column. The depth of beam is 450 mm and the width of the beam is 300mm

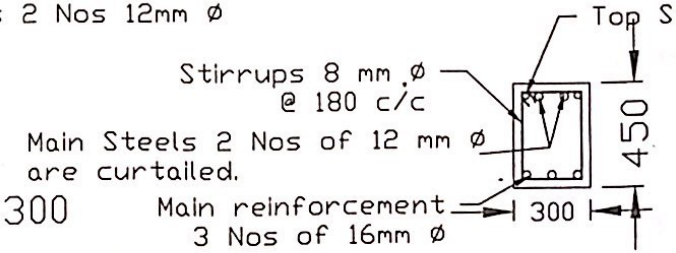
Reinforcement details:
Tension Steels total 5 Nos 16 mm ø and 2 bars are curtailed of the support upto mid span.

Compression Steels (Top Steel) total 4 Nos 12 mm ø and 2 bars are curtailed and 2 Nos runs through Stirrups 8mm ø @ 250mm c/c





Section "XX"

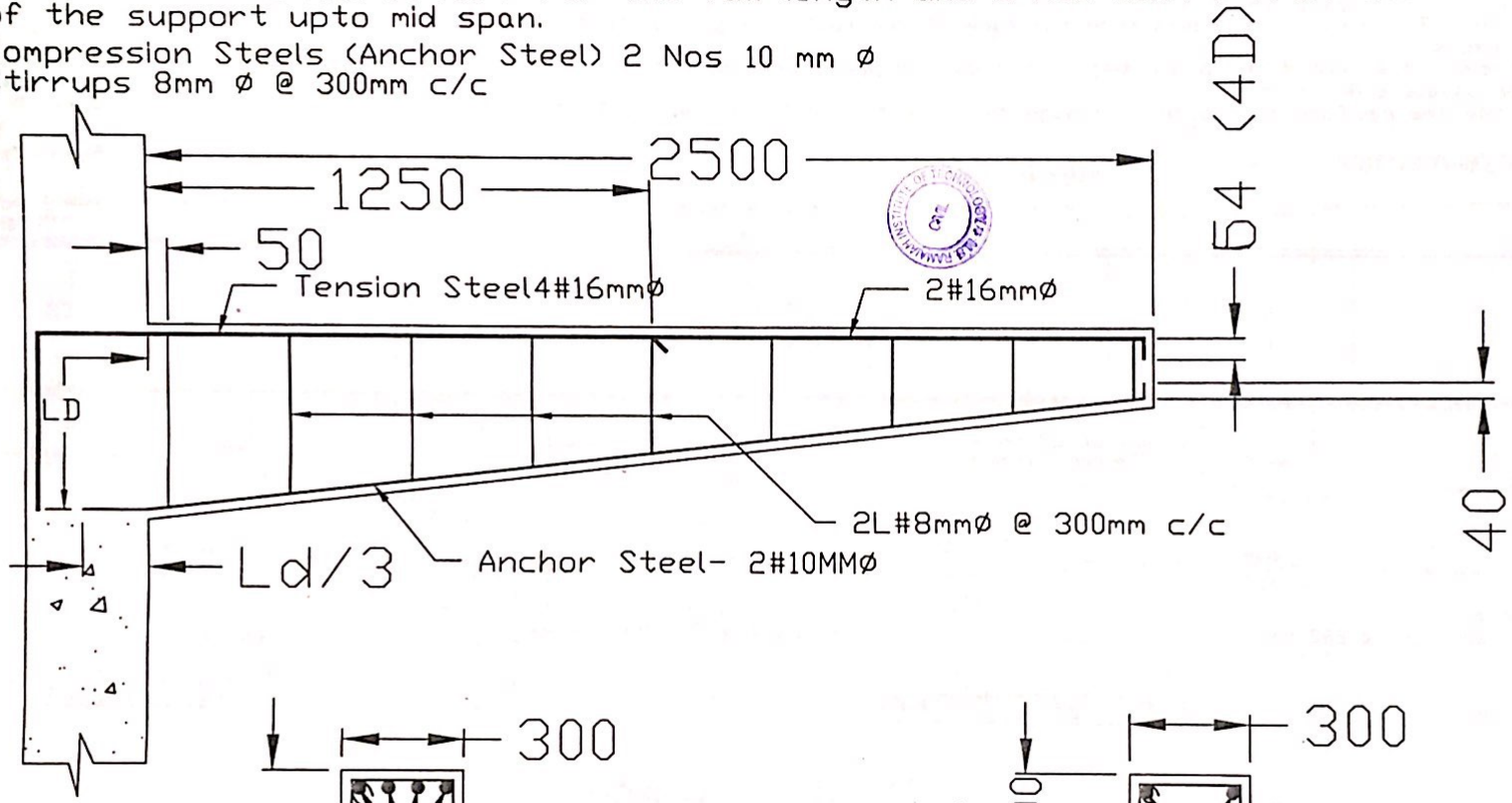


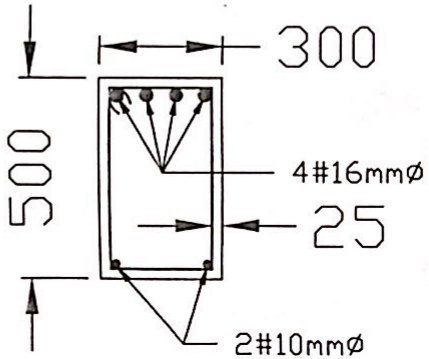
Section "YY"

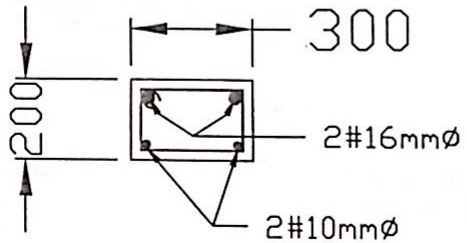
Cantilever beams:

A Cantilerver beam is fixed to a R,C,C, column of size 300x300mm, overall Length of the beam is 2.5 meter from the inner face of the column. Thickness at fixed end / at support is 500 mm and the thickness at free end in 200mm

Reinforcement details:
Tension Steels 2 Nos 16 mm ø for the full length and 2 Nos 16mm ø from the face of the support upto mid span.
Compression Steels (Anchor Steel) 2 Nos 10 mm ø
Stirrups 8mm ø @ 300mm c/c





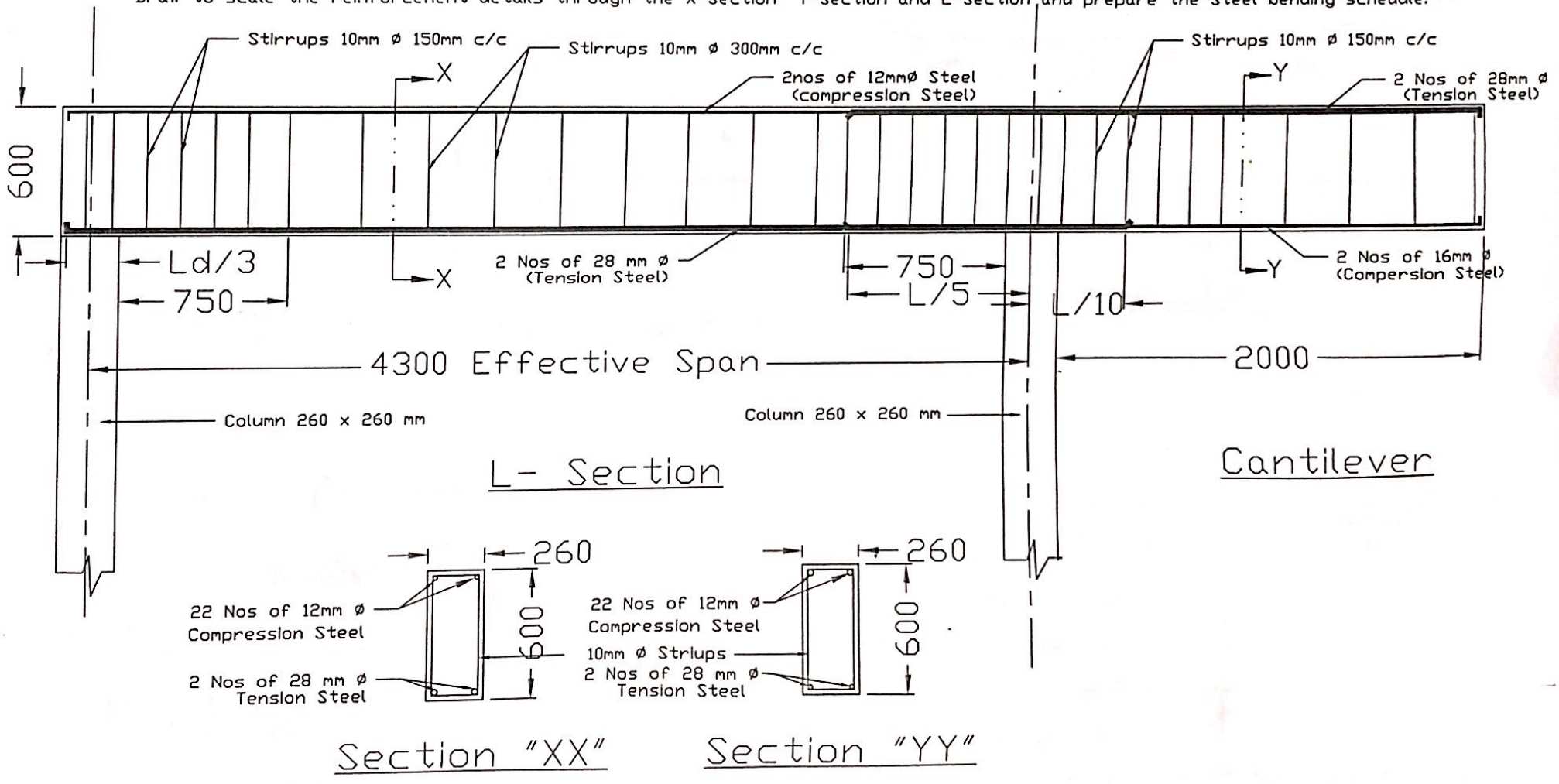


Section At Free End

Overhanging beam

A rectangular beam 260mm x 600 mm overall rests on two R,C,C, column 260x260mm spaced 4.3 mts c/c and projected by 2 mts beyond the face of the column.

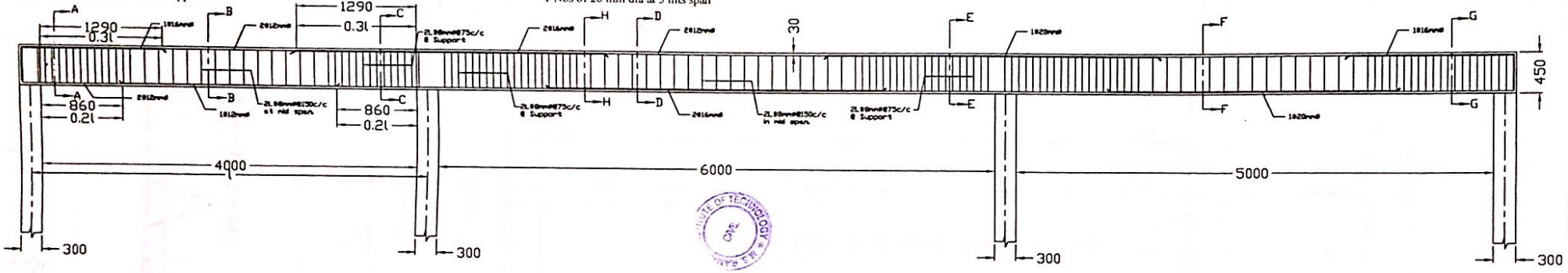
Supported beams:
Tension Steels 2 Nos 28 mm ø
Compression Steels 2 Nos 12 mm ø
Stirrups 10mm ø @ 150mm c/c for 750mm from the face of the support and balance @ 300mm c/c
Cantilever beams:
Tension Steels 2 Nos 28mm ø and projecting backwards in support beam by 2 Mts
Compression Steels 2 Nos 16mm ø
Draw to scale the reinforcement details through the X-Section Y-Section and L-Section and prepare the Steel bending schedule.

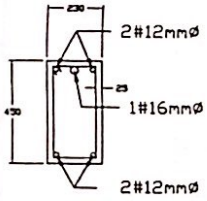


Continuous Beam

Draw the L/S and C/S of a continuous beam having the following data:
Clear span of beams is 4mts, 6mts and 5 mts respectively and rest on the column size 230 X 300
Size of the beam is 230x450 mm.
Reinforcement detail:
2 Nos of 12 mm Dia Steel at Top (Tension Steel)
2 Nos of 12 mm Dia Steel at Bottom (Compression Steel)
2L Stirrups of 8mm Dia at 150 mm c/c at mid span and 2L Stirrups
of 8 mm dia at 75 mm c/c at support

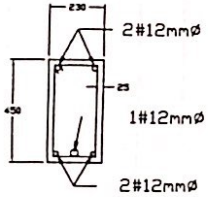
Additional Steels At top
1 Nos of 16 mm dia at the left end support of 4 mts span.
2 Nos of 16 mm dia at 4mts and 6 mts support
1 Nos of 20 mm dia at 6 mts and 5 mts support
1 Nos of 16 mm dia at the right end support of 5 mts span.
Additional Steels At Bottom:
1 Nos of 12 mm dia at 4 mts span.
2 Nos of 16 mm dia at 6 mts span
1 Nos of 20 mm dia at 5 mts span





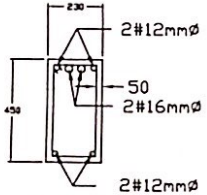
Scale 2:1

Section "AA"



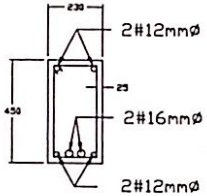
Scale 2:1

Section "BB"



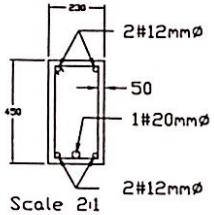
Scale 2:1

Section "CC"



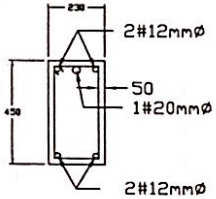
Scale 2:1

Section "DD"



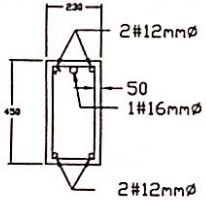
Scale 2:1

Section "EE"



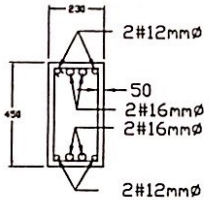
Scale 2:1

Section "FF"



Scale 2:1

Section "GG"



Scale 2:1

Section "HH"

One Way Slab:

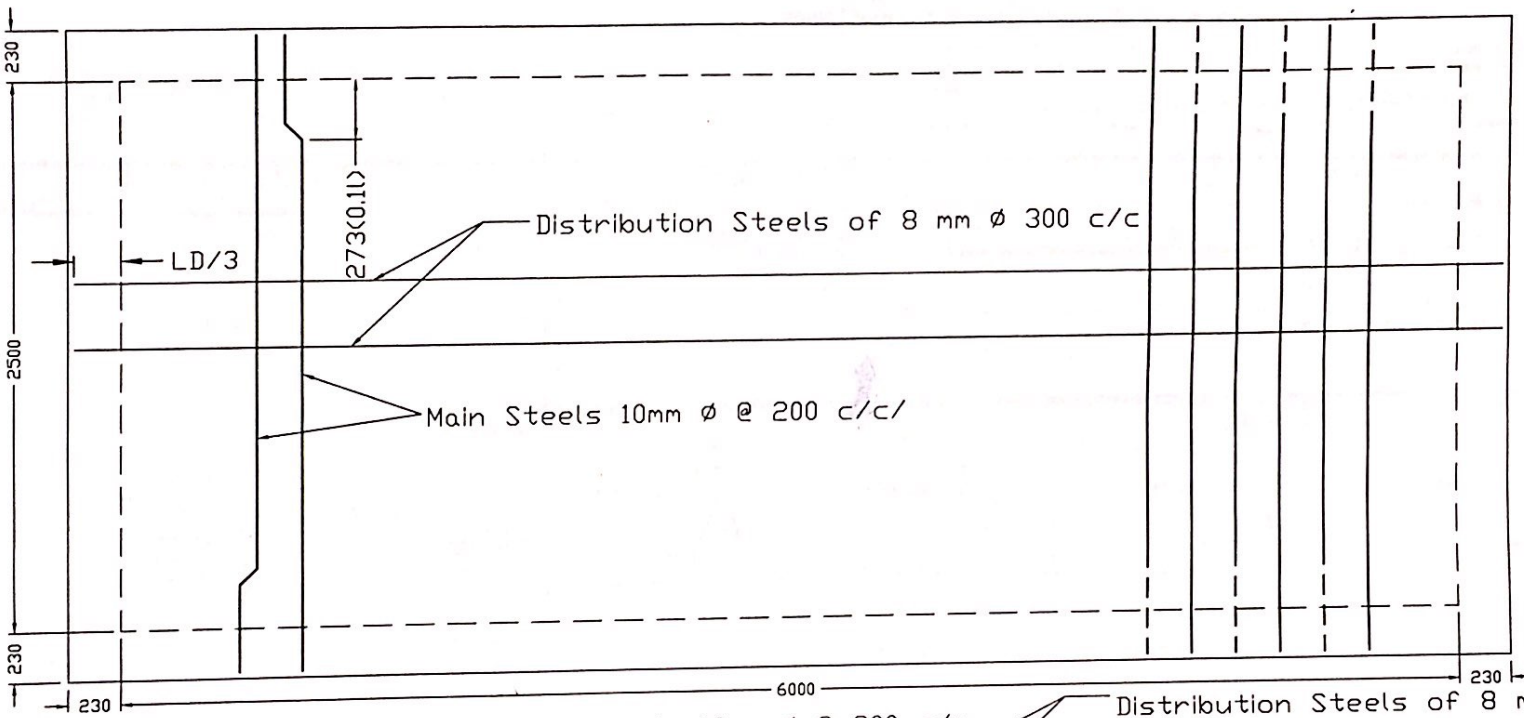
One way slab is provided over a room of internal dimension of 6mts X 2.5mts simply supported on 230mm thick wall all round.

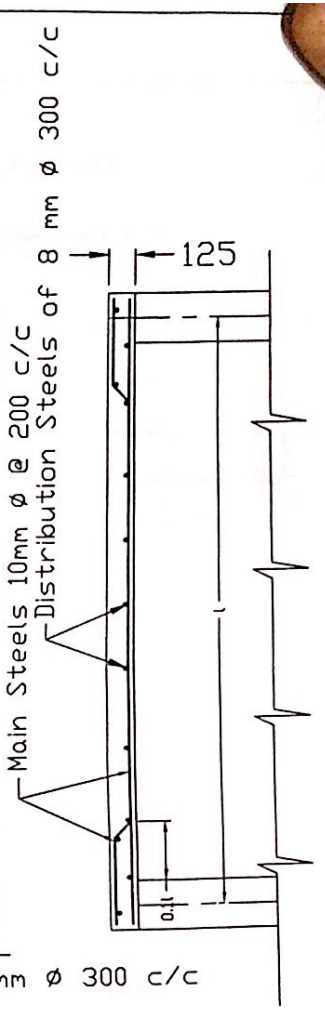
Thickness of slab is 125 mm

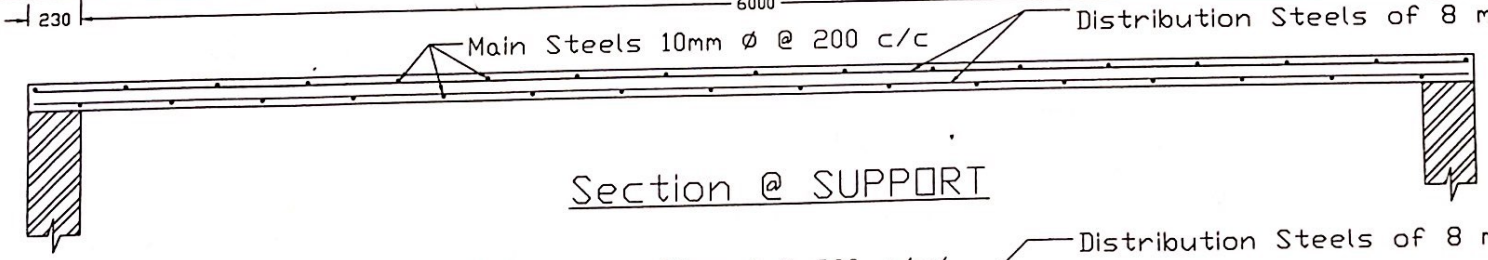
Main reinforcement dia 10mm @ 200 mm c/c

Distribution steel dia 8 mm @ 300 mm c/c

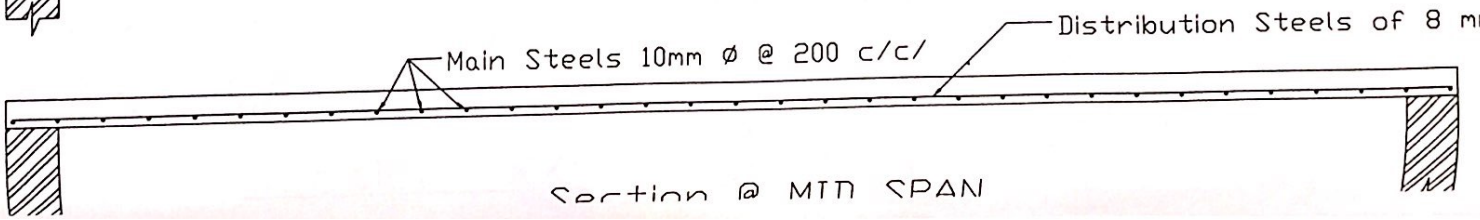
Draw a plan and C/S along short and longer span showing reinforcement details.







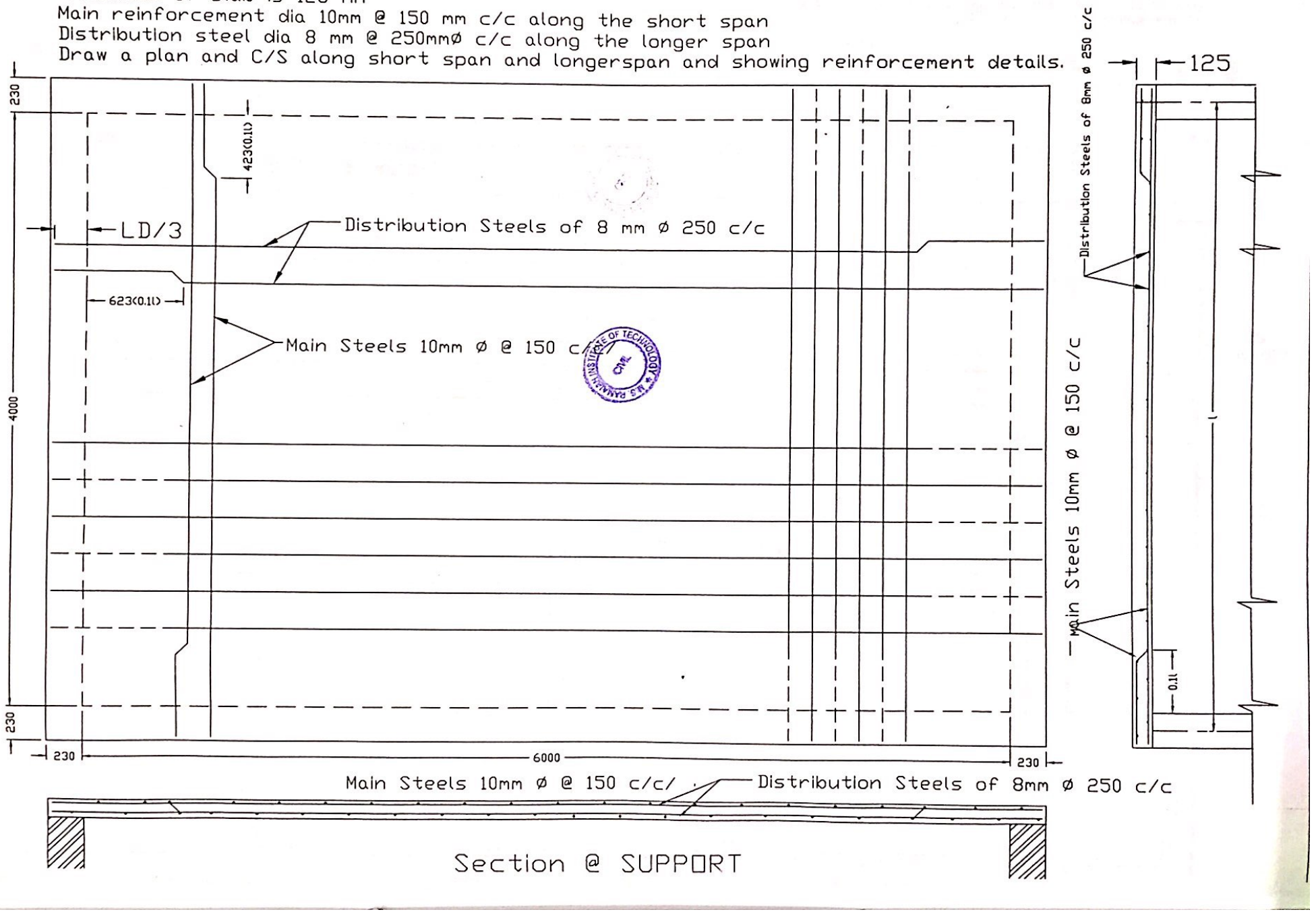
Section @ SUPPORT



Section @ MID SPAN

Two Way Slab

Two way slab is provided over a room of internal dimension of 6mts X 4mts simply supported on 230mm thick wall all round with corners free to lift.
Thickness of slab is 125 mm
Main reinforcement dia 10mm @ 150 mm c/c along the short span
Distribution steel dia 8 mm @ 250mmø c/c along the longer span
Draw a plan and C/S along short span and longerspan and showing reinforcement details.

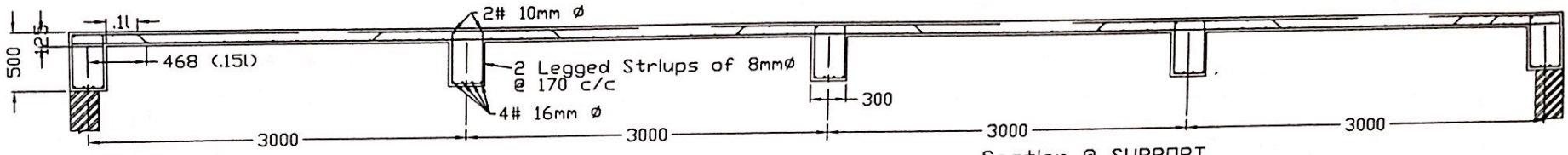


Continuous Slab

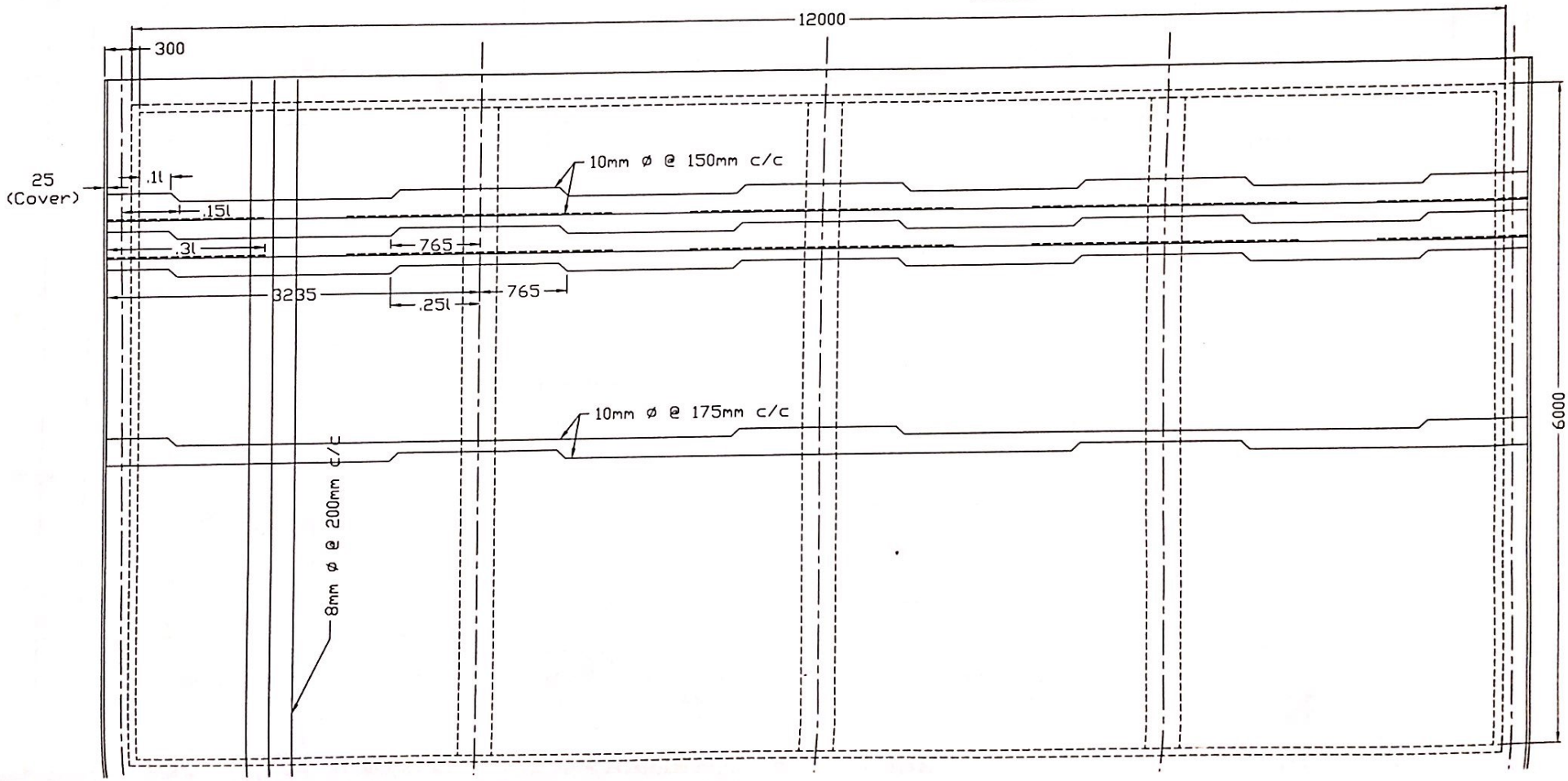
Room dimension of 12.0 mts by 6.0 mts

Draw the section plan and section elevation along 12 mts. The size of the beam width is 300m and the depth is 500mm for the beam, provide nominal 4 nos of 16 mm ø and 2 Nos of 10mm ø at top and 2 legged stirrups of 8mm ø @ 150 c/c

The beam are placed at 3 mts c/c. the thickness of the slab is 125 mm, Main reinforcement of continuoused slab of 10 mm ø @ 150mm c/c distribution steel 8mm ø @ 200mm c/c and provide extra reinforcement at top of the support of 8mm ø @ 300mm c/c.



Section @ SUPPORT



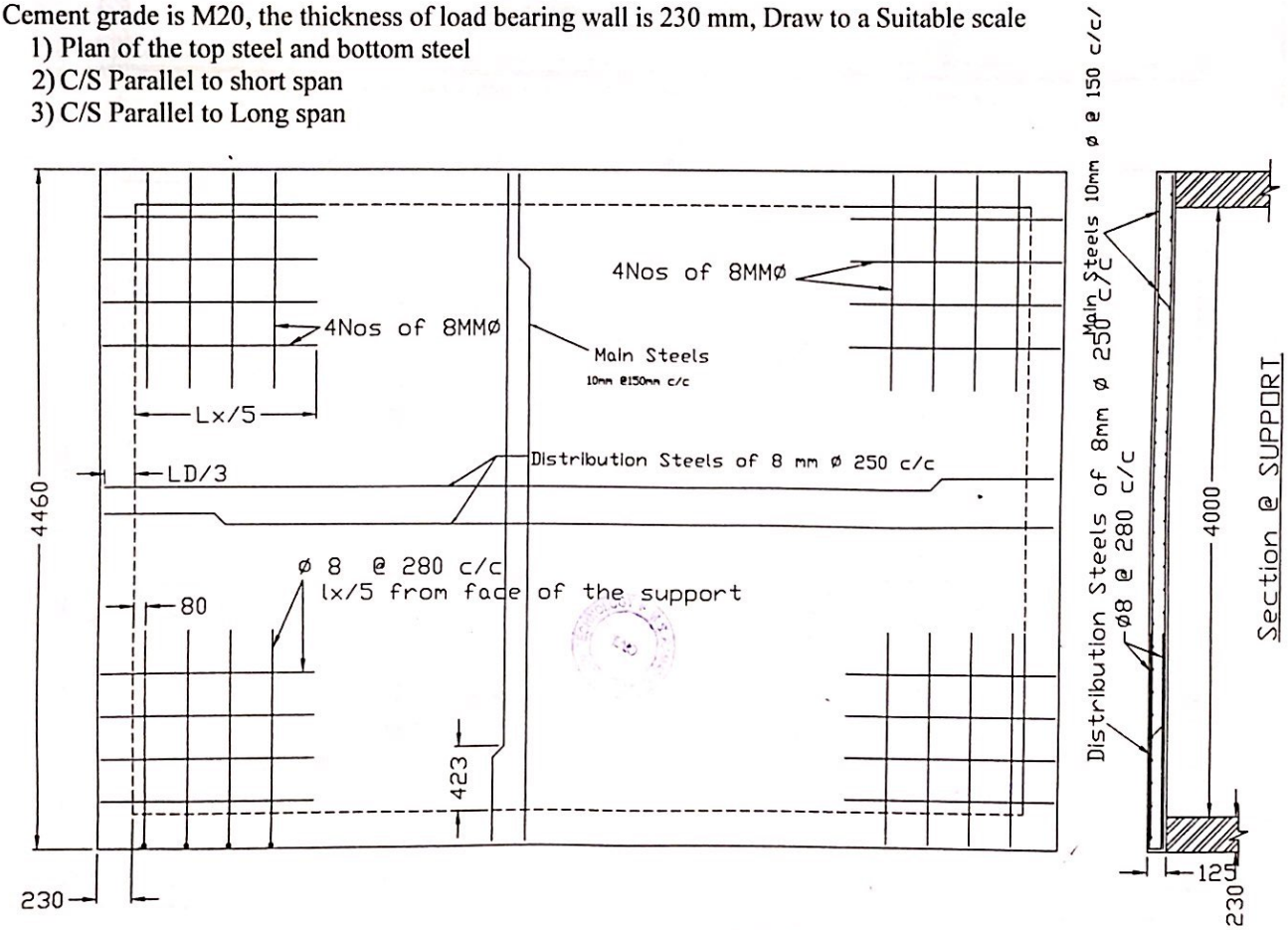
RESTARINED 2WAY SLAB

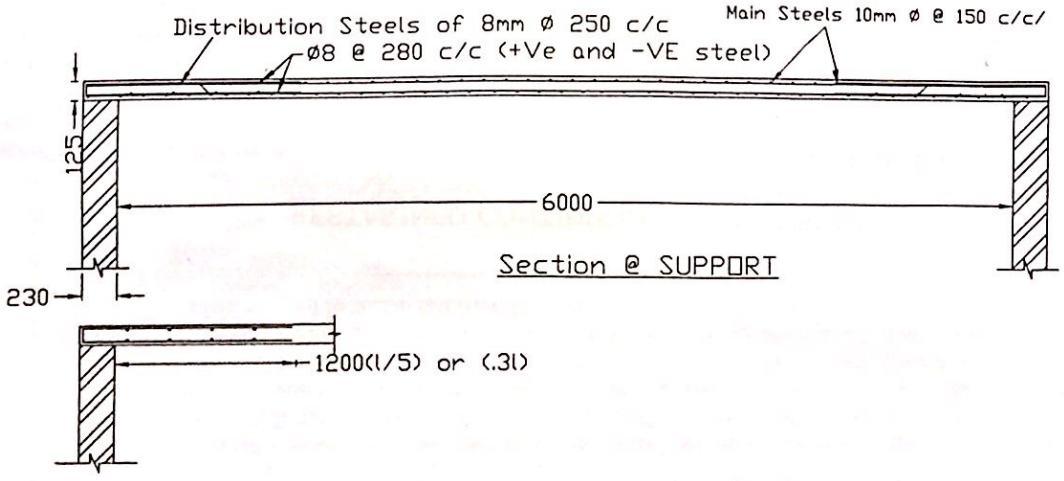
An interior panel of a two way slab has a clear dimension of 4 x 6 Meter. The thickness of the slab is 125 mm, FE 415 steel, M20 cement.

Reinforcement: 1) Short span the steel # 10 @ 150 c/c 2) Long span the steel # 8 @ 250 c/c 3)+Ve and -Ve steel of 4 Nos of 8 mm dia at all corners

Cement grade is M20, the thickness of load bearing wall is 230 mm, Draw to a Suitable scale

1) Plan of the top steel and bottom steel
2) C/S Parallel to short span
3) C/S Parallel to Long span



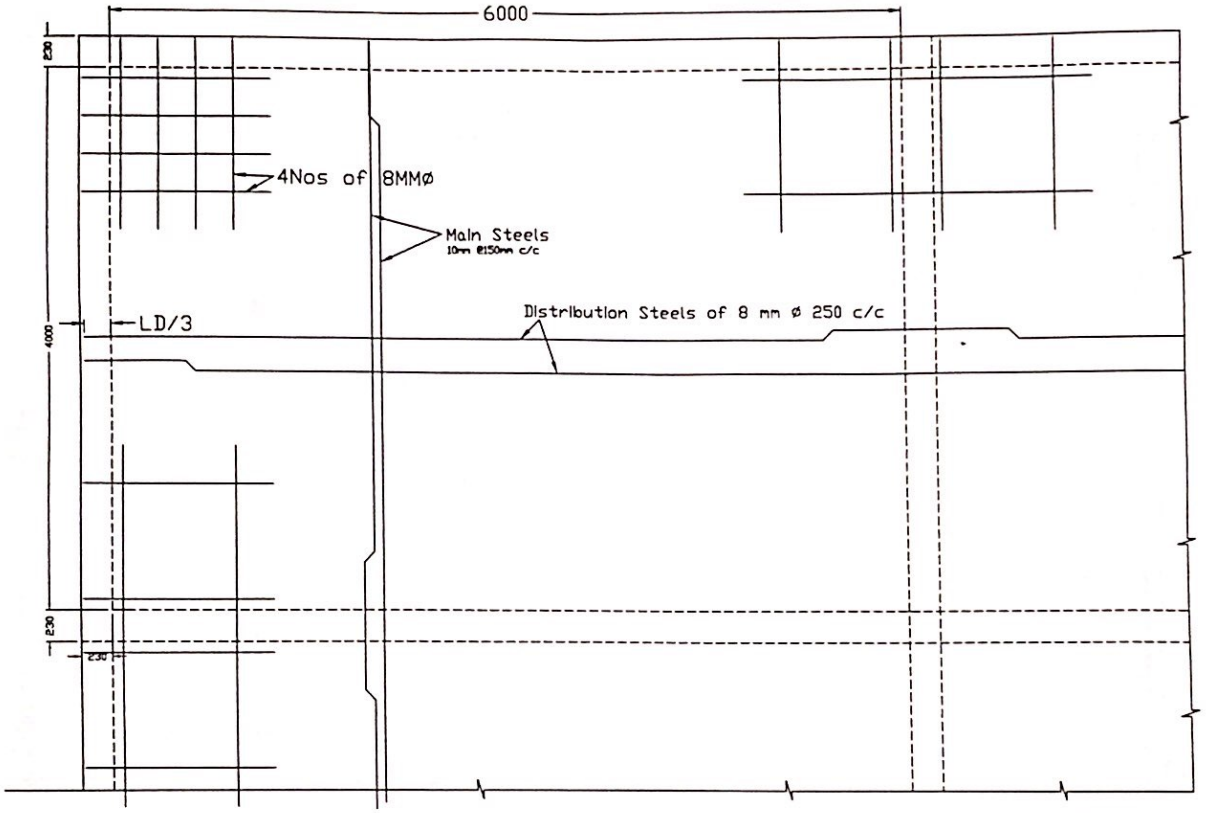


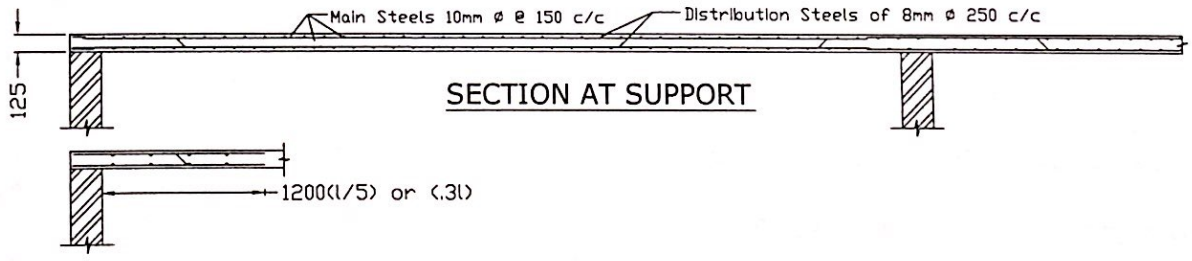
RESTARINED CONTINUOUS CORNER SLAB

A Panel of a two way slab is continuous on 2 edges and fixed on 2 side having with a clear dimension of 4Mx6M. The reinforcement detail of the slab with a thickness of 125mm is given below:

1) Short span the steel # 10 @ 150 c/c 2) Long span the steel # 8 @ 250 c/c 3)+Ve and -Ve steel of 4 Nos of 8 mm dia at all corners 4) M20 cement concrete, thickness of wall is 230 MM

Draw a) Plan Showing detail reinforcement b) C/Sof slab.

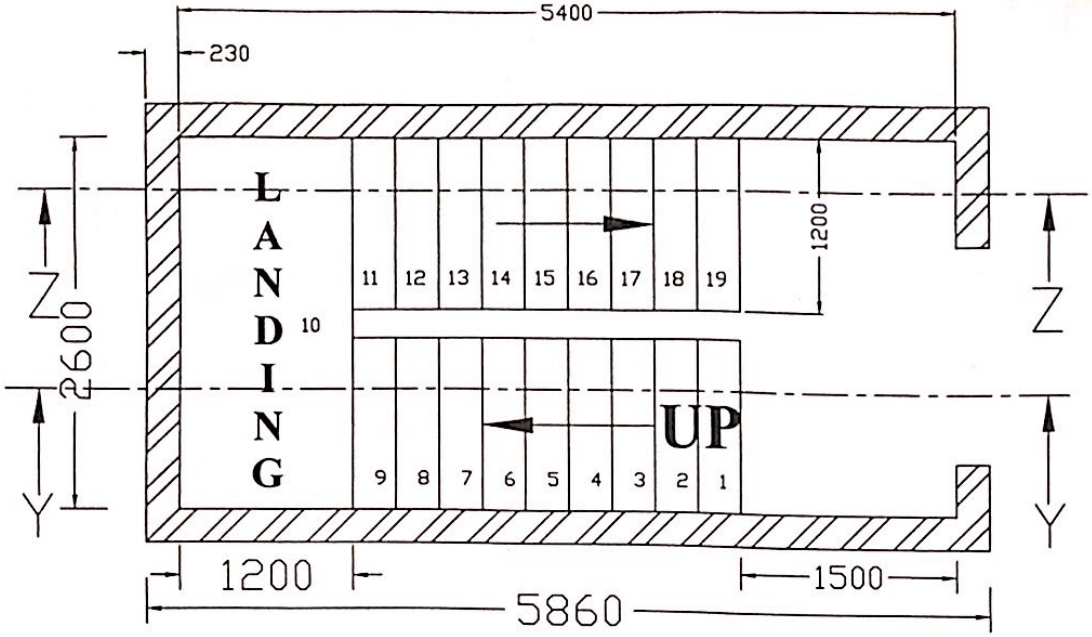




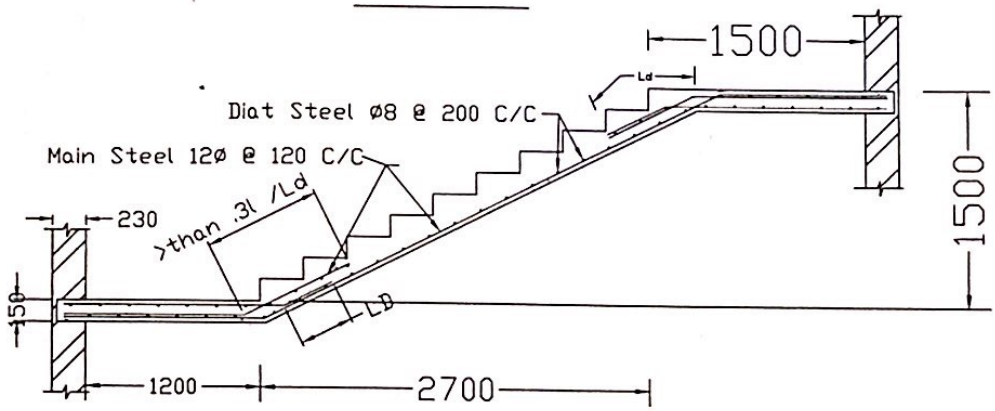
SECTION AT SUPPORT

DOG LEGGED STAIRCASE

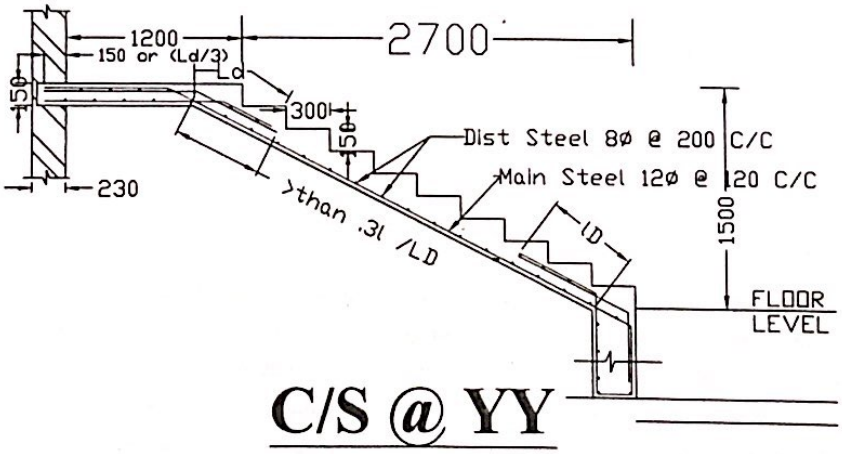
A dog legged stair case is to be detailed with the following: Particulars size of stair case room 2600x5400mm. width of the flight is 1200 mm , Minimum width of landing 1200mm, Minimum No of tread in each flight is 10, tread = 300 mm and minimum rise 150mm, wall thickness of 230 mm all round. Waist slab thickness = 150mm. Main Steel of 12Ø @ 120 c/c and distribution steel for each flight of 8Ø @ 200 c/c. First flight start at G. F. L and the foundation is 750mm below the G.F.L and the second flight starts on walls. The clear height of the staircase room is 3 mts Draw to a Suitable scale 1) plan 2) sectional details of G.F.L to First flight 3) Sectional details of flight to flight



PLAN



C/S @ ZZ

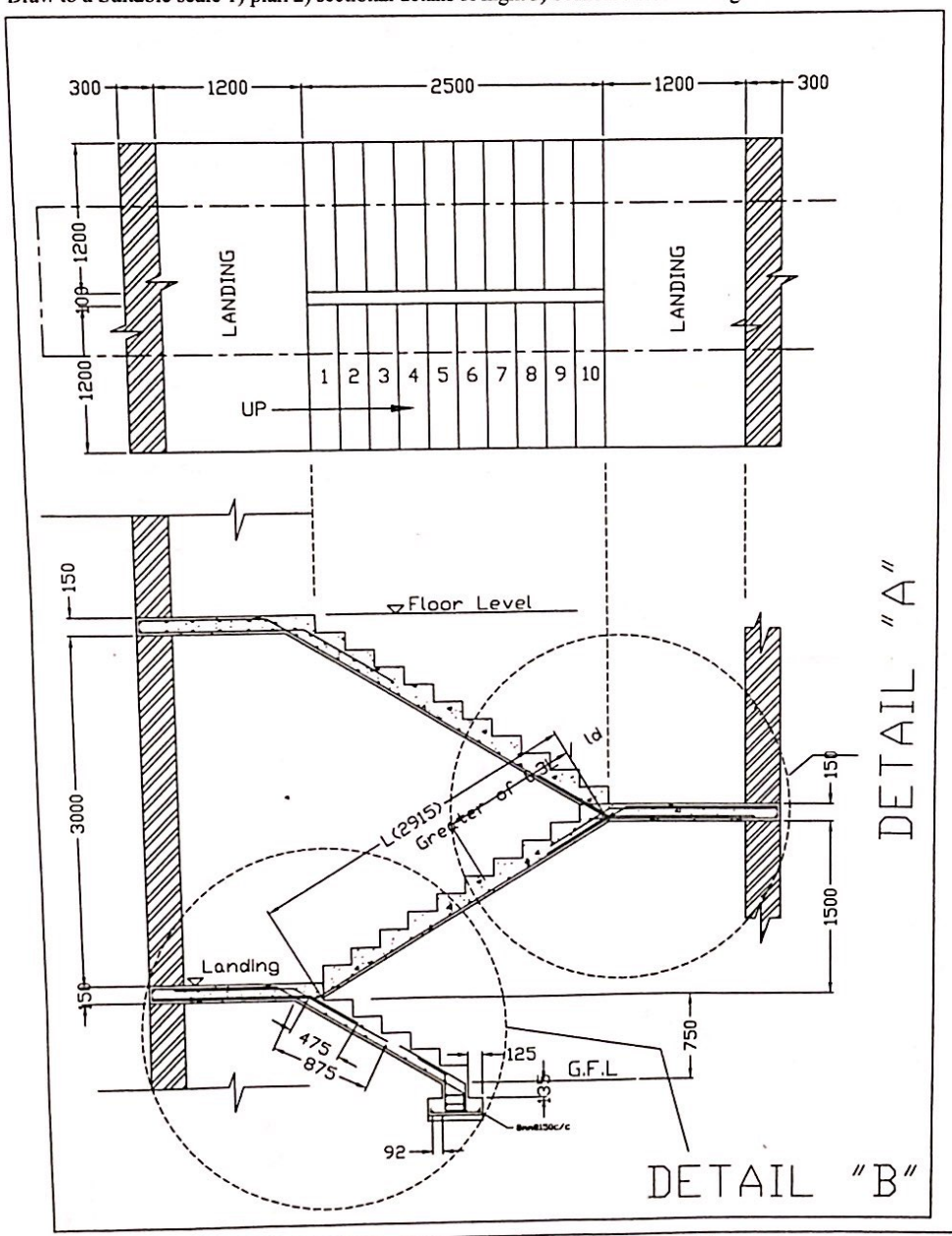


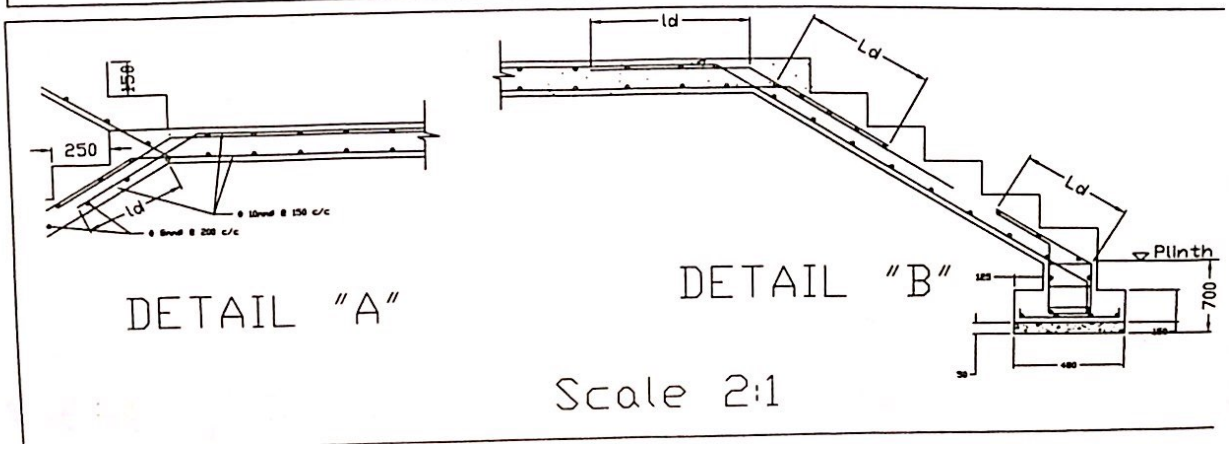
C/S @ YY

Dog Legged Stairs

A dog legged stair case is to be detailed with the following: Particulars size of stair case room 2500x4900mm, width of the flight is 1200mm , width of landing 1200mm, No of tread in each flight is 10, tread = 250 mm and rise 150mm, wall thickness of 300 mm on both side of landing. Waste slab thickness = 150mm. Main Steel # 12 @ 100 c/c and distribution steel for each flight # 8 @ 200 c/c. First flight start from G. F. L and the foundation is 700mm below the G.F.L and the second flight starts on walls at a distance of 750mm from the GFL and the third flight start at distance of 1500 mm from the bottom of the second flight.

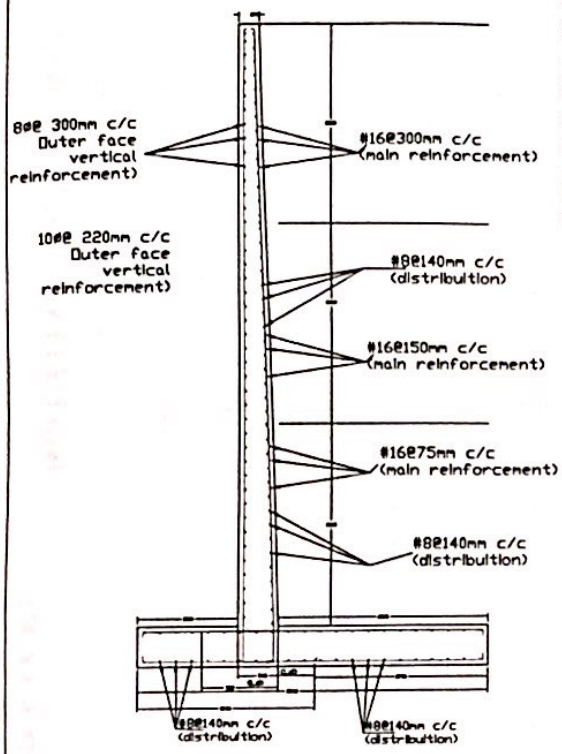
Draw to a Suitable scale 1) plan 2) sectional details of flight 3) Sectional details of flight •



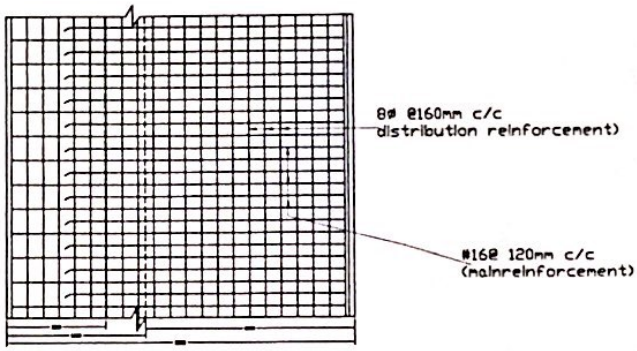


CANTILEVER RETAINING WALL

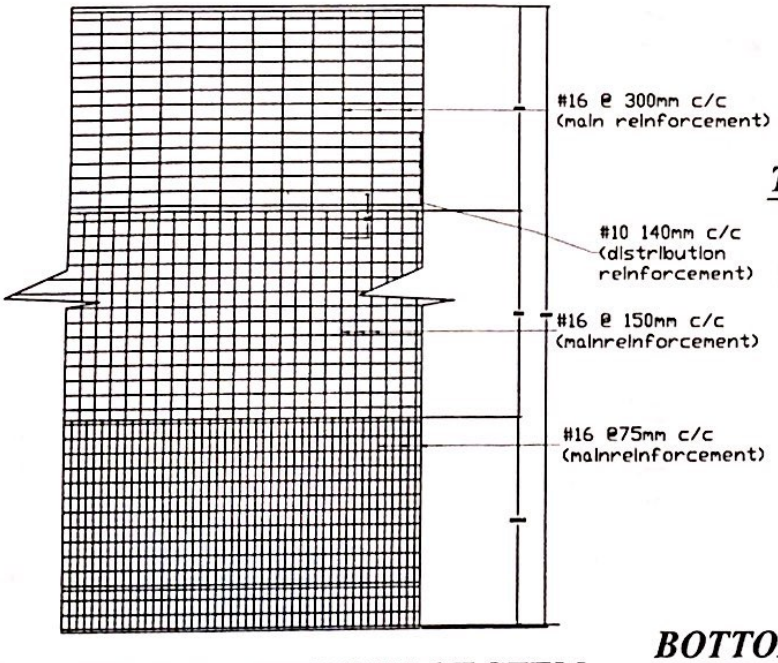
The detail of the cantilever type retaining walls as follows: Thickness of stem at top 200mm, at bottom 400mm, Height of the stem above the base slab is 6 meter. Width of the base slab is 3.5 meter and the thickness of the base is 400mm. Toe Projecting is 1 meter.
Reinforcement. Stem main reinforcement #16 @ 75mm c/c up to 2 meter from base slab, #16 @ 150 mm c/c from 2 meter up to 4 meter and # 16 @300mm c/c in the top height of 2meter, Distribution # 8 @ 140 c/c.
Along Outer face # 10 @ 220 mm c/c in the vertical direction and # 8 mm @ 300 c/c/ in the horizontal direction.
Heel Slab Main # 16 @ 120
Toe slab Main # 16 @ 150
Distribution steel in both toe and heel slab is # 8 @ 160.
Draw to a scale a) C/S of the wall b) Longitudinal section of stem showing the reinforcement. C) Sectional plan showing the details of reinforcement in heal slab.



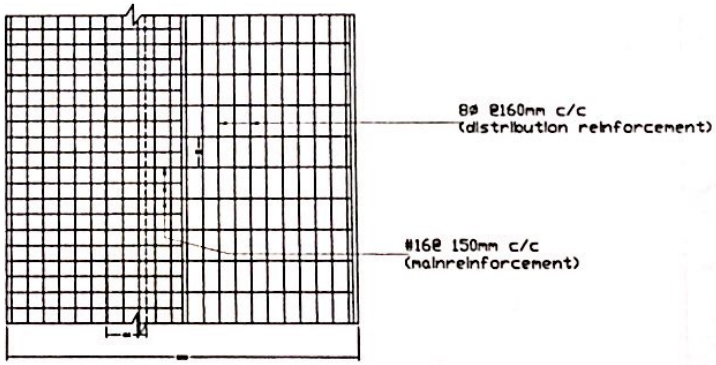
CROSS SECTION OF STEM



TOP PLAN OF BASE SLAB (HEEl)



LONGITUDINAL SECTION OF STEM

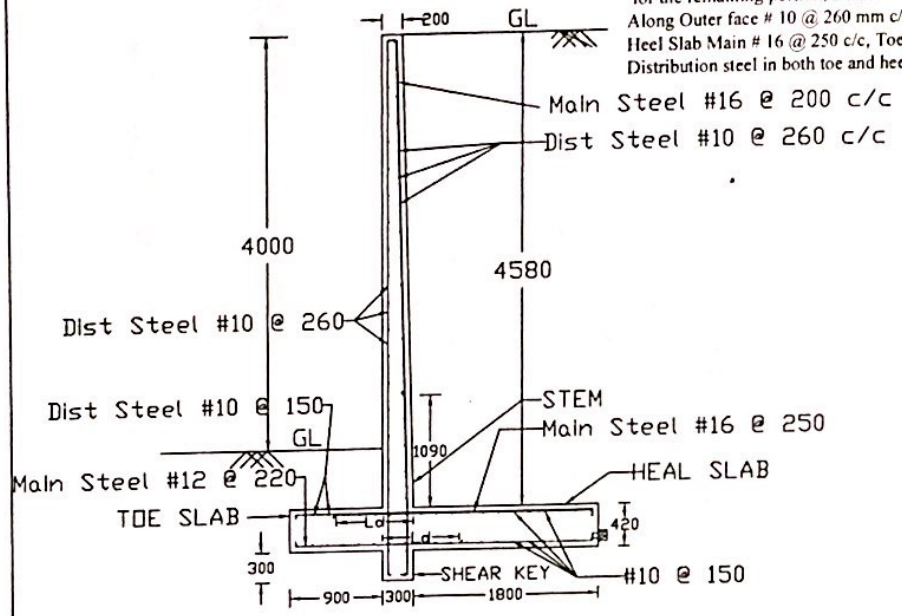


BOTTOM PLAN OF BASE SLAB (TOE)

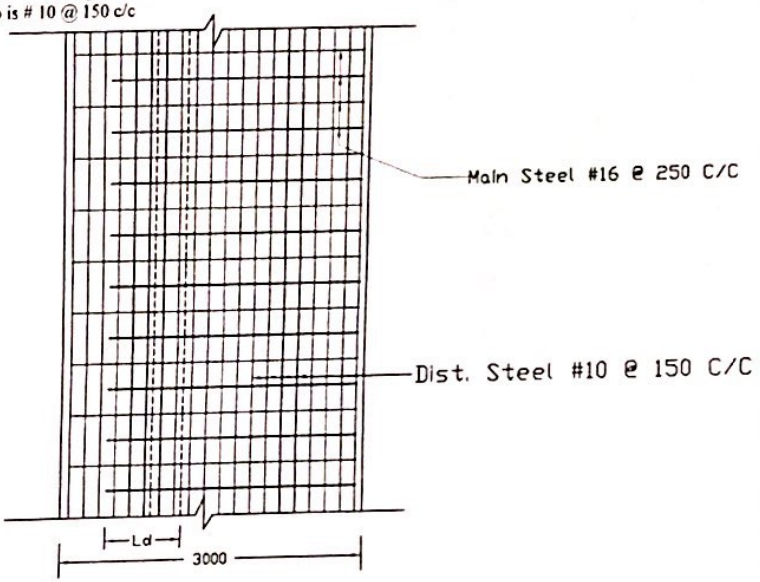
RETAINING WALL

Draw the following Views: 1) Cross section of retaining wall showing reinforcement details
2) Longitudinal section showing curtailment

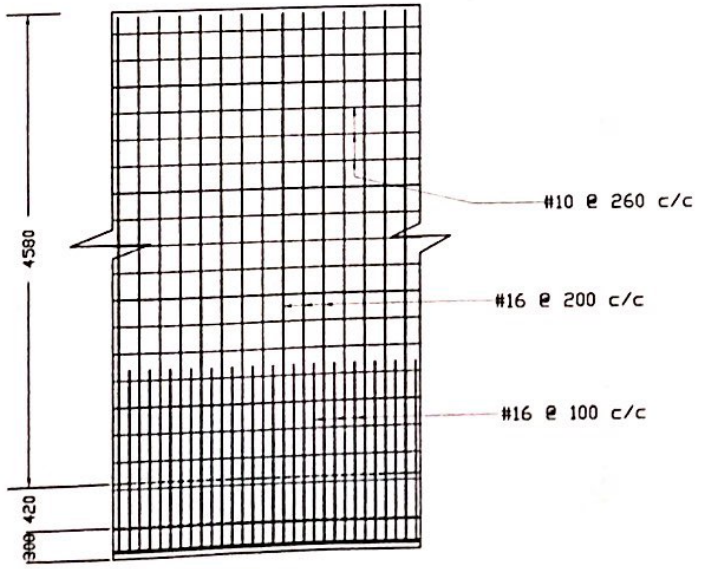
Overall Depth of Foundation / Wall is 5.2 Mts, Thickness of base slab 450mm and the height of the stem is 4.75mts and 4 mts above the ground level, Length of Toe slab is 900 mm and length of the heel slab1.8mts, depth of the shear key is 300 x 300 (overall length of slab is 3mts.)
Reinforcement Stem main reinforcement #16 @ 100 mm c/c upto 2 Mts from the top the base slab and # 16 @200mm c/, for the remaining portion, Distribution # 10 @ 260 c/c.
Along Outer face # 10 @ 260 mm c/c in the vertical direction and # 10 mm @ 260 c/c/ in the horizontal direction.
Heel Slab Main # 16 @ 250 c/c, Toe slab Main # 12 @ 220 c/c
Distribution steel in both toe and heel slab is # 10 @ 150 c/c



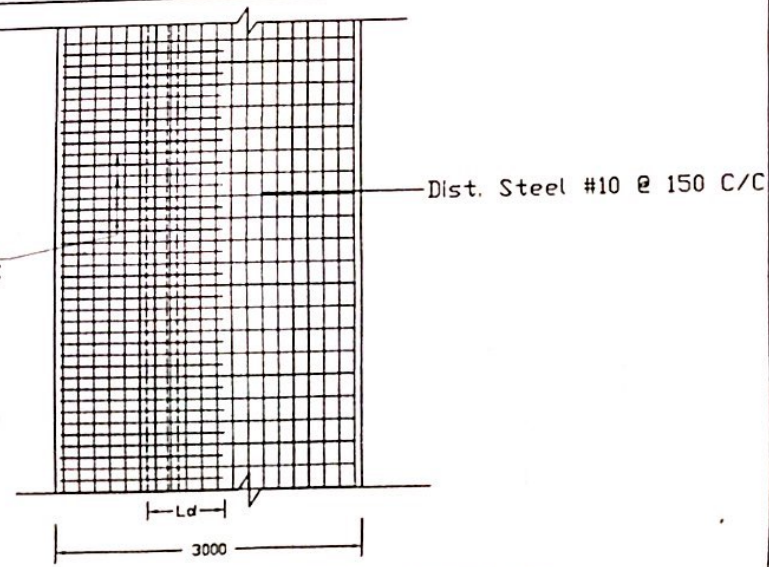
CROSS SECTIONAL ELEVATION



TOP PLAN OF BASE SLAB



LONGITUDINAL ELEVATION (INNER FACE)



BOTTOM PLAN OF BASE SLAB

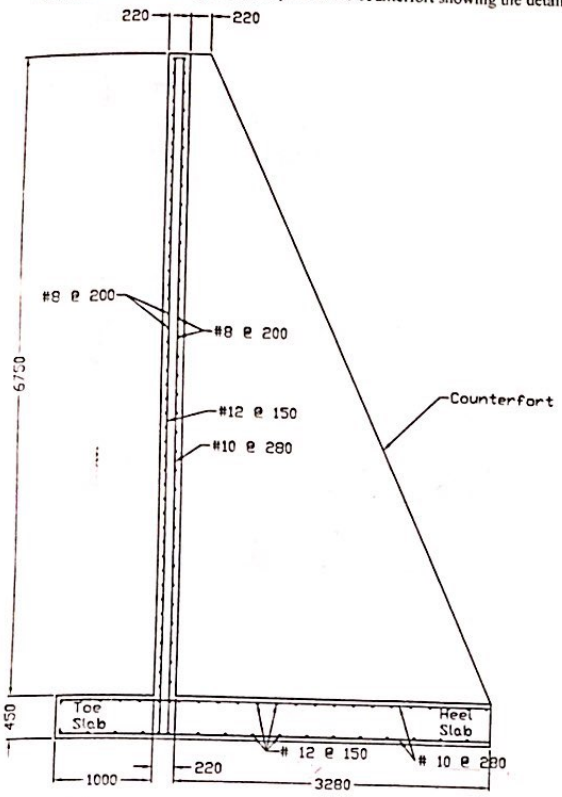
COUNTERFORT WALL

The detail of the Counterfort retaining walls as follows: Thickness of stem at top 220mm, at bottom 220mm, Height of the stem above the base slab is 6.750 meter. Width of the base slab is 3.28 meter and the thickness of the base is 450mm. Toe Projecting is 1 meter.

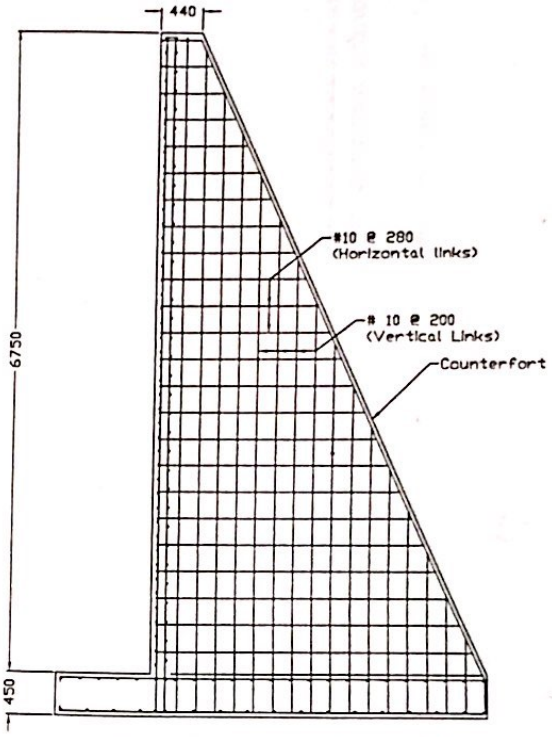
Reinforcement: Stem main reinforcement Along Inner face # 18 Ø @280 mm c/c in the vertical direction and # 8 Ø @ 200 c/c/ in the horizontal direction.Along Outer face # 12 Ø @ 150 mm c/c in the vertical direction and # 8 Ø @ 200 c/c/ in the horizontal direction.

Heel Slab Main # 12 Ø @ 150 mm ,Toe slab Main # 12 Ø @ 150, Distribution steel in both toe and heel slab is # 10 Ø @ 280mm,

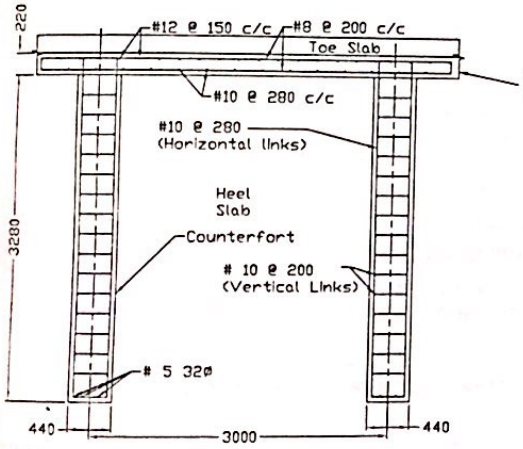
Draw to a scale a) C/S of the Stem way from the counterfort b) C/S of the Stem way at counterfort showing reinforcement detail. C) Sectional plan of the counterfort showing the details of reinforcement.



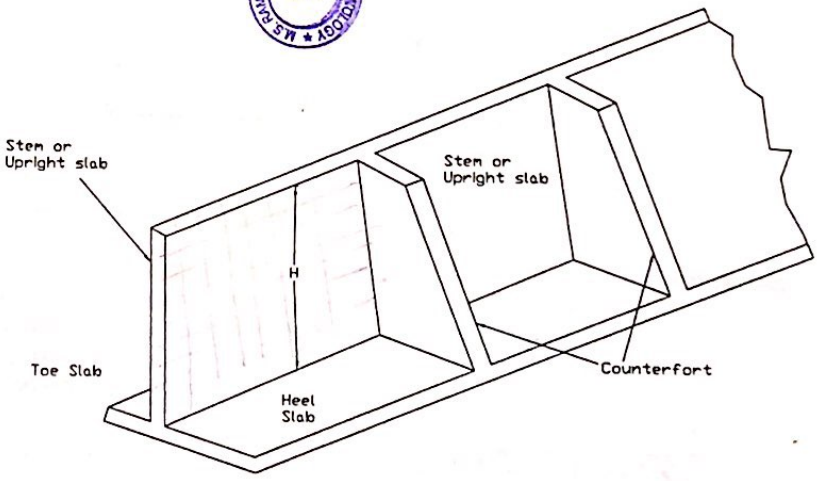
Sectional elevation Midway Between Support



Sectional elevation of Counterfort



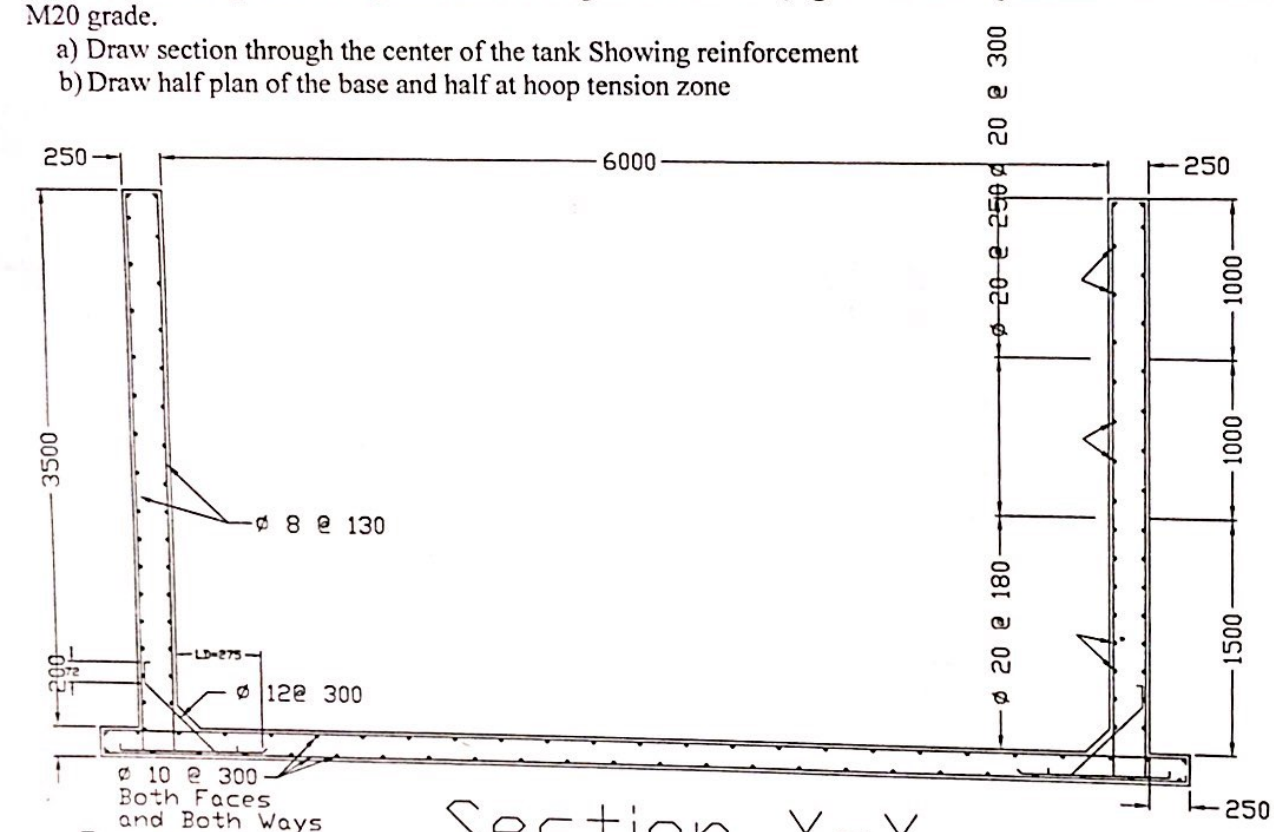
Sectional Plan at base of Counterfort



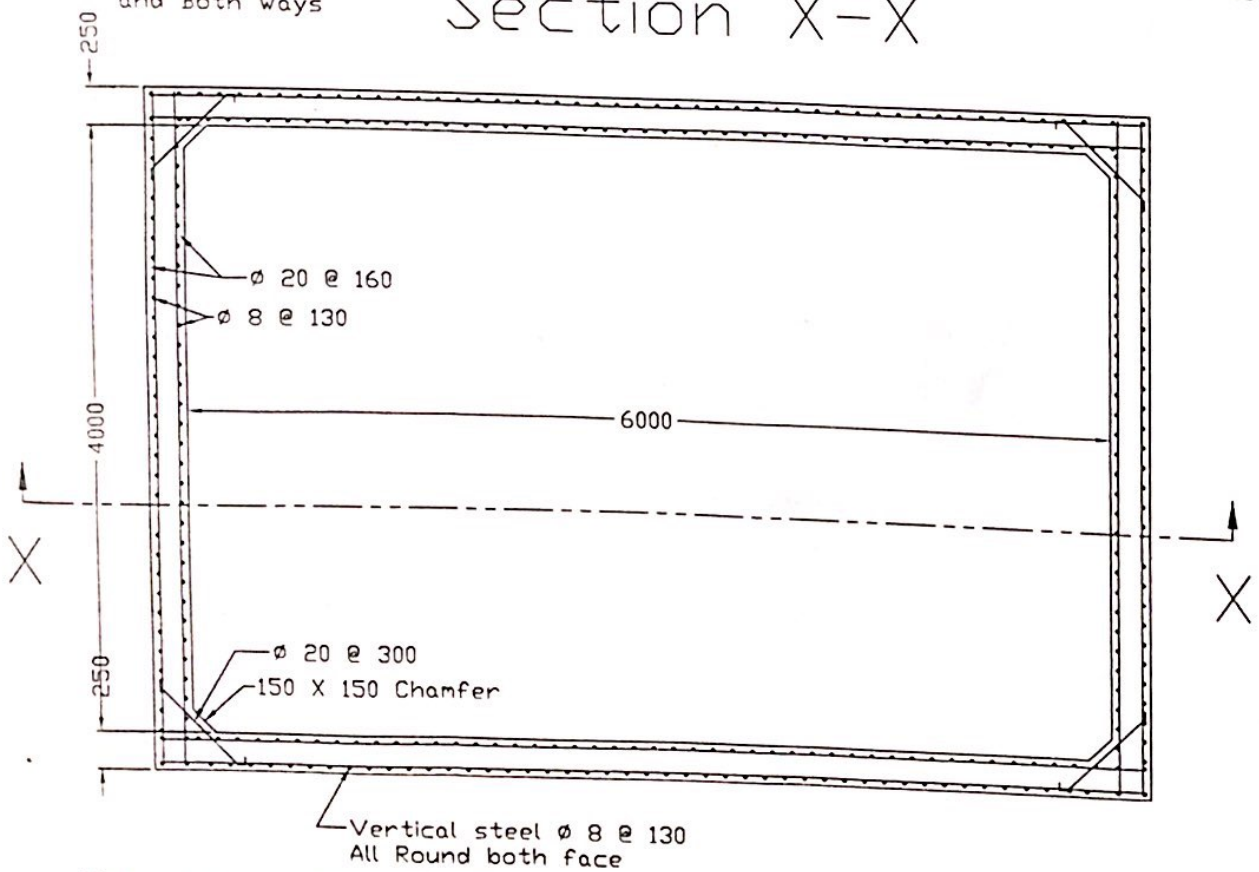
Reinforcement details for rectangular tank

A Rectangular water tank on ground with fixed base has following details.
1) The Internal size of tank is 6 m by 4 m, 2) Height 3.5 Meter with 2 Meter free banned 3) tank is open at top 4) thickness of wall = 250 mm, 5) thickness of base slab = 200 mm 6) Reinforcement : Main Steel #20 on both faces @ 180 c/c up to 1.5M from base, # 20 @ 250 c/c from 1.5M to up to 2.5 M and From 2.5 M upto top is # 20 @ 300 c/c 8) base slab # 10 @300 c/c both way @ bottom and top of slab steel of FE 415 and cement M20 grade.

a) Draw section through the center of the tank Showing reinforcement
b) Draw half plan of the base and half at hoop tension zone



Section X-X

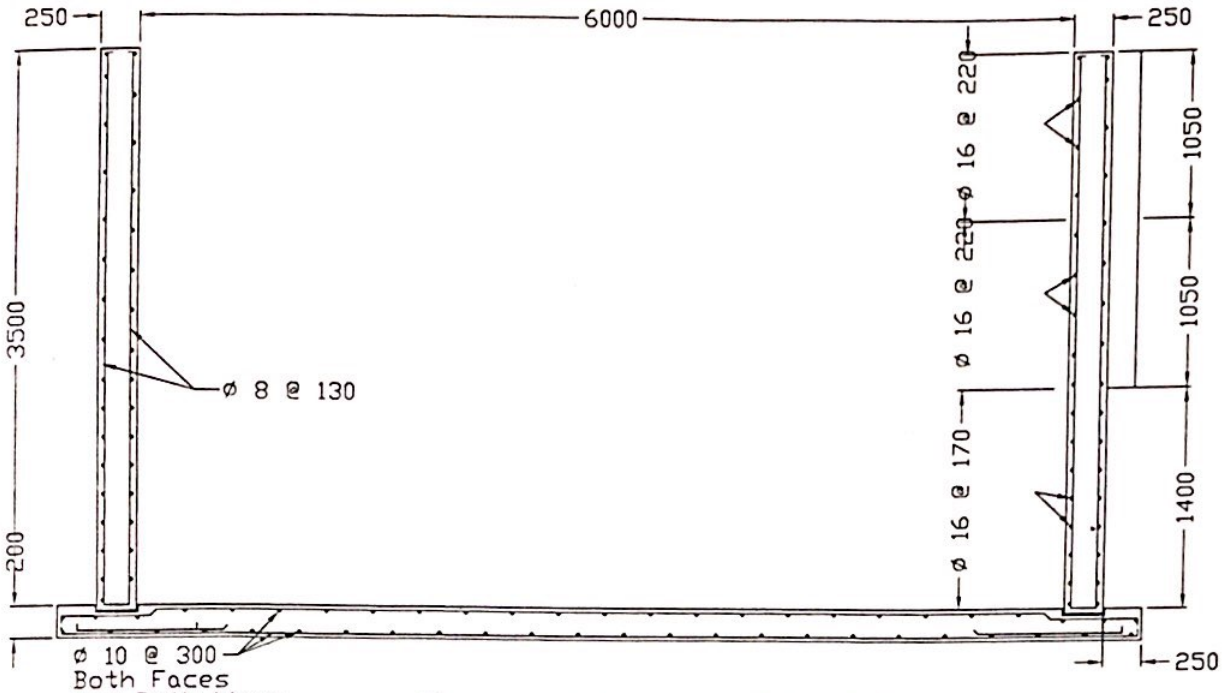


PLAN @ 0.5M above the Slab

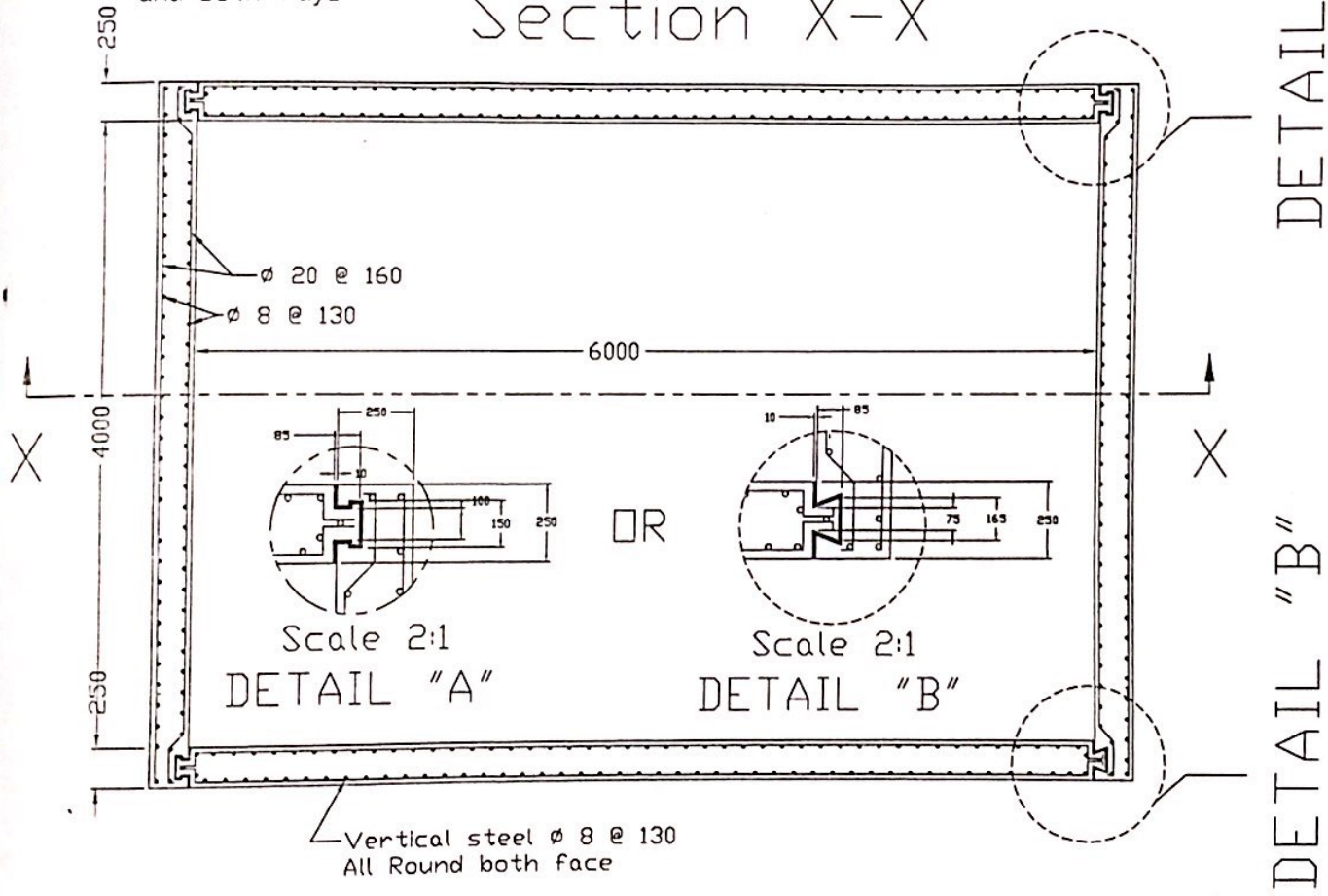
Reinforcement details for Flexible rectangular tank

A rectangular water tank on ground with flexible base and side wall has the following details:
1) Diameter of tank = 10 m 2) Height 4 Meter with 2 Meter free banned 3) tank is open at top
4) thickness of wall = 250 mm 5) thickness of base slab = 150 mm, 6) Reinforcement : Hoop Steel #12 on both faces @ 170 c/c up to 1.4M from base, # 16 @ 220 c/c from 1.4 m to 2.45 M and # 16 @ 270 c/c from 2.45M to top Cantilever steel # 12 @ 120 mm c/c 8) base slab # 8 @ 200 c/c both way @ bottom and top of slab steel of FE 415 and cement M20 grade.

a) Draw section through the center of the tank Showing reinforcement
b) Plan of the base
c) Plan at 0.5meters above the base.



Section X-X

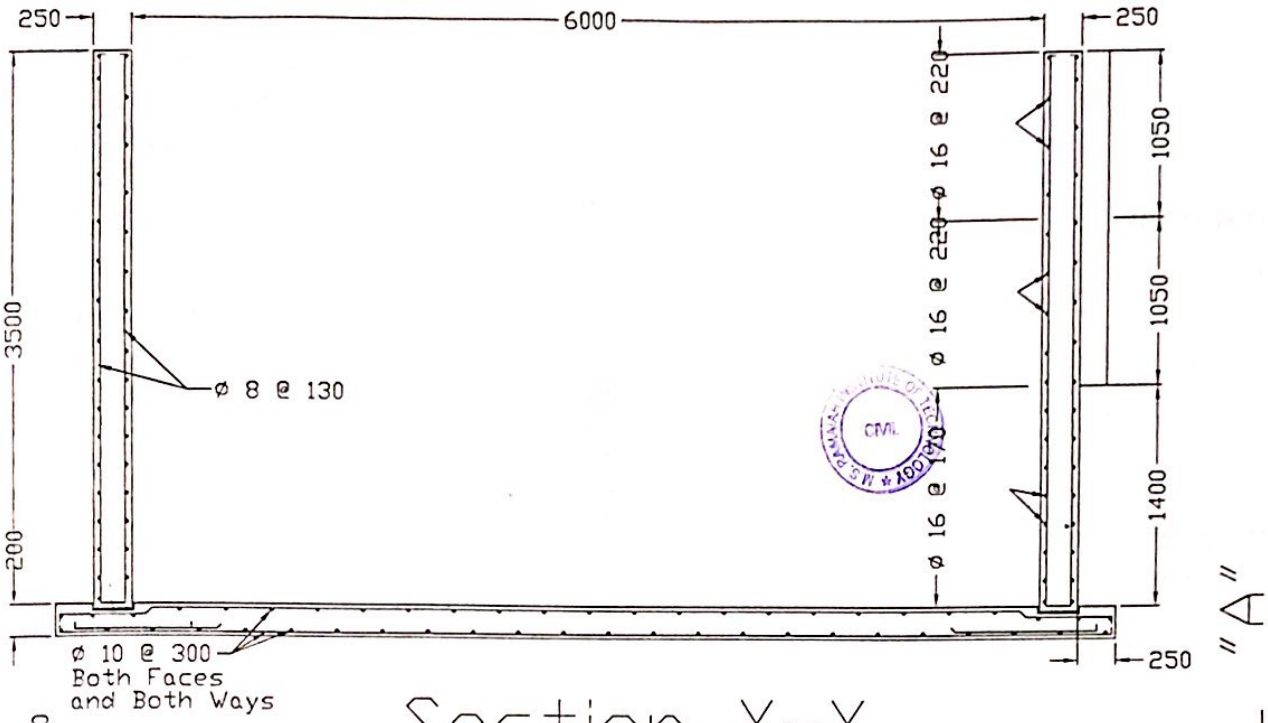


PLAN @ 0.5M above the Slab

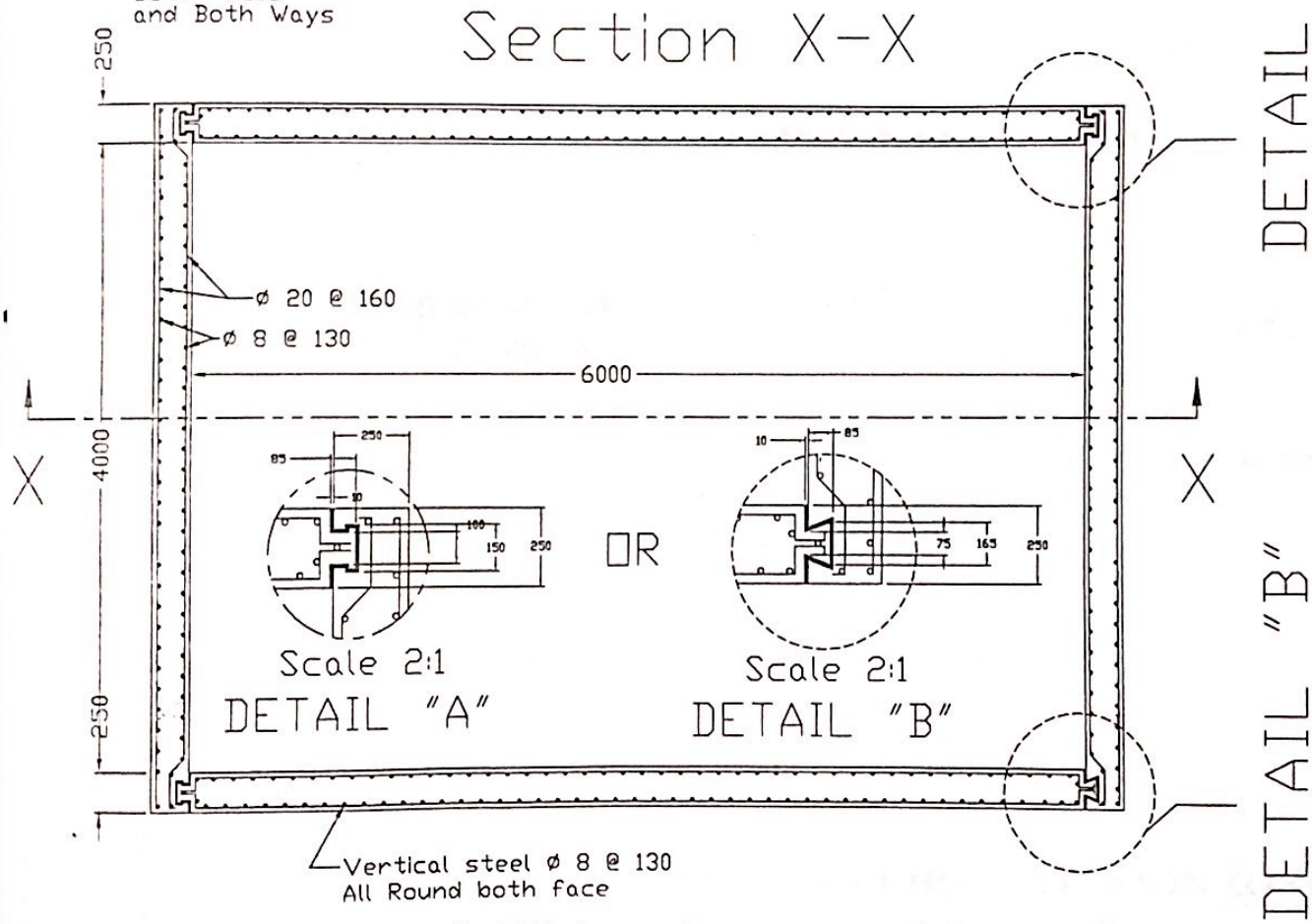
Reinforcement details for Flexible rectangular tank

A rectangular water tank on ground with flexible base and side wall has the following details:
1) Diameter of tank = 10 m 2) Height 4 Meter with 2 Meter free banned 3) tank is open at top
4) thickness of wall = 250 mm 5) thickness of base slab = 150 mm, 6) Reinforcement : Hoop Steel #12 on both faces @ 170 c/c up to 1.4M from base, # 16 @ 220 c/c from 1.4 m to 2.45 M and # 16 @ 270 c/c from 2.45M to top Cantilever steel # 12 @ 120 mm c/c 8) base slab # 8 @ 200 c/c both way @ bottom and top of slab steel of FE 415 and cement M20 grade.

a) Draw section through the center of the tank Showing reinforcement
b) Plan of the base
c) Plan at 0.5meters above the base.



Section X-X

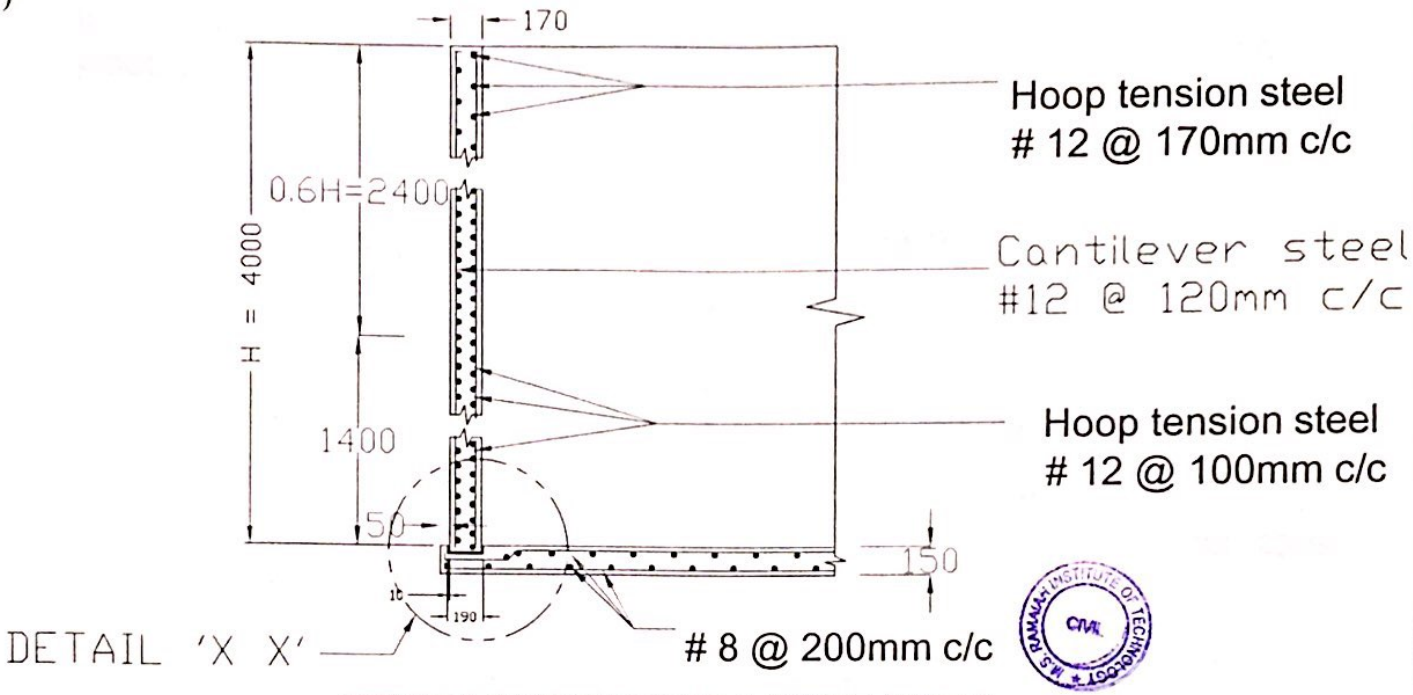


PLAN @ 0.5M above the Slab

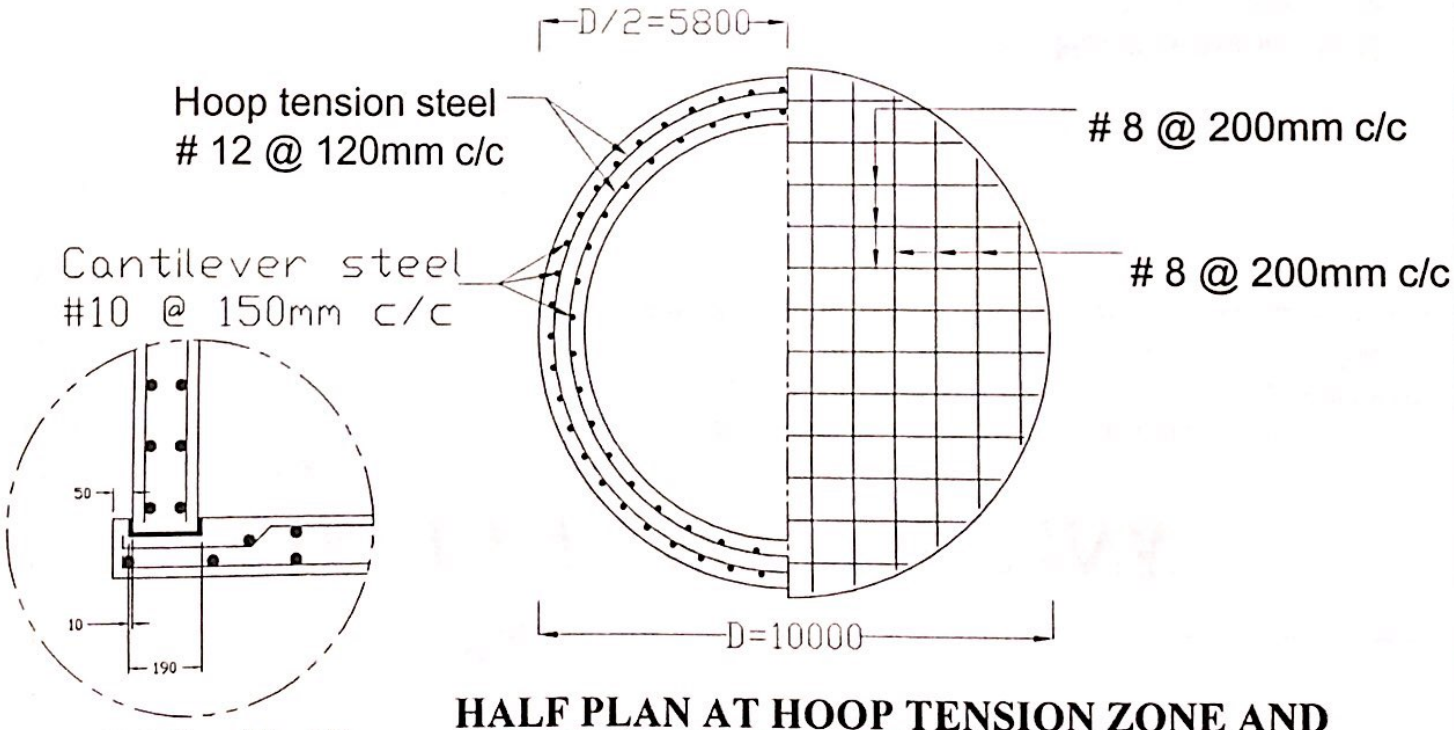
CIRCULAR Flexible *WATER TANK*

A circular water tank on ground with flexible base has following details.
1) Diameter of tank = 10 m 2) Height 4 Meter with 200mm free board 3) tank is open at top 4) thickness of wall = 170 mm, 5) thickness of base slab = 150 mm 6) Reinforcement : Hoop Steel #12 on both faces @ 100 c/c up to 2M from base, and 170 c/c from 2M to top. Vertical steel # 12 @ 120 mm c/c 7) base slab # 8 @ 200 c/c both way @ bottom and top of slab steel of FE 415 and cement M20 grade.

a) Draw section through the center of the tank Showing reinforcement
b) Draw half plan of the base and half at hoop tension zone
c)



CROSS SECTIONAL ELEVATION

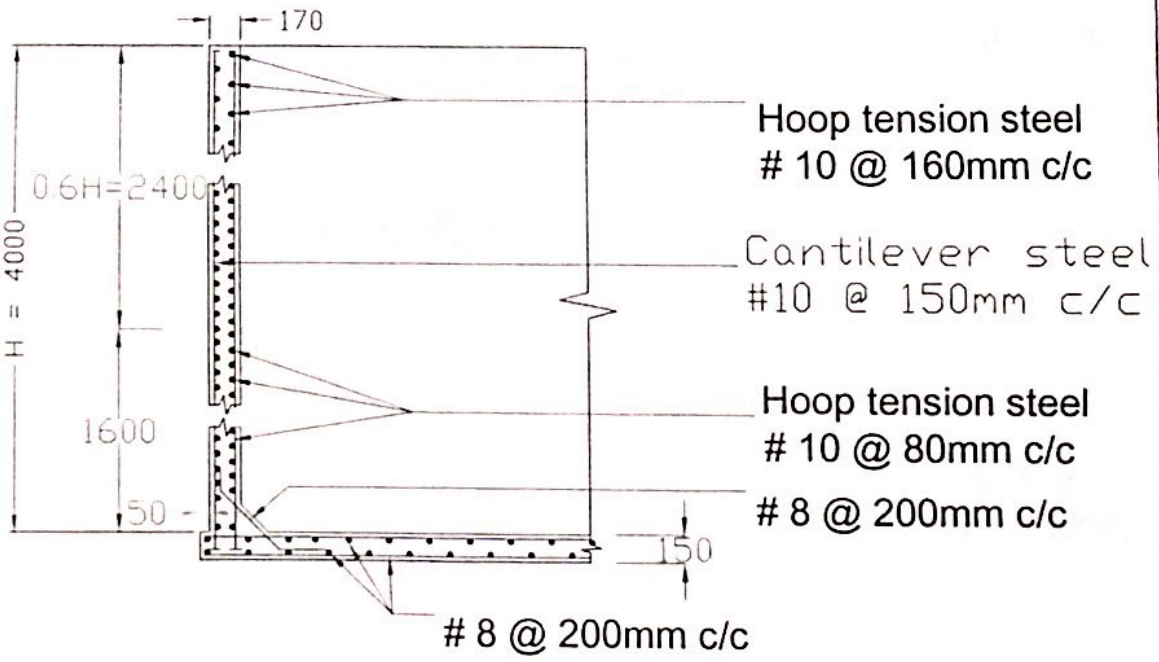


HALF PLAN AT HOOP TENSION ZONE AND HALF PLAN AT BASE SLAB

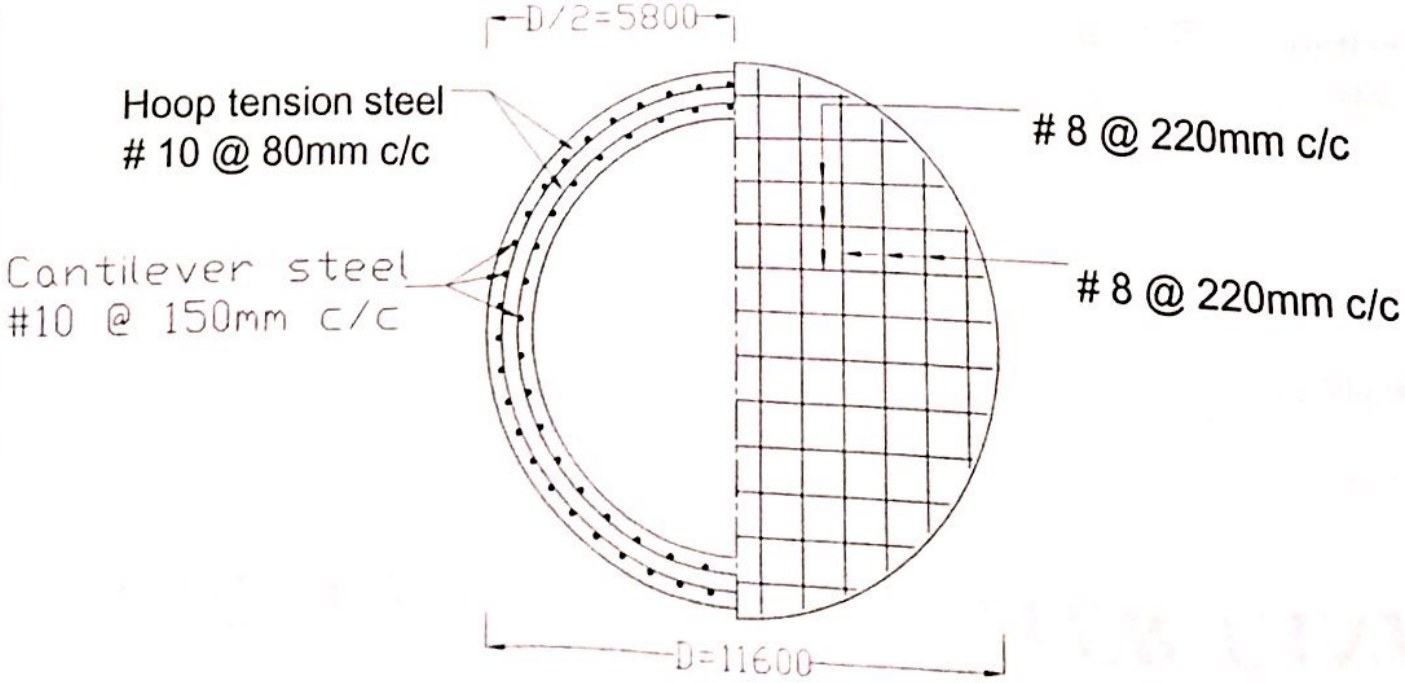
CIRCULAR WATER TANK

A circular water tank on ground with fixed base has following details.
1) Diameter of tank = 11.6 m 2) Height 4 Meter with 200mm free board 3) tank is open at top 4) thickness of wall = 170 mm, 5) thickness of base slab = 150 mm 6) Reinforcement : Hoop Steel #10 on both faces @ 80 c/c up to 1.6M from base, and 160 c/c from 1.6M to top.Cantilever steel # 10 @ 150 mm c/c 7) base slab # 8 @ 200 c/c both way @ bottom and top of slab steel of FE 415 and cement M20 grade.

a) Draw section through the center of the tank Showing reinforcement
b) Draw half plan of the base and half at hoop tension zone



CROSS SECTIONAL ELEVATION



HALF PLAN AT HOOP TENSION ZONE AND HALF PLAN AT BASE SLAB

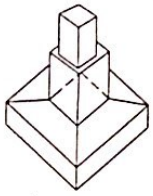
Isolated Square Column

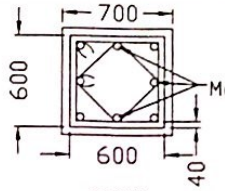
Draw to a suitable scale showing the reinforcement detail for a Square column of section 600mmx600mm,which is suitable for supporting an axial load of 1000Kn. Assume SBC 200 Kn/m2. Material used are M20 grade concrete and Fc 415 Hysd Steels. The column size at the plinth is 700mmx700mm.

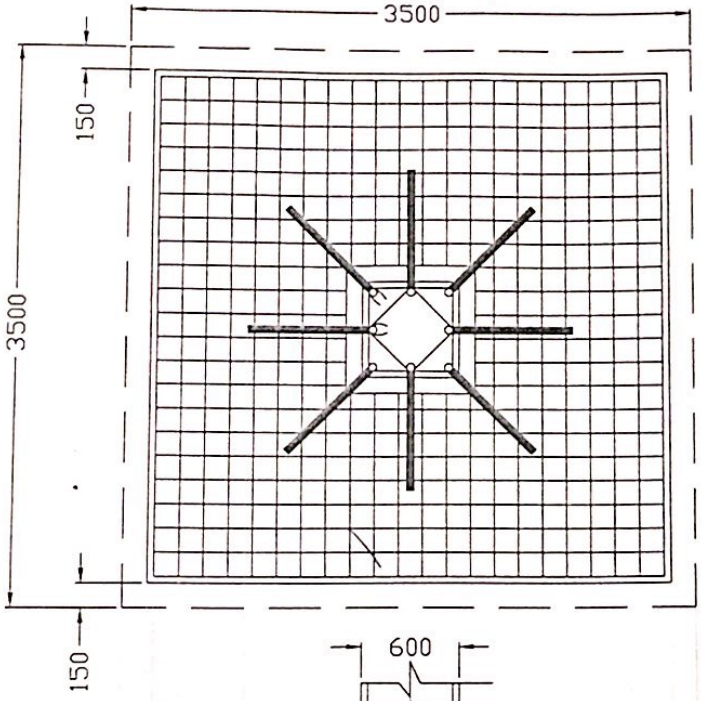
Foundation Details :Depth of foundation is 1800mm the foundation size is 3500mX3500mm.
The height of the base concrete is 300mm at the edge and at the face of column is 600mm

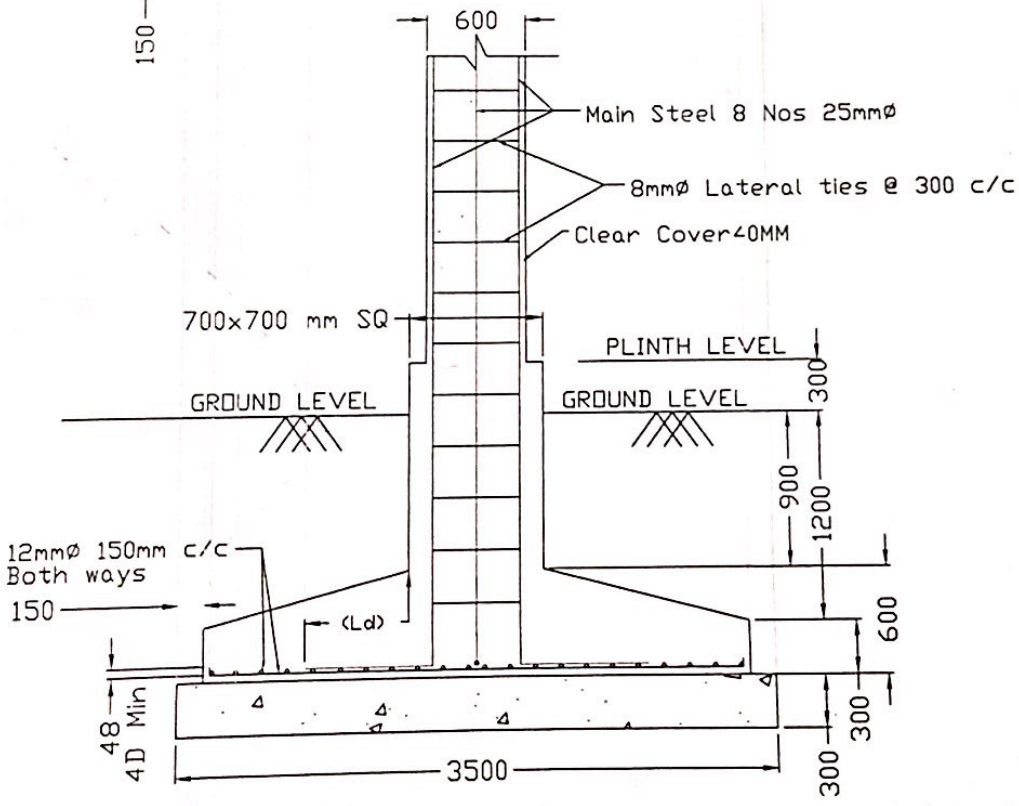
Reinforcement details:

Bottom mate 12mm ø @ 150mm c/c Both Ways
Column of 8 # 25mmø and stirrups of 2l # 8mmø @ 300mm c/c
Provide additional diamond shape lateral ties of 8mmø @ 300 c/c









Isolated Rectangular Column

Draw to a suitable scale showing the reinforcement detail for a Rectangular column of section 300mmx500mm,which is sultable for supporting an axial load of 1000Kn. Assume SBC 200 Kn/m2. Material used are M20 grade concrete and Fc 415 Hysd Steels.

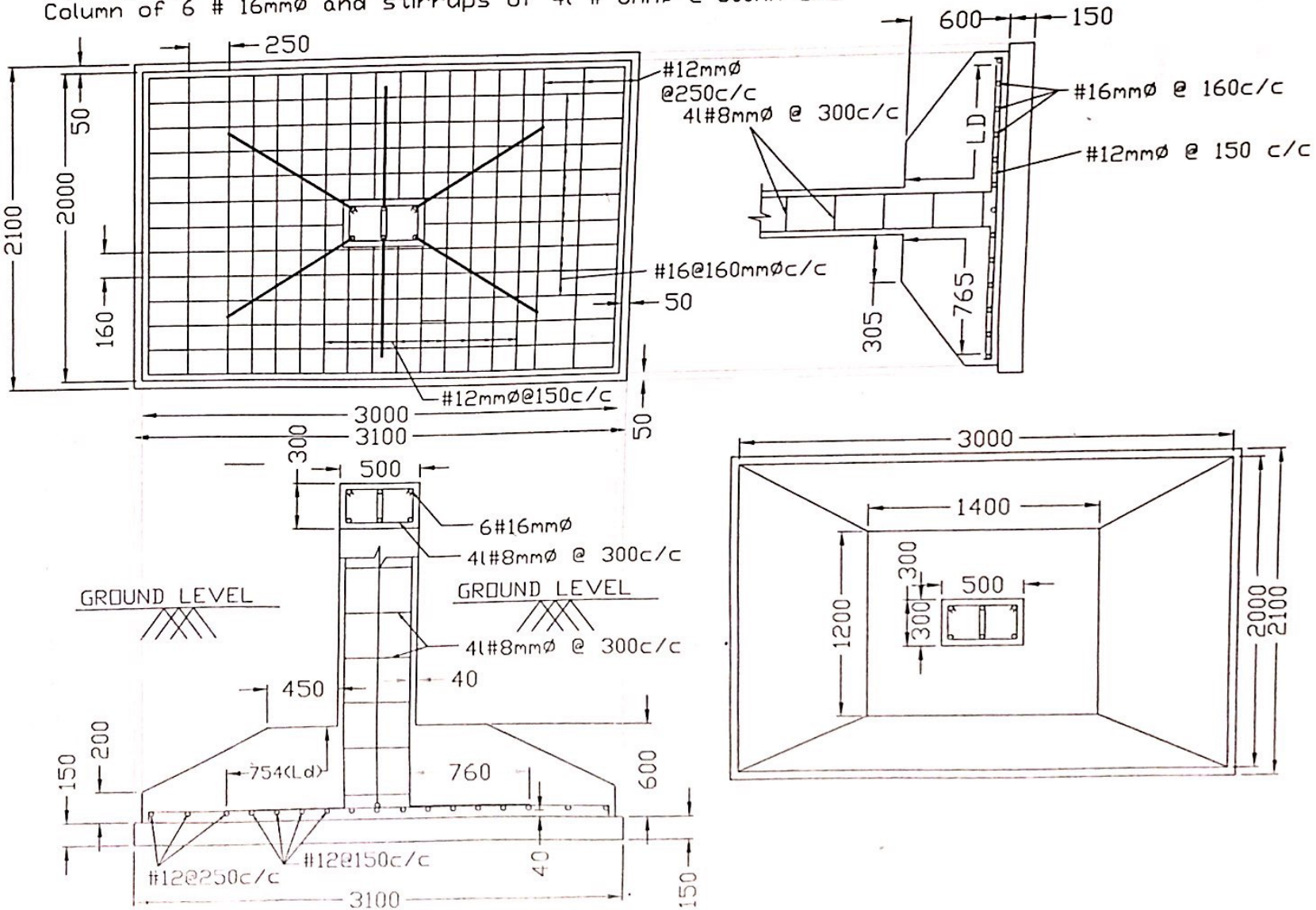
Provide 150mm PCC bed

Reinforcement details:

Longer span # 16 @ 160mmø c/c

Shorter span # 12 @ 150mmø c/c

Column of 6 # 16mmø and stirrups of 4l # 8mmø @ 300mm c/c

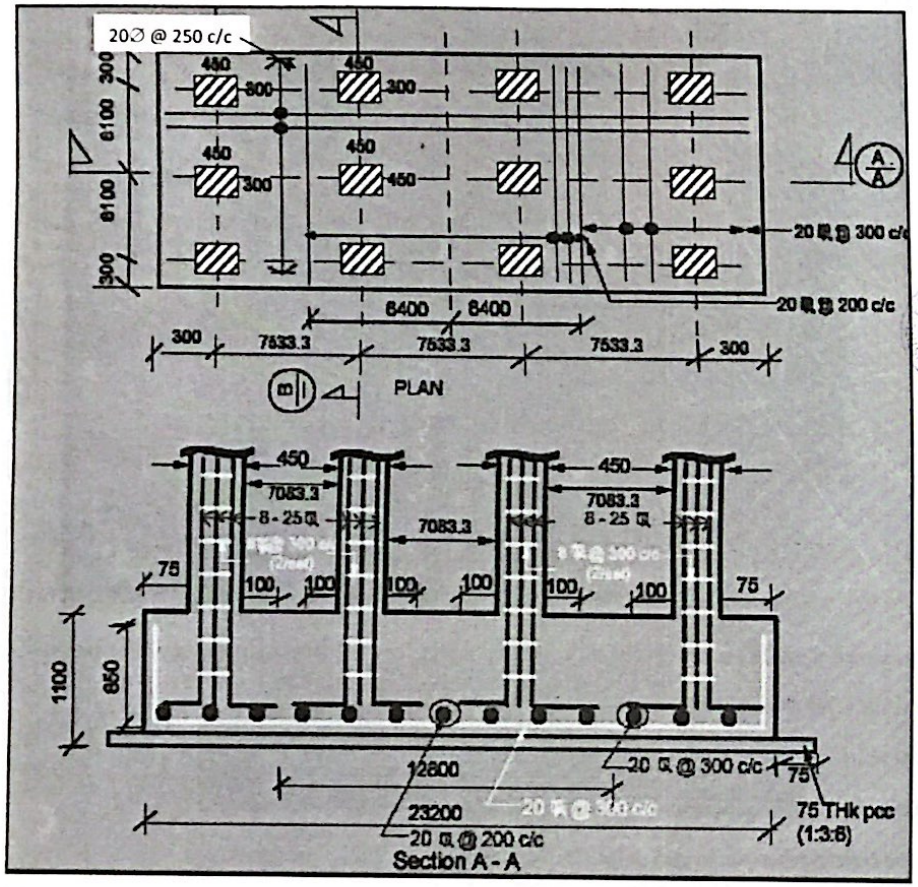


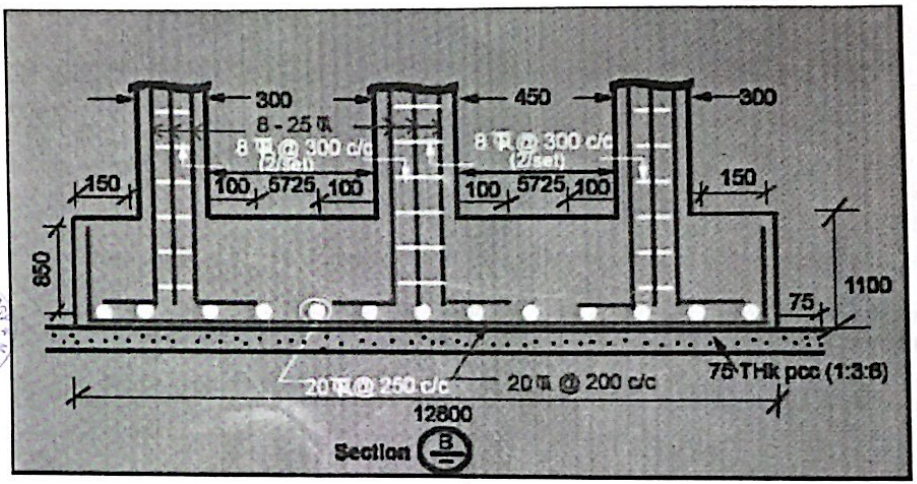
Raft Footing

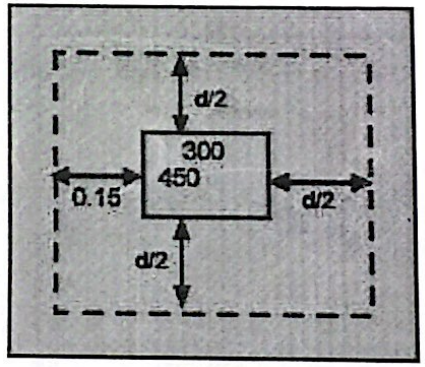
The size of the raft footing is 12800 by 23199.9 and the overall depth of 1.1m=D
Provide 20∅ @200c/c in centre band and 20∅ @300c/c at other parts along the shorter direction At the ends, length of bar provided=150mm.

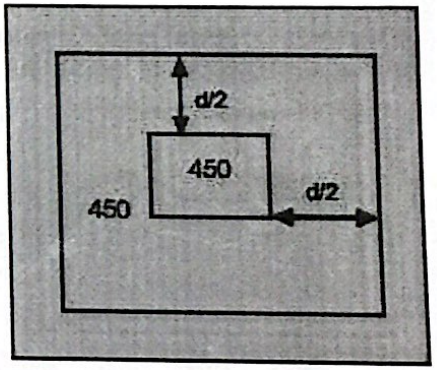
Extra length or Development length of 850mm, Take size of the columns are as: 300*450 mm for all external and 450*450 mm for interior column,

Provide 20 mm diameter bars @250 c/c along shorter direction in bottom, Provide 20 mm diameter bars @250 c/c in longer direction.
Provide 20 mm diameter bars @ 200 c/c in central band and 20 mm diameter bars @300 c/c at other parts along shorter direction at bottom.

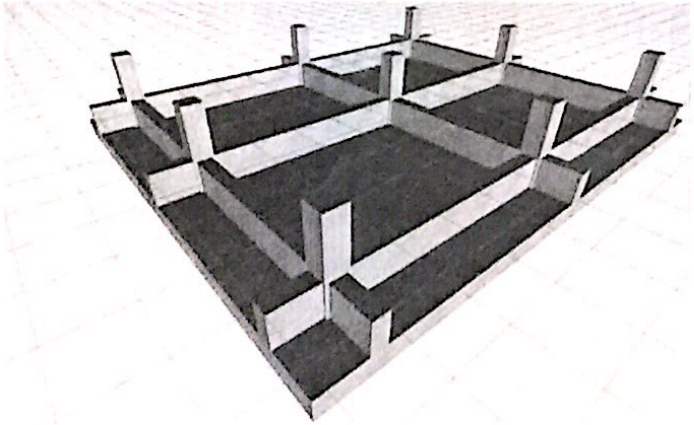






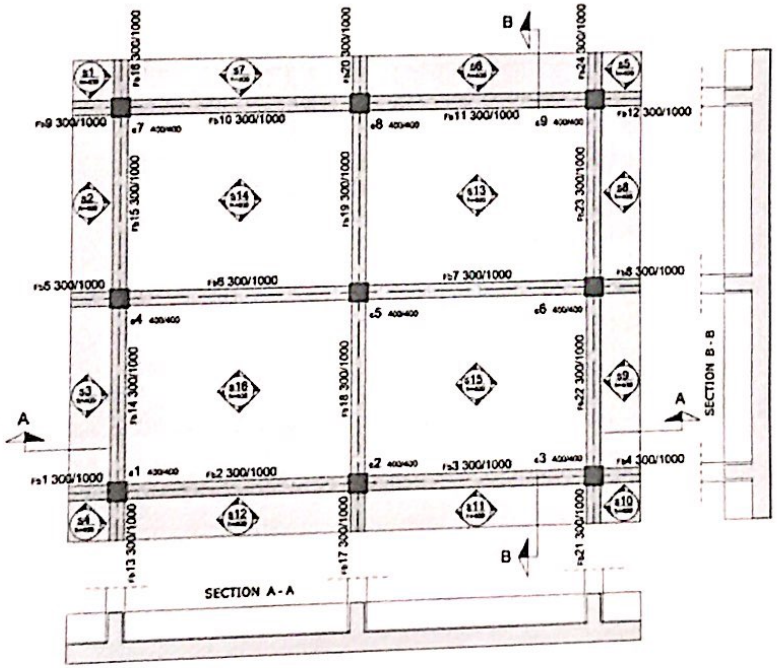


(1) Ribbed raft foundation



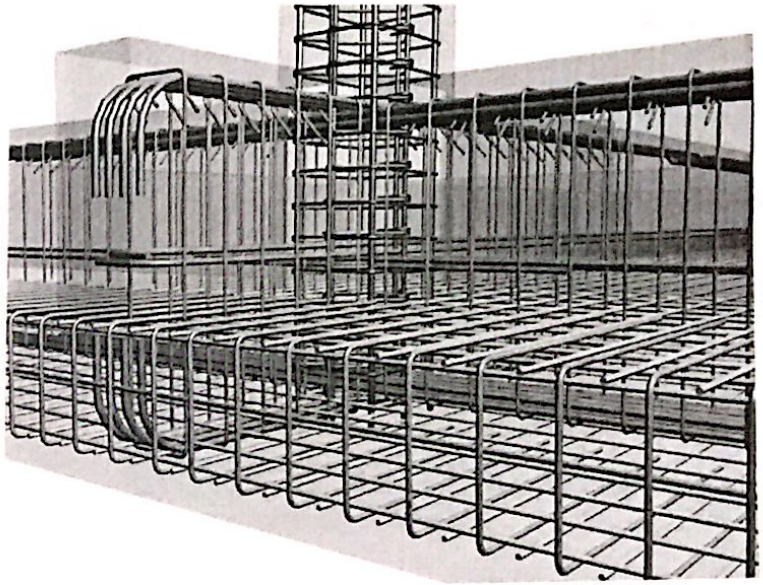
In a ribbed raft foundation apart from the unified foundation slab there are also beams which behave as stiffeners. The beams add stiffness to the foundation and they also level the soil stresses.

Unified foundation slab (raft foundation) with stiffeners (beams)



The formwork's assembling and the reinforcement implementation of a raft foundation stiffened by beams are two relatively strenuous procedures. A ribbed foundation can be stiffened either by beams or by walls. In the latter case, the reinforcement of the foundation slab does is independent of the wall's reinforcement.

Reinforcement of ribbed raft foundation



As shown at the figure, the ribbed raft foundation reinforcement can be separated into three categories:

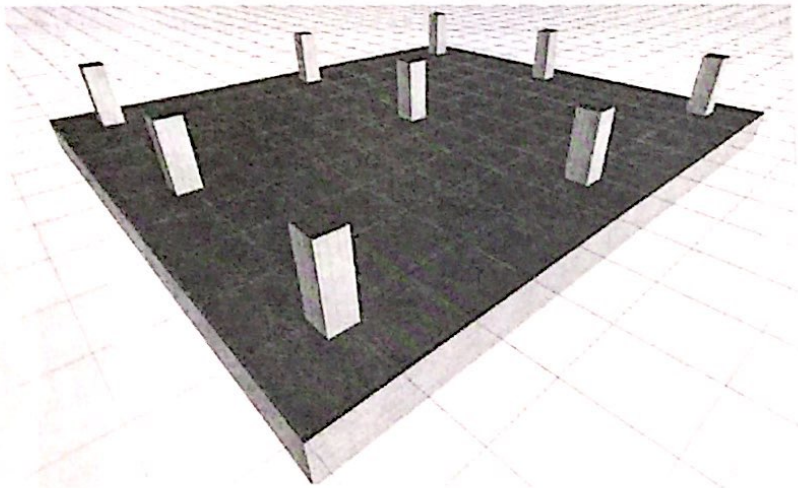
(a) slabs' reinforcement (in yellow color)

(b) slabs' free edges reinforcement (in blue color)

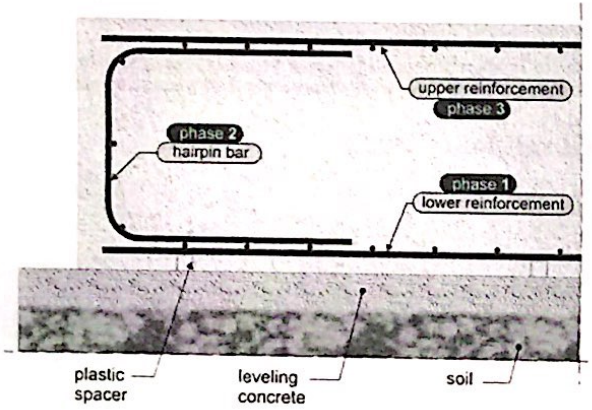
(c) beams' reinforcement (in green color)

The column rebars are in grey color.

(2) Solid raft foundation

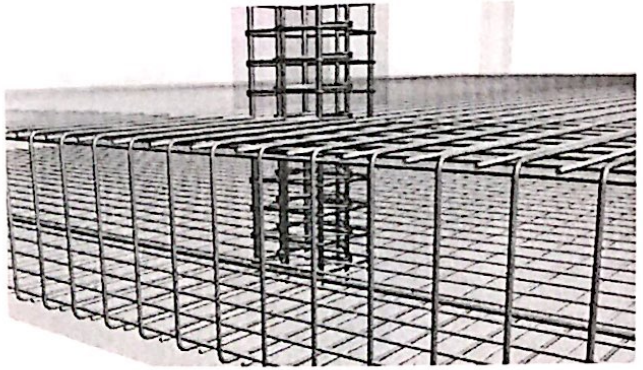


Detail of raft foundation reinforcement



The foundation slabs are reinforced with two wire meshes, one placed at the lower fibers and one at the upper fibers. Since the most intense stresses appear along the columns' axis, their surrounding areas are usually reinforced with stronger or double grates. The slabs' free edges are reinforced with common hairpin bars or with a wire mesh shaped like a hairpin.

Reinforcement of solid raft foundation



The reinforcement of a solid raft foundation can be separated into three categories, as shown at the following figure:

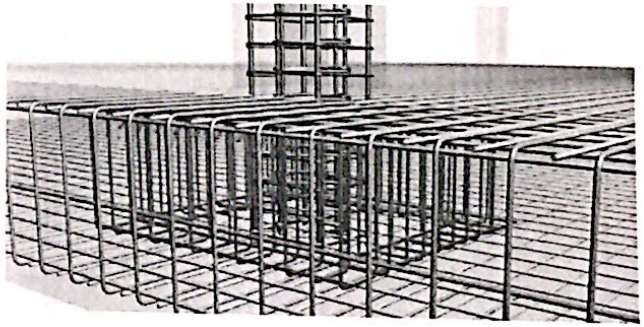
(a) slabs' reinforcement

(b) slabs' free edges reinforcement

(c) punching shear reinforcement (when necessary) in the area surrounding certain columns (in red color)

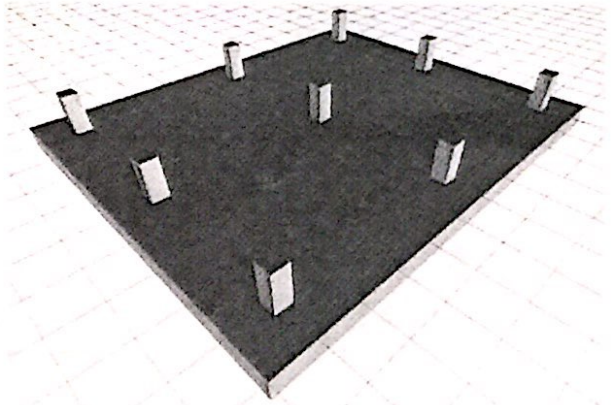
The column rebars are in grey color.

Raft foundation with punching shear reinforcement



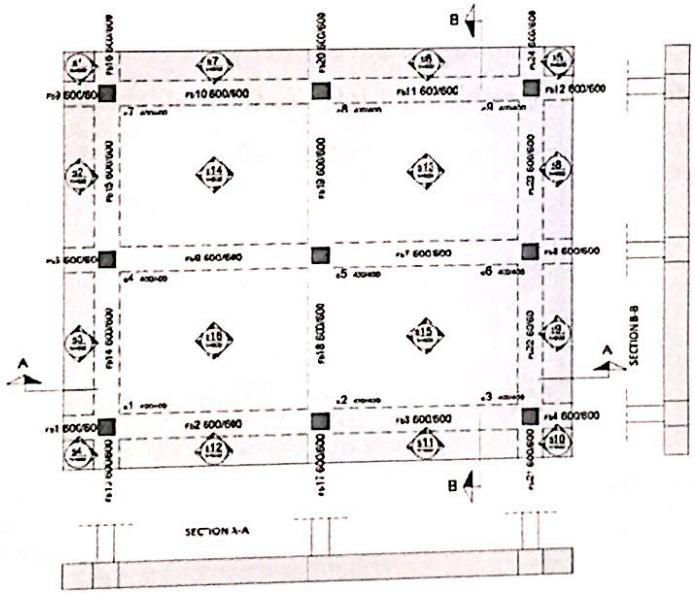
When the columns are subjected to large loads and the foundation slab's thickness is analogically small, it is obligatory to use punching shear reinforcement. That reinforcement can be provided by stirrup cages, as it is in this example, by bundles of properly bent rebars or by special industrial elements.

(3) Raft foundation with hidden beams



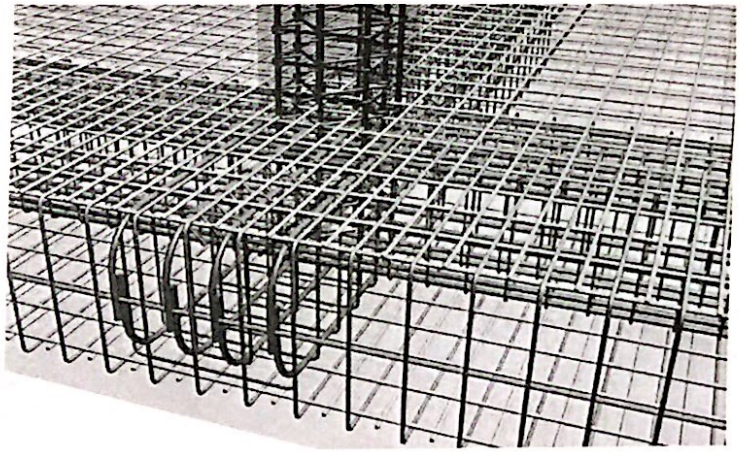
In a raft foundation with hidden beams, the foundation slab is unified and has no additional stiffeners. This means that geometrically, it is as simple as the previous case. Its formwork assembling does not require a lot of effort as opposed to its reinforcement implementation.

Raft foundation with hidden beams



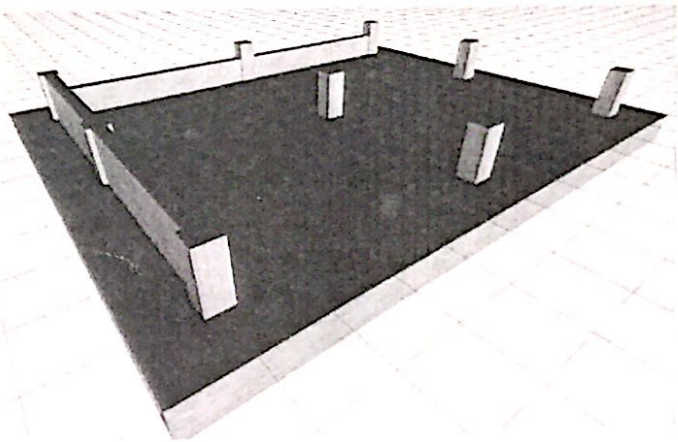
In a raft foundation with hidden beams, the foundation slab is unified and has no additional stiffeners. This means that geometrically, it is as simple as the previous case. Its formwork assembling does not require a lot of effort as opposed to its reinforcement implementation.

Reinforcement of raft foundation with hidden beam



The stirrups placed inside the hidden beams may be two-legged or four-legged (as they are in this example). On other occasions, stirrups with more than four legs can be used.

(4) Mixed raft foundation



BEAM To BEAM BOLT CONNECTION

Draw to a suitable scale elevation(front view) End view (Side view), elevation (rear view) and connectional plan cutting at Web showing maximum details of a R.S.J beam beam connection steel framed structure.

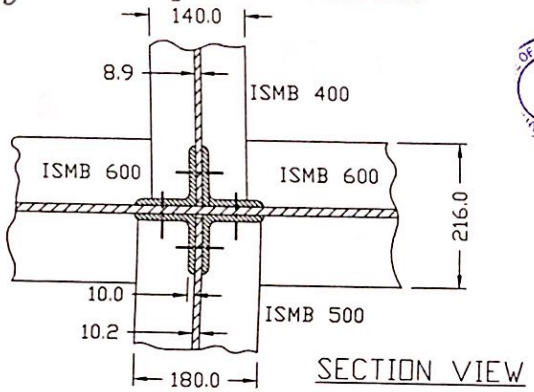
Main beam size 1 No ISMB 600, @ 102.6 kg/m b=210 tw=12.6, Ft_f = 20.8

Secondary ~~Main~~ beam size 1 No ISMB 500 @ b=180 tw=10.2, Ft_f = 17.2

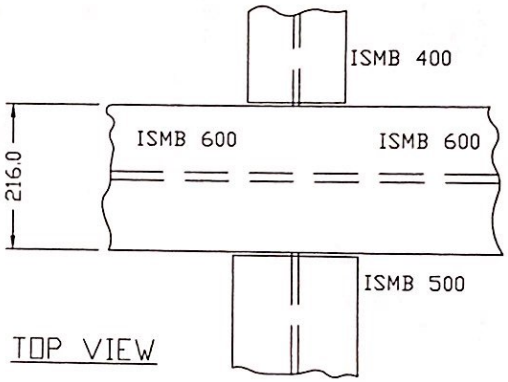
Secondary ~~Main~~ beam size 1 No ISMB 400, @ b=140 tw=8.9, Ft_f = 16.0

Cleat Angle size 90x90x10 @

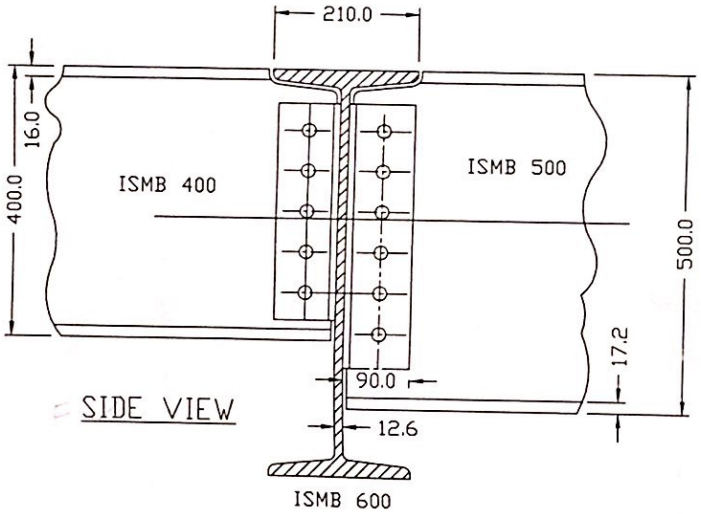
Use M20 Bolts of 4.6 Grade



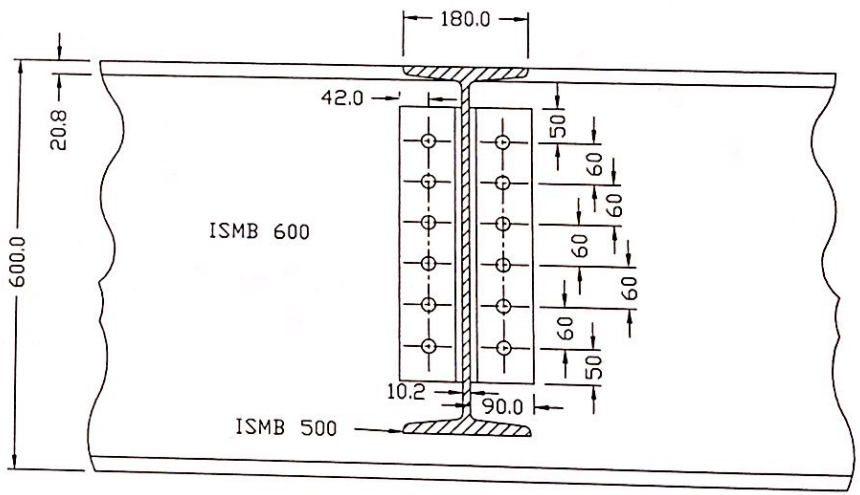
SECTION VIEW



TOP VIEW



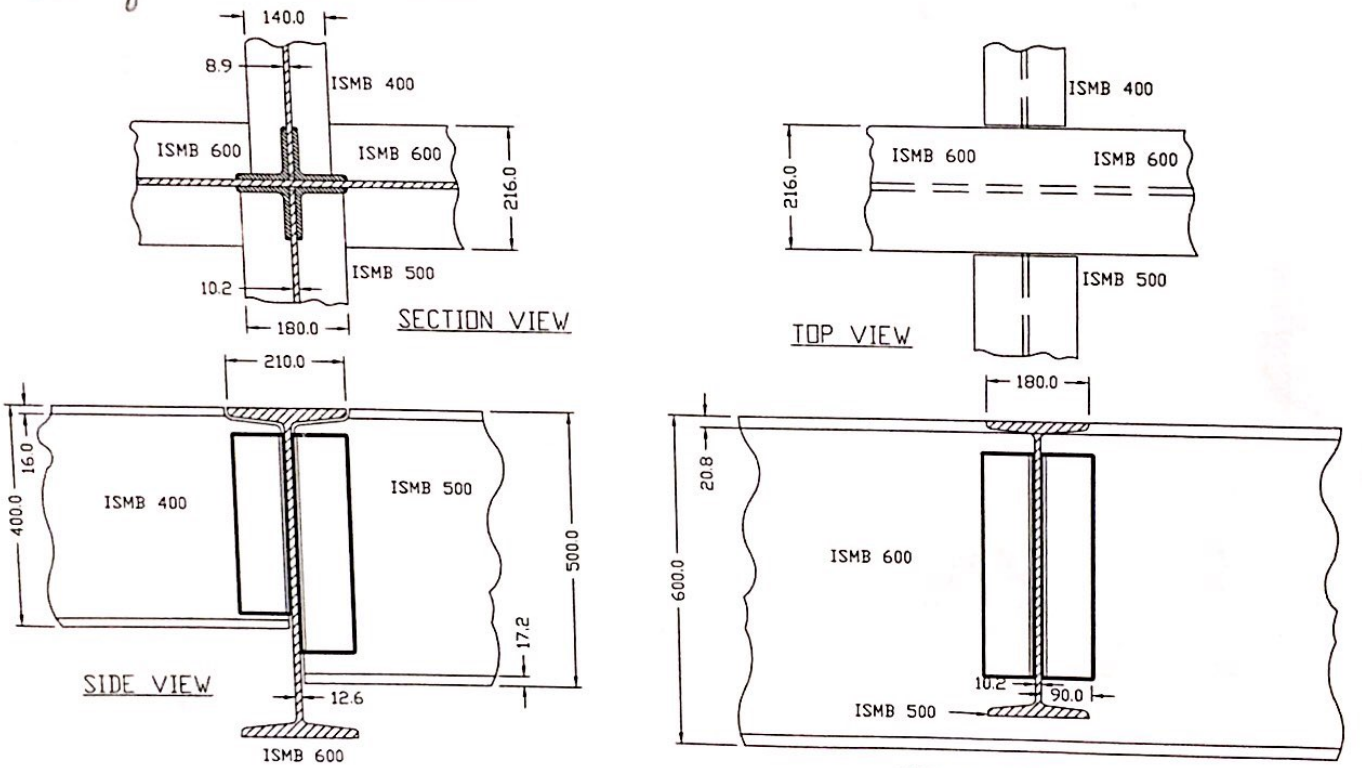
SIDE VIEW



FRONT VIEW

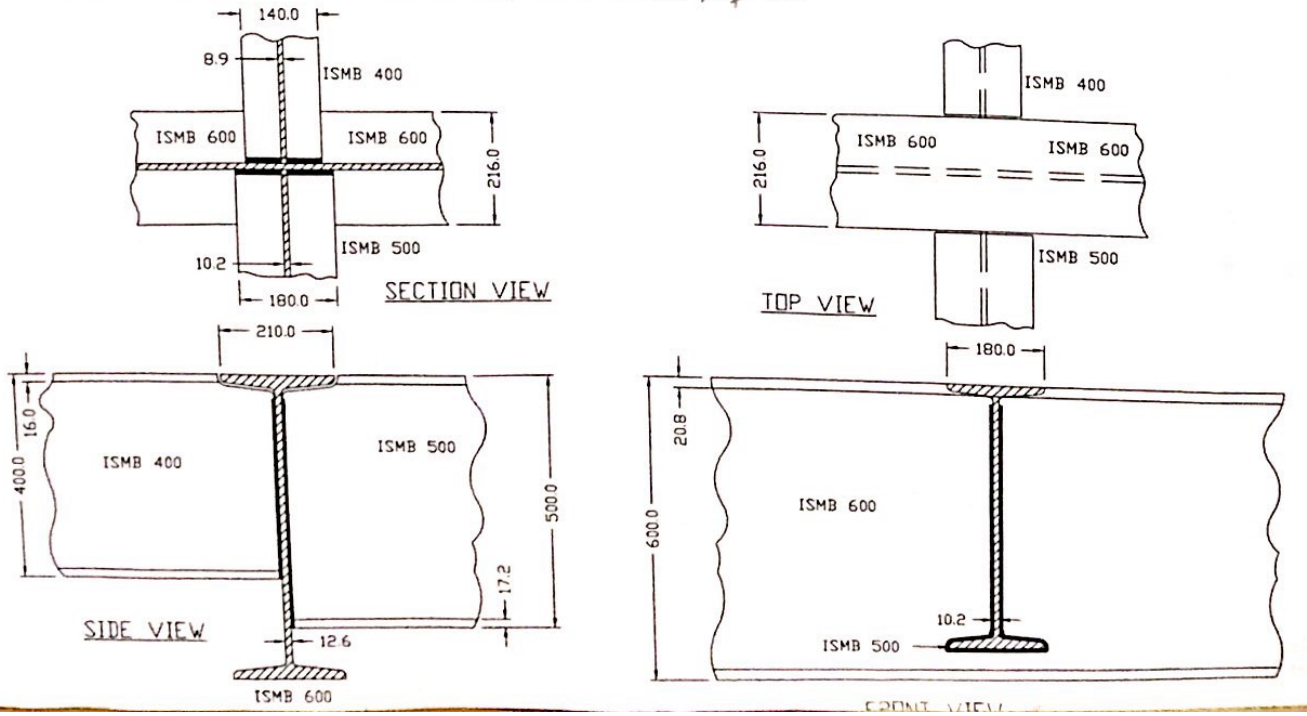
BEAM To BEAM WELDED CONNECTION

Draw to a suitable scale elevation(front view) End view (Side view), elevation (rear view) and connectional plan cutting at Web showing maximum details of a R.S.J beam beam connection steel framed structure.
Main beam size 1 No ISMB 600, b=210 tw=12.6, Ft_f = 20.8
Secondary Main beam size 1 No ISMB 500, b=180 tw=10.2, Ft_f = 17.2
Secondary Main beam size 1 No ISMB 400, b=140 tw=8.9, Ft_f = 16.0
Cleat Angle size 90x90x10



BEAM To BEAM WELDED CONNECTION

Draw to a suitable scale elevation(front view) End view (Side view), elevation (rear view) and connectional plan cutting at Web showing maximum details of a R.S.J beam beam connection steel framed structure.
Main beam size 1 No ISMB 600, b=210 tw=12.6, Ft_f = 20.8
Secondary Main beam size 1 No ISMB 500, b=180 tw=10.2, Ft_f = 17.2
Sec. Main beam size 1 No ISMB 400, b=140 tw=8.9, Ft_f = 16.0

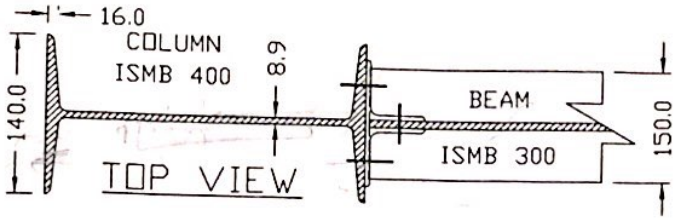


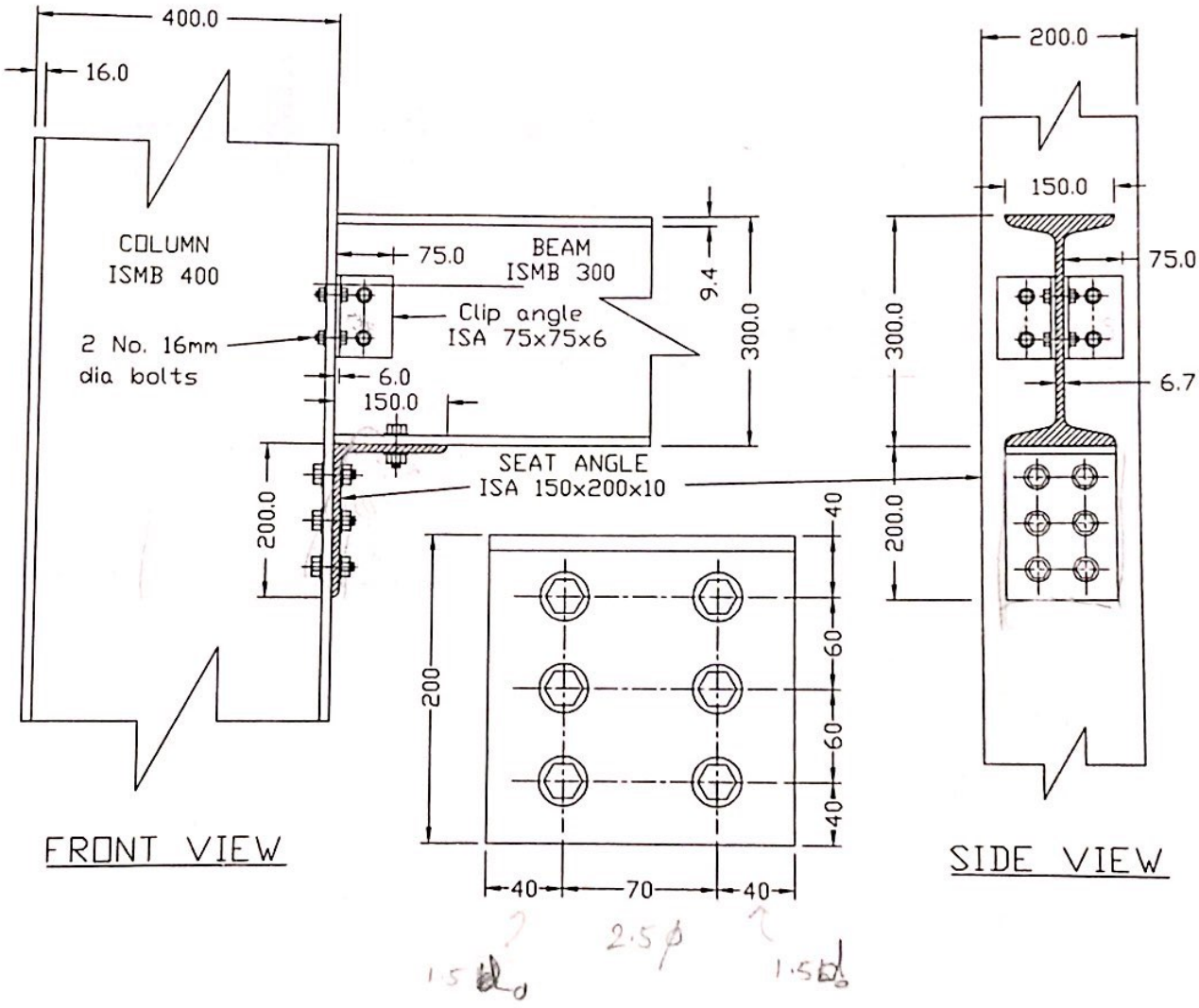
COLUMN to BEAM BOLT CONNECTION USING SEAT ANGLE

Draw to a suitable scale elevation(front view) End view (Side view), elevation (rear view) and connectional plan cutting at Web showing a column beam connection.

Column size 1 No ISHB 400, b=140, t_f =16.0, t_w =8.9, Seat angle-ISA 150x200x10, Beam -1Nos. ISLB 300, b=170, t_w =9.4, t_f =6.7 web cleat-ISA 75x75x6,

All Dimension are in mm





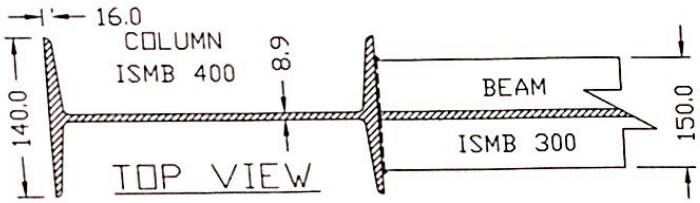
1.5 ϕ_0 2.5 ϕ 1.5 ϕ_0

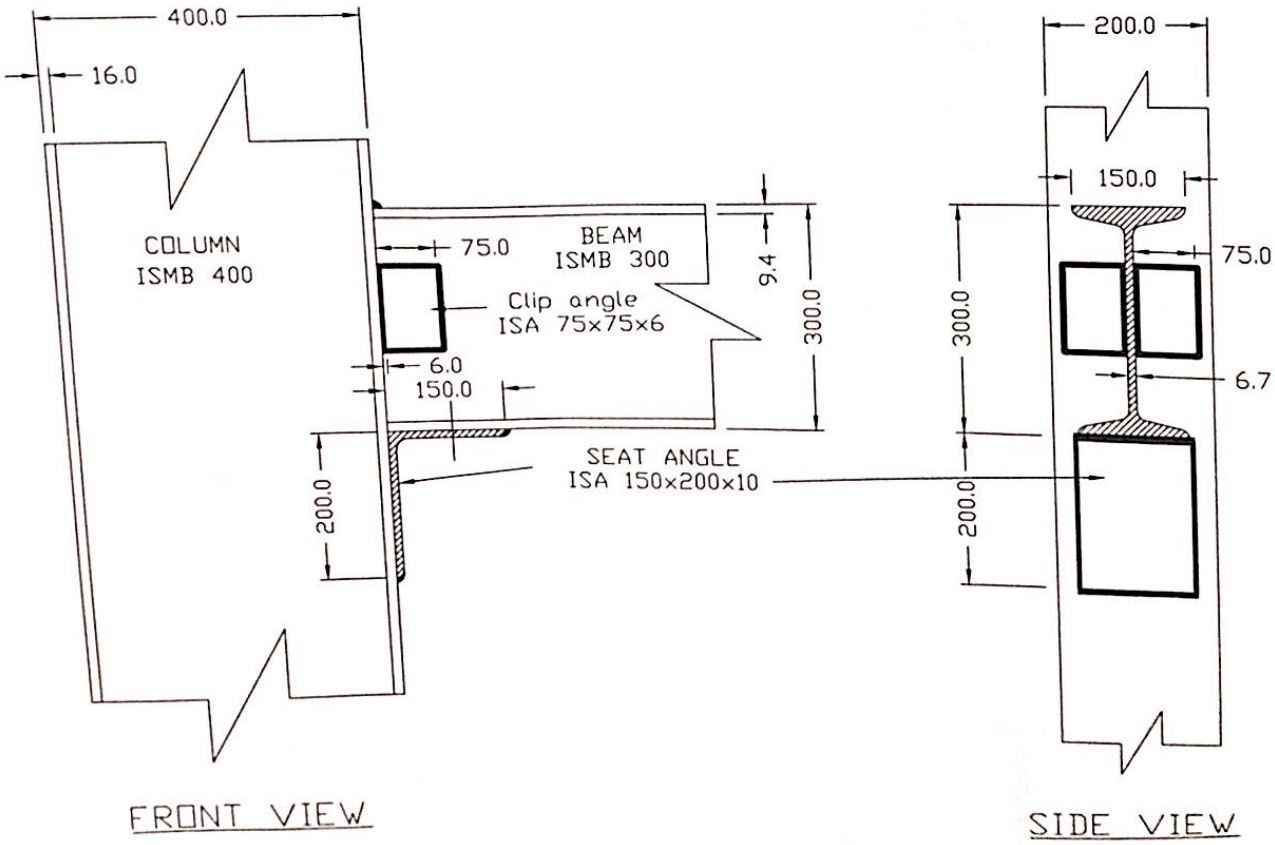
COLUMN BEAM WELD CONNECTION USING SEAT ANGLE

Draw to a suitable scale elevation(front view) End view (Side view), elevation (rear view) and connectional plan cutting at Web showing a column beam connection using seat angle.

Column size 1 No ISHB 400, b=140, t_f =16.0, t_w =8.9, Seat angle-ISA 150x200x10, Beam -1Nos. ISLB 300, b=170, t_w =9.4, t_f =6.7 web cleat-ISA 75x75x6,

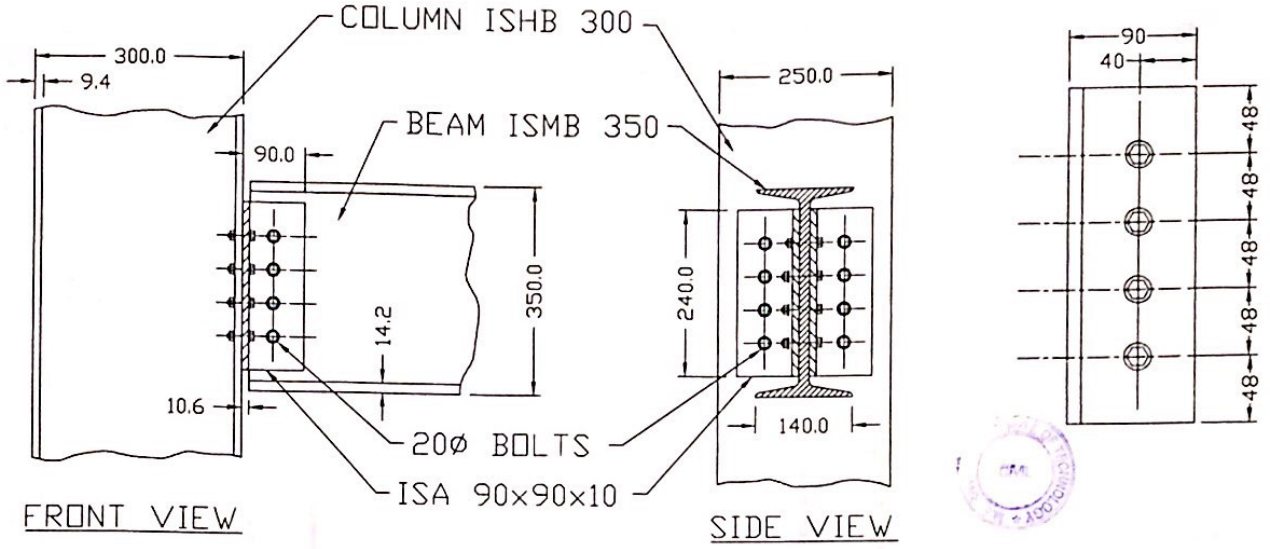
All Dimension are in mm





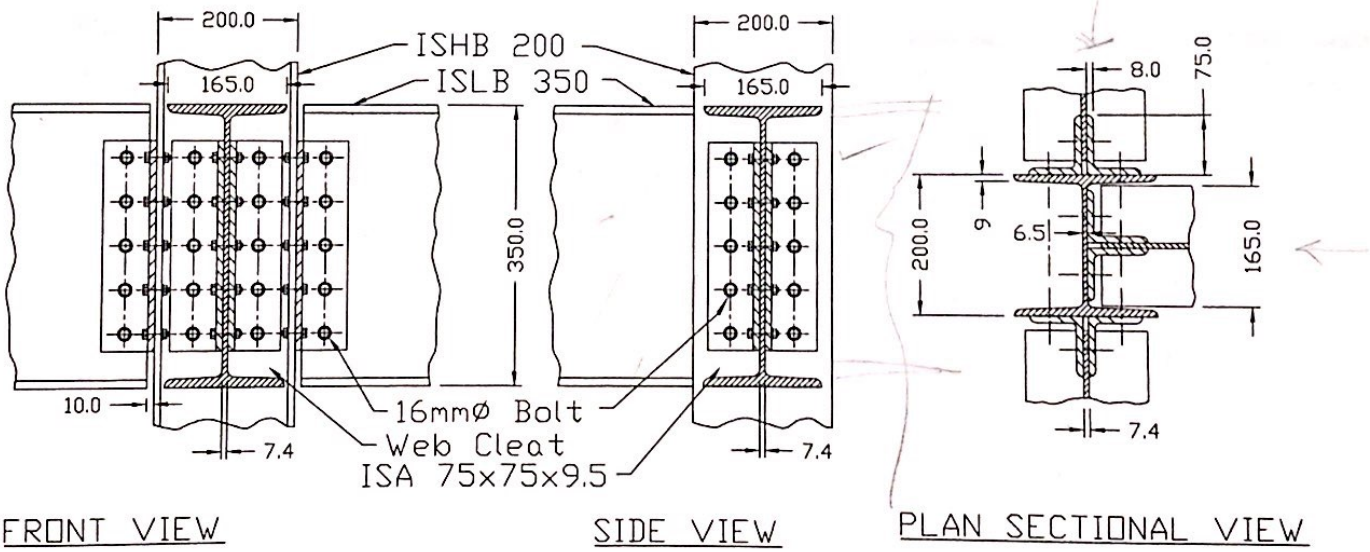
COLUMN BEAM BOLT CONNECTION

Draw the front and side elevation of a framed connection of a beam ISMB 350, b=140, t_f = 14.2, t_w =8.1 to the flange of a column ISHB 300, b=250, t_f =10.6, t_w =9.4 with a pair of cleat angle ISA 90x90x10 of suitable length to provide 20mm ø bolts 12Nos.



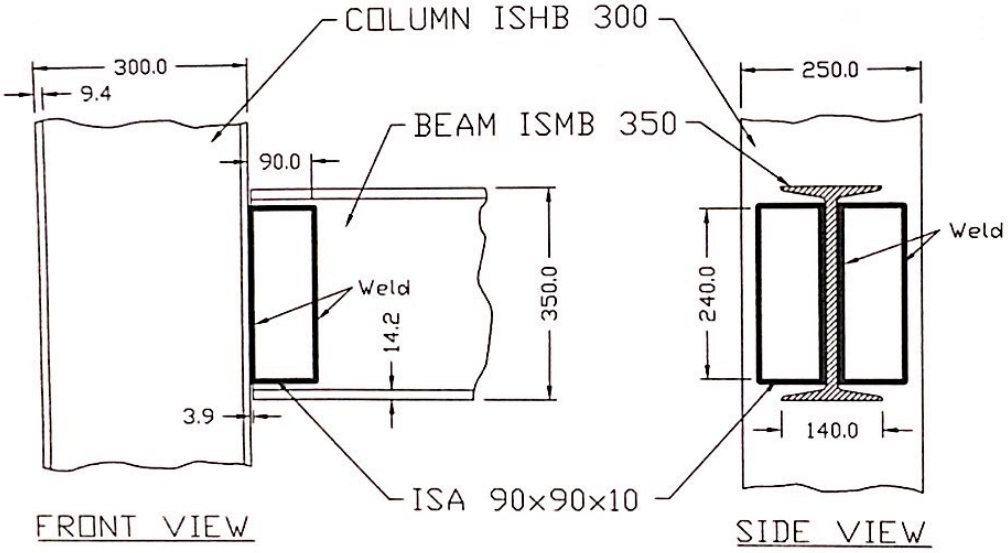
COLUMN BEAM BOLT CONNECTION (Intermediate)

Draw to a suitable scale elevation(front view) and End view (Side view) of a R.S.J beam column connection for an intermediate column at the first floor level in a steel framed structure. Column size 1 No ISHB 200, b=200, t_f =9.0, t_w =7.8. Beam -4Nos. ISLB 350, b=165, t_f =11.4, t_w =7.4 web cleat-ISA 75x75x10,



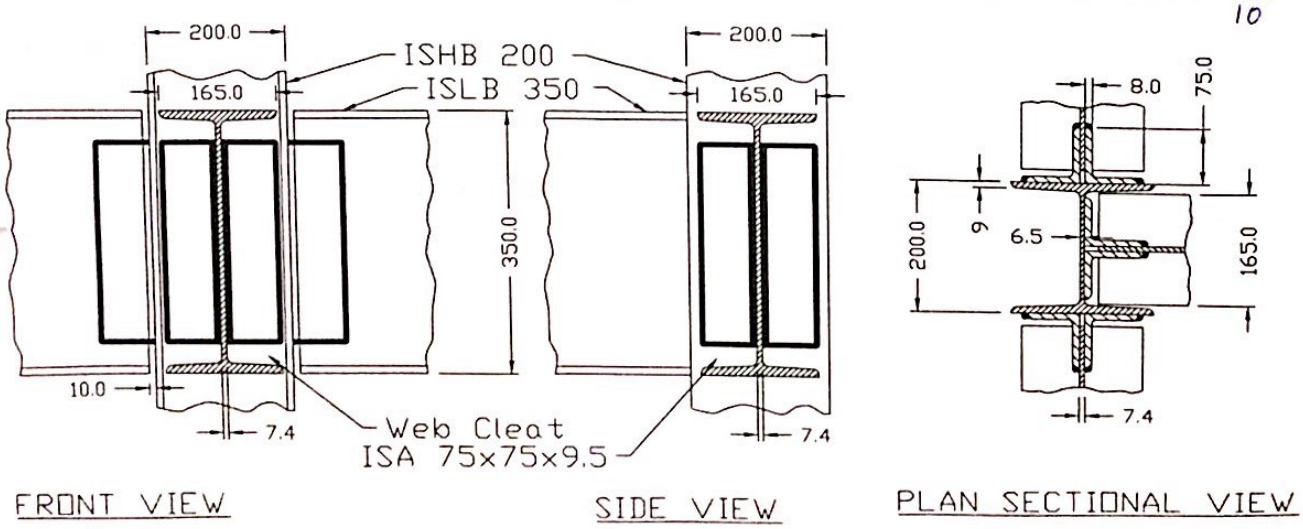
COLUMN BEAM WELD CONNECTION

Draw the front and side elevation of a framed connection of a beam ISMB 350, b=140, t_f = 14.2, t_w =8.1 to the flange of a column ISHB 300, b=250, t_f =10.6, t_w =9.4 with a pair of cleat angle ISA 90x90x10 of suitable length, ~~to provide 20mm Ø bolts 12Nos.~~



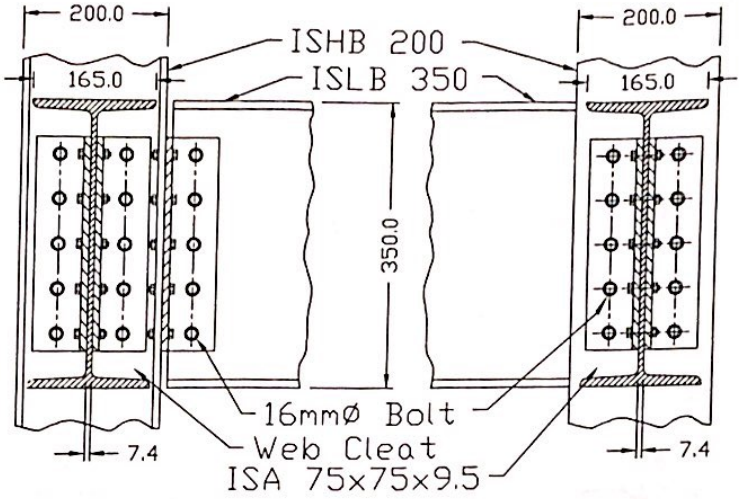
COLUMN BEAM WELD CONNECTION (Intermediate)

Draw to a suitable scale elevation(front iew) and End view (Side view) of a R.S.J beam-column connection for an intermediate column at the first floor level in a steel framed structure. Column size 1 No ISHB 200, b=200, t_f =9.0, t_w =7.8. Beam -4Nos. ISLB 350, b=165, t_f =11.4, t_w =7.4 web cleat-ISA 75x75x~~8~~10

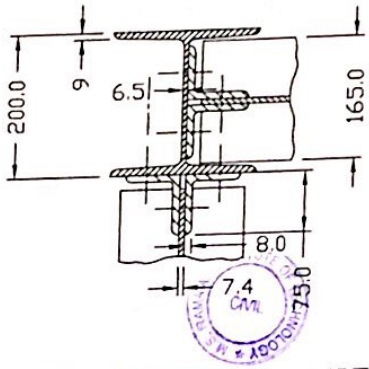


COLUMN BEAM BOLT CONNECTION (Corner)

Draw to a suitable scale elevation(front iew) and End view (Side view) of a R.S.J beam column connection for an corner column at the first floor level in a steel framed structure. Column size 1 No ISHB 200, b=200, t_f =9.0, t_w =7.8. Beam -2 Nos. ISLB 350, b=165, t_f =11.4, t_w =7.4 web cleat-ISA 75x75x9.5,



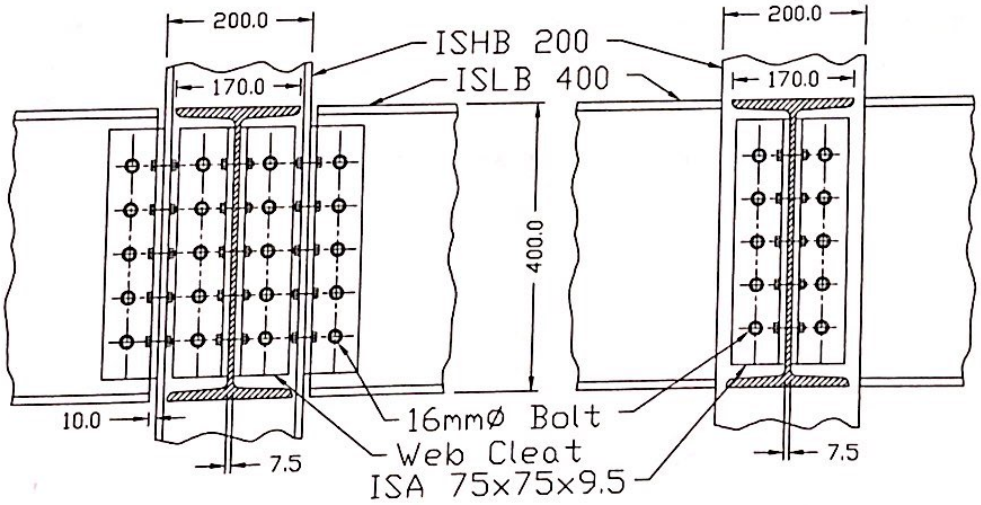
FRONT VIEW SIDE VIEW



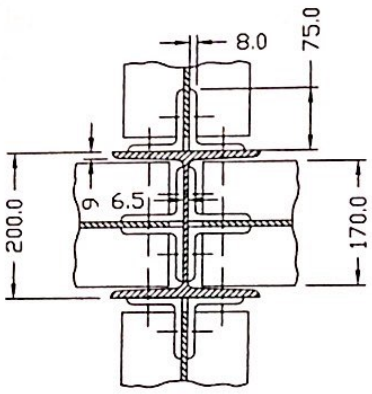
PLAN SECTIONAL VIEW

COLUMN BEAM WELD CONNECTION (Interior)

Draw to a suitable scale elevation(front iew) and End view (Side view) of a R.S.J beam column connection for an interior column at the first floor level in a steel framed structure. Column size 1 No ISHB 200, b=200, t_f =9.5, t_w =7.8. Beam -4Nos. ISLB 400, b=165, t_f =12.5, t_w =8.0 web cleat-ISA 75x75x9.5, of suitable length, Bolts - 16mmØ total 50Nos. All Dimension are in mm



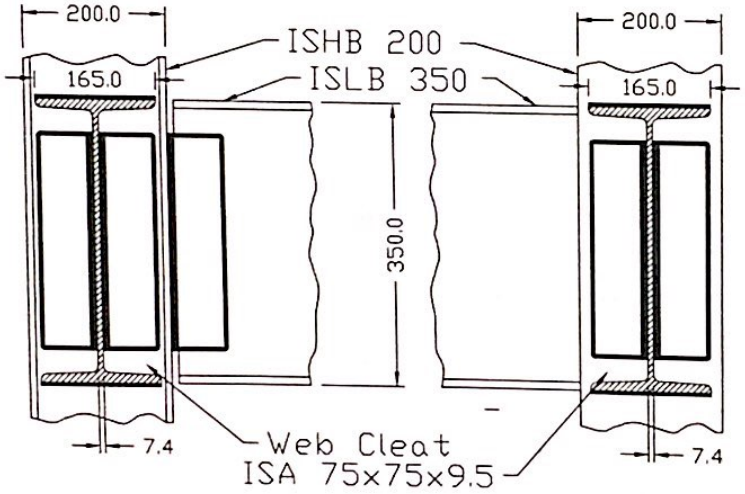
FRONT VIEW SIDE VIEW



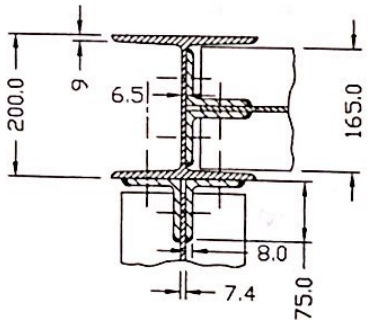
PLAN SECTIONAL VIEW

COLUMN BEAM BOLT CONNECTION (Corner)

Draw to a suitable scale elevation(front iew) and End view (Side view) of a R.S.J beam column connection for an corner column at the first floor level in a steel framed structure. Column size 1 No ISHB 200, b=200, t_f =9.0, t_w =7.8. Beam -2Nos. ISLB 350, b=165, t_f =11.4, t_w =7.4 web cleat-ISA 75x75x9.5,



FRONT VIEW

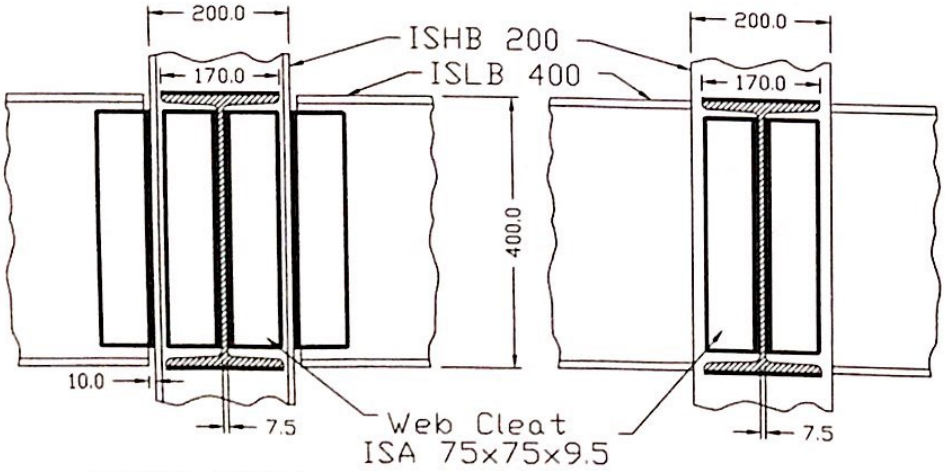


SIDE VIEW

PLAN SECTIONAL VIEW

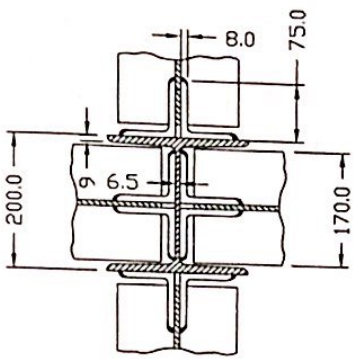
COLUMN BEAM WELD CONNECTION (Interior)

Draw to a suitable scale elevation(front iew) and End view (Side view) of a R.S.J beam column connection for an interior column at the first floor level in a steel framed structure. Column size 1 No ISHB 200, b=200, t_f =9.5, t_w =7.8. Beam -4Nos. ISLB 400, b=165, t_f =12.5, t_w =8.0 web cleat-ISA 75x75x9.5, of suitable length, Bolts - 16mmØ total 50Nos. All Dimension are in mm



FRONT VIEW

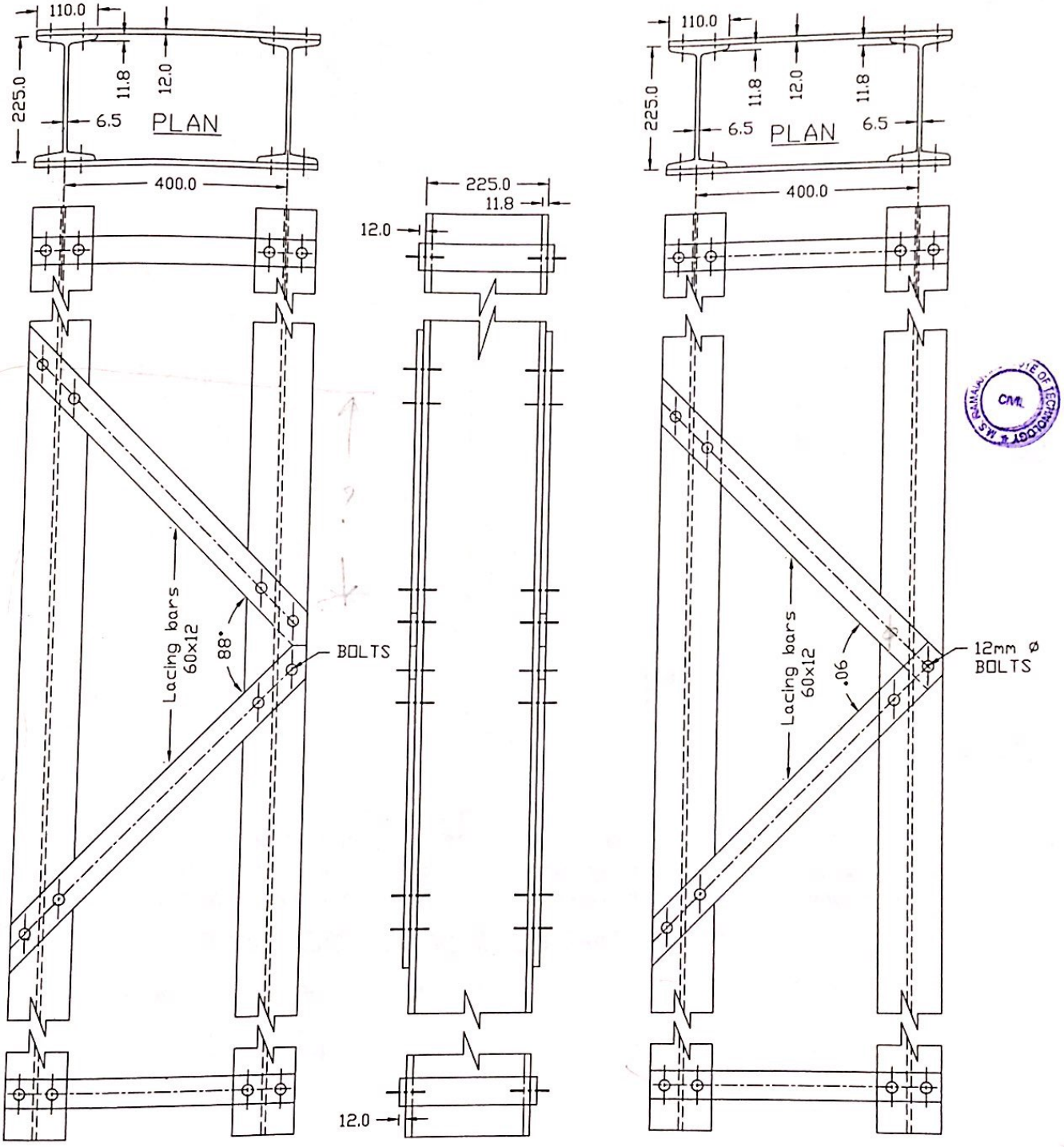
SIDE VIEW



PLAN SECTIONAL VIEW

COLUMN SINGLE LACING SYSTEM

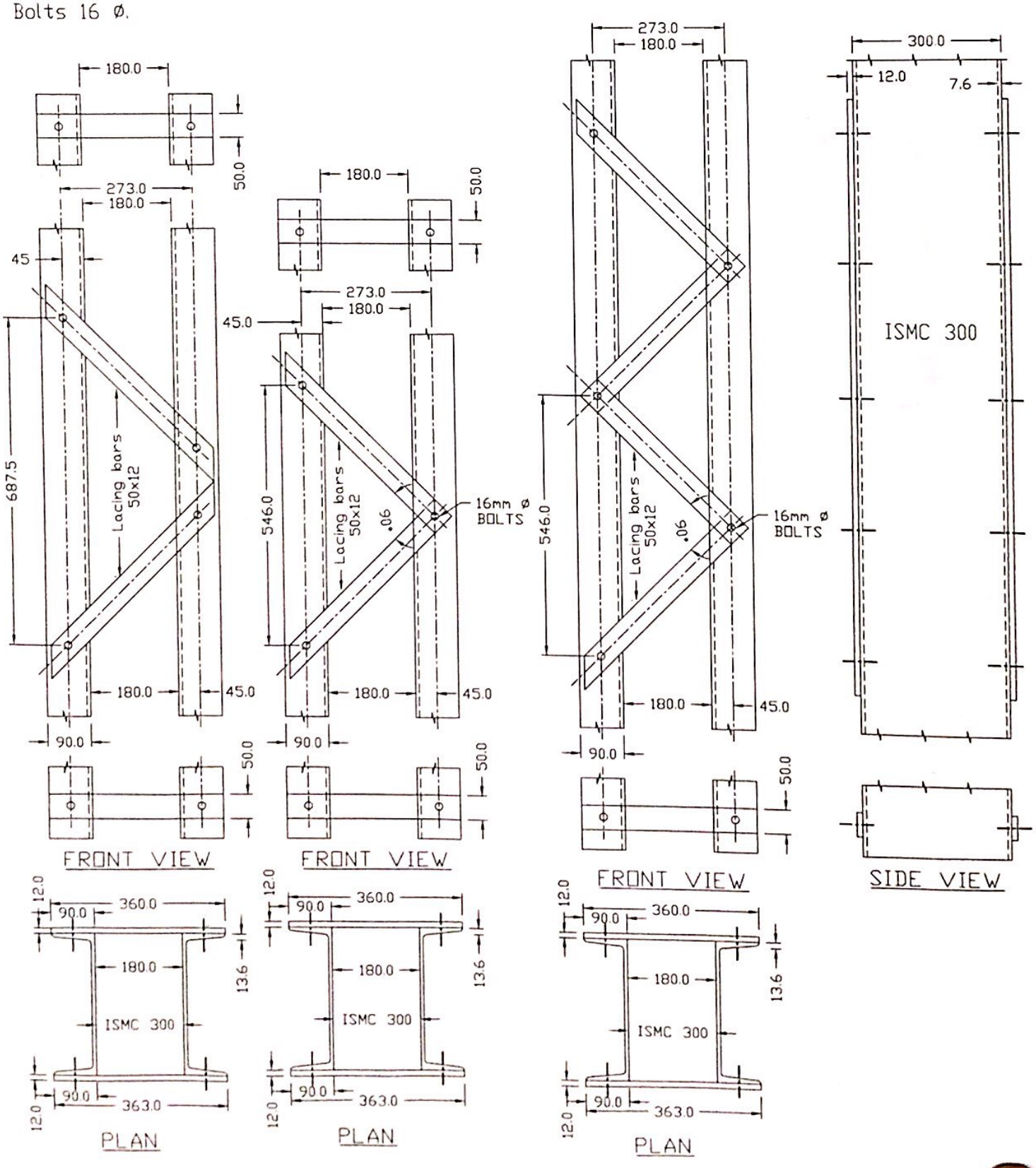
Draw to a suitable scale elevation(front view) and End view (Side view) of a Single lacing system with a center to center distance of 400.0 from the following data: Column ISMB = 225 @ 31.2 kg/m , Lacing bar = 60 x 12mm, Bolts 12 ø.



FRONT VIEW SIDE VIEW FRONT VIEW

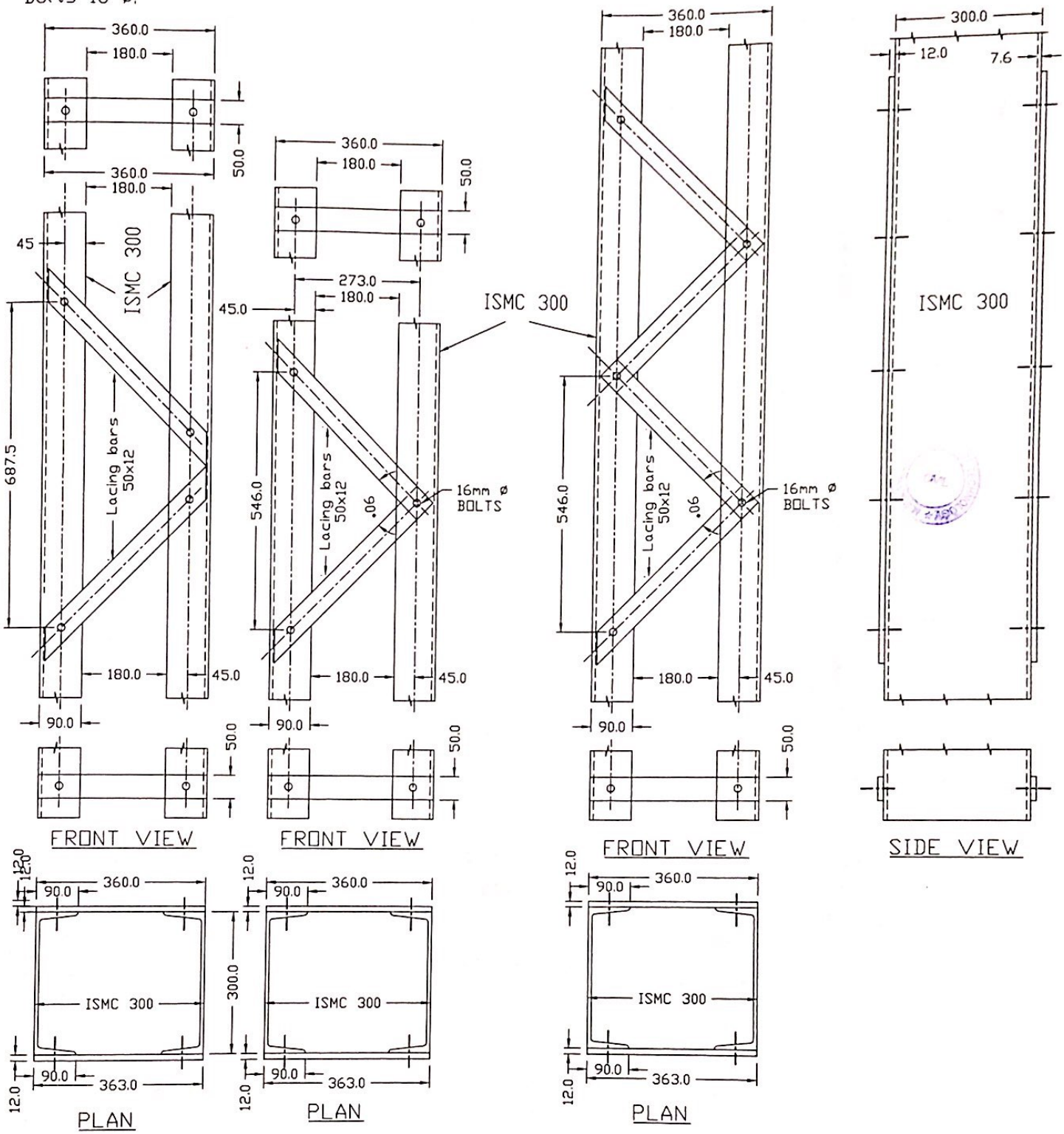
COLUMN SINGLE LACING SYSTEM (Back to Back)

Draw to a suitable scale elevation (front view) and End view (Side view) of a Single lacing system with a back to back distance of 180.0 from the following data: Column ISMC = 300 @ 58.8 kg/m , Lacing bar = 50 x 12mm, Batten plate of 50 x 12mm Bolts 16 ø.



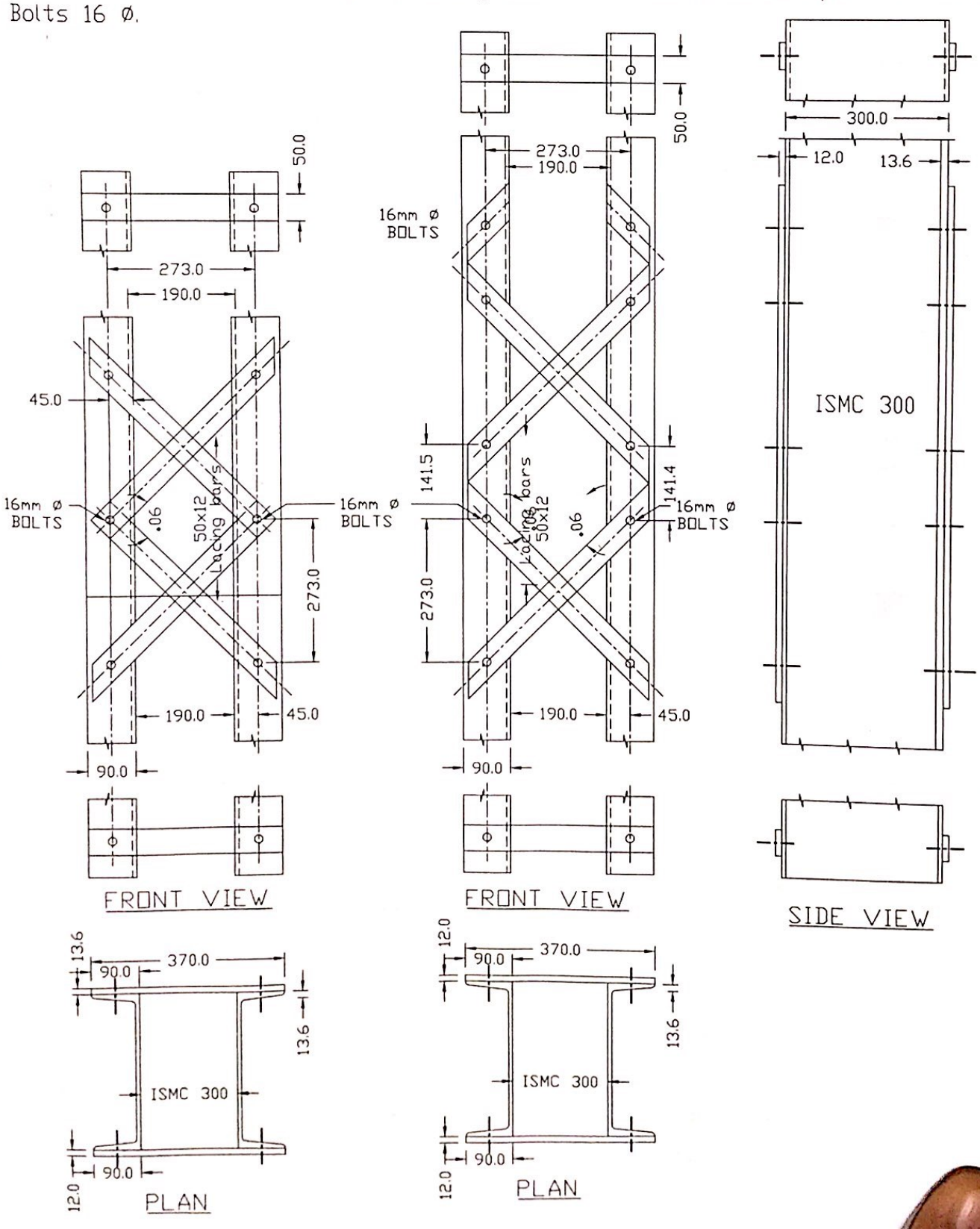
COLUMN SINGLE LACING SYSTEM (Face to Face)

Draw to a suitable scale elevation (front view) and End view (Side view) of a Single lacing system with a face to face distance of 360.0 from the following data: Column ISMC = 300 @ 58.8 kg/m , Lacing bar = 50 x 12mm, Batten plate of 50 x 12mm Bolts 16 ø.



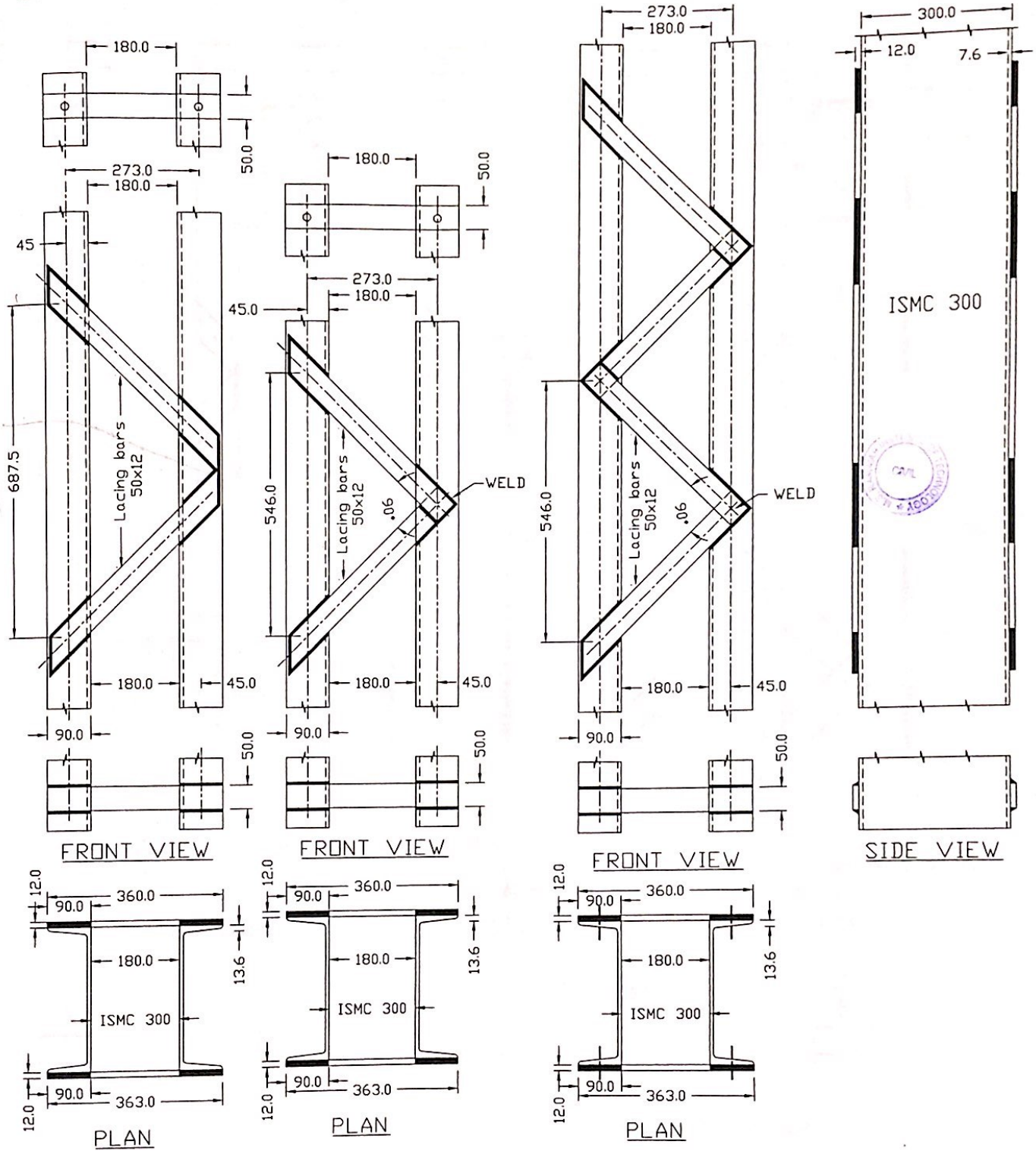
COLUMN DOUBLE LACING SYSTEM

Draw to a suitable scale elevation(front iew) and End view (Side view) of a double lacing system with a back to back distance of 190.0 from the following data: Column ISMC = 300 @ 35.8 kg/m , Lacing bar = 50 x 12mm, Batten plate of 50 x 12mm Bolts 16 ø.



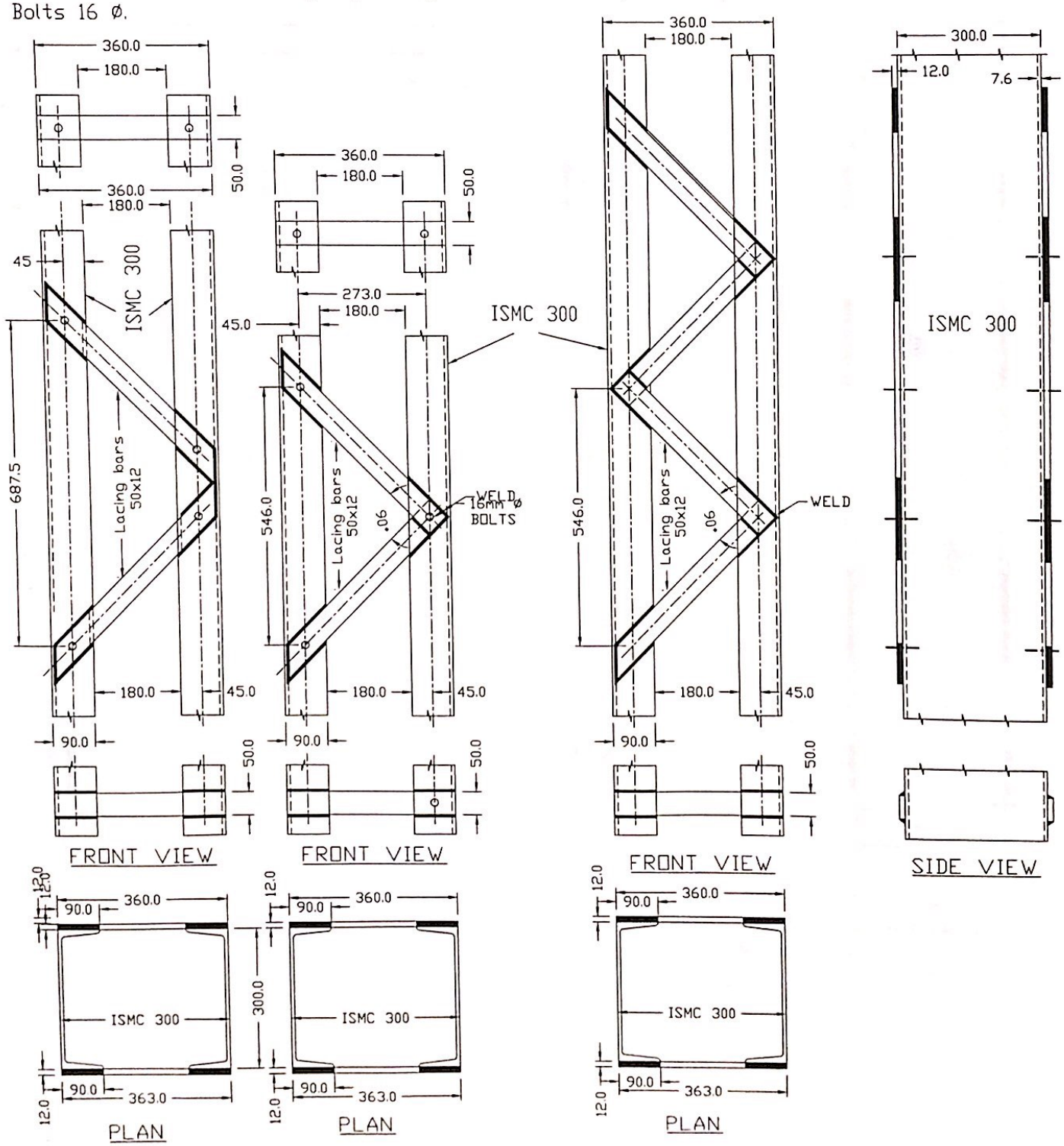
COLUMN SINGLE LACING SYSTEM WELD (Back to Back)

Draw to a suitable scale elevation (front view) and End view (Side view) of a Single lacing system with a back to back distance of 180.0 from the following data: Column ISMC = 300 @ 58.8 kg/m , Lacing bar = 50 x 12mm, Batten plate of 50 x 12mm Bolts 16 Ø.



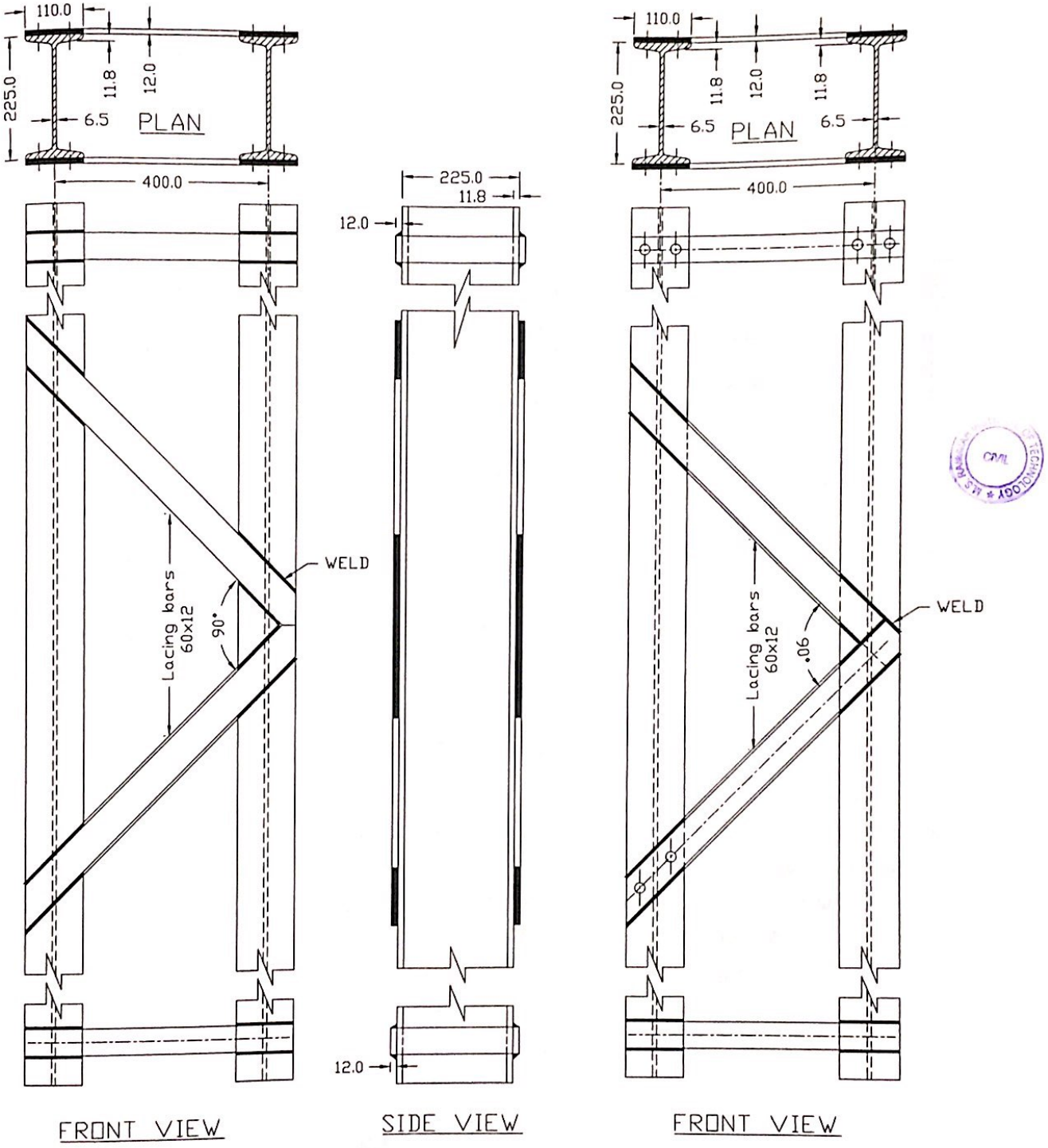
COLUMN SINGLE LACING SYSTEM WELD (Face to Face using c channels)

Draw to a suitable scale elevation (front view) and End view (Side view) of a Single lacing system with a face to face distance of 360.0 from the following data:
Column ISMC = 300 @ 58.8 kg/m , Lacing bar = 50 x 12mm, Batten plate of 50 x 12mm
Bolts 16 ø.



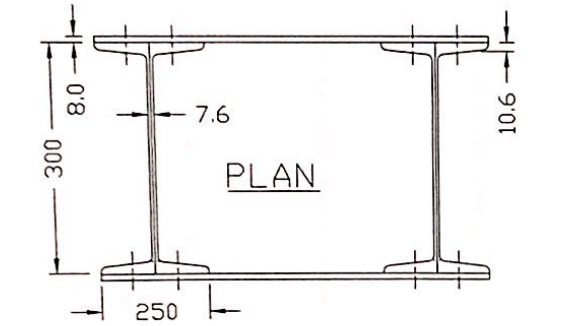
COLUMN SINGLE LACING SYSTEM

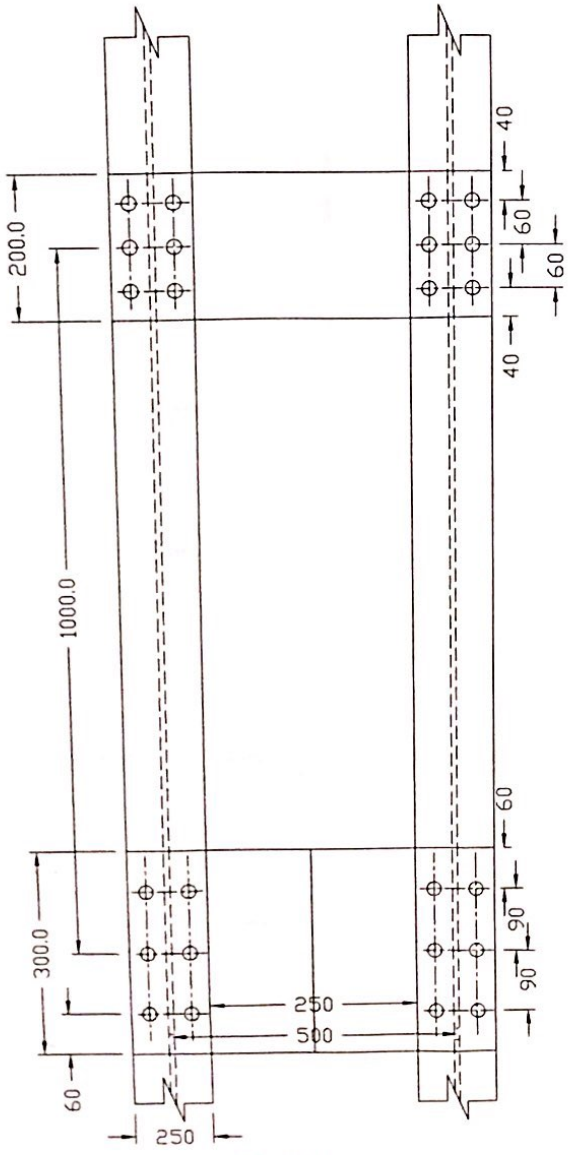
Draw to a suitable scale elevation(front iew) and End view (Side view) of a Single lacing system with a center to center distance of 400.0 from the following data: Column ISMB = 225 @ 31.2 kg/m , Lacing bar = 60 x 12mm, Bolts 12 Ø.



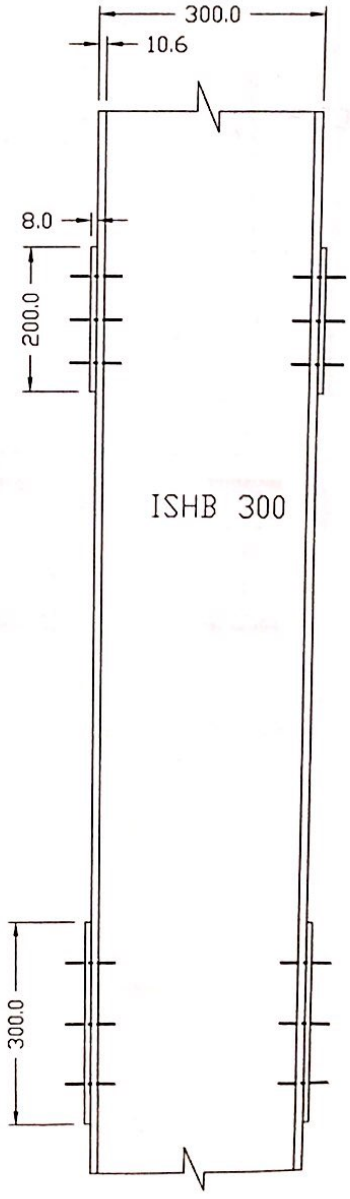
COLUMN BATTEN

Two ISHB 300 58.8 kg/m center to center distance of 300mm are connected together by batten plate 300mm x8 mm bottom and the reaming batten are 200mmx 8mm at a spacing of 1000 mm center to center. The batten are connected to the column using 6 bolts in two lines of 20mm dia.





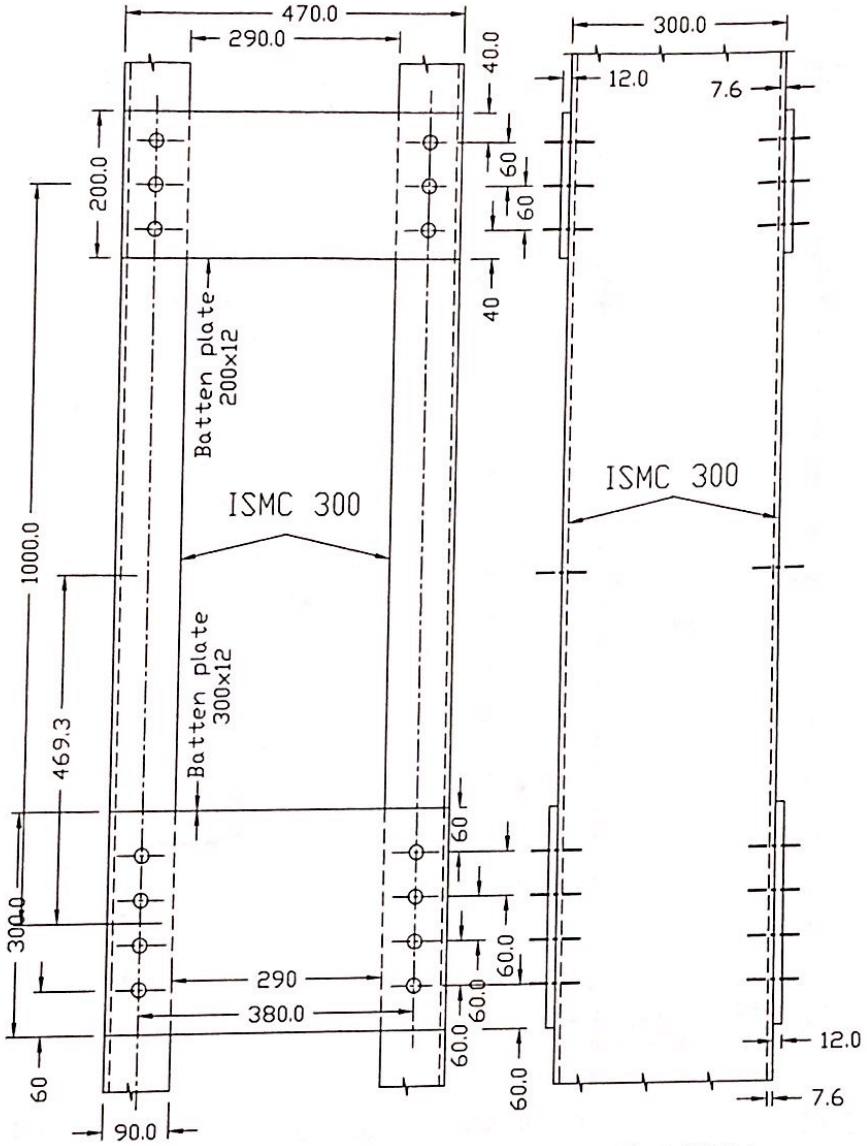
PLAN



SIDE VIEW

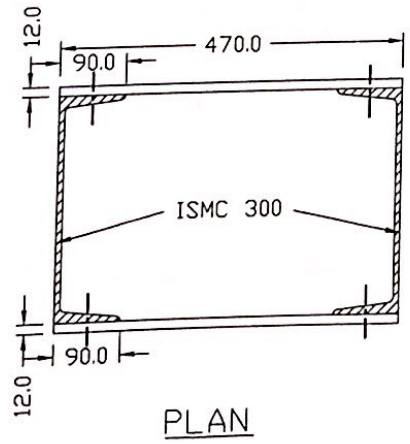
COLUMN BATTEN SYSTEM (Face to Face Using C channels)

Draw to a suitable scale elevation (front view) and End view (Side view) of a batten system with a face to face distance of 470.0 from the following data:
Column ISMC = 300 @ 58.8 kg/m , batten plate @ bottom = 300 x 12mm,
Batten plate remaining of 200 x 12mm at a spacing of 1000 mm c/c, Bolts 16 ø.

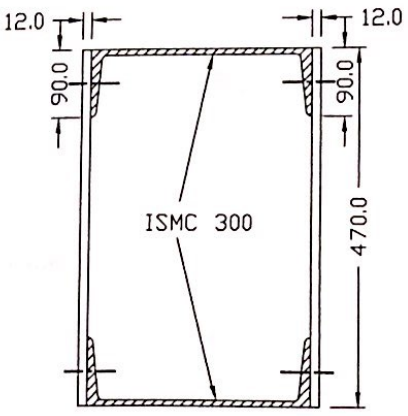


FRONT VIEW

SIDE VIEW



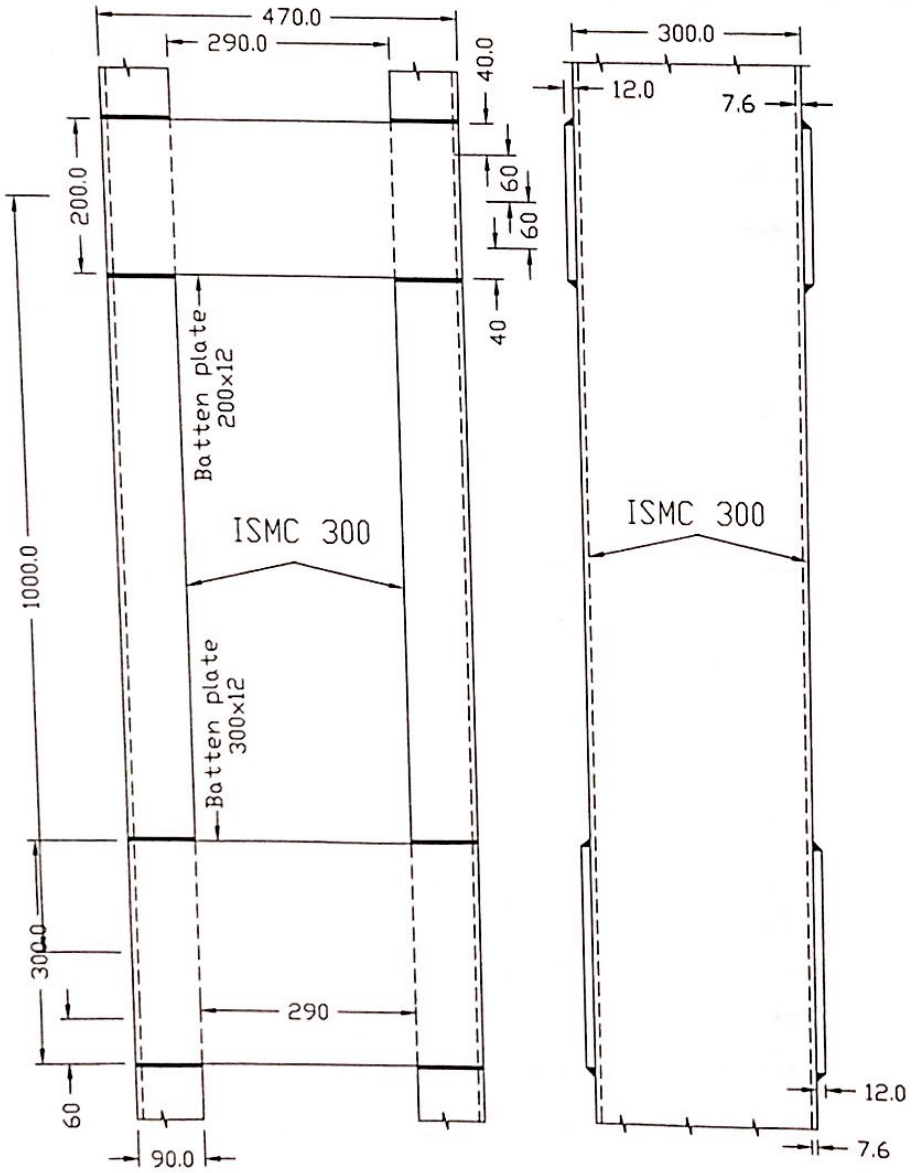
PLAN



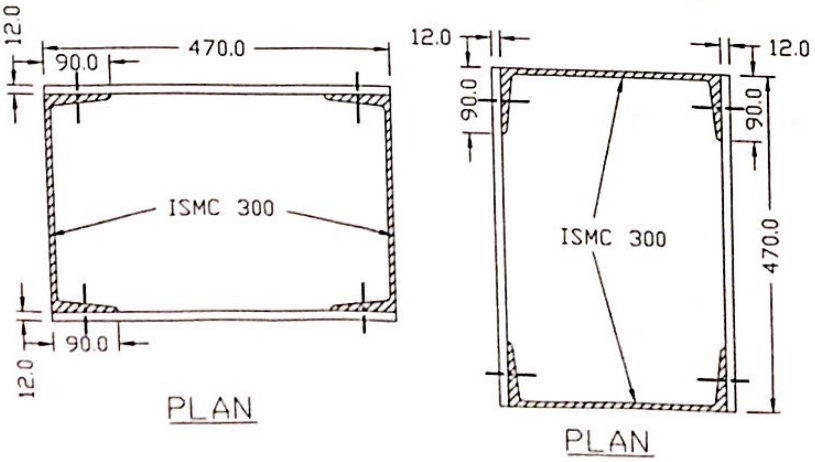
PLAN

COLUMN BATTEN SYSTEM (Face to Face Using C channels)

Draw to a suitable scale elevation (front view) and End view (Side view) of a batten system with a face to face distance of 470.0 from the following data:
Column ISMC = 300 @ 58.8 kg/m , batten plate @ bottom = 300 x 12mm,
Batten plate remaining of 200 x 12mm at a spacing of 1000 mm c/c, Bolts 16 Ø.



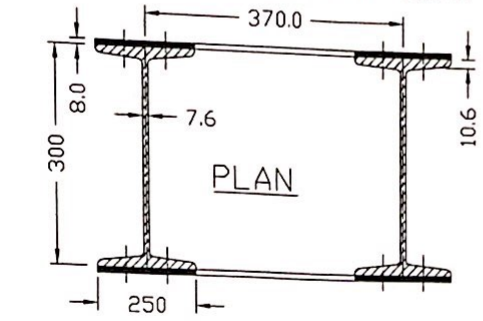
FRONT VIEW SIDE VIEW

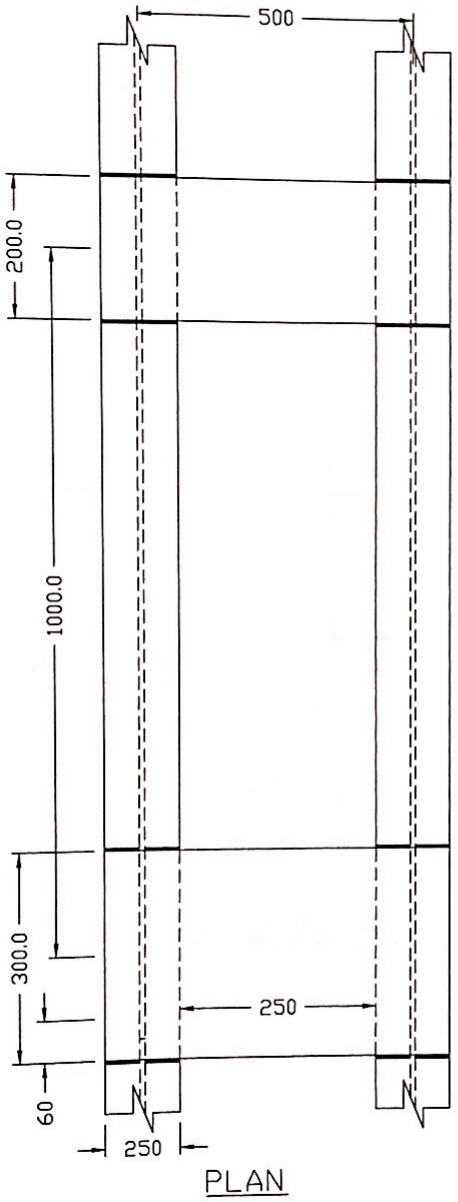


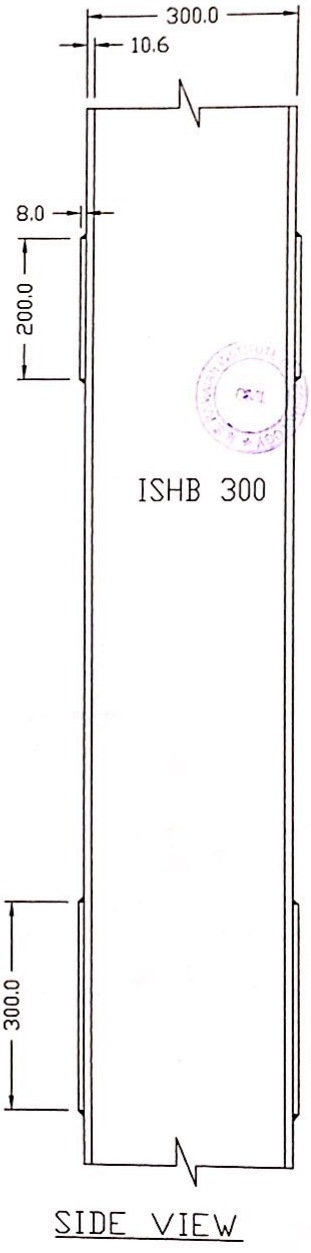
PLAN PLAN

COLUMN BATTEN WELD

Two ISHB 300 58.8 kg/m center to center distance of 300mm are connected together by batten plate 300mm x8 mm bottom and the reaming batten are 200mmx 8mm at a spacing of 1000 mm center to center. The batten are connected to the column using 6 bolts in two lines of 20mm dia.



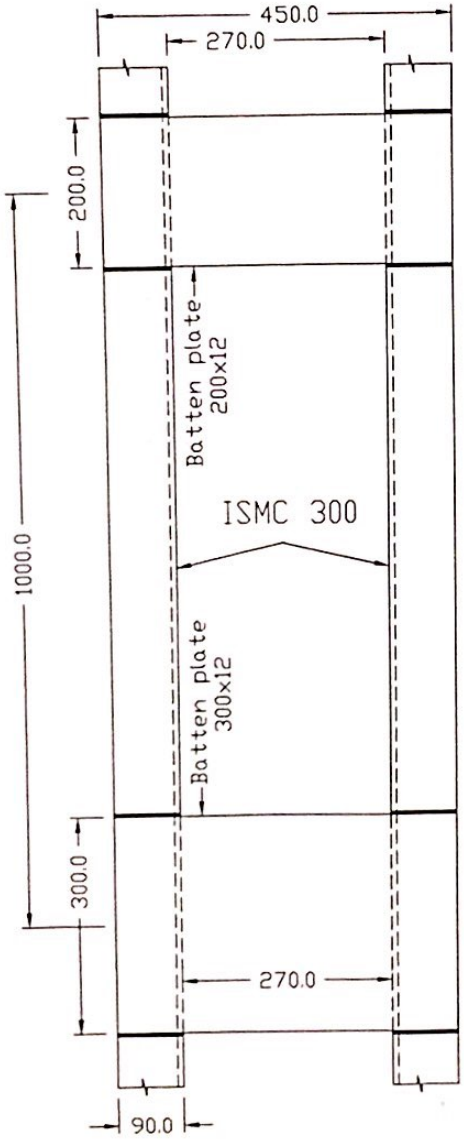




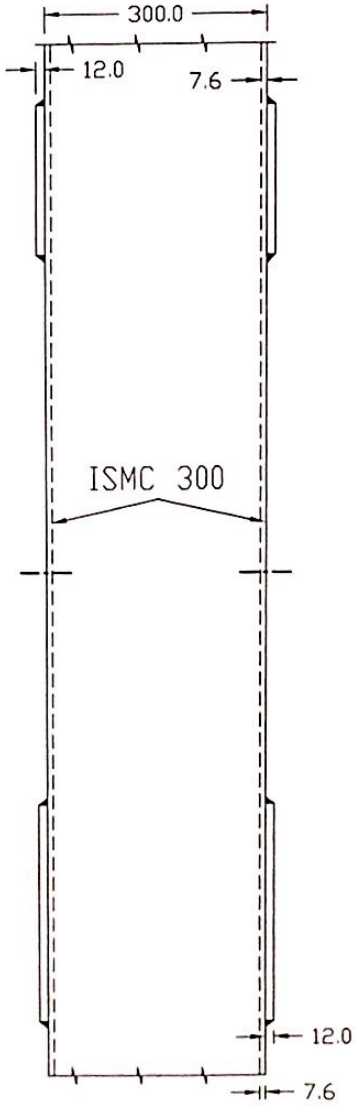
FRONT VIEW

COLUMN BATTEN SYSTEM WELD (Back to Back Using C channels)

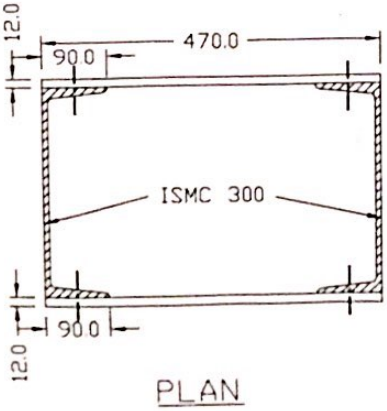
Draw to a suitable scale elevation (front view) and End view (Side view) of a batten system with a back to back distance of 270.0 from the following data:
Column ISMC = 300 @ 58.8 kg/m , batten plate @ bottom = 300 x 12mm,
Batten plate remaining of 200 x 12mm at a spacing of 1000 mm c/c, Bolts 16 ø.



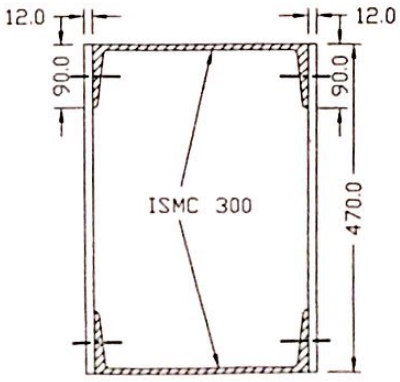
FRONT VIEW



SIDE VIEW



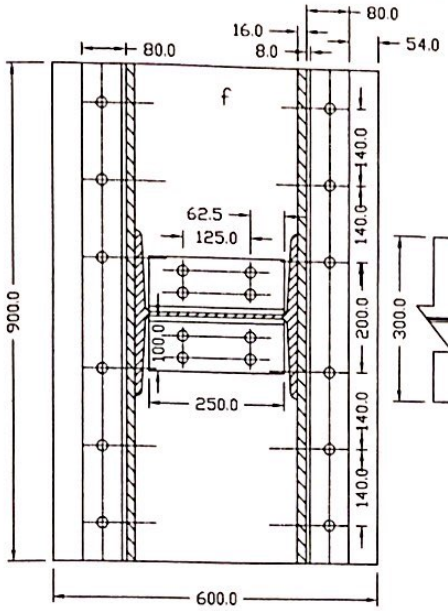
PLAN



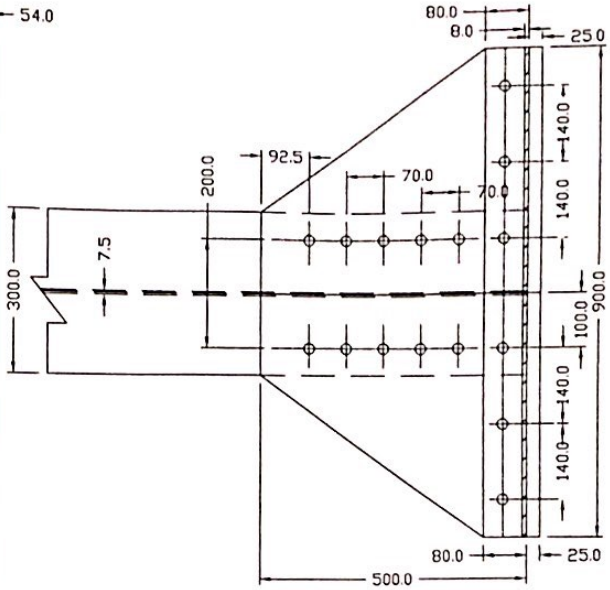
PLAN

GUSSET PLATE

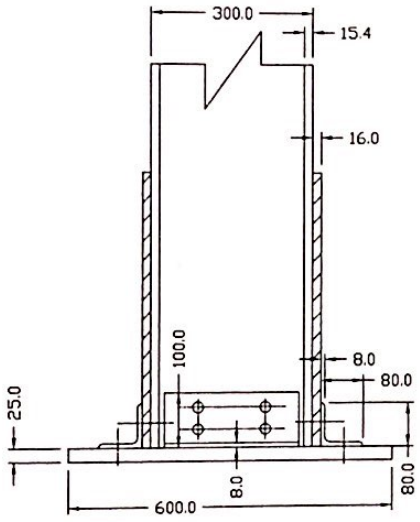
Draw to a suitable scale front elevation Side elevation of column with slab base from the following data: Column size = ISHB 300 t_f = 15.4 t_w =7.5 flange width 250mm
Base plate = 900x600x25, Cleat ISA 80x80x8 having length 250, Use 16mm dia 2 rows for cleat angle and remaining of 16mm dia bolts. Gusset plate of 900 x 500mm x 16 mm thick and cleats ISA 100x100x8 2Nos of length 900mm



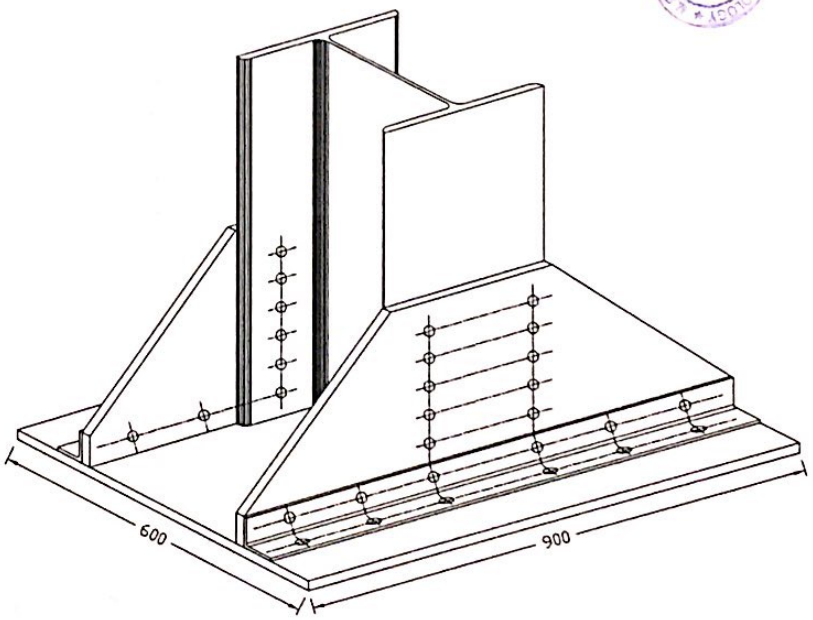
PLAN



FRONT VIEW

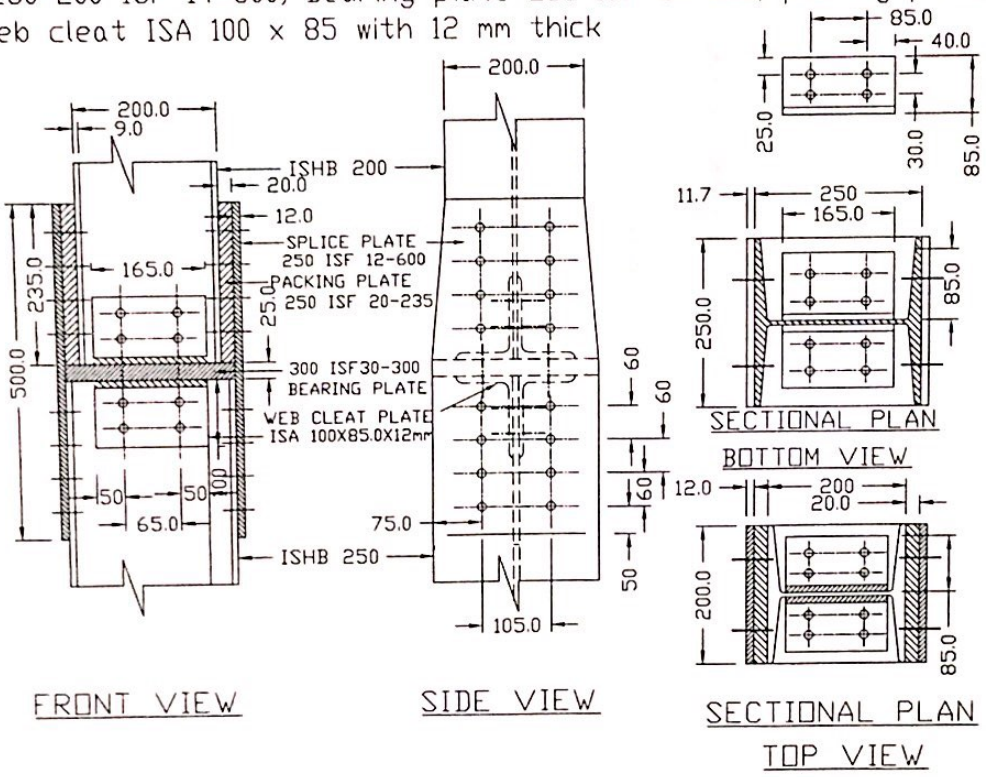


SIDE VIEW



COLUMN Splice With bearing Plate (having same section)

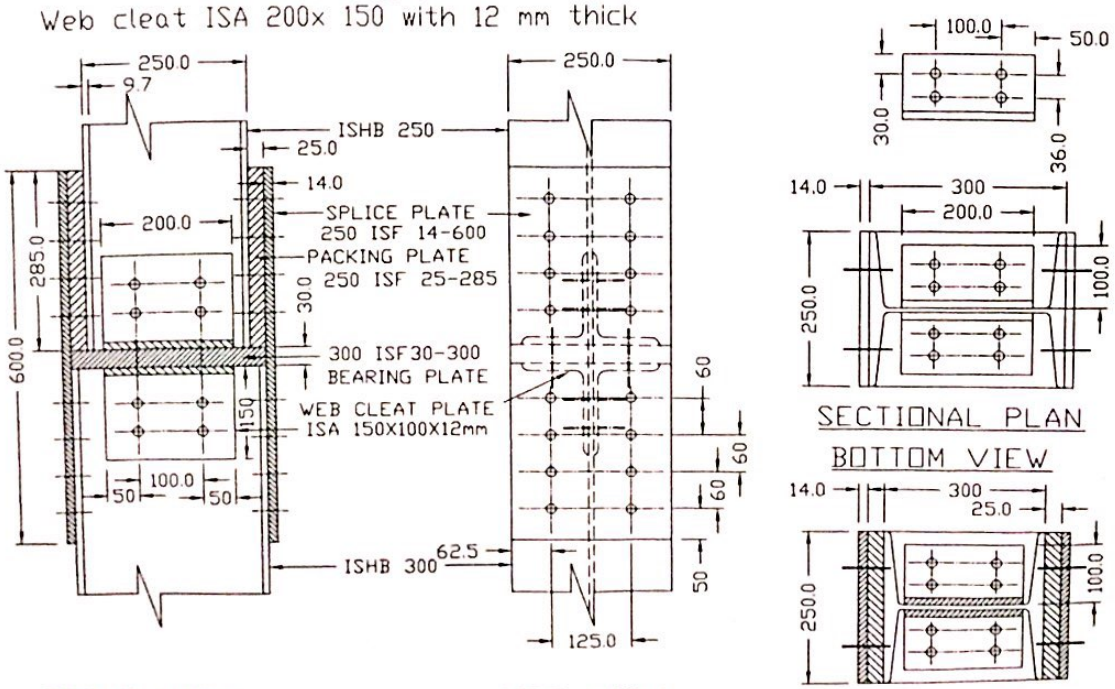
Draw to a suitable scale elevation(front iew) and End view (Side view) of two same depths of column from the following given data:
Column ISHB = 250 @ 54.7 kg/m and ISHB 200 @ 40.0 kg/m, splice plates.
= 250-200 ISF 14-600, Bearing plate 250 ISF 25-250, packing plate 250 ISF 20-235.0
Web cleat ISA 100 x 85 with 12 mm thick



FRONT VIEW SIDE VIEW SECTIONAL PLAN
TOP VIEW

COLUMN Splice With bearing Plate (having same section)

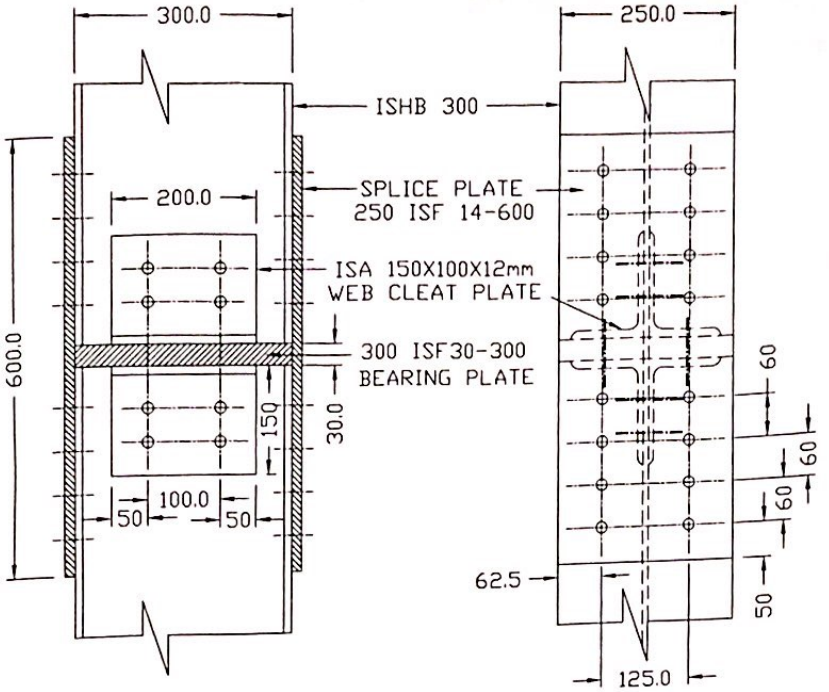
Draw to a suitable scale elevation(front iew) and End view (Side view) of two same depths of column from the following given data:
Column ISHB = 300 @ 58.8 kg/m and ISHB 250 @ 54.7 kg/m, splice plates.
= 250 ISF 14-600, Bearing plate 300 ISF 30-300, packing plate 250 ISF 25-285.0
Web cleat ISA 200x 150 with 12 mm thick



FRONT VIEW SIDE VIEW SECTIONAL PLAN
TOP VIEW

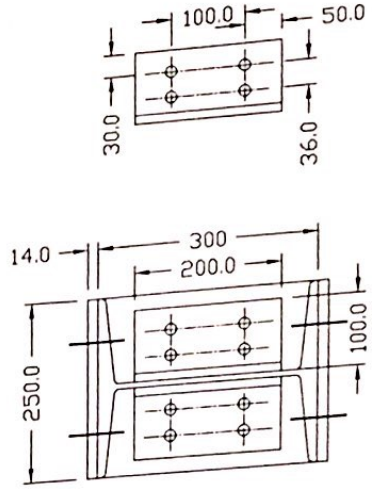
COLUMN Splice With bearing Plate (having same section)

Draw to a suitable scale elevation(front iew) and End view (Side view) of two same depths of column from the following given data:
Column ISHB = 300 @ 58.8 kg/m , splice plates = 250 ISF 14-600, Bearing plate 300 ISF 30-300, Web cleat ISA 200x 150 with 12 mm thick



FRONT VIEW

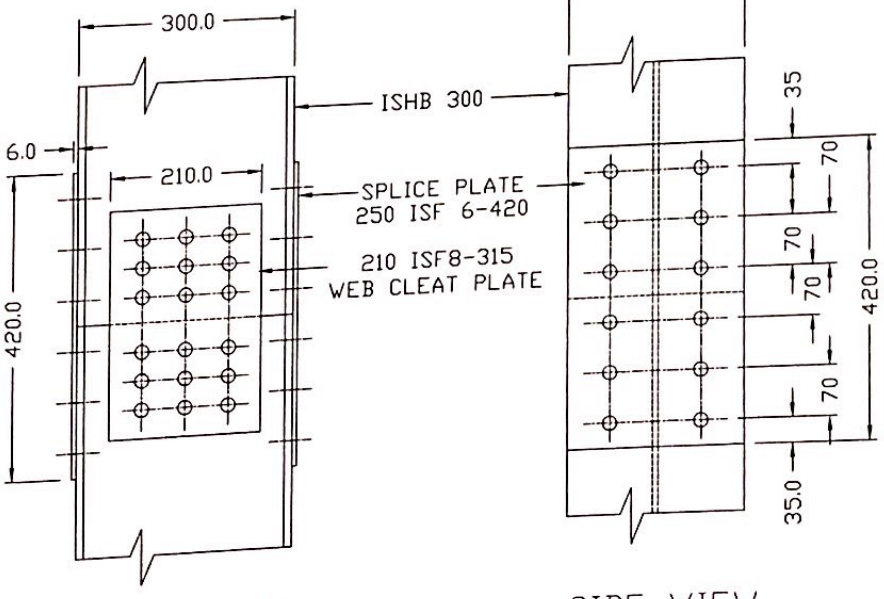
SIDE VIEW



PLAN SECTIONAL VIEW

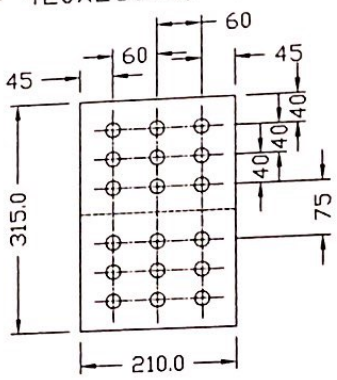
COLUMN Splice (having same section)

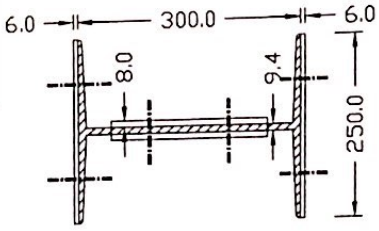
Draw to a suitable scale elevation(front iew) and End view (Side view) of a column splicing arrangement from the following data:
2 Nos. Column ISHB = 300 @ 58.8 kg/m , cover plates = 420x250x6, Bolts 20 ø.
Web cleat plate 315x210x8 and use Bolts 20 ø.



FRONT VIEW

SIDE VIEW





PLAN