

## Annex A (Examples)



# Example 1

Check if the joint shown in fig 1.1 resists the applied moments and forces of fig 1.2

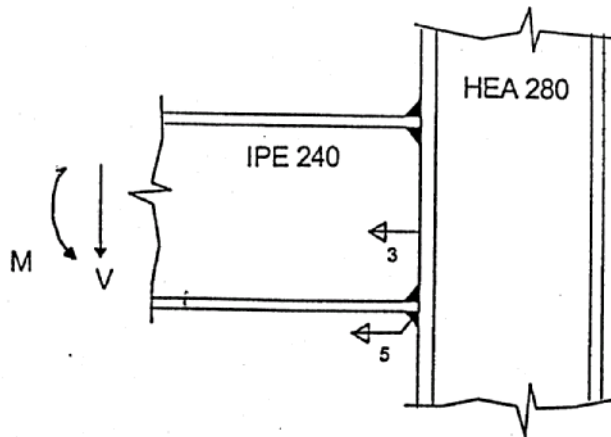


Fig 1.1

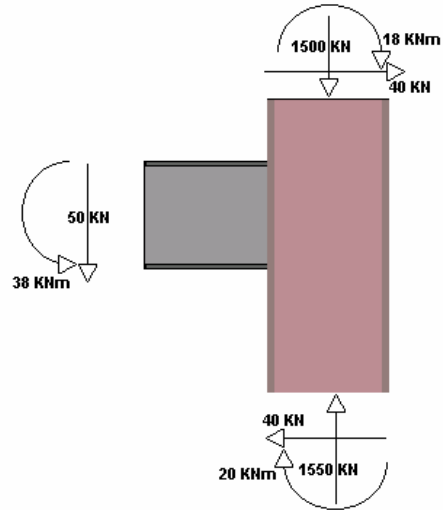


Fig 1.2

The Input Data form according to the data of this example is the following:

**INPUT DATA OF MOMENT CONNECTIONS**

**General connection data**

Column: HE-A280 | Weld thick Af: 5  
 Beam: IPE240 | Weld thick Aw: 3  
 Steel quality: Fe360 | Beam length: 6000

Welded Column       Two beams  
 Welded Beam       Braced frame

Supl. web plate  
 Thick ts: 0  
 Plates no:   
 Type:   
 Haunch  
 Height:   
 Length:

**Applied Moments and Forces**

Moment left(KNm)	38	Moment right(KNm)	0
Shear left	50	Shear right	0
Axial left	0	Axial right	0
Moment Up (KNm)	-18	Moment Down(KNm)	20
Shear Up	-40	Shear Down	40
Axial Up	-1500	Axial Down	-1550

Stiffeners  
 Stiffner up      Stiffner's Width: 0  
 Stiffner diag.      Stiffner's Thickness: 0  
 Stiffner down

Ok    Bolts    Help    Cancel

Since we do not need to enter bolts data we can click on **OK** to get the results:

**STIFFNESS RESULTS**

Lever arm Z = 230.2

K1 = 5.246047	K2 = 5.969775	K3 = 5.969775
K4 not exists	K5 not exists	K10 not exists
Factor Keq	NOT EXISTS	
Sum (1/Ki)	NOT EXISTS	
mi = 1 for moment Msd	mi = 2.988453 for moment Mrd	
My,sd = -38	My,rd = -64.45502	
Sj (kNm) for moment Msd = 21170.98	Sj (kNm) for moment Mrd = 7084.261	
Phi for moment My,sd = 1.79491E-03	Phi for moment My,rd = 9.09834E-03	

**Next**

Note that for a welded connection only  $K_1$ ,  $K_2$ ,  $K_3$  coefficients appear in the stiffness results.

Clicking on **Next** the Analysis Results form appears:

**ANALYSIS RESULTS**

Print data  
 Print results

DATA OF COLUMN

Type.....	HE-A280
Steel grade.....	Fe360
Height.....	270 mm
width.....	280 mm
web thickness.....	8 mm
Flange thickness.....	13 mm

DATA OF BEAM

Type.....	IPE240
Steel grade.....	Fe360
Height.....	240 mm
width.....	120 mm
web thickness.....	6.2 mm

STRENGTH OF COLUMN IN TENSION AND BENDING

Strength of web in tension, Ft,wc,Rd.....	306.25 kN
Strength of flange in bending, Ft,fc,Rd.....	307.76 kN

STRENGTH OF COLUMN WEB IN COMPRESSION

Design strength in compression, Fc,wc,Rd .....	280.00 kN
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STRENGTH OF COLUMN WEB IN SHEAR

Design strength in shear, Vwp,Rd .....	352.79 kN
Design Shear of column Vsd .....	118.33 kN

STRENGTH OF BEAM IN COMPRESSION AND SHEAR

Design strength in compression, Fc,fb,Rd.....	340.59 kN
Shear design resistance Vw,Rd h .....	190.88 kN

DATA OF COLUMN

Type..... HE-A280  
 Steel grade..... Fe360  
 Height..... 270 mm  
 Width..... 280 mm  
 Web thickness..... 8 mm  
 Flange thickness..... 13 mm

DATA OF BEAM

Type..... IPE240  
 Steel grade..... Fe360  
 Height..... 240 mm  
 Width..... 120 mm  
 Web  
 thickness..... 6.2 mm  
 Flange thickness..... 9.8 mm

CONNECTION DETAILS

Connection type..... Beam to column con. welded or with end plate  
 Number of Beams..... 1  
 Steel grade..... Fe360  
 Weld thickness Af..... 5 mm  
 Weld thickness Aw..... 3.1 mm

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STRENGTH OF COLUMN IN TENSION AND BENDING

Strength of web in tension, Ft,wc,Rd..... 306.25 kN  
 Strength of flange in bending, Ft,fc,Rd..... 307.76 kN

STRENGTH OF COLUMN WEB IN COMPRESSION

Design strength in compression, Fc,wc,Rd ..... 280.00 kN

STRENGTH OF COLUMN WEB IN SHEAR

Design strength in shear, Vwp,Rd ..... 352.79 kN  
 Design Shear of column Vsd ..... 118.33 kN

STRENGTH OF BEAM IN COMPRESSION AND SHEAR

Design strength in compression, Fc,fb,Rd..... 340.59 kN  
 Shear design resistance Vy,Rd,b ..... 190.88 kN

CONNECTION'S FINAL STRENGTH

Beam's flange and web in compression check enabled..... YES  
 Applied moment My,sd ..... -38.00 KNm  
 Moment design resistance My,Rd ..... -64.46 KNm

THE CONNECTION RESISTS IN MOMENT My

$$(M_y, sd / M_y, Rd) + (M_z, sd / M_z, Rd) = 0.59 + 0.00 = 0.59 < 1$$

THE CONNECTION RESISTS IN MOMENT

Shear design resistance Vy,Rd,b ..... 190.88 kN  
 Applied shear Vy,sd ..... -50.00 kN

THE CONNECTION RESISTS IN SHEAR Vy

$$(V_y, sd / V_y, Rd) + (V_z, sd / V_z, Rd) = 0.26 + 0.00 = 0.26 < 1$$

THE CONNECTION RESISTS IN SHEAR

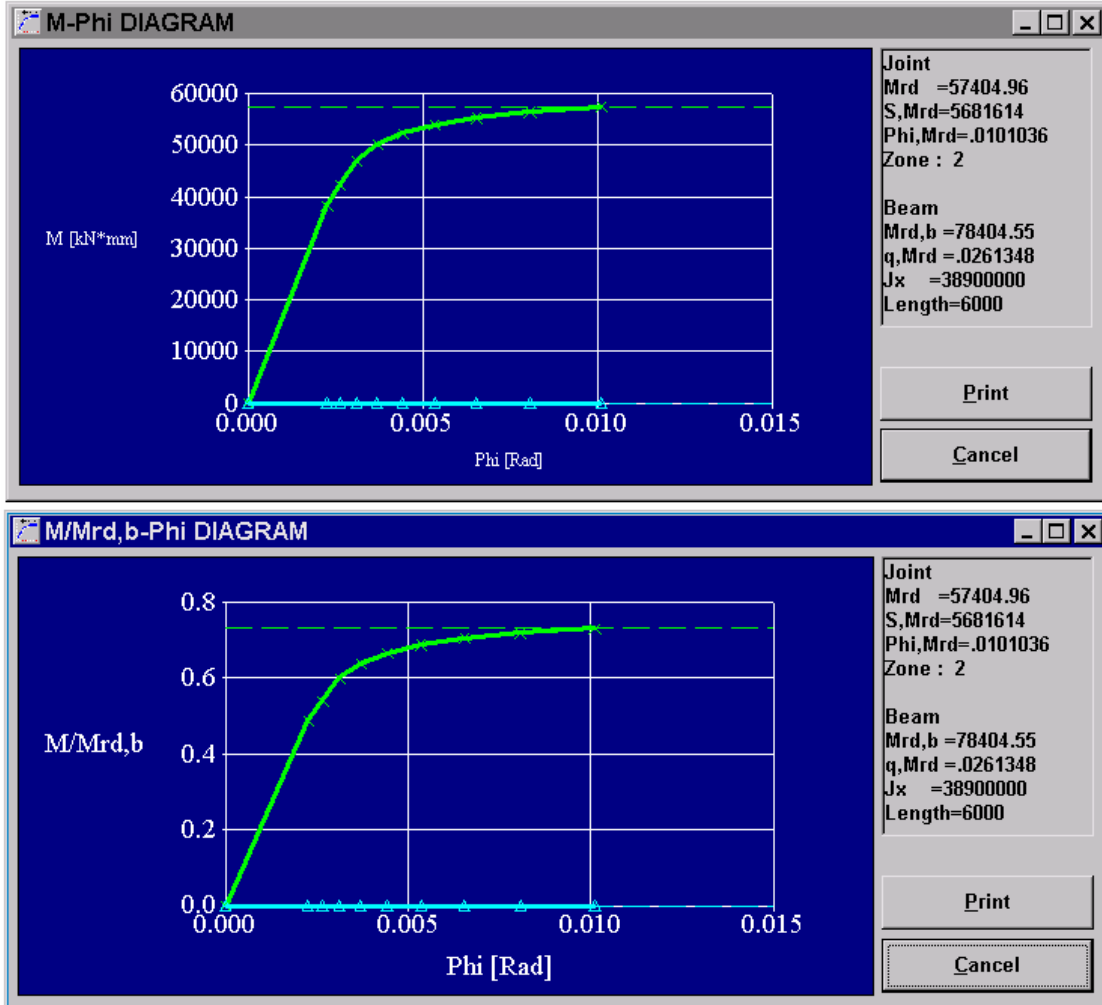
STRENGTH OF WELDS

For moments My,sd Mz,sd :  
 ow = < fu/aw = 0.288  
 ocomp = 0.027 < fu/Bw\*aw = 0.360  
 The check of the welds is OK

For moment My,Rd= Mpl,b = 78.40 kNm (AnnexJ 3.1.3(4)) :

ow = 0.313 > fu/aw = 0.288  
 +++++WARNING The check of the welds has failed

The diagrams for this connection follow:



From the first diagram we can see that the connection is classified by stiffness in zone 2 and the relation between the moment and the rotation of the joint.

From the second diagram we can see that the connection is classified as partial strength.

## Example 2

Solve the welded joint of fig. 2.1 for the moment and forces of fig. 2.2

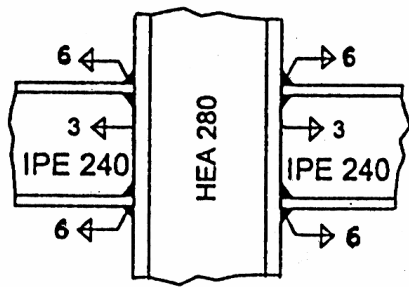


Fig 2.1

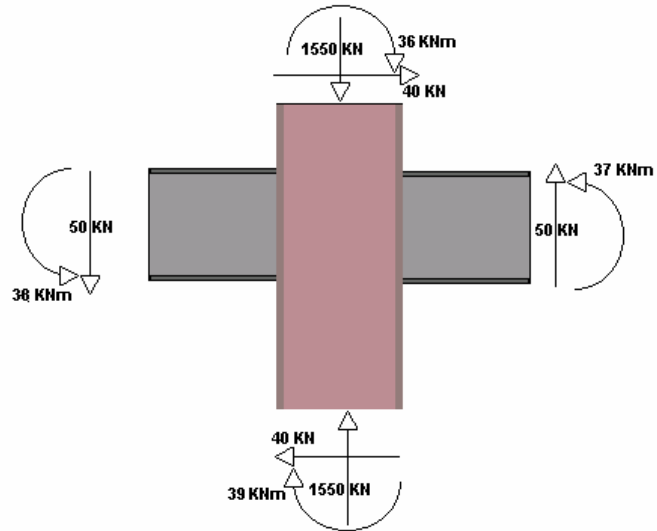


Fig 2.2

After entering the data of the problem to Steel Connections V1.0 the Input Data Form must look like this:

Since we don't have to enter bolts data , we can click **OK** to proceed with the analysis.

**INPUT DATA OF MOMENT CONNECTIONS**

**General connection data**

Column: HE A280  
 Beam: IPE240  
 Steel quality: Fe360

Weld thick Af: 5  
 Weld thick Aw: 3.1  
 Beam length: 6000

Supl. web plate  
 Thick ts: 0  
 Plates no: 0  
 Type: [dropdown]

Welded Column  
 Welded Beam  
 Two beams  
 Braced frame

Enable beam's flange and web in compression check.

Haunch  
 Height: 0  
 Length: 0

**Applied Moments and Forces**

Moment left(KNm)	-48	Moment right(KNm)	47
Shear left	50	Shear right	50
Axial left	0	Axial right	0

Mz: 0  
 Vz: 0

Moment Up (KNm)	-36	Moment Down(KNm)	39
Shear Up	-40	Shear Down	40
Axial Up	-1550	Axial Down	-1550

Stiffeners  
 Stiffner up  
 Stiffner diag.  
 Stiffner down

Stiffner's Width: 0  
 Stiffner's Thickness: 0

Ok Bolts Help Cancel

The stiffness results for this connection are presented in the following form:

**STIFFNESS RESULTS**

Lever arm Z = 230.2

K1 = 2.623024      K2 = 5.969775      K3 = 5.969775

K4 not exists      K5 not exists      K10 not exists

Factor Keq      NOT EXISTS

Sum (1/Ki)      NOT EXISTS

mi = 2.966964 for moment Msd      mi = 2.988453 for moment Mrd

My,sd = -48      My,rd = -48.12847

Sj (kNm) for moment Msd = 5236.568      Sj (kNm) for moment Mrd = 5198.914

Phi for moment My,sd = 9.166308E-03      Phi for moment My,rd = 9.257409E-03

**Next**

Clicking on **Next** the Analysis Results form appears:

**ANALYSIS RESULTS**

Print data      Print results

DATA OF COLUMN

Type..... HE-A280

Steel grade..... Fe360

Height..... 270 mm

width..... 280 mm

web thickness..... 8 mm

Flange thickness..... 13 mm

DATA OF BEAM

Type..... IPE240

Steel grade..... Fe360

Height..... 240 mm

width..... 120 mm

web thickness..... 6.2 mm

STRENGTH OF COLUMN IN TENSION AND BENDING

Strength of web in tension, Ft,wc,Rd..... 228.68 kN

Strength of flange in bending, Ft,fc,Rd..... 307.76 kN

STRENGTH OF COLUMN WEB IN COMPRESSION

Design strength in compression, Fc,wc,Rd ..... 209.07 kN

STRENGTH OF COLUMN WEB IN SHEAR

Design strength in shear, Vwp,Rd ..... 352.79 kN

Design Shear of column Vsd ..... 355.83 kN

++++ERROR Column FAILS in shear Vsd > VRd !!!

STRENGTH OF BEAM IN COMPRESSION AND SHEAR



DATA OF COLUMN

Type..... HE-A280  
 Steel grade..... Fe360  
 Height..... 270 mm  
 Width..... 280 mm  
 Web thickness..... 8 mm  
 Flange thickness..... 13 mm

DATA OF BEAM

Type..... IPE240  
 Steel grade..... Fe360  
 Height..... 240 mm  
 Width..... 120 mm  
 Web thickness..... 6.2 mm  
 Flange thickness..... 9.8 mm

CONNECTION DETAILS

Connection type..... Beam to column con. welded or with end plate  
 Number of Beams..... 2  
 Steel grade..... Fe360  
 Weld thickness Af..... 5 mm  
 Weld thickness Aw..... 3.1 mm

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STRENGTH OF COLUMN IN TENSION AND BENDING

Strength of web in tension, Ft,wc,Rd..... 228.68 kN  
 Strength of flange in bending, Ft,fc,Rd..... 307.76 kN

STRENGTH OF COLUMN WEB IN COMPRESSION

Design strength in compression, Fc,wc,Rd ..... 209.07 kN

STRENGTH OF COLUMN WEB IN SHEAR

Design strength in shear, Vwp,Rd ..... 352.79 kN  
 Design Shear of column Vsd ..... 355.83 kN

+++++ERROR Column FAILS in shear Vsd > VRd !!!

STRENGTH OF BEAM IN COMPRESSION AND SHEAR

Design strength in compression, Fc,fb,Rd..... 340.59 kN  
 Shear design resistance Vy,Rd,b ..... 190.88 kN

CONNECTION'S FINAL STRENGTH

Beam's flange and web in compression check enabled..... YES  
 Applied moment My,sd ..... -48.00 KNm  
 Moment design resistance My,Rd ..... -48.13 KNm

+++++ERROR THE CONNECTION FAILS IN MOMENT My

(My,sd/My,Rd) + (Mz,sd/Mz,Rd) = 1.00 + 0.00 = 1.00 < 1  
 THE CONNECTION RESISTS IN MOMENT

Shear design resistance Vy,Rd,b ..... 190.88 kN  
 Applied shear Vy,sd ..... -50.00 kN  
 THE CONNECTION RESISTS IN SHEAR Vy

(Vy,sd/Vy,Rd) + (Vz,sd/Vz,Rd) = 0.26 + 0.00 = 0.26 < 1  
 THE CONNECTION RESISTS IN SHEAR

STRENGTH OF WELDS

For moments My,sd Mz,sd :  
 ow = < fu/aw = 0.288  
 ocomp = 0.027 < fu/Bw\*aw = 0.360  
 The check of the welds is OK

For moment My,Rd= Mpl,b = 78.40 kNm (AnnexJ 3.1.3(4)) :  
 ow = 0.313 > fu/aw = 0.288  
 +++++WARNING The check of the welds has failed

From a quick view at the results we can easily see that the column's web fails in shear because of the applied moments (that is the reason that the final result for the connection indicates that it fails in moment). To solve the problem we must simply add two stiffner panels of 9mm thickness and 120 mm width (the length must always be from column's left to right flange), and the connection takes the form of fig 2.3

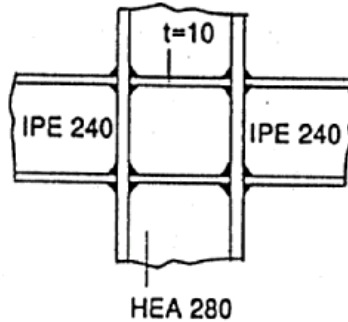


Fig 2.3

The Input Data form must now look like this :

**INPUT DATA OF MOMENT CONNECTIONS**

**General connection data**

Column: HE A280  
 Beam: IPE240  
 Steel quality: Fe360

Weld thick Af: 8  
 Weld thick Aw: 3.1  
 Beam length: 6000

Supl. web plate  
 Thick ts: 0  
 Plates no: 0  
 Type: [dropdown]

Welded Column  
 Welded Beam  
 Two beams  
 Braced frame

Enable beam's flange and web in compression check.

Haunch  
 Height: 0  
 Length: 0

**Applied Moments and Forces**

Moment left(KNm): -48  
 Shear left: -50  
 Axial left: 0

Moment right(KNm): 47  
 Shear right: 50  
 Axial right: 0

Mz: 0  
 Vz: 0

Moment Up (KNm): -36  
 Shear Up: -40  
 Axial Up: -1550

Moment Down(KNm): 39  
 Shear Down: 40  
 Axial Down: -1550

Stiffners  
 Stiffner up  
 Stiffner diag.  
 Stiffner down

Stiffner's Width: 120  
 Stiffner's Thickness: 9

Ok Bolts Help Cancel





Note that we increased the Af weld's thickness to 8 mm because the check of the flange's welds has failed.

Clicking on **OK** and then on the Analysis Results button, we take the following stiffness results:

STIFFNESS RESULTS		
		Lever arm Z = 230.2
▼		
K1 = 1.85411	K2 = -	K3 = -
K4 not exists	K5 not exists	K10 not exists
Factor Keq		NOT EXISTS
Sum (1/Ki)		NOT EXISTS
mi = 2.258138 for moment Msd	mi = 2.988453 for moment Mrd	
Msd = -38	Mrd = -42.15569	
Sj for moment Msd = 9137.234	Sj for moment Mrd = 6904.288	
Phi for moment Msd = 4.158808E-03	Phi for moment Mrd = 6.105725E-03	
<b>Next</b>		

Note that the  $K_2$  and  $K_3$  coefficients are not been computed because horizontal stiffeners are being used.

By pressing Next we take the following results :

ANALYSIS RESULTS	
<input checked="" type="checkbox"/> Print data	   
<input checked="" type="checkbox"/> Print results	
<b>DATA OF COLUMN</b> Type..... HE-A280 Steel grade..... Fe360 Height..... 270 mm Width..... 280 mm web thickness..... 8 mm Flange thickness..... 13 mm	
<b>DATA OF BEAM</b> Type..... IPE240 Steel grade..... Fe360 Height..... 240 mm Width..... 120 mm web thickness..... 6.2 mm	
<b>STRENGTH OF COLUMN IN TENSION AND BENDING</b> Strength of web in tension, Ft,wc,Rd..... 232.35 kN Strength of flange in bending, Ft,fc,Rd..... Construction Measures	
<b>STRENGTH OF COLUMN WEB IN COMPRESSION</b> Design strength in compression, Fc,wc,Rd ... Construction Measures	
<b>STRENGTH OF COLUMN WEB IN SHEAR</b> Design strength in shear, Vwp,Rd ..... 385.88 kN Design Shear of column Vsd ..... 355.83 kN	
<b>STRENGTH OF BEAM IN COMPRESSION AND SHEAR</b> Design strength in compression, Fc,fb,Rd..... 340.59 kN Shear design resistance Vw,Rd h ..... 190.88 kN	

DATA OF COLUMN

Type..... HE-A280  
 Steel grade..... Fe360  
 Height..... 270 mm  
 Width..... 280 mm  
 Web thickness..... 8 mm  
 Flange thickness..... 13 mm

DATA OF BEAM

Type..... IPE240  
 Steel grade..... Fe360  
 Height..... 240 mm  
 Width..... 120 mm  
 Web thickness..... 6.2 mm  
 Flange thickness..... 9.8 mm

CONNECTION DETAILS

Connection type..... Beam to column con. welded or with end plate  
 Number of Beams..... 2  
 Steel grade..... Fe360  
 Weld thickness Af..... 8 mm  
 Weld thickness Aw..... 3.1 mm

++++WARNING Stiffeners Dimensions are less than minimum  
 Program took into account the min. allowed dimensions by EC3.

Stiffener's Width b ..... 120.0 mm  
 Stiffener's Thickness t ..... 10 mm

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STRENGTH OF COLUMN IN TENSION AND BENDING  
 Strength of web in tension, Ft,wc,Rd..... 232.35 kN  
 Strength of flange in bending, Ft,fc,Rd..... Construction Measures

STRENGTH OF COLUMN WEB IN COMPRESSION  
 Design strength in compression, Fc,wc,Rd ... Construction Measures

STRENGTH OF COLUMN WEB IN SHEAR  
 Design strength in shear, Vwp,Rd ..... 385.88 kN  
 Design Shear of column Vsd ..... 355.83 kN

STRENGTH OF BEAM IN COMPRESSION AND SHEAR  
 Design strength in compression, Fc,fb,Rd..... 340.59 kN  
 Shear design resistance Vy,Rd,b ..... 190.88 kN

CONNECTION'S FINAL STRENGTH  
 Beam's flange and web in compression check enabled..... YES  
 Applied moment My,sd ..... -48.00 KNm  
 Moment design resistance My,Rd ..... -53.49 KNm  
 THE CONNECTION RESISTS IN MOMENT My

(My,sd/My,Rd) + (Mz,sd/Mz,Rd) = 0.90 + 0.00 = 0.90 < 1  
 THE CONNECTION RESISTS IN MOMENT

Shear design resistance Vy,Rd,b ..... 190.88 kN  
 Applied shear Vy,sd ..... -50.00 kN  
 THE CONNECTION RESISTS IN SHEAR Vy

(Vy,sd/Vy,Rd) + (Vz,sd/Vz,Rd) = 0.26 + 0.00 = 0.26 < 1  
 THE CONNECTION RESISTS IN SHEAR

STRENGTH OF WELDS  
 For moments My,sd Mz,sd :  
 ow = < fu/aw = 0.288  
 ocomp = 0.019 < fu/Bw\*aw = 0.360  
 The check of the welds is OK

For moment My,Rd= Mpl,b = 78.40 kNm (AnnexJ 3.1.3(4)) :  
 ow = 0.208 < fu/aw = 0.288  
 The check of the welds is OK

Note that the minus (-) symbol before the design moment resistance  $M_{Rd}$  is used to declare that the connection is being solved for the negative moments of the left beam (moments that compress the beam's lower flange).

## Example 3

Solve the connection of figure 3.1 for :

- 1)  $M_{sd} = -100$  kNm and  $V_{sd} = -50$  kN.
- 2) Find  $M_{Rd}$  and  $V_{Rd}$  for moments that cause tension at beam's lower flange.

Bolts type is M20, their quality is 8.8 and the steel quality for the connected members is Fe360

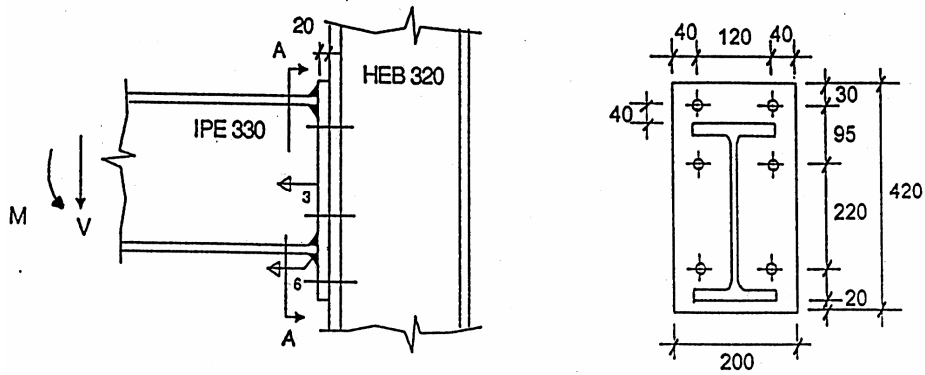


FIG. 3.1

( 1.)

**INPUT DATA OF MOMENT CONNECTIONS**

**General connection data**

Column: HE-B320, Weld thick Af: 6, Weld thick Aw: 3.75, Beam: IPE330, Steel quality: Fe360, Beam length: 4000

Welded Column       Two beams  
 Welded Beam       Braced frame

**Applied Moments and Forces**

Moment left(KNm): -100, Moment right(KNm): 0, Shear left: -50, Shear right: 0, Axial left: 0, Axial right: 0, Moment Up (KNm): 0, Moment Down(KNm): 0, Shear Up: 0, Shear Down: 0, Axial Up: 0, Axial Down: 0

**Supl. web plate**  
Thick ts: 0, Plates no: , Type:

**Haunch**  
Height: , Length:

**Stiffeners**  
 Stiffner up      Stiffner's Width: 0  
 Stiffner diag.      Stiffner's Thickness: 0  
 Stiffner down

Ok    Bolts    Help    Cancel

First we must input the general data for the connection. The Input Data form must look like this :

Then we must input the bolt's data .After clicking on **Bolts** we must fill in the appropriate values as shown below:

**INPUT DATA OF BOLTED MOMENT CONNECTIONS**

**Connection data**

Bolts type: M20, Bolts quality: 8.8, No of Bolt Rows: 3, Distance H(i): H(1), Distance H(i): 95, Distance ex: 30, Distance w: 120, Distance mx: 40, End Plate height: 420, End Plate width: 200, End Plate thickness: 20

Ok    Cancel    Help

**Holes type**  
 Normal holes  
 Oversized holes  
 Long slotted holes  
 Short slotted holes

Shear plane  
 Corrosive influence

**Backing plates**  
Height: , Thickness: , Position:  Up  Down

**Preloaded bolts**  
Edge type: , Conn. Category:

For a three bolt rows connection like this one, we have two H(i) distances. To enter the correct distance values we shall follow the next steps:

Distance H(i) **H(1)**  
 Distance H(i) **95**

First we select H(1) from the **Distance H(i)**

Distance H(i) **H(2)**  
 Distance H(i) **220**

Then we select H(2) from the **Distance H(i)**

After entering all data we can click on **OK** to return to the Input Data form and on **OK** again to calculate the results.

By pressing the results button the Stiffness Results form appears:

**STIFFNESS RESULTS**

Bolted Connection With Extended End Plate.

Lever arm Z = 300.9638

For the tensioned bolt row Nr 1

K1 = 6.493289	K2 = 10.94695	K3 = 5.919087
K4 = 43.16125	K5 = 19.53707	K10 = 9.116279

Factor Keq 6.741258  
 Sum (1/Ki) .3936951

mi = 1.049536 for moment Msd	mi = 2.988453 for moment Mrd
My,sd = -100	My,rd = -147.3379
Sj (kNm) for moment Msd = 46035.23	Sj (kNm) for moment Mrd = 16167.45
Phi for moment My,sd = 2.172249E-03	Phi for moment My,rd = 9.113241E-03

Next

Note that for a bolted connection the combo box becomes active and we can choose the bolt row in tension to see the results. (In this example the upper two bolt rows are tensioned).

Then by pressing **Next** the Strength Results of the Bolted Connections form appears:

STRENGTH RESULTS OF BOLTED CONNECTIONS			
Bolted Connection With Extended End Plate.			
Beam-End Plate $ow = < fu/aw = 0.288$			
	Bolt row Nr	Y	Z
Column's web panel in Shear $V_{wp}, R_d$		1	
Column's web in compression $F_c, w_c, R_d$		570.890	
<input checked="" type="checkbox"/> Beam's flange and web in compression $F_c, f_b, R_d$		575.523	
Column's web in tension $F_t, w_c, R_d$		539.289	
Column's flange in bending $F_t, f_c, R_d$		446.606	
End plate in bending $F_t, e_p, R_d$		282.240	
Beam's web in tension $F_t, w_b, R_d$		201.544	
Final resistance of bolt row $F_{ti}, R_d$		-	
		201.544	
Bolt's resistance in shear	94.080	Shear resistance of each bolt row	
Bolt's resistance in tension	141.120	Row Nr	1 92.187 Y
Bolt's resistance in bearing	130.909	Row Nr	1 Z
Moment resistance			
	My	-147.34	Mz
Shear resistance			
	Vy	307.68	Vz
			Next
			Exit

In this form we can see the strength of the connection in moment and shear (note again the minus symbol (-) before moment resistance as in example 1 and 2).

We can also examine the results of the checks of the connection's "basic components", and see that for the first bolt row the end plate's in bending check is the critical one. Note that for the first bolt row, the beam web in tension check have not been performed, because the first bolt row is outside the beam's area and does not interfere with the beam's web.

Clicking on the **Next** button we can take the results:



DATA OF COLUMN

Type..... HE-B320  
 Steel grade..... Fe360  
 Height..... 320 mm  
 Width..... 300 mm  
 Web thickness..... 11.5 mm  
 Flange thickness..... 20.5 mm

DATA OF BEAM

Type..... IPE330  
 Steel grade..... Fe360  
 Height..... 330 mm  
 Width..... 160 mm  
 Web thickness..... 7.5 mm  
 Flange thickness..... 11.5 mm

CONNECTION DETAILS

Connection type..... Beam to column con. welded or with end plate  
 Number of Beams..... 1  
 Steel grade..... Fe360  
 End plate's Height..... 420 mm  
 End plate's Width..... 200 mm  
 End plate's Thickness..... 20 mm  
 Distance from top of end plate to top of beam..... 70 mm  
 Weld thickness Af..... 6 mm  
 Weld thickness Aw..... 3.75 mm

BOLTS

Bolts type..... M20  
 Bolt's steel grade..... 8.8  
 Distance W..... 120 mm  
 Edge distance..... 40 mm  
 Distance H(1)..... 95 mm  
 Distance H(2)..... 220 mm  
 Top edge distance..... 30 mm  
 Bottom edge distance..... 75 mm  
 Number of bolt rows..... 3  
 Number of bolt columns..... 2

\*\*\*\*\*

CONNECTION'S STRENGTH RESULTS

Tension resistance Ftr,Rd of bolt-row 1..... 201.54 kN  
 Tension resistance Ftr,Rd of bolt-row 2..... 260.42 kN  
 Tension resistance Ftr,Rd of bolt-row 3..... 77.33 kN  
 Bolt's resistance in Tension ..... 141.120 kN  
 Bolt's resistance in Shear ..... 94.080 kN  
 Bolt's resistance in Bearing ..... 130.909 kN

CONNECTION'S FINAL STRENGTH

Beam's flange and web in compression check enabled..... YES  
 Applied moment My,sd ..... -100.00 KNm  
 Moment design resistance My,Rd ..... -147.34 KNm  
 THE CONNECTION RESISTS IN MOMENT My

(My,sd/My,Rd) + (Mz,sd/Mz,Rd) = 0.68 + 0.00 = 0.68 < 1  
 THE CONNECTION RESISTS IN MOMENT

Applied shear Vy,sd ..... -50.00 kN  
 Shear design resistance Vy,Rd,b ..... 307.68 kN  
 THE CONNECTION RESISTS IN SHEAR Vy

(Vy,sd/Vy,Rd) + (Vz,sd/Vz,Rd) = 0.16 + 0.00 = 0.16 < 1  
 THE CONNECTION RESISTS IN SHEAR

STRENGTH OF WELDS

For moments My,sd Mz,sd :  
 ow = < fu/aw = 0.288  
 ocomp = 0.016 < fu/Bw\*aw = 0.360  
 The check of the welds is OK

For moment My,Rd= Mpl,b = 171.76 kNm (AnnexJ 3.1.3(4)) :  
 ow = 0.299 > fu/aw = 0.288  
 +++++WARNING The check of the welds has failed

(2.)

To solve the connection for moments that cause tension in the beam's lower flange we must simply load the left beam with a random positive moment (i.e +1kNm). All the other data of the connection remain the same. The input data form must look like this:

Since we do not need to change anything about the bolts data, we press OK to start the calculations and then the results button to get the results:

Note that solving for positive (clockwise at left beam) moments the 2<sup>nd</sup> and 3<sup>rd</sup> bolt rows are in tension instead of the 1<sup>st</sup> and 2<sup>nd</sup> in leg (1.).

STRENGTH RESULTS OF BOLTED CONNECTIONS			
Bolted Connection With Extended End Plate.			
Beam-End Plate $ow = < fu/aw = 0.288$			
	Bolt row Nr	Y	Z
Column's web panel in Shear $V_{wp,Rd}$	2		
Column's web in compression $F_{c,wc,Rd}$	2		
<input checked="" type="checkbox"/> Beam's flange and web in compression $F_{c,fb,Rd}$	3		
Column's web in tension $F_{t,wc,Rd}$	266.124		
Column's flange in bending $F_{t,fc,Rd}$	405.439		
End plate in bending $F_{t,ep,Rd}$	278.023		
Beam's web in tension $F_{t,wb,Rd}$	242.529		
Final resistance of bolt row $F_{ti,Rd}$	354.200		
	212.276		
Bolt's resistance in shear	94.080	Shear resistance of each bolt row	
Bolt's resistance in tension	141.120	Row Nr	1 188.160 Y
Bolt's resistance in bearing	130.909	Row Nr	1 Z
Moment resistance			
My	84.00	Mz	Next
Shear resistance			
Vy	333.32	Vz	Exit

Note that the moment resistance is positive and different than before because the connection is not symmetric. The user now knows the strength of the connection in moment and shear under positive moments.



## Example 4

Find the moment and shear resistance of the bolted connection of the top frame joint shown in figure 4.1.

Bolts type is M20, their quality is 8.8 and the steel quality of the connected members is Fe360.

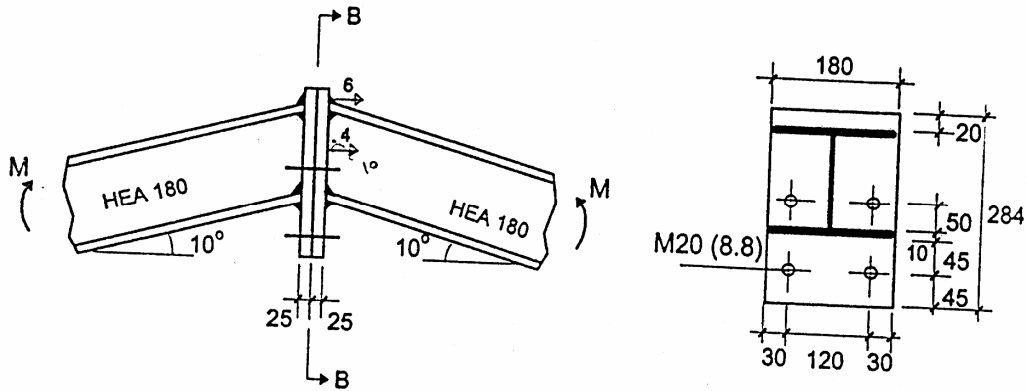
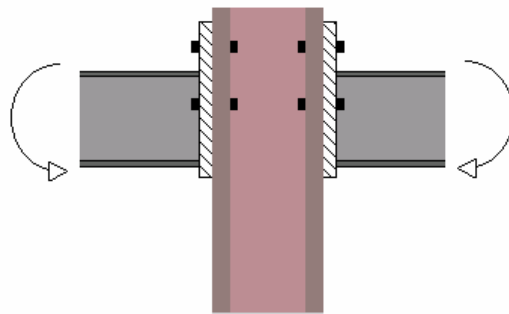


Fig. 4.1

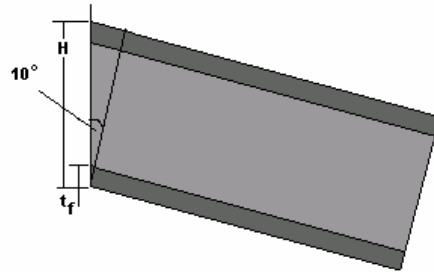
To transform the connection to a type compatible with Steel Connections V1.0 we must use the following model :



This is a two beams connection with extended end plates. We must pay attention to the following:

- The column's cross section must be much bigger than the cross sections of the beams and of the end plates, so that none of the checks of the column's "basic components" will be critical for the connection.

- In case the roof's slope is big enough, the differences between the geometric characteristics of the horizontal and the inclined beam should be taken under consideration.



In this example the beam's height is 171 mm and the beam's flange thickness is 9.5mm. For a slope of 10° we should make the following transformations:

BEAM'S HEIGHT: 
$$H = \frac{171\text{mm}}{\cos(10)} = 173.64 \text{ mm}$$

FLANGE'S THICKNESS: 
$$t_f = \frac{9.5\text{mm}}{\cos(10)} = 9.65\text{mm}$$

The Input Data form for this example must look like this:

The screenshot shows the 'INPUT DATA OF MOMENT CONNECTIONS' dialog box. It is divided into several sections:

- General connection data:** Column (Welded), Beam (Welded), Steel quality (Fe360), Weld thick Af (6), Weld thick Aw (4), Beam length (1000).
- Supl. web plate:** Thick ts (0), Plates no (0), Type (0).
- Haunch:** Height (0), Length (0).
- Applied Moments and Forces:** Moment left (KaNm) (-1), Shear left (0), Axial left (0), Moment right (KaNm) (.1), Shear right (0), Axial right (0), Moment Up (KaNm) (0), Shear Up (0), Axial Up (0), Moment Down (KaNm) (0), Shear Down (0), Axial Down (0).
- Stiffeners:** Stiffner up, Stiffner diag., Stiffner down (all unchecked), Stiffner's Width (0), Stiffner's Thickness (0).
- Welded Sections:** A diagram of a welded section with dimensions B, H, T<sub>w</sub>, and T<sub>f</sub>.
- Column and Beam properties:**

	Column	Beam
B =	180	180
H =	200	173.65
T <sub>w</sub> =	30	6
T <sub>f</sub> =	30	9.65
Welds Thick - ness	15	15

Buttons at the bottom: Ok, Bolts, Help, Cancel.

Note that the column is given as Welded allowing us to give large Tw and Tf thickness in order to obtain a large strength. The beam is also welded so we can enter the right height and flange thickness values, as described above.

After entering all the values in the Input Data form we can click on **OK** to pass to the Input Data of Bolted Moment Connections form:

After completing the input data procedure we shall click on **OK** to return to the Input Data form and then **OK** again to calculate the results which are:

Lever arm Z =		175.494
For the tension bolt row Nr 1		
K1 = -	K2 = 49.90299	K3 = 17.97133
K4 = 124.8615	K5 = 54.27981	K10 = 7.466667
Factor Keq	8.883789	
Sum (1/Ki)	.1326035	
mi = 1 for moment Msd	mi = 2.988453 for moment Mrd	
Msd = -1	Mrd = -69.05765	
Sj for moment Msd = 48774.07	Sj for moment Mrd = 16320.85	
Phi for moment Msd = 2.05027E-05	Phi for moment Mrd = 4.231254E-03	

**STRENGTH RESULTS OF BOLTED CONNECTIONS**

Beam-End Plate  $\sigma_{v1} = 0.189 > \sigma_{max} = 0.180$  Bolt row Nr

Web panel in Shear $V_{wp}, R_d$	666.052
Column web in compression $F_{c,wc}, R_d$	2132.219
Beam flange and web in compression $F_{c,fb}, R_d$	417.638
Column web in tension $F_{t,wc}, R_d$	767.866
Column flange in bending $F_{t,fc}, R_d$	282.240
End plate in bending $F_{t,ep}, R_d$	224.840
Beam web in tension $F_{t,wb}, R_d$	-
Final resistance of bolt row $F_{ti}, R_d$	224.840

Bolt's resistance in shear	<input type="text" value="120.576"/>	Shear resistance of each bolt row	
Bolt's resistance in tension	<input type="text" value="141.120"/>	Row Nr	<input type="text" value="1"/> <input type="text" value="103.932"/>
Bolt's resistance in bearing	<input type="text" value="208.346"/>		

**Moment resistance**

**Shear resistance**

In this form we can easily see the resistance of the connection in moment and shear.

In this example the column exists only for the program's needs. For that reason we must be certain that any check on the "basic components" relative to the column is not critical.

For the first bolt row the check of the end plate in bending is the critical one.

Beam-End Plate  $\sigma_{v1} = 0.189 > \sigma_{max} = 0.180$  Bolt row Nr

Web panel in Shear $V_{wp}, R_d$	441.212
Column web in compression $F_{c,wc}, R_d$	1907.379
Beam flange and web in compression $F_{c,fb}, R_d$	192.798
Column web in tension $F_{t,wc}, R_d$	958.914
Column flange in bending $F_{t,fc}, R_d$	282.240
End plate in bending $F_{t,ep}, R_d$	282.240
Beam web in tension $F_{t,wb}, R_d$	336.886
Final resistance of bolt row $F_{ti}, R_d$	192.798

For the second bolt row the beam's flange and web in compression check is the critical one.

So we can assume that the modeling we introduced was right and the results can be evaluated. If a check in a column's basic component is critical for the connection then the strength of the column should be increased and then the results recalculated.

Note that now only the left view of the program's graphics shows the real connection. All the other views represent the model.



## Example 5

Solve the connection of fig 4.1 for the applied moment and forces (slope is  $20^\circ$ ).

Beam IPE300 ,Column IPE400 ,steel quality Fe360.

Bolts M20, quality is 8.8.

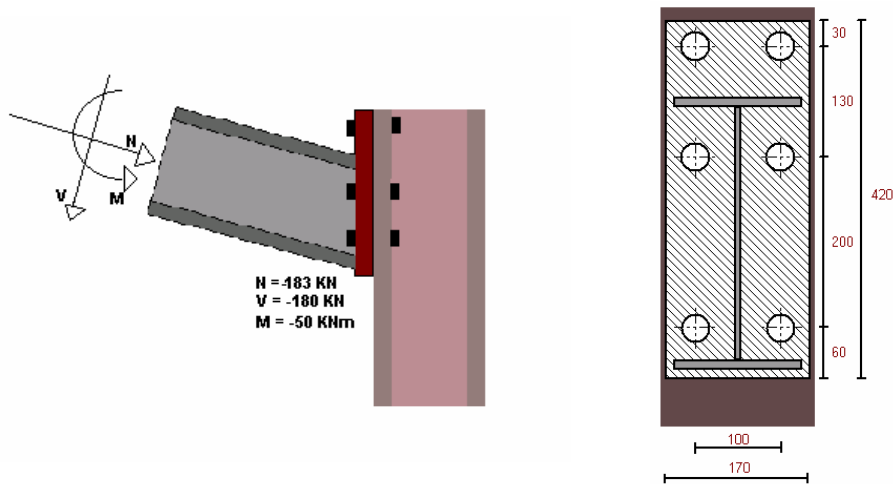


FIG. 5.1

First we must transform the forces according to a coordinates system with the N axis placed horizontally.

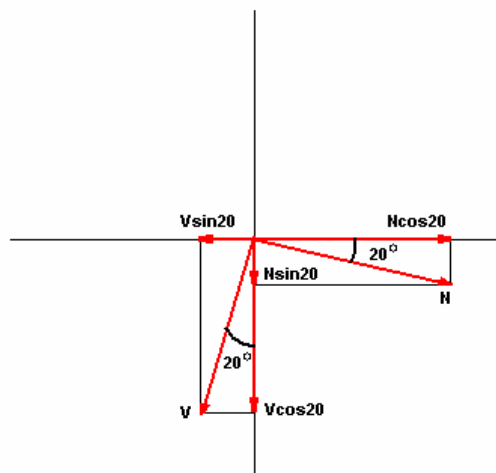


FIG. 5.2

Based upon Fig. 5.2 we can find the Shear( $V_1$ ) and Axial ( $N_1$ ) forces for our model:

$$V_1 = -(V\cos 20^\circ + N\sin 20^\circ) = -(180\cos 20^\circ + 183\sin 20^\circ)\text{KN} = 231.68 \text{ KN}$$

$$N_1 = V\sin 20^\circ - N\cos 20^\circ = 180\sin 20^\circ \text{ KN} - 183\cos 20^\circ \text{ KN} = 110.4 \text{ KN}$$

Then we must transform the beam's height and flange thickness in order to represent those of a IPE 300 beam with an angle cut of  $20^\circ$  in the right edge. Working as described in example 4, we can write:

BEAM'S HEIGHT:  $H = 319.25 \text{ mm}$

FLANGE'S THICKNESS:  $t_f = 11.39\text{mm}$

Therefore we can introduce the model of the connection as follows:

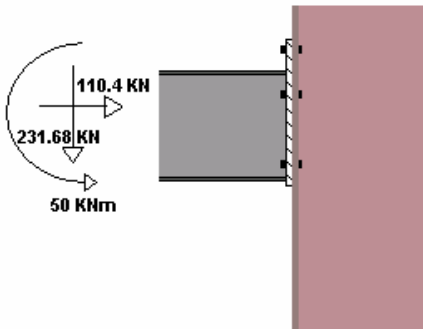


FIG. 5.3

The Input Data form must look like this:

**INPUT DATA OF MOMENT CONNECTIONS**

**General connection data**

Column: IPE400  
 Beam: Welded  
 Steel quality: Fe360

Weld thick Af: 8  
 Weld thick Aw: 3.55  
 Beam length: 6000

Supl. web plate  
 Thick ts: 0  
 Plates no:   
 Type:   
 Haunch  
 Height: 0  
 Length: 0

Welded Column  
 Welded Beam  
 Two beams  
 Braced frame

**Applied Moments and Forces**

Moment left(KNm): -50  
 Shear left: -231.68  
 Axial left: -110.4

Moment right(KNm): 0  
 Shear right: 0  
 Axial right: 0

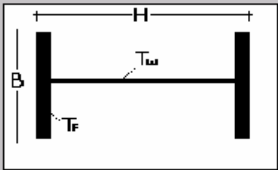
Moment Up (KNm): 0  
 Shear Up: 0  
 Axial Up: 0

Moment Down(KNm): 0  
 Shear Down: 0  
 Axial Down: 0

Stiffners  
 Stiffner up  
 Stiffner diag.  
 Stiffner down

Stiffner's Width: 0  
 Stiffner's Thickness: 0

**Welded Sections**



	Column	Beam
B =	0	150
H =	0	319.25
T <sub>w</sub> =	0	7.1
T <sub>f</sub> =	0	11.39
Welds Thick - ness	0	15

Ok Bolts Help Cancel

And for the bolts data:

**INPUT DATA OF BOLTED MOMENT CONNECTIONS**

**Connection data**

Bolts type: M20  
 Bolts quality: 8.8  
 End Plate height: 420  
 End Plate width: 170  
 End Plate thickness: 20

No of Bolt Rows: 3  
 Distance H(i): H(1)  
 Distance H(i): 130  
 Distance ex: 30  
 Distance w: 100  
 Distance mx: 60

**Holes type**

Normal holes  
 Oversized holes  
 Long slotted holes  
 Short slotted holes

Shear plane  
 Corrosive influence

Backing plates  
 Height: 0  
 Thickness: 0  
 Position:  Up  
 Down

Preloaded bolts  
 Edge type:   
 Conn. Category:

Ok  
 Cancel  
 Help

After entering all the data we must click on **OK** to return to the Input Data form and then **OK** again to calculate the results, which are:

**STIFFNESS RESULTS**

Lever arm Z = 320.8152

For the tensioned bolt row Nr 1

K1 = 5.061413	K2 = 4.483489	K3 = 2.672686
K4 = 14.34786	K5 = 23.94607	K10 = 10.88889
Factor Keq		3.392919
Sum (1/Ki)		.7153453
mi = 1 for moment Msd	mi = 2.988453 for moment Mrd	
My,sd = .50	My,rd = -91.55231	
Sj (kNm) for moment Msd = 30214.35	Sj (kNm) for moment Mrd = 10110.37	
Phi for moment My,sd = 1.654843E-03	Phi for moment My,rd = 9.05529E-03	

Next

**STRENGTH RESULTS OF BOLTED CONNECTIONS**

<b>Beam-End Plate <math>ow = &lt; fu/aw = 0.288</math></b>		<b>Y</b>	<b>Z</b>
	<b>Bolt row Nr</b>	1	
Column's web panel in Shear $V_{wp,Rd}$		474.351	
Column's web in compression $F_{c,wc,Rd}$		299.804	
<input checked="" type="checkbox"/> Beam's flange and web in compression $F_{c,fb,Rd}$		419.014	
Column's web in tension $F_{t,wc,Rd}$		284.410	
Column's flange in bending $F_{t,fc,Rd}$		205.043	
End plate in bending $F_{t,ep,Rd}$		142.567	
Beam's web in tension $F_{t,wb,Rd}$		-	
Final resistance of bolt row $F_{ti,Rd}$		142.567	
<b>Bolt's resistance in shear</b>	94.080	<b>Shear resistance of each bolt row</b>	
<b>Bolt's resistance in tension</b>	141.120	Row Nr	1 120.271 <b>Y</b>
<b>Bolt's resistance in bearing</b>	88.364	Row Nr	1 <b>Z</b>
<b>Moment resistance</b>			
	<b>My</b>	-91.55	<b>Mz</b>
<b>Shear resistance</b>			
	<b>Vy</b>	410.28	<b>Vz</b>
			<b>Next</b>
			<b>Exit</b>

Clicking on **Next** we can get the following output:

```
DATA OF COLUMN
Type..... IPE400
Steel grade..... Fe360
Height..... 400 mm
Width..... 180 mm
Web thickness..... 8.6 mm
Flange thickness..... 13.5 mm
```

```
DATA OF BEAM
Type..... Welded
Steel grade..... Fe360
Height..... 319.25 mm
Width..... 150 mm
Web thickness..... 7.1 mm
Flange thickness..... 11.39 mm
```

```
CONNECTION DETAILS
Connection type..... Beam to column con. welded or with end plate
Number of Beams..... 1
Steel grade..... Fe360
End plate's Height..... 420 mm
End plate's Width..... 170 mm
End plate's Thickness..... 20 mm
Distance from top of end plate to top of beam..... 90 mm
Weld thickness Af..... 8 mm
Weld thickness Aw..... 3.55 mm
```

```
BOLTS
Bolts type..... M20
Bolt's steel grade..... 8.8
Distance W..... 100 mm
Edge distance..... 35 mm
Distance H(1)..... 130 mm
Distance H(2)..... 200 mm
Top edge distance..... 30 mm
Bottom edge distance..... 60 mm
Number of bolt rows..... 3
Number of bolt columns..... 2
```

\*\*\*\*\*

```
CONNECTION'S STRENGTH RESULTS
Tension resistance Ftr,Rd of bolt-row 1..... 142.57 kN
Tension resistance Ftr,Rd of bolt-row 2..... 157.24 kN
Bolt's resistance in Tension ..... 141.120 kN
Bolt's resistance in Shear ..... 94.080 kN
Bolt's resistance in Bearing ..... 88.364 kN
```

```
CONNECTION'S FINAL STRENGTH
Beam's flange and web in compression check enabled..... YES
Applied moment My,sd ..... -50.00 kNm
Moment design resistance My,Rd ..... -91.55 kNm
THE CONNECTION RESISTS IN MOMENT My
```

(My, sd/My, Rd) + (Mz, sd/Mz, Rd) = 0.55 + 0.00 = 0.55 < 1  
THE CONNECTION RESISTS IN MOMENT

```
Applied shear Vy,sd ..... -231.68 kN
Shear design resistance Vy,Rd,b ..... 410.28 kN
THE CONNECTION RESISTS IN SHEAR Vy
```

(Vy, sd/Vy, Rd) + (Vz, sd/Vz, Rd) = 0.56 + 0.00 = 0.56 < 1  
THE CONNECTION RESISTS IN SHEAR

```
STRENGTH OF WELDS
For moments My,sd Mz,sd :
ow = < fu/aw = 0.288
ocomp = 0.069 < fu/Bw*aw = 0.360
The check of the welds is OK
```

```
For moment My,Rd= Mpl,b = 145.70 kNm (AnnexJ 3.1.3(4)) :
ow = 0.227 < fu/aw = 0.288
The check of the welds is
```

## Example 6

Solve the connection of fig. 6.1. Bolts type is M12 and their quality is 8.8. Steel quality of the connected members is Fe360.

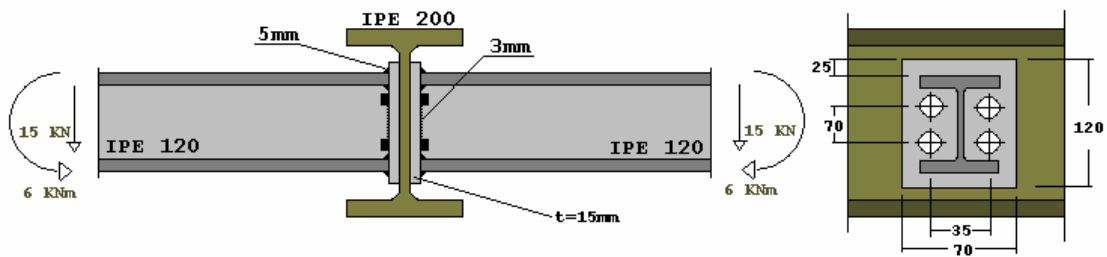


FIG. 6.1

To transform the connection to a type compatible with Steel Connections V1.0 we shall create the following model:

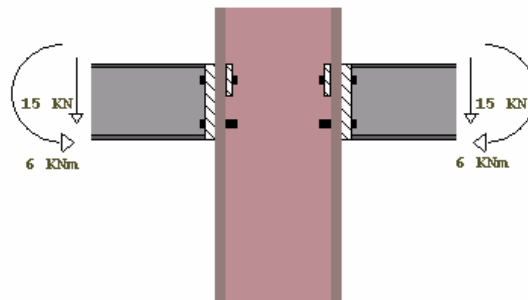


FIG. 6.2

- The column will be given as welded so we can be sure that no check of its “basic components” will be critical.
- The supporting beam (IPE 200) will be represented by the backing plates. When checking the first bolt row area in bearing, the program takes in consideration the thinner plate (end plate, flange or backing plate). If the backing plate has a thickness equal to the thickness of the supporting beam’s web, then the check will be the same as checking the supporting beam’s web in bearing, which as a matter of speaking is the only one we need to do for this beam.

- For a IPE 200 beam we have (from tables) 10.7mm web's thickness. This is the thickness of the backing plates for our model.



The Input Data form must look like this:

And the bolts data:

After the end of the input data procedure we can see the results

**STIFFNESS RESULTS**

Lever arm Z = 77.10256

For the tensioned bolt row Nr 1

K1 = -	K2 = 12.05981	K3 = 1.685484
K4 = 955.5728	K5 = 2619.517	K10 = 2.337608
Factor Keq	1.475997	
Sum (1/Ki)	.7604284	
mi = 1.687564 for moment Msd	mi = 2.988453 for moment Mrd	
My,sd = -6	My,rd = -7.414333	
Sj (kNm) for moment Msd = 972.8334	Sj (kNm) for moment Mrd = 549.3539	
Phi for moment My,sd = 6.167552E-03	Phi for moment My,rd = 1.349646E-02	

Next

**STRENGTH RESULTS OF BOLTED CONNECTIONS**

Beam-End Plate  $\delta_{f1} = 0.208 > \delta_{max} = 0.157$

Bolt row Nr 1

Web panel in Shear $V_{wp,Rd}$	333.026
Column web in compression $F_{c,wc,Rd}$	515.283
Beam flange and web in compression $F_{c,fb,Rd}$	114.052
Column web in tension $F_{t,wc,Rd}$	87.448
Column flange in bending $F_{t,fc,Rd}$	97.114
End plate in bending $F_{t,ep,Rd}$	97.114
Beam web in tension $F_{t,wb,Rd}$	70.318
Final resistance of bolt row $F_{ti,Rd}$	70.318

Bolt's resistance in shear	32.371	Shear resistance of each bolt row	
Bolt's resistance in tension	48.557	Row Nr 1	31.257
Bolt's resistance in bearing	49.151		

Moment resistance -7.41

Shear resistance 75.17

Next

Exit

For the first bolt row the beam's web in tension check is critical.

Beam-End Plate $\delta f1 = 0.208 > \delta max = 0.157$	Bolt row Nr
Web panel in Shear $V_{wp,Rd}$	262.708
Column web in compression $F_{c,wc,Rd}$	444.964
Beam flange and web in compression $F_{c,fb,Rd}$	43.734
Column web in tension $F_{t,wc,Rd}$	87.448
Column flange in bending $F_{t,fc,Rd}$	97.114
End plate in bending $F_{t,ep,Rd}$	97.114
Beam web in tension $F_{t,wb,Rd}$	65.329
Final resistance of bolt row $F_{t,Rd}$	43.734

For the second bolt row the beam's flange and web in compression check is critical. Since no check of the column's basic components is critical for the connection, the model may represent the real connection and the results can be evaluated.

## DATA

DATA OF COLUMN  
Type..... Welded  
Steel grade..... Fe360  
Height..... 200 mm  
Width..... 150 mm  
Web thickness..... 15 mm  
Flange thickness..... 15 mm

DATA OF BEAM  
Type..... IPE120  
Steel grade..... Fe360  
Height..... 120 mm  
Width..... 64 mm  
Web thickness..... 4.4 mm  
Flange thickness..... 6.3 mm

CONNECTION DETAILS  
Connection type..... Beam to column connection  
Number of Beams..... 2  
Steel grade..... Fe360  
End plate's Height..... 120 mm  
End plate's Width..... 70 mm  
End plate's Thickness..... 15 mm  
Distance from top of end plate to top of beam..... 25 mm  
Weld thickness Af..... 5 mm  
Weld thickness Aw..... 3 mm

DETAILS OF BACK PLATE  
Steel grade..... Fe360  
Plate's height..... 50 mm  
Plate's width..... 49.5 mm  
Plate's thickness..... 10.7 mm

BOLTS GROUP ON COLUMN  
Bolts type..... M12  
Bolt's steel grade..... 8.8  
Distance W..... 35 mm  
Edge distance..... 35 mm  
Distance H(1)..... 70 mm  
Top edge distance..... 25 mm  
Bottom edge distance..... 25 mm  
Number of bolts rows..... 2  
Number of bolts columns..... 2

## RESULTS

CONNECTION'S STRENGTH RESULTS  
Tension resistance  $F_{tr,Rd}$  of bolt-row 1..... 70.32 kN  
Tension resistance  $F_{tr,Rd}$  of bolt-row 2..... 43.73 kN  
Bolt's resistance in Tension =..... 48.557 kN  
Bolt's resistance in Shear =..... 32.371 kN  
Bolt's resistance in Bearing =..... 49.151 kN

CONNECTION'S FINAL STRENGTH  
Applied moment  $M_{sd}$  =..... -6.00 kNm  
Moment design resistance  $M_{Rd}$  =..... -7.41 kNm  
THE CONNECTION RESISTS IN MOMENT  
Applied shear  $V_{sd}$  =..... -15.00 kN  
Shear design resistance  $V_{Rd,b}$  =..... 75.17 kN  
THE CONNECTION RESISTS IN SHEAR

STRENGTH OF WELDS

Design strength of weld in Shear.....	116.4770 kN
Design Shear $V_{sd}$ is.....	15.0000 kN
Design strength of weld in Tension.....	113.8997 kN
Design Tension force $B_{fb} \cdot T_{fb} \cdot F_y / \gamma_{m0}$ is.....	86.1382 kN
The check of web's welds is OK	
The check of flange's welds is OK	

## Example 7

Solve the connection of figure 7.1 for :

3)  $M_{sd} = -10$  KNm and  $V_{sd} = -40$  KN.

4) Find  $M_{Rd}$  and  $V_{Rd}$  for moments that cause tension at beam's lower flange.

Bolts type is M20, their quality is 8.8 and the steel quality for the connected members is Fe360

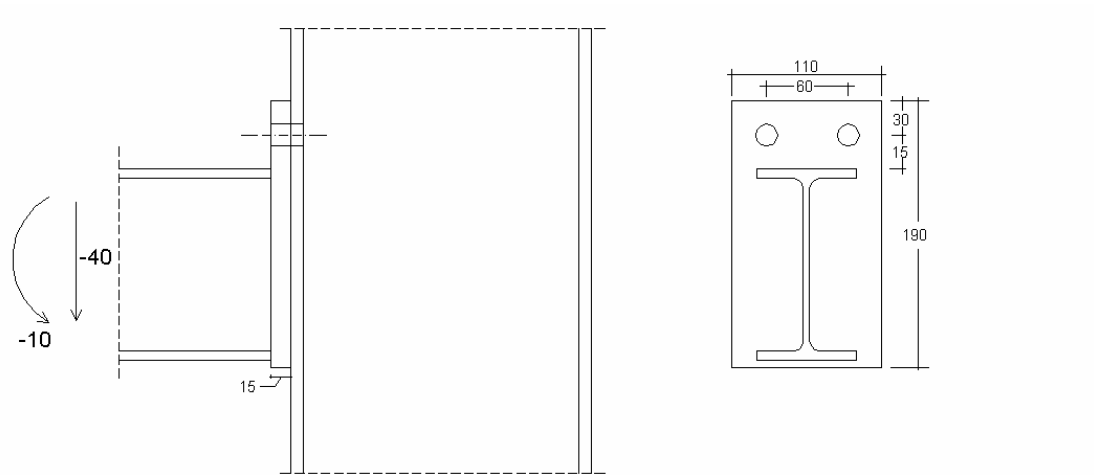


FIG. 7.1

**(1.)**

First we must input the general data for the connection. The Input Data form must look like this :

**INPUT DATA OF MOMENT CONNECTIONS**

General connection data

Column: IPE220  
 Beam: IPE140  
 Steel quality: Fe360

Weld thick Af: 6  
 Weld thick Aw: 4  
 Beam length: 2000

Supl. web plate

Thickts: 0  
 Plates no: [dropdown]  
 Type: [dropdown]

Haunch  
 Height: 0  
 Length: 0

Welded Column  
 Welded Beam  
 Enable beam's flange and web in compression check.

Two beams  
 Braced frame

Applied Moments and Forces

Moment left(KNm): -10  
 Shear left: -40  
 Axial left: 0

Moment right(KNm): 0  
 Shear right: 0  
 Axial right: 0

Mz: 0  
 Vz: 0

Moment Up (KNm): 0  
 Shear Up: 0  
 Axial Up: 0

Moment Down(KNm): 0  
 Shear Down: 0  
 Axial Down: 0

Stiffners

Stiffner up  
 Stiffner diag.  
 Stiffner down

Stiffner's Width: 0  
 Stiffner's Thickness: 0

Ok Bolts Help Cancel

**NOTE :** In the input data form the fields Mz and Vz are not enabled because the connection must have at least two bolt rows in order to have resistance in the minor axis of the cross section.

Then we must input the bolt's data .After clicking on **Bolts** we must fill in the appropriate values as shown below:

**INPUT DATA OF BOLTED MOMENT CONNECTIONS**

Connection data

Bolts type: M16  
 Bolts quality: 8.8

End Plate height: 190  
 End Plate width: 110  
 End Plate thickness: 15

No of Bolt Rows: 1

Distance H(i): [dropdown]  
**Distance H(i): 115**  
 Distance ex: 30  
 Distance w: 60  
 Distance mx: 15

Ok  
 Cancel  
 Help

Holes type

Normal holes  
 Oversized holes  
 Long slotted holes  
 Short slotted holes

Shear plane  
 Corrosive influence

Backing plates

Height: 0  
 Thickness: 0  
 Position:  Up  
 Down

Preloaded bolts

Edge type: [dropdown]  
 Conn. Category: [dropdown]

Note that for a one bolt row connection like this one, we have no H(i) distances

After entering all data we can click on **OK** to return to the Input Data form and on **OK** again to calculate the results.

By pressing the results button the Stiffness Results form appears:

STIFFNESS RESULTS

Ex 7

Lever arm Z = 151.55

For the tensioned bolt row Nr 1

K1 = 3.989511	K2 = 3.717711	K3 = 2.070122
K4 = 12.58729	K5 = 27.85629	K10 = 8.752613
Factor Keq		1.403196
Sum (1/Ki)		1.232299

mi = 1 for moment Msd	mi = 2.988453 for moment Mrd
My,sd = -10	My,rd = -15.86893
Sj (kNm) for moment Msd = 3913.949	Sj (kNm) for moment Mrd = 1309.691
Phi for moment My,sd = 2.554964E-03	Phi for moment My,rd = 1.211655E-02

Next

Then by pressing **Next** the Strength Results of the Bolted Connections form appears:

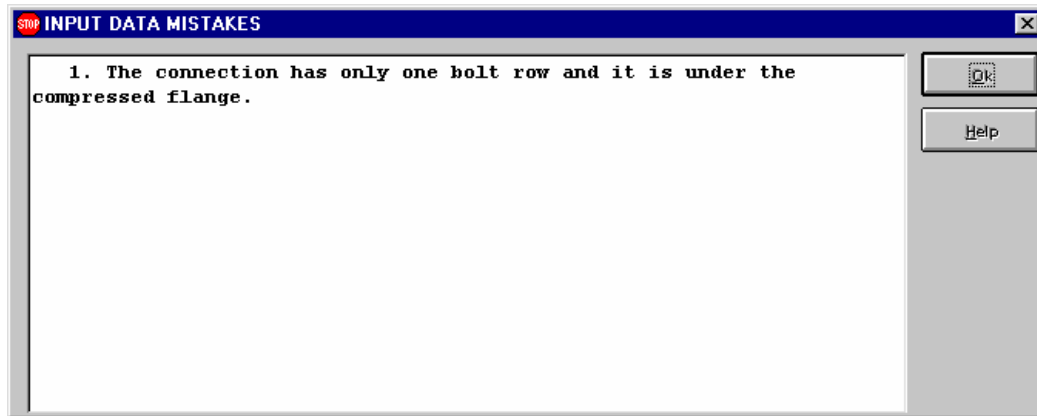


STRENGTH RESULTS OF BOLTED CONNECTIONS			
Ex 7			
Beam-End Plate $\sigma_{v1} = 0.208 < \sigma_{max} = 0.233$			
	Bolt row Nr	Y	Z
Column's web panel in Shear $V_{wp,Rd}$		178.624	
Column's web in compression $F_{o,wo,Rd}$		141.170	
<input checked="" type="checkbox"/> Beam's flange and web in compression $F_{o,fb,Rd}$		141.729	
Column's web in tension $F_{t,wo,Rd}$		117.127	
Column's flange in bending $F_{t,fo,Rd}$		104.711	
End plate in bending $F_{t,ep,Rd}$		172.024	
Beam's web in tension $F_{t,wb,Rd}$		-	
Final resistance of bolt row $F_{ti,Rd}$		104.711	
Bolt's resistance in shear	60.288	Shear resistance of each bolt row	
Bolt's resistance in tension	90.432	Row Nr	1 70.714 Y
Bolt's resistance in bearing	92.935	Row Nr	1 Z
<div style="border: 1px solid gray; width: 100%; height: 40px; margin-bottom: 5px;"></div>			
Moment resistance	My	-15.87	Mz
Shear resistance	Vy	70.71	Vz
			Next
			Exit

## (2.)

To solve the connection for moments that cause tension in the beam's lower flange we must simply load the left beam with a random positive moment (i.e. +1kNm). All the other data of the connection remain the same.

As soon as we press the OK button we get the following error message



An Extended end Plate connection with only one bolt row cannot resist positive moments because the position of the single bolt row is under the "compressed flange" of the beam.

## Example 8

Solve the connection of figure 8.1 for :

5)  $M_{sd} = -6 \text{ KNm}$  and  $V_{sd} = -15 \text{ KN}$ .

6) Find  $M_{Rd}$  and  $V_{Rd}$  for moments that cause tension at beam's lower flange.

Bolts type is M20, their quality is 8.8 and the steel quality for the connected members is Fe360

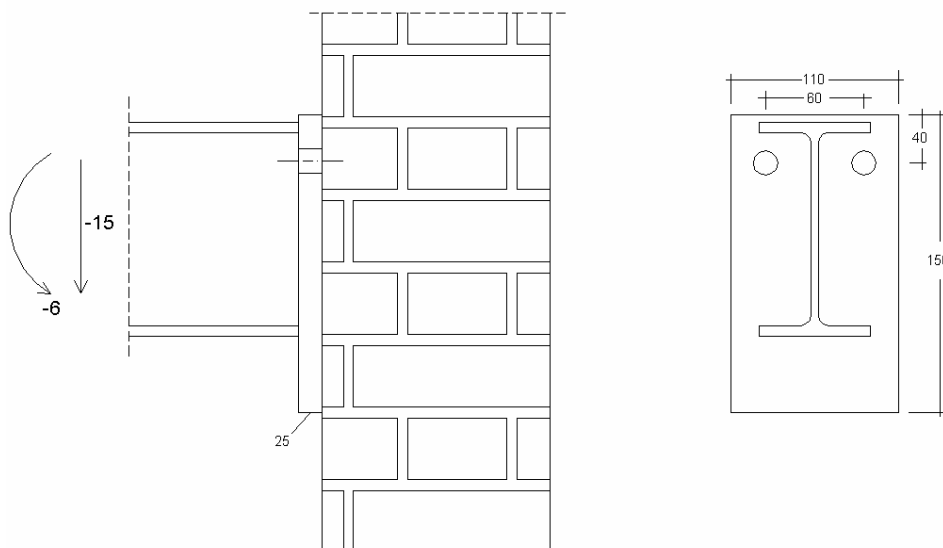


FIG. 8.1

To transform the connection to a type compatible with Steel Connections V1.0 we shall create the following model:

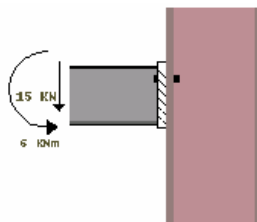


FIG. 8.2

- The wall will be given as welded column with very big cross section dimensions in order to be sure that no check of its “basic components” will be critical.

( 1.)

First we must input the general data for the connection. The Input Data form must look like this :

**NOTE :** In the input data form the fields  $M_z$  and  $V_z$  are not enabled because the connection must have at least two bolt rows in order to have resistance in the minor axis of the cross section.

Then we must input the bolt's data .After clicking on **Bolts** we must fill in the appropriate values as shown below:

**INPUT DATA OF BOLTED MOMENT CONNECTIONS**

**Connection data**

Bolts type:  No of Bolt Rows:   
 Bolts quality:  Distance H(i):   
 End Plate height:  **Distance H(i)**:   
 End Plate width:  Distance ex:   
 End Plate:  Distance w:   
 Distance mx1:

**Holes type**

Normal holes  
 Oversized holes  
 Long slotted holes  
 Short slotted holes

Shear plane

Corrosive influence

Backing plates

Height:  Thickness:  Position:  
 Up  
 Down

Preloaded bolts

Edge type:  Conn. Category:

After entering all data we can click on **OK** to return to the Input Data form and on **OK** again to calculate the results.

All the following steps for viewing and printing the analysis results are the same as in Example 7.

## (2.)

To solve the connection for moments that cause tension in the beam's lower flange we must simply load the left beam with a random positive moment (i.e +1kNm). All the other data of the connection remain the same.

**NOTE :** A flash end Plate connection with only one bolt row can resist positive moments because the position of the single bolt row is over the "compressed flange" of the beam. Of course we must expect very small design moment resistance (at least in typical connections) because of the small lever arm  $Z$  (fig.8.3). For the particular example the values of design resistance moment is  $M_{Rd}=4.81\text{kNm}$  and the value for design resistance in shear is  $V_{Rd}=57.90\text{kN}$ .

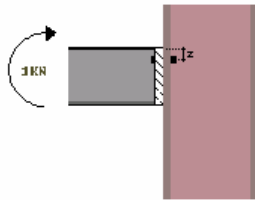


FIG. 8.3



## Example 9

Find the moment and shear resistance of the bolted connection of the joint shown in figure 9.1. The column is HEA 140, the beam is a IPE 140 and the angle cleat is a 100X50X10.

Bolts type is M12, their quality is 8.8 and the steel quality of the connected members is Fe360.

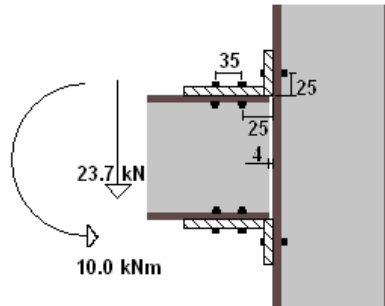


Fig. 9.1

The Input Data form for this example must look like this:

**INPUT DATA OF MOMENT CONNECTIONS**

**Connection** | Bolts / Angle Cleats | Forces

**General connection data**

Column: HE-A140 | Beam length: 3500  
Beam: IPE140 | Gap: 4  
Steel quality: Fe360

Welded Column |  Two beams  
 Welded Beam |  Braced frame  
 Enable beam's flange and web in compression check.

**Supl. web plate**  
Thick ts: [ ]  
Plates no: [ ]  
Type: [ ]

**Stiffeners**  
 Stiffner up  
 Stiffner diag.  
 Stiffner down  
Stiffner's Width: [ ]  
Stiffner's Thickness: [ ]

Ok | Help | Cancel



Then we shall press the “Bolts/Angle Cleats” Tab to enter the rest of the data

First we select the “Not Equal” option and then the cleat 100X50X10. Then we select the bolts type M12 of 8.8 quality.

The input data form will look like this:

The screenshot shows a software dialog box titled "INPUT DATA OF MOMENT CONNECTIONS" with three tabs: "Connection", "Bolts / Angle Cleats", and "Forces". The "Bolts / Angle Cleats" tab is active. It contains several input fields and options:

- Connection data:** Bolts type (M12), Bolts quality (8.8), No of Bolt Rows (1), Distance H(i) (empty), mx1 (30), mx2 (55), Wcf (empty), Wbf (empty).
- Preloaded bolts:** A checkbox that is unchecked. Below it are "Edge type" and "Conn. Category" dropdown menus.
- Holes type:** Radio buttons for Normal holes (selected), Oversized holes, Long slotted holes, and Short slotted holes.
- Backing plates:** A checkbox that is unchecked. Below it are "Position" radio buttons (Up selected, Down, Up + Down) and a "Thickness" input field.
- Forces:** Radio buttons for Equal, Not Equal (selected), and Custom Sized.
- Dimensions table:** A table with the following values:

H =	100
B =	50
t =	10
W1 =	55
W2 =	0
W3 =	30
A =	1410
r1 =	9
r2 =	4.5
Length =	0
- Cleat selection:** A dropdown menu showing "L100X50X10".

At the bottom of the dialog are "Ok", "Help", and "Cancel" buttons.

The program automatically fills all the fields with the values found in the angle cleats database. But we are not obliged to keep these values.

So we shall increase the number of bolt rows from 1 to 2 and determine the other dimensions as in the form shown below:

**INPUT DATA OF MOMENT CONNECTIONS**

Connection		Bolts / Angle Cleats		Forces																							
<b>Connection data</b>				<input type="radio"/> Equal <input checked="" type="radio"/> Not Equal <input type="radio"/> Custom Sized																							
Bolts type	M12	No of Bolt Rows	2	<table border="1"> <tr><td>H =</td><td>100</td></tr> <tr><td>B =</td><td>50</td></tr> <tr><td>t =</td><td>10</td></tr> <tr><td>W1 =</td><td>55</td></tr> <tr><td>W2 =</td><td>0</td></tr> <tr><td>W3 =</td><td>30</td></tr> <tr><td>A =</td><td>1410</td></tr> <tr><td>r1 =</td><td>9</td></tr> <tr><td>r2 =</td><td>4.5</td></tr> <tr><td>Length =</td><td>73</td></tr> <tr><td colspan="2">L100x50x10</td></tr> </table>		H =	100	B =	50	t =	10	W1 =	55	W2 =	0	W3 =	30	A =	1410	r1 =	9	r2 =	4.5	Length =	73	L100x50x10	
H =	100																										
B =	50																										
t =	10																										
W1 =	55																										
W2 =	0																										
W3 =	30																										
A =	1410																										
r1 =	9																										
r2 =	4.5																										
Length =	73																										
L100x50x10																											
Bolts quality	8.8	Distance H(i)	1																								
		Distance H(i)	30																								
mx1	25	mx2	35																								
Wcf	40	Wbf	40																								
<input type="checkbox"/> Preloaded bolts																											
Edge type		Conn. Category																									
<b>Holes type</b>		<input type="checkbox"/> Backing plates																									
<input checked="" type="radio"/> Normal holes		Position	Thickness																								
<input type="radio"/> Oversized holes		<input checked="" type="radio"/> Up																									
<input type="radio"/> Long slotted holes		<input type="radio"/> Down																									
<input type="radio"/> Short slotted holes		<input type="radio"/> Up + Down																									
<input checked="" type="checkbox"/> Shear plane																											
<input type="checkbox"/> Corrosive influence																											
Ok		Help		Cancel																							

Then after entering the forces of the connection we press OK to solve.

After showing the results form we see that the connection can not resist the applied moment, as you can see below:

**STRENGTH RESULTS OF BOLTED CONNECTIONS**

example9

		Bolt row Nr	
		1	
Column's web panel in Shear Vwp,Rd			112.202
Column's web in compression Fc,wc,Rd			117.722
<input checked="" type="checkbox"/> Beam's flange and web in compression Fc,fb,Rd			141.729
Column's web in tension Ft,wc,Rd			54.123
Column's flange in bending Ft,fc,Rd			95.695
Angle Cleat in bending Ft,ac,Rd			76.168
Final resistance of bolt row Fti,Rd			54.123
Bolt's resistance in shear		32.371	
Bolt's resistance in tension		48.557	
Bolt's resistance in bearing (Column)		35.022	
Bolt's resistance in bearing (Beam)		23.028	
		Shear resistance of each bolt row	
		Row Nr	1
			38.970
Moment resistance		-9.20	Next
Shear resistance		103.71	Exit

The critical check is the one of the column's web in tension. So we can reinforce the connection by adding a supplementary web plate with 8mm thickness as shown below:

STRENGTH RESULTS OF BOLTED CONNECTIONS			
example9			
		Bolt row Nr	1
Column's web panel in Shear $V_{wp,Rd}$			161.465
Column's web in compression $F_{c,wc,Rd}$			197.401
<input checked="" type="checkbox"/> Beam's flange and web in compression $F_{c,fb,Rd}$			141.729
Column's web in tension $F_{t,wc,Rd}$			77.424
Column's flange in bending $F_{t,fc,Rd}$			95.695
Angle Cleat in bending $F_{t,ac,Rd}$			76.168
Final resistance of bolt row $F_{t,Rd}$			76.168
Bolt's resistance in shear	32.371	Shear resistance of each bolt row	
Bolt's resistance in tension	48.557	Row Nr	1
Bolt's resistance in bearing (Column)	35.022		28.472
Bolt's resistance in bearing (Beam)	23.028		
No need of plug welds or bolts in supplementary web plate.			
Moment resistance	-12.95		Next
Shear resistance	93.21		Exit

Now the connection resists the applied moment. It is important to note that the column's web in tension check is not any more the critical one. Now the angle cleat is failing, and if we wanted to reinforce it again we should change the angle cleat type.

## Example 10

Check if the base plate connection in fig 1.1 resists the following applied moments and forces  $M=44\text{kNm}$  ,  $V= 25\text{kN}$ ,  $N=120\text{kN}$ . Anchors M30/S355.

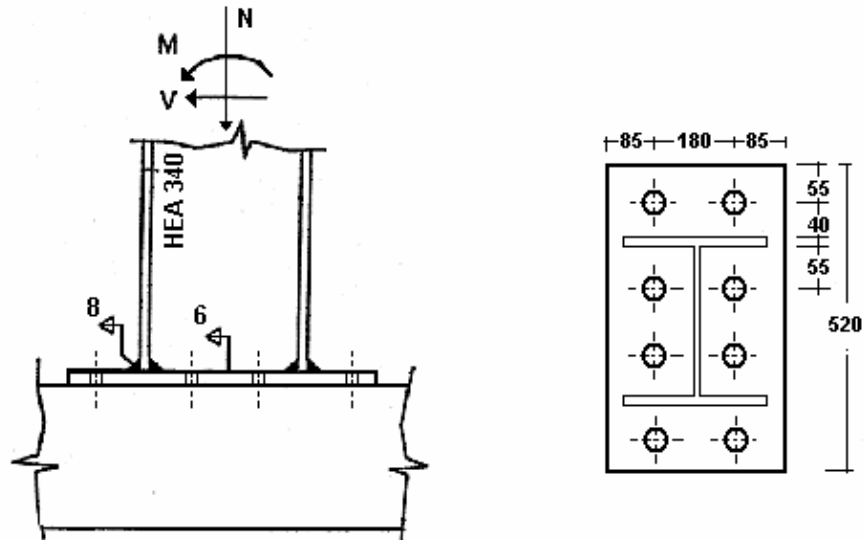


Fig 1.1

The Input Data forms according to the data of this example are the following:

Foundation Connection-EC3

**General connection data** Anchors/Plates

Column: HE-A340 Steel: Fe360 Concrete: C20/25

Af: 5 Aw: 4.25

Welded Column

Applied Forces

Moment: 44 Shear: 25 Axial: -120

Foundation design

Ar: 600 Br: 600 H: 1200

Ok Help Cancel

Foundation Connection-EC3

General connection data Anchors/Plates

Bolts Details

do: M30 Fe510 tp: 10

Shear Plane

Stiffeners

Thickness: 6 Height: 135

Shear Element

Type: HE-A120 Length: 130

Anchors/Plates

Footing Plate

Hp = 520 Bp = 350 Tp = 25

Connection Type

1 row/2 columns  
 2 rows/2 columns  
 4 rows/2 columns  
 2 rows/2 columns - stiff.  
 2 rows/4 columns - stiff.

Anchors Distances

W: 180 Mx1: 40 W/1: Mx2: 55

Ok Help Cancel

At the first (General connection data) form we define the general data of the connection like the cross section of the column and the quality of the material the dimensions of the concrete foundation and the applied moment and forces.

At the second (Anchors/Plates) form we define the type and the geometry of the connection, the type of anchors, the stiffeners and the shear element if they exist. Note that because of the double symmetric of the connection only the distances from the one flange of the column required.

In case the connection has a shear element all the shear force is considered to be applied on it.

If there is no shear element the program checks also the anchors in shear and the base plate in bearing. If the shear plane passes through the portioned part of the anchors (reduced shear area) then the user must define it by checking the appropriate text box.

By pressing the results button the Results form appears:

Results - Foundation Connection-EC3		
<b>Applied Moments and Forces</b> Moment <input type="text" value="44.00"/> Shear <input type="text" value="25.00"/> Axial <input type="text" value="-120.00"/>	<b>Anchors Resistances</b> Anchor's Resistance in Tension <input type="text" value="247.20"/> Applied Tension <input type="text" value="8.07"/> Minimum Anchor Depth <input type="text" value="492.63"/> Anchor's Resistance in Shear <input type="text"/> Applied Shear <input type="text"/>	<b>Stiffener Plate's Resistances</b> Mrd <input type="text"/> Msd <input type="text"/> Vrd <input type="text"/> Vsd <input type="text"/>
<b>Shear Element</b> Class <input type="text" value="1"/> Mrd <input type="text" value="38.57"/> Msd <input type="text" value="15.00"/> Vrd <input type="text" value="156.89"/> Vsd <input type="text" value="25.00"/>	<b>Footing Plate's Resistances</b> Resist. of Footing Pl. in Bearing <input type="text"/> Applied Shear <input type="text"/> Str. Of Footing Plate in Tension <input type="text" value="12.53"/> Applied Tension Force <input type="text" value="8.07"/> Str. Of Concrete in Compression <input type="text" value="2876.21"/> Column's Res. in Compr. <input type="text" value="963.04"/> Min. Resistance <input type="text" value="963.04"/> Applied Compression Force <input type="text" value="152.27"/>	Applied Stress <input type="text" value="0.02"/> Welds Resistance <input type="text" value="0.24"/> <div style="text-align: center;"> <input type="button" value="Next"/> <input type="button" value="Exit"/> </div>

The resistance of the connection is checked by the resistance of its basic components.

As concerns the shear element the program classifies its cross section and compares the resistance in moment and shear with the applied moment and shear force.

The resistance of one anchor in tension is compared with the applied tension force on it. The minimum allowed anchor depth is also calculated by the program.

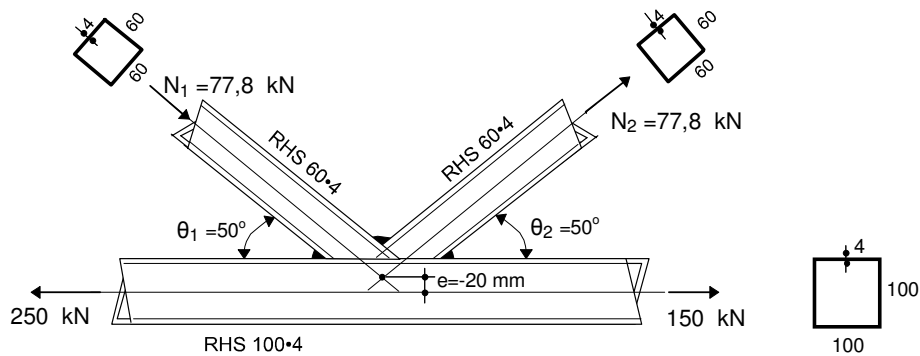
The same way the strength of the base plate in tension is checked. For the resistance in compression zone of the connection the program finds the minimum value between the strength of the concrete and the strength on the equivalent T-stub and compares it with the applied compression force.

Note that if one of the above mentioned checks fails the corresponding values are presented with red color.

## Example 11

### Hollow section joint composed from SHS cross sections.

Check the strength of the joint of the following figure if the overlap of the diagonal braces is  $\lambda_{ov} = 40\%$ , and the steel quality of the connected members is Fe 360.



**figure 1.** Hollow section joint

**Range of validity of the EC3.**

$$\frac{b_i}{b_o} = \frac{60}{100} = 0,60 > 0,25$$



$$\frac{b_1}{t_1} = \frac{60}{4} = 15 < 1,1 \sqrt{\frac{E}{f_{y,i}}} = 1,1 \cdot \sqrt{\frac{210000}{235}} = 32,9 \quad (\text{compression})$$

$$\frac{b_2}{t_2} = \frac{60}{4} = 15 < 35 \quad (\text{tension})$$

$$\frac{b_o}{t_o} = \frac{100}{4} = 25 < 35 \quad (\text{tension})$$

$$\frac{h_i}{b_i} = \frac{h_o}{b_o} = 1 \begin{matrix} > 0,5 \\ < 2,0 \end{matrix}$$

25 % <  $\lambda_{ov} = 40$  % < 100 %, and

$$\frac{b_1}{b_2} = \frac{60}{60} = 1 > 0,75$$

From the above we conclude that the joint is in the range of validity of the EC3

Cross sections category 1 (pure compression)

$$f_y = 235 \text{ N/mm}^2 < 355 \text{ N/mm}^2$$

$$t_i = 4 \text{ mm} > 2,5 \text{ mm}$$

$$t_o = 4 \text{ mm} < 25 \text{ mm}$$

$$\min\theta_i = 30,96^\circ > 30^\circ$$

$$e = -20 \text{ mm} > -0,55 d_o = -0,55 \cdot 100 = -55 \text{ mm}$$

(we can ignore the moments resulting from the eccentricity).

**Resistance of the joint according to EC3 (table 7.10).**

We have to check only the overlapping braced member.

$$b_{\text{eff}} = \frac{10}{100} \cdot \frac{235 \cdot 4}{235 \cdot 4} \cdot 60 = 24 \text{ mm} < 60 \text{ mm}$$

$$b_{\text{e,ov}} = \frac{10}{60} \cdot \frac{60 \cdot 4}{60 \cdot 4} \cdot 60 = 40 \text{ mm} < 60 \text{ mm}$$

$$k_{\eta} = 1,0 \quad (\text{tension})$$

for :  $(25 \% < \lambda_{\text{ov}} = 40 \% < 50 \%)$

$$N_{2,\text{Rd}} = 23,5 \cdot 0,4 \cdot \left[ 2,4 + 4 + \frac{40}{50} \cdot (2 \cdot 6 - 4 \cdot 0,4) \right] \frac{1,10}{1,10} = 138,4 \text{ kN} > 77,8 \text{ kN}$$

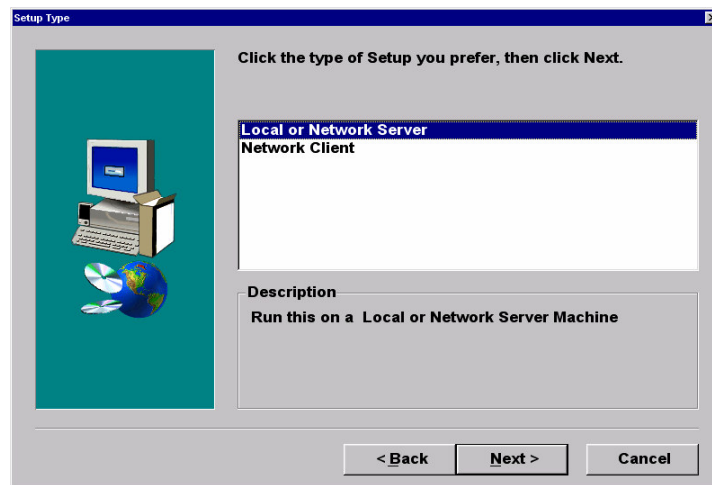
For steel quality Fe 360 :

$$\frac{\alpha}{t} = \frac{3,5}{4} = 0,875 > 0,84 \quad \alpha = 0,84$$

The resistance of the joint and the welds is sufficient.

## Installation Instructions.

1. Insert the installation CD into the CD-ROM drive.
2. If AutoRun is enabled on your system, the Steel Connections Autoplay form will appear on your screen. Otherwise, double click the 'My Computer' Icon on your Windows Desktop, then Right-click on your CD-ROM drive icon and click **Autoplay**.
3. Click on the **Installieren** Button to proceed with the installation or otherwise click on the **Abort** Button to abort the Installation.
4. Follow the instructions on screen to complete the installation.
5. When the Setup type form appears:

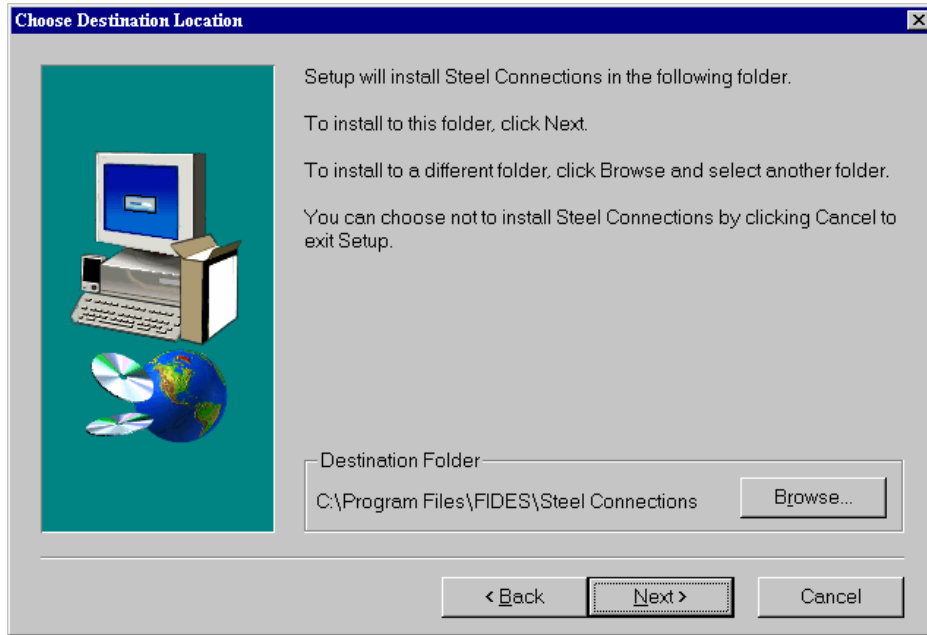


Choose according to the following description:

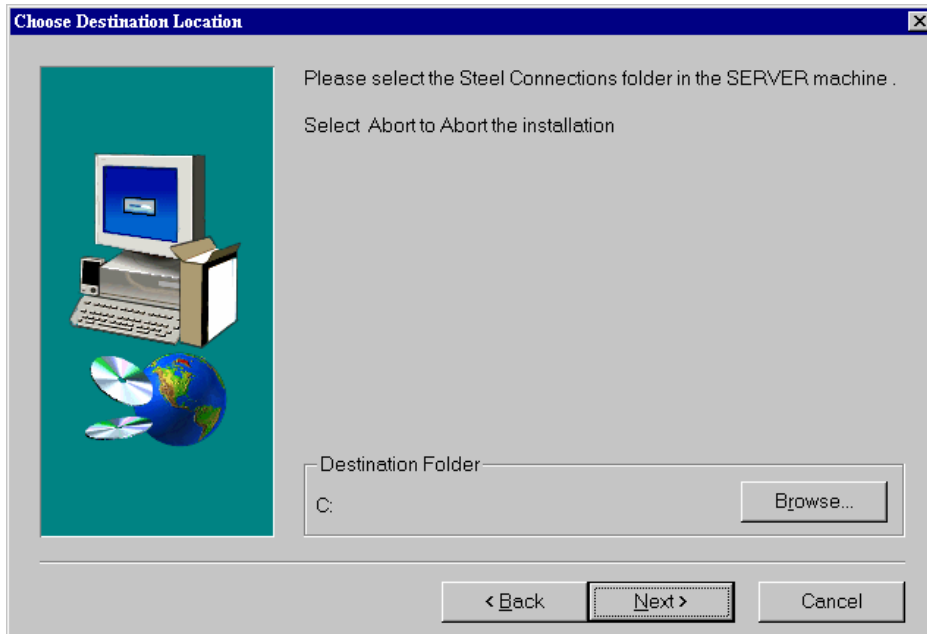
- If you are installing Steel Connections to run from a single computer (that is having obtained a *demo* or *local* license) Or if you are installing the Server portion of a Network Installation choose *Local or Network Server*.
- If you are installing a Steel Connections Network client, choose *Network client*.

Next one of two forms appear according to the kind of installation we choose to perform in the previous step.

- If you have chosen *Local or Network Server* the following screen prompts you for a destination folder where the steel Connections files will be installed



- If you have chosen *Network client* the following screen prompts you for the folder on the server where the Steel Connections (Network server installation) application resides



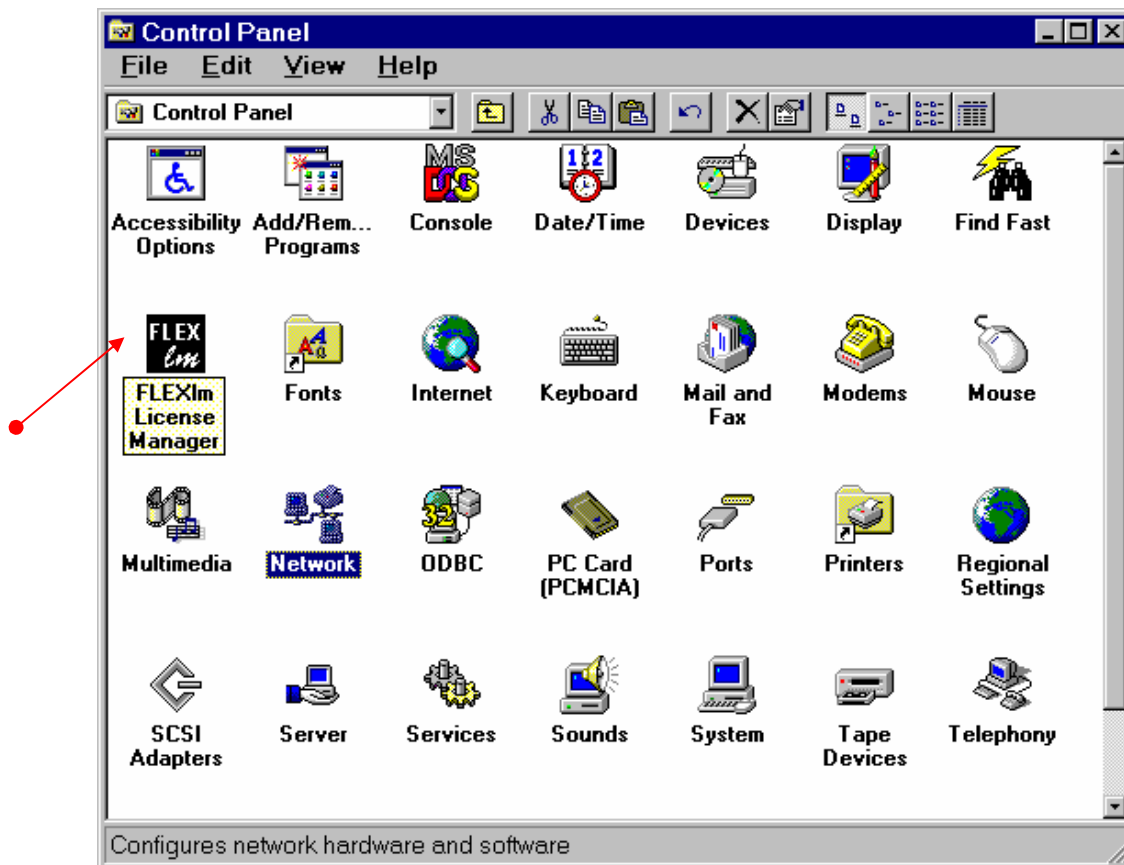
The selection of this folder is needed in order to create the shortcuts at your desktop and start menu. If you like you can omit this step and manually create the shortcuts later.

## SETTING UP YOUR APPLICATION IN THE NETWORK

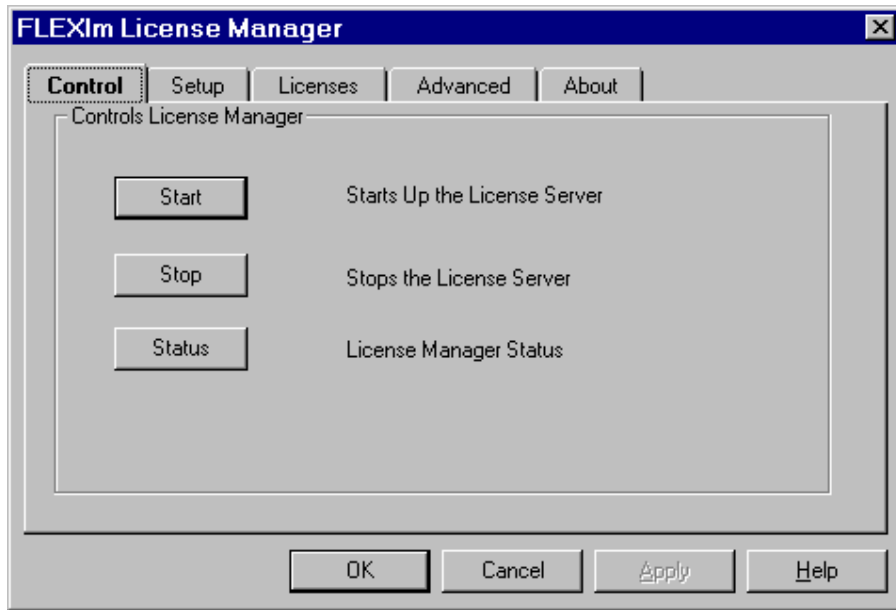
In case you have purchased the multi user version of the program, you will have to set up the authentication and licensensing checking on your license server computer first, before running the application. The license Checking software relies on the TCP/IP protocol to ferry license information through your network, so before doing anything else, you will have to set up TCP/IP for every workstation that is going to run the application. Please refer to your operating System Manual for Details on that procedure.

To configure the license Checking Software you'll have to start the licensing checker control center utility provided with your setup disks, which is installed in your system as a control panel application.

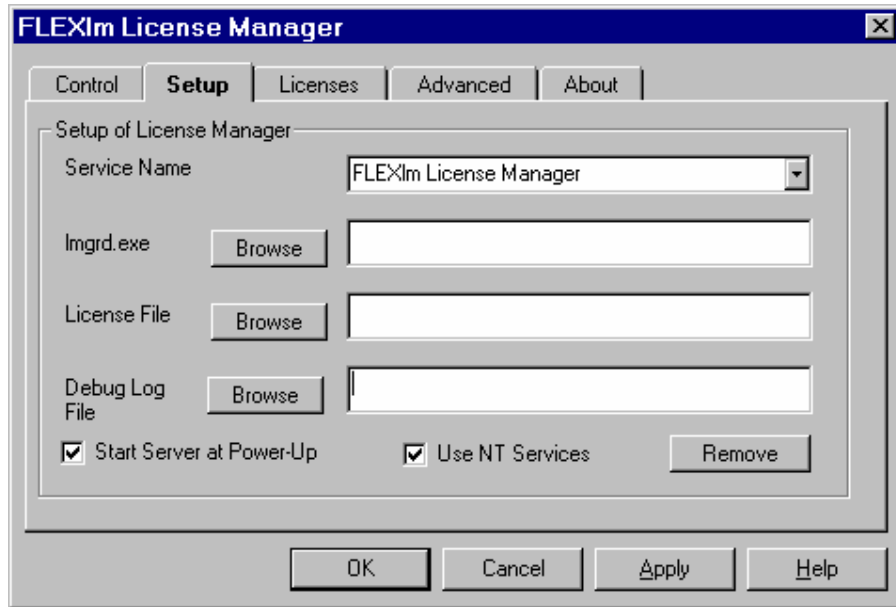
Start control panel (Start Menu\Settings\Control Panel) double click on the FLEXIm License Manager icon as seen in the following screen shot.



And the Flexlm control centre will appear on your screen:



Click on the Setup tab and you will see the following card:



Then you will have to fill in the fields for Imgrd.exe, License File and Debug Log File.

The first two files are located in the \Protect directory under the directory you chose to install the application (\Program Files\Fides\Steel Connections\ by default). The log file is created the first time you start the licensing checker.

You can click on the Browse button and locate the files by a standard open file dialog

Or type the complete pathname of the files in the corresponding fields.

Note that after using Browse to locate a file, locating the rest in same way starts the open file dialog in the same directory chosen before.

After providing this information you must check out:

- Both the *Start Server at Power-Up* and Use NT Services check boxes if your system is Windows NT and you would like to start the license checker automatically every time you start your computer or only the *Use NT Services* check box in case you like to start the license checker manually before starting the application
- Or only the *Start Server at Power-Up* check box if your System is Windows 95 and you would like to start the license checker automatically every time you start your computer.

**Note that in that case the *Use NT Services* check box is grayed out and cannot be checked.**

You can stop the automatic startup of the license checker at any later time by starting the Licensing checker control centre, going to the Setup tab and pressing the Remove button.

After doing all that, you must press the Apply button in order to make changes permanent. The control utility will prompt you with a Yes, No, Cancel message box,

Press the Yes button to complete the action.

**That's all you need to do to set up the license checker. You can now either restart your computer in order to start the license checker (if you chose the Start Server at Power-Up option) or press the control tab on the license checker control centre window in order to manually control the license checker.**

As you can see in figure 2 there are 3 buttons in the control tab:

- Start : starts the license checker
- Stop : stops the license checker
- Status : Checks the status of the license checker

Note: Clicking on the License Tab of the license checker control centre lets you edit your license in Notepad. DO NOT change your license file unless you know what you 're doing. Modifying your license file may render it useless and prevent the application from starting. Handling of the license file is done through the special application supplied with your installation CD.



## STARTING THE APPLICATION FOR THE FIRST TIME

After setting up the license checker you may try to launch the application by clicking on its icon on the programs section of start menu. Every time the application starts, it tries to validate your license. In case it can't do so it displays a message describing what it thinks went wrong.

If something is wrong with your license or if you are starting the application for the first time you must (re)enable your license by starting Mr. Register (register.exe) located in the \protect folder under the folder you installed your application.

This has the following form:

The screenshot shows a Windows-style dialog box titled "Registration Form". At the top left, it features the logo for "FIDES DV-PARTNER SOFISTIK SYSTEMHAUS". The "Date" field is set to "10/6/1998".

Step 1: "Select a Program :". The "Program Component" dropdown is set to "STeelCON" and the "Version" dropdown is set to "1998.100".

Step 2: "Select a License Type :". Three radio buttons are present: "Demo License", "Local License" (which is selected), and "Network License".

Below the license selection, it says "This is Your Computer's ID" followed by a text box containing the alphanumeric string "18766A18C3D13BD3".

Step 3: "Enter your firm details :". A button labeled "Entry Form" is located to the right.

Step 4: "Request your authentication Code :". A button labeled "Print Fax Page" is located to the right.

Below step 4, there is a note: "Procede to step 5 after you have obtained your registration code from FIDES DV-Partner".

Step 5: "Complete the registartion process :". A button labeled "Register" is located to the right.

At the bottom center is an "OK" button. At the bottom right are two small icons representing the German and British flags.

You must enter the required information in the fields to reflect your correct license in case it is damaged or you can specify a new license adding or even removing permissions. That is provided you own a license key to validate that you really have the right to use what you asked for.

You can choose from the following 3 basic license styles:

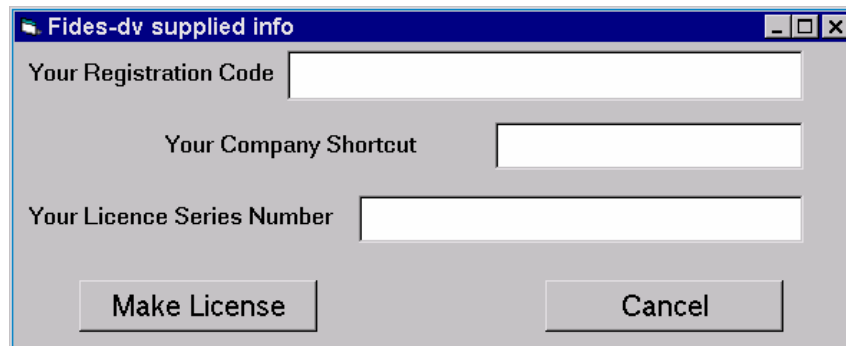
Demo: A license expiring in 6 weeks.

Local: A license for a single computer.

Network: A license for many computers running from a central Server also used for license checking.

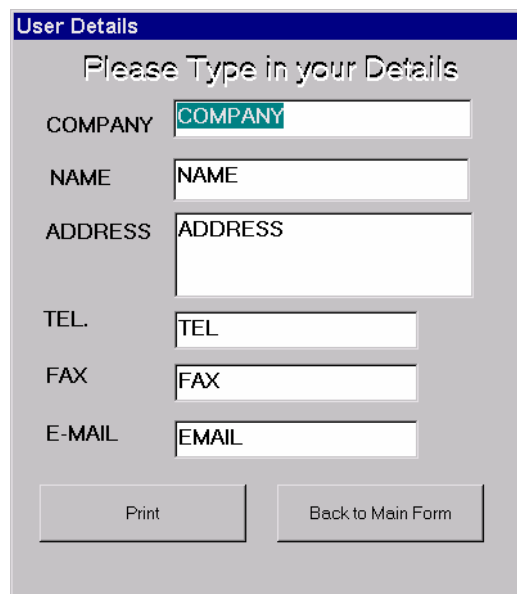
- You must type in a valid date if you go for a Demo license
- Your Server computer name or better its IP address and how many network licenses you want If you go for a Network license

After filling the fields you can press the Register Button and the following form appears:



The screenshot shows a dialog box with a blue title bar containing the text "Fides-dv supplied info". Inside the dialog, there are three text input fields: "Your Registration Code", "Your Company Shortcut", and "Your Licence Series Number". At the bottom of the dialog, there are two buttons: "Make License" and "Cancel".

Here you fill in info supplied by us after we have received a letter/FAX with your request.



The screenshot shows a form titled "User Details" with a blue header. Below the header, it says "Please Type in your Details". There are six text input fields labeled "COMPANY", "NAME", "ADDRESS", "TEL.", "FAX", and "E-MAIL". The "COMPANY" field contains the text "COMPANY". At the bottom of the form, there are two buttons: "Print" and "Back to Main Form".

By pressing print on the first form a third one appears with all of your details to fill in and print your request by clicking the print button so you can fax it to us and we will sent you your registration Code, your company Shortcut and your license serial number which you can enter in the appropriate field of the previous form and get your application ready to start.