

THE BEHAVIOUR OF A MULTI-STOREY STEEL FRAMED BUILDING SUBJECTED TO FIRE ATTACK

EXPERIMENTAL DATA

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British Steel

SWINDEN TECHNOLOGY CENTRE
WORLD BEATERS IN APPLIED STEEL RESEARCH

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Forward

During the last three years British Steel's Swinden Technology Centre in Rotherham has been leading a major European fire research programme on a modern multi-storey composite steel framed structure built within the BRE large scale test facility at Cardington. This project was co-sponsored by the European Coal and Steel Community (ECSC) with TNO (The Netherlands) and CTICM (France) as partners.

One of the principal objectives of the research programme was to understand and develop numerical calculation procedures that are capable of describing and predicting the structural behaviour of modern multi-storey composite steel framed buildings subject to fire attack. This involved four major fire tests being carried out on different parts of the frame to study various aspects of structural behaviour and included a real full scale demonstration fire in an open plan office. Because of the uniqueness of the experimental programme in terms of the size and scope of the tests, the project team are pleased to be able to make the data available to other research organisations involved in understanding and the development of fire safety engineering applied to steel framed buildings.

British Steel Swinden Technology Centre would welcome hearing from other organisations who have used the information provided in developing numerical calculations for describing both the thermal and structural response of steel structures in fire by writing to the address given below.

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Introduction

This document and the accompanying CD has been prepared so that researchers in the field of Fire Safety Engineering have ready access to the actual data electronically logged during each of the four fire tests.

The format of the document is such that a general description of the location and construction of each test within the BRE 8-storey building is provided followed by detailed drawings showing the exact location of each piece of instrumentation. Each drawing refers to a data file which is cross referenced with the actual data stored on the CD.

The data on the CD can be accessed using **Windows 95 with Microsoft Internet Explorer**. In the **Address Window** type **X:\BREDISKS\INDEX.html** click on **hyperlinks** to access menus/data. For X insert letter of CD port.

The BRE 8-Storey Frame

The experimental programme was conducted on the 8-storey frame built within the UK Building Research Establishment large scale test facility at Cardington. This is a composite steel and concrete structure designed to meet current UK national design codes (BS 5950) and checked for compliance with the provisions of the EC3 ENV 1993-1-1. The structure is a braced frame incorporating three stiff cores (a central lift shaft and two stair wells at either end of the building), with primary partial depth end plate and secondary fin plate connections.

Composite action is achieved by shear studs welded through trapezoidal steel decking onto both the primary and secondary beams. The slab was cast using lightweight concrete with an in-situ density of 1900kg/m^3 to provide a maximum floor thickness of 130 mm. This incorporates an A142 anti-cracking mesh.

The structure is laid out in five 9m bays along the elevation and 6m-9m-6m bays across the gables thereby providing a total floor area in plan of 45m x 21m. In order to rationalise on sizes, standardise on connection details and so reduce fabrication and erection costs, only four beam sections (254UB trimmers, 305UB ribs, 356UB and 610UB spine members) and three column sections (305UC x 198 & 118kg/m and 254UC x 89kg/m) were used. The internal columns were spliced twice within the height of the structure whereas the peripheral columns were spliced only once. Figure 1 shows the general floor layout.

Table 1 provides details of the floor loading for the structure. It will be noted that the design imposed floor loads were taken to be 2.5kN/m^2 on all floors except for the roof which was designed to support a plant room with 7.5kN/m^2 loading. With the exception of the 5th floor, the

imposed loads were obtained with sand bags each weighing 11 kN uniformly distributed throughout the building.

Table 1: Details of Floor Loading

Load Case	Value (kN/m²)
Composite slab	2.06
Steel sections	0.25
Raised floor	0.4
Services	0.25
Ceiling	0.15
Partitions	1.0
Imposed	0.83 ($\frac{1}{3}$ design load)

It should be noted that although the purpose of the building was for conducting research it was designed and built under normal commercial pressures and is therefore a 'real structure.'

Fire Tests

In the programme four major fire tests were designed and carried out to investigate different aspects of structural behaviour. These increased in complexity as the programme progressed and are generically referred to as:

- (i) 1D - Restrained Beam
- (ii) 2D - Plane Frame
- (iii) 3D - Corner
- (iv) Office Fire (Demonstration)

(i) 1D - Restrained Beam

The objective of the first test was to understand the structural deformation mechanisms involved when a single beam is heated and restrained by a composite slab spanning in two directions with the surrounding steel frame remaining at ambient temperature.

The test was carried out on the 7th floor of the building as shown in Figure 2 around a 305 x 165mm UB spanning 9 m into the minor axes of a pair of 254 x 254 UC's. In view of the importance of achieving a uniform temperature profile along the length of the beam and maintaining the connections as near as possible at ambient temperature, a gas fired furnace 8 m long x 3 m wide was built up to the underside of the composite floor. This incorporated a flexible ceramic fibre curtain fixed between the steel decking and the top of the furnace to allow the beam and surrounding floor to vertically deflect unimpeded. Ceramic fibre collars were also fitted around the ends of the beams as they passed through the furnace walls to minimise spurious heat losses.

Temperature measurements:

Locations for measuring the temperature profiles through the heated beam and composite floor slab are shown in Figures 3 and 4.

Strain gauge measurements:

Localised strain was measured at the ends of the beam around the connections, on the surface of the floor slab immediately above the test beam as well as in the concrete reinforcement, see Figures 5-7. In addition, Figure 8 provides the correction factor to be applied to the high temperature strain gauges fitted to the ends of the test beam, just outside the furnace line.

Vertical deflection:

Vertical deflection along the test beam was measured through the floor slab directly above the upper flange as well as the relative movement between the lower flange tips, see Figure 9.

Lateral displacements:

Lateral displacements (thermal expansion effects) were measured between the columns around the test beam as shown in Figure 10.

Rotation measurements:

Locations for measuring rotation at the connections and along the length of the test beam are illustrated in Figure 11.

(ii) 2D - Plane Frame

The second test was designed to evaluate the behaviour of a series of beams and columns supporting the fourth floor by taking a 2D slice across the full width of the building as shown schematically in Figures 12 and 13. It was also necessary to determine how important fire protection should be extended around the type of connection used in the BRE frame when the columns would normally be insulated. For these reasons, all the columns were lightly protected up to a height of 200 mm below the connections. The beams as well as the beam/beam and beam/column connections remained totally exposed.

To heat the structure a gas fired furnace 21 m long x 4 m high was constructed to form a 2.5 m wide corridor across the full width of the building. This incorporated a ceramic fibre curtain fitted between the underside of the steel decking and the top of the wall to allow the floor slab to deflect without providing additional support. Slots were also built in the wall to allow the secondary beams to deflect and for instrumentation bars to transmit the movement of the internal structure to externally placed transducer measuring systems. Heating was provided by eight independent industrial burners mounted on one side of the furnace near floor level. The final test arrangement was over four times longer than the normal Standard fire resistance furnace and is believed to be the largest gas fired test furnace ever constructed within a steel framed building. Detailed structural drawings of the test compartment are shown in Figures 14-16.

Temperature measurements:

Figures 17A-C identify the locations of the temperature profiles measured along the beams (primary and secondary), at the connections, around the columns and through the composite floor slab immediately above the furnace.

Strain gauge measurements:

Strain gauges were fitted to the columns above, below and within the test compartment behind the fire protection (high temperature type) as indicated in Figures 18A-D. For the latter a correction for temperature as given in Figure 8 can be applied.

Vertical deflection:

Vertical deflection of the primary beams within the test compartment were measured relative to the floor above. The measuring locations are identified in Figure 19 and in each case both the upper flange and relative movement between the lower flange tips were monitored as shown in Figure 20. Note however, that as result of structural movement in the frame above the furnace during the latter stages of the test, these measurements are not absolute.

Column displacements:

Instrumentation for measuring lateral displacement of the columns at the height of the test furnace is illustrated in Figure 21. For the edge columns, movement was measured relative to the Cardington building and therefore are absolute values.

Rotation measurements:

Rotations at each of the main connections within the test compartment were measured as illustrated in Figures 22 and 23.

(iii) 3D - Corner

The objective of the third test was to evaluate the behaviour of a complete composite floor system and in particular the importance of membrane action. However, since it was also necessary to create a 'real' fire to achieve the required level of thermal input into the structure, instrumentation was included to provide additional information that would be helpful in the validation of the parametric equations for fire growth given in EC1 ENV 1991-2-2 'Actions on structures exposed to fire'.

A compartment with a floor area of approximately 80 m² was built on the first floor in one corner of the structure as shown in Figure 24. To ensure that the gable end walls and wind posts did not provide a load bearing function, all restraints and ties were removed. Figures 25-27 show details on the construction of the compartment and as in the previous tests a gap of approximately 400 mm was provided between the top of the walls and the underside of the steel decking to permit unimpeded movement of the floor slab. This was closed off with 50 mm ceramic fibre blanket. Slots in the wall construction were also provided below the beams as they passed through the

compartment to ensure no additional support was given to the floor slab. In essence the wall structure was no more than a non-loadbearing construction for containing the fire.

Ventilation was provided by a single 7 m wide opening partially covered by an adjustable insulated screen. Although the initial ventilation conditions were pre-calculated to provide an effective opening factor $A_v \sqrt{h} / A_o$ of $0.031 \text{m}^{1/2}$ (modified to take account of the thermal properties of compartment boundaries), the screen allowed some control over the burning rates and temperatures attained within the compartment.

Based upon the behaviour of the structural frame in the 2D - plane frame test, all the columns were protected to their full height including the main beam to column connections, using 25 mm ceramic fibre blanket. The edge beams were also protected in the same manner. However, all the internal beams (primary and secondary) remained **totally** exposed including the beam to beam fin plate connections.

To test the structure it was necessary to develop temperatures of around 1000°C . From EC1, this was achieved with a fire loading of $45 \text{ kg of wood/m}^2$ of floor area accompanied by a small increase in the ventilation conditions during the test to an effective opening factor of $0.034 \text{m}^{1/2}$.

Temperature measurements:

Temperature profiles were measured in the beams, columns and connections as well as in the floor slab. These locations are identified in Figures 28 and 29. Temperatures of the atmosphere gases were also measured across the compartment primarily at 500 mm below the decking with additional selected positions at 1000 mm and 2000 mm, see Figure 30.

Strain gauge measurements:

The structure around the test compartment was extensively instrumented with strain gauges fitted to the columns, beams and surface of the floor slab immediately above the compartment, see Figures 31 - 38. Those fitted to the columns within the compartment were capable of operating at elevated temperatures and were positioned behind the fire protection for which a temperature correction as given in Figure 8, can be applied.

Vertical deflection:

Vertical deflection of the beams and floor slab exposed to fire were measured relative to the third floor above the compartment as indicated in Figure 39. Longitudinal thermal expansion effects of the columns around the perimeter of the compartment were also measured relative to the ground floor as shown in Figure 39.

Column displacements:

Horizontal displacements between the columns were measured at the locations identified in Figure 40.

Rotation measurements:

Rotations at each of the main connections were measured in the vertical plane as shown in Figure 41.

(iv) Office Fire (Demonstration)

The purpose of the fourth test in the programme was to demonstrate some of the important conclusions reached in the earlier studies in a more realistic fire scenario while at the same time evaluating other aspects of structural behaviour not previously addressed.

A compartment up to 18 m wide and 10 m deep was built on the first floor (see Figure 42) to represent an open plan office. Details of the construction are shown in Figures 43 - 45. While the blockwork wall construction was built in a similar manner to the previous tests by leaving a gap to the underside of the steel decking, in this test no attempt was made to decouple the existing ties and wall restraints.

The compartment was fitted out with modern day furnishings, computers and filing systems using similar proportions of wood to plastic as found from surveys carried out in modern office accommodation, Figure 46. To quantify the fire loading all the contents placed in the compartment were separated into their component parts, the materials identified, accurately weighed and re-assembled. The total fire loading available for combustion was equivalent to 45.6 kg of wood/m² of floor area which is in excess of the 95% fractile for fire loading in offices (the 80% fractile is currently proposed in draft design codes). Table 2 summarises the fire load contents.

Based upon the lessons learnt in the earlier studies, the columns were protected to their full height including the main beam to column connections using 25 mm ceramic fibre. However, both the primary and secondary beams remained **totally** exposed. The height of the external dado wall was also increased to 1350 mm. Single pane aluminium framed glazing was installed along one external wall but note that a central area within each bay remained unfilled.

In designing for the type of fire required, while it was possible to identify a wide range of scenarios the overriding factor was to create a severe condition that would 'test' the structure and generate the levels of heating that could be experienced in real building fires. For these reasons the method of ignition and the initial ventilation conditions were designed to assist fire growth and increase the likelihood of flash-over. It was also necessary to ensure that while the ventilation area was calculated to develop high temperatures, it was important that the fire did not burn-out before the structure had time to respond. These requirements were achieved with the partially glazed system installed within the external wall and starting the test by igniting several cribs made up of a combination of wood and plastic located at the rear of the compartment. Measures were also taken to reduce the height of the hot gas layer at ceiling level to increase downward radiation. Once flash-over occurred the fire was ventilation controlled with a maximum heat release rate of 58 MW.

Temperature measurements:

Temperature profiles were measured in the primary, secondary and edge beams, selected columns and connections as identified in Figures 47 and 48. The vertical temperature profile of the atmosphere gases were measured throughout the compartment including those at the windows and just outside the facade, see Figures 49 and 50.

Strain gauge measurements:

Strain gauges were installed solely along the columns within the compartment behind the protection (high temperature type), as well as immediately above the test floor. The locations are identified in Figures 51 and 52.

Vertical deflection:

Vertical deflection of the beams and floor slab were measured relative to the third floor above the compartment as shown in Figure 53.

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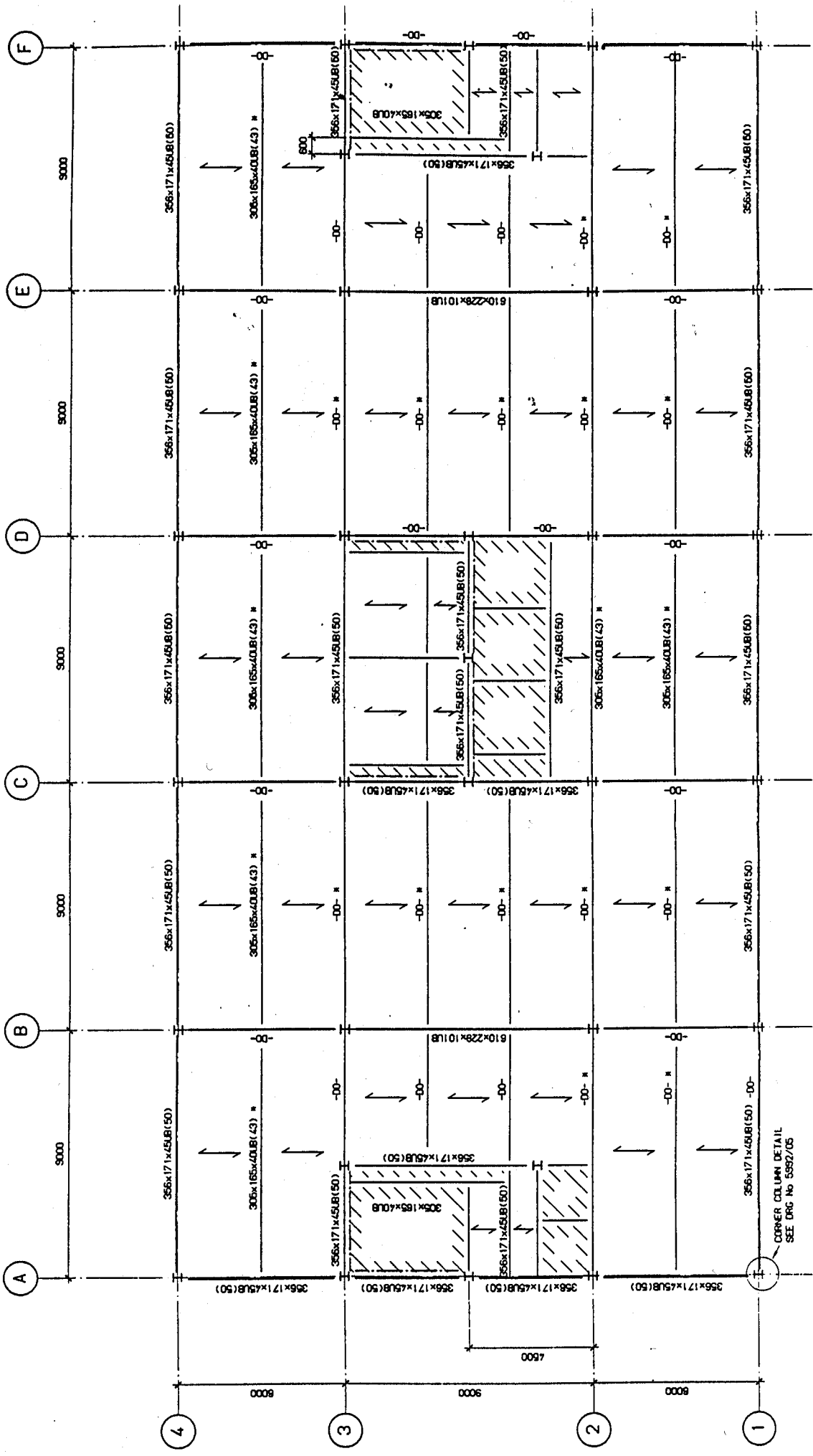
Summary of Fire Loading : Wood Equivalent**Table 2**

Location	Wood kg	Plastic kg	Paper kg	Others kg	Total kg
Work Station 1	459.7	74.4	42.8	2.3	579.2
Work Station 2	419.0	83.2	42.8	2.2	547.2
Work Station 3	543.6	76.8	26.8	2.8	650.0
Work Station 4	642.7	64.7	42.8	1.3	751.5
Manager	191.0	47.5	90.5	1.4	330.4
Secretary	158.9	46.5	110.2	4.7	320.3
Seating/Rest Area Reception	195.7	45.6	2.7	6.7	250.7
Storage: Bookshelves, Files	185.6	36.0	384.5	-	606.1
Carpet	-	501.6	-	-	501.6
Cribs	1310.0	278.0	-	-	1588.0
Miscellaneous	-	-	-	38.4	38.4
Totals	4106.2	1254.3	743.1	59.9	6163.4
% of Total	66.6	20.4	12.1	1	100

Floor Area = 135.12 m²

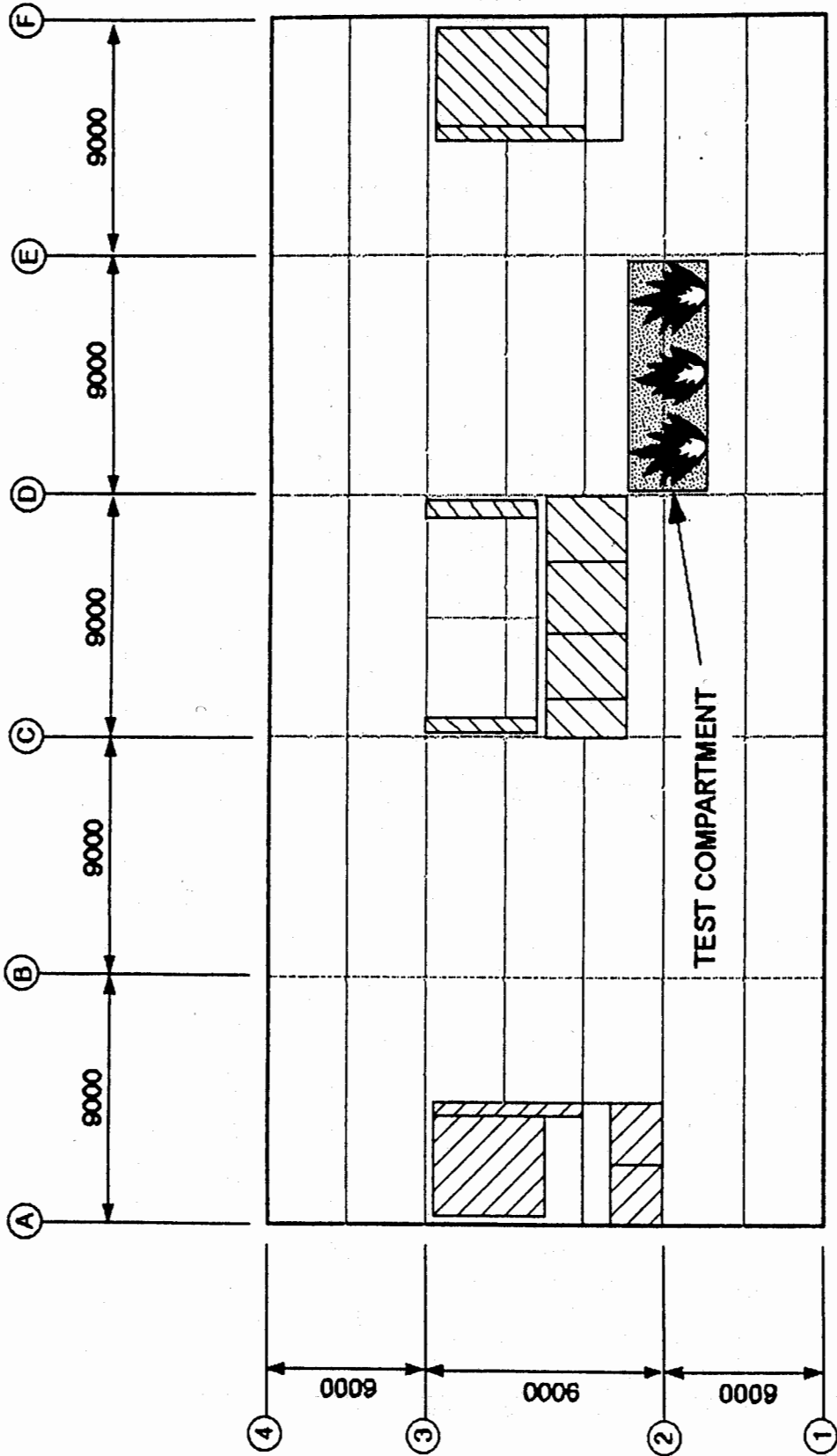
Fire Loading = 6163.4 kg of wood

Fire Load Density ≡ 45.6 kg of wood/m² of Floor Area



General Floor Layout - BRE 8-Storey Frame

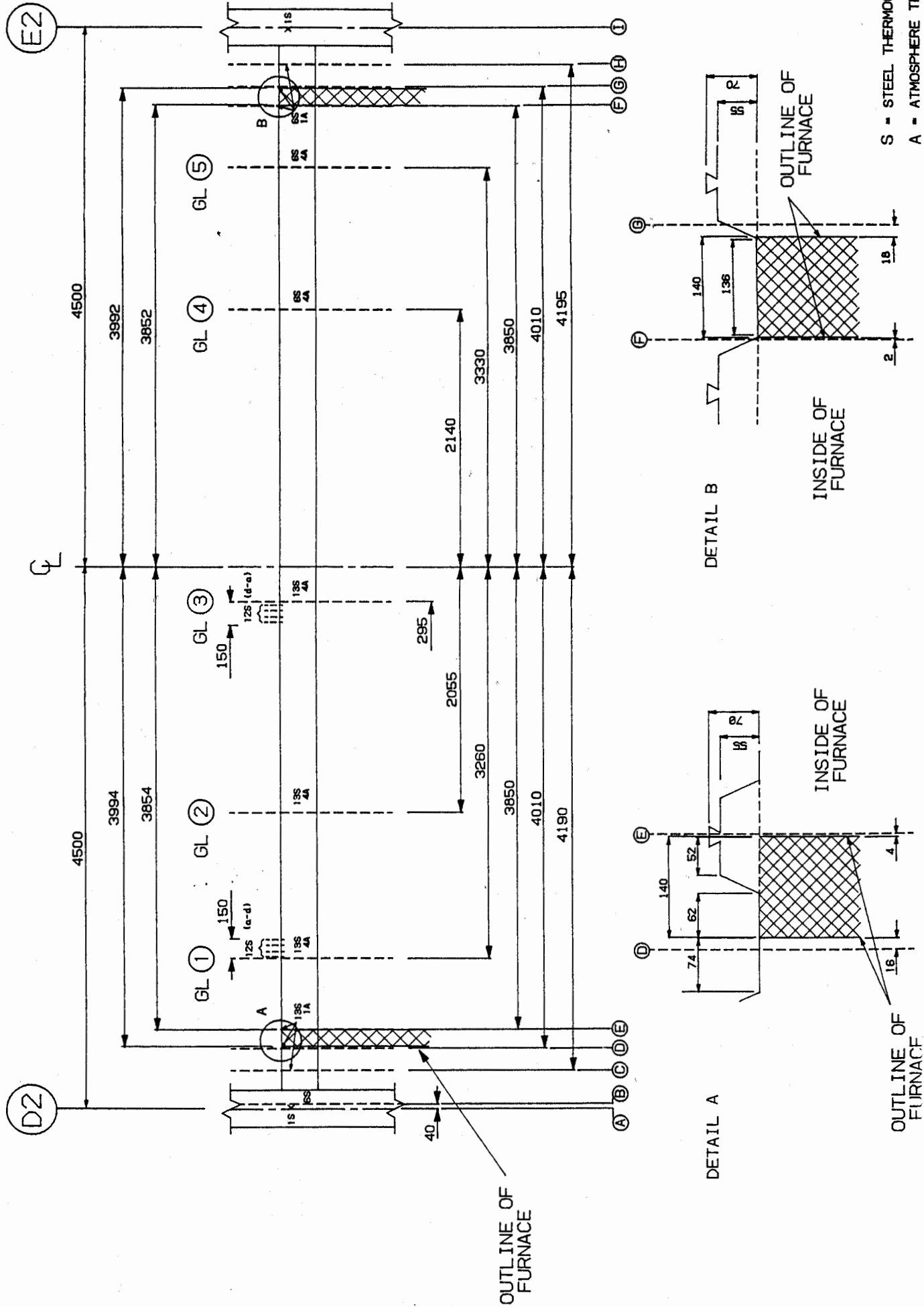
Figure 1



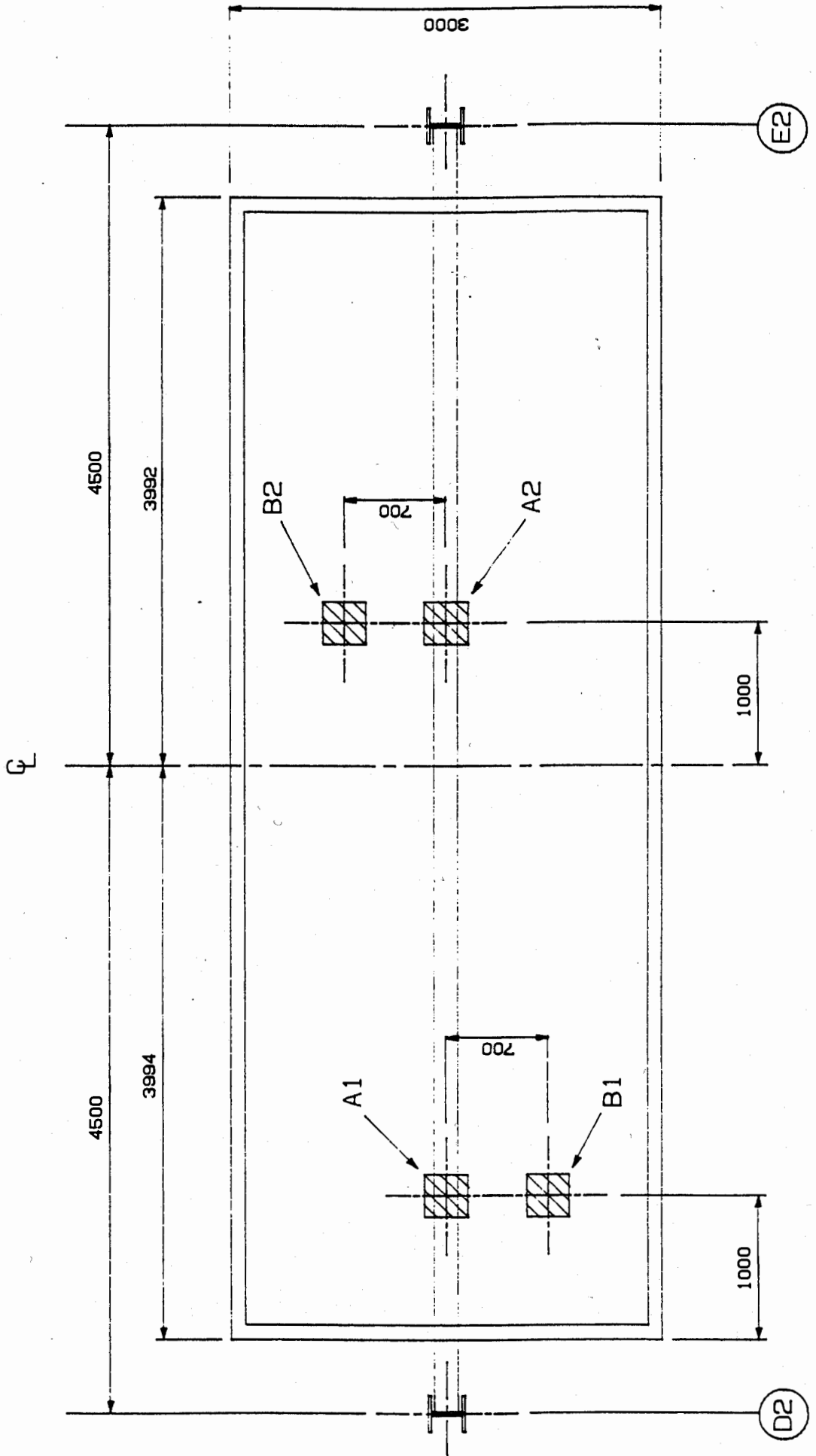
TEST 1 : RESTRAINED BEAM FIGURE 2

TEST 1 : RESTRAINED BEAM : LOCATIONS OF INSTRUMENTATION FOR MEASURING STEEL AND ATMOSPHERIC TEMPERATURE PROFILES ALONG THE TEST BEAM : Figure 3

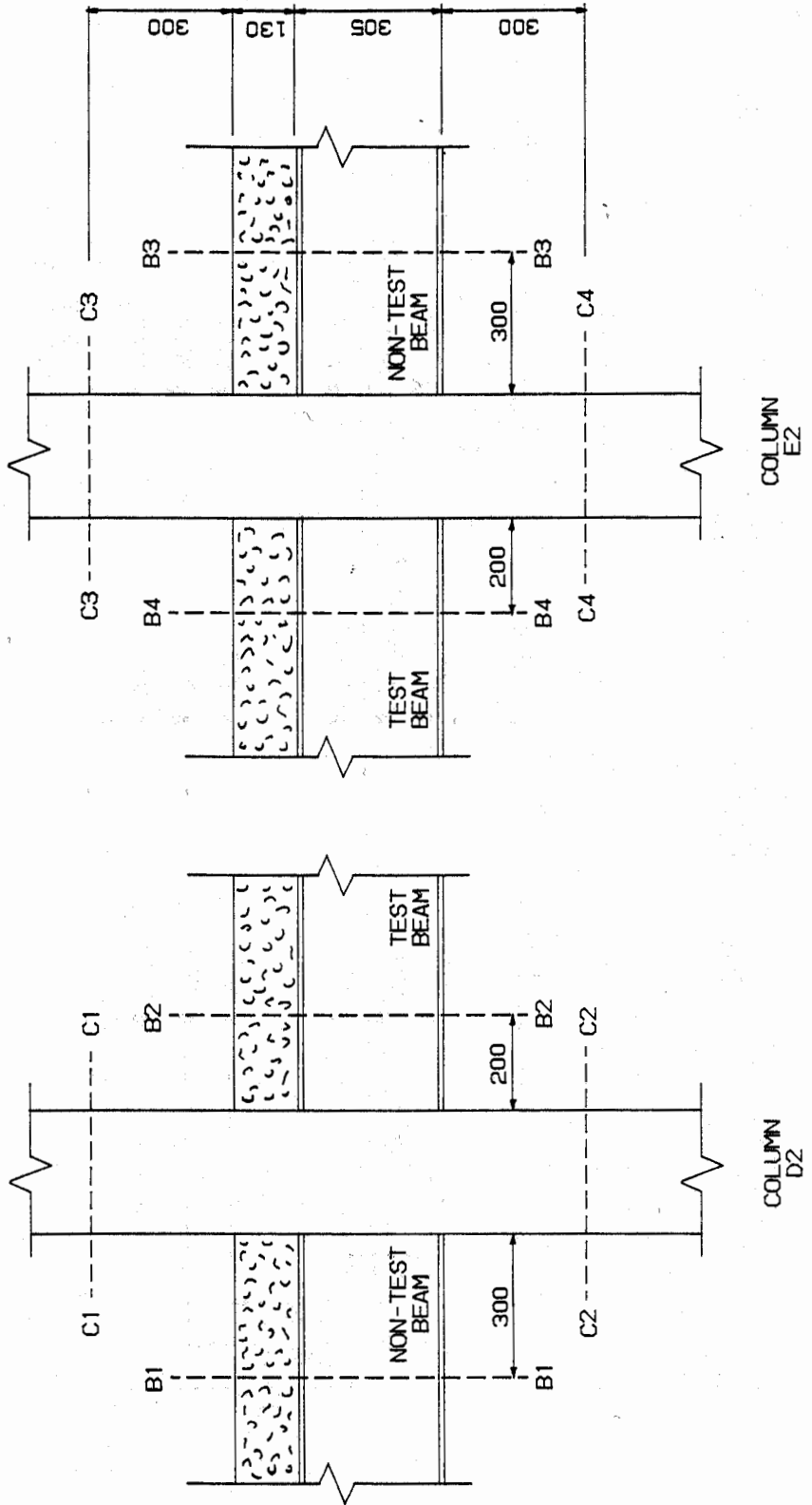
JAN. 95



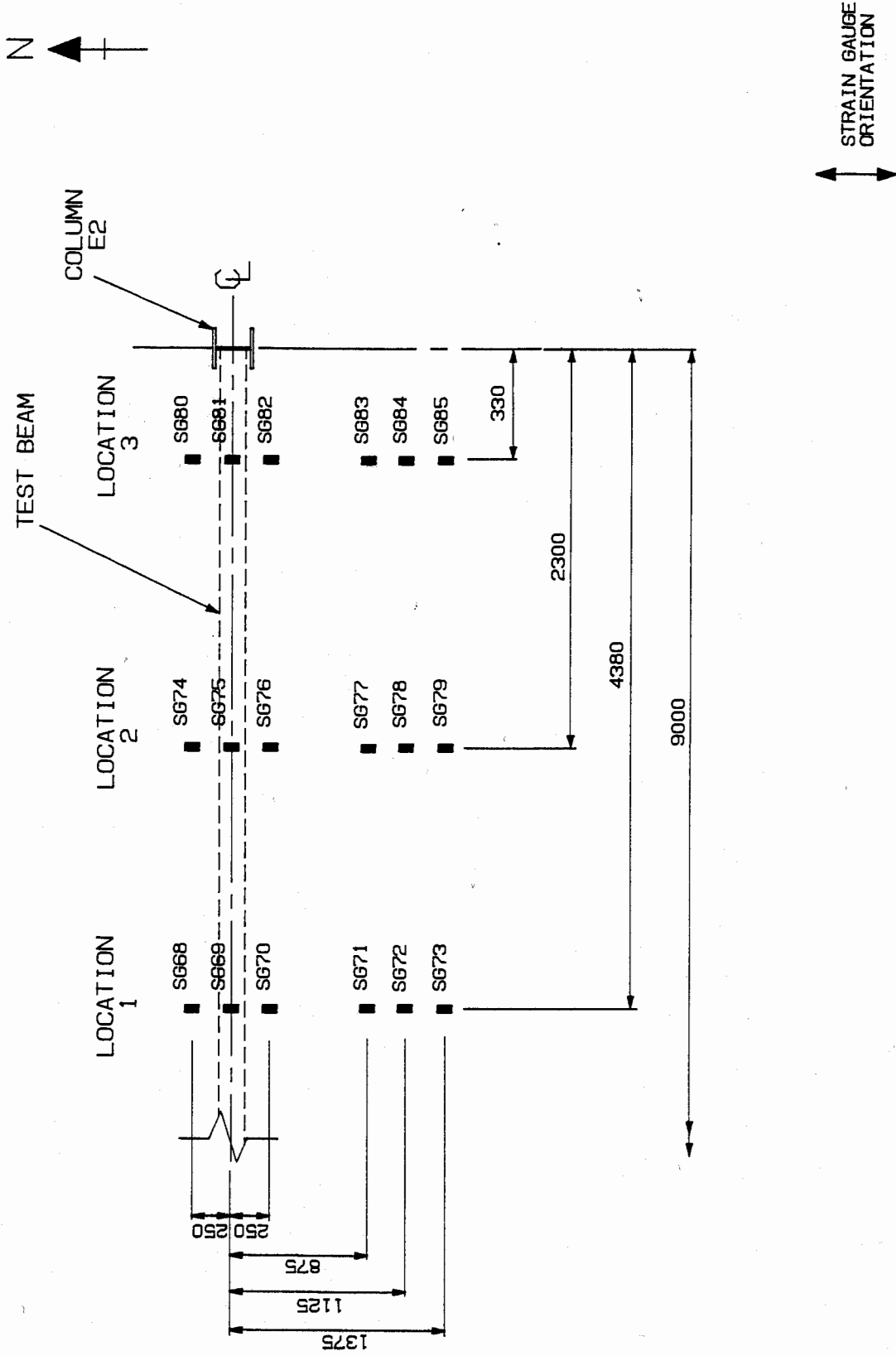
TEST 1 : RESTRAINED BEAM : LOCATIONS OF INSTRUMENTATION FOR MEASURING TEMPERATURE PROFILES WITHIN THE FLOOR SLAB : Figure 4



TEST 1 : RESTRAINED BEAM : LOCATION OF INSTRUMENTATION FOR MEASURING STRAIN PROFILES IN THE STEEL MEMBERS : **Figure 5**

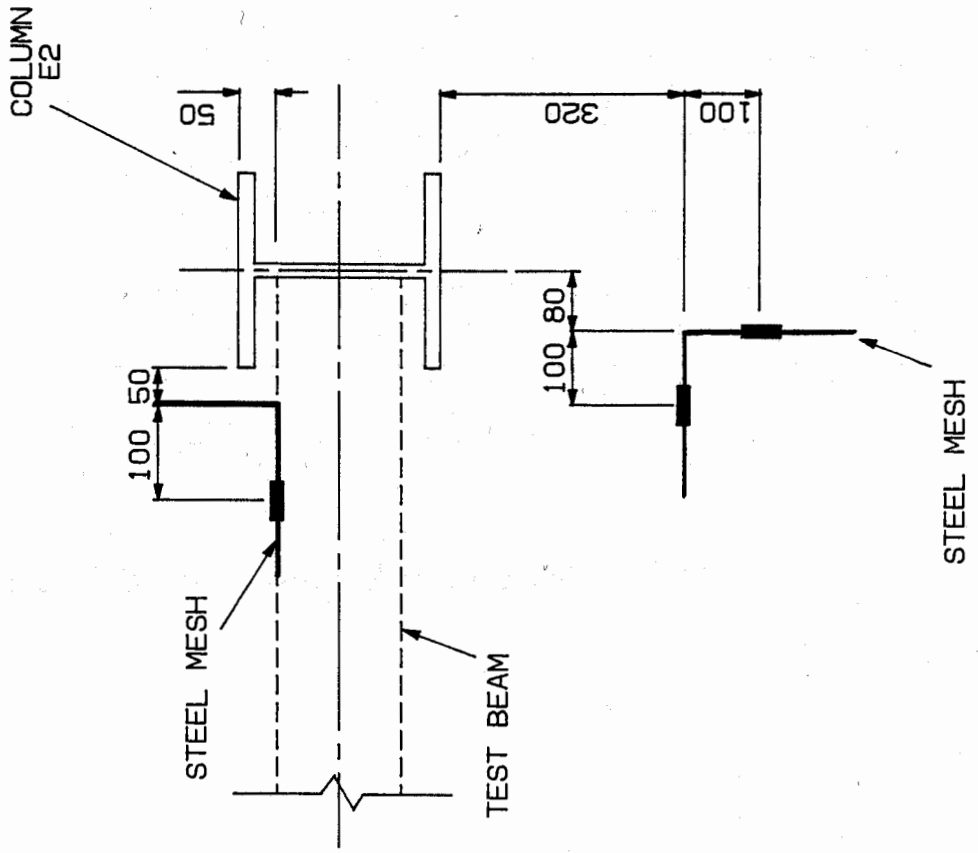


TEST 1 : RESTRAINED BEAM : CONCRETE STRAIN GAUGE POSITIONS ON FLOOR ABOVE THE TEST BEAM : Figure 6



STRAIN GAUGE ORIENTATION

TEST 1 : RESTRAINED BEAM : LOCATIONS OF STRAIN GAUGES INSTALLED ON THE MESH REINFORCEMENT IN THE FLOOR ABOVE THE TEST BEAM : Figure 7

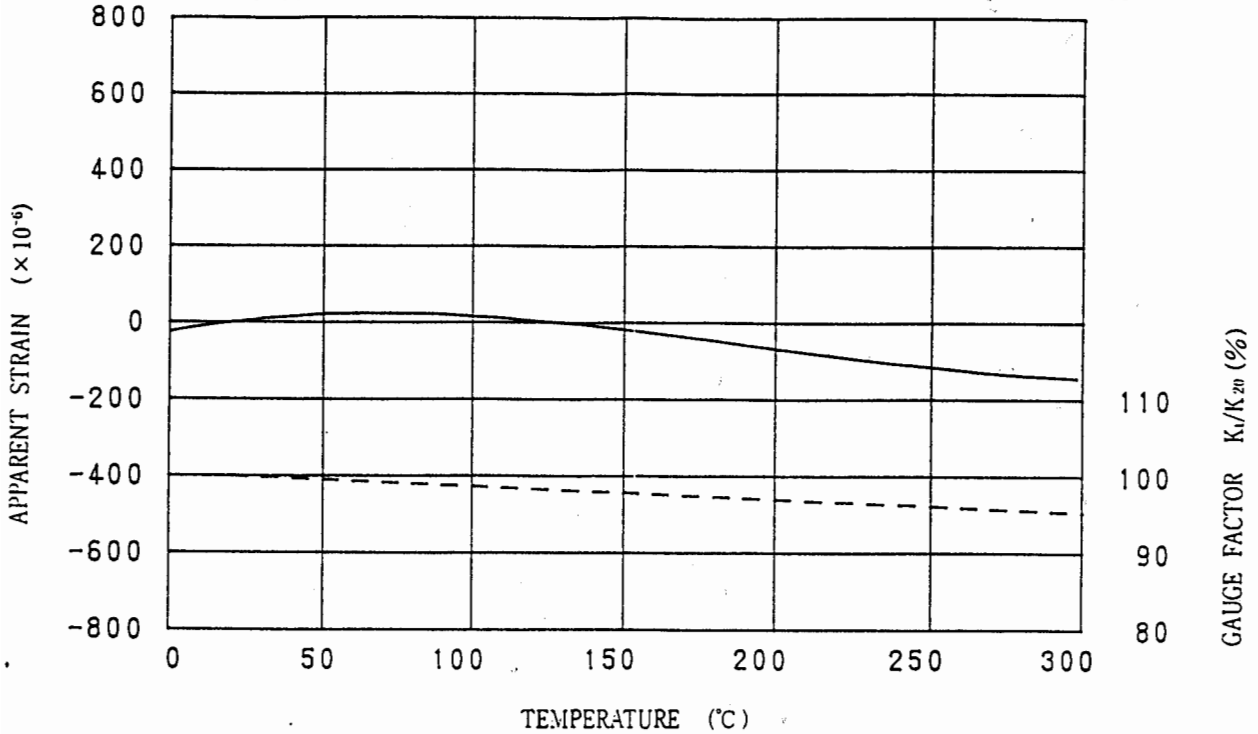


TML STRAIN GAUGE TEST DATA DATA NO. SA161

GAUGE TYPE: AW-6 TEST OBJECT: Mild Steel

LOT NO.: S503211 ADHESIVE: Spot welding

G. F. SET: 2.00 ——— APPARENT STRAIN - - - - - GAUGE FACTOR



Tokyo Sokki Kenkyujo Co., Ltd.

Apparent Strain =
Correction
(0 - 300°C)

$$A + Bx + Cx^2 + Dx^3$$

where x = temperature in °C

$$A = -24.6431$$

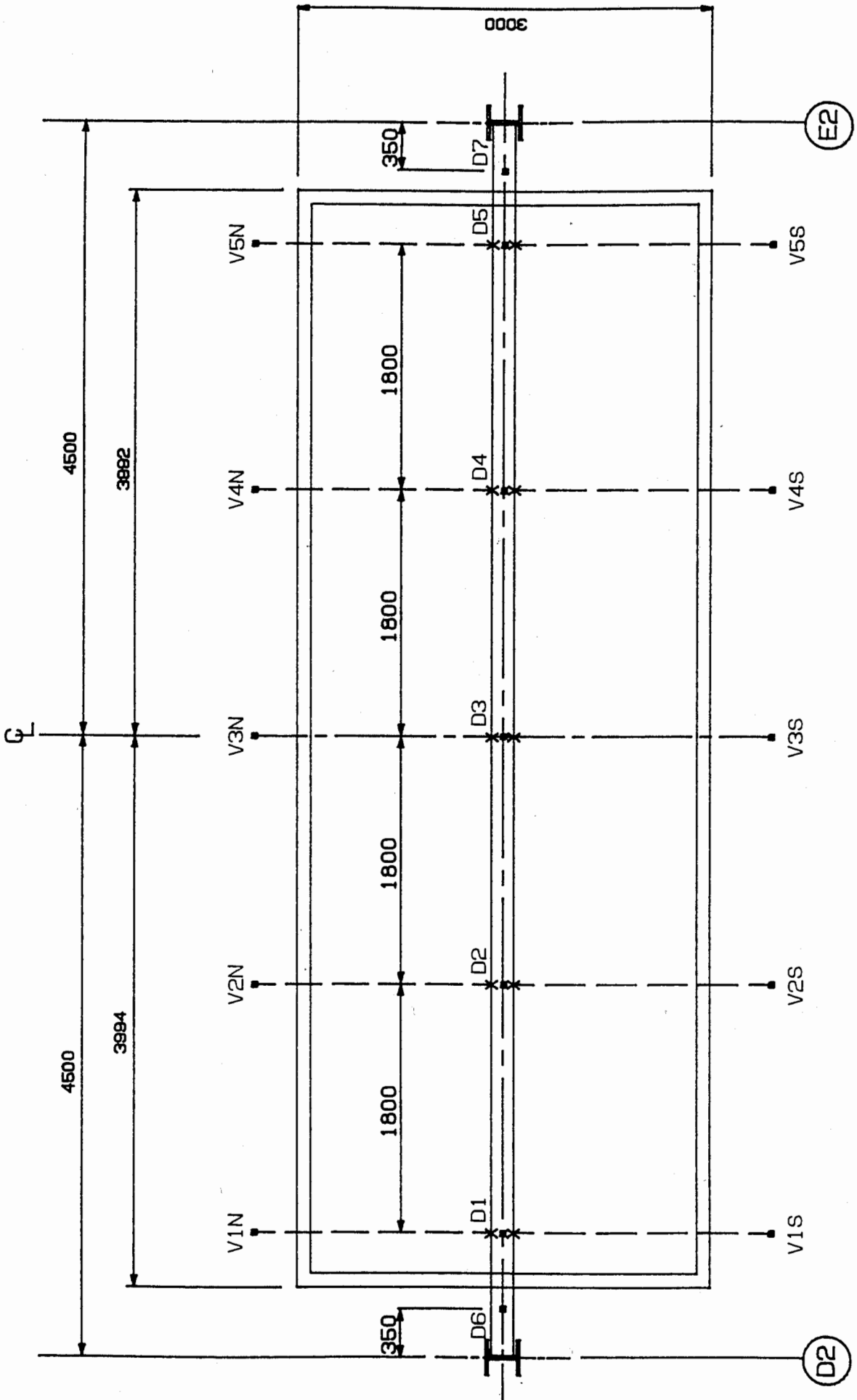
$$B = 1.47965$$

$$C = -0.129173 \times 10^{-1}$$

$$D = 0.220324 \times 10^{-4}$$

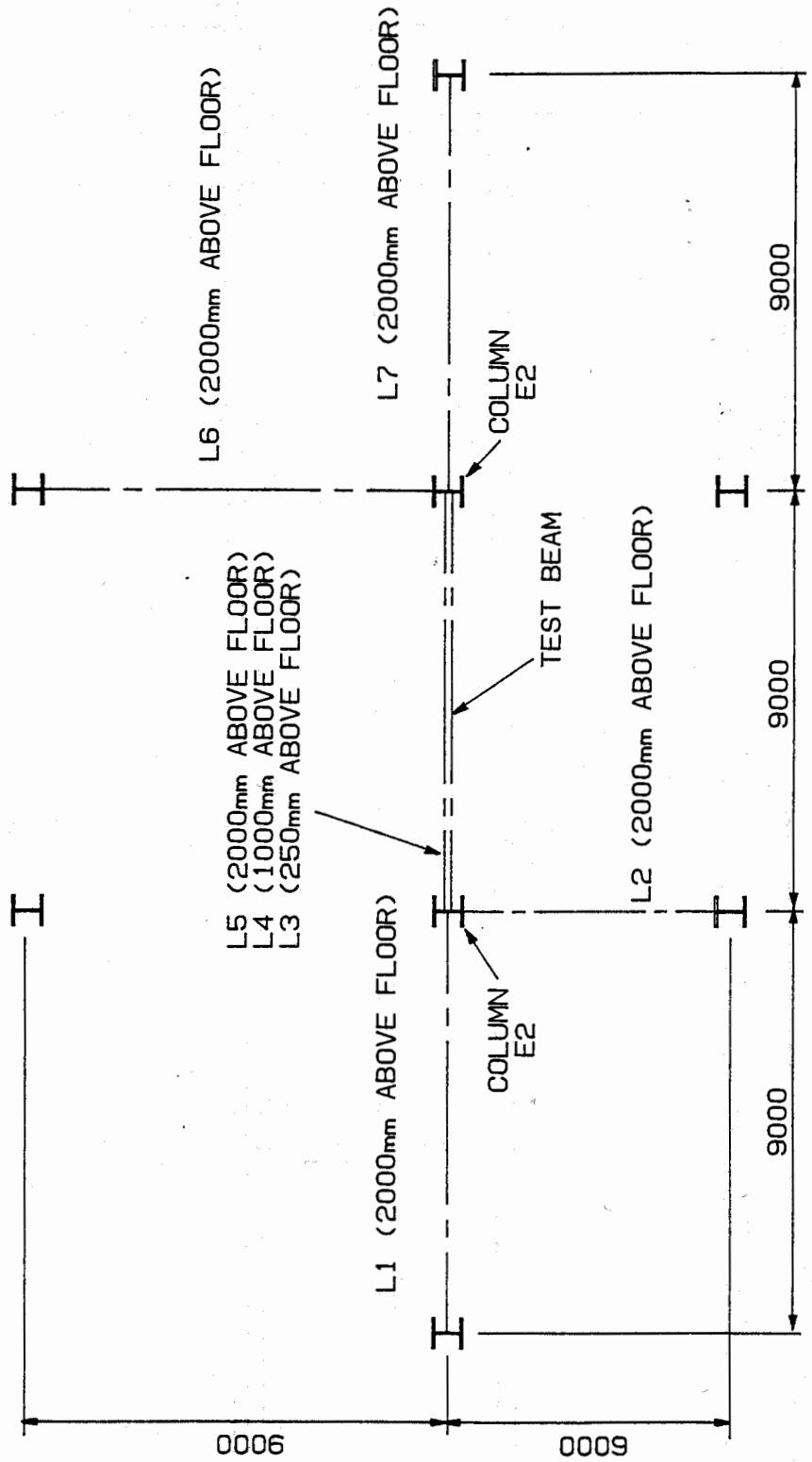
Correction Factor for High Temperature Strain Gauges

Figure 8

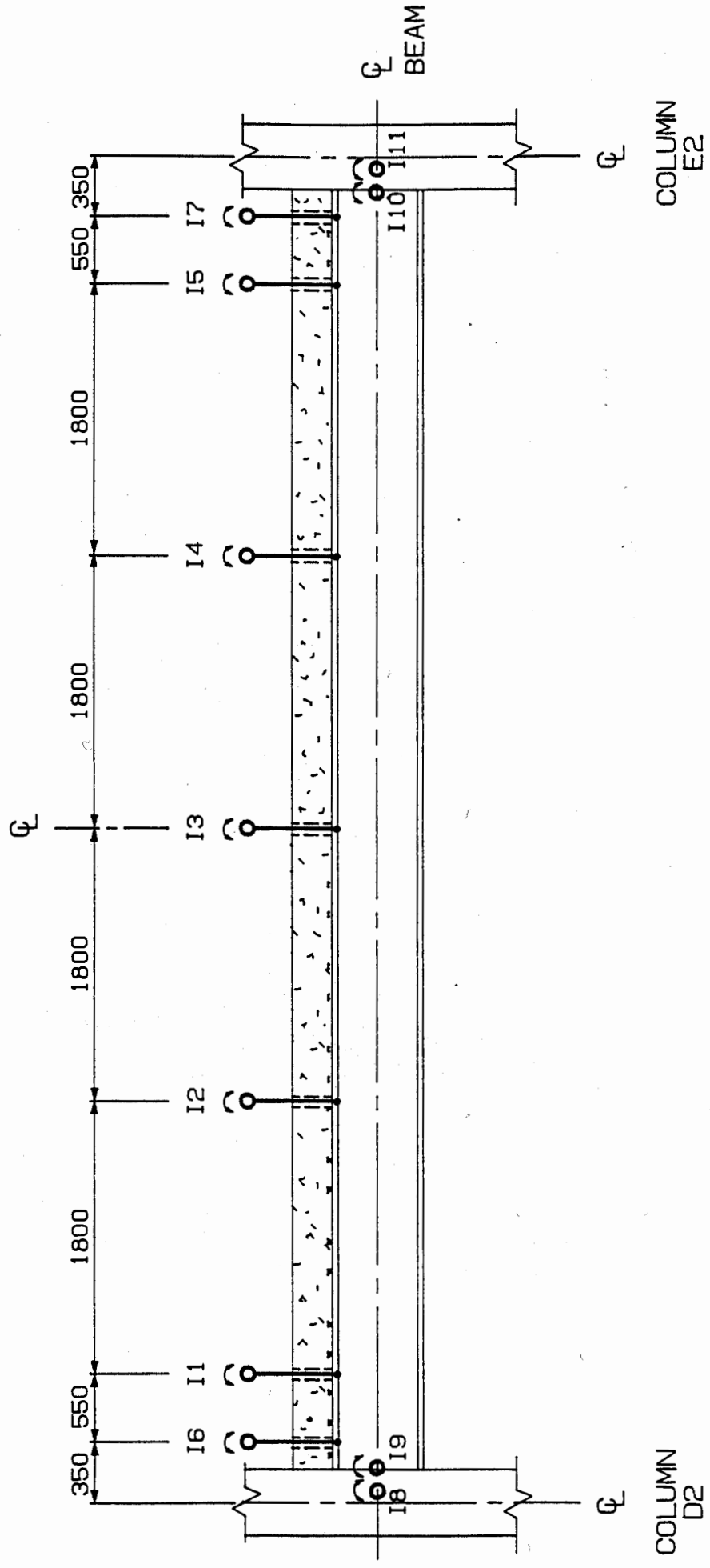


Locations For Measuring Vertical Deflection Figure 9

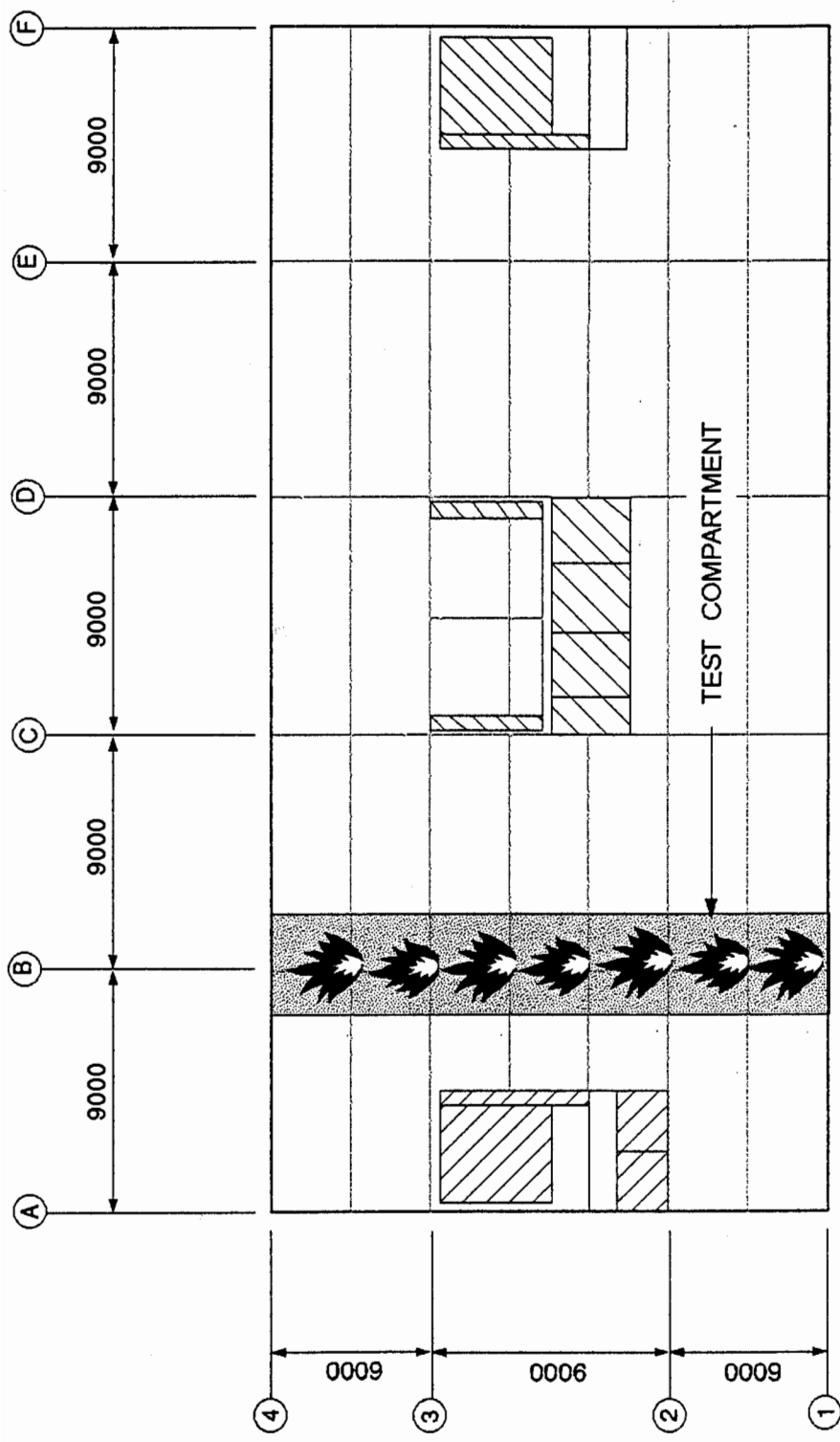
TEST 1 : RESTRAINED BEAM : LOCATION OF INSTRUMENTATION FOR MEASURING HORIZONTAL DISPLACEMENTS BETWEEN COLUMNS ABOVE THE TEST FLOOR **Figure 10**



TEST 1 : RESTRAINED BEAM : INCLINOMETER POSITIONS FOR MEASURING ROTATION OF THE TEST BEAM AND COLUMN FLANGES AT THE CONNECTIONS Figure 11

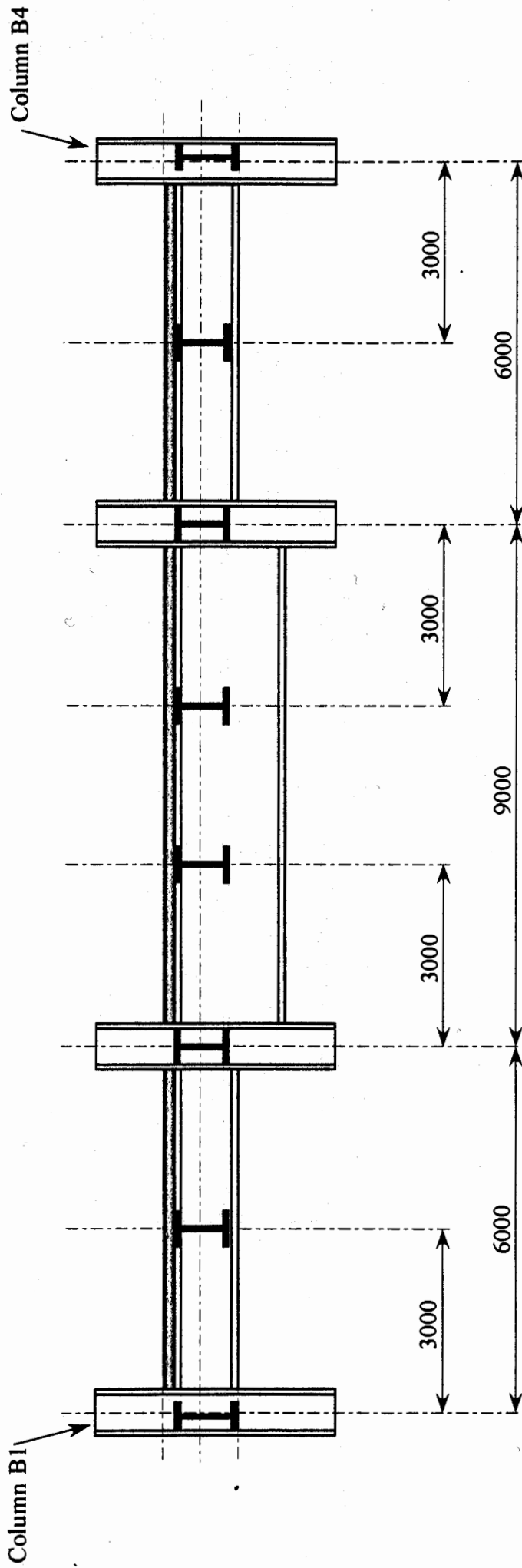
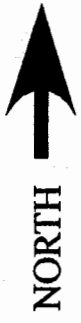


NOTE : INCLINOMETERS I18 AND I11 ARE FIXED TO THE COLUMN FACE
INCLINOMETERS I19 AND I10 ARE FIXED TO THE BEAM WEB



PLANE FRAME : TEST 2 - LOCATION OF COMPARTMENT

Figure 12



PLANE FRAME : TEST 2 - SCHEMATIC LAYOUT OF STEEL WORK

Figure 13

NOTES

1. ALL DIMENSIONS IN mm.
2. COLUMNS ARE GRID REFERENCED IN ACCORDANCE WITH P.B.A DRAWINGS.
3. ALL BEAMS TO REMAIN UNPROTECTED.
4. ALL VOIDS BETWEEN SECONDARY BEAMS AND DECKING TO REMAIN UNFILLED.
5. ALL COLUMNS PROTECTED FOR FIRE RESISTANCE UP TO 200mm BELOW LOWER FLANGE OF BEAM AT CONNECTION. THICKNESS OF PROTECTION TO BE SPECIFIED BY BST.
6. BLOCKWORK WALLS TO BE LINED WITH SINGLE LAYER, 50mm THK. CERAMIC FIBRE, 96 Kg/m³ DENSITY. FLOOR TO BE LINED WITH 80mm ROCKWOOL, 50mm CERAMIC FIBRE 64 Kg/m³ DENSITY.

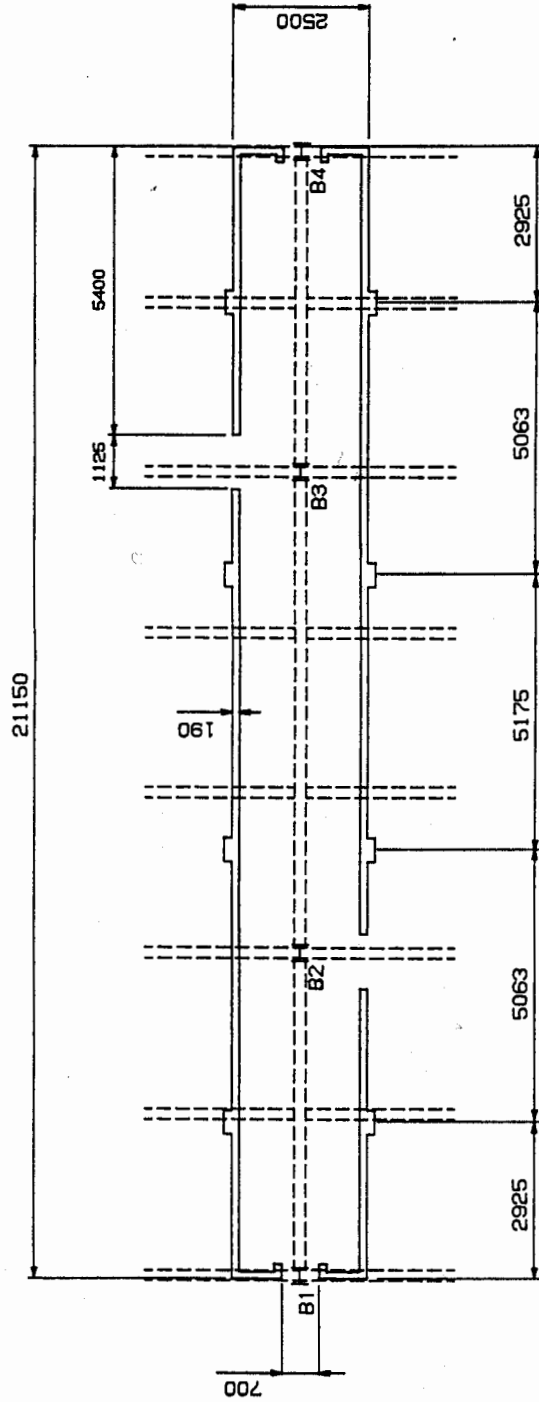


Figure 14

REV. : 4	31/3/96	DRS
PIERS HAVE BEEN MOVED ISSUE FOR CONSTRUCTION		
REV. : 3	20/2/96	DRS
PIERS HAVE BEEN MOVED AND TWO ADDED ISSUE FOR TENDER		
REV. : 2	17/2/96	DRS
PIERS HAVE BEEN MOVED		
REV. : 1	13/2/96	DRS
NOTES HAVE BEEN EDITED		

BRITISH STEEL TECHNICAL SWINDEN LABORATORIES MOORGATE, ROTHERHAM HEAVY ENGINEERING & DESIGN	PROJECT TITLE:	BRE BUILDING	PROJECT NO.:	S423	DATE	30/1/95	DRAWING NO.	
	DRAWING TITLE:	TEST CONFIGURATION: TEST 2 : PLAN OF FURNACE ON LEVEL 3			DRAWN	DRS		95HE 0054 /A3/4
				CHECKED				
				SCALE	1:100			



LINTELS

LABEL	NO.	TYPE	CLEAR SPAN
L1	2	NAYLOR P145	1125
L2	3	NAYLOR P145	450
L3	1	NAYLOR P145	300

- NOTES
- ALL DIMENSIONS ARE IN mm
 - BLOCKWORK SHALL BE 190 mm THK. STRANLITE BLOCKS, MINIMUM COMPRESSIVE STRESS 7 N/mm² OR SIMILAR.
 - MORTAR TO BE GRADE (111) AS DESCRIBED IN B.S.5628:PART 1
 - THE BURNERS AND WINDOWS ARE ONLY TO BE PLACED ON ELEVATION SHOWN.
 - LINTELS SHALL BE PROVIDED AS DESCRIBED OR SIMILAR, APPROVED BY THE ENGINEER.
 - GAP BETWEEN METAL DECKING AND TOP OF WALL TO BE FITTED WITH CERAMIC FIBRE FIRE BARRIER 50 THK., 96 Kg/m³ DENSITY. FIRE BARRIER SUPPORTED BY DEXION STRIP AND HELD IN POSITION BY 8mm THREADED BAR THROUGH FLOOR AT 800 NOMINAL CENTRES. WIDTH OF SLAB EXPOSED TO FIRE SHALL BE 225mm (MIN) GAP BETWEEN BLOCKWORK WALL AND SECONDARY BEAMS TO BE MADE GOOD BY STEEL PANELS FITTED AROUND BEAM BOTH SIDES WITH SPACE INFILLED WITH LOOSE CERAMIC FIBRE.
 - 64 Kg/m³ ANCHORS SUPPLIED BY BST TO BE FIXED AT EACH COURSE ON THE INSIDE WALL. SEE DRAWING NO. 95-E0057/A4
 - VIEWING PORTS ~ 450 x 450mm. OPENING IN BLOCKWORK IS 460 x 460
 - VIEWING PORT ~ 225 x 300mm. OPENING IN BLOCKWORK IS 225 x 300
 - SPECIALLY CUT BLOCK SUPPLIED BY B.S.T

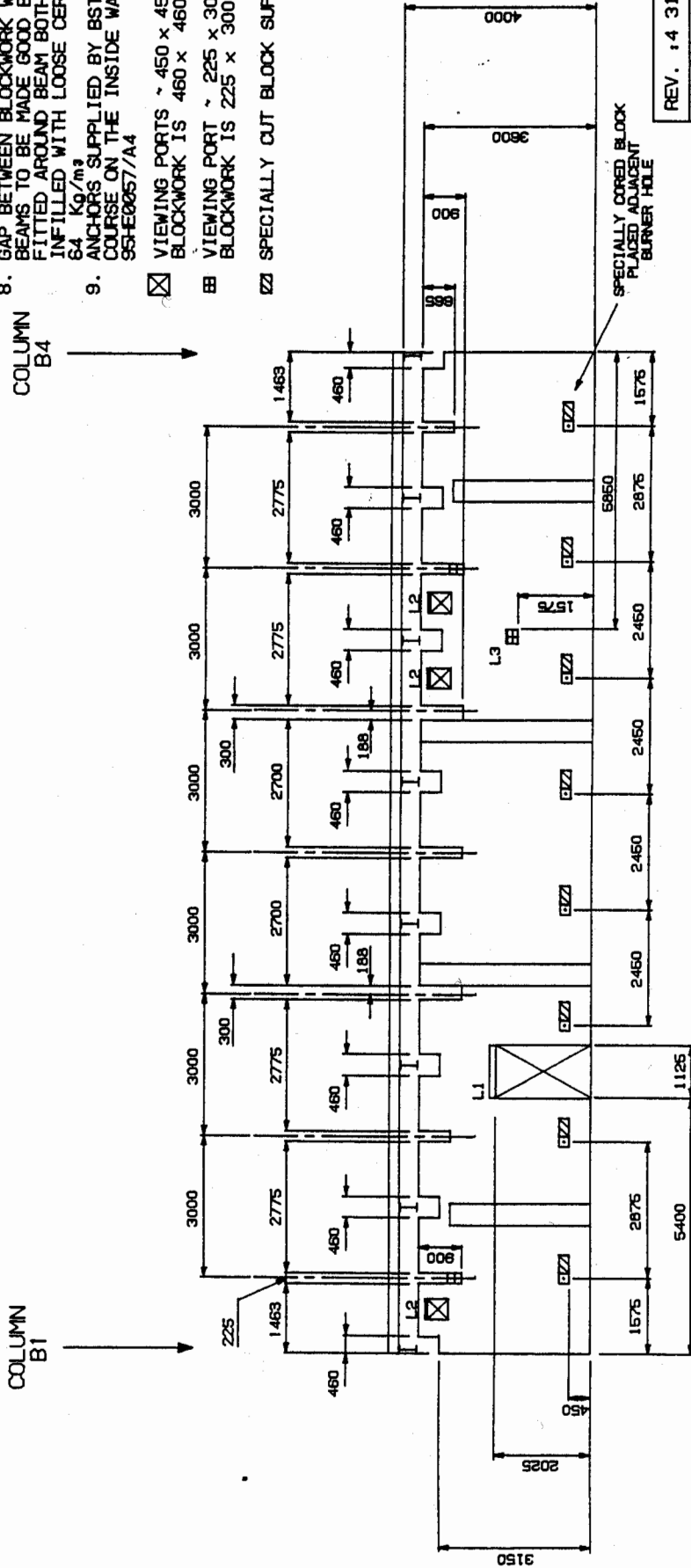


Figure 15

REV. :3 20/2/96	PIERS HAVE BEEN MOVED AND TWO MORE ADDED. POSITION OF BURNERS MOVED. VIEWING PORT ADDED. ISSUE FOR TENDER. DRS
REV. :2 17/2/96	SOME NOTES CHANGED AND POSITION OF BURNERS CHANGED PLUS LINTELS ADDED. DRS
REV. :1 13/2/96	SOME NOTES CHANGED AND POSITION/VOLUME OF BURNERS CHANGED DRS

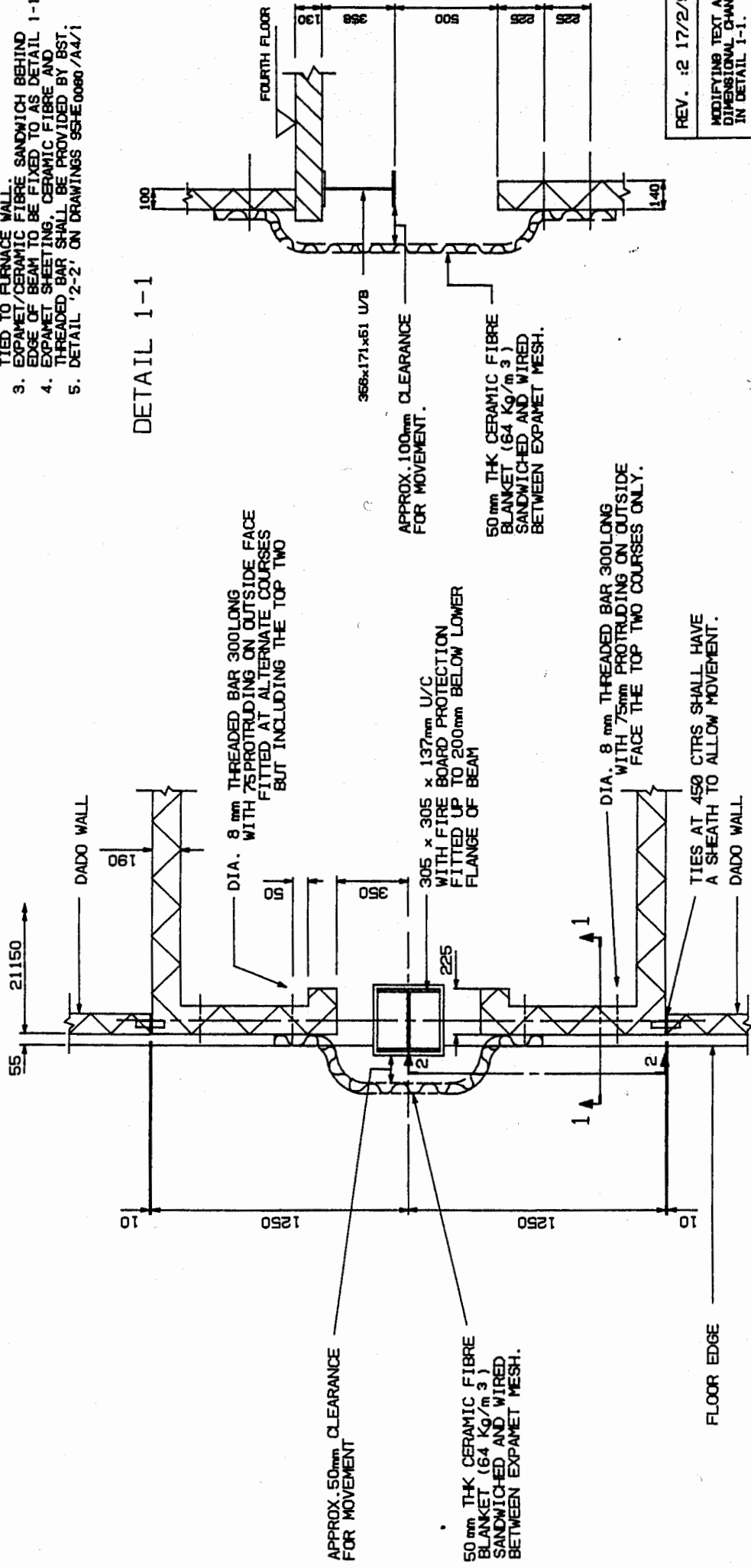
PROJECT NO. : S423	DATE	30/1/95	DRAWING NO.
	DRAWN	DRS	
PROJECT TITLE: BRE BUILDING	CHECKED		95-E 0055 /A3/4
	SCALE	1:100	
DRAWING TITLE: SIDE ELEVATION. TEST CONFIGURATION - TEST 2			

BRITISH STEEL TECHNICAL
SWINDEN LABORATORIES
MOORGATE, ROTHERHAM
HEAVY ENGINEERING & DESIGN



NOTES

1. ALL DIMENSIONS IN mm
2. EXISTING BLOCKWORK DADO WALL 140mm THICK SHALL BE REMOVED TO ALLOW CONSTRUCTION OF FURNACE WALL, THEN REINSTATED AND TIED TO FURNACE WALL.
3. EXPANET/CERAMIC FIBRE SANDWICH BEHIND EDGE OF BEAM TO BE FIXED TO AS DETAIL 1-1
4. EXPANET SHEETING, CERAMIC FIBRE AND THEREAD BAR SHALL BE PROVIDED BY BST.
5. DETAIL '2-2' ON DRAWINGS S5HE0060/A4/1



DETAIL 1-1

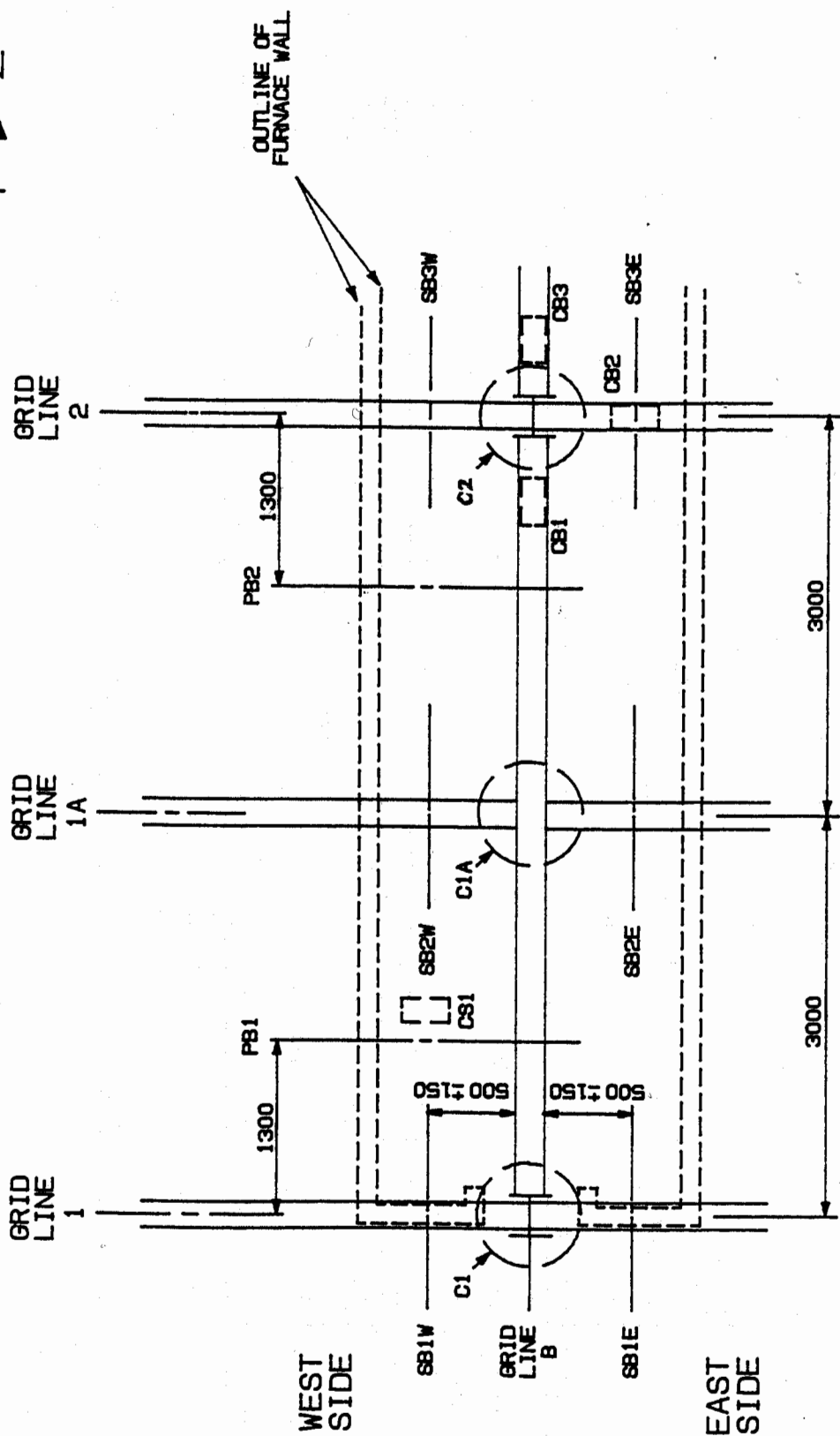
Figure 16

REV. :2 17/2/95	REV. :3 20/2/95	REV. :1 13/2/95	REV. :4 31/3/95
MODIFYING TEXT AND DIMENSIONAL CHANGE IN DETAIL 1-1.	DETAILS OF THREADED BAR CHANGED AND DETAIL 1-1 DIMENSION CHANGE. ISSUE FOR TENDER.	ISSUE FOR CONSTRUCTION. DETAIL '2-2' ADDED.	ISSUE FOR CONSTRUCTION. DETAIL '2-2' ADDED.
DR8	DR8	DR8	DR8
DATE	DATE	DATE	DATE
31/1/95	31/1/95	31/1/95	31/1/95
DRAWN	DRAWN	DRAWN	DRAWN
DRS	DRS	DRS	DRS
CHECKED	CHECKED	CHECKED	CHECKED
SCALE	SCALE	SCALE	SCALE
1:20	1:20	1:20	1:20
DRAWING NO.	DRAWING NO.	DRAWING NO.	DRAWING NO.
95HE 0056 /A3/4	95HE 0056 /A3/4	95HE 0056 /A3/4	95HE 0056 /A3/4

BRITISH STEEL TECHNICAL
SWINDEN LABORATORIES
MOORGATE, ROTHERHAM
HEAVY ENGINEERING & DESIGN

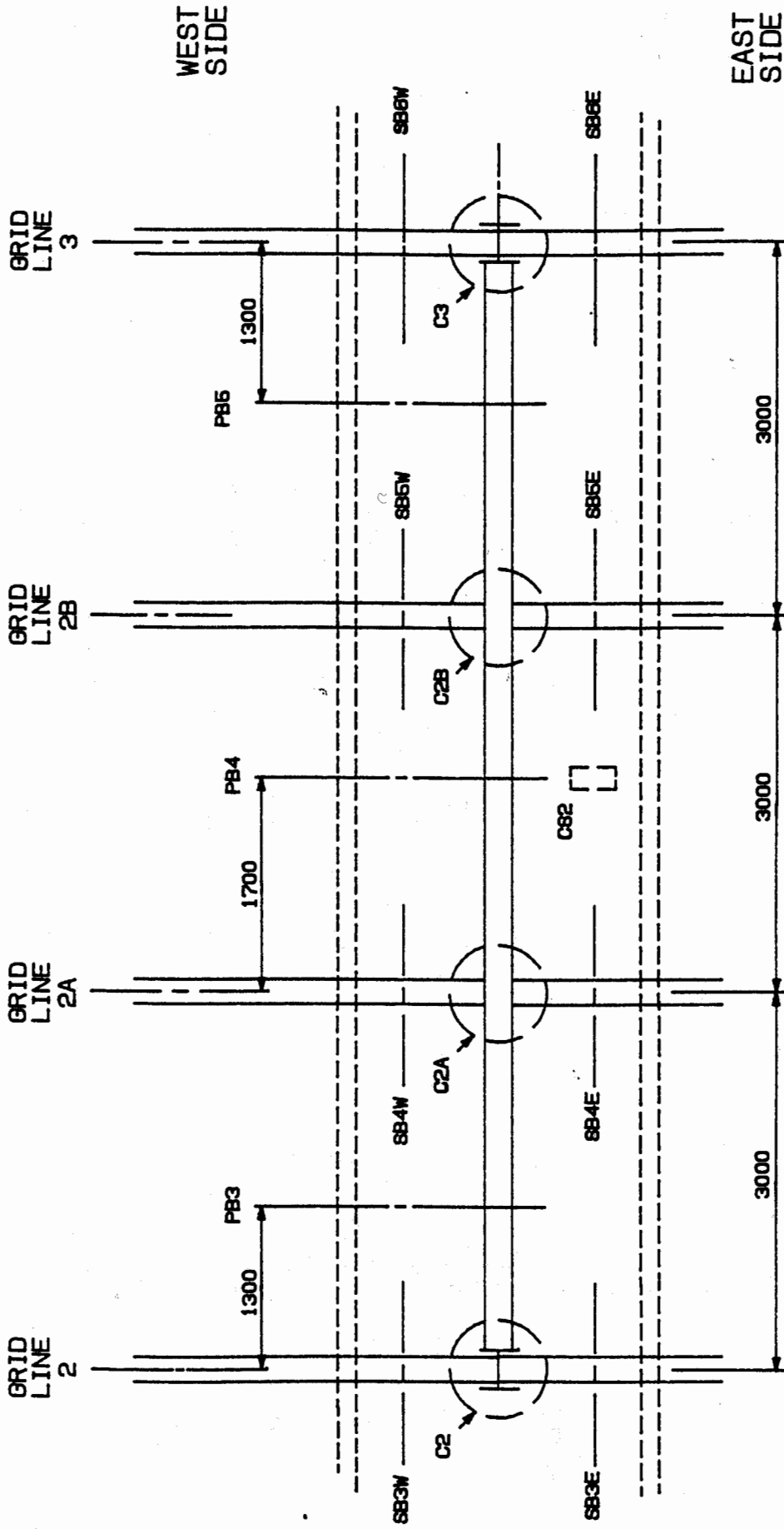


PROJECT TITLE: BRE BUILDING
DRAWING TITLE: FIRE COMPARTMENT : TEST 2 : END DETAIL
PROJECT NO.: S423/S2438
DATE: 31/1/95
DRAWN: DRS
CHECKED: DRS
SCALE: 1:20



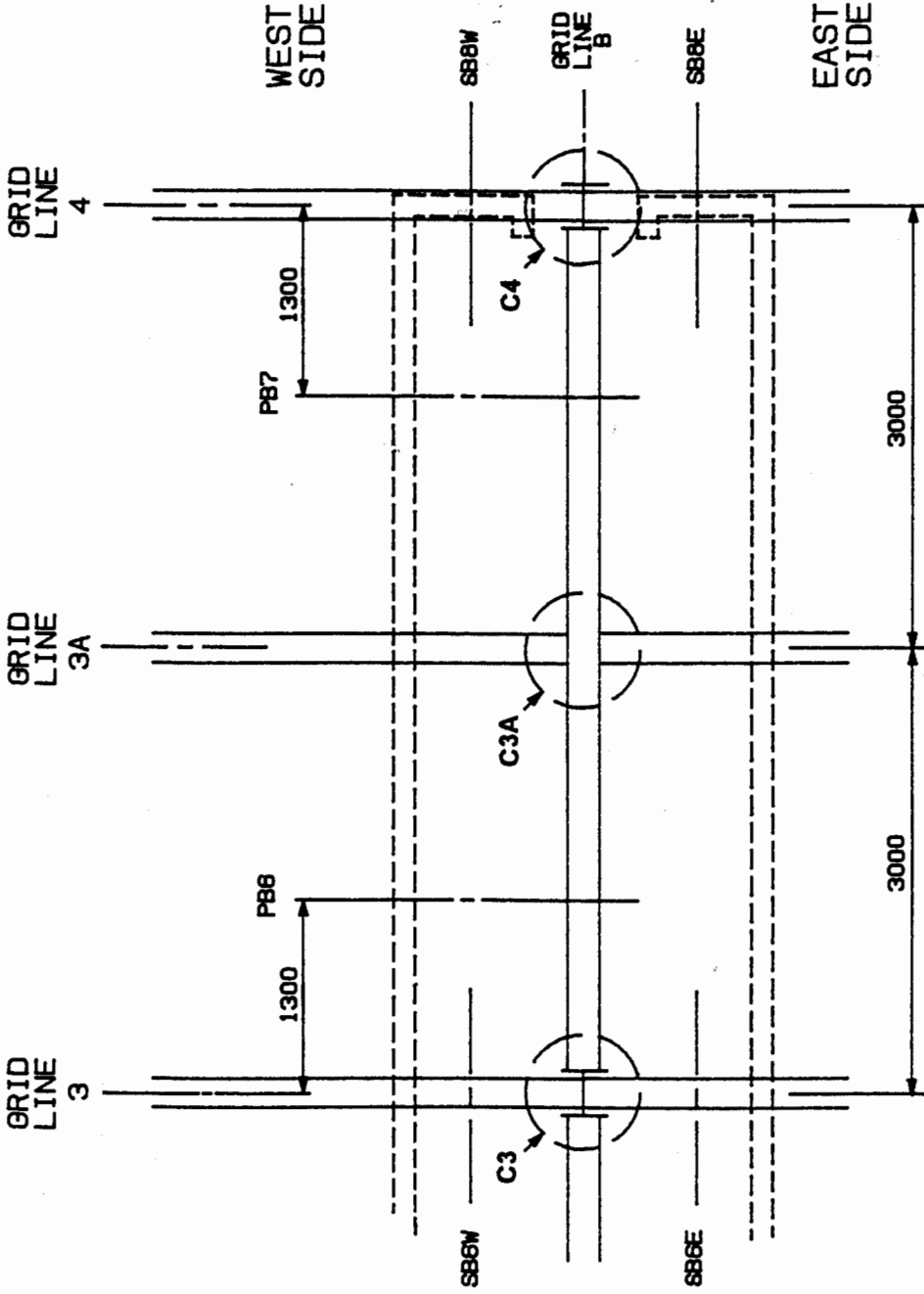
- KEY
- PB - PRIMARY BEAM
 - SB - SECONDARY BEAM
 - CS - CONCRETE CUT-OUT OVER BEAM
 - CS - CONCRETE CUT-OUT IN SLAB
 - C - CONNECTION

IDENTIFICATION OF TEMPERATURE PROFILES



- KEY
- PB - PRIMARY BEAM
 - SB - SECONDARY BEAM
 - CB - CONCRETE CUT-OUT OVER BEAM
 - CS - CONCRETE CUT-OUT IN SLAB
 - C - CONNECTION

IDENTIFICATION OF TEMPERATURE PROFILES Figure 17B



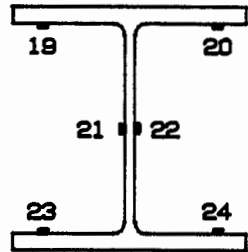
- KEY
- PB - PRIMARY BEAM
 - SB - SECONDARY BEAM
 - CS - CONCRETE CUT-OUT OVER BEAM
 - CS - CONCRETE CUT-OUT IN SLAB
 - C - CONNECTION

IDENTIFICATION OF TEMPERATURE PROFILES Figure 17C

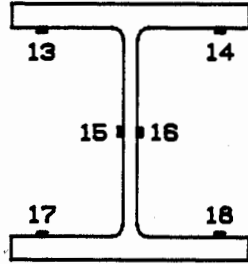
LOCATION OF THE AMBIENT TEMPERATURE STRAIN GAUGES FITTED TO THE FOURTH FLOOR COLUMNS 500mm ABOVE THE TEST FURNACE : Figure 18A



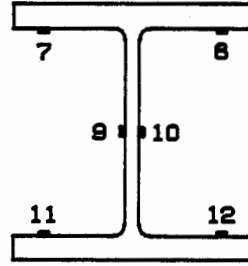
B1
305x305x137 kg/m



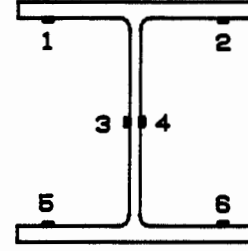
B2
305x305x198 kg/m



B3
305x305x198 kg/m



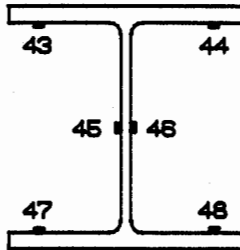
B4
305x305x137 kg/m



LOCATION OF THE AMBIENT TEMPERATURE STRAIN GAUGES FITTED TO THE SECOND FLOOR COLUMNS BELOW THE TEST FURNACE : Figure 18B

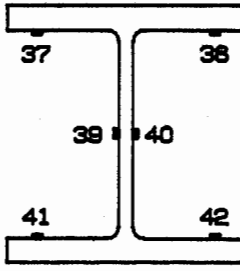


B1
305x305x137 kg/m



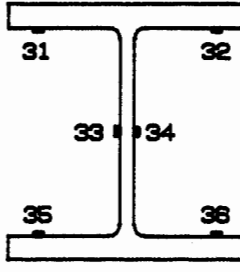
655mm BELOW DECKING
(300mm BELOW 356x171mm BEAM)

B2
305x305x198 kg/m



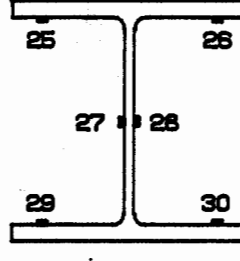
910mm BELOW DECKING
(300mm BELOW 610x229mm BEAM)

B3
305x305x198 kg/m



655mm BELOW DECKING
(300mm BELOW 356x171mm BEAM)

B4
305x305x137 kg/m

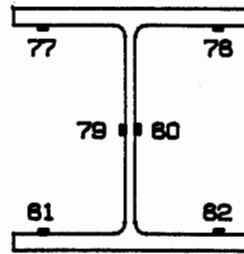


655mm BELOW DECKING
(300mm BELOW 356x171mm BEAM)

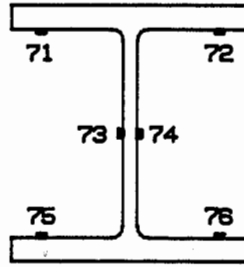
LOCATION OF THE HIGH TEMPERATURE STRAIN GAUGES FITTED TO THE THIRD FLOOR COLUMNS WITHIN THE TEST FURNACE, 2000mm ABOVE THE CONCRETE SLAB : Figure 18C



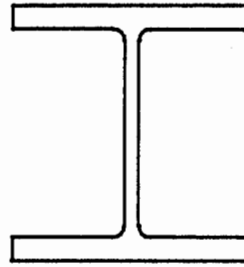
B1
305x305x137 kg/m



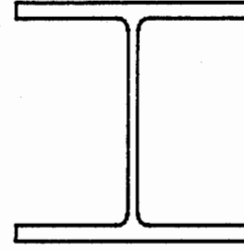
B2
305x305x198 kg/m



B3
305x305x198 kg/m



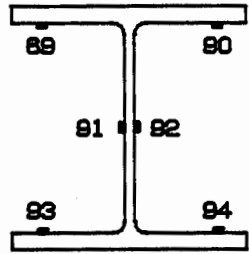
B4
305x305x137 kg/m



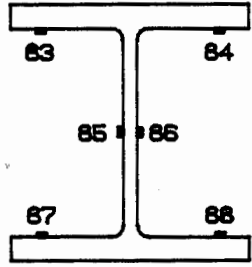
LOCATION OF THE HIGH TEMPERATURE STRAIN GAUGES FITTED TO THE THIRD FLOOR
COLUMNS WITHIN THE TEST FURNACE, 500mm ABOVE THE CONCRETE SLAB : Figure 18D



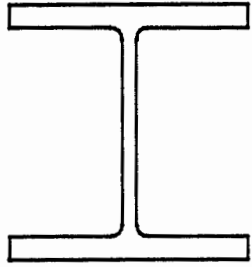
B1
305x305x137 kg/m



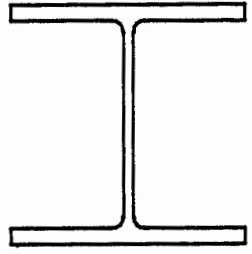
B2
305x305x198 kg/m



B3
305x305x198 kg/m

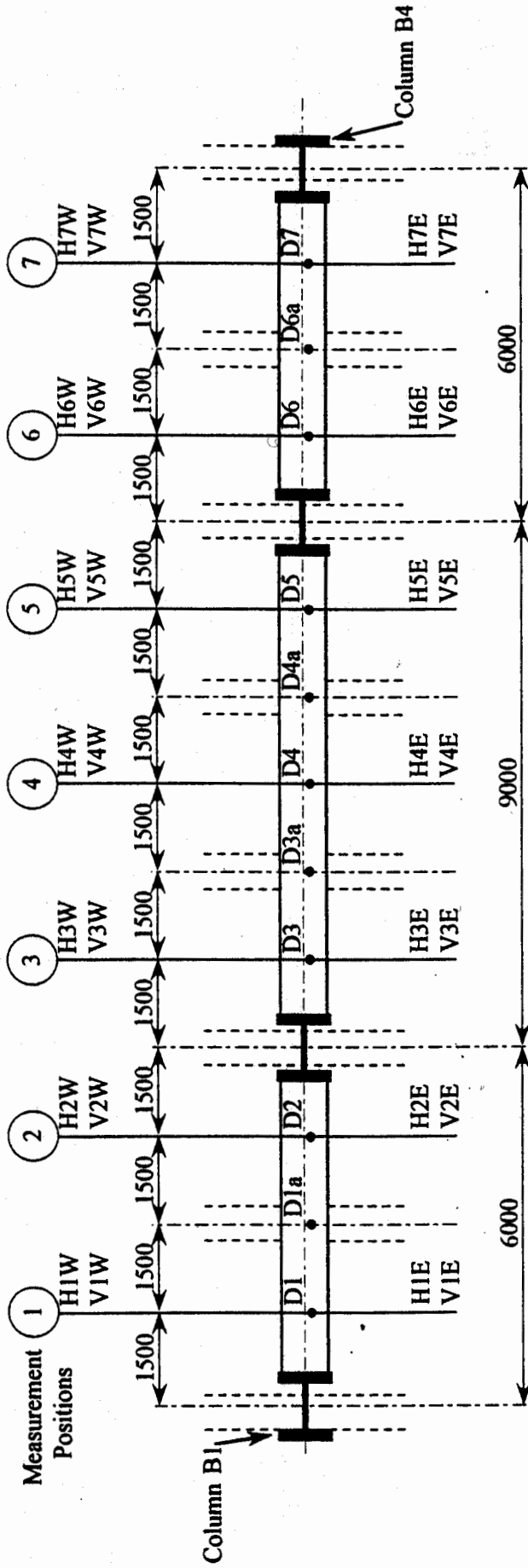


B4
305x305x137 kg/m

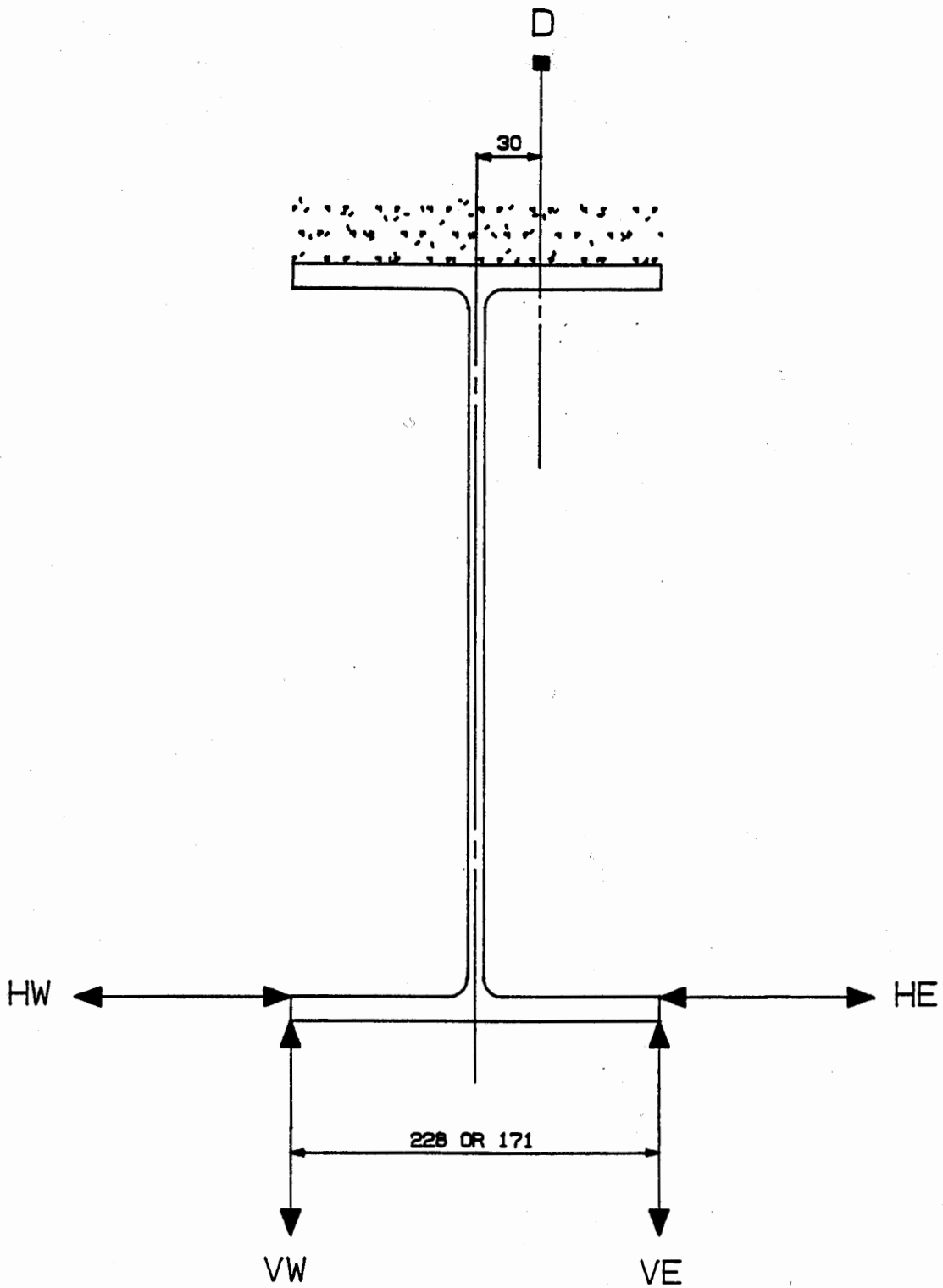


Test 2 - Measurement Stations for the Primary Floor Beams

Figure 19



- D = Vertical Deflection
- H = Horizontal Deflection
- V = Vertical Deflection
- Top Flange
- Bottom Flange
- Bottom Flange

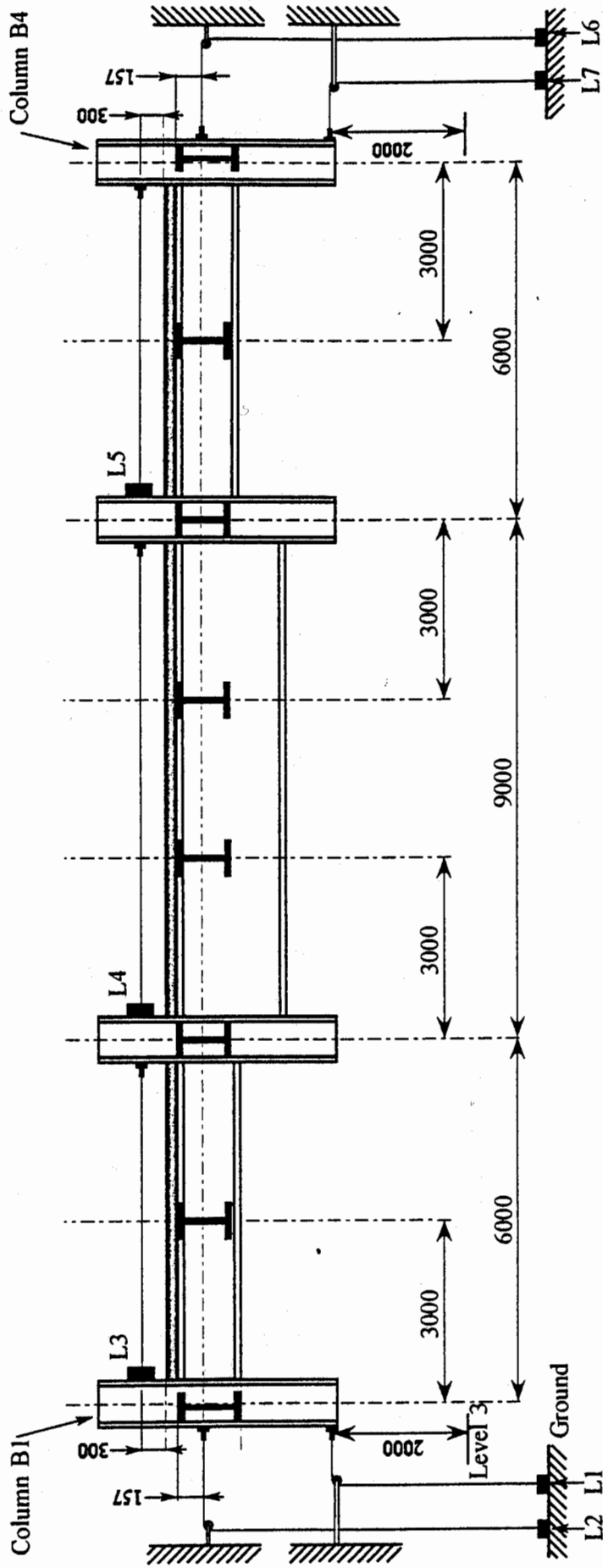


D - VERTICAL DEFLECTIONS: UPPER FLANGE
 V - VERTICAL DEFLECTIONS: LOWER FLANGE
 H - LATERAL DISPLACEMENTS: LOWER FLANGE

DETAIL VIEW OF INSTRUMENTATION LOCATIONS FOR THE PRIMARY BEAMS

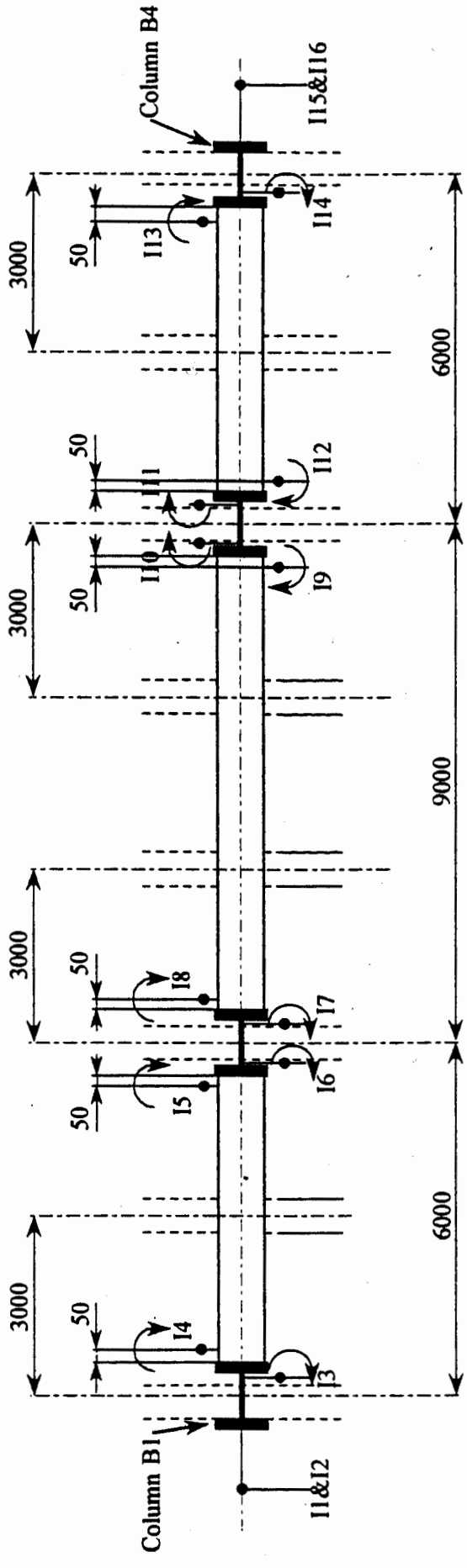
Figure 20

Test 2 - Measurement Positions for Column Displacements Figure 21



L = Horizontal Displacements Between Columns

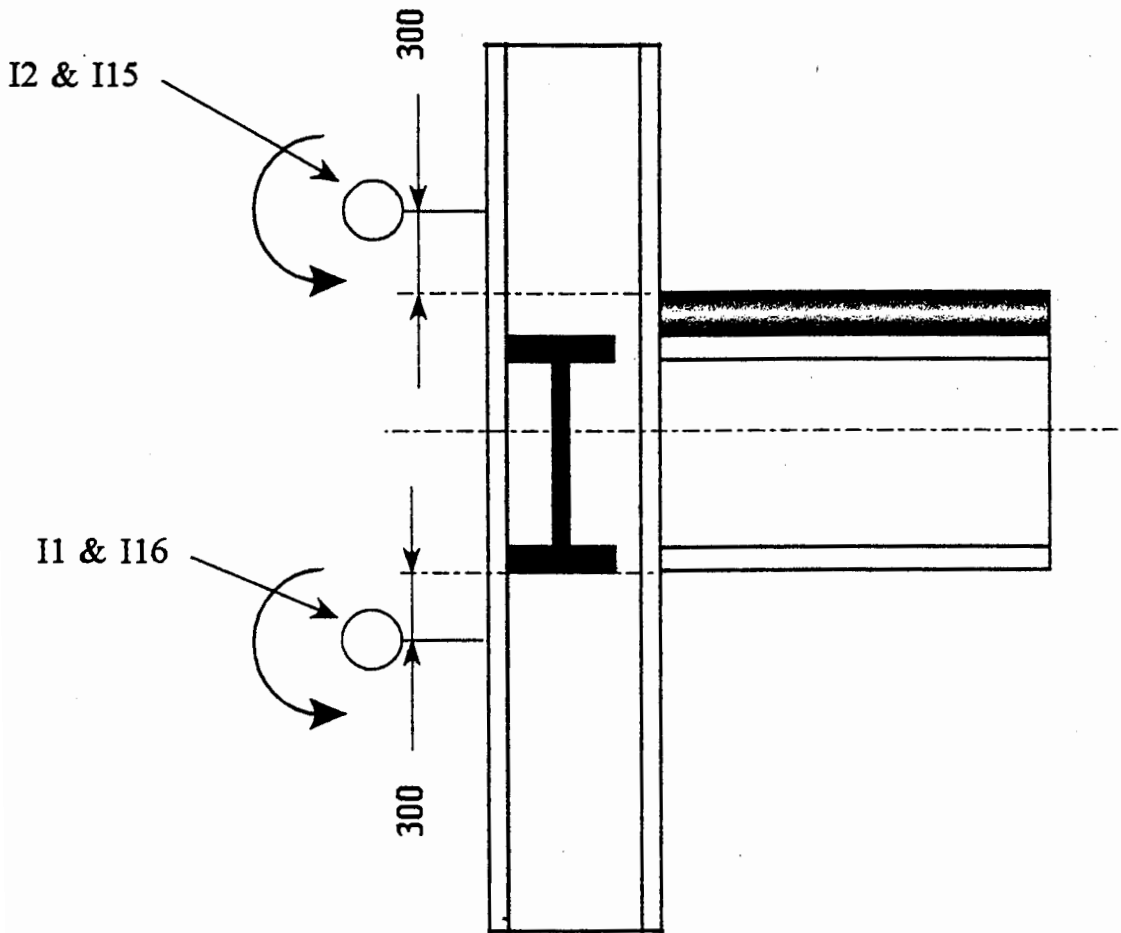
Test 2 - Measurement Positions for Beam and Column Rotations Figure 22

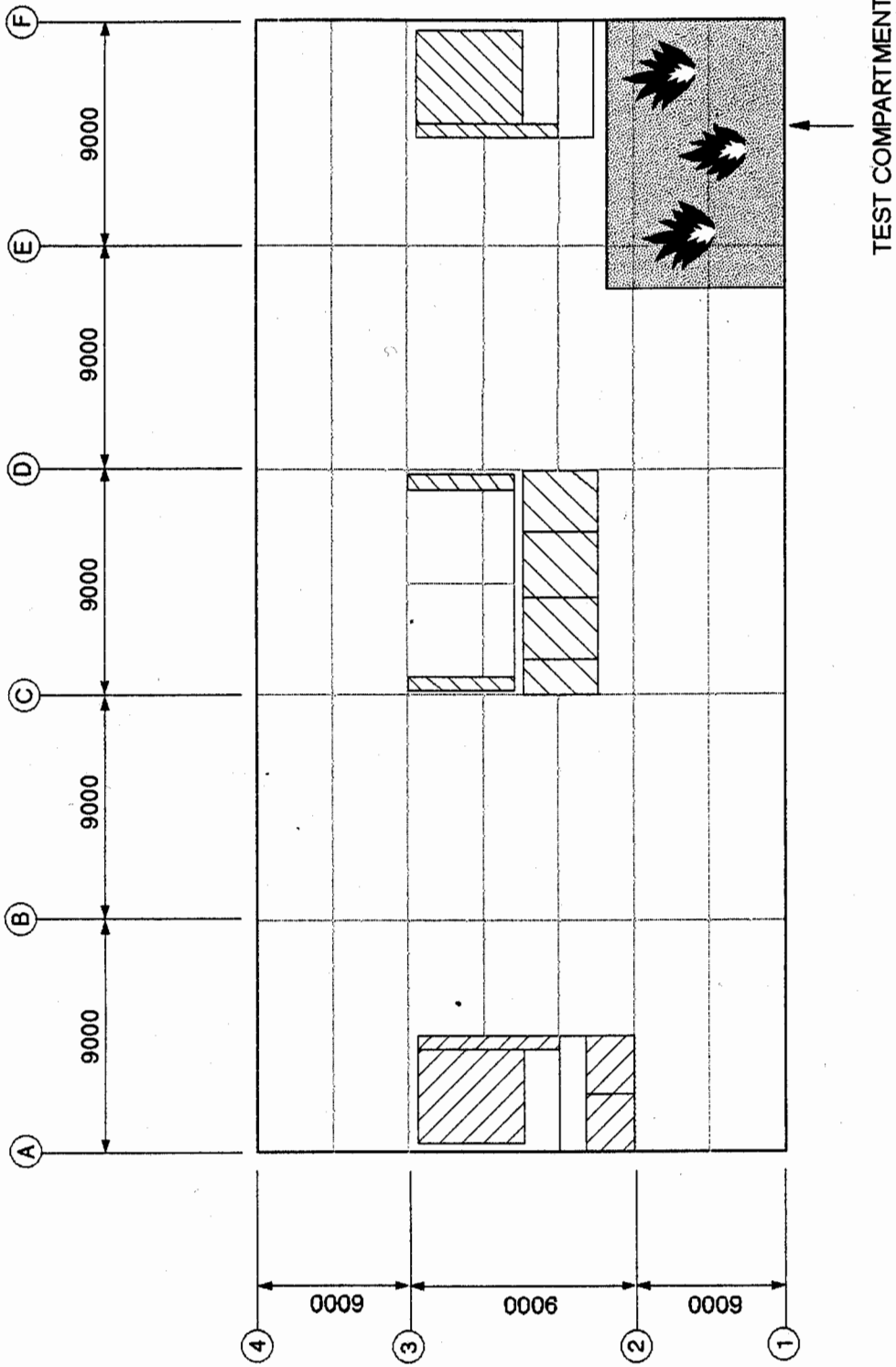


I = Clinometer Positions

Test 2 - Measurement Positions for Column B1 and B4 Rotations

Figure 23

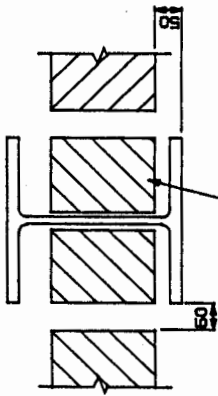




TEST 3 : CORNER COMPARTMENT TEST Figure 24

DETAIL 1

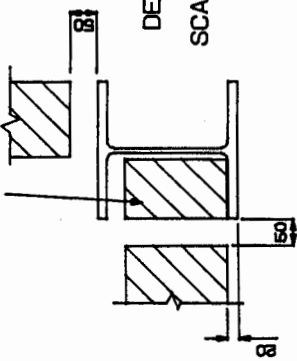
SCALE 1:10



CUT BLOCKWORK
SEE NOTES

DETAIL 2

SCALE 1:10



NOTES:

1. ALL DIMENSIONS IN mm.
2. COLUMNS ARE GRID REFERENCED IN ACCORDANCE WITH P.B.A DRAWINGS.
3. ALL BEAMS TO REMAIN UNPROTECTED.
4. ALL COLUMNS PROTECTED TO U/S OF SLAB. THICKNESS OF PROTECTION TO BE SPECIFIED BY BST.
5. BLOCKWORK SHALL BE 190mm THK. STRAN LITE BLOCKS. MINIMUM COMPRESSIVE STRESS 7 N/mm² OR SIMILAR APPROVED BY THE ENGINEER.
6. MORTAR TO BE GRADE (111) AS DESCRIBED IN B.S 5628:PART 1
7. LINTELS SHALL BE PROVIDED AS DESCRIBED OR SIMILAR APPROVED BY THE ENGINEER.
8. EXISTING 140mm THK. BLOCKWORK SHALL BE REMOVED WHERE INDICATED. REINSTATED AND TIED TO FURNACE WALL USING SHEATH TIES.
9. CUT BLOCK SHALL BE TIED TO COLUMN WEBS AT 675 CENTRES.

NEW WALL TIED TO EXISTING MASONRY PANEL WITH SHEATH TIES TO PERMIT MOVEMENT.

EXISTING MASONRY PANEL CUT FULL HEIGHT AWAY FROM BOTH COLUMNS AND RESTRAINED BY SCAFFOLDING.

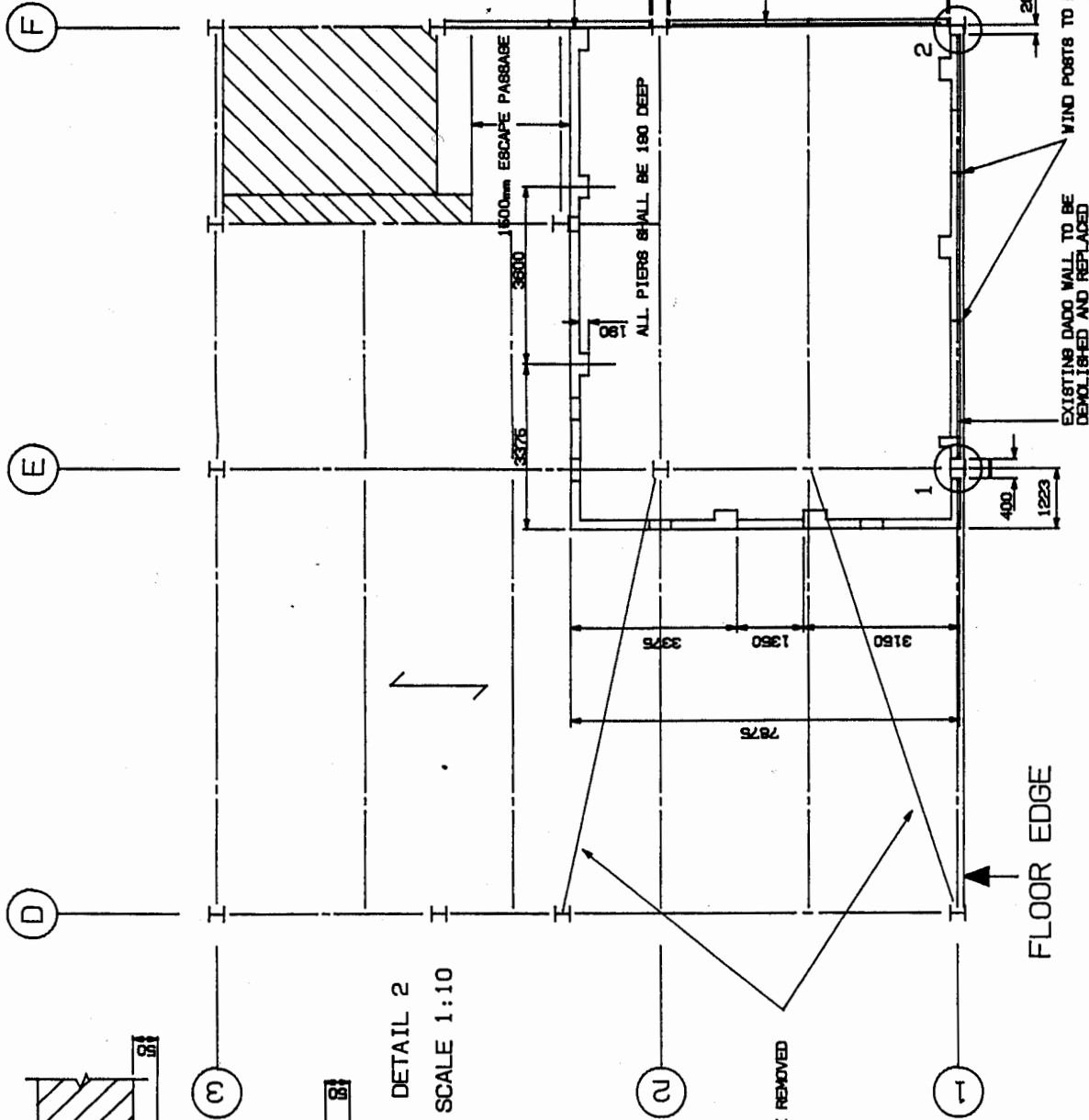


Figure 25

REV. 1 2	20/8/95
ONE WINDOW REMOVED DETAIL OF BLOCKWORK ADDED. ISSUED FOR CONSTRUCTION	
REV. 1 1	1/6/85
ISSUED FOR TENDER	
DR8	

PROJECT NO.:	22/5/95	DRAWING NO.	
PROJECT TITLE:	BRE BUILDING	DRAWN	DR8
DRAWING TITLE:	TEST THREE - EXISTING GABLE WALL RETAINED	CHECKED	
		SCALE	1:100
			95-E 0080 /A3/2

BRITISH STEEL plc
SWINDEN TECHNOLOGY CENTRE
MOORGATE, ROTHERHAM
HEAVY ENGINEERING & DESIGN

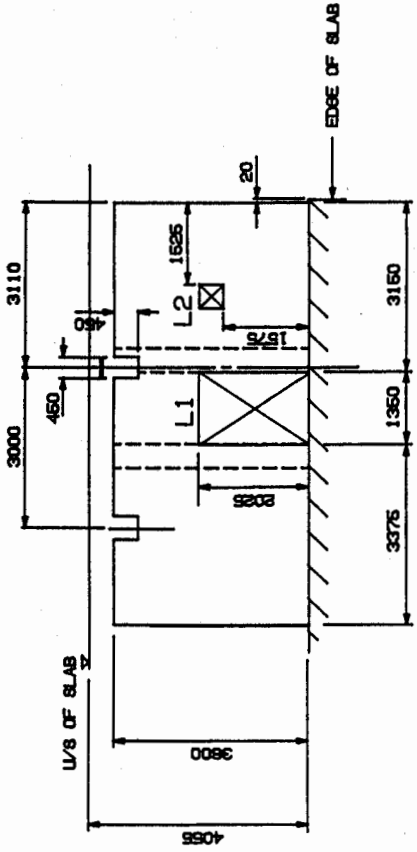


LINTELS

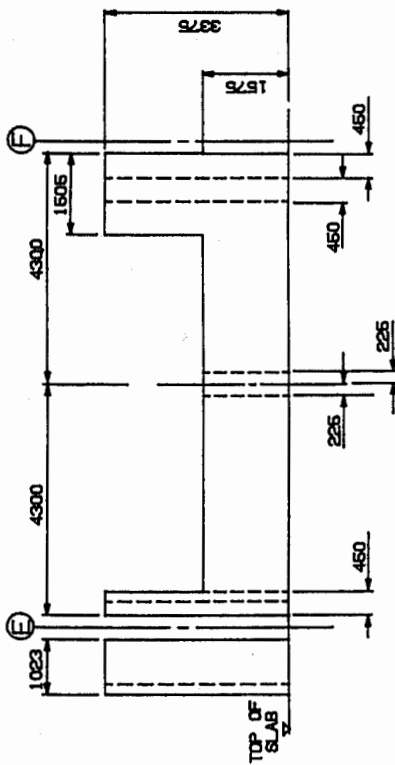
LABEL NO.	TYPE	CLEAR SPAN
L1	1	NAYLOR P180 1350
L2	3	NAYLOR P180 450

NOTES :

1. REFER TO DRAWING 95E0080/A3



ELEVATION OFF GRIDLINE E-E



WALL ELEVATION GRIDLINE 1-1

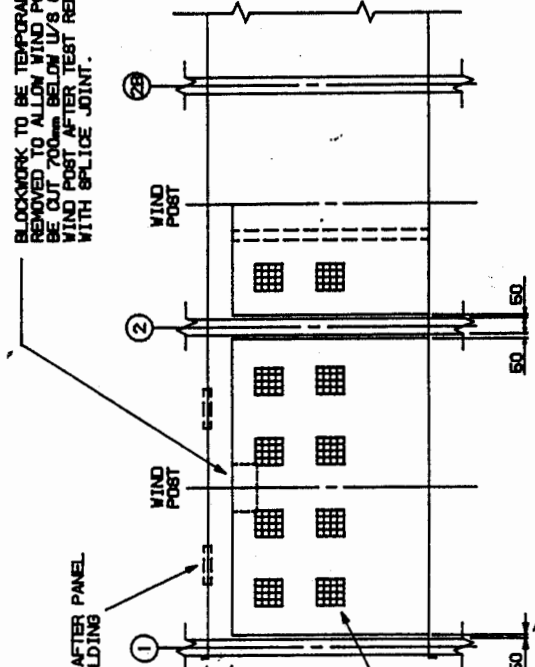
BLOCKWORK TO BE TEMPORARILY REMOVED TO ALLOW WIND POST TO BE CUT 700mm BELOW U/S OF SLAB WIND POST AFTER TEST REPLACED WITH SPLICE JOINT.

REMOVE WALL RESTRAINTS AFTER PANEL IS RESTRAINED BY SCAFFOLDING

REMOVE TOP AND NARROW COURSES OF BLOCKWORK

500x500 EXPOSED PANELS PLACED ON INNER FACE TO PROVIDE BEARING RESTRAINTS. PANELS ARE TO BE CONNECTED TO SCAFFOLDING VIA TIE MECHANISM.

NEW WALL TIED TO EXISTING PANEL VIA BREATHED TIES



ELEVATION ON GRIDLINE F-F

FULL HEIGHT VERTICAL CUTS MADE PREFERABLY WITH MECHANICAL TOOLS THEN REMOVE BLOCKWORK TO ALLOW MOVEMENT OF COLUMN.

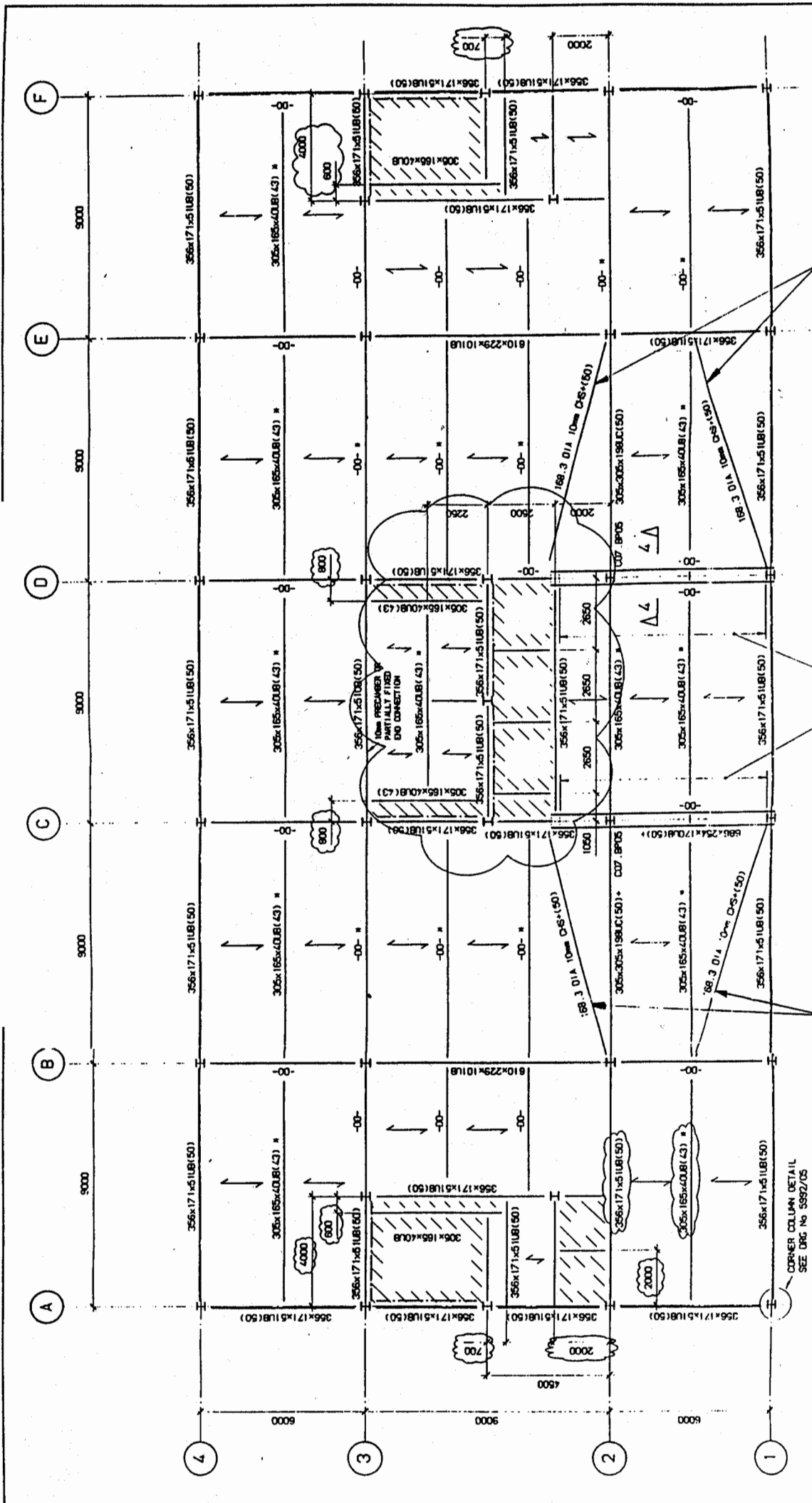
Figure 26

NORTH ELEVATION

REV. 12 20/6/95	WINDOW LOCATIONS ALTERED DIMENSIONS ALTERED ON PANEL F-F. ISSUED FOR CONSTRUCTION DRS
REV. 11 1/6/95	ISSUED FOR TENDER DRS

BRITISH STEEL plc SWINDEN TECHNOLOGY CENTRE MOORGATE, ROTHERHAM	PROJECT TITLE:	BRE BUILDING	PROJECT NO.1:	S423	DATE	23/5/95	DRAWING NO.	DRS
	DRAWING TITLE:	TEST THREE - ELEVATIONS. EXISTING GABLE WALL RETAINED			CHECKED		SCALE	1:100





REV. : 1 1/6/95
 ISSUED FOR TENDER
 DRS

TIES TO BE REINSTITATED
 TIES TO BE REMOVED PRIOR TO CONSTRUCTION
 EXTENT OF 300x15 THK PLATE (50) WELDED TO FLANGES

BRITISH STEEL p.l.c
 SWINDEN TECHNOLOGY CENTRE
 MOORGATE, ROTHERHAM
 HEAVY ENGINEERING & DESIGN

PROJECT TITLE:
 BRE BUILDING

PROJECT NO. :
 S2438

DATE
 22/5/95

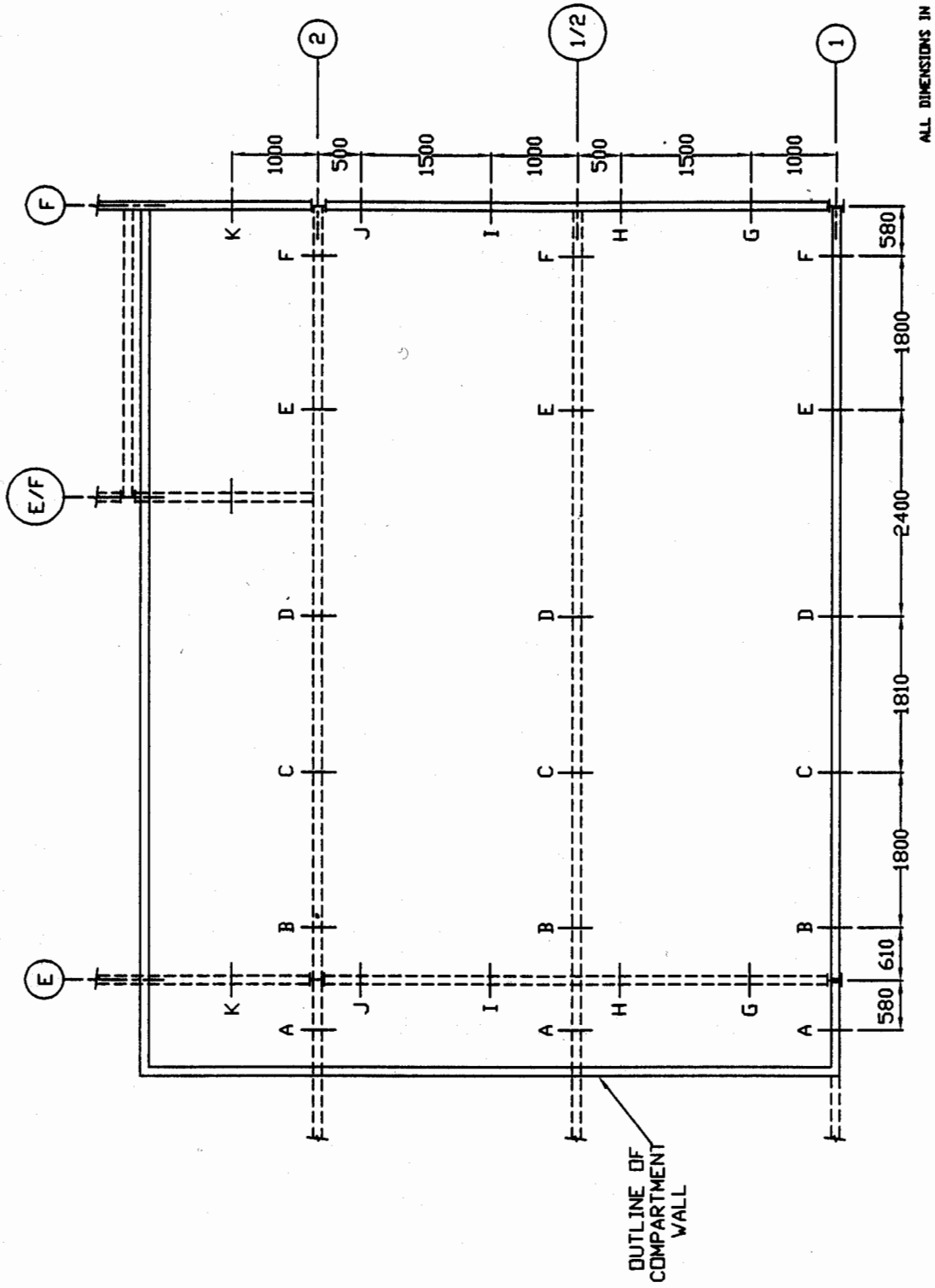
DRAWN
 DKS

CHECKED
 CUM

SCALE
 N

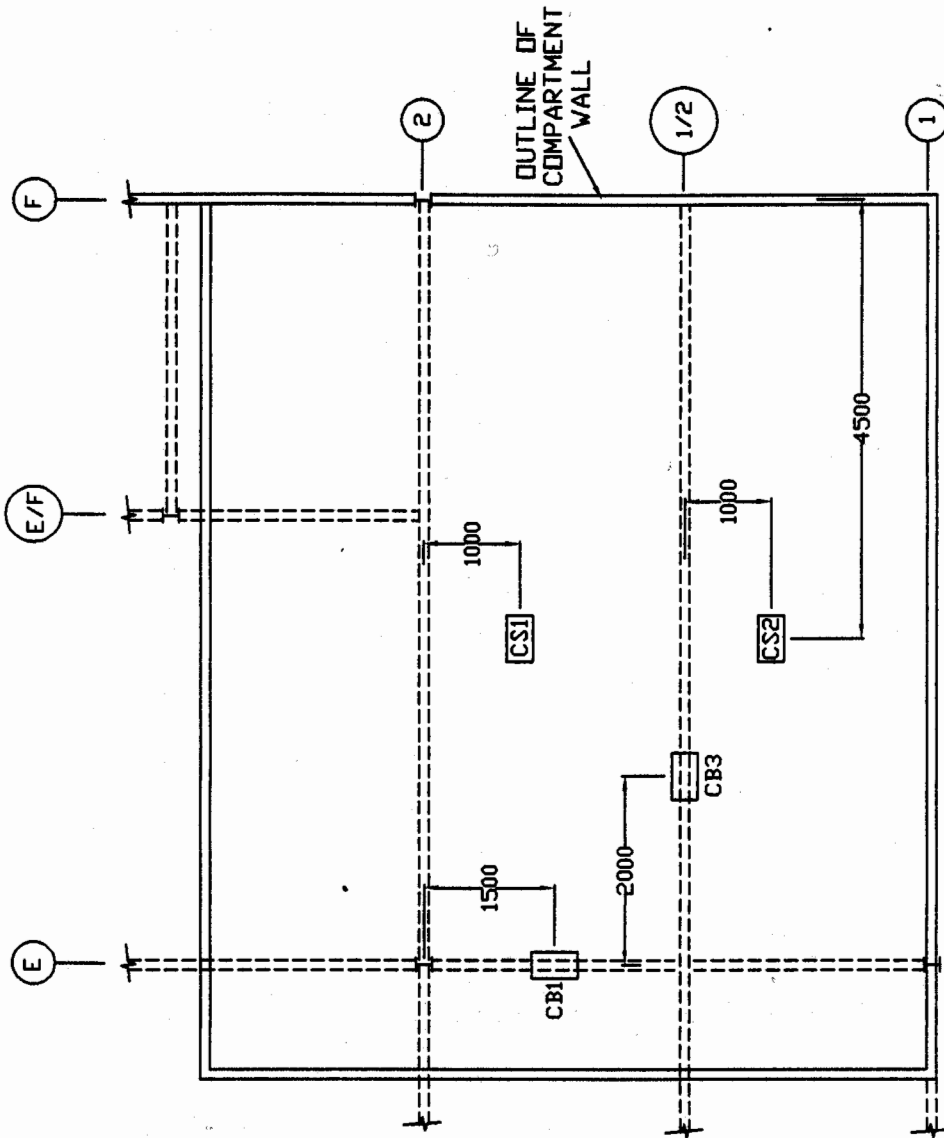
DRAWING NO.
 SS-E 0085 /A3/1

Figure 27



TEST 3 : LOCATIONS FOR MEASURING BEAM TEMPERATURE PROFILES

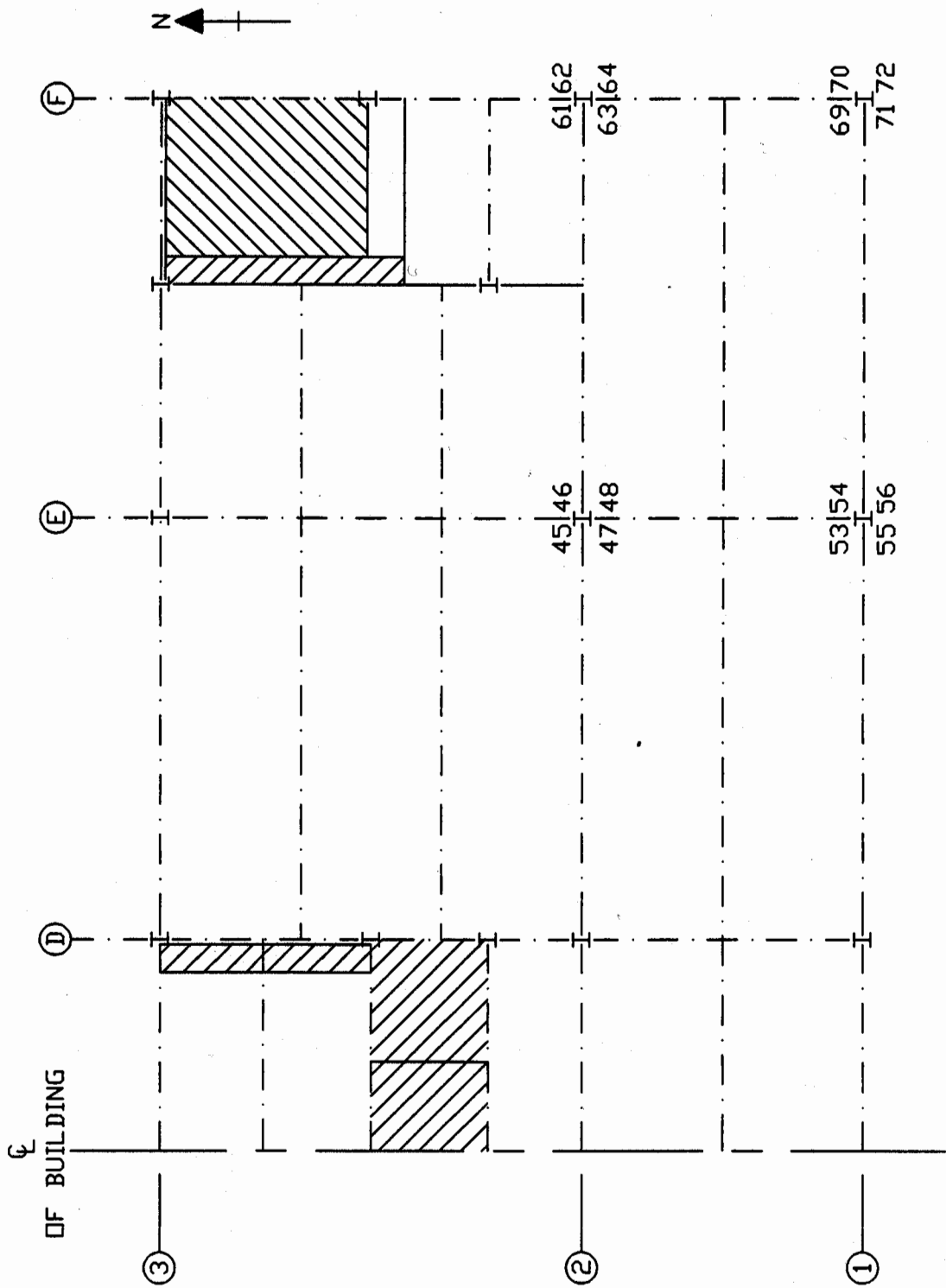
Figure 28



ALL DIMENSIONS IN MM

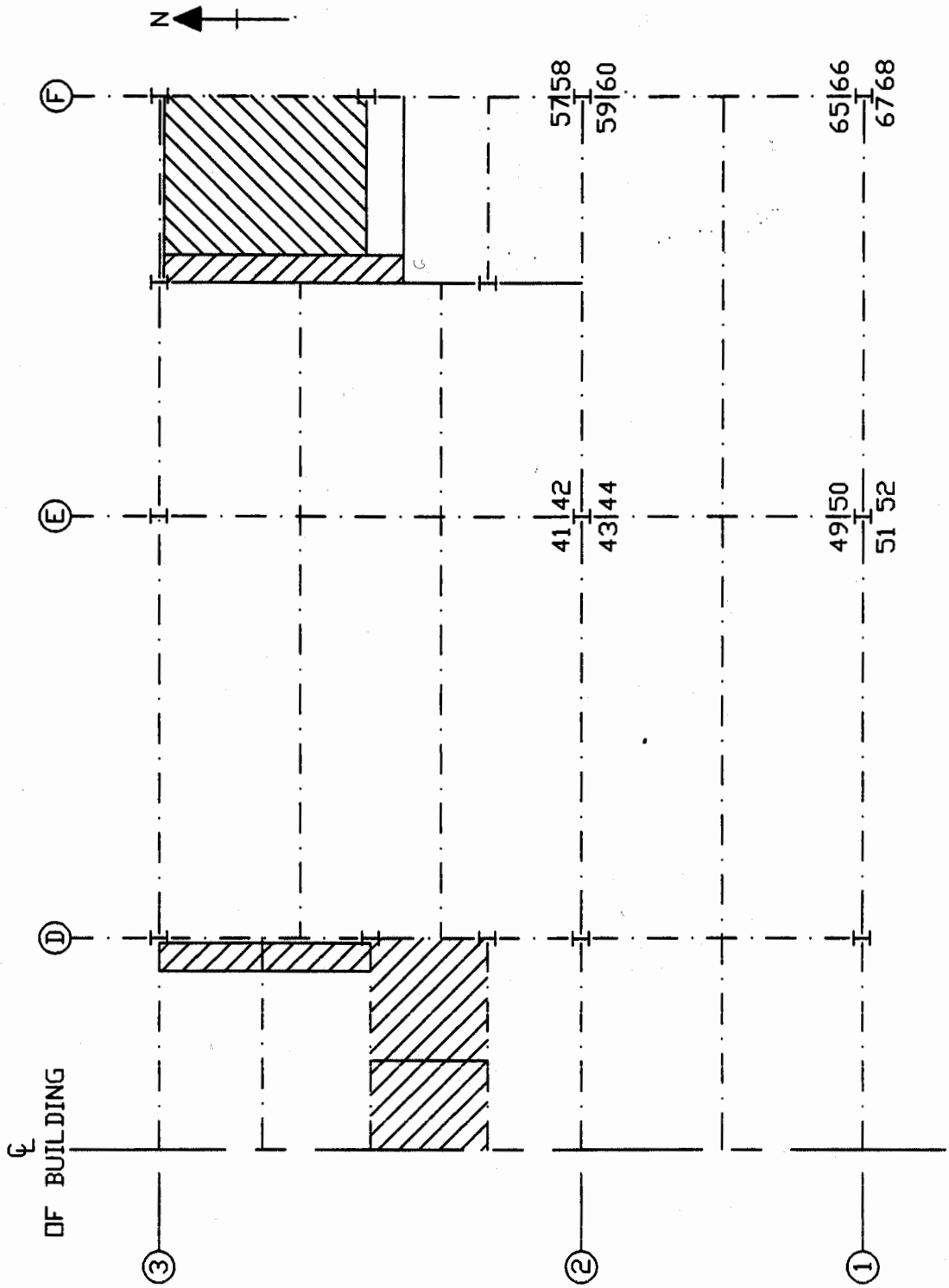
TEST 3 : LOCATIONS FOR MEASURING TEMPERATURE PROFILES
IN THE COLUMNS, CONNECTIONS & THROUGH
THE SLAB

Figure 29



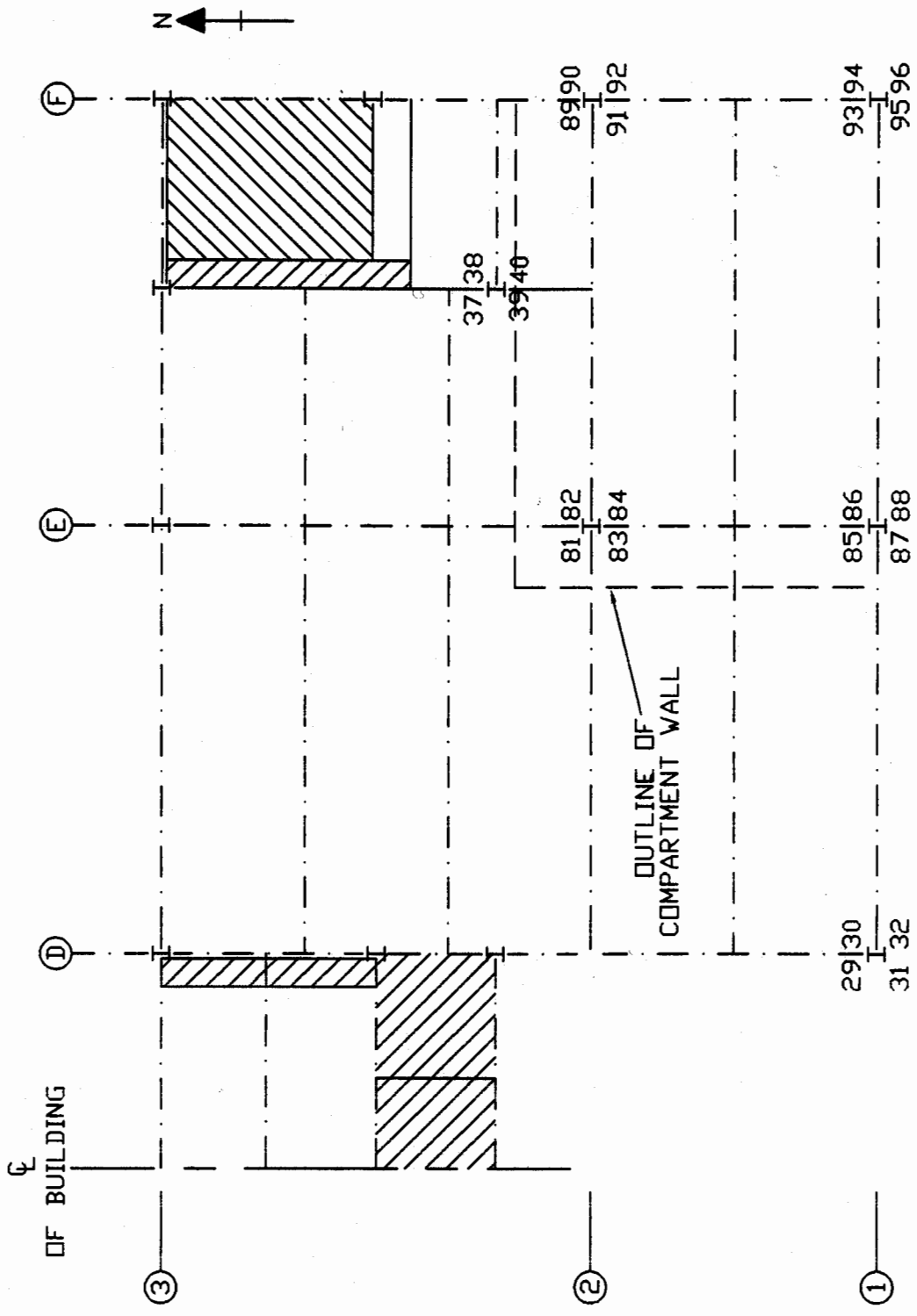
GROUND FLOOR LAYOUT - LOCATION OF COLUMN STRAIN GAUGES;
300 mm ABOVE GROUND FLOOR SLAB

Figure 31



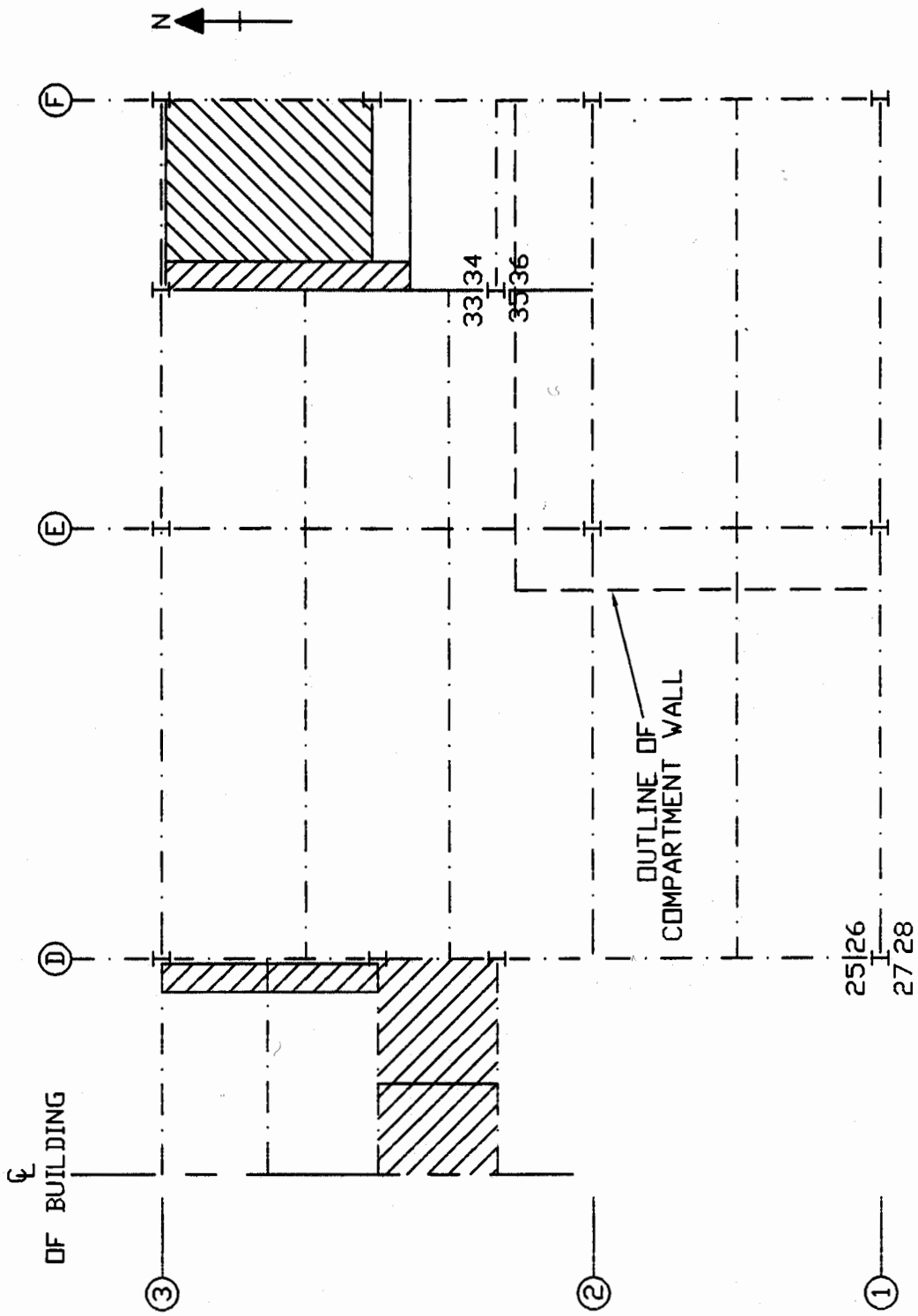
GROUND FLOOR LAYOUT - LOCATION OF COLUMN STRAIN GAUGES, 300 mm BELOW LEVEL 1 SLAB

Figure 32



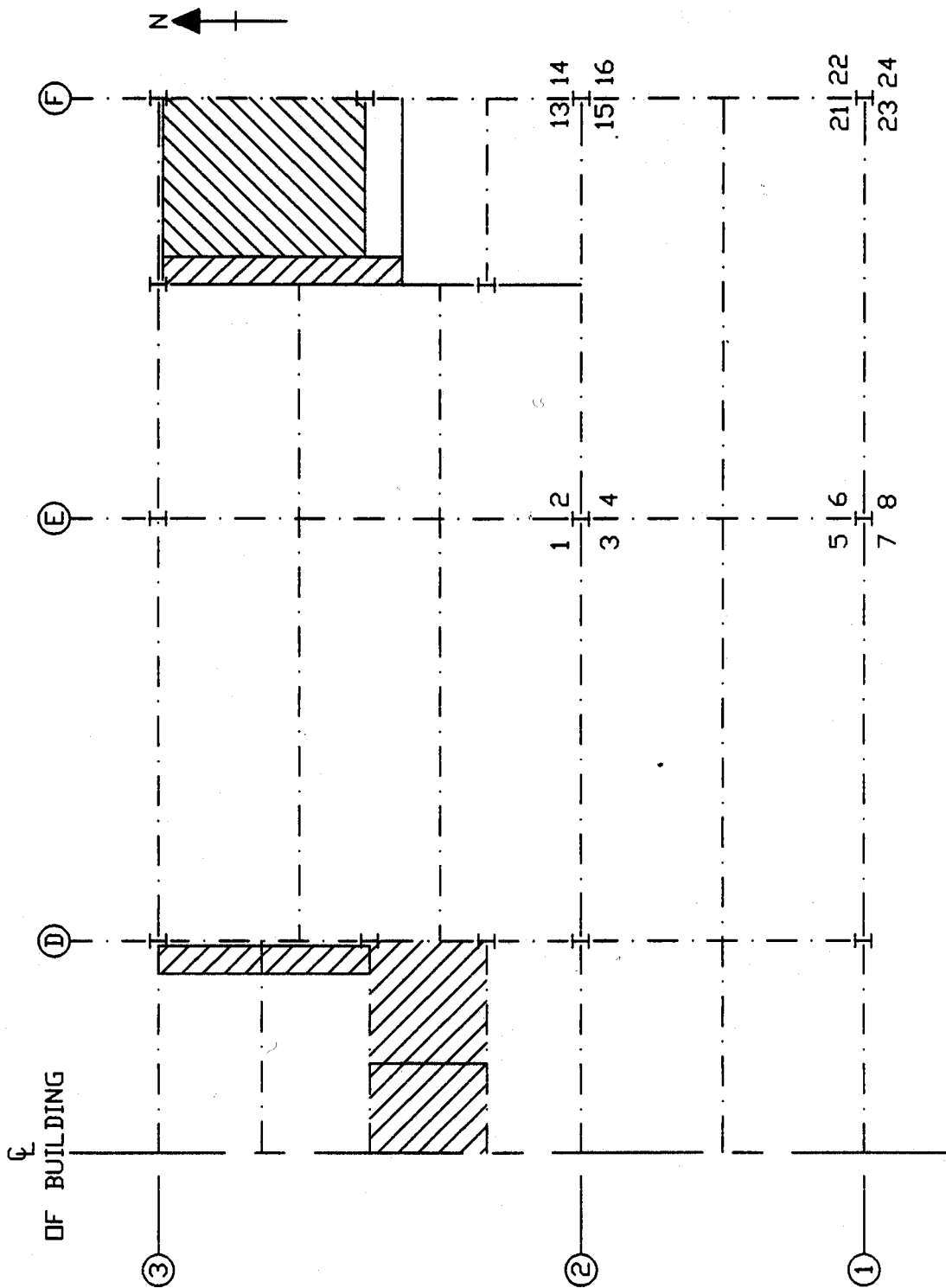
FIRST FLOOR LAYOUT - LOCATION OF COLUMN STRAIN GAUGES; 500 mm ABOVE LEVEL 1 SLAB

Figure 33

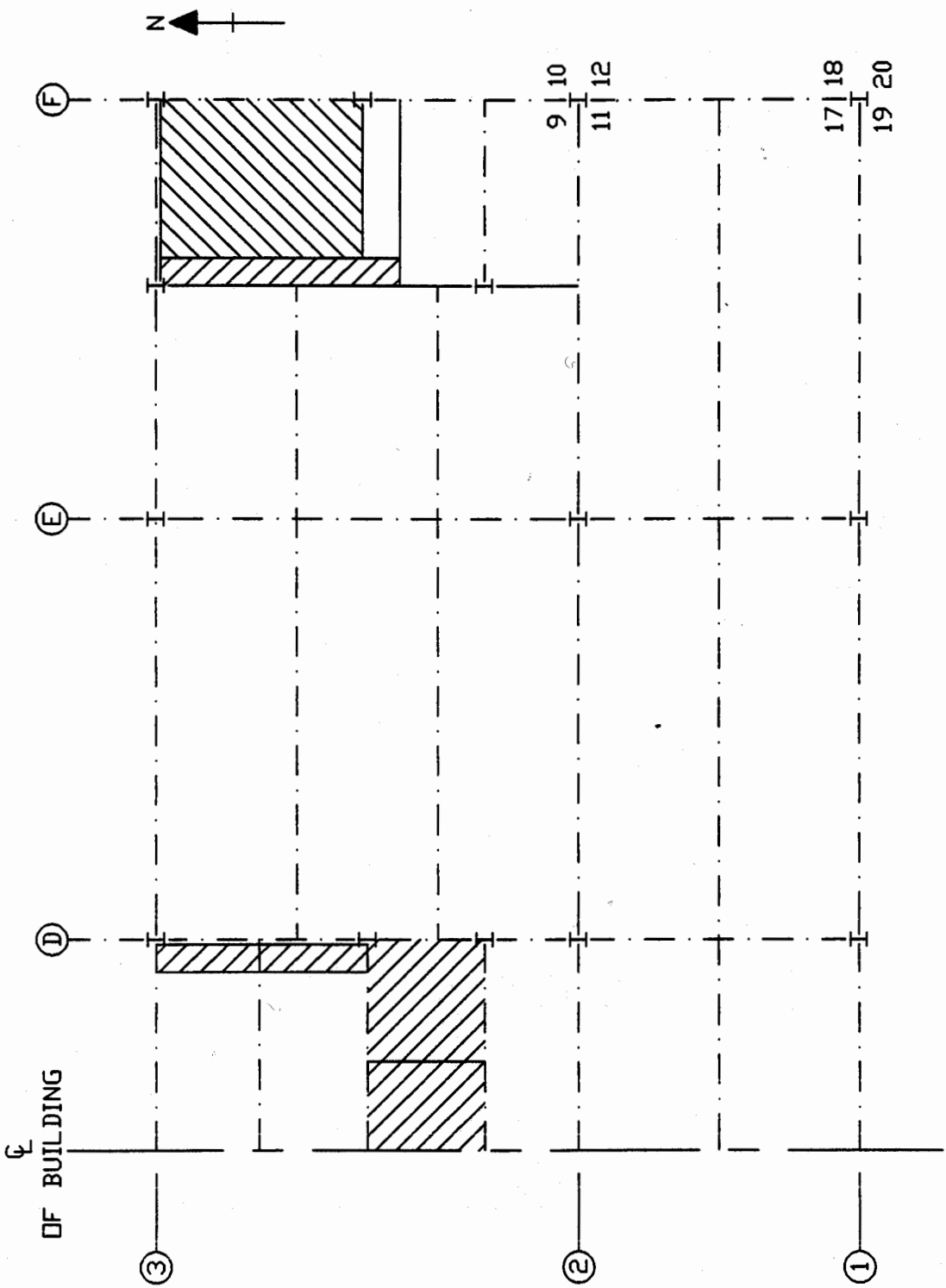


FIRST FLOOR LAYOUT - LOCATION OF COLUMN STRAIN GAUGES;
 500 mm BELOW LEVEL 2 SLAB

Figure 34

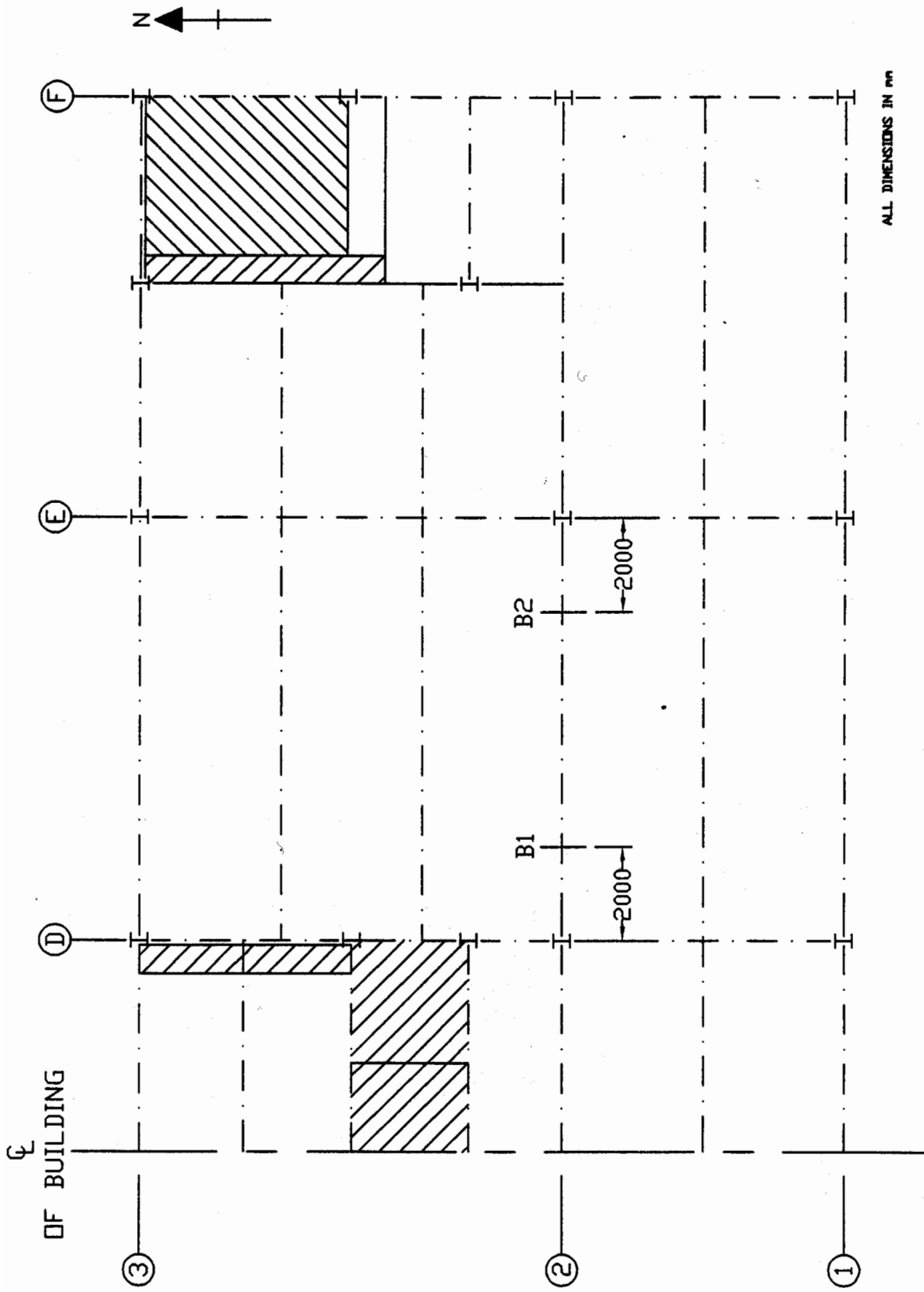


SECOND FLOOR LAYOUT - LOCATION OF COLUMN STRAIN GAUGES:
500 mm ABOVE LEVEL 2 SLAB

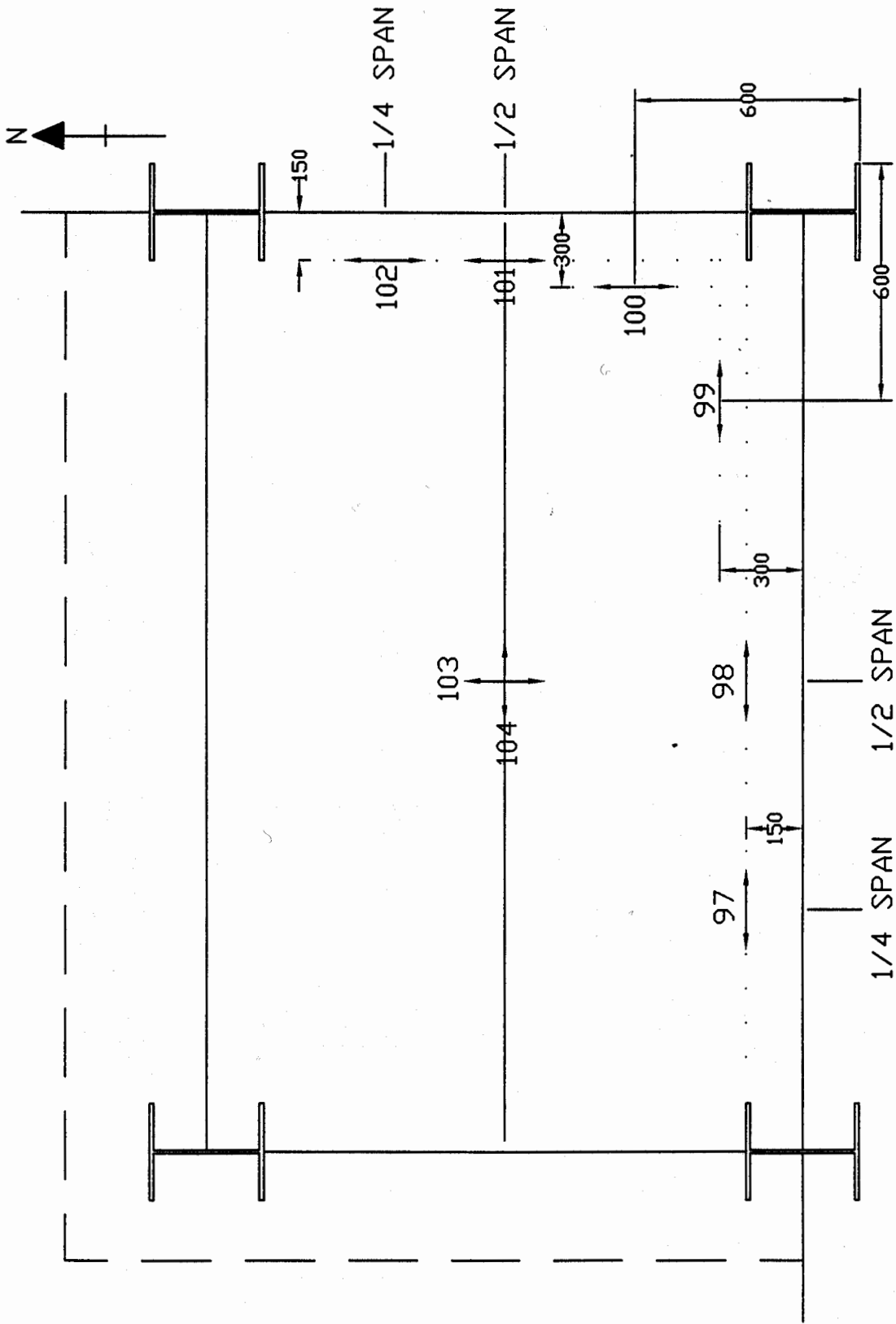


SECOND FLOOR LAYOUT - LOCATION OF COLUMN STRAIN GAUGES;
500 mm BELOW LEVEL 3 SLAB

Figure 36

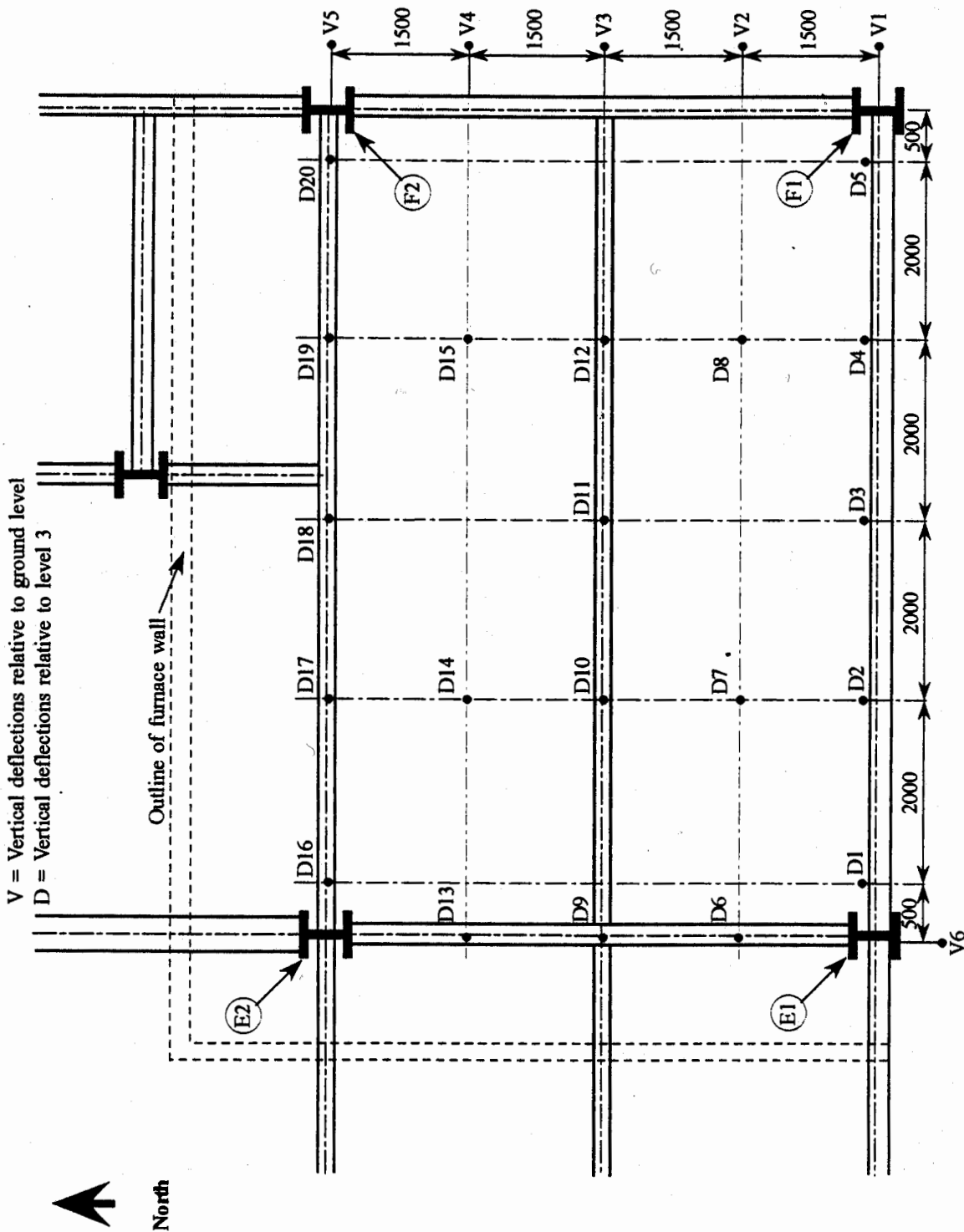


SECOND FLOOR LAYOUT - LOCATION OF BEAM STRAIN GAUGES Figure 37

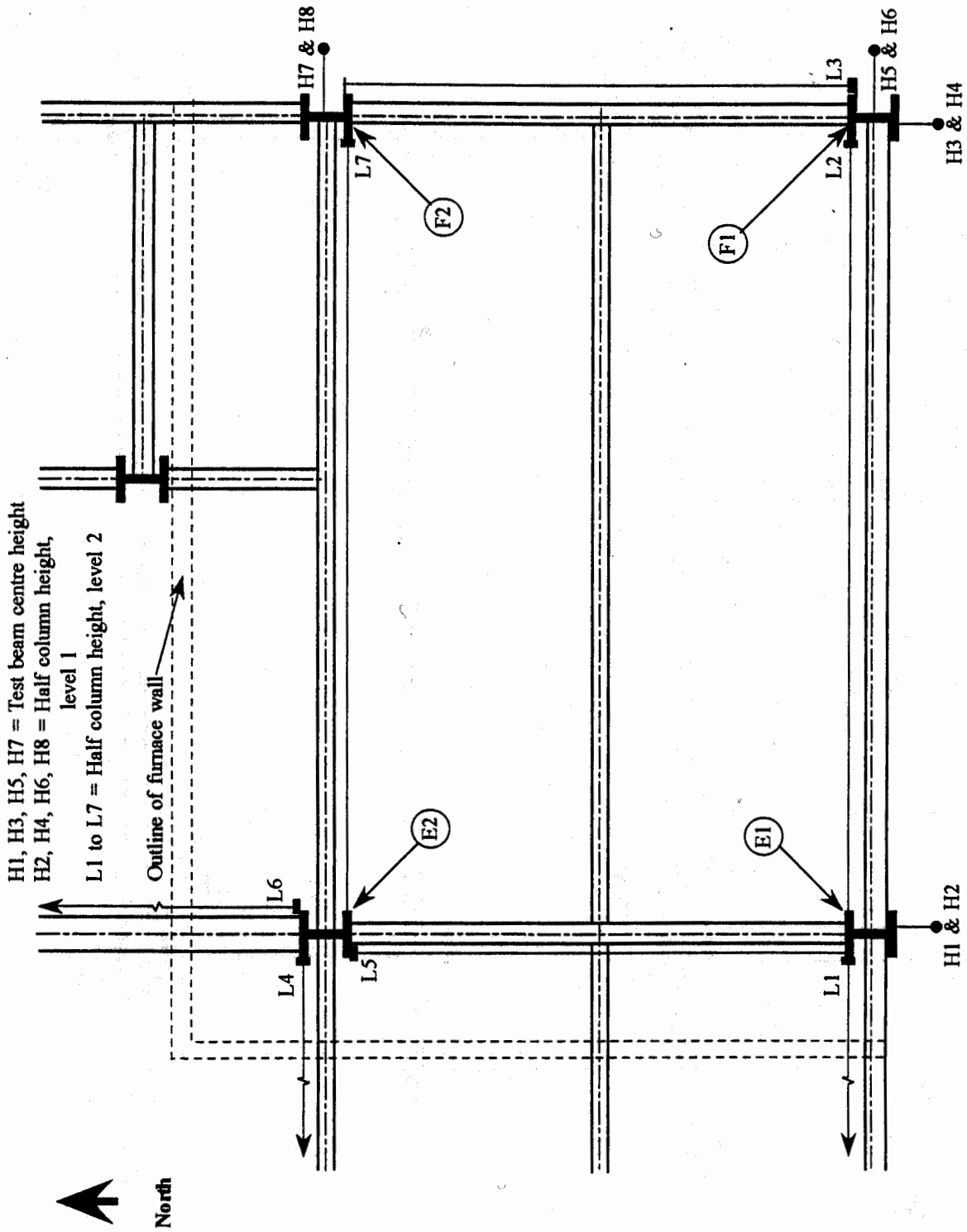


CONCRETE STRAIN GAUGE MEASUREMENTS ON THE SURFACE OF LEVEL 2 SLAB (ABOVE THE TEST COMPARTMENT)

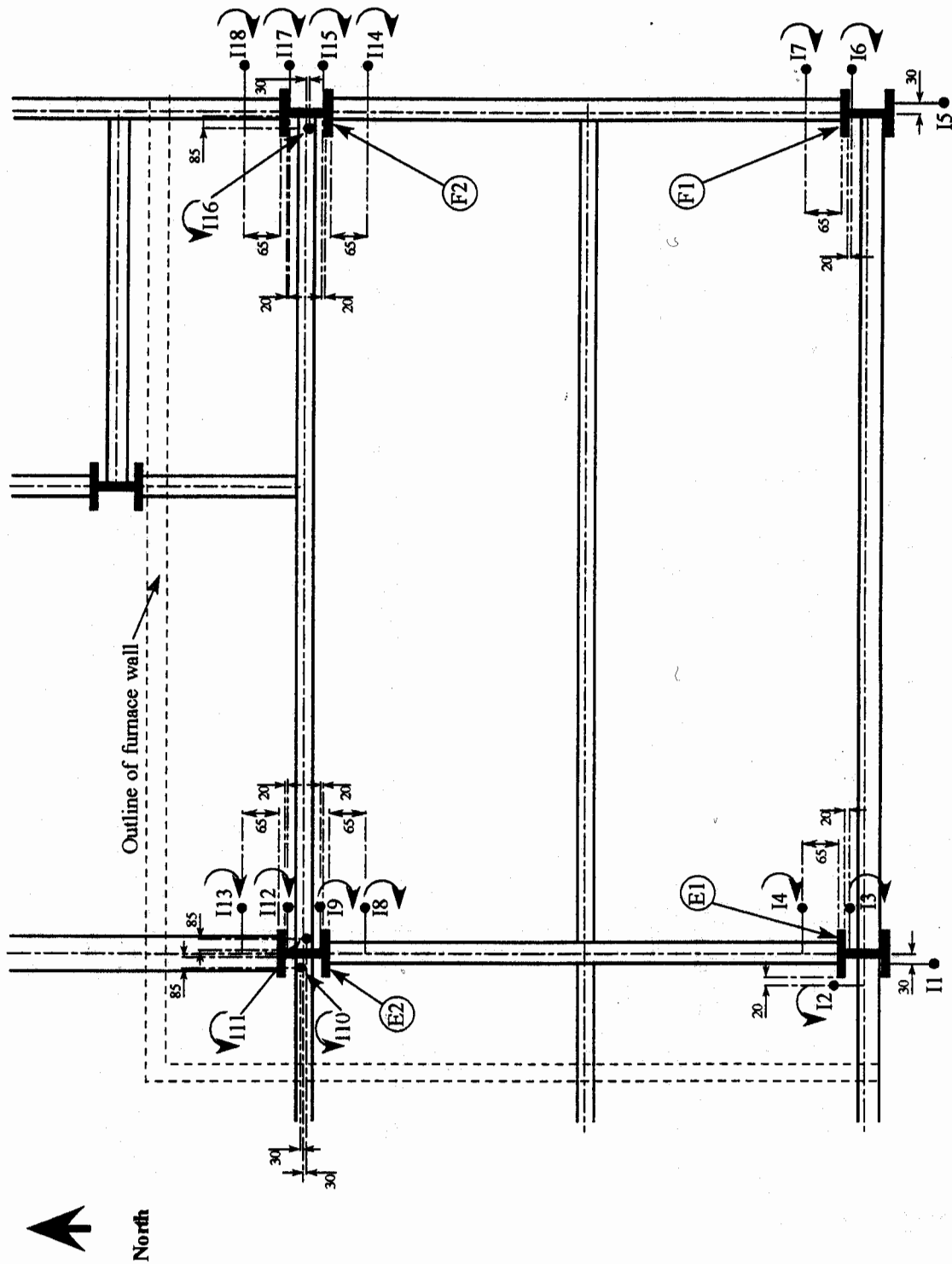
Figure 38



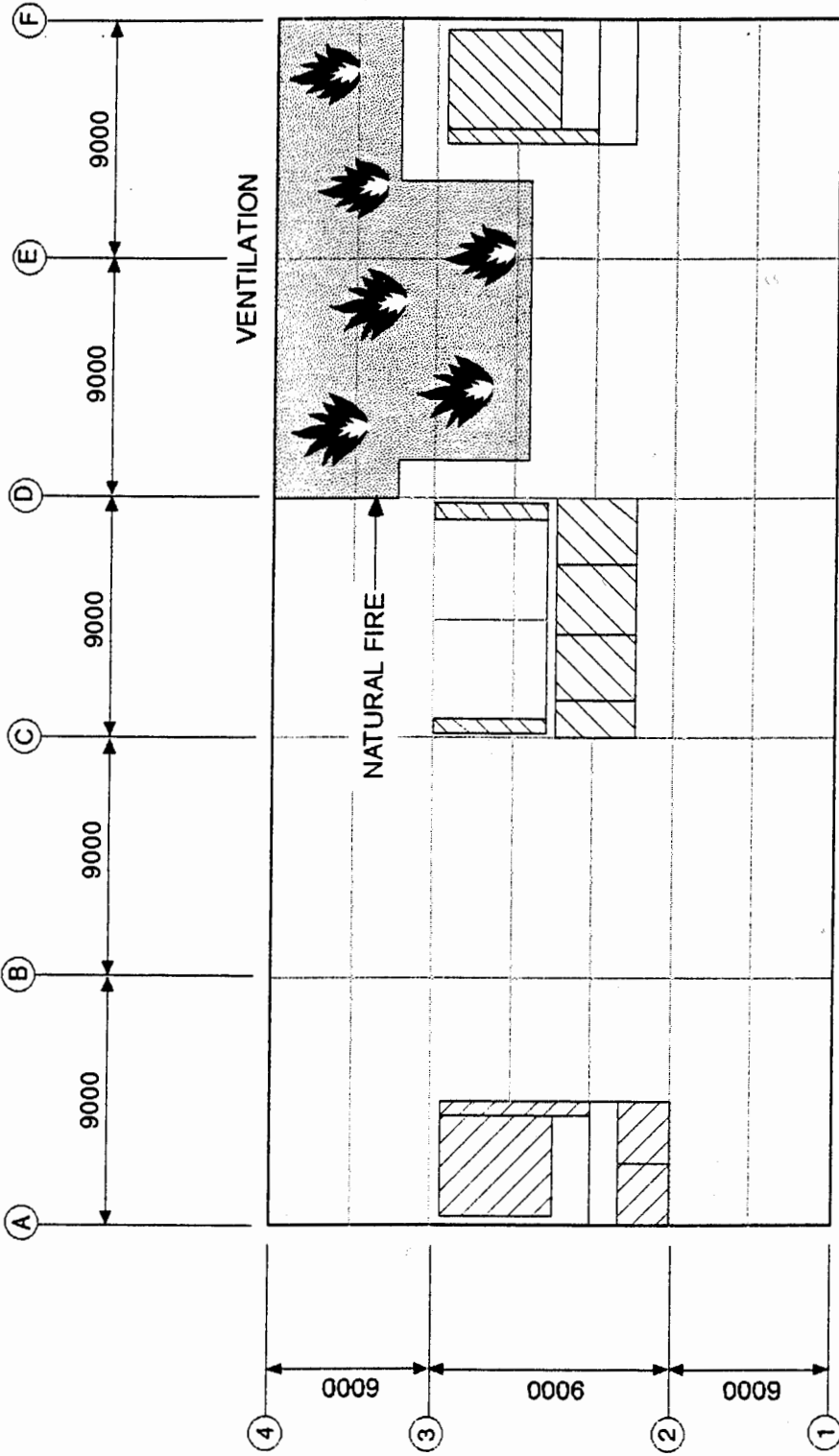
Test 3 - Transducer Positions for Measuring Vertical Deflections Figure 39



Test 3 - Transducer Positions for Measuring Horizontal Displacements Figure 40



Test 3 - Clinometer Positions for Measuring Rotation at the Connections (Vertical Plane)



TEST 4 : DEMONSTRATION TEST

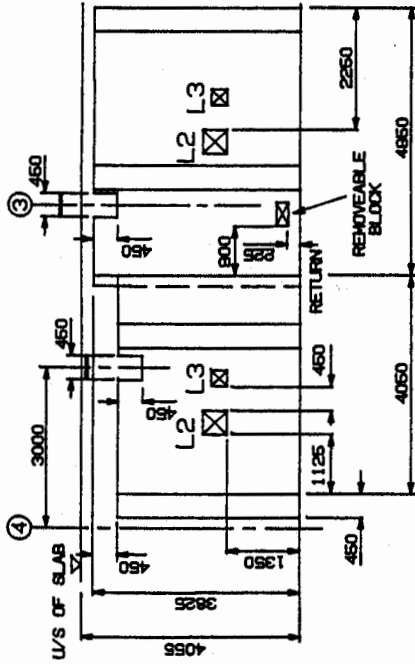
Figure 42

LINTELS

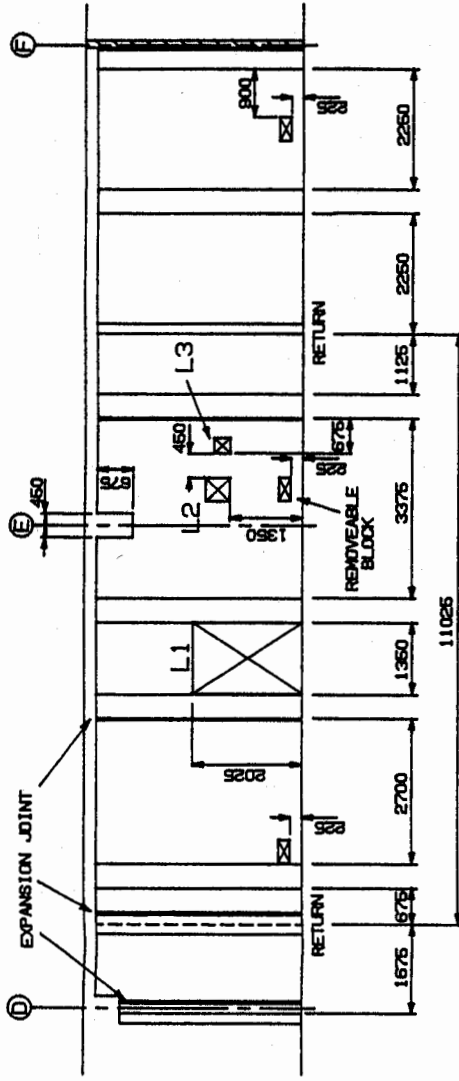
LABEL NO.	TYPE	CLEAR SPAN
L1	NAVYLOK P180	1360
L2	NAVYLOK P180	450
L3	NAVYLOK P180	360

NOTES :

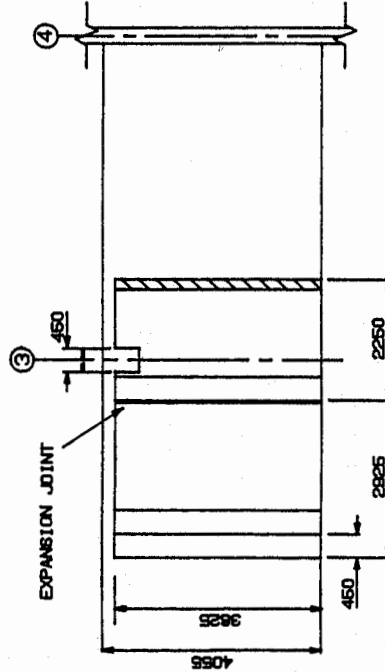
1. REFER TO DRAWING 95FE0088/A3



WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION

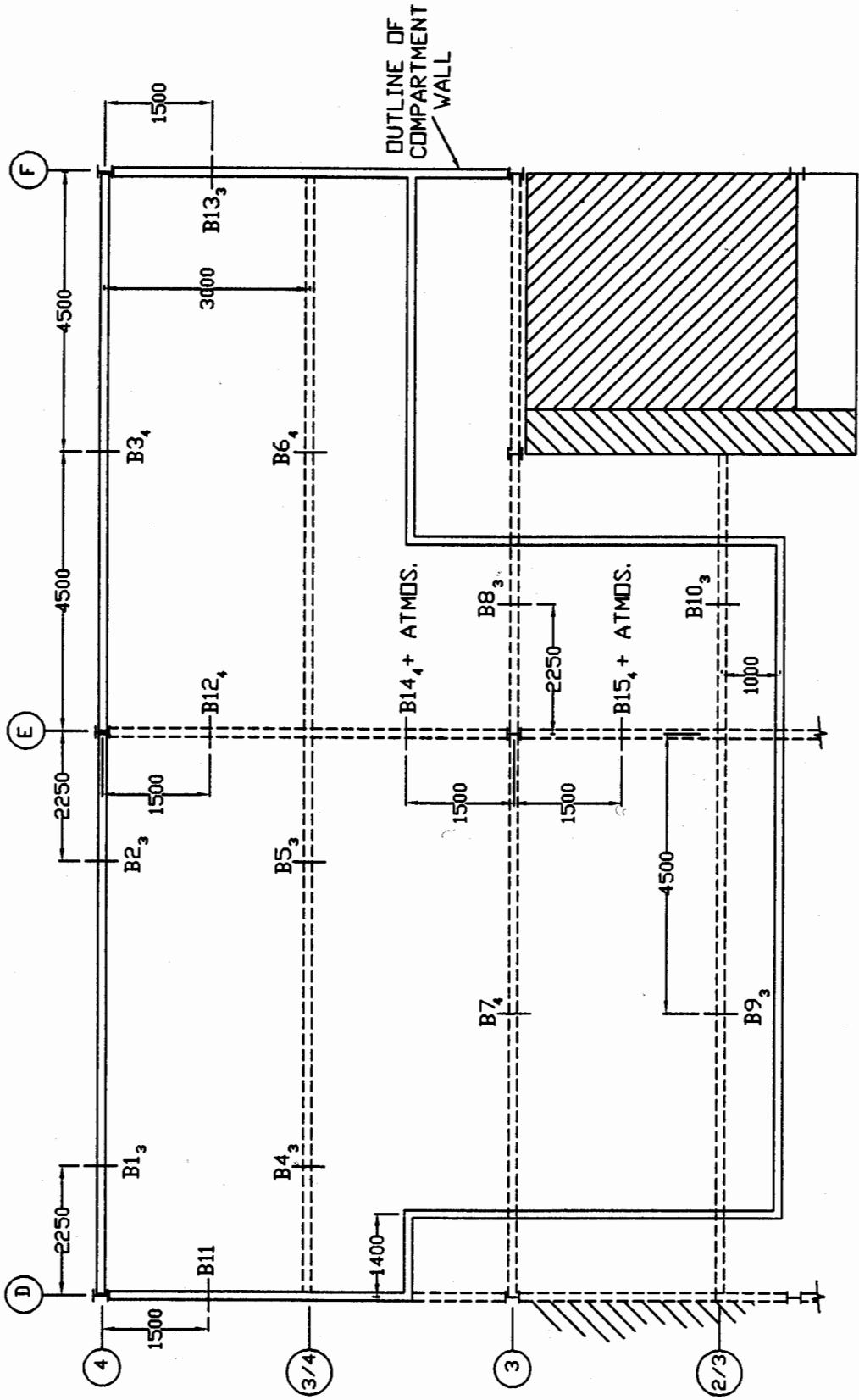
Figure 45

BRITISH STEEL PLC
SWINDEN TECHNOLOGY CENTRE
MOORGATE, ROTHERHAM
HEAVY ENGINEERING & DESIGN

PROJECT TITLE: BRE BUILDING
PROJECT NO.1: S423
DRAWING TITLE: TEST 4 - ELEVATIONS EAST, WEST AND SOUTH

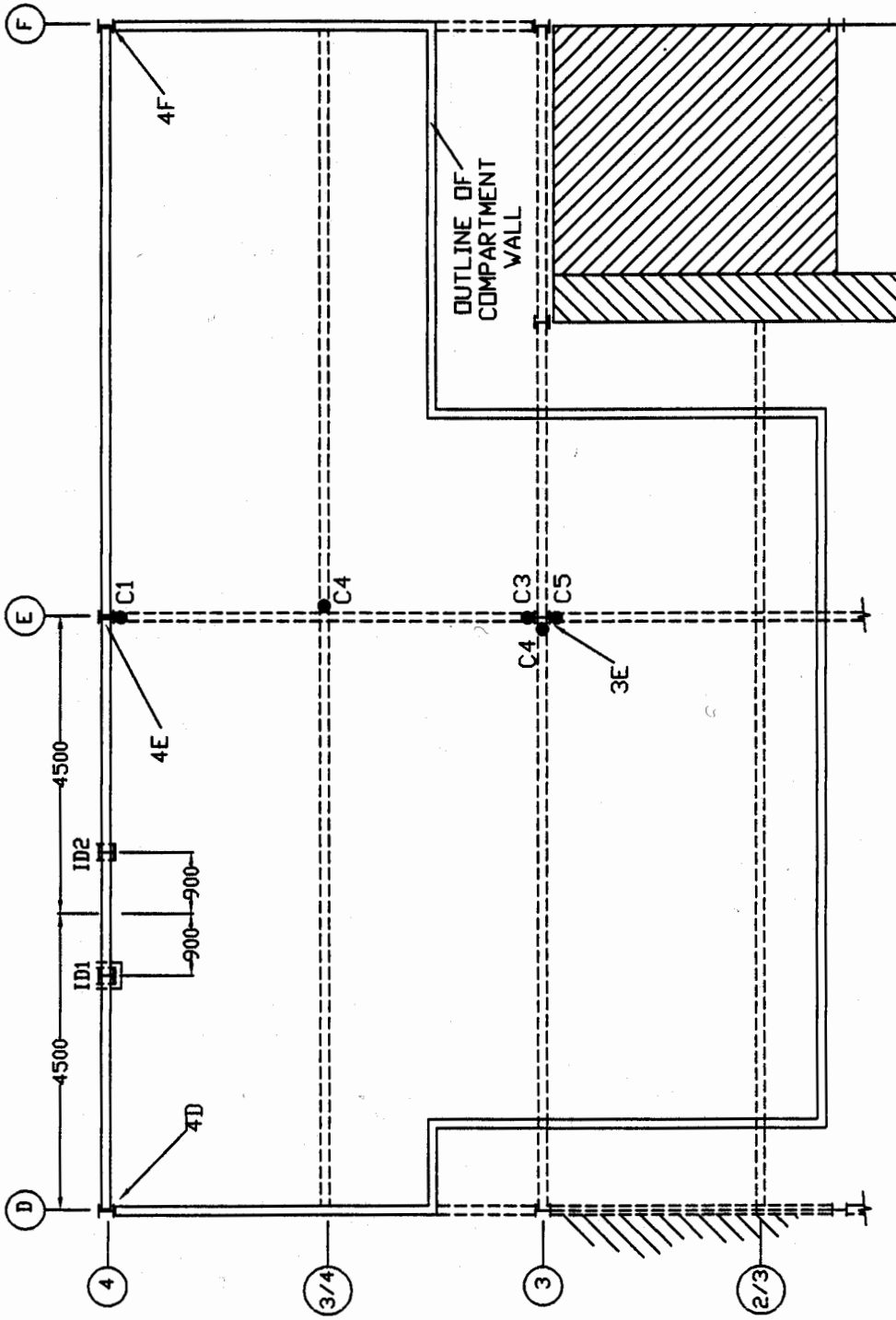
DATE	21/9/95
DRAWN	DR8
CHECKED	
SCALE	1:100
DRAWING NO.	
	95FE 0100 /A3/2

REV. 2:	28/3/98
ISSUED FOR TENDER	DRS
REV. 1:	31/1/88
ISSUED FOR COMMENT	DRS



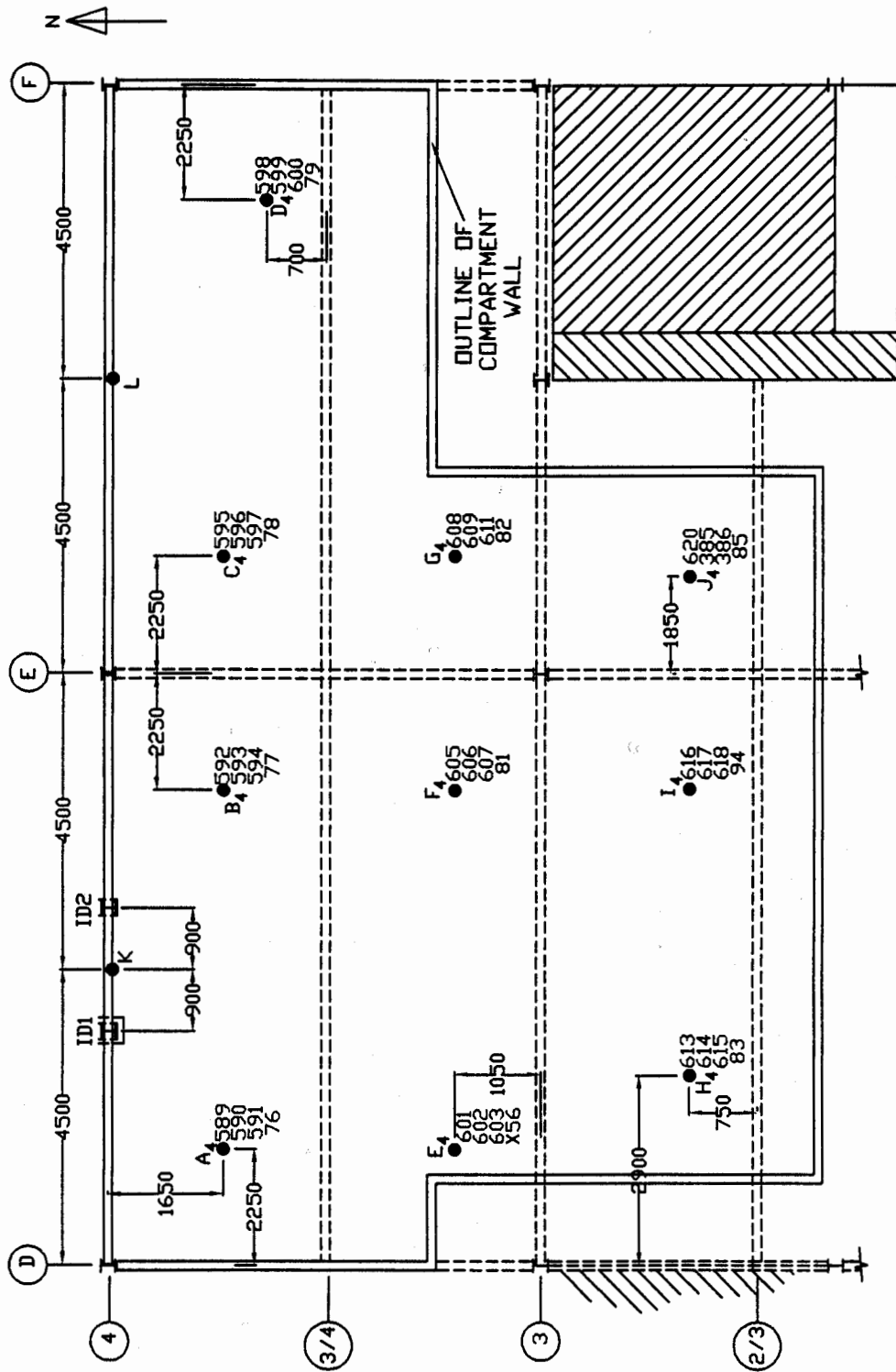
TEST 4 : LOCATIONS FOR MEASURING BEAM TEMPERATURE PROFILES
& LOCAL ATMOS. (DETAILED ELSEWHERE) Figure 47

ALL DIMENSIONS IN MM



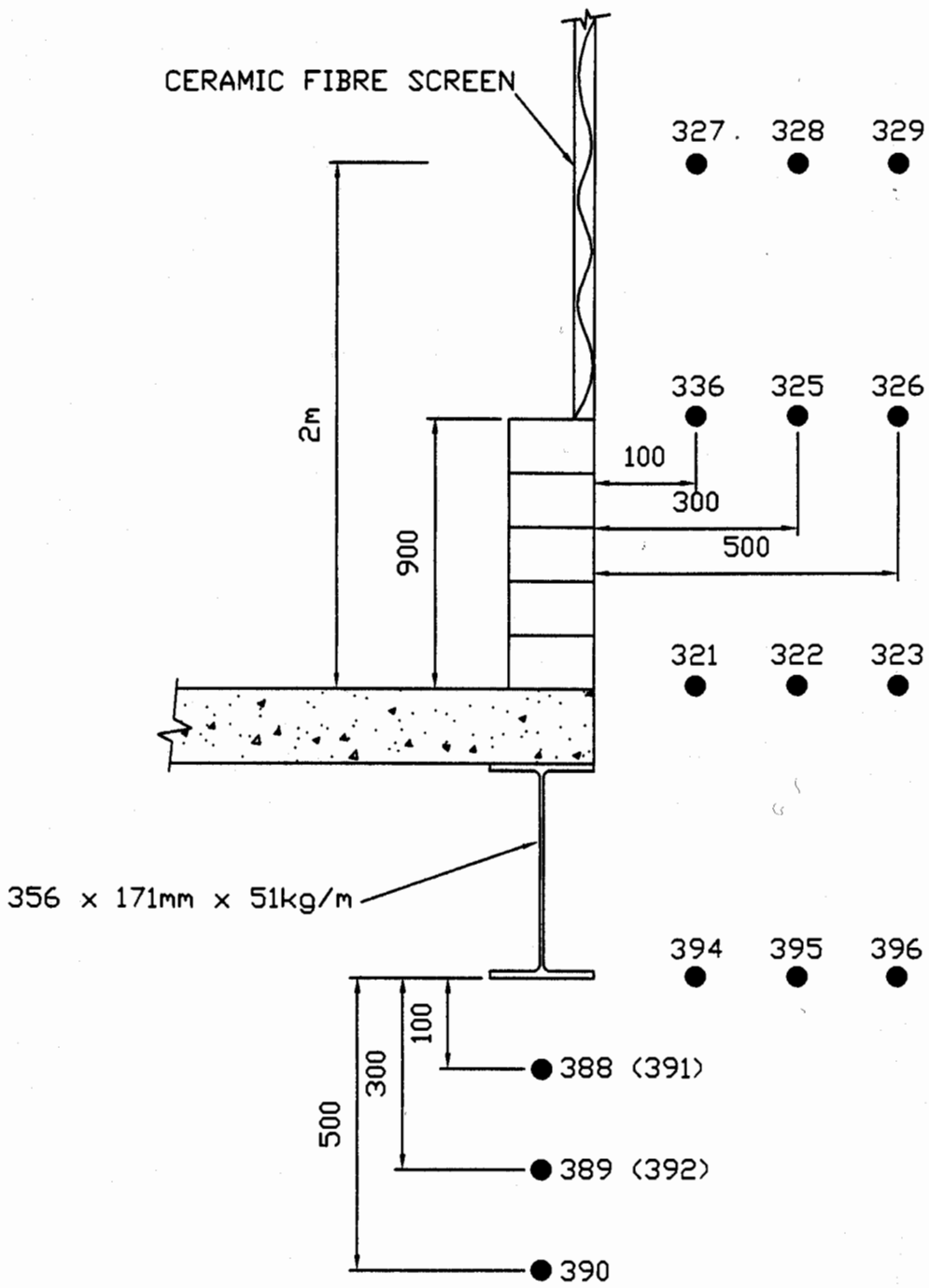
C1-C5 = T/C's IN CONNECTIONS
 3E, 4D, 4E, 4F = T/C's IN COLUMNS
 ID1, ID2 = T/C's IN INDICATIVES

THERMOCOUPLES IN COLUMNS, CONNECTIONS
 AND PARTIALLY PROTECTED STEEL INDICATIVE SPECIMENS Figure 48



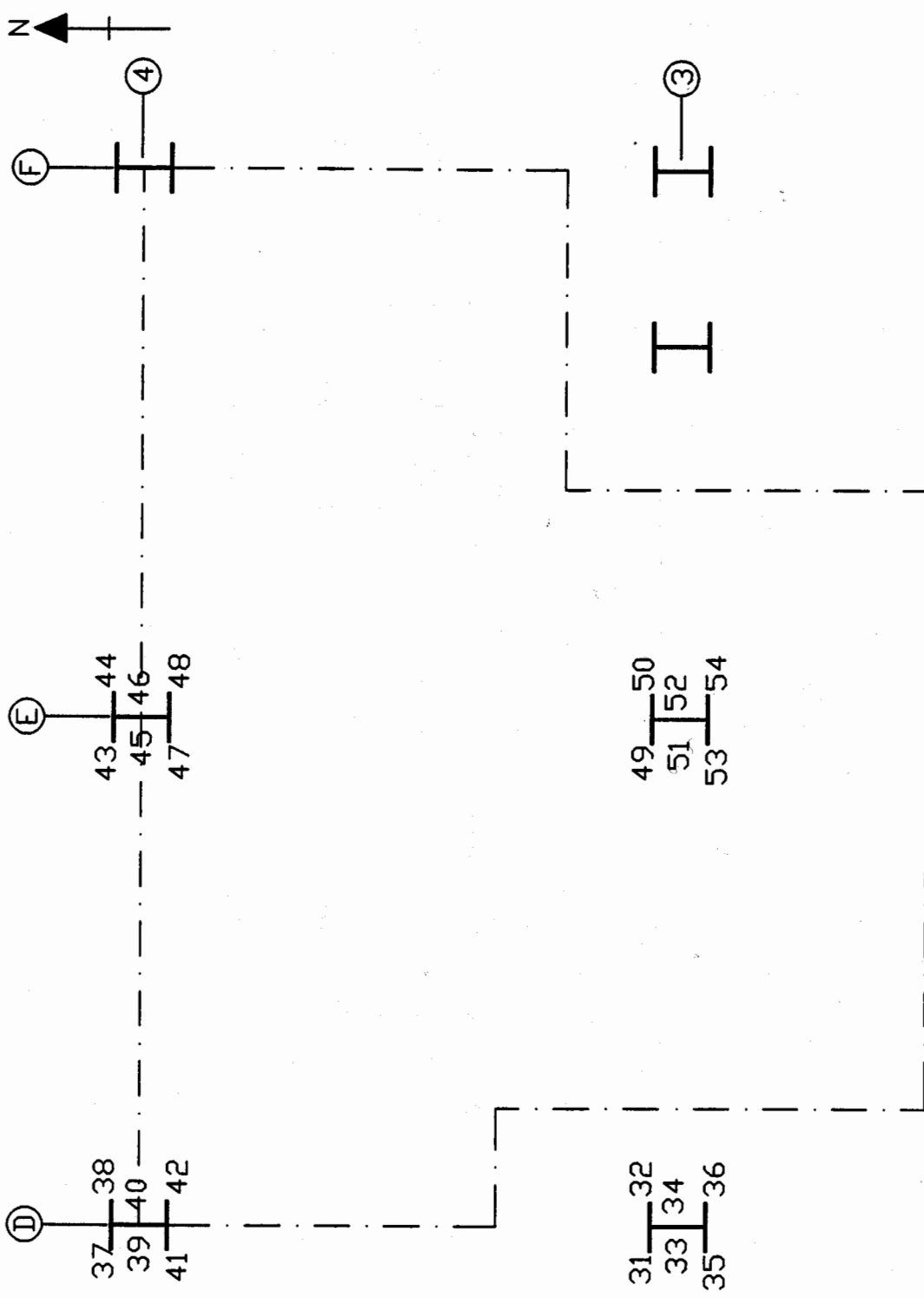
TEST 4 : LOCATION OF ATMOSPHERE THERMOCOUPLES Figure 49

ALL DIMENSIONS IN MM



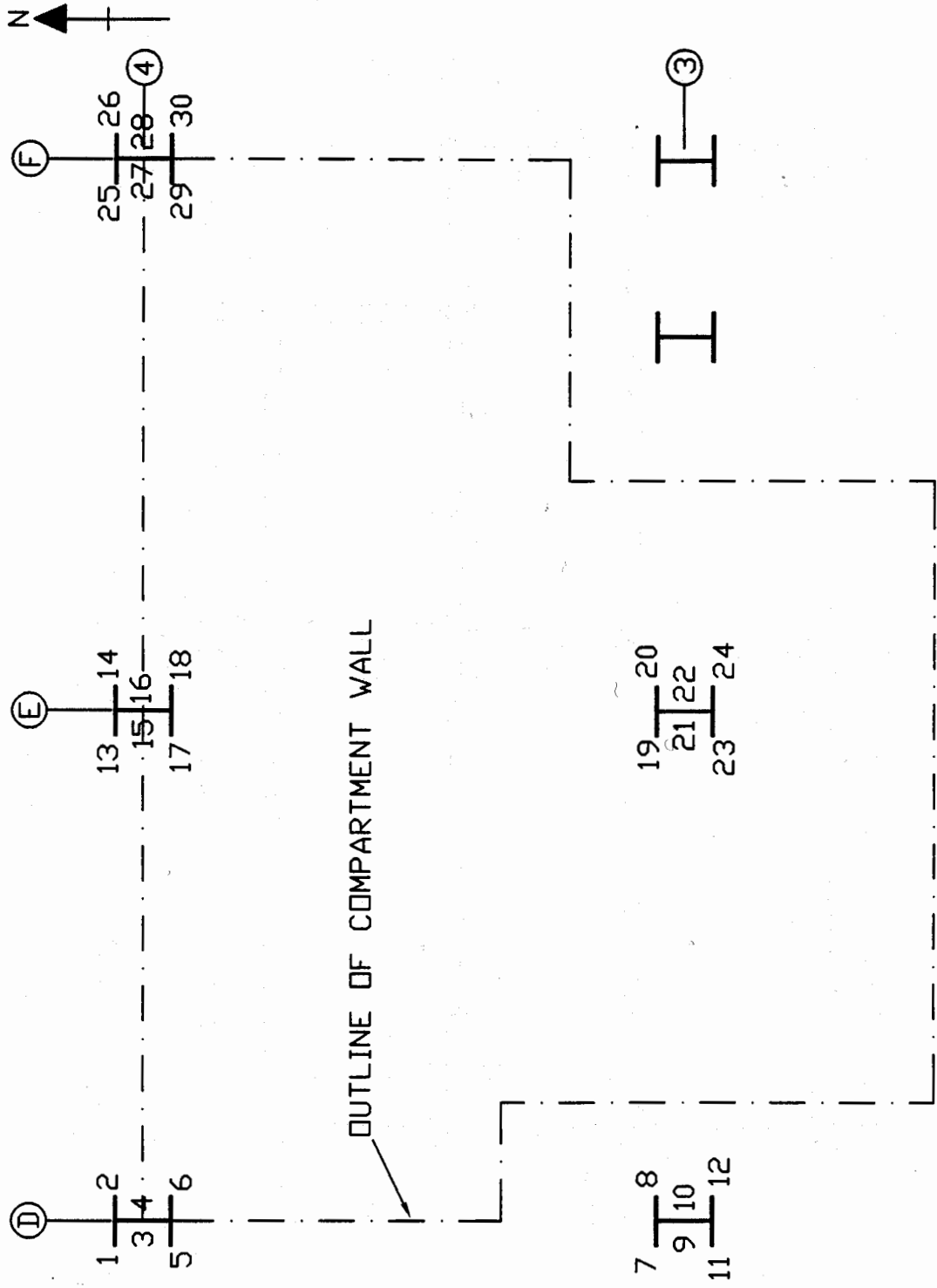
LOCATION OF THERMOCOUPLES FOR MEASURING THE PROFILE OF HOT GASES AT THE FACADE

Figure 50

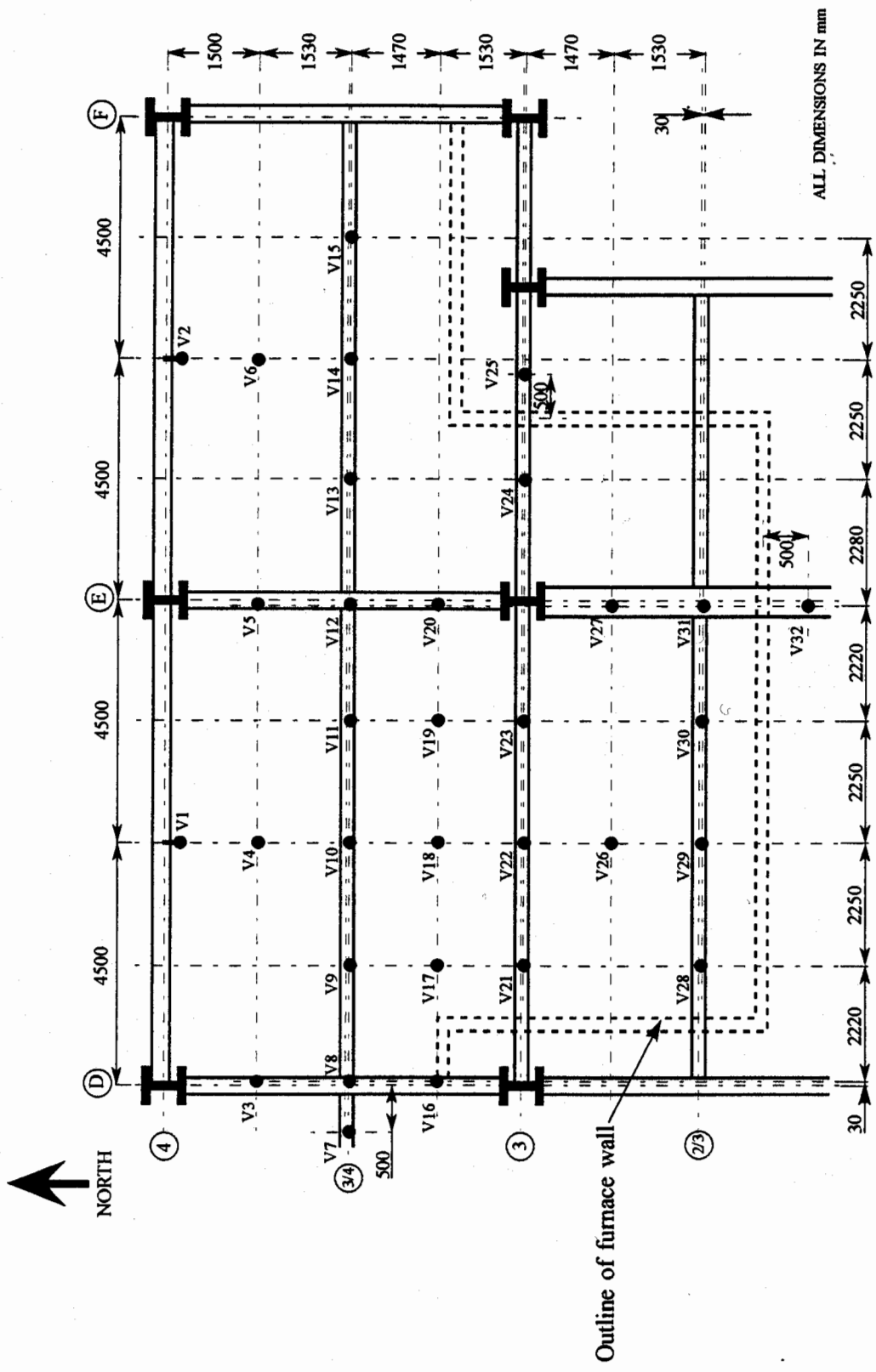


LOCATION OF STRAIN GAUGES ON LEVEL 1 (TEST COMPARTMENT)
1.5m ABOVE FLOOR SLAB

Figure 51



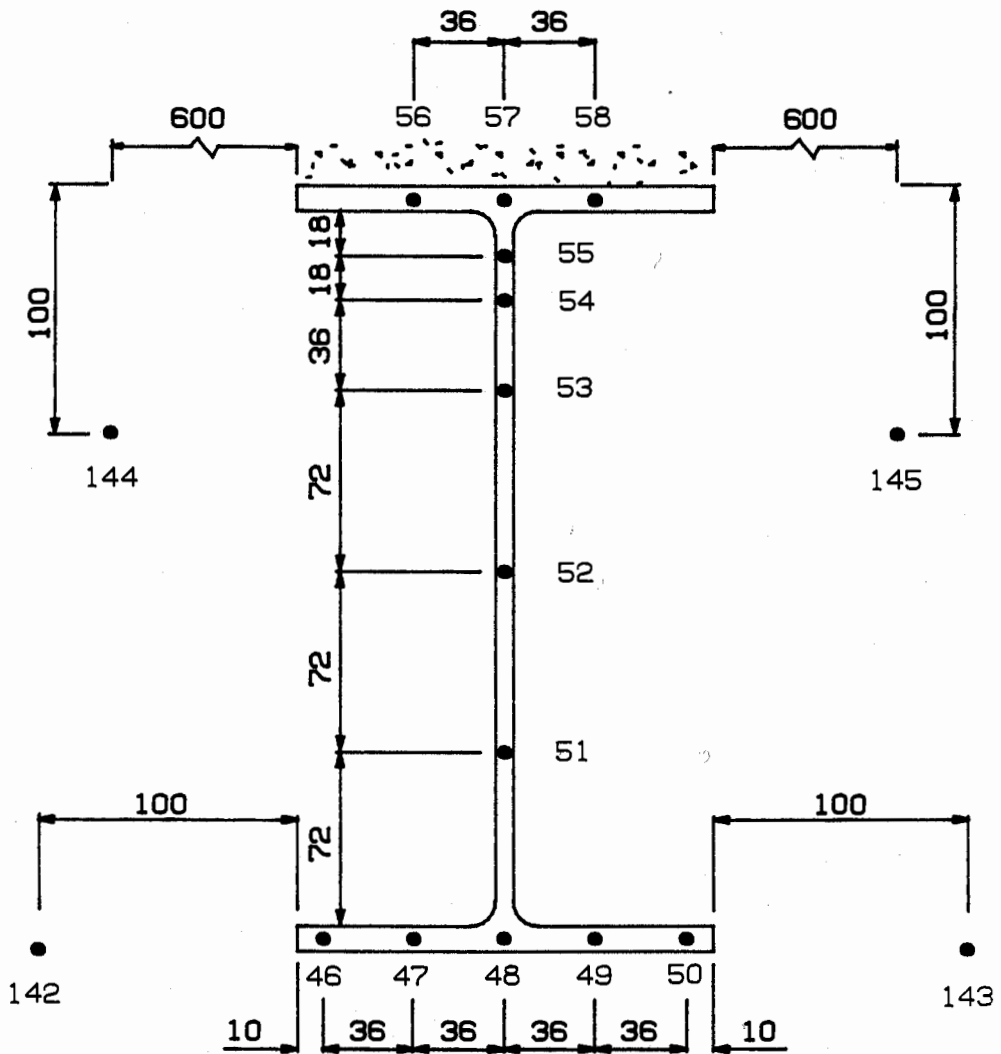
LOCATION OF STRAIN GAUGES ON LEVEL 2 (ABOVE TEST COMPARTMENT)
 1.5m ABOVE FLOOR SLAB
 Figure 52



Test 4 - Location of Transducer Positions for Measuring Deflections Figure 53

TEST 1

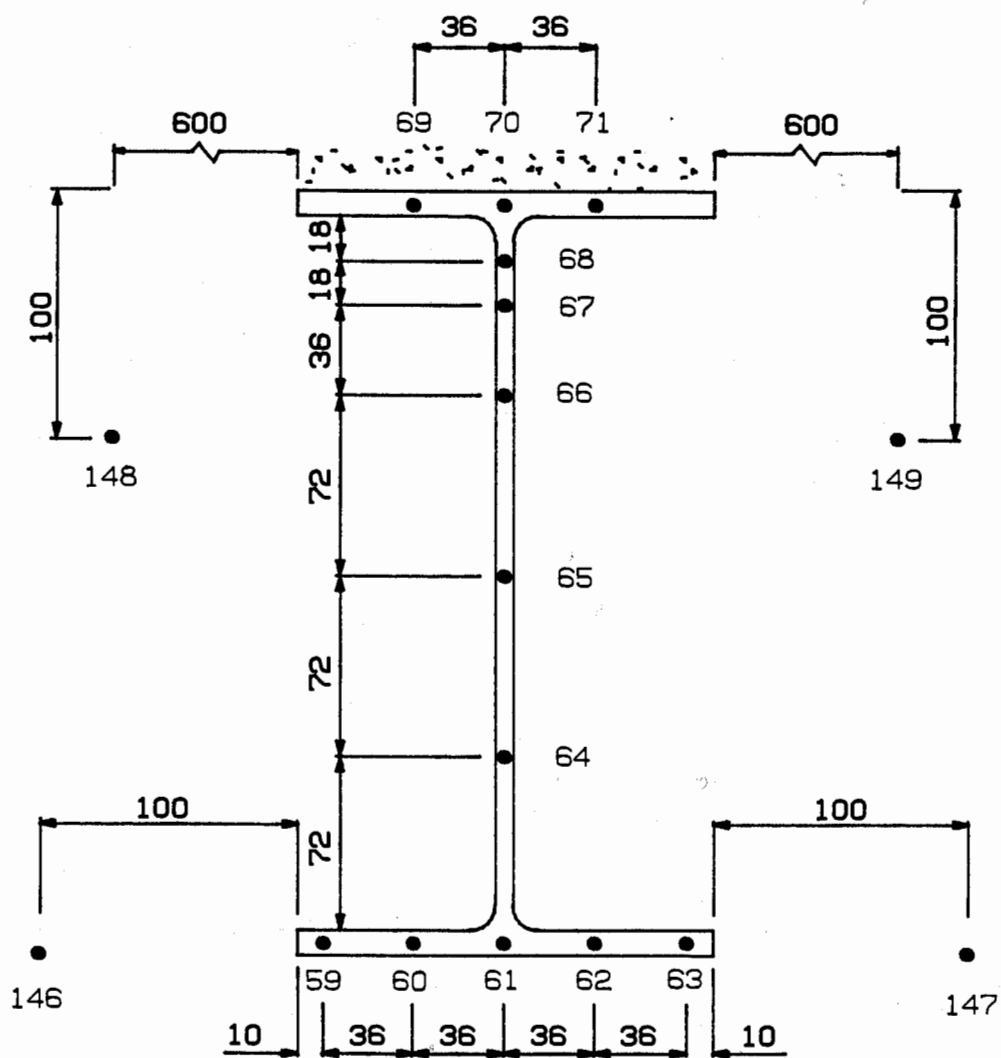
RESTRAINED BEAM



13 STEEL THERMOCOUPLES
 4 ATMOSPHERE THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON GRID LINE 1

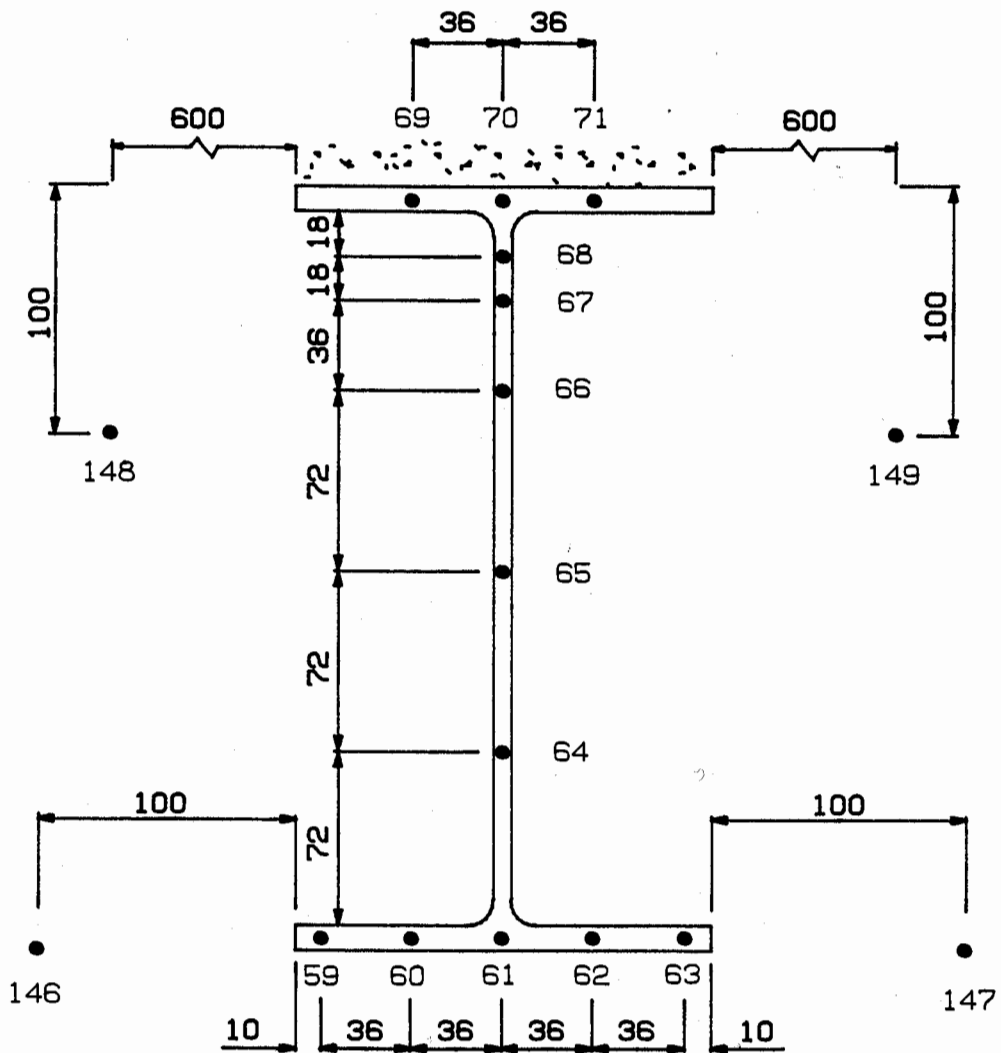
Data File: PROGL1, Figure 1/1



13 STEEL THERMOCOUPLES
 4 ATMOSPHERE THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON GRID LINE 2

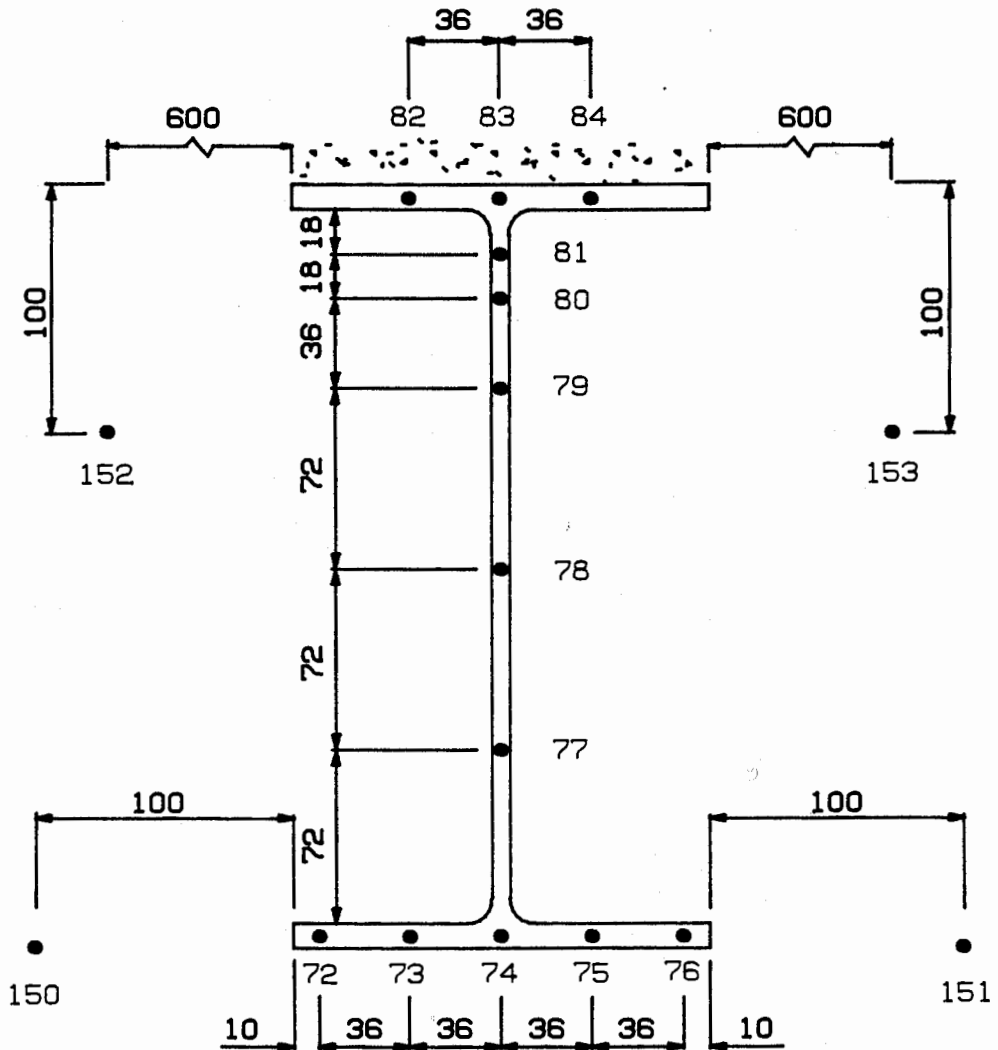
Data File: PROGL2, Figure 1/2



13 STEEL THERMOCOUPLES
 4 ATMOSPHERE THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON GRID LINE 2

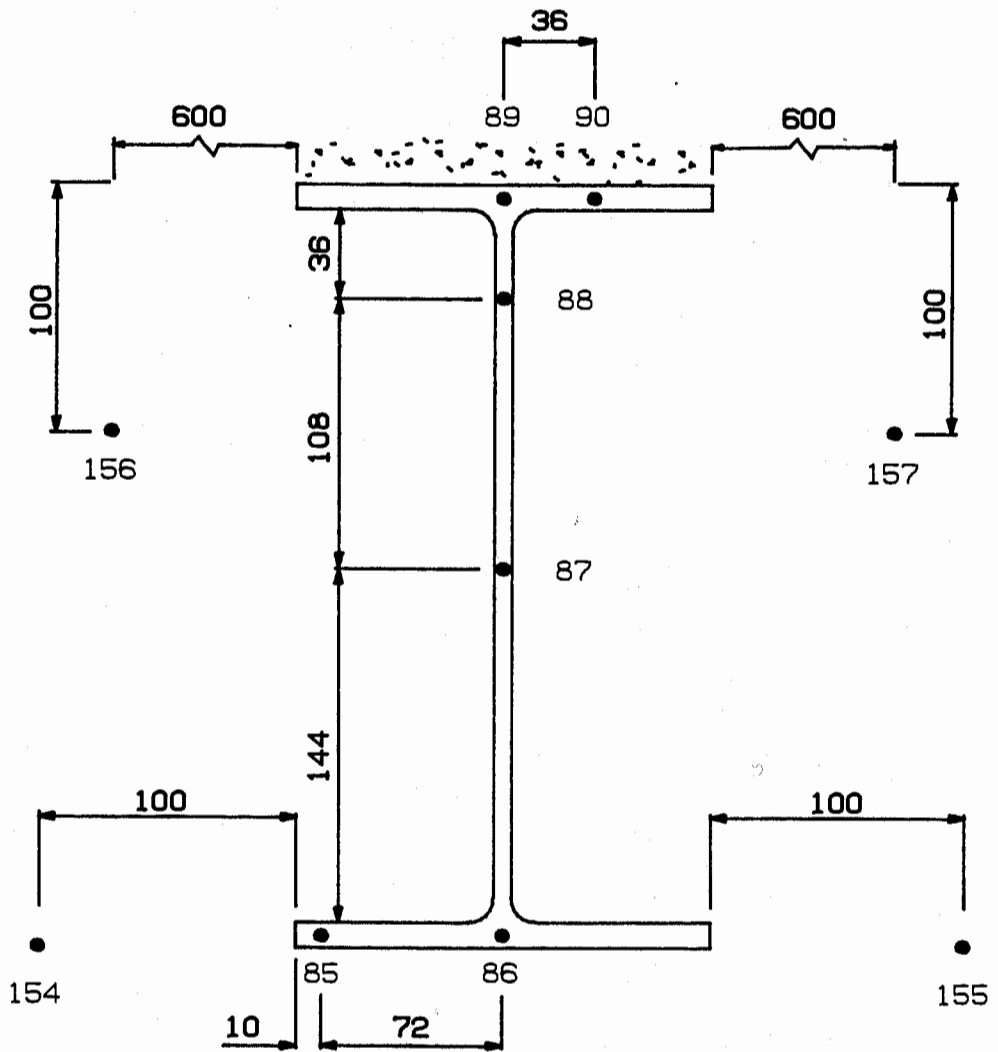
Data File: PROGL2, Figure 1/2



13 STEEL THERMOCOUPLES
 4 ATMOSPHERE THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON GRID LINE 3

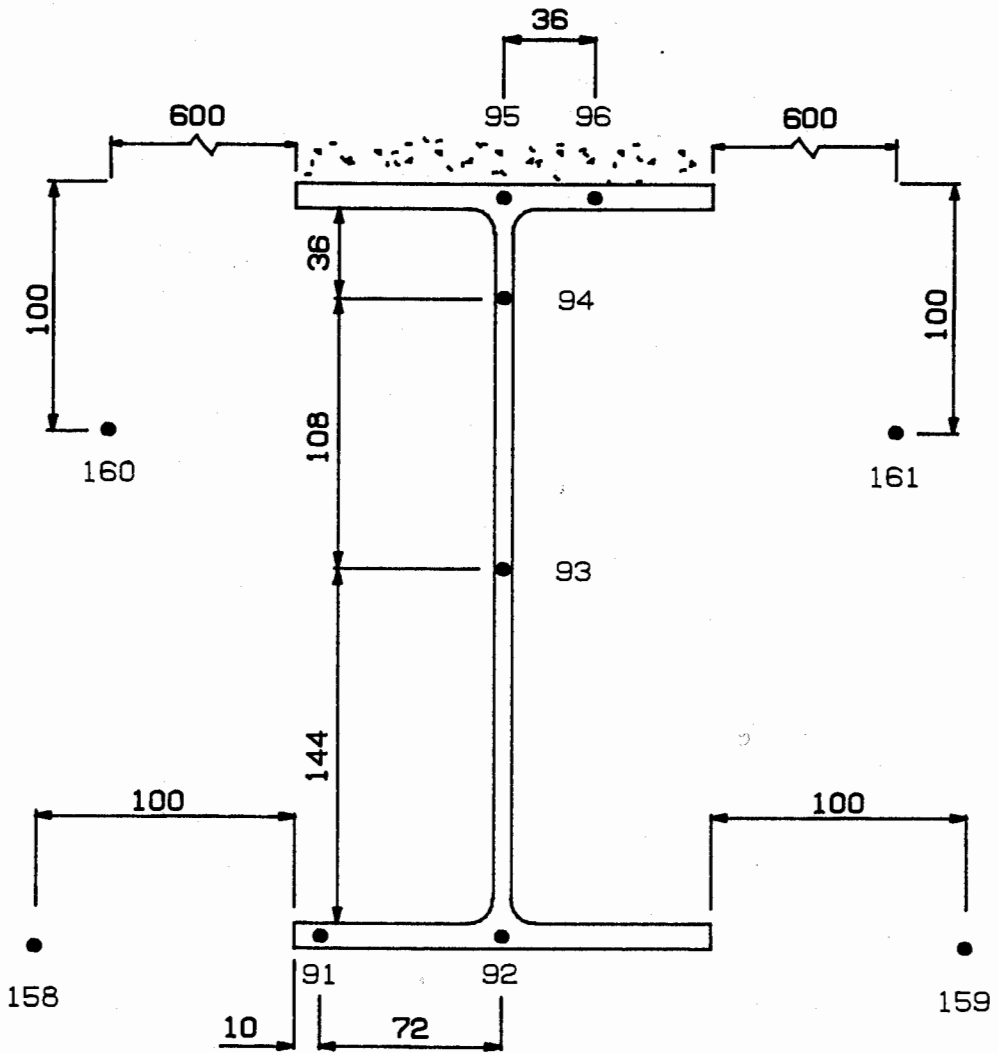
Data File: PROGL3, Figure 1/3



6 STEEL THERMOCOUPLES
 4 ATMOSPHERE THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON GRID LINE 4

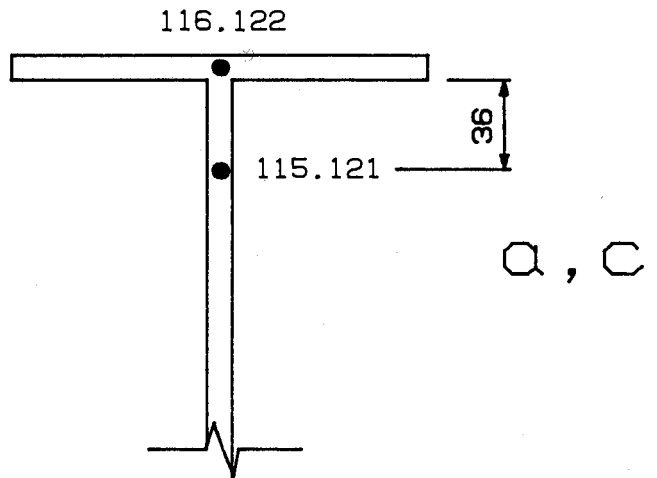
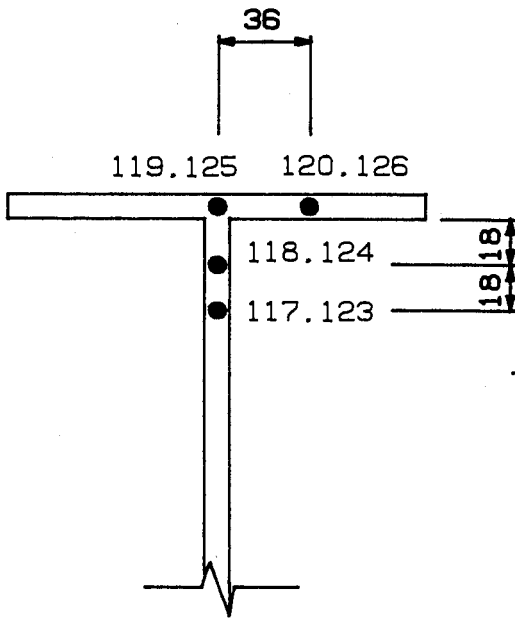
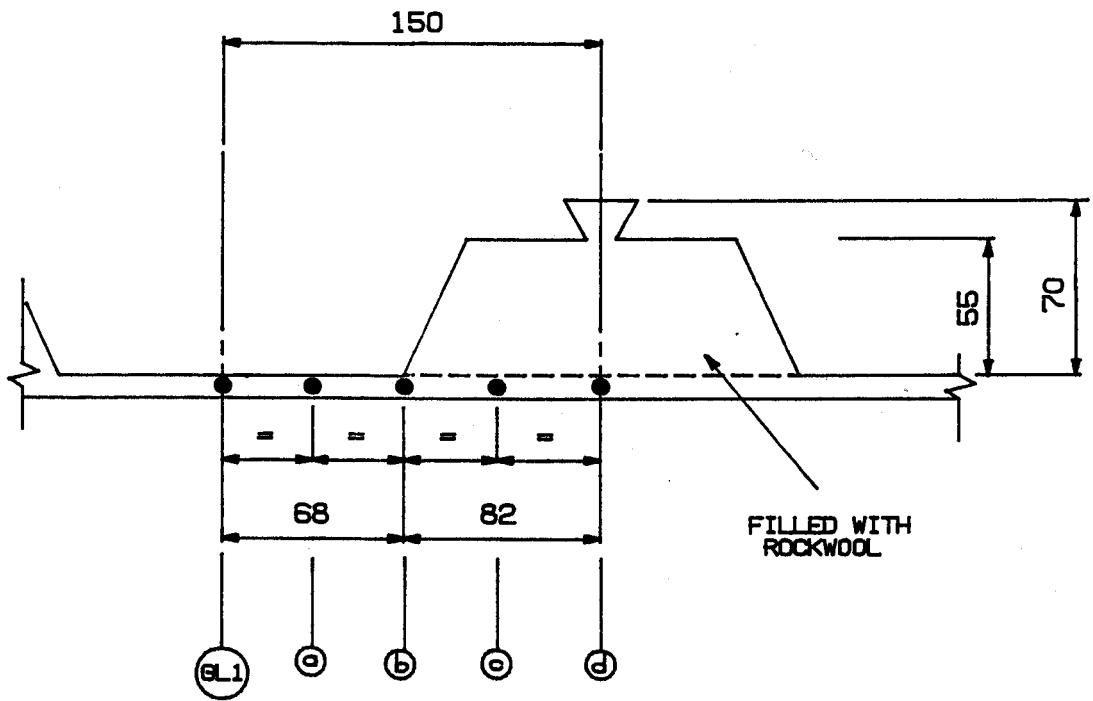
Data File: PROGL4, Figure 1/4



6 STEEL THERMOCOUPLES
 4 ATMOSPHERE THERMOCOUPLES

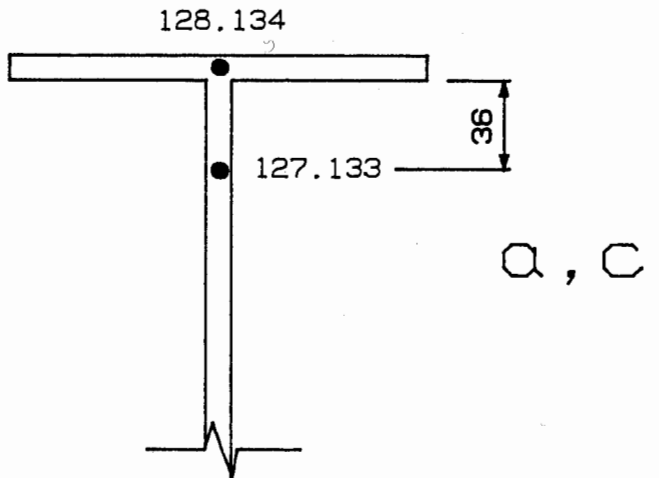
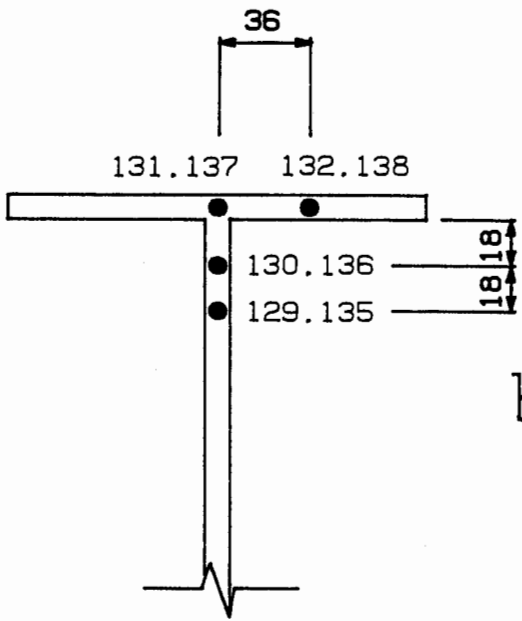
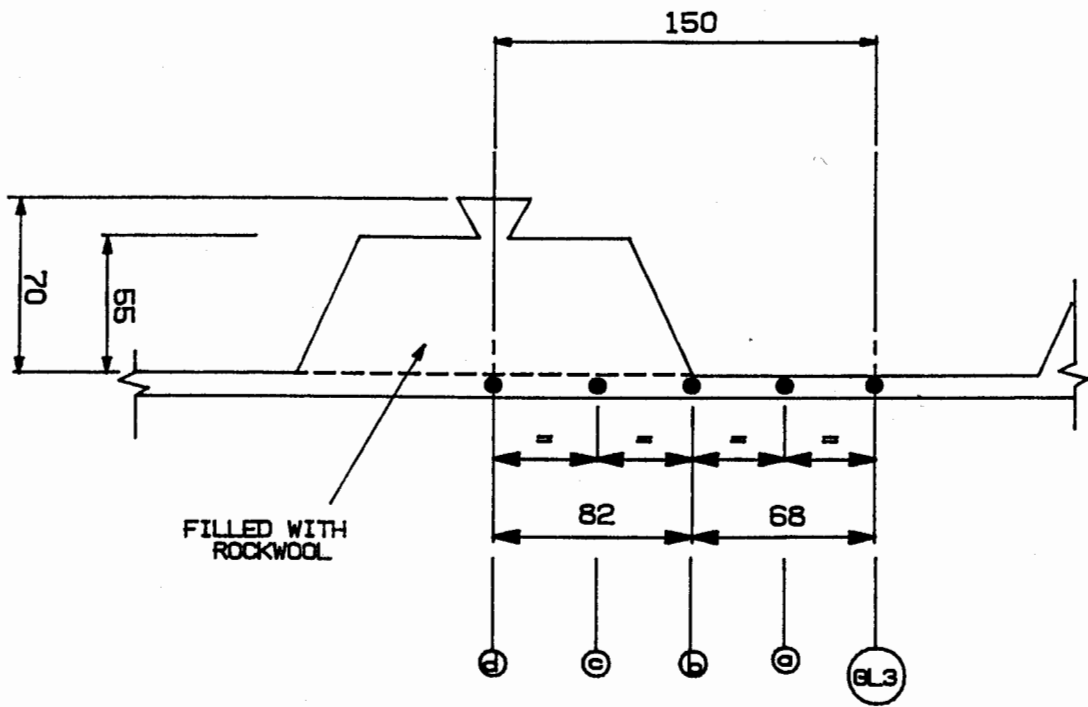
THERMOCOUPLE LOCATIONS ON GRID LINE 5

Data File: PROGL5, Figure 1/5

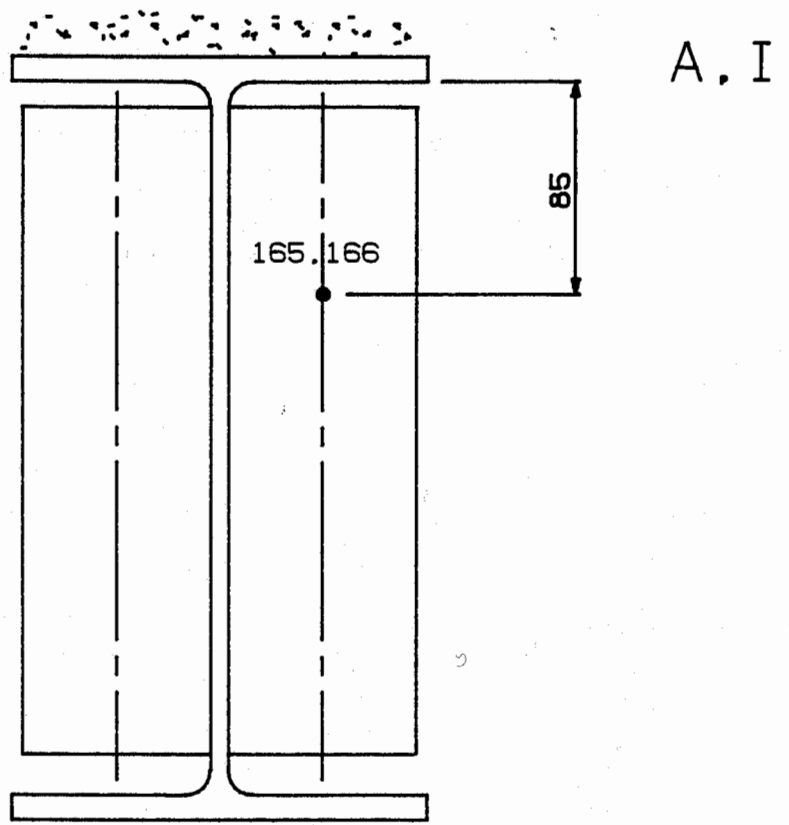


THERMOCOUPLE LOCATIONS AT GRID LINE 1 (a-d)

Data File: GL1ad, Figure 1/6



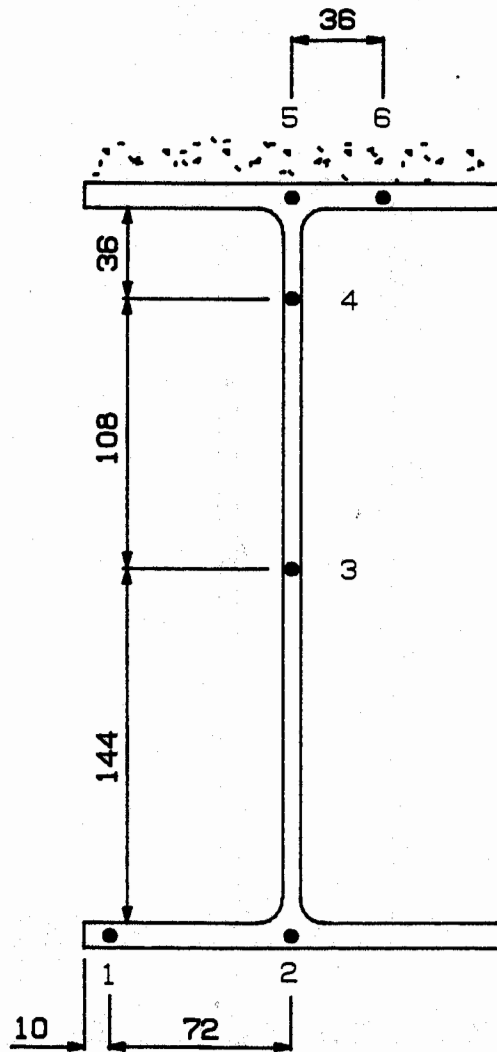
THERMOCOUPLE LOCATIONS AT GRID LINE 3(d-a)



1 STEEL THERMOCOUPLE

THERMOCOUPLE LOCATIONS IN THE END PLATES AT A AND I

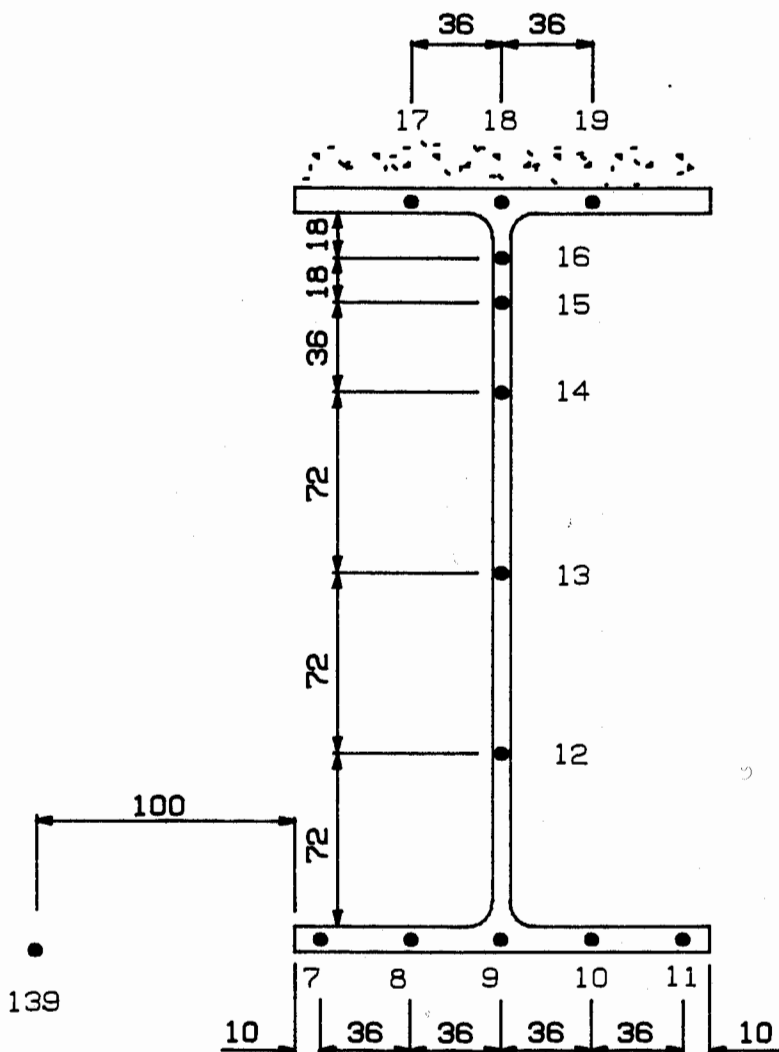
Data File: PROAI, Figure 1/8



6 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS AT B

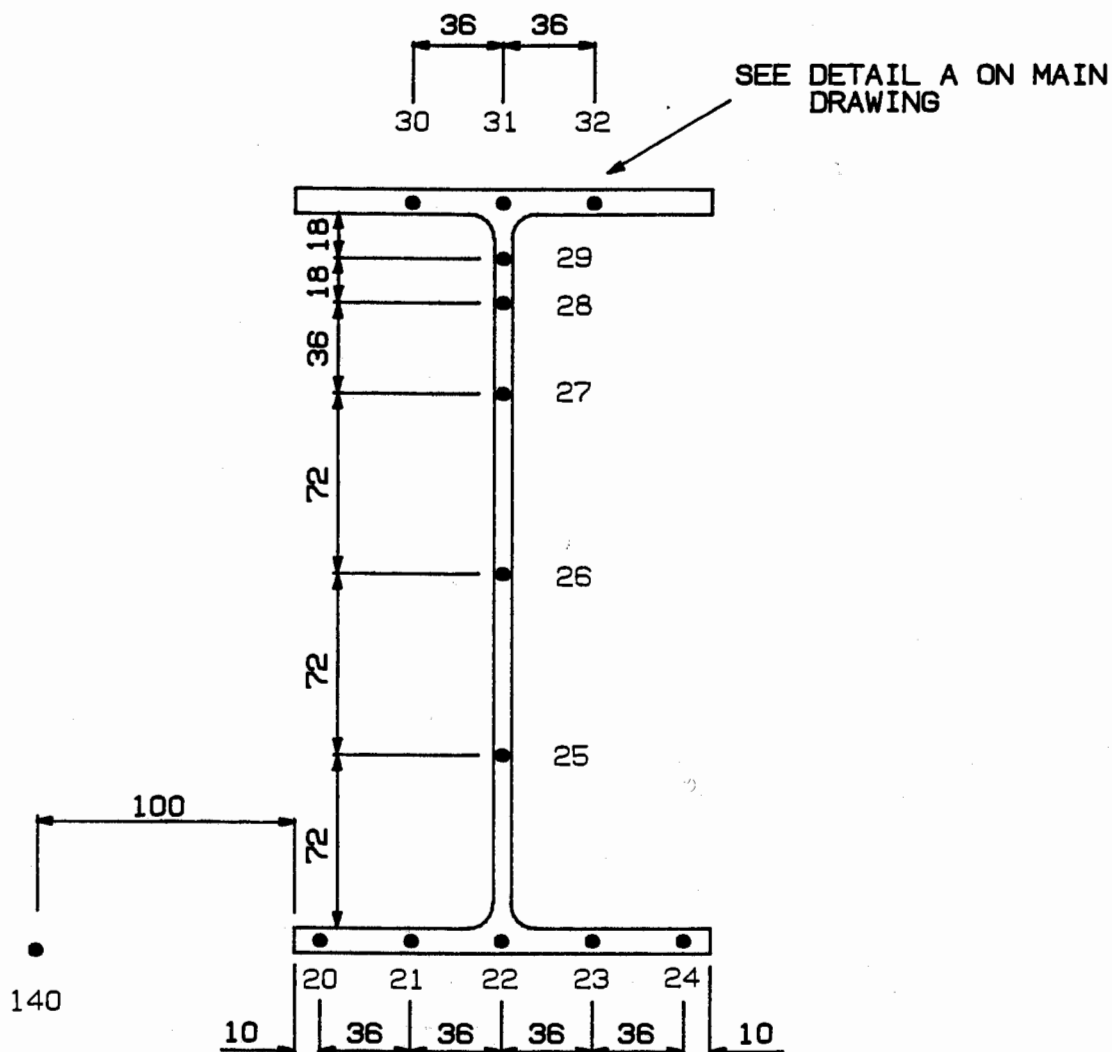
Data File: PROB, Figure 1/9



13 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

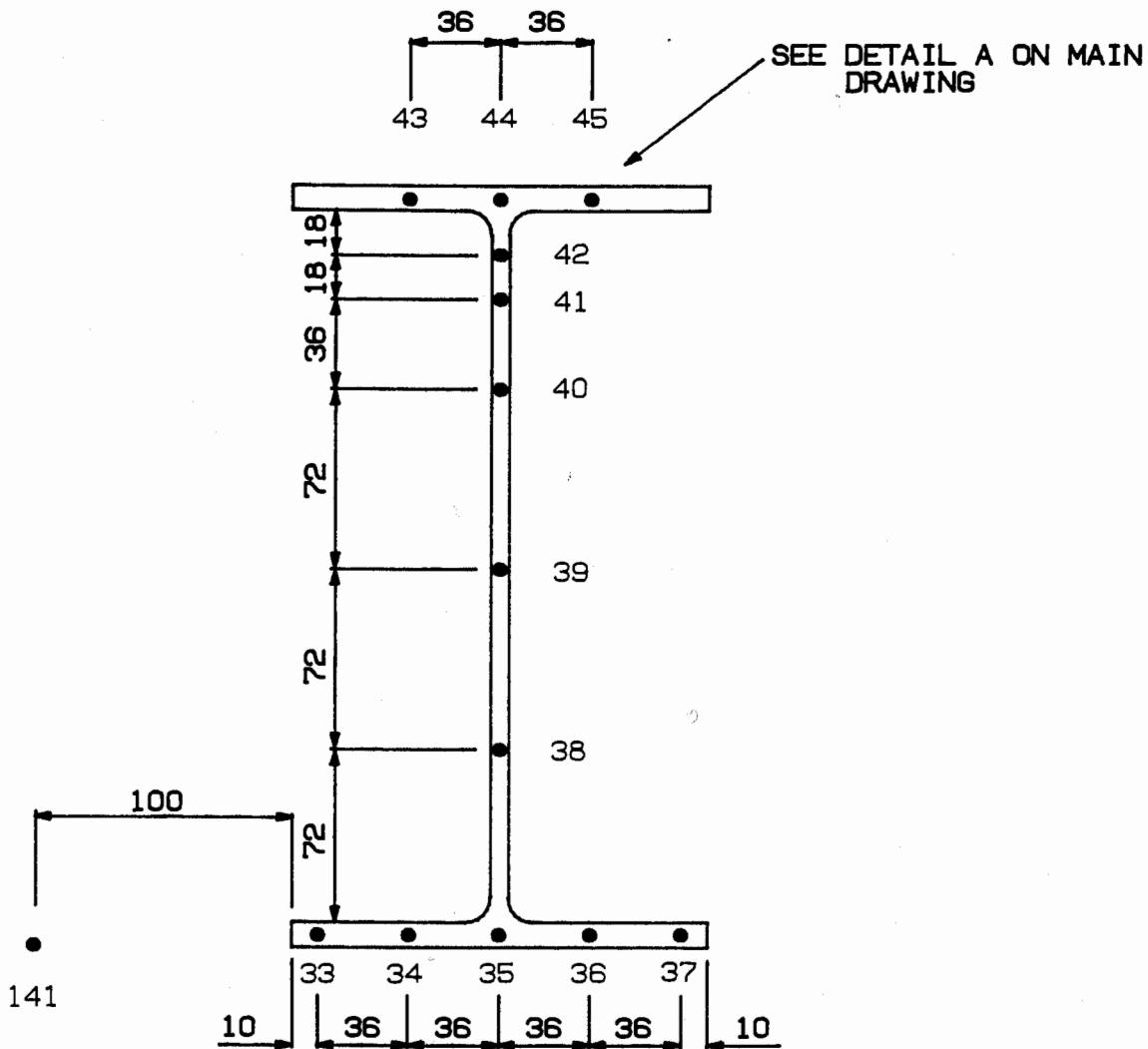
THERMOCOUPLE LOCATIONS AT C

Data File: PROC, Figure 1/10



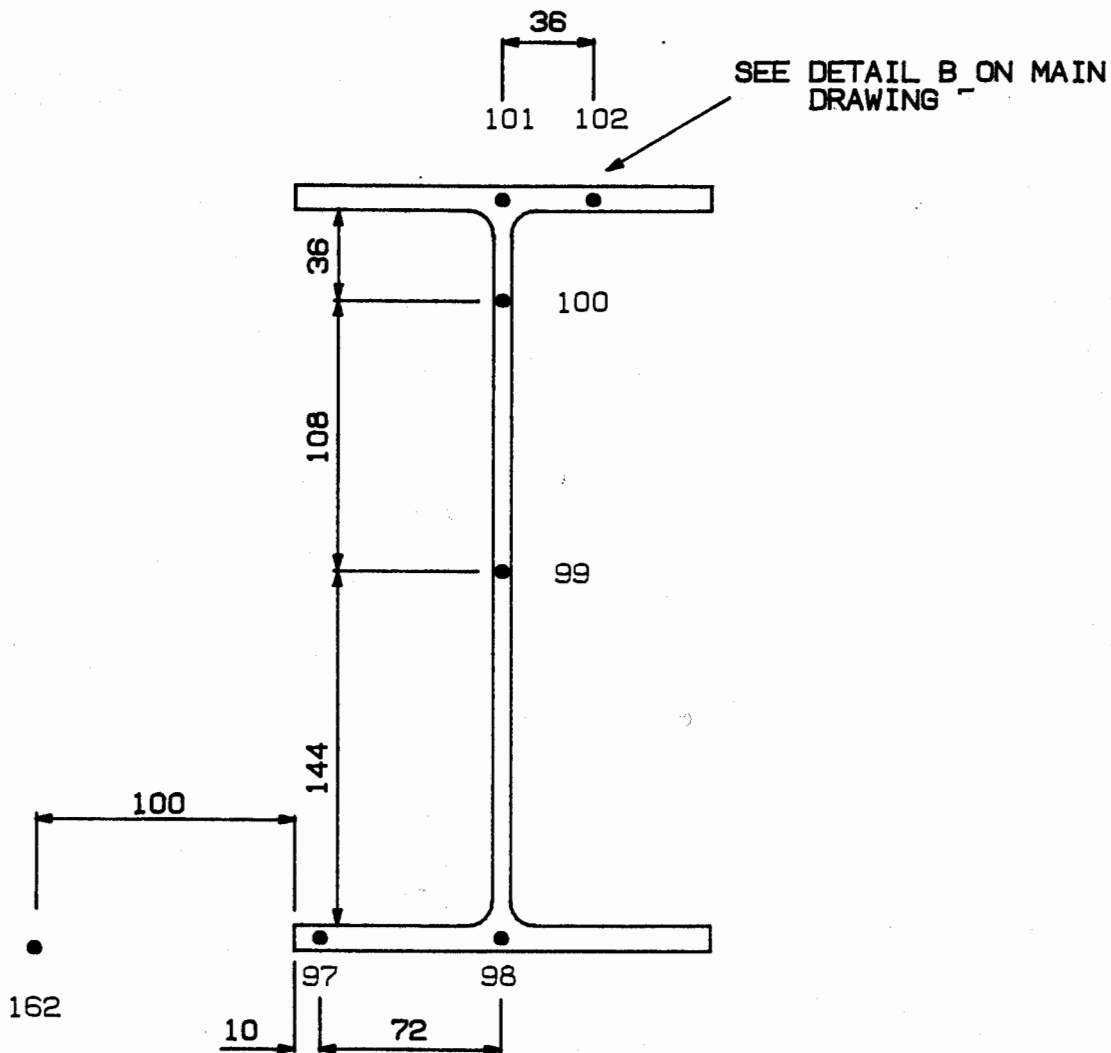
13 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

THERMOCOUPLE LOCATIONS AT D



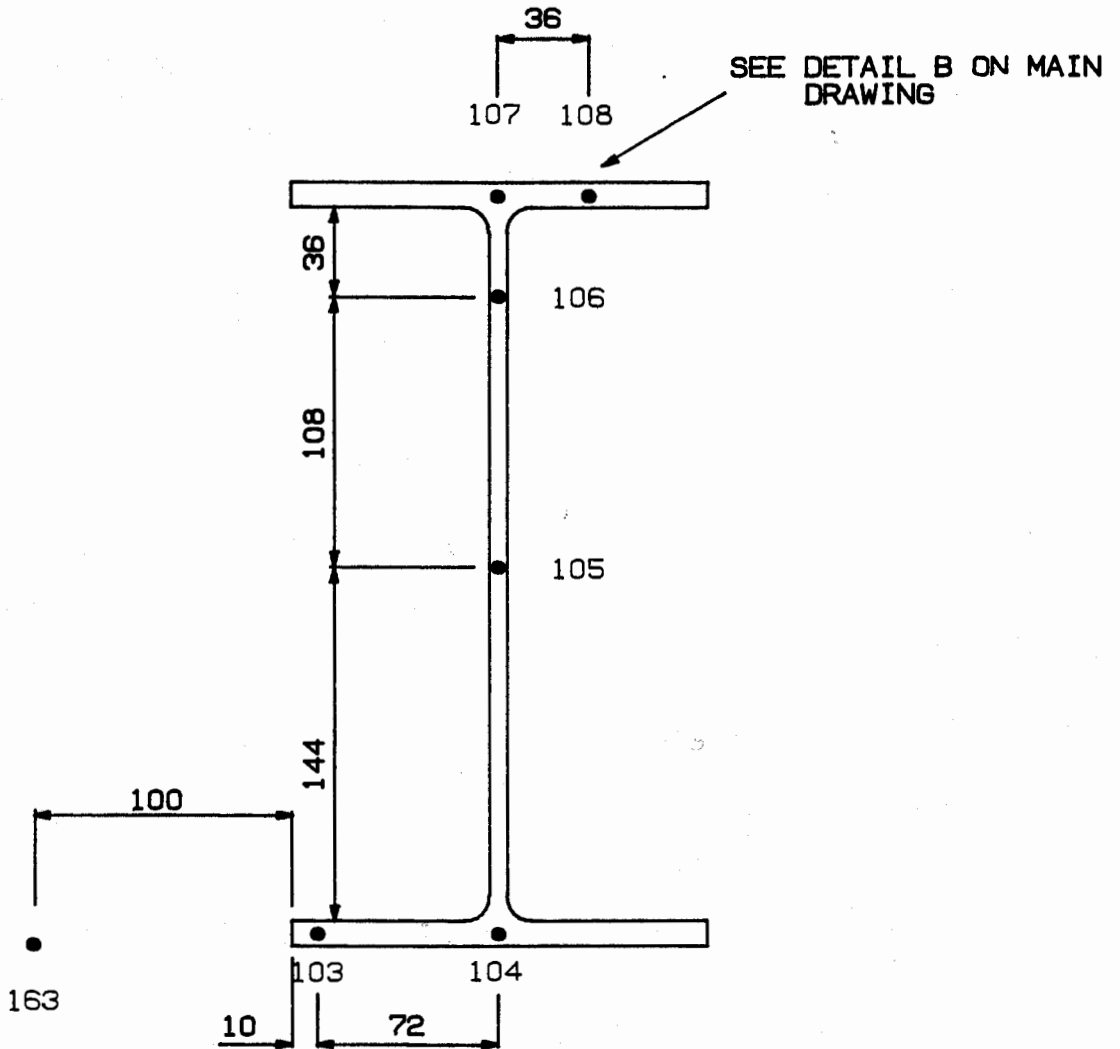
13 STEEL THERMOCOUPLES
1 ATMOSPHERE THERMOCOUPLE

THERMOCOUPLE LOCATIONS AT E



6 STEEL THERMOCOUPLES
1 ATMOSPHERE THERMOCOUPLE

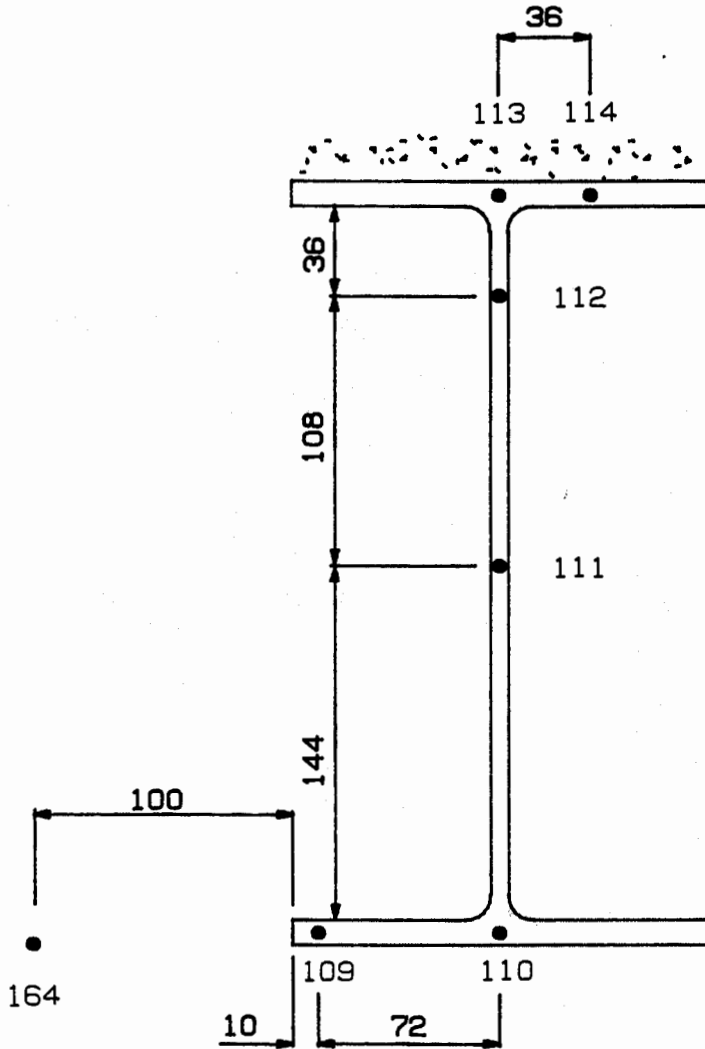
THERMOCOUPLE LOCATIONS AT F



6 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

THERMOCOUPLE LOCATIONS AT G

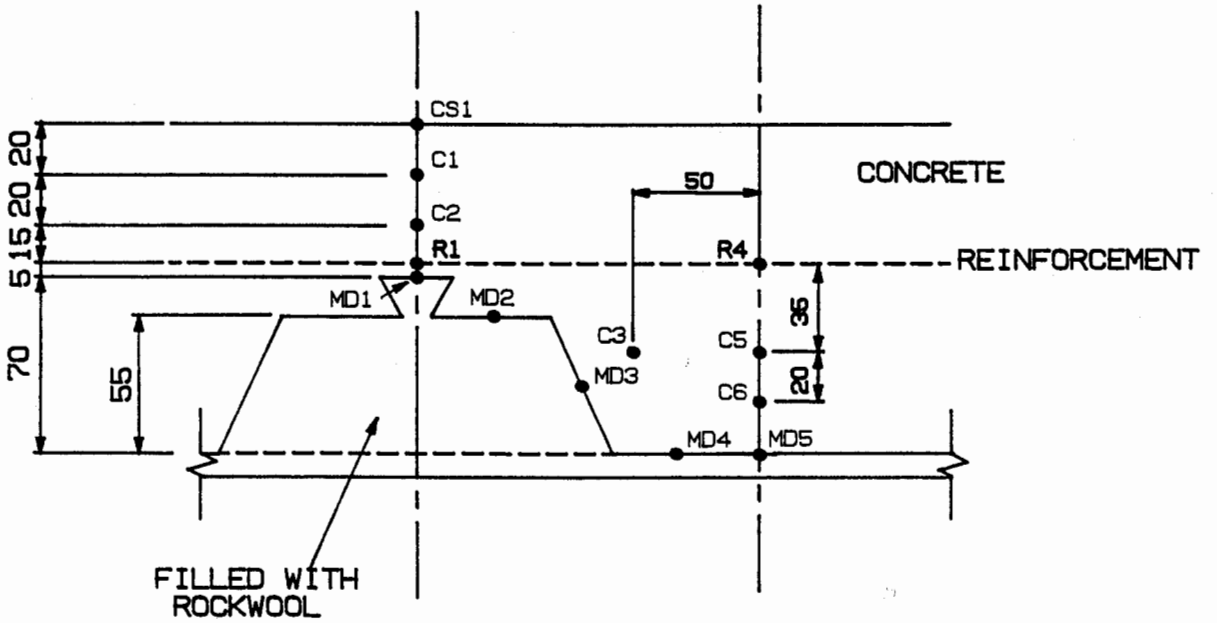
Data File: PROG , Figure 1/14



6 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

THERMOCOUPLE LOCATIONS AT H

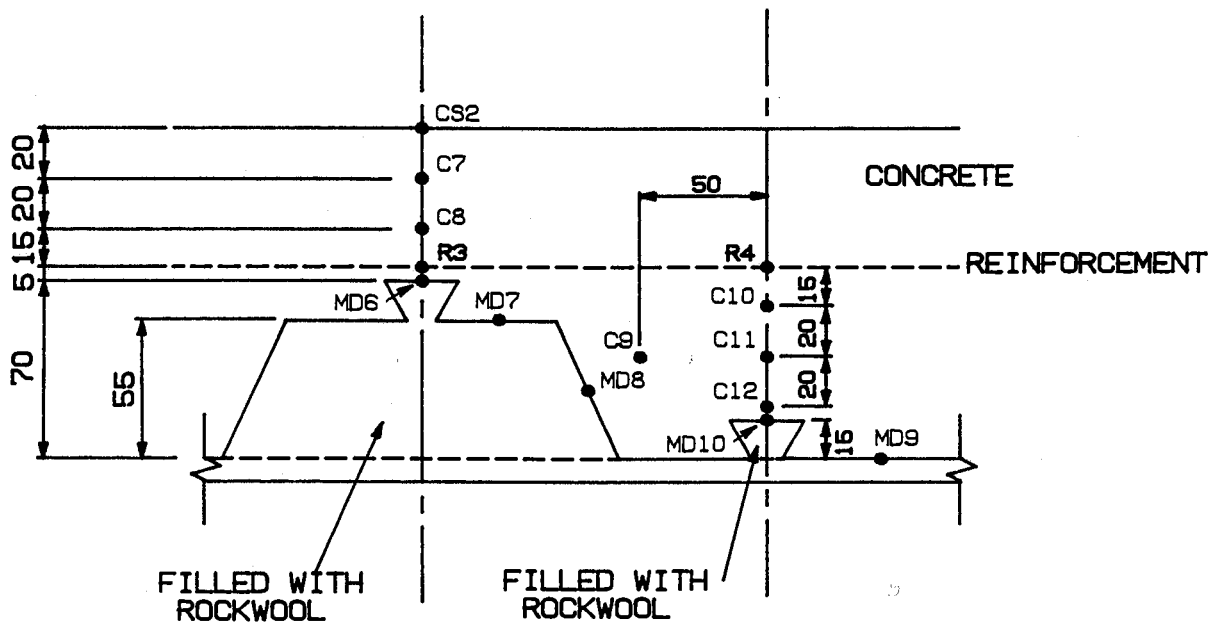
Data File: PROH , Figure 1/15



7 CONCRETE THERMOCOUPLES
 5 METAL DECKING THERMOCOUPLES
 2 REINFORCEMENT THERMOCOUPLES

THERMOCOUPLE LOCATIONS IN THE FLOOR SLAB OVER BEAM AT A1

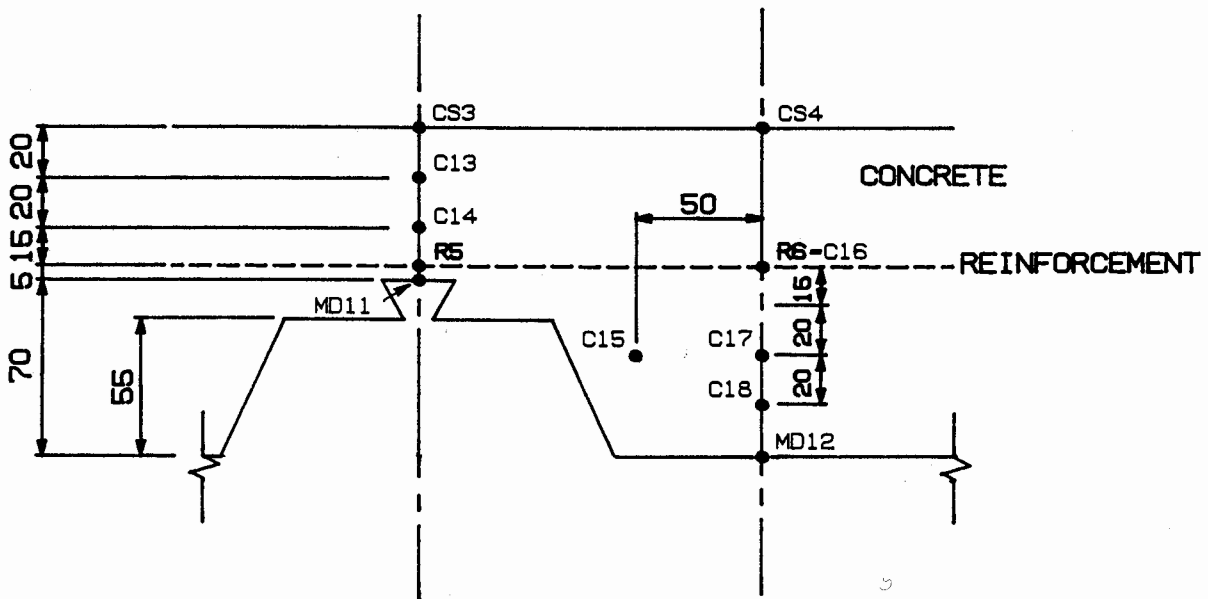
Data File: PROA1 , Figure 1/16



- 7 CONCRETE THERMOCOUPLES
- 5 METAL DECKING THERMOCOUPLES
- 2 REINFORCEMENT THERMOCOUPLES

THERMOCOUPLE LOCATIONS IN THE FLOOR SLAB OVER BEAM AT A2

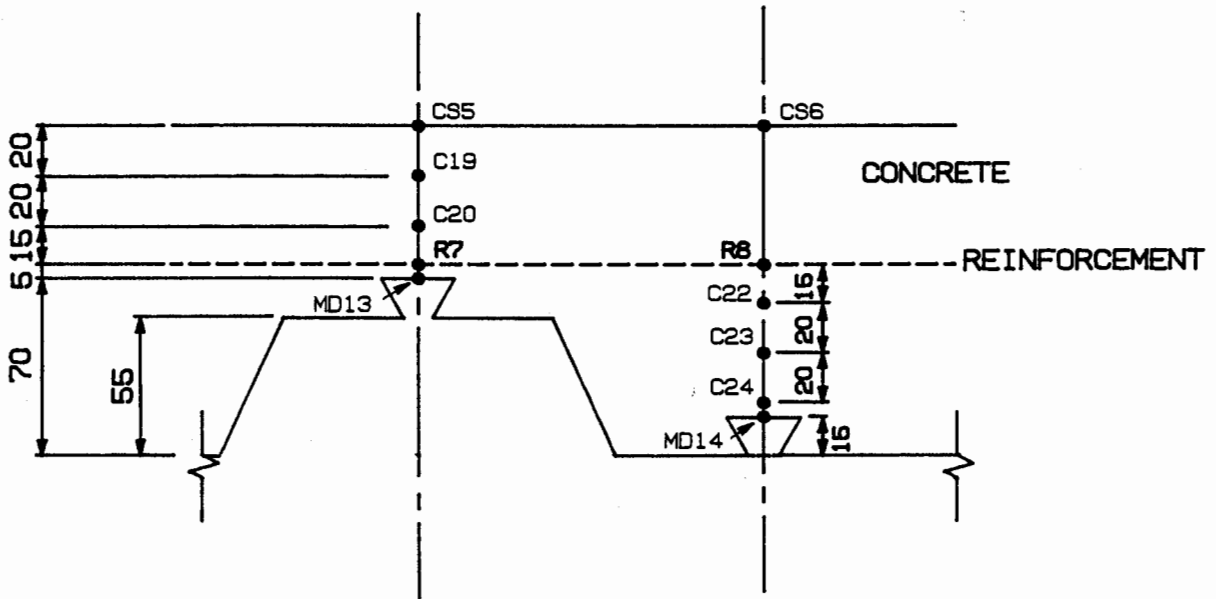
Data File: PROA2 , Figure 1/17



8 CONCRETE THERMOCOUPLES
 2 METAL DECKING THERMOCOUPLES
 2 REINFORCEMENT THERMOCOUPLES

THERMOCOUPLE LOCATIONS IN THE FLOOR SLAB BETWEEN BEAM
 AND FURNACE WALL AT B1

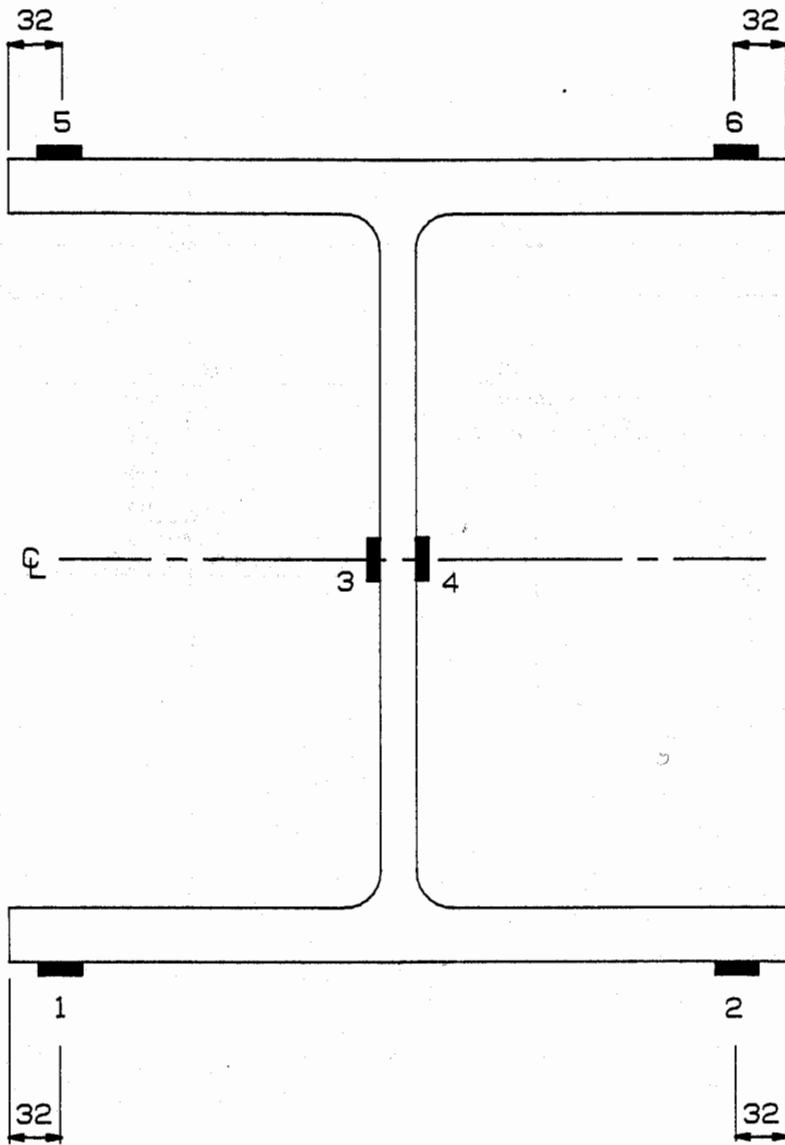
Data File: PROB1 , Figure 1/18



- 7 CONCRETE THERMOCOUPLES
- 2 METAL DECKING THERMOCOUPLES
- 2 REINFORCEMENT THERMOCOUPLES

THERMOCOUPLE LOCATIONS IN THE FLOOR SLAB BETWEEN BEAM AND FURNACE WALL AT B2

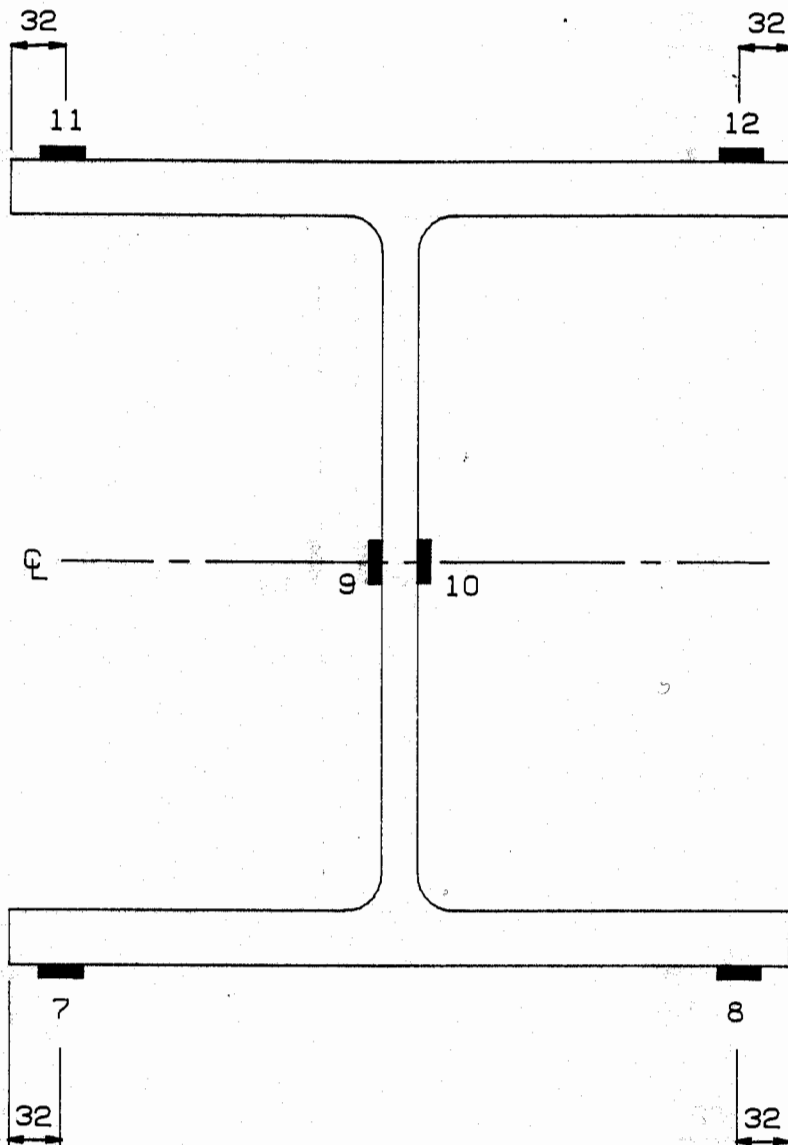
Data File: PROB2 , Figure 1/19



DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT C1

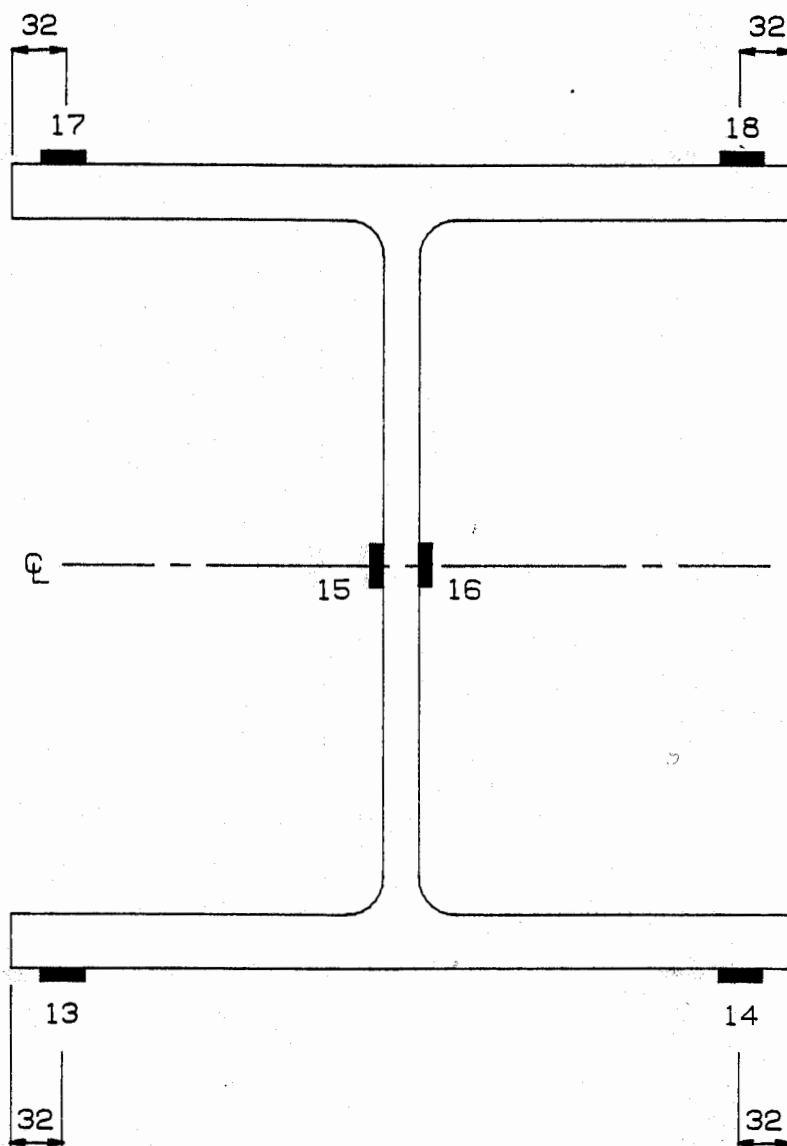
Data File: PROC1 , Figure 1/20



DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT C2

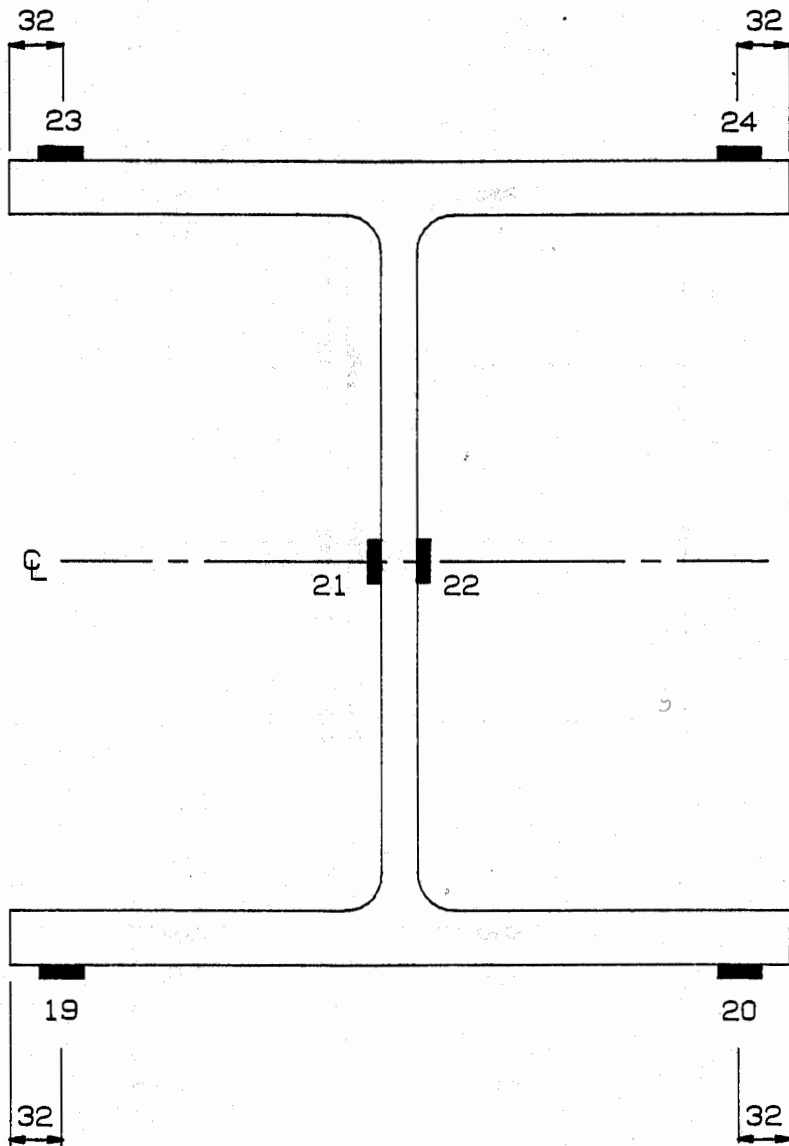
Data File: PROC2 , Figure 1/21



DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT C3

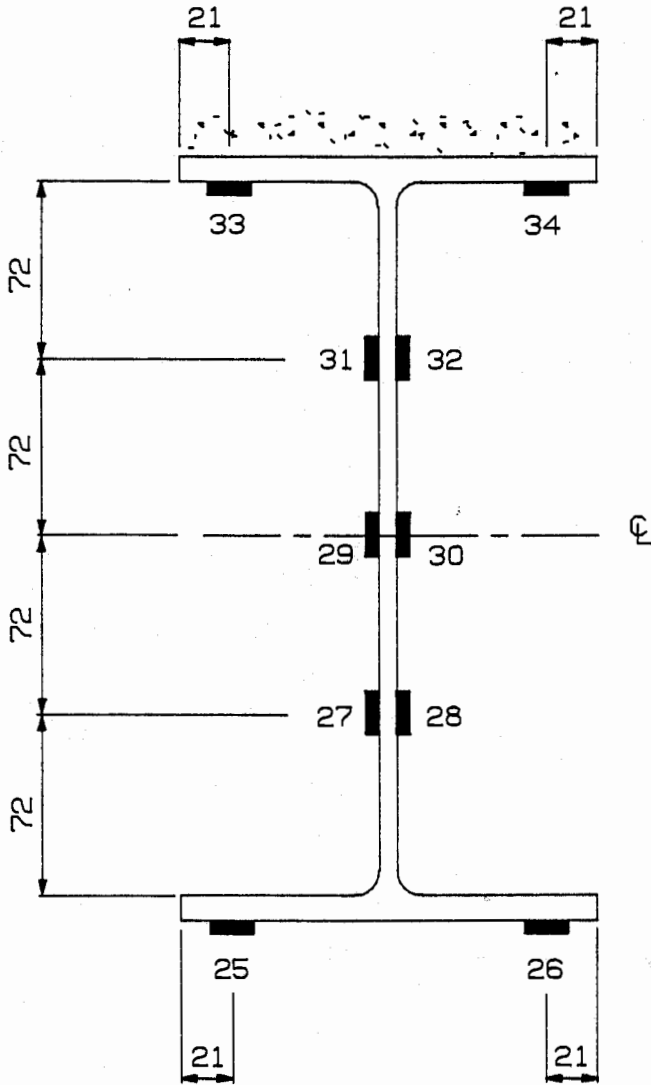
Data File: PROC3 , Figure 1/22



DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT C4

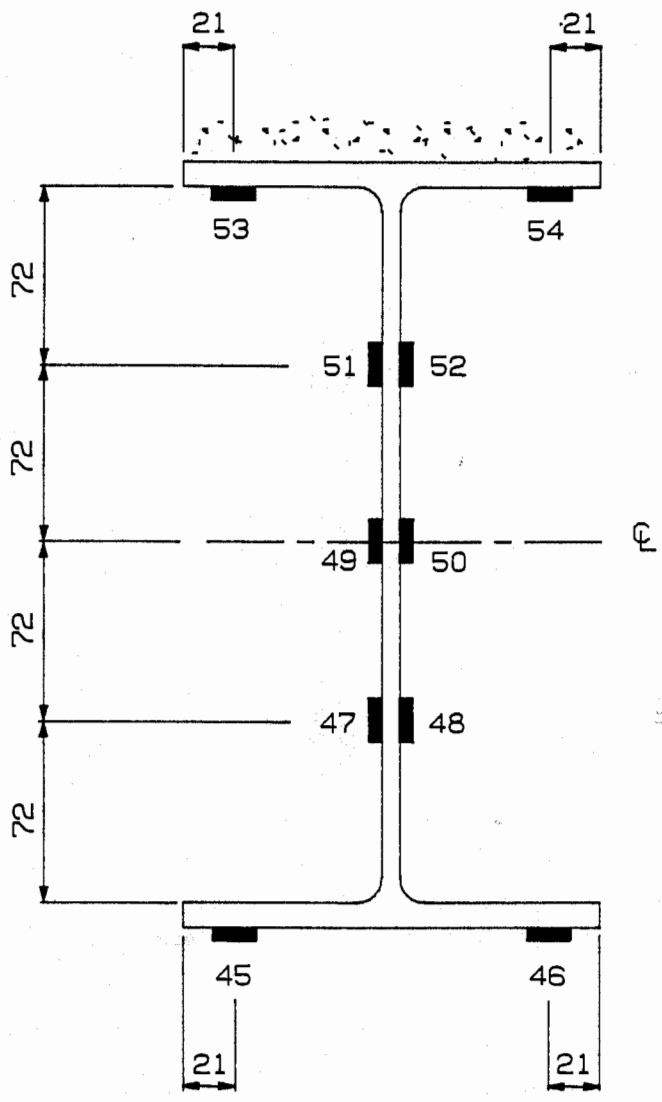
Data File: PROC4 , Figure 1/23



DIMENSIONS IN mm

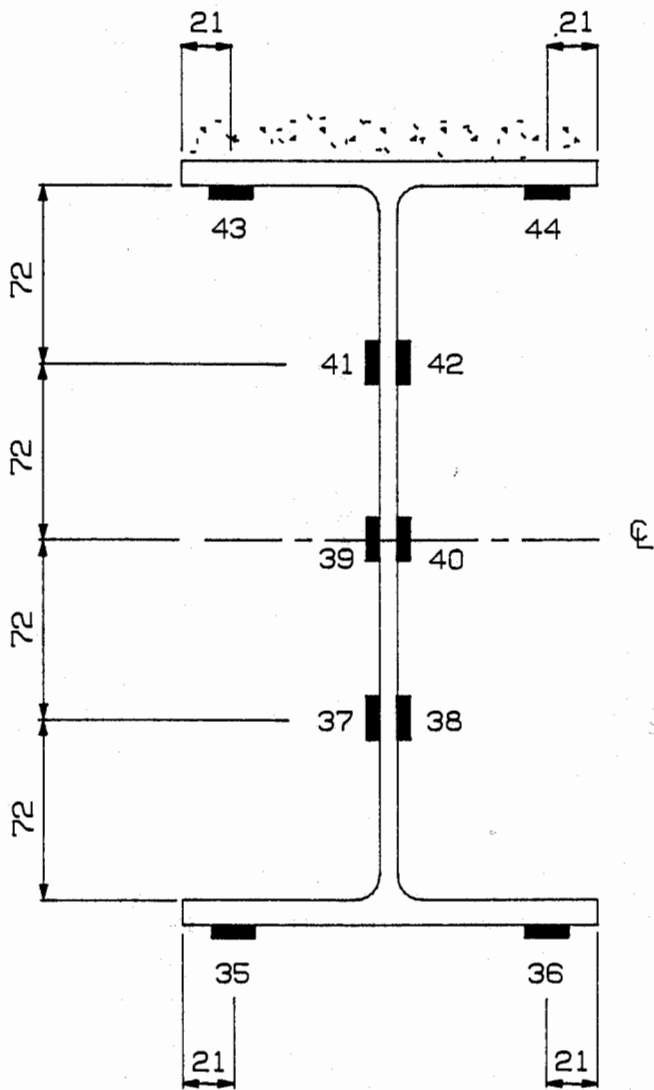
STRAIN GAUGE LOCATIONS AT B1

Data File: PROB1 , Figure 1/24



DIMENSIONS IN mm

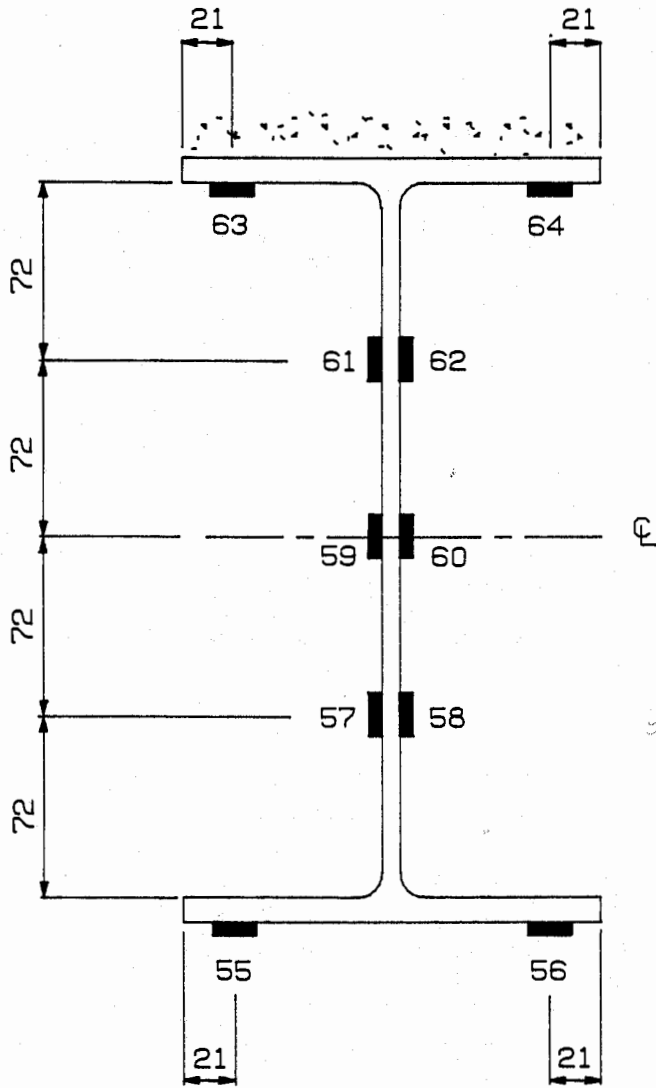
STRAIN GAUGE LOCATIONS AT B2



DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT B3

Data File: PROB3 , Figure 1/26

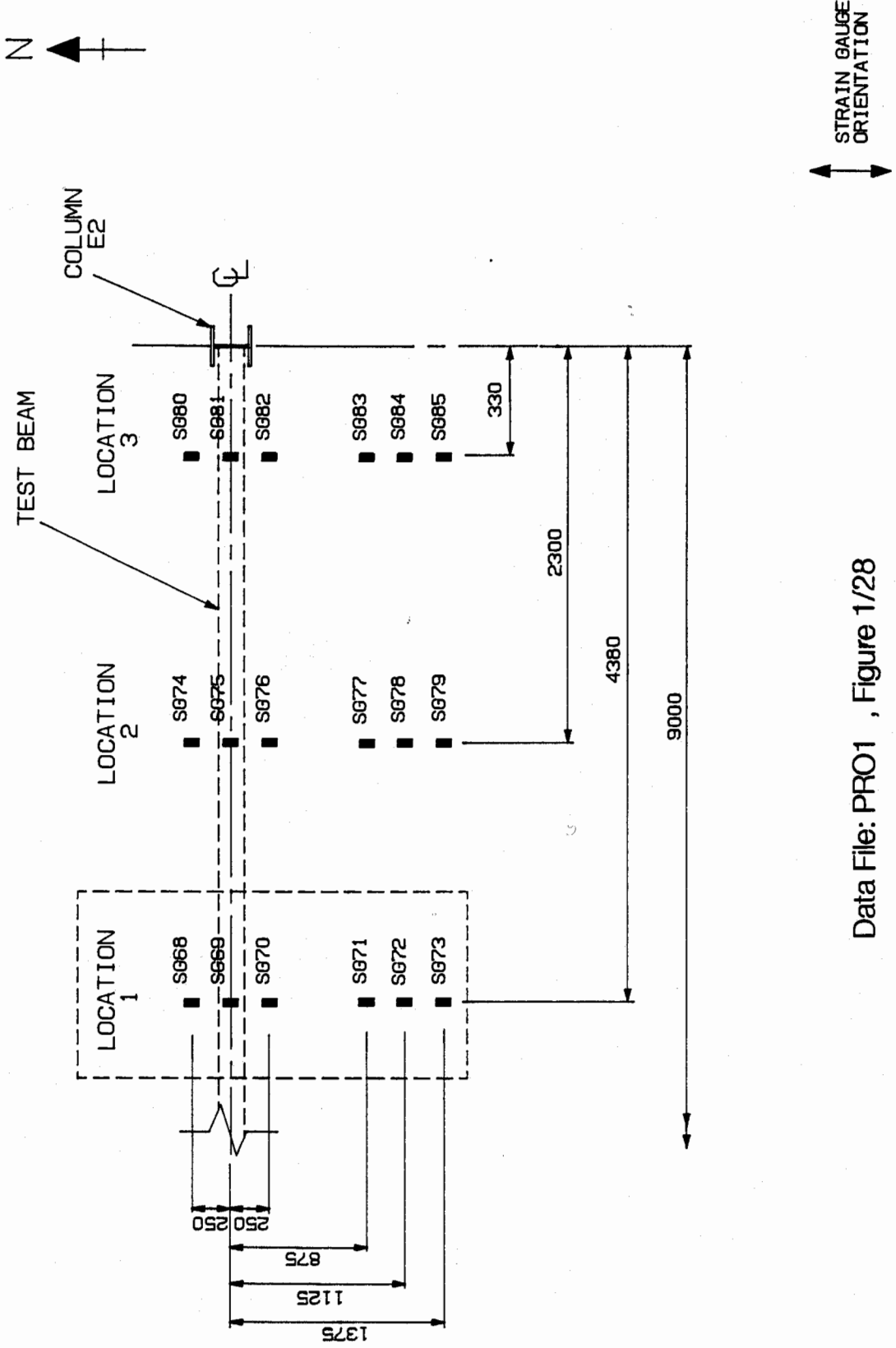


DIMENSIONS IN mm

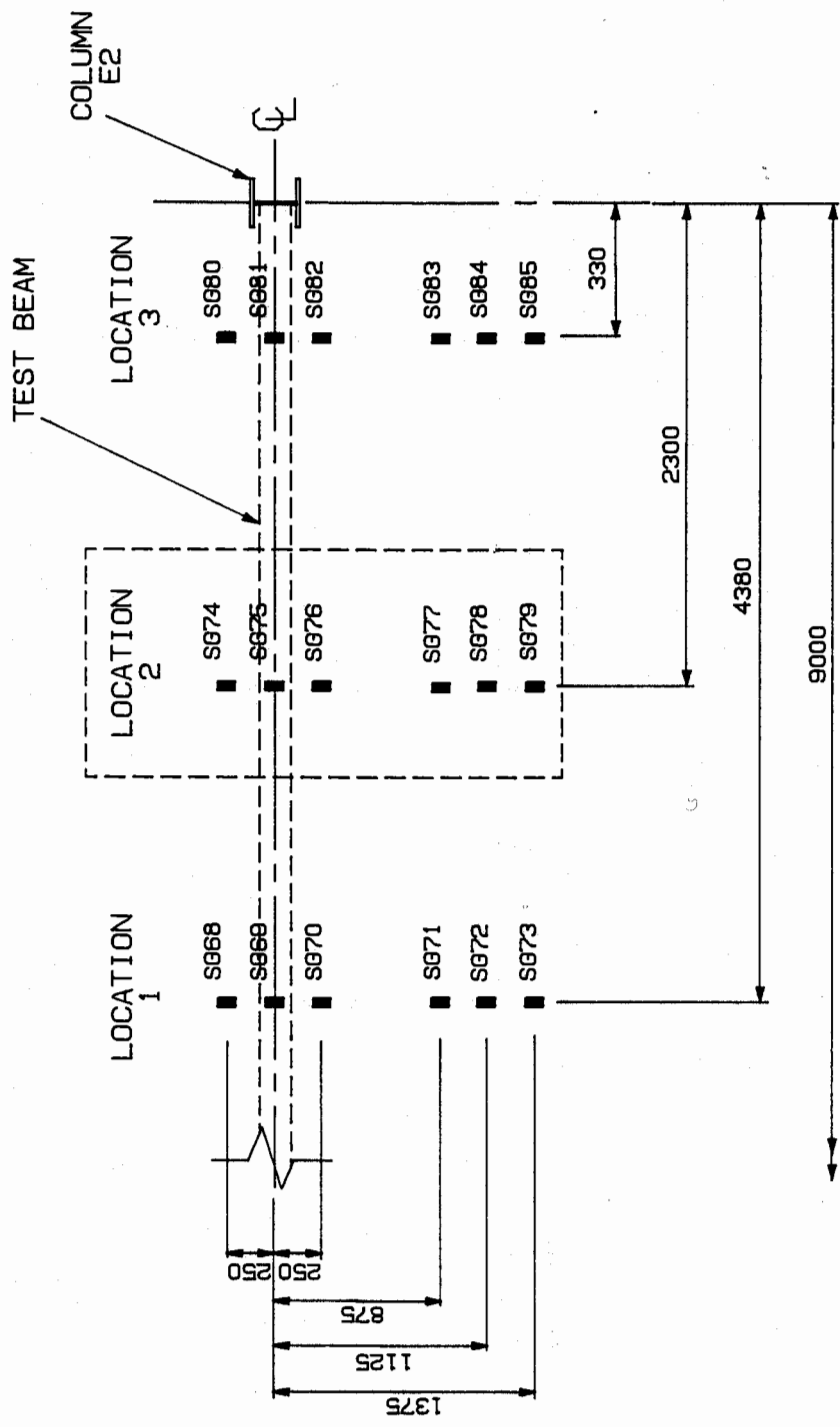
STRAIN GAUGE LOCATIONS AT B4

Data File: PROB4 , Figure 1/27

TEST 1 : RESTRAINED BEAM : STRAIN GAUGE POSITIONS AT LOCATION 1

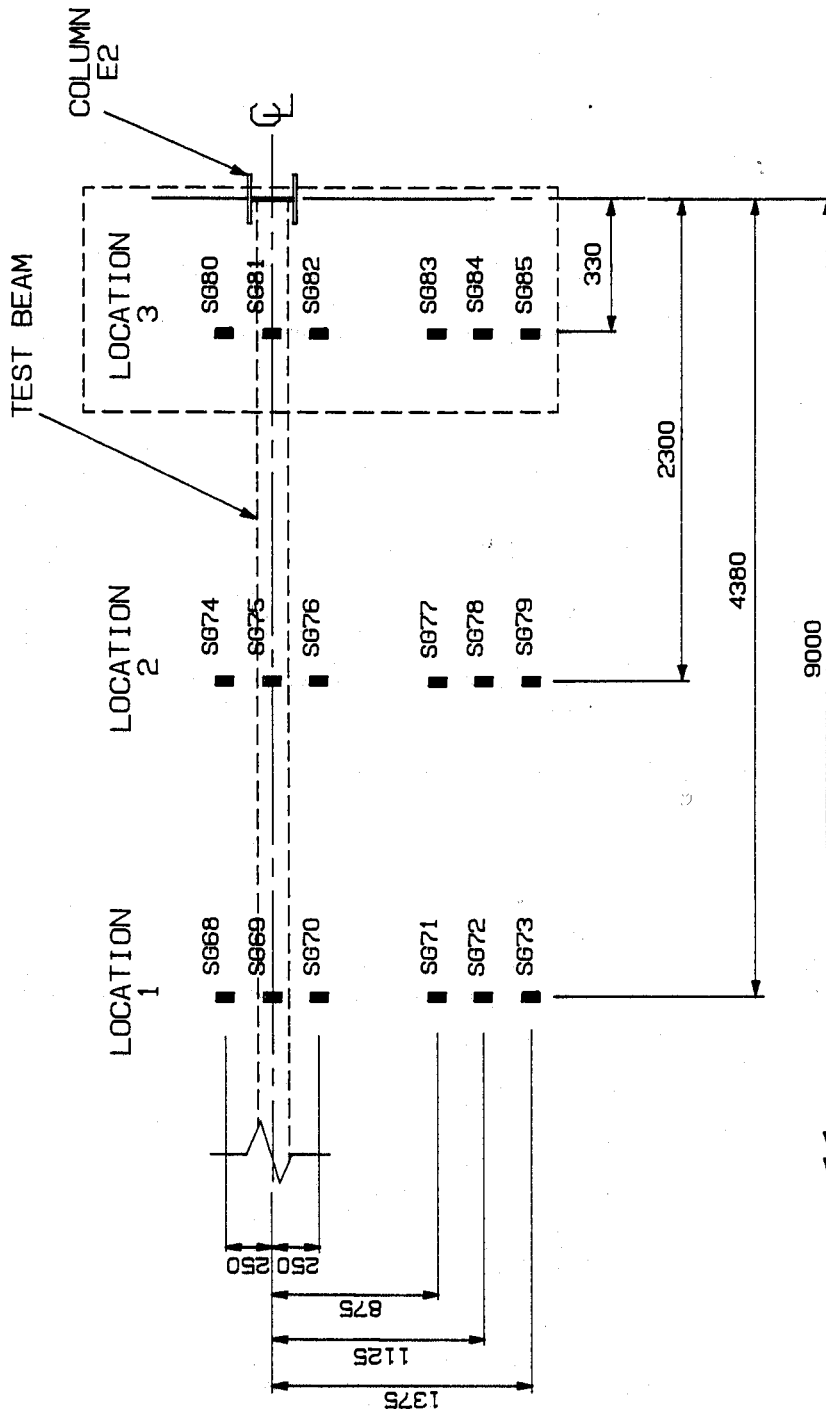


TEST 1 : RESTRAINED BEAM : STRAIN GAUGE POSITIONS AT LOCATION 2

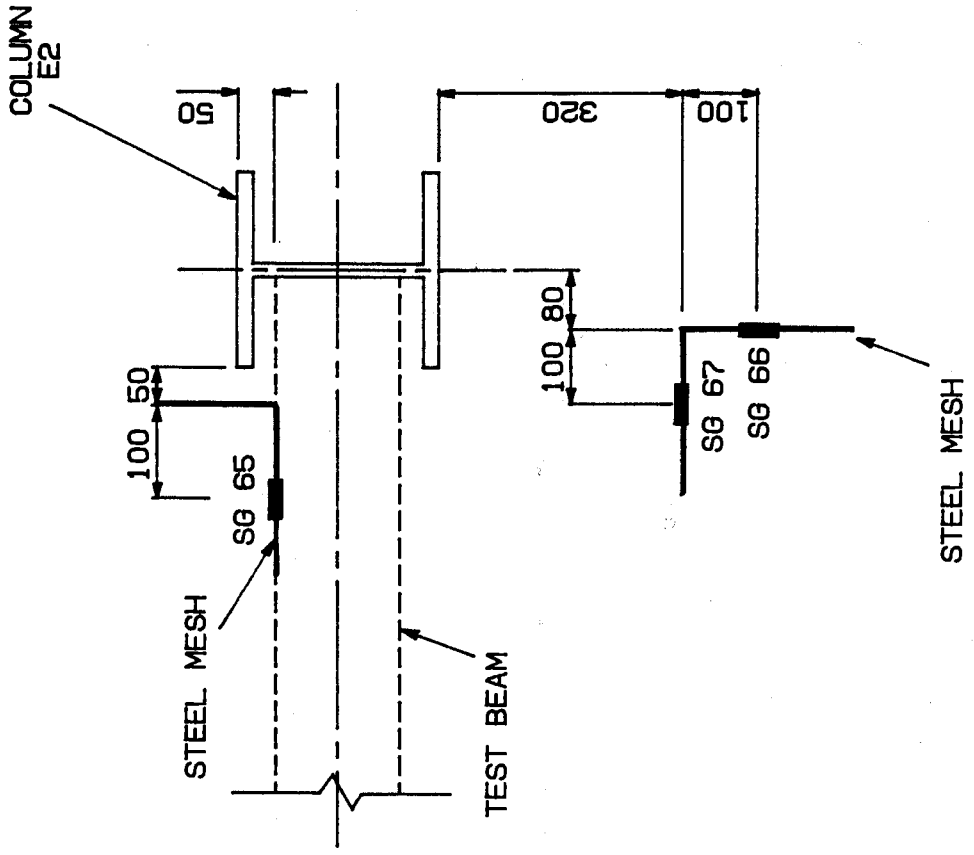


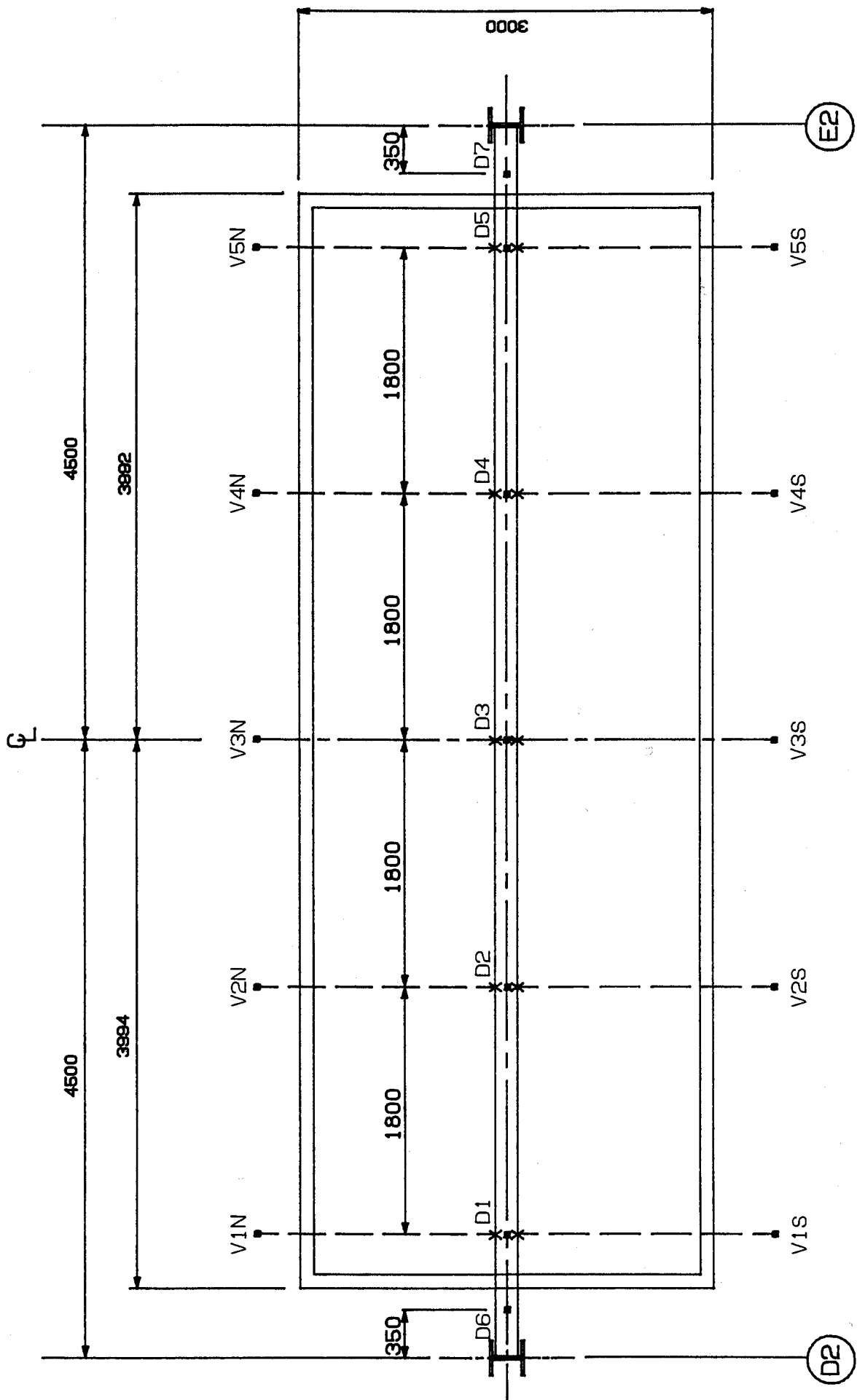
Data File: PRO2 , Figure 1/29

TEST 1 : RESTRAINED BEAM : STRAIN GAUGE POSITIONS AT LOCATION 3

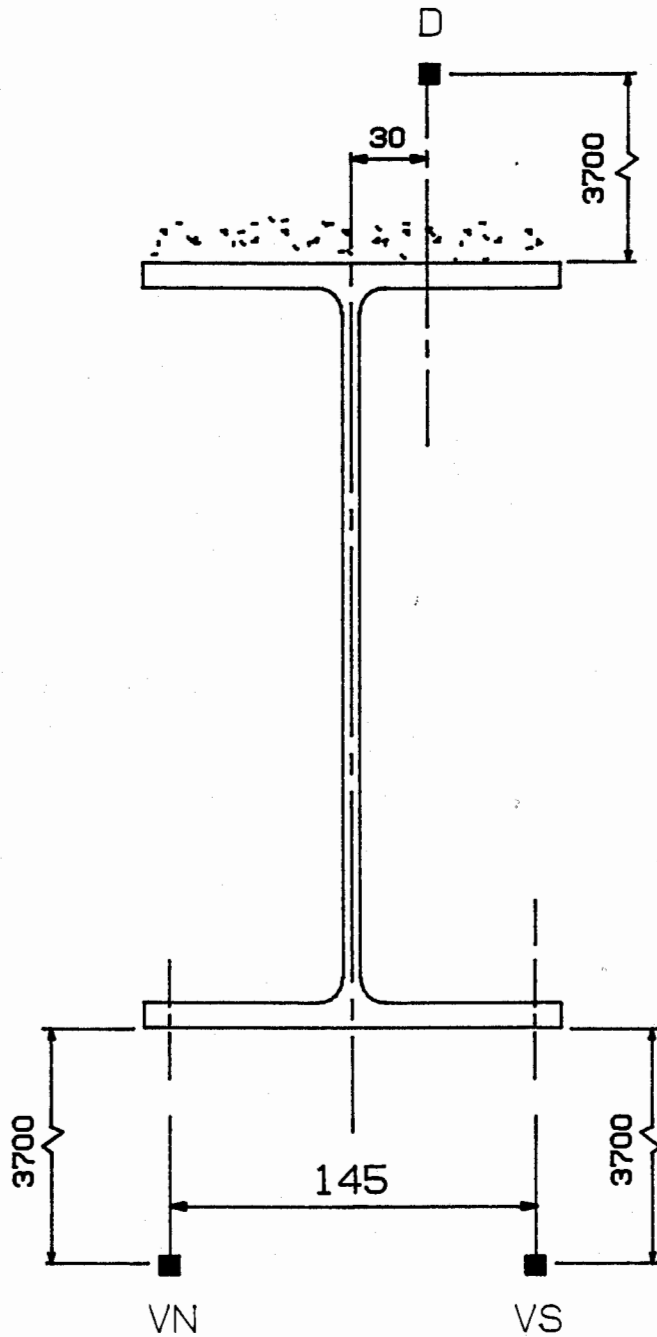


TEST 1 : RESTRAINED BEAM ; LOCATIONS OF STRAIN GAUGES INSTALLED ON THE MESH REINFORCEMENT IN THE FLOOR ABOVE THE TEST BEAM





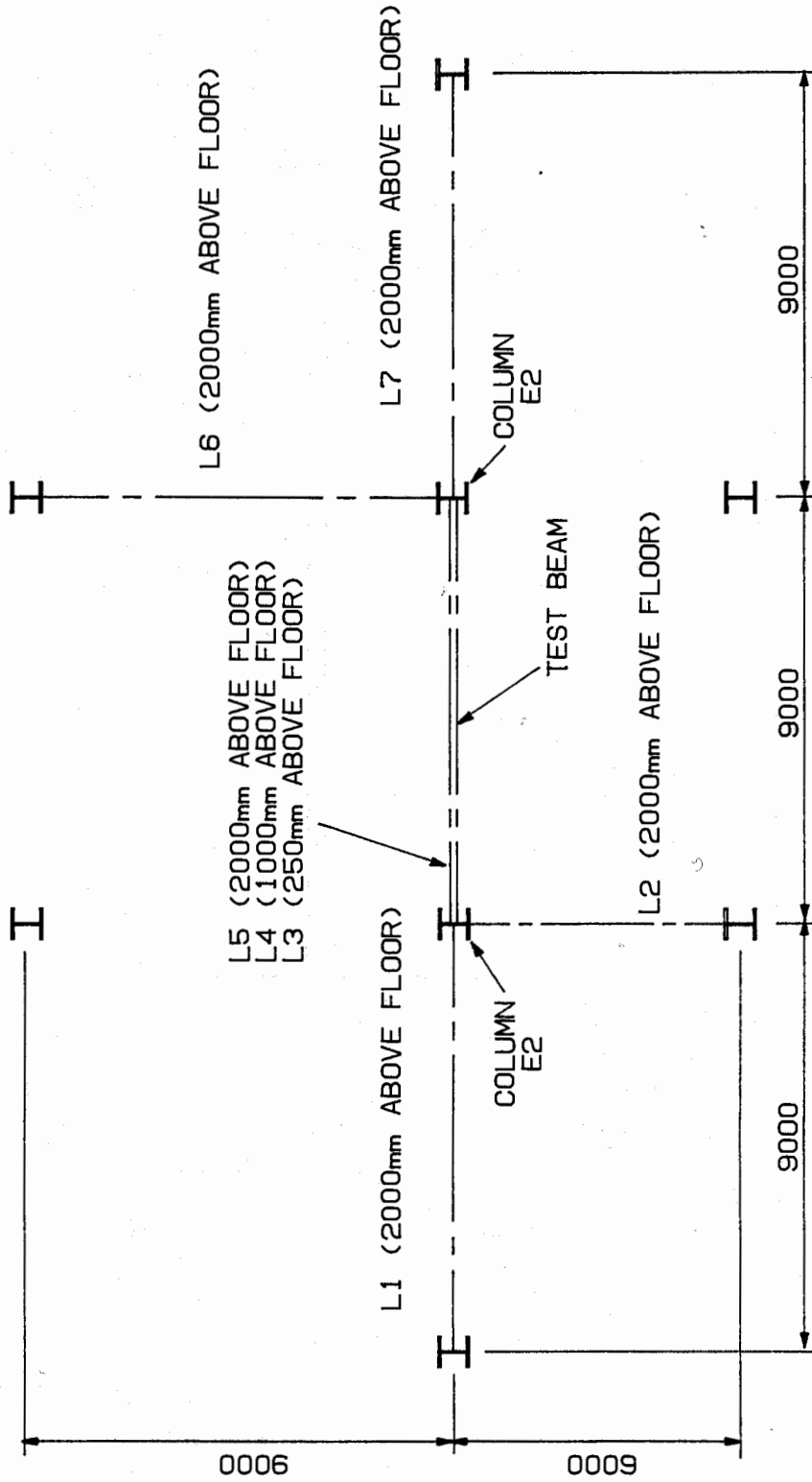
INSTRUMENTATION LOCATIONS ON TEST BEAM



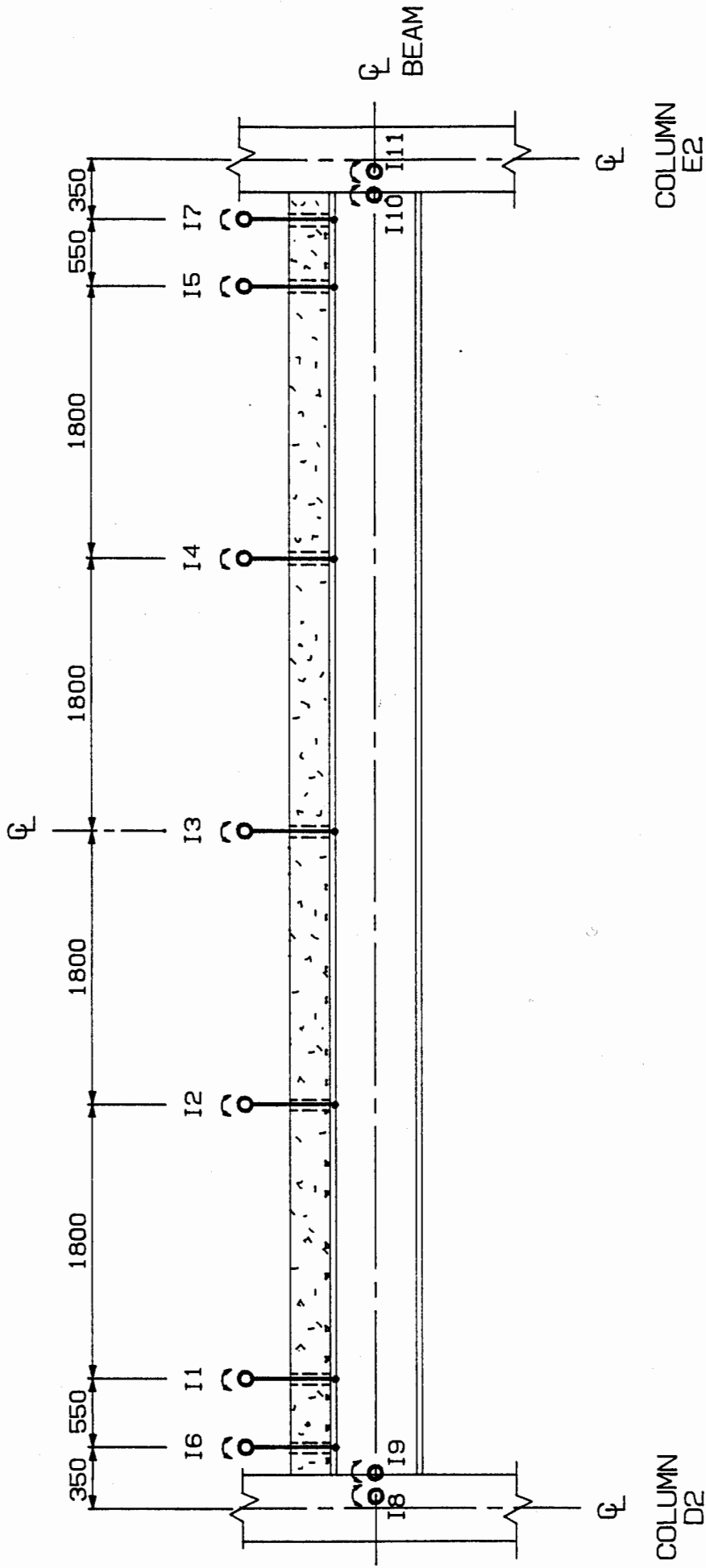
D - VERTICAL DEFLECTIONS UPPER FLANGE
 V - VERTICAL DEFLECTIONS LOWER FLANGE

DETAIL VIEW OF INSTRUMENTATION LOCATIONS

TEST 1 : RESTRAINED BEAM : LOCATION OF INSTRUMENTATION FOR MEASURING HORIZONTAL DISPLACEMENTS BETWEEN COLUMNS ABOVE THE TEST FLOOR



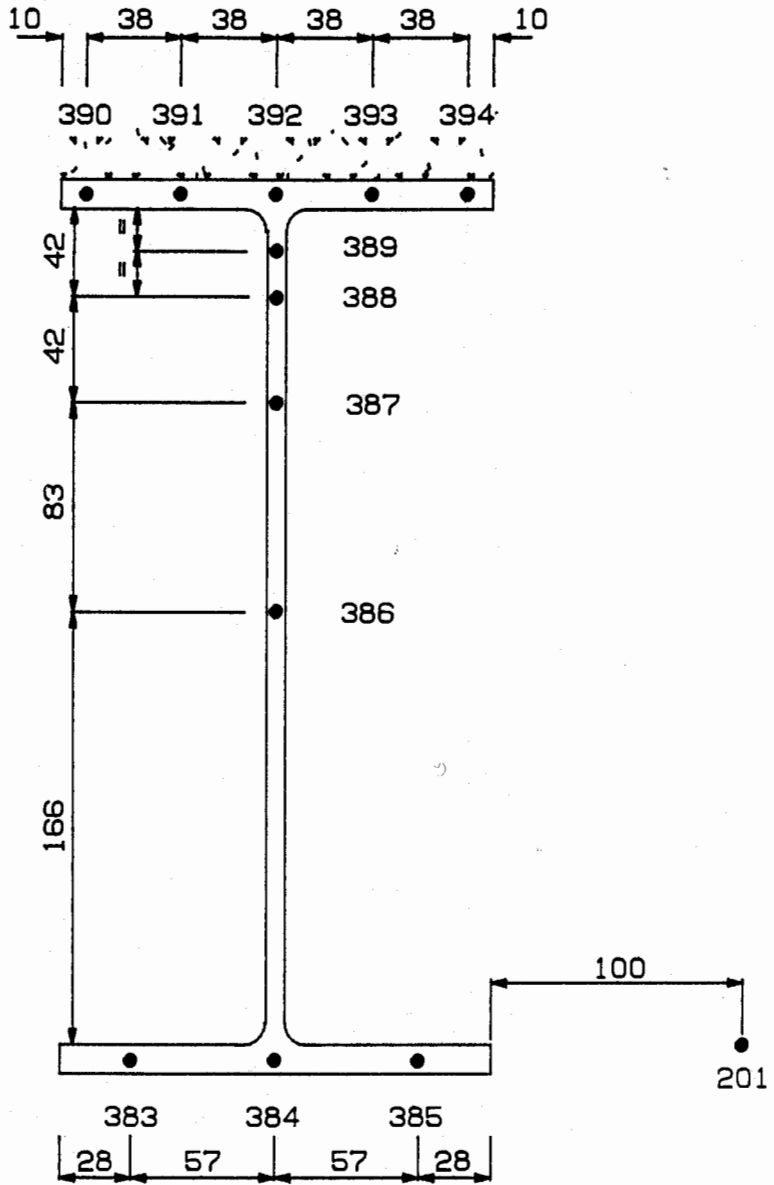
TEST 1 : RESTRAINED BEAM : INCLINOMETER POSITIONS FOR MEASURING ROTATION
OF THE TEST BEAM AND COLUMN FLANGES AT THE CONNECTIONS



NOTE : INCLINOMETERS I8 AND I11 ARE FIXED TO THE COLUMN FACE
INCLINOMETERS I9 AND I10 ARE FIXED TO THE BEAM WEB

TEST 2

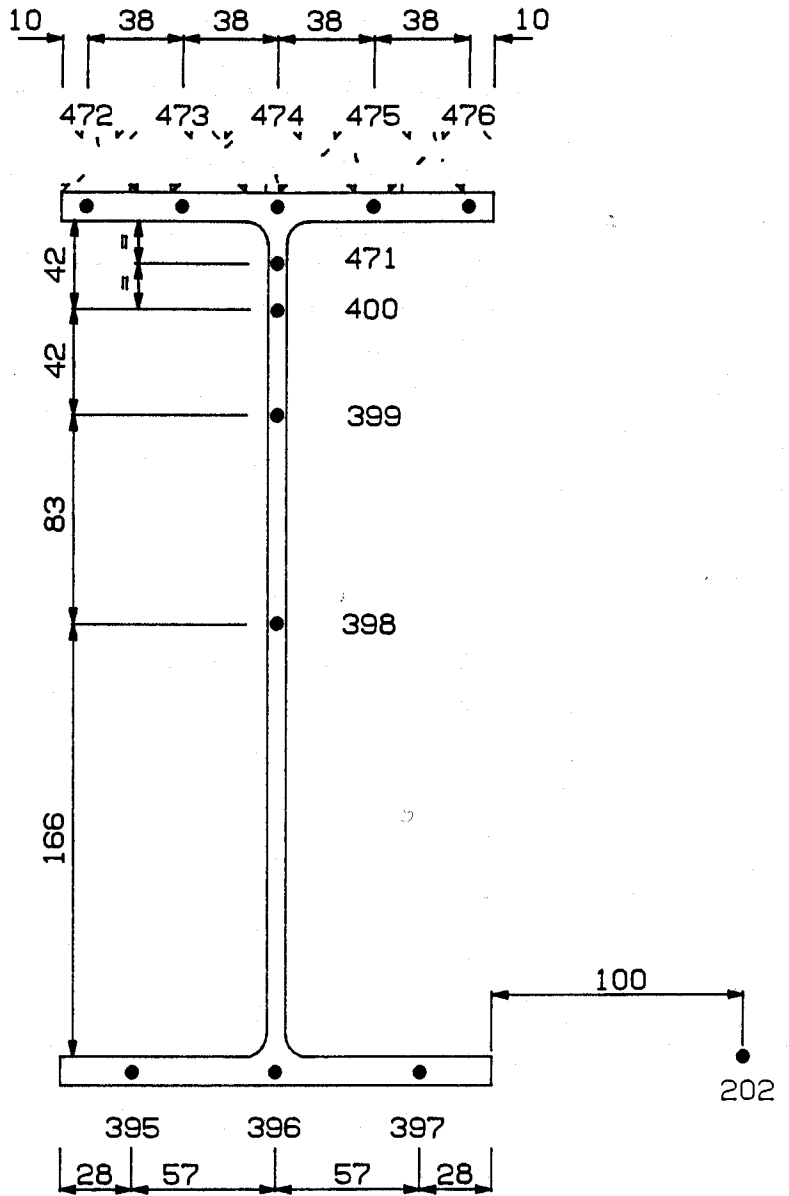
PLANE FRAME



12 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

THERMOCOUPLE LOCATIONS ON PRIMARY BEAM AT PB1
 356x171x51Kg/m

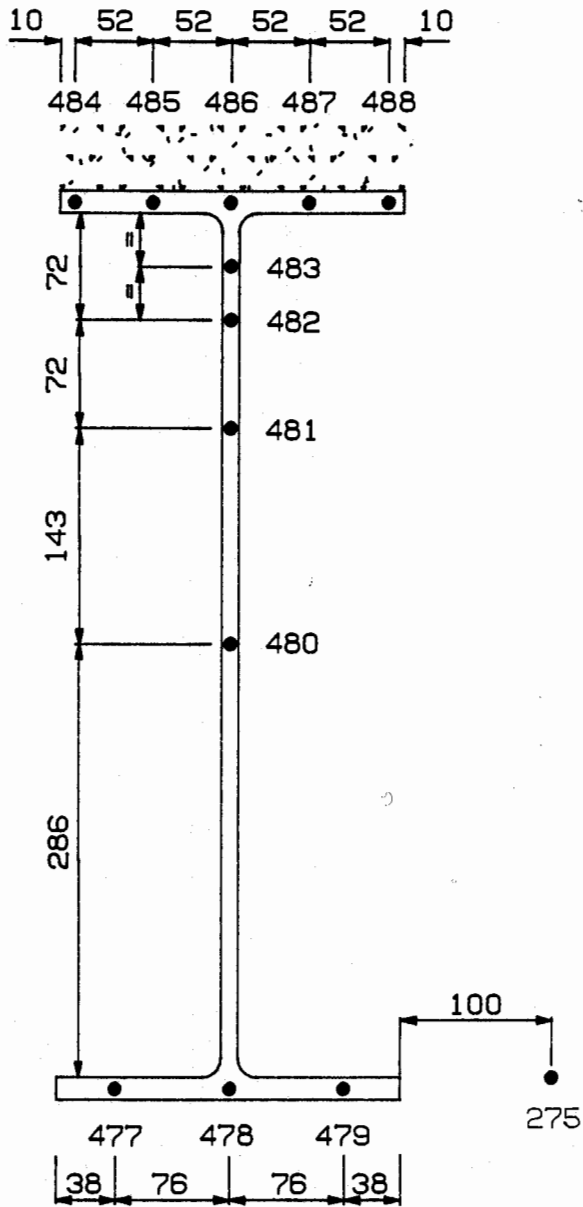
Data File: PB1 , Figure 2/1



12 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

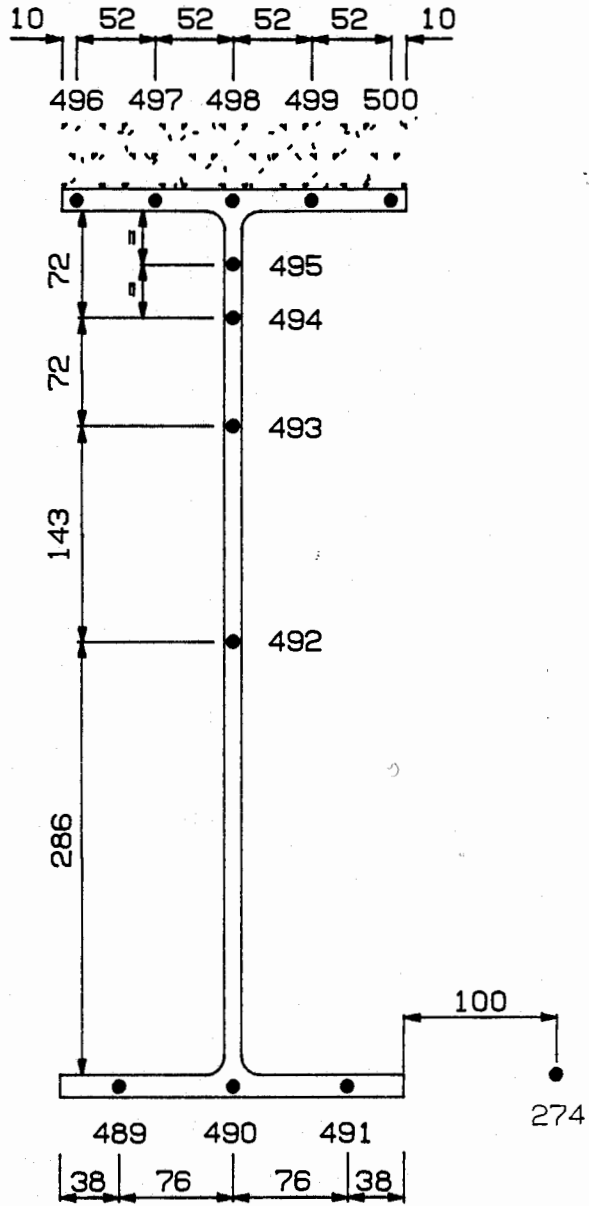
THERMOCOUPLE LOCATIONS ON PRIMARY BEAM AT PB2
 356x171x51Kg/m

Data File: PB2 , Figure 2/2



12 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

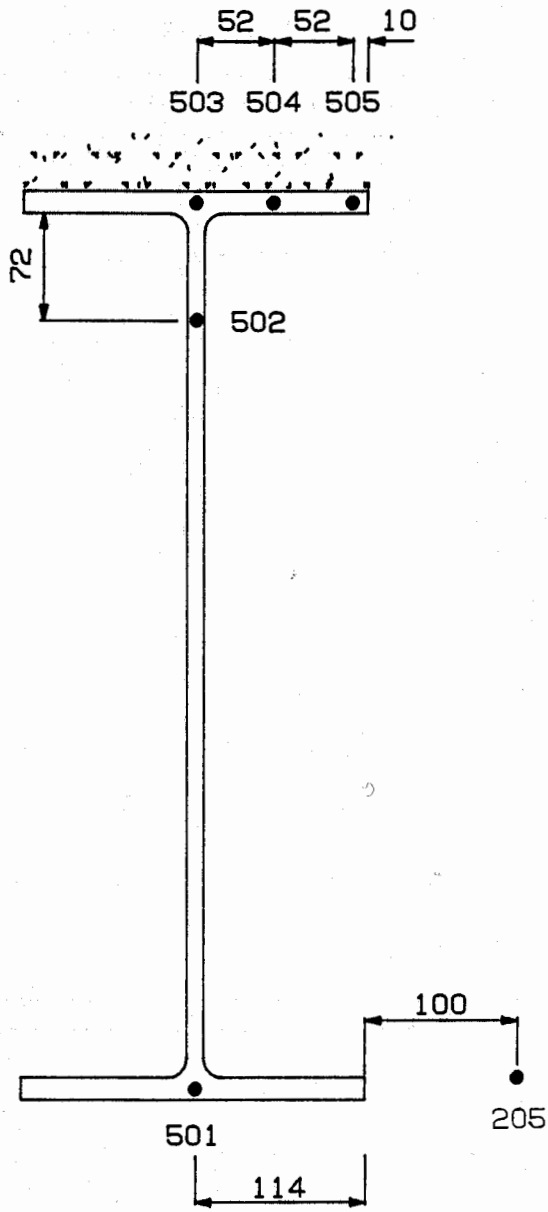
THERMOCOUPLE LOCATIONS ON PRIMARY BEAM AT PB3
 610x229x101Kg/m



12 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

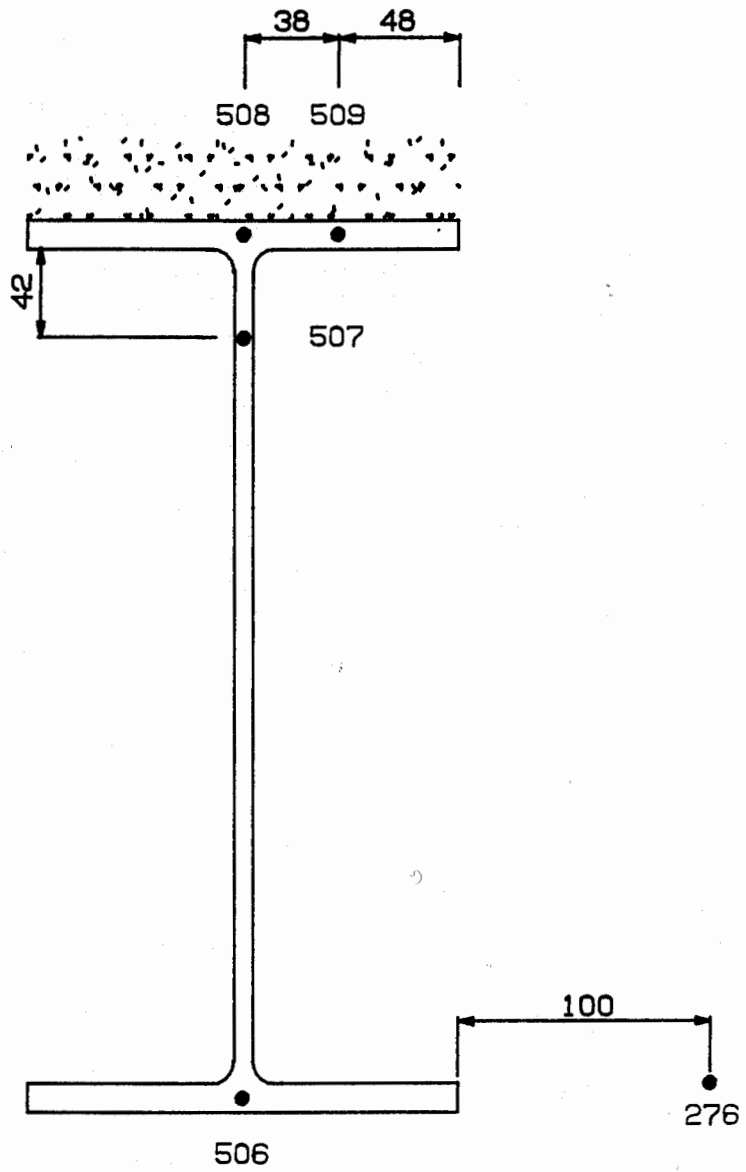
THERMOCOUPLE LOCATIONS ON PRIMARY BEAM AT PB4
 610x229x101Kg/m

Data File: PB4 , Figure 2/4



5 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

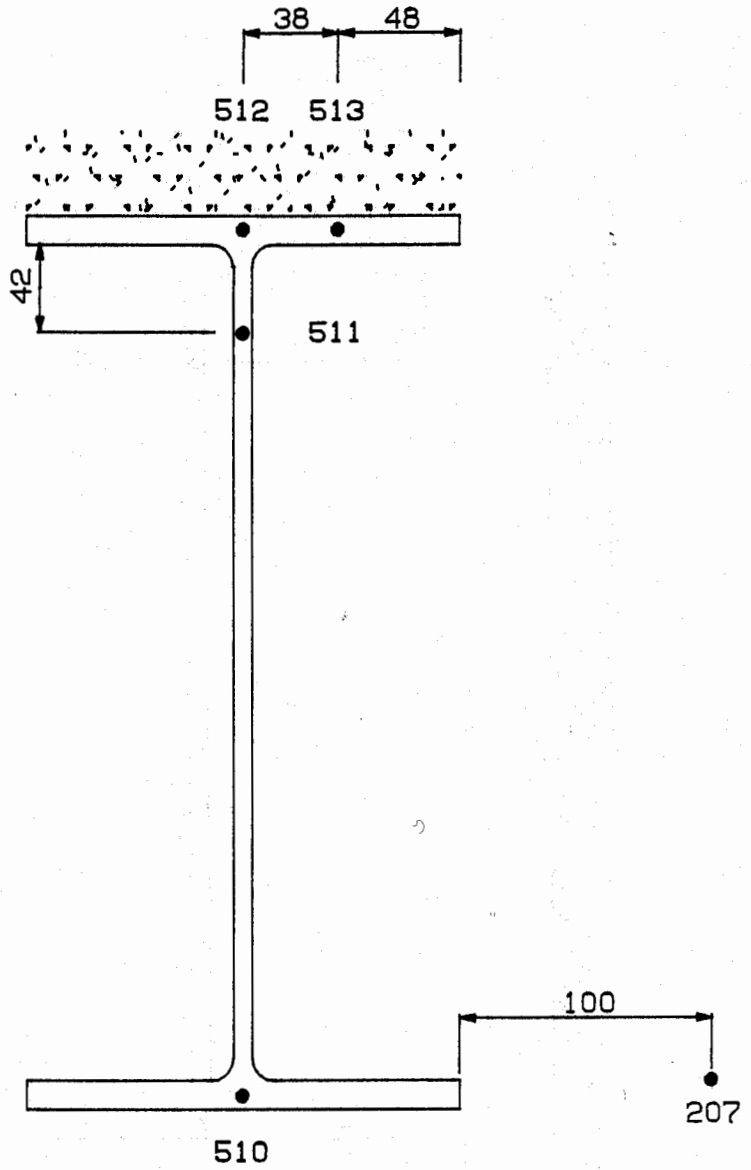
THERMOCOUPLE LOCATIONS ON PRIMARY BEAM AT PB5
 610x229x101Kg/m



4 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

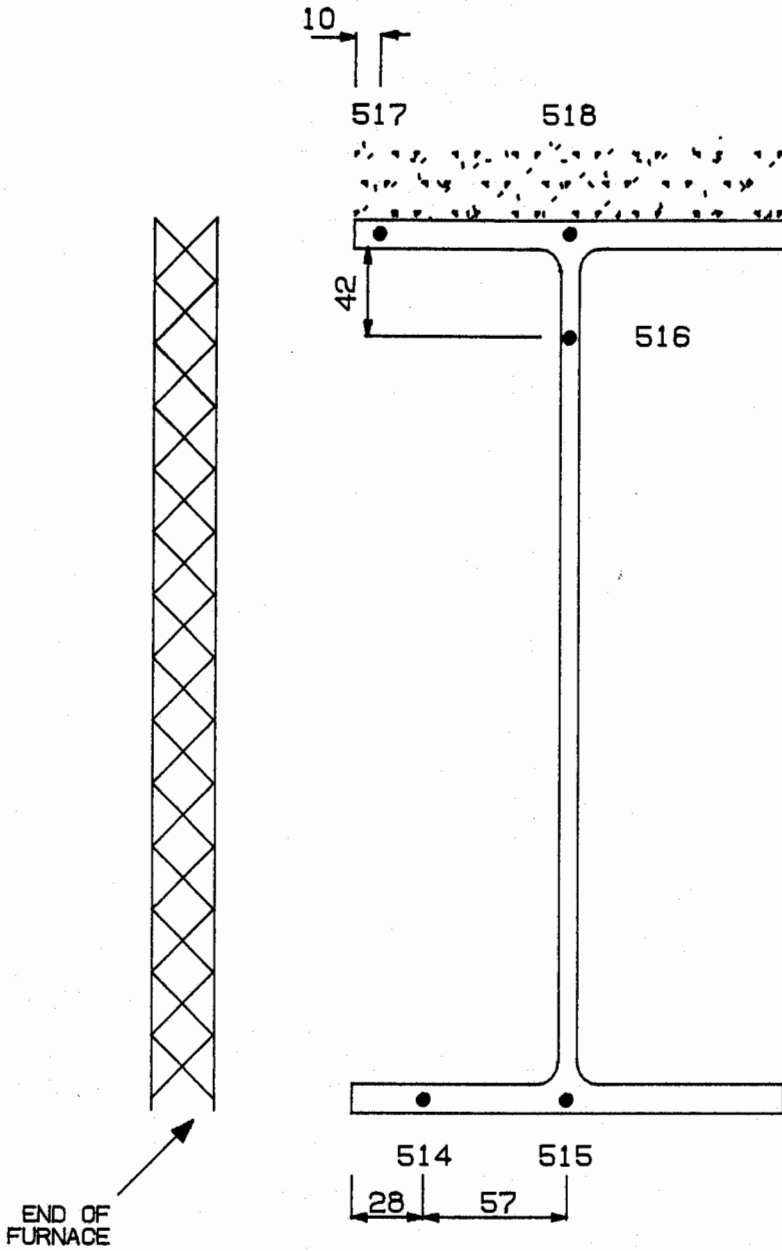
THERMOCOUPLE LOCATIONS ON PRIMARY BEAM AT PB6
 356x171x51 Kg/m

Data File: PB6 , Figure 2/6



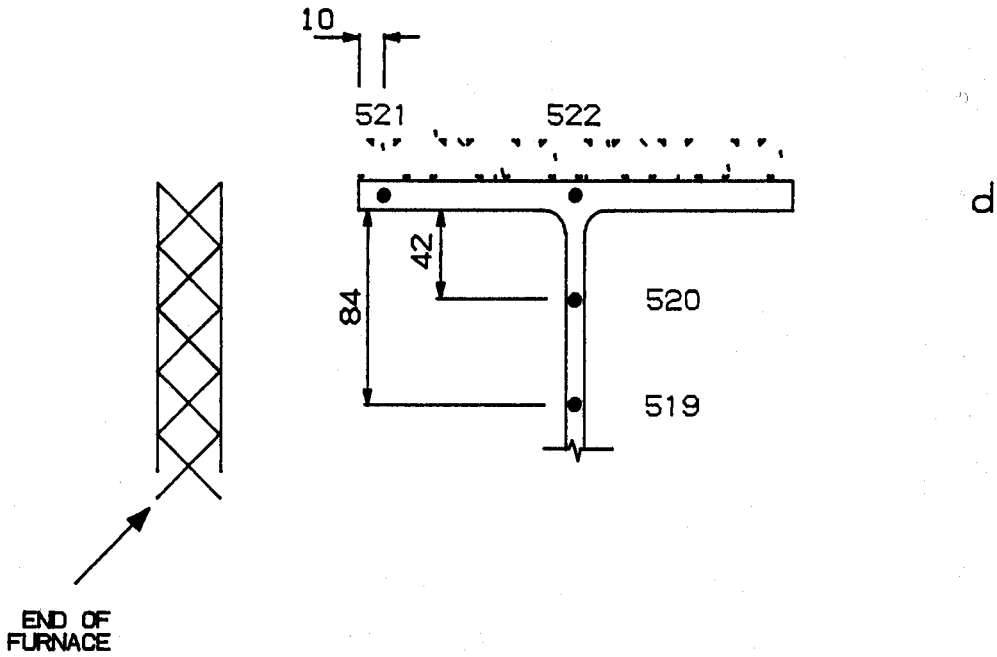
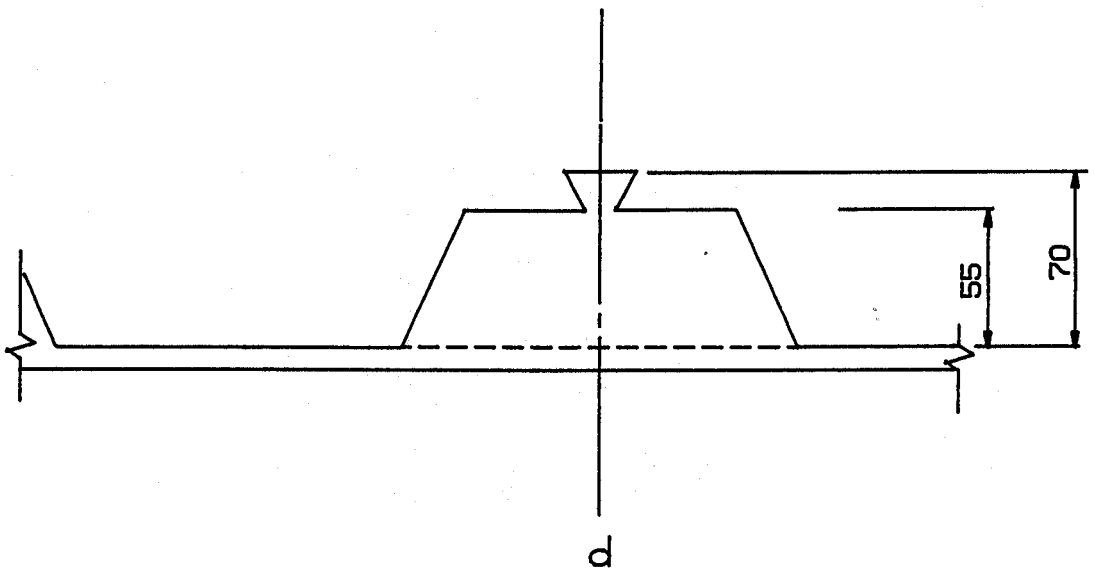
4 STEEL THERMOCOUPLES
 1 ATMOSPHERE THERMOCOUPLE

THERMOCOUPLE LOCATIONS ON PRIMARY BEAM AT PB7
 356x171x51 Kg/m

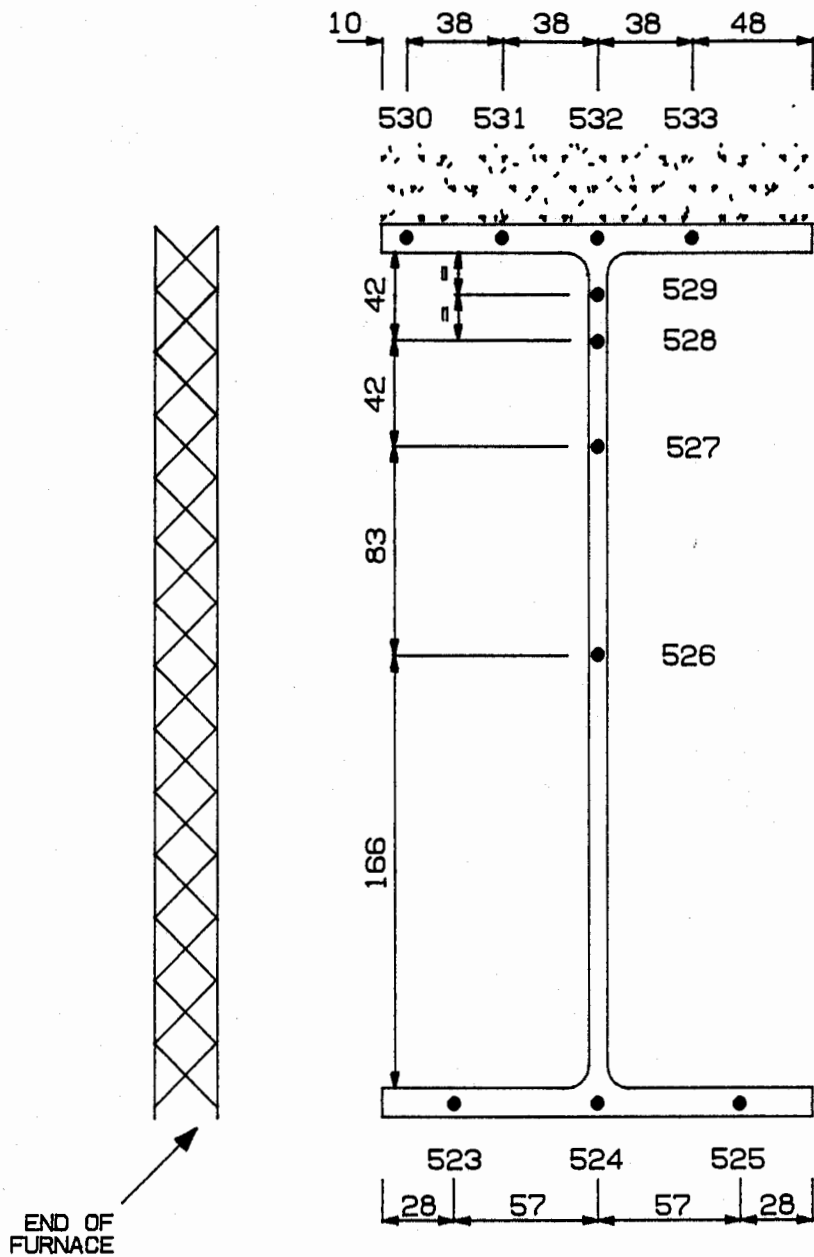


5 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON EDGE BEAM AT SB1E
 356x171x51 Kg/m



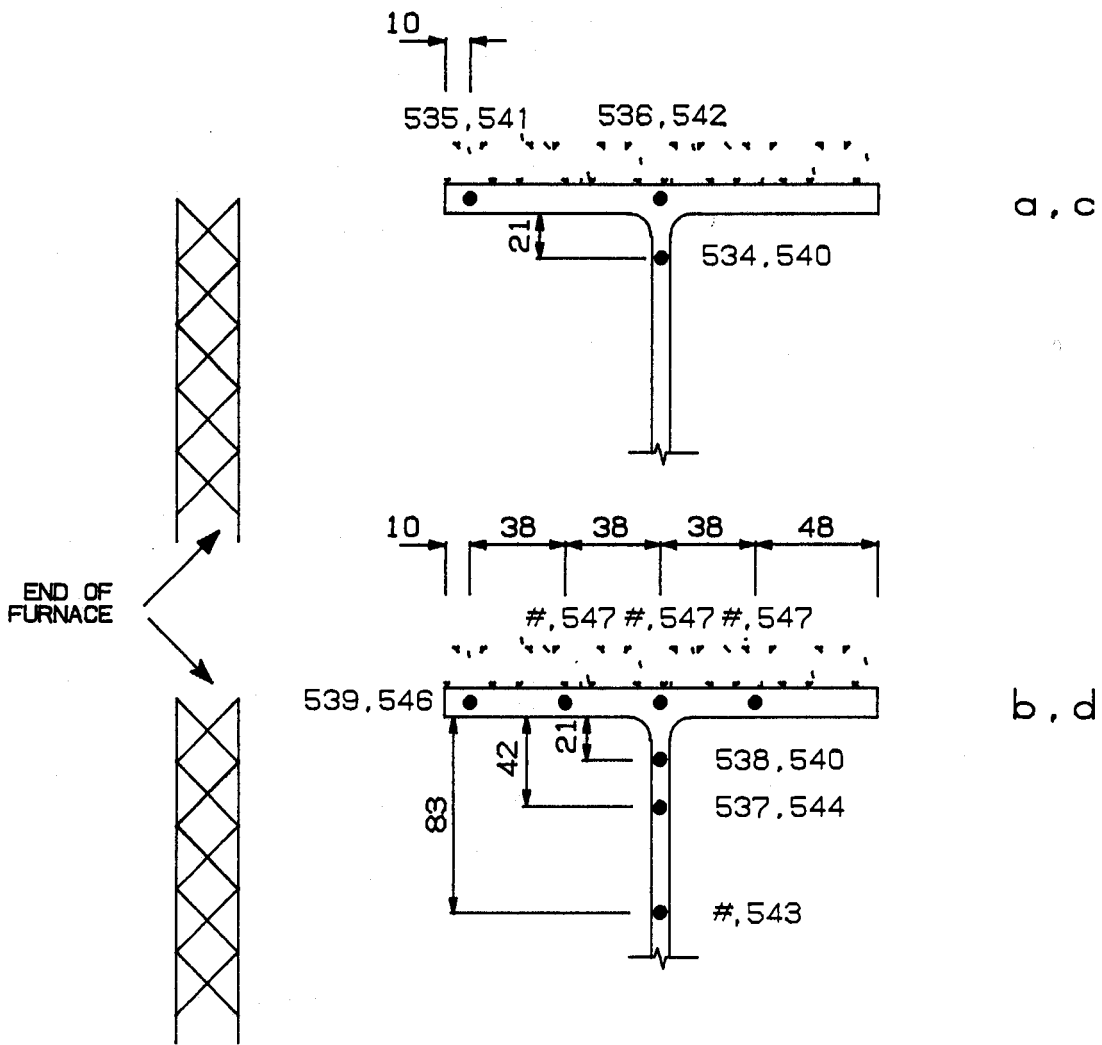
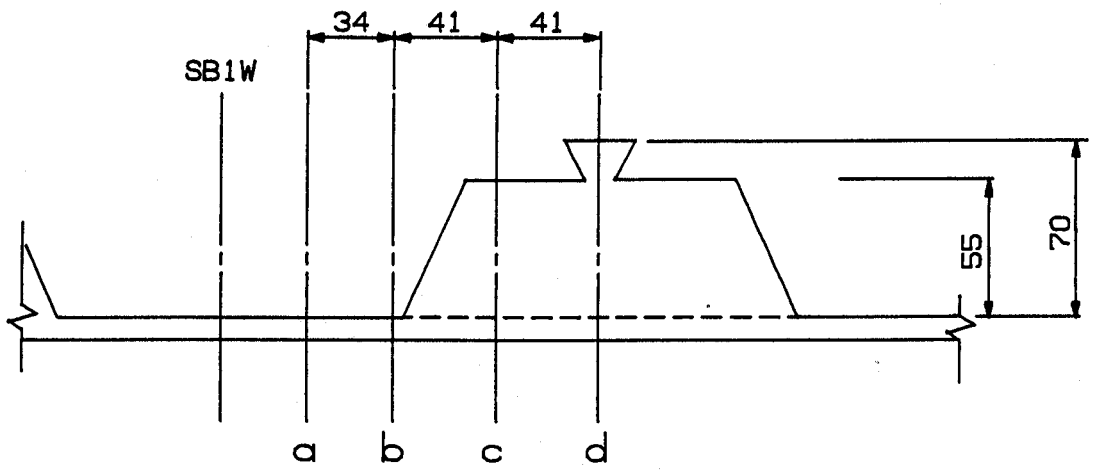
THERMOCOUPLE LOCATIONS ON EDGE BEAM AT SB1E_d
 356x171x51 Kg/m



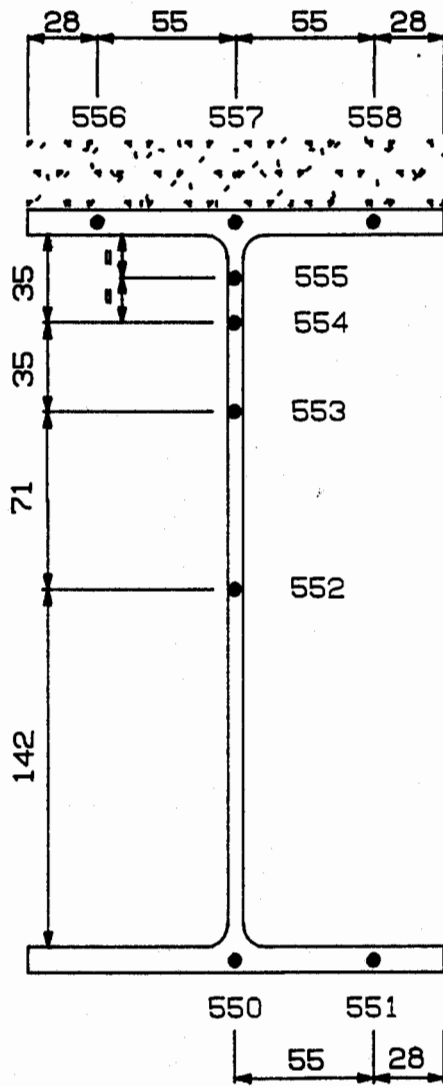
11 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON EDGE BEAM AT SB1W
 356x171x51 Kg/m

Data File: SB1W , Figure 2/10



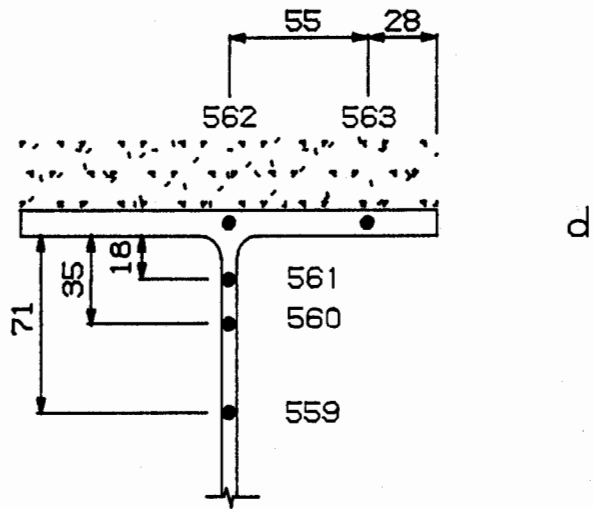
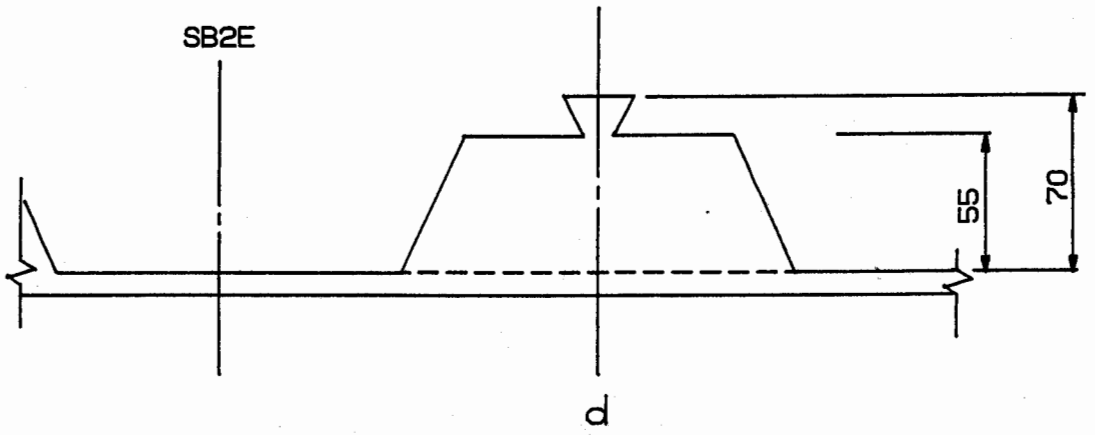
THERMOCOUPLE LOCATIONS ON EDGE BEAM AT SB1Wa_d
356x171x51 Kg/m



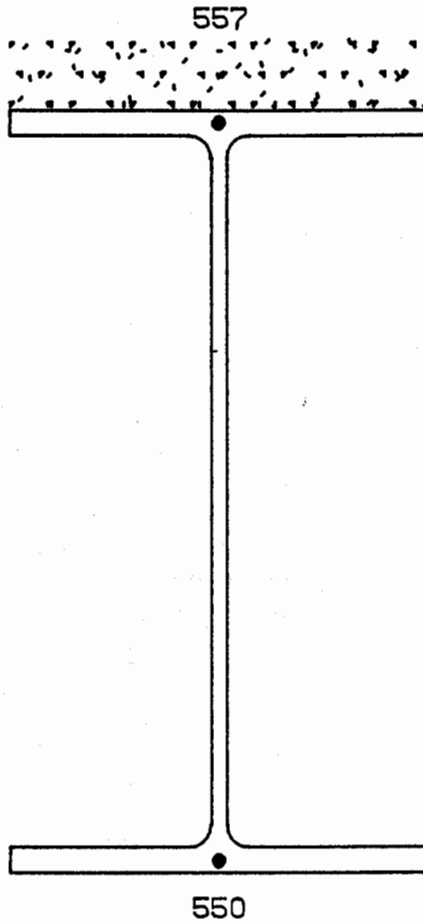
9 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB2E
 305x165x40 Kg/m

Data File: SB2E , Figure 2/12

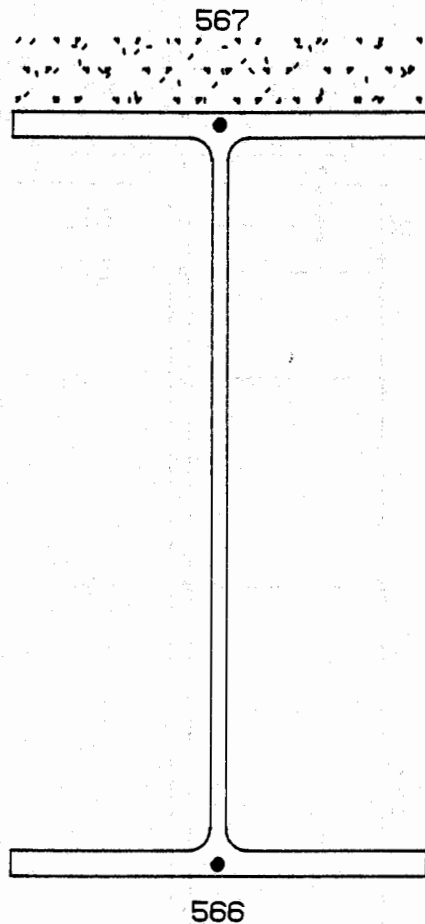


THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB2E_d
 305x165x40 Kg/m



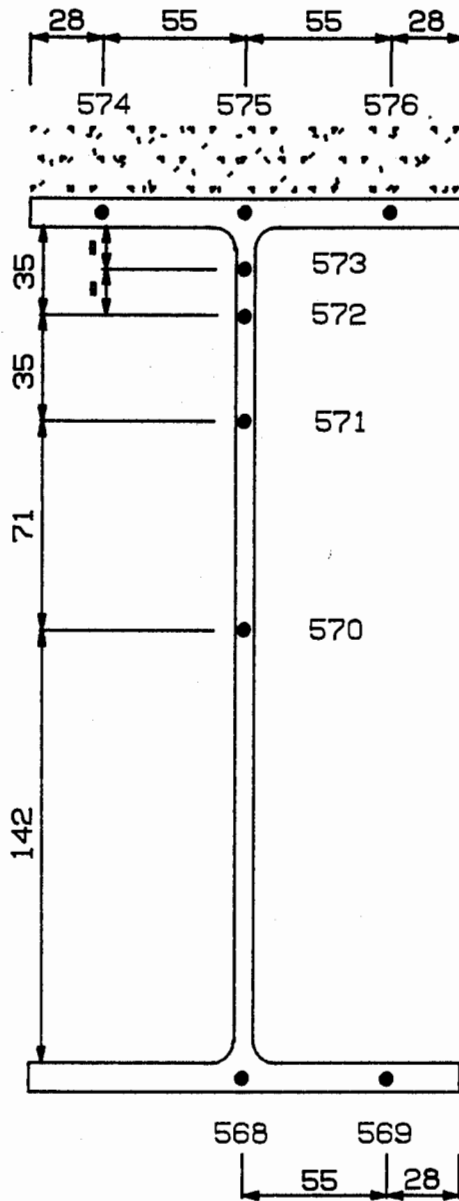
2 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB2W
305x165x40 Kg/m



2 STEEL THERMOCOUPLES

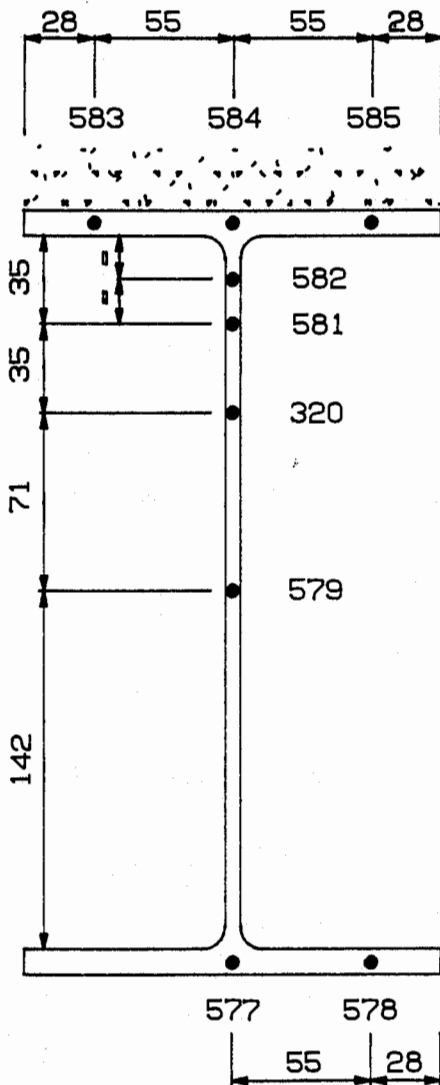
THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB3E
305x165x40Kg/m



9 STEEL THERMOCOUPLES

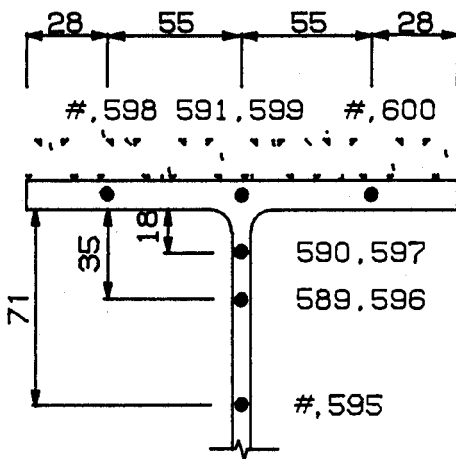
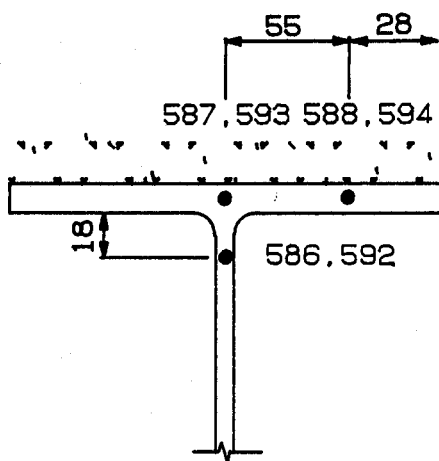
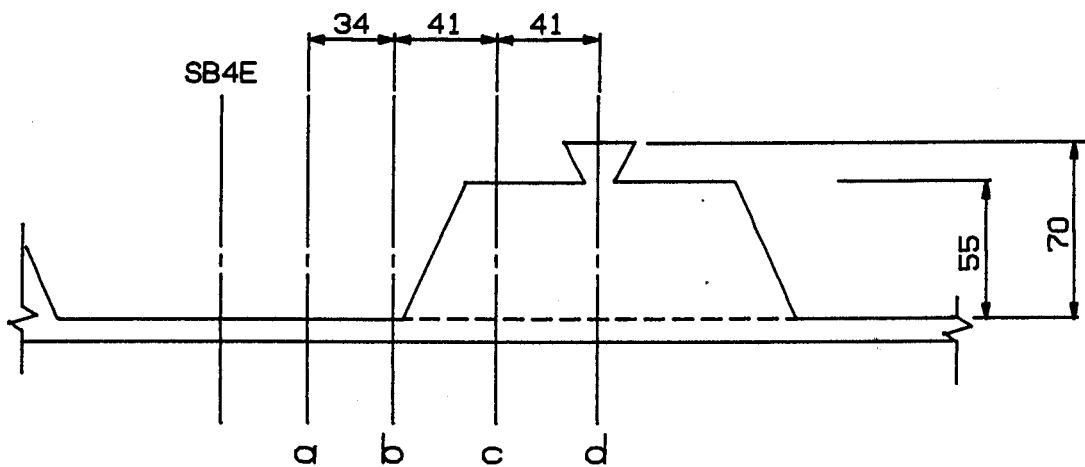
THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB3W
 305x165x40 Kg/m

Data File: SB3W , Figure 2/16

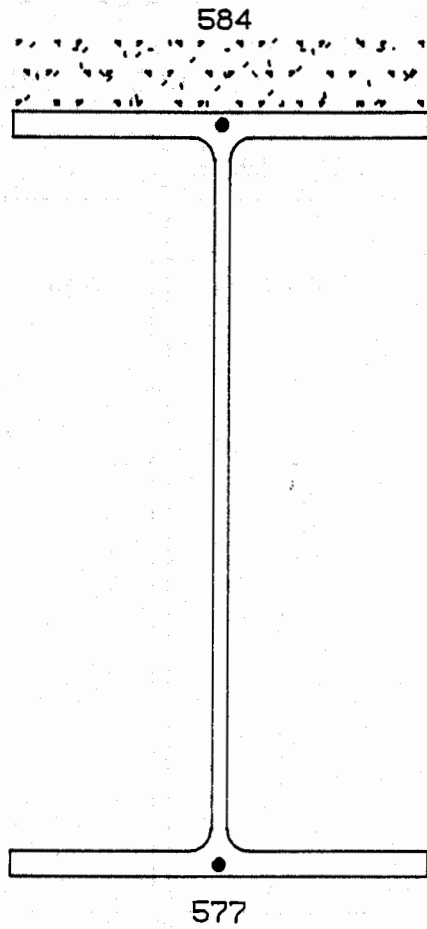


9 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB4E
 305x165x40Kg/m

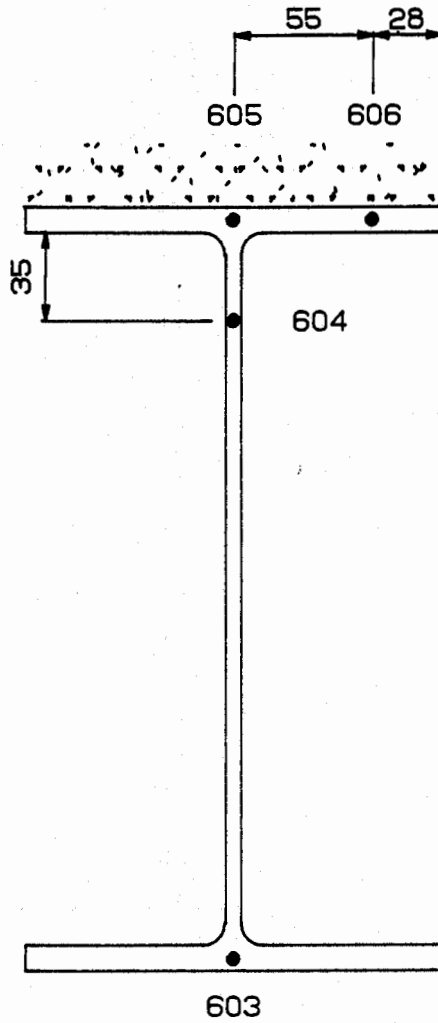


THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB4Ea_d
305x165x40 Kg/m



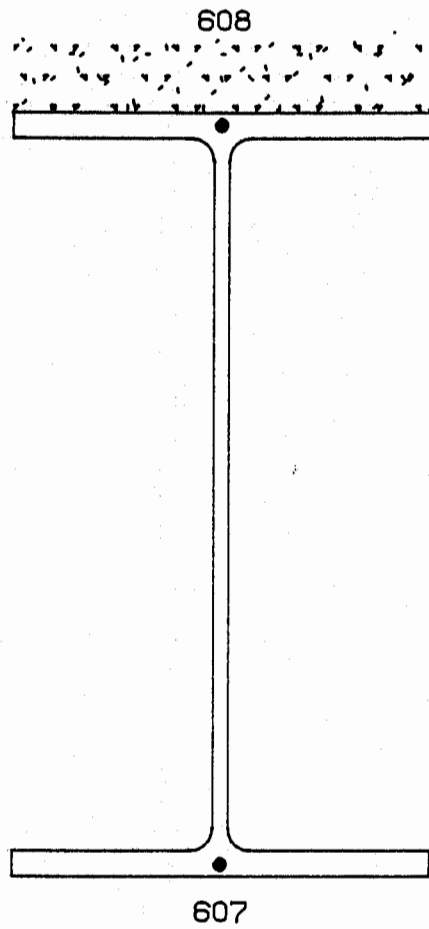
2 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB4W
305x165x40Kg/m



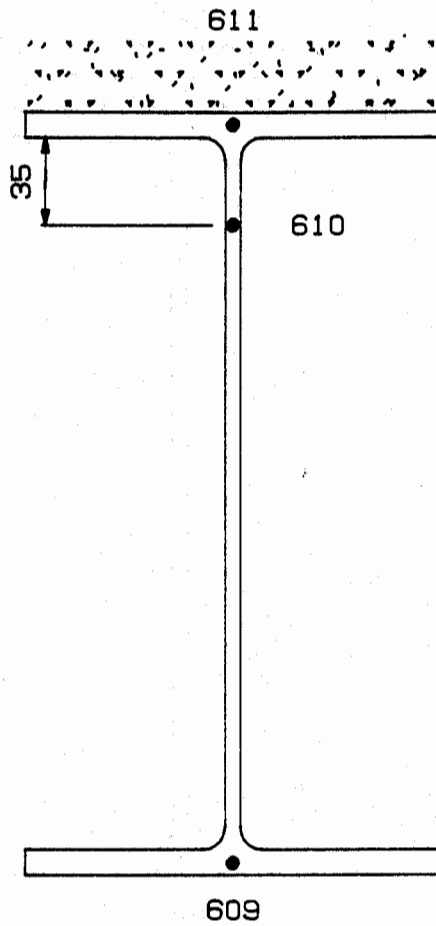
4 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB5E
305x165x40Kg/m



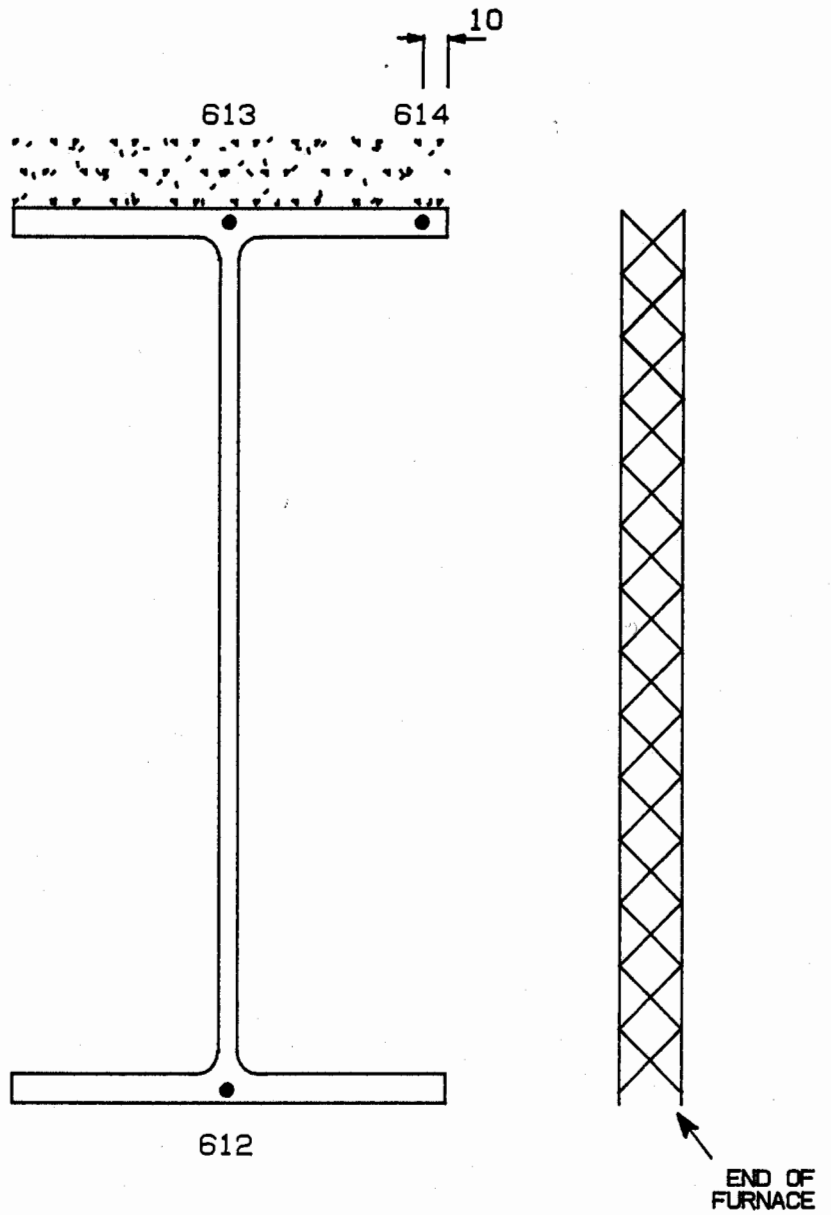
2 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB6W
305x165x40Kg/m



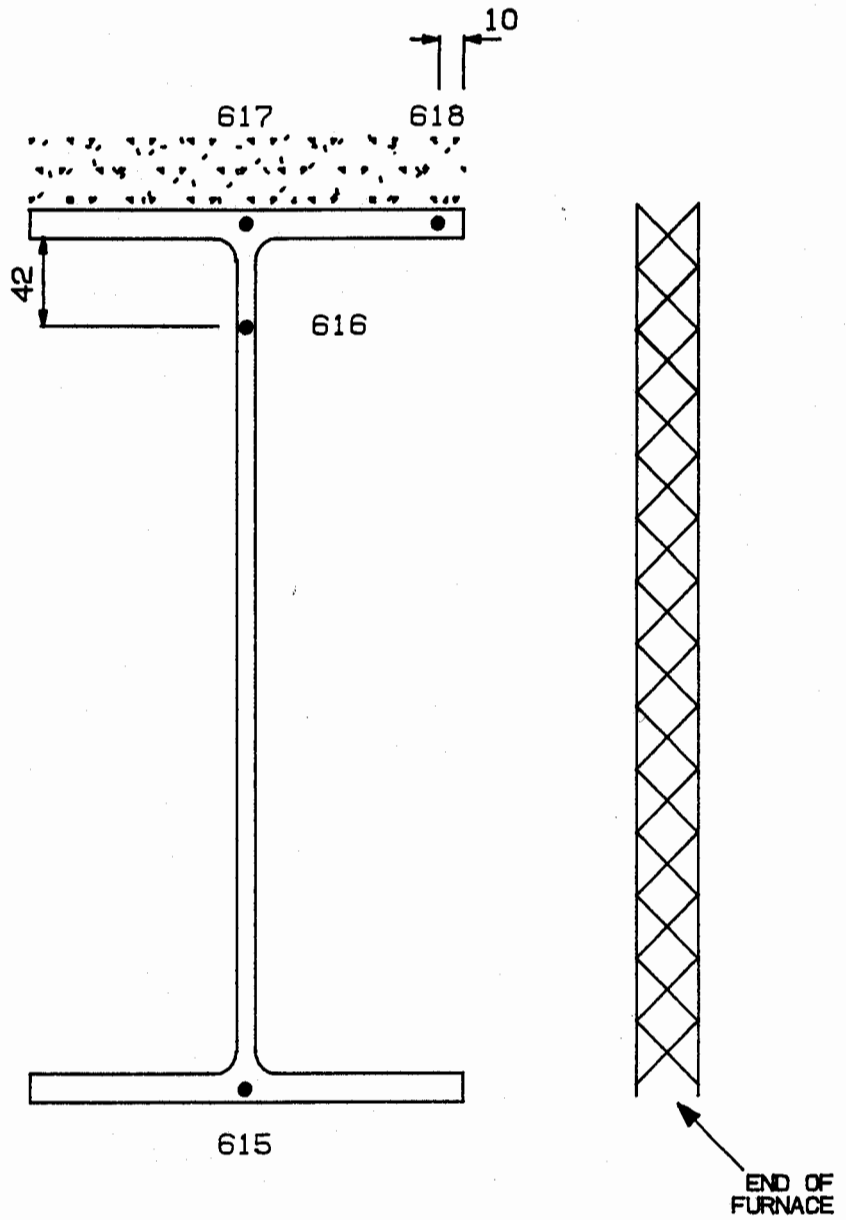
3 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT SB7E
305x165x40 Kg/m



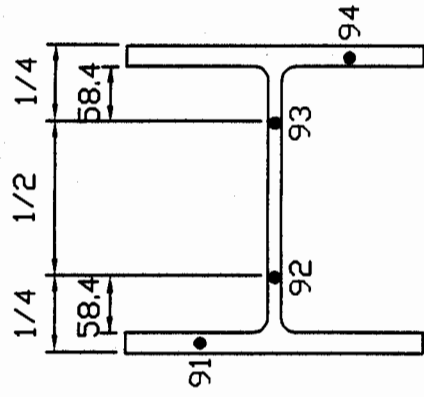
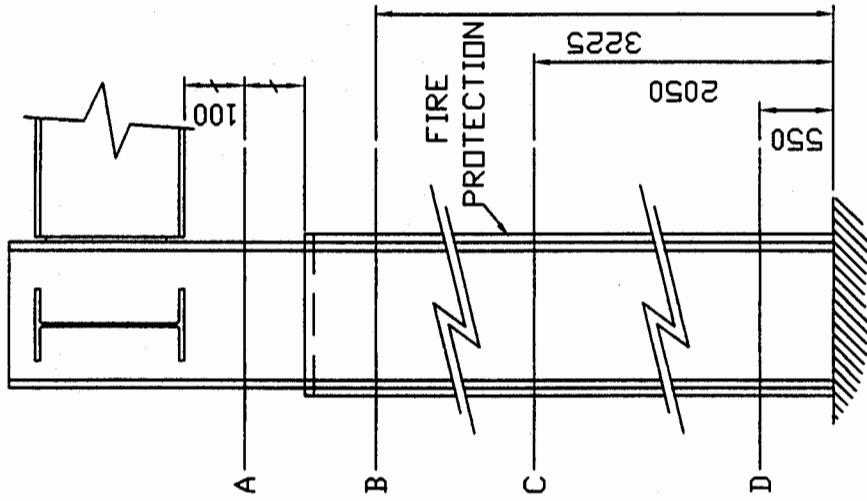
3 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON EDGE BEAM AT SB8E
 356x171x51Kg/m

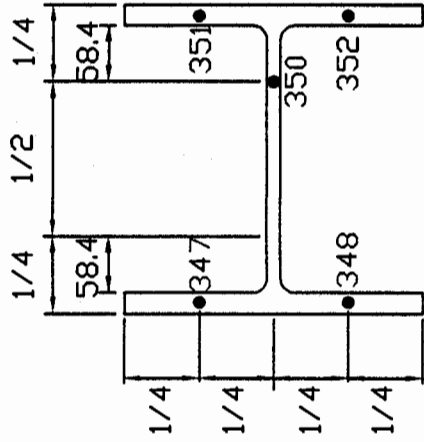


4 STEEL THERMOCOUPLES

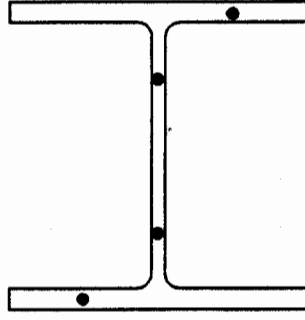
THERMOCOUPLE LOCATIONS ON EDGE BEAM AT SB8W
 356x171x51Kg/m



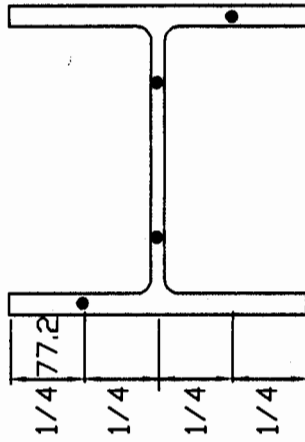
SECTION A-A



SECTION B-B

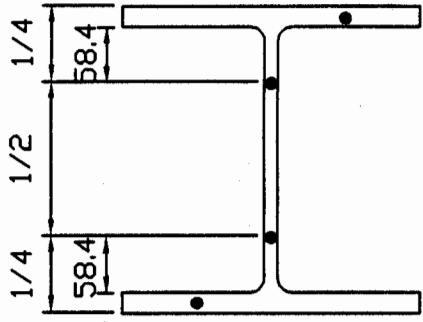


SECTION C-C

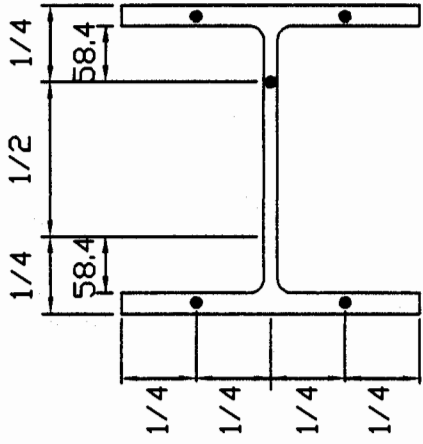


SECTION D-D

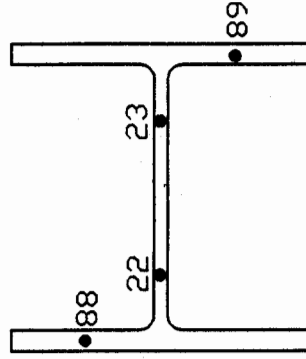
COLUMN AT B1 - 305 x 305mm x 137kg/m
VIEW LOOKING WEST



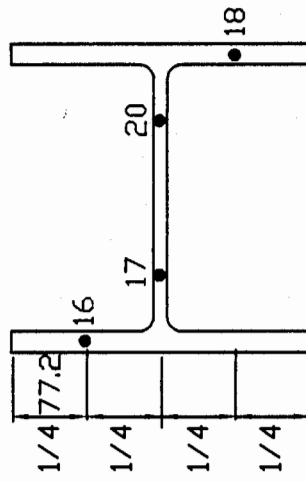
SECTION B-B



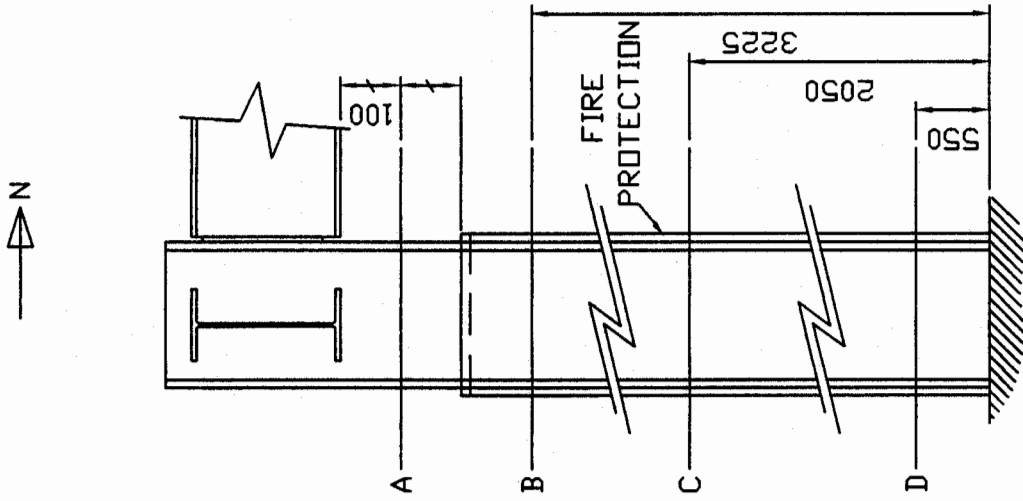
SECTION A-A



SECTION D-D

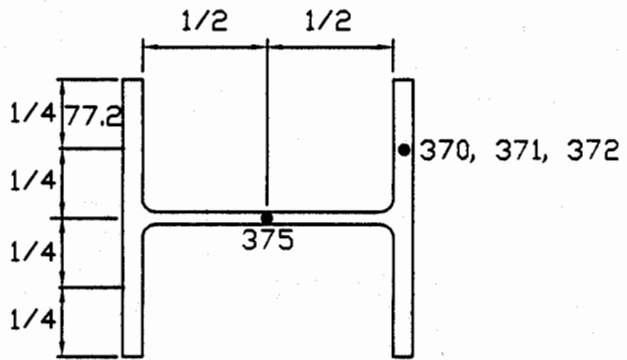
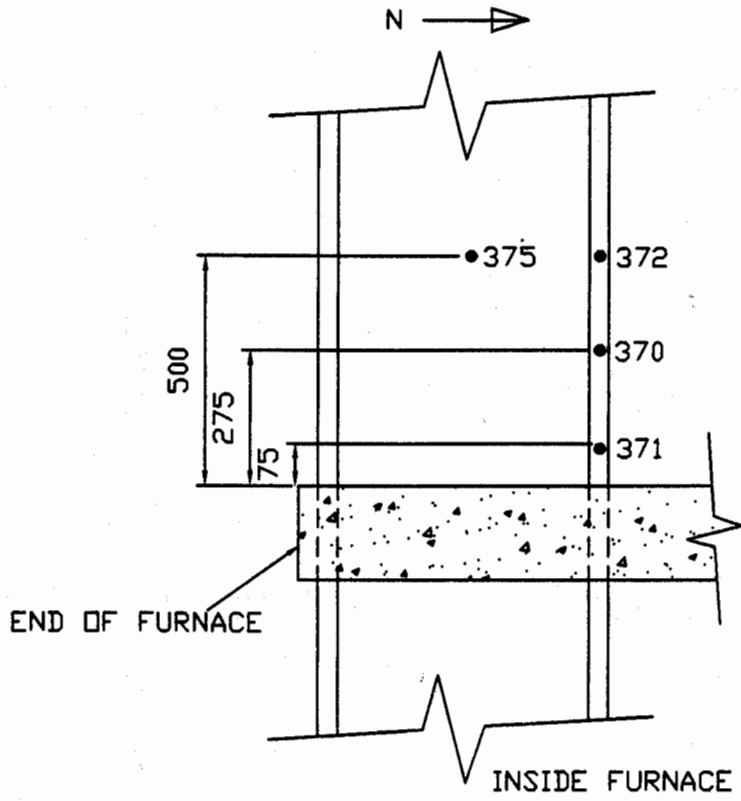


SECTION C-C

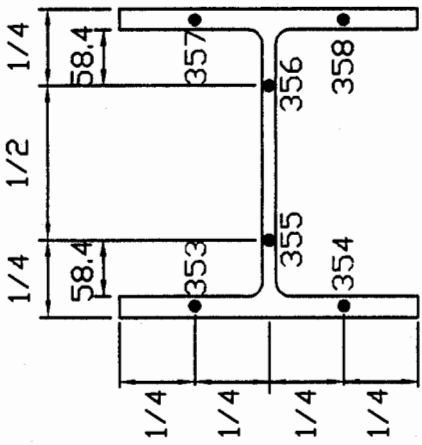
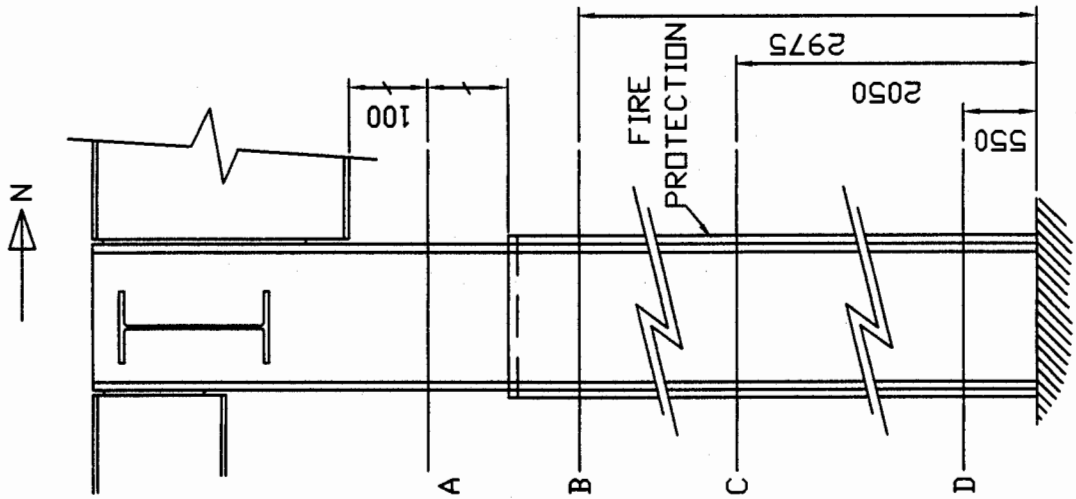


COLUMN AT B1 - 305 x 305mm x 137kg/m

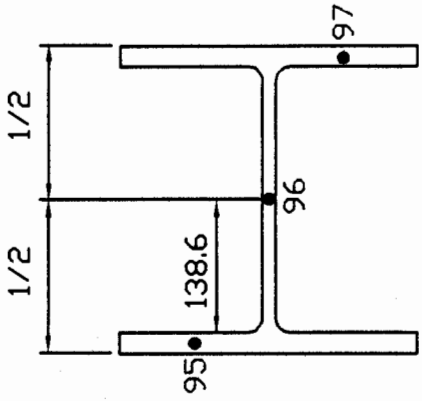
VIEW LOOKING WEST



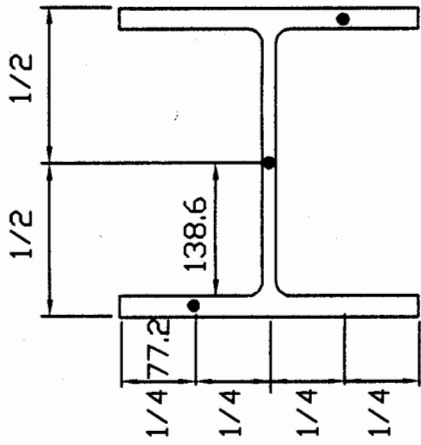
THERMOCOUPLE LOCATIONS AT COLUMN B1
ABOVE THE TEST FLOOR



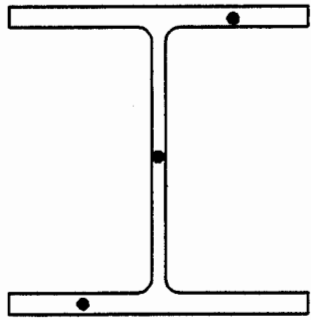
SECTION A-A



SECTION B-B



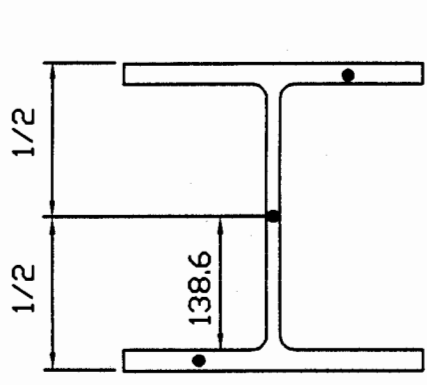
SECTION C-C



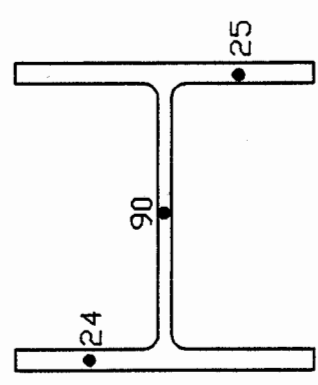
SECTION D-D

COLUMN AT B2 - 305 x 305mm x 137kg/m

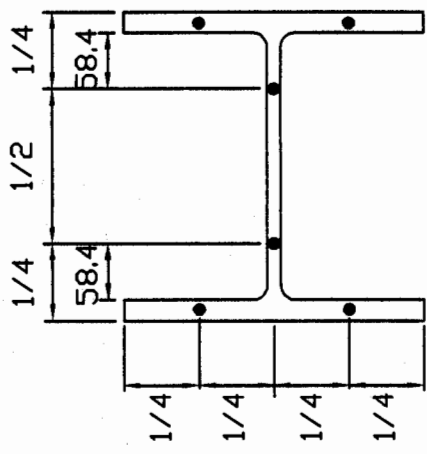
VIEW LOOKING WEST



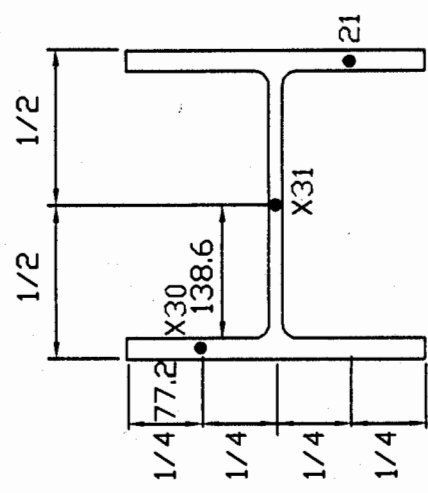
SECTION B-B



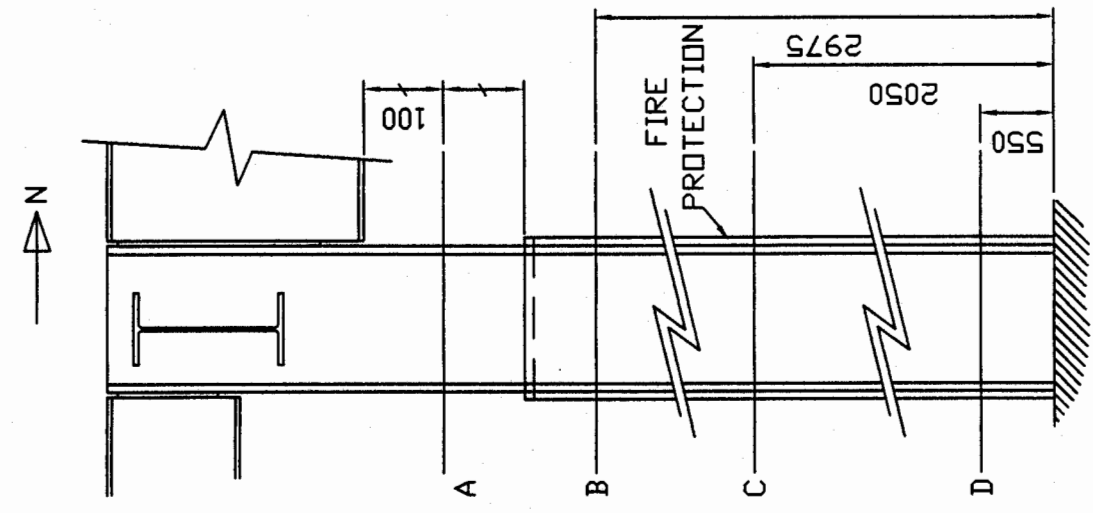
SECTION D-D



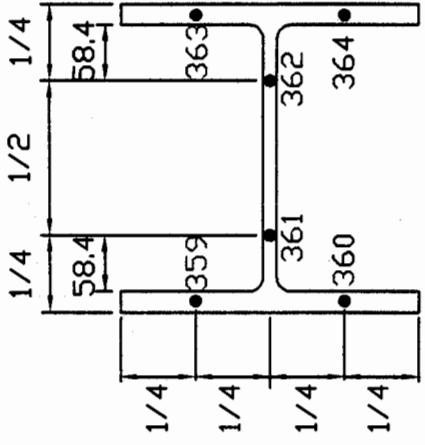
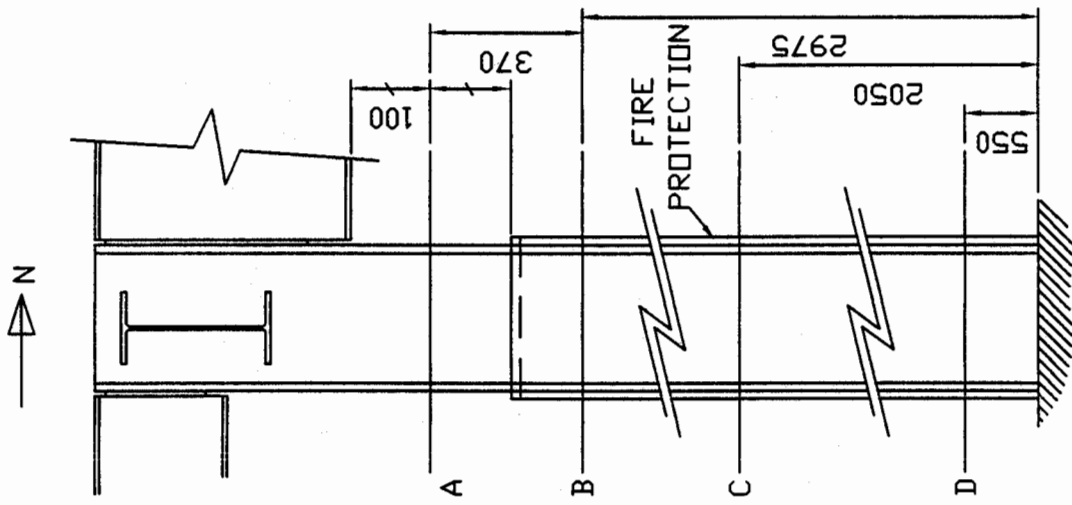
SECTION A-A



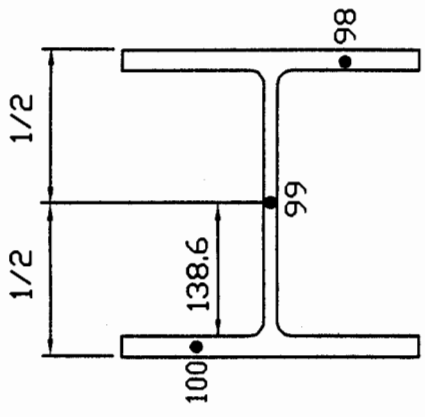
SECTION C-C



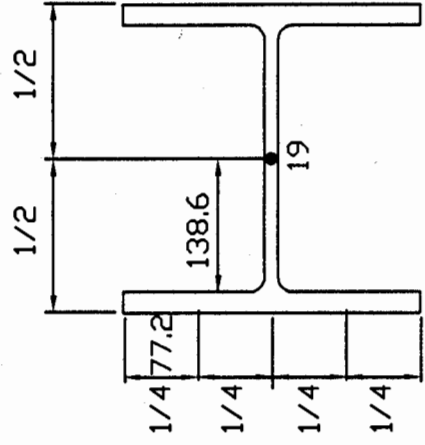
COLUMN AT B2 - 305 x 305mm x 137kg/m
VIEW LOOKING WEST



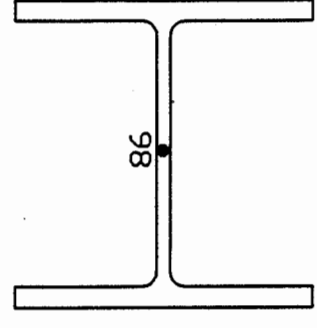
SECTION A-A



SECTION B-B



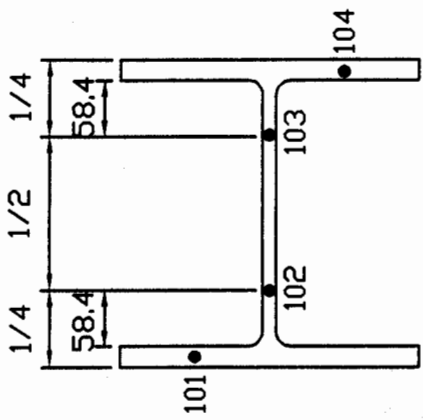
SECTION C-C



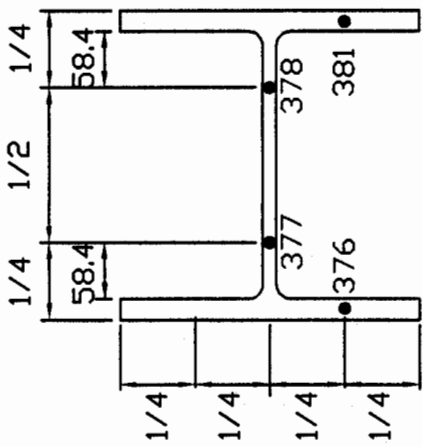
SECTION D-D

COLUMN AT B3 - 305 x 305mm x 137kg/m

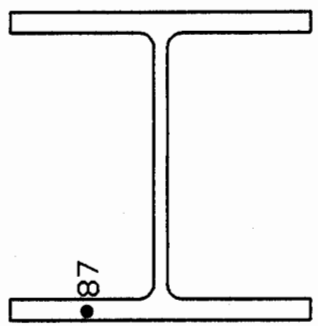
VIEW LOOKING EAST



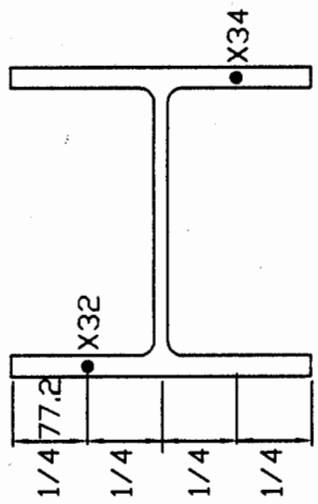
SECTION B-B



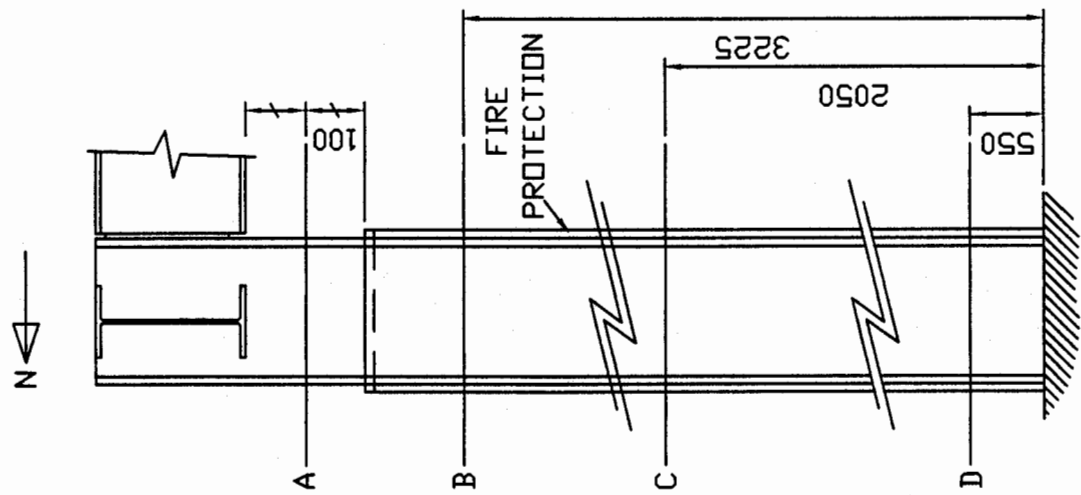
SECTION A-A



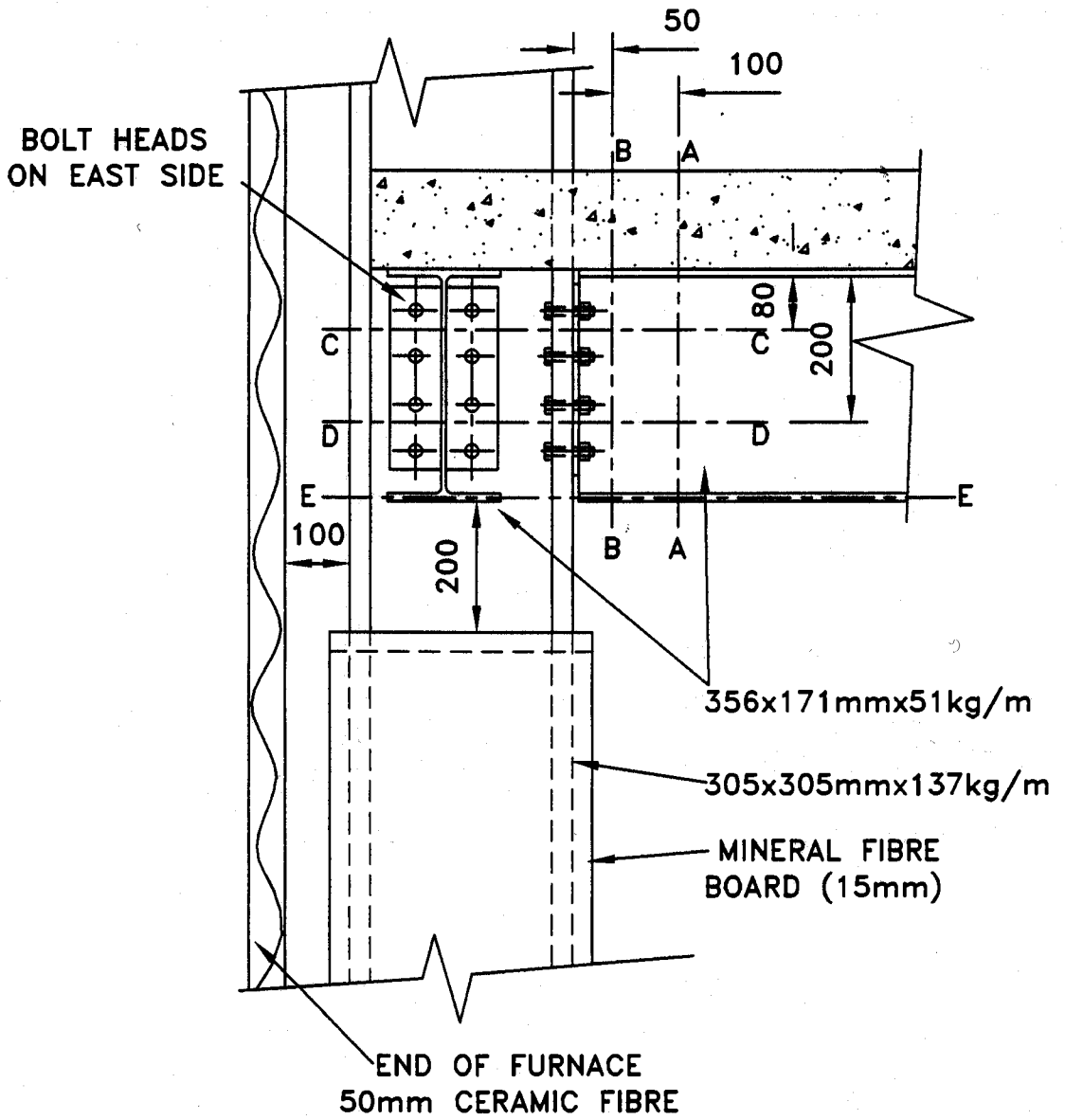
SECTION D-D



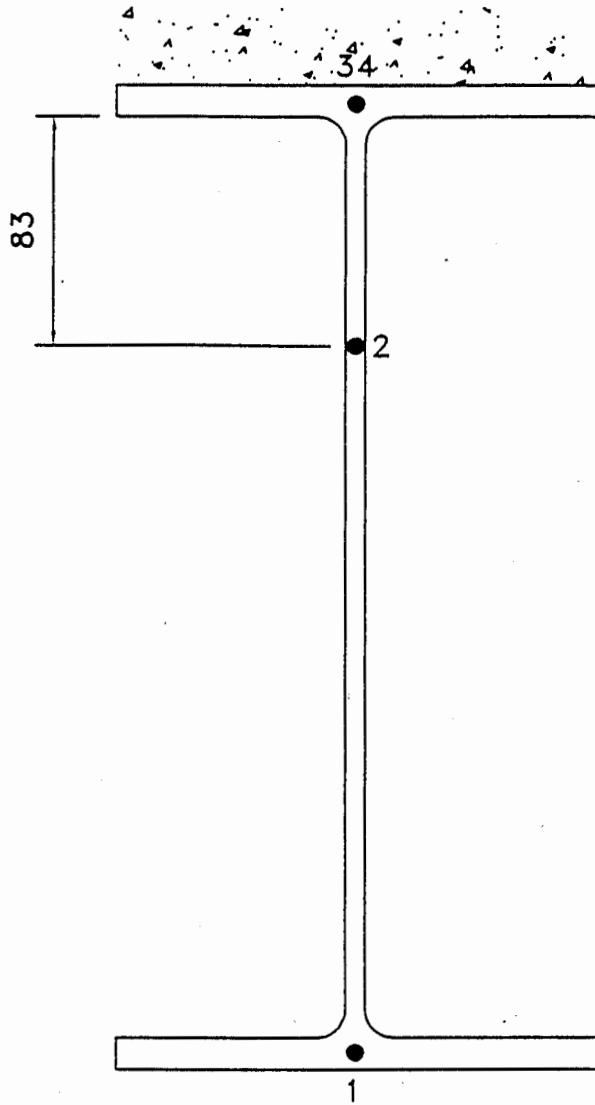
SECTION C-C



COLUMN AT B4 - 305 x 305mm x 137kg/m
VIEW LOOKING EAST

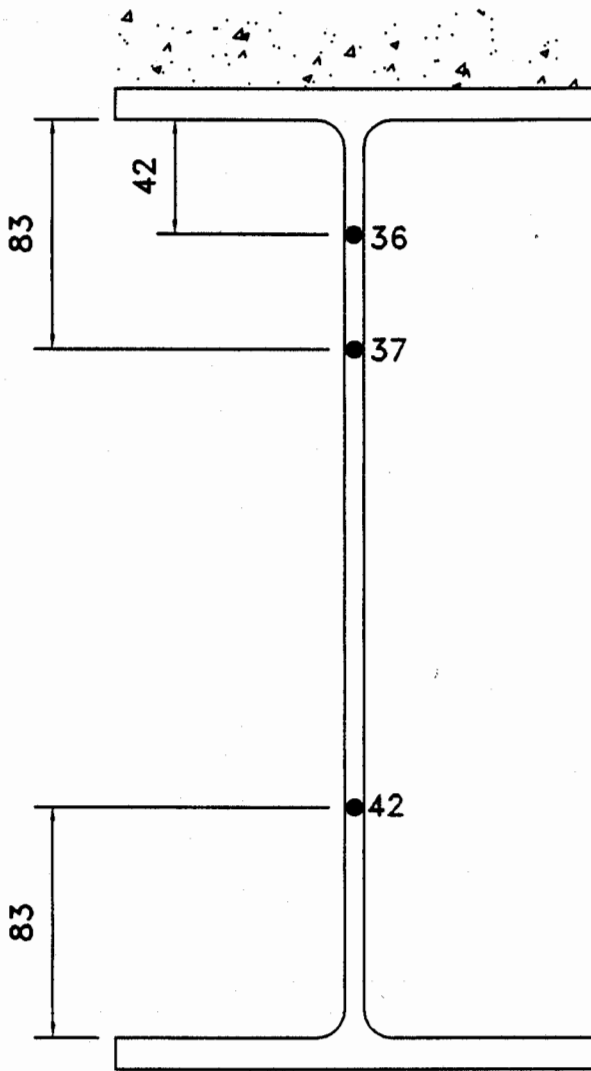


CONNECTIONS C1 AND C4 AT COLUMNS B1 AND B4
 GENERAL ARRANGEMENT VIEWED ON GRID LINES 1(WEST)
 AND 4 (EAST)



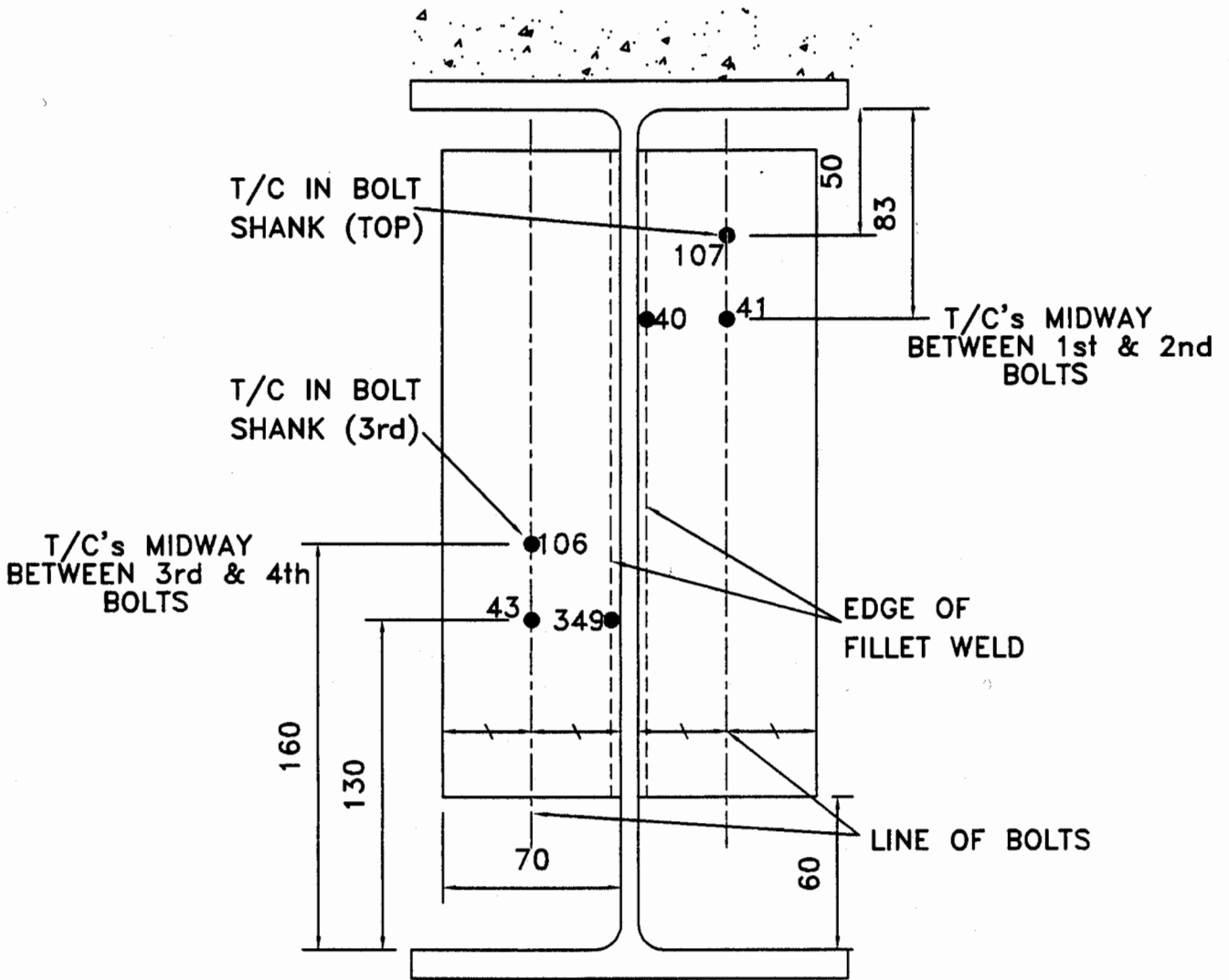
SECTION A-A
150mm FROM
END PLATE

C1-CONNECTION DETAIL AT COLUMN B1
PRIMARY BEAM : 356x171mmx51kg/m
VIEW LOOKING SOUTH

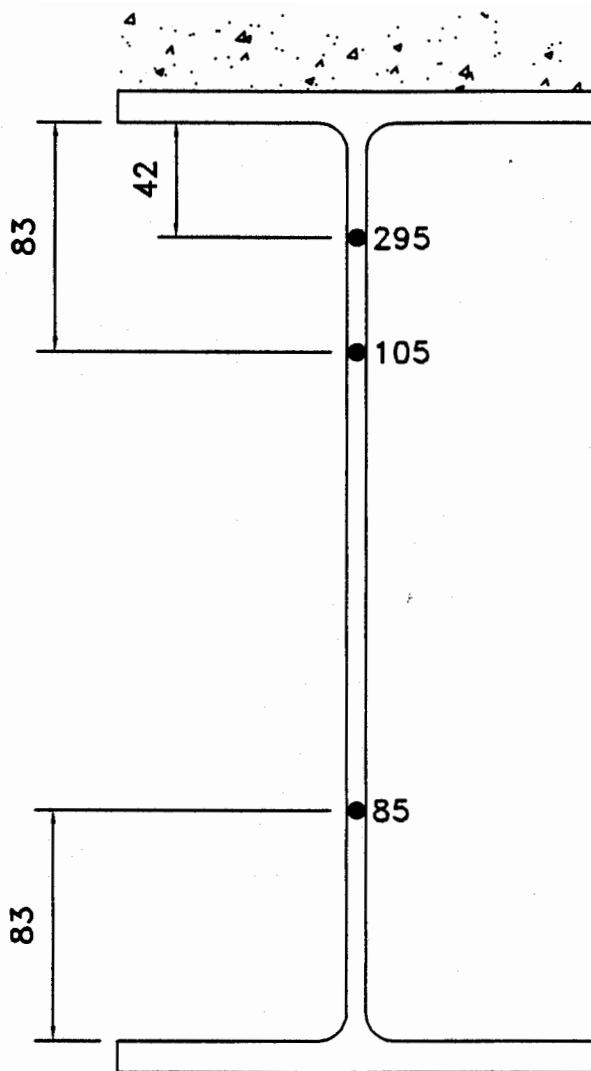


SECTION B-B
50mm FROM
END PLATE

C1-CONNECTION DETAIL AT COLUMN B1
PRIMARY BEAM : 356x171mmx51kg/m
VIEW LOOKING SOUTH

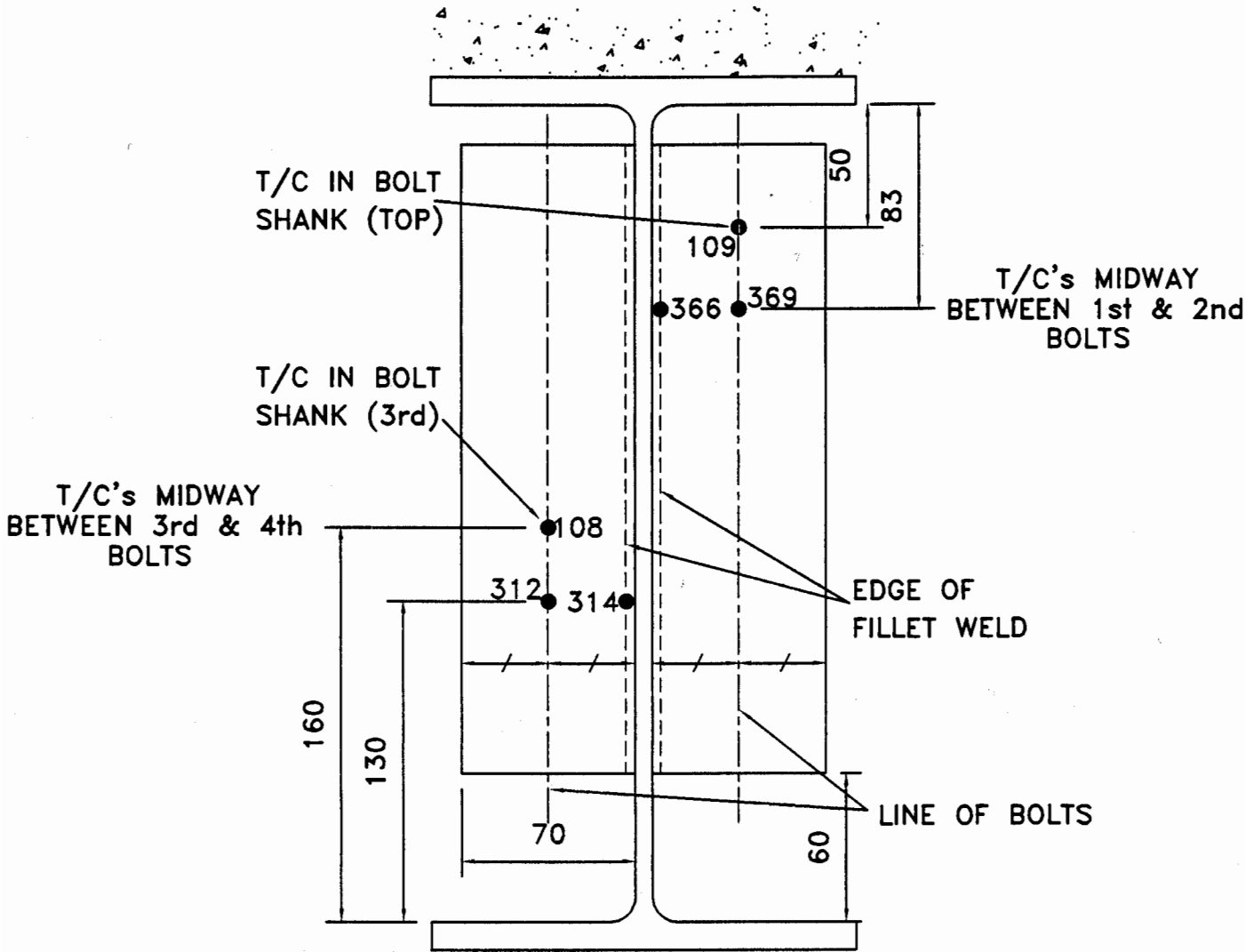


C1-CONNECTION DETAIL AT COLUMN B1
 PRIMARY BEAM : 356x171mmx51kg/m (PB1)
 VIEW LOOKING SOUTH

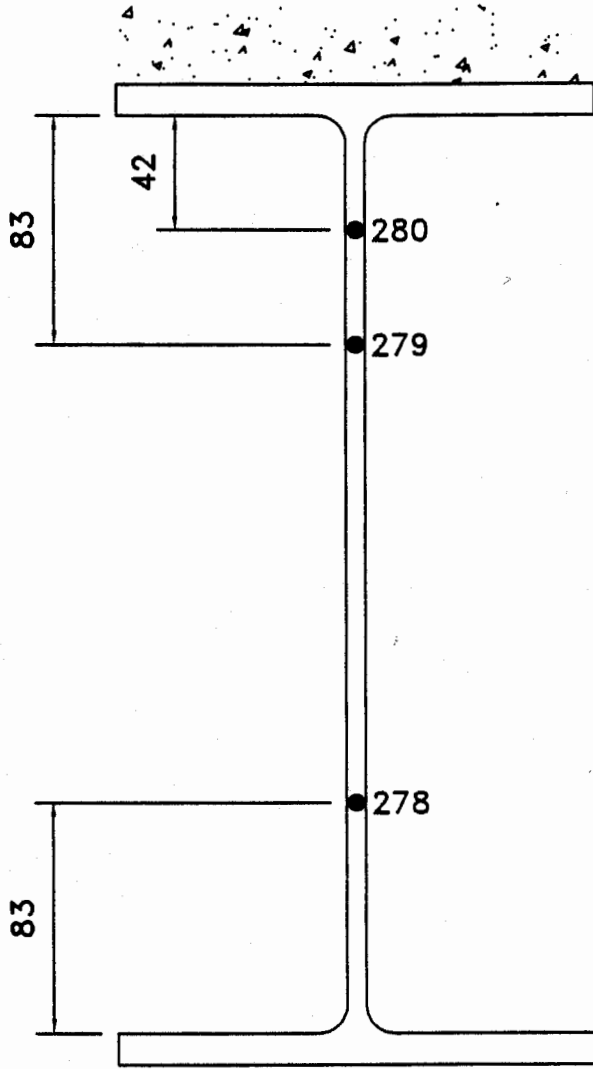


50mm FROM
END PLATE

C1-CONNECTION DETAIL AT COLUMN B1
SECONDARY BEAM : 356x171mmx51kg/m (SB1W)
VIEW LOOKING EAST

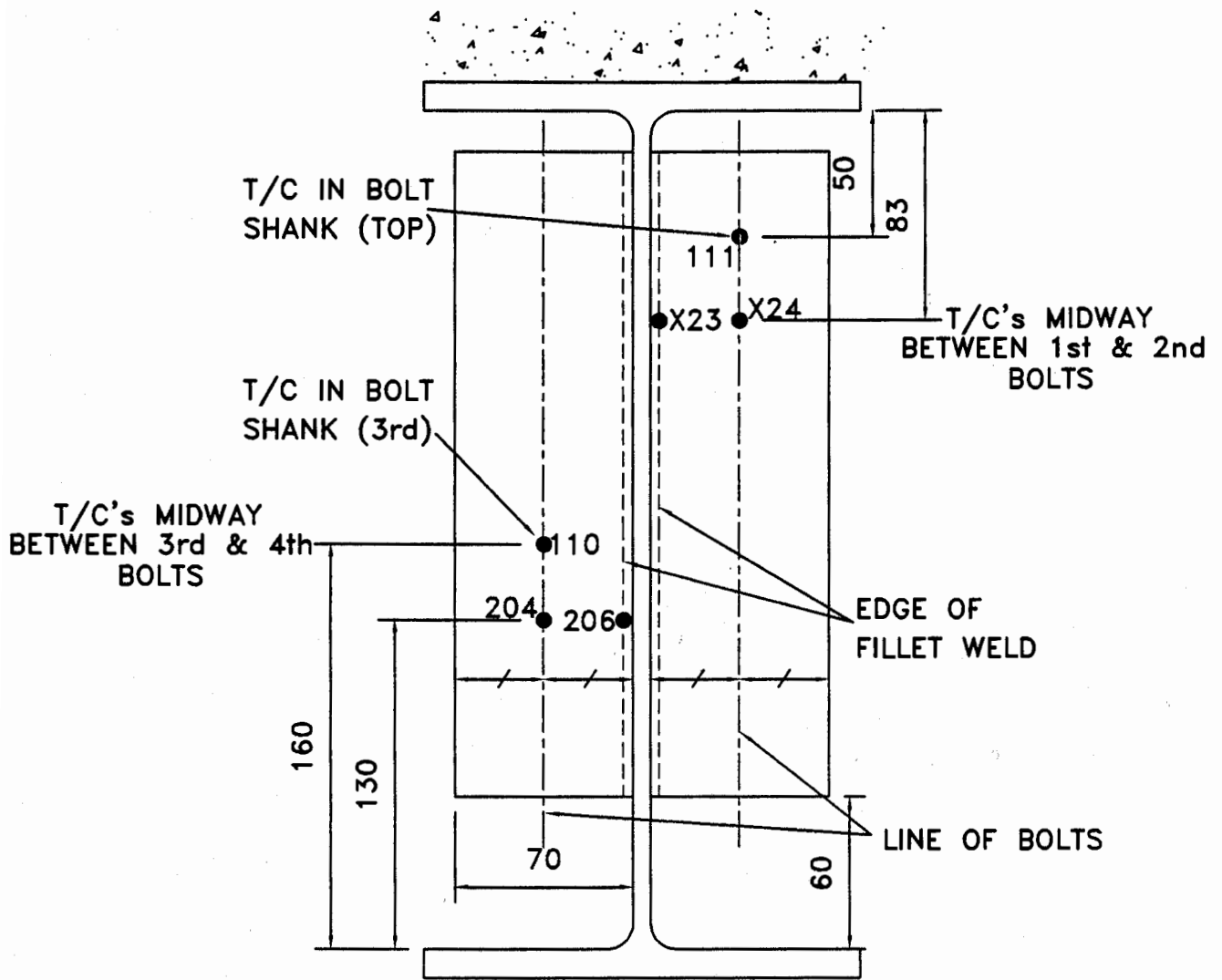


C1-CONNECTION DETAIL AT COLUMN B1
 SECONDARY BEAM : 356x171mmx51kg/m (SB1W)
 VIEW LOOKING EAST

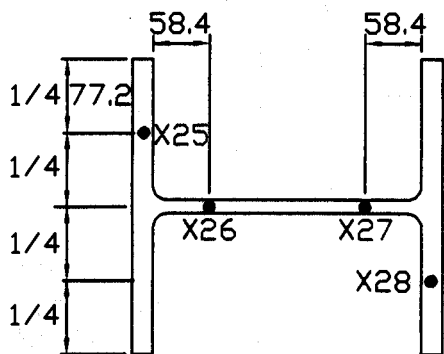
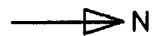


50mm FROM
END PLATE

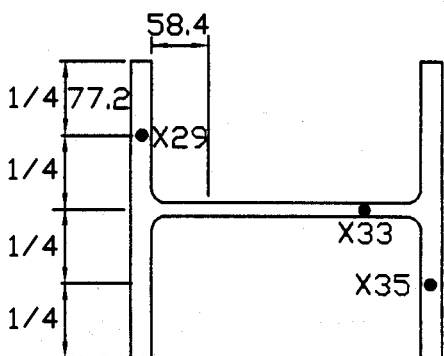
C1-CONNECTION DETAIL AT COLUMN B1
 SECONDARY BEAM : 356x171mmx51kg/m (SB1E)
 VIEW LOOKING WEST



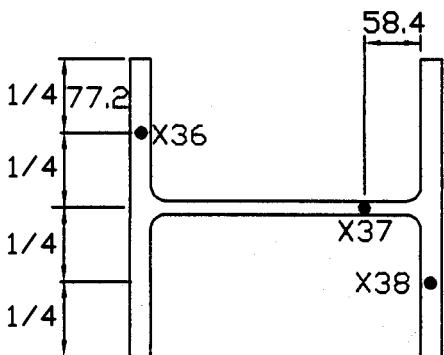
C1-CONNECTION DETAIL AT COLUMN B1
 SECONDARY BEAM : 356x171x51 kg/m (SB1E)
 VIEW LOOKING WEST



SECTION C-C
BETWEEN 1st AND 2nd BOLTS

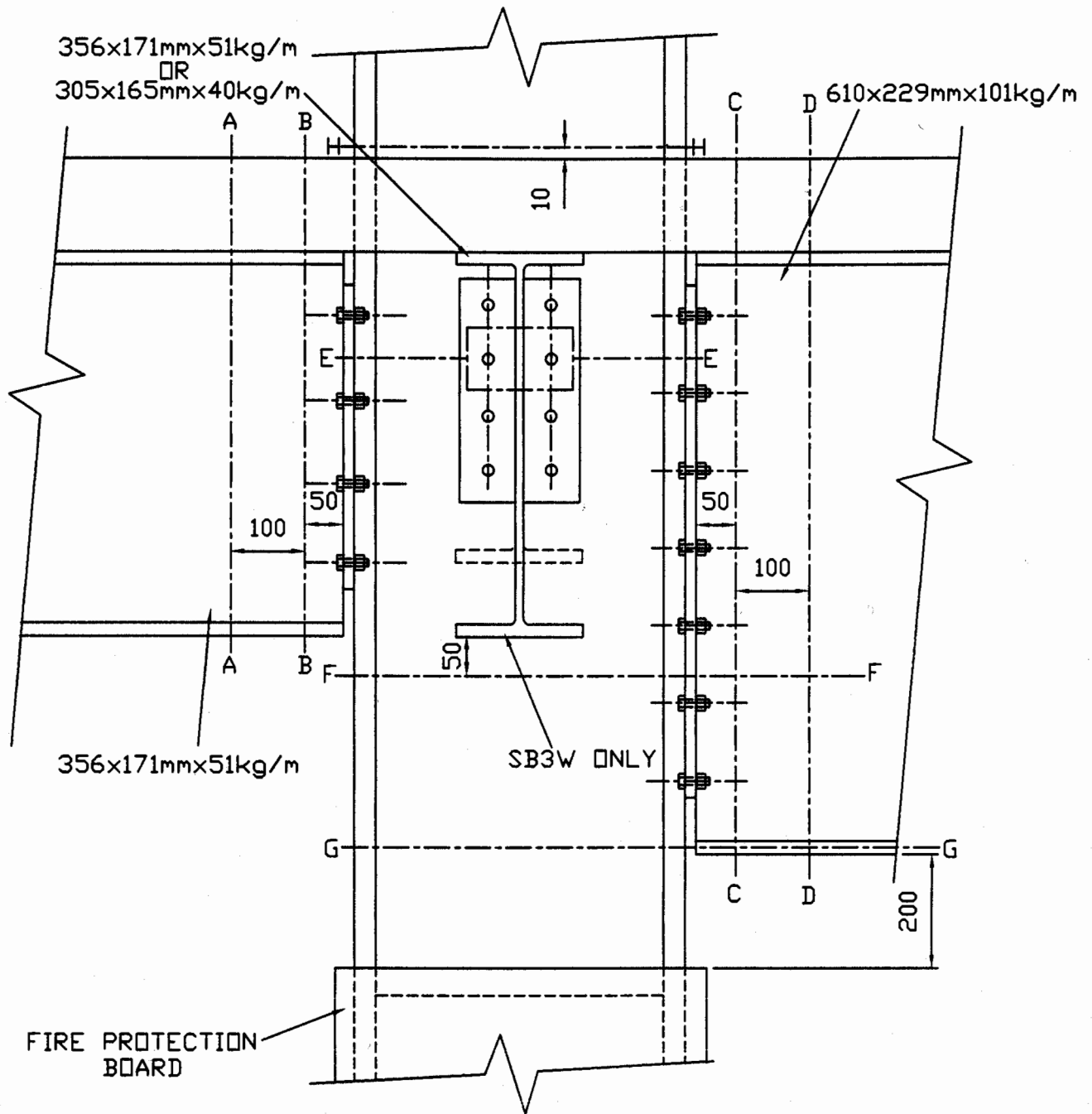


SECTION D-D
BETWEEN 3rd AND 4th BOLTS

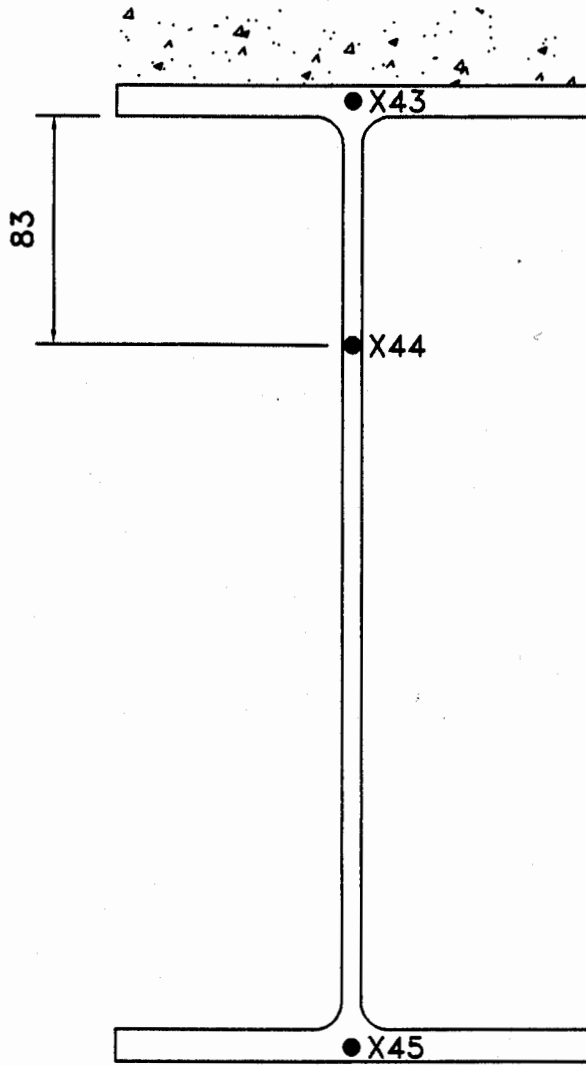


SECTION E-E
IN LINE WITH LOWER FLANGE

DETAIL AT CONNECTION C1 AT COLUMN B1

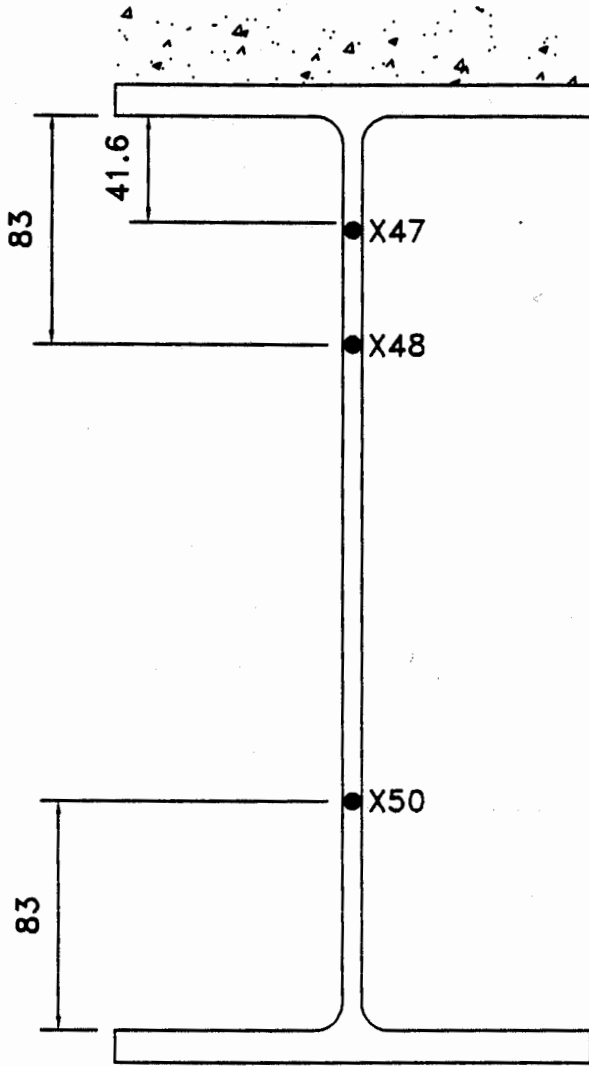


GENERAL ARRANGEMENT OF CONNECTION C2
AT COLUMN B2 VIEWED EAST OR WEST



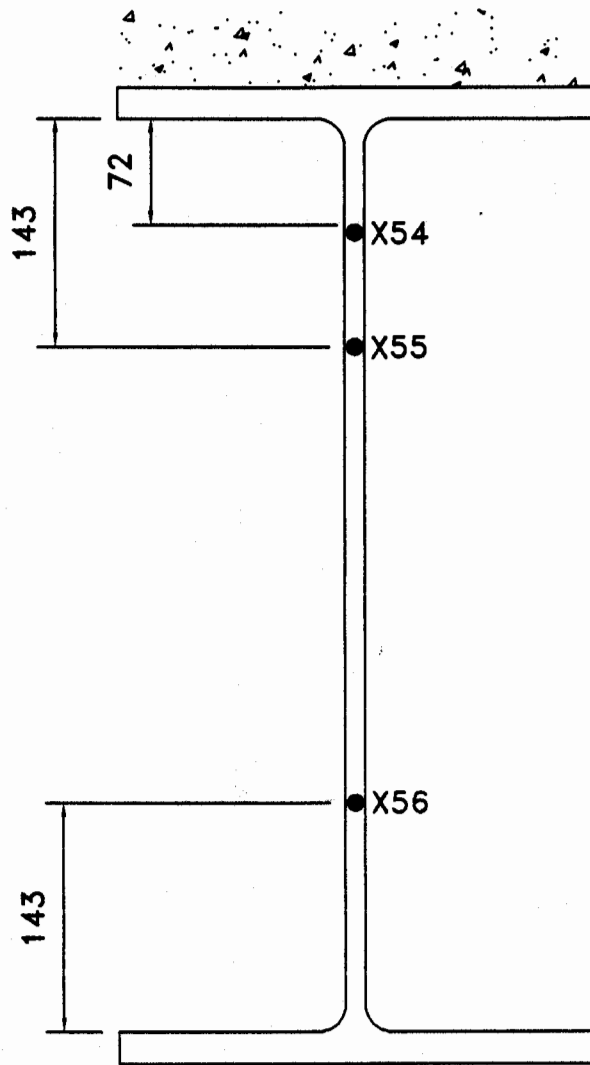
SECTION A-A
150mm FROM
END PLATE

C2-CONNECTION DETAIL AT COLUMN B2
PRIMARY BEAM : 356x171mmx51kg/m
SECTION THROUGH A-A VIEW LOOKING NORTH



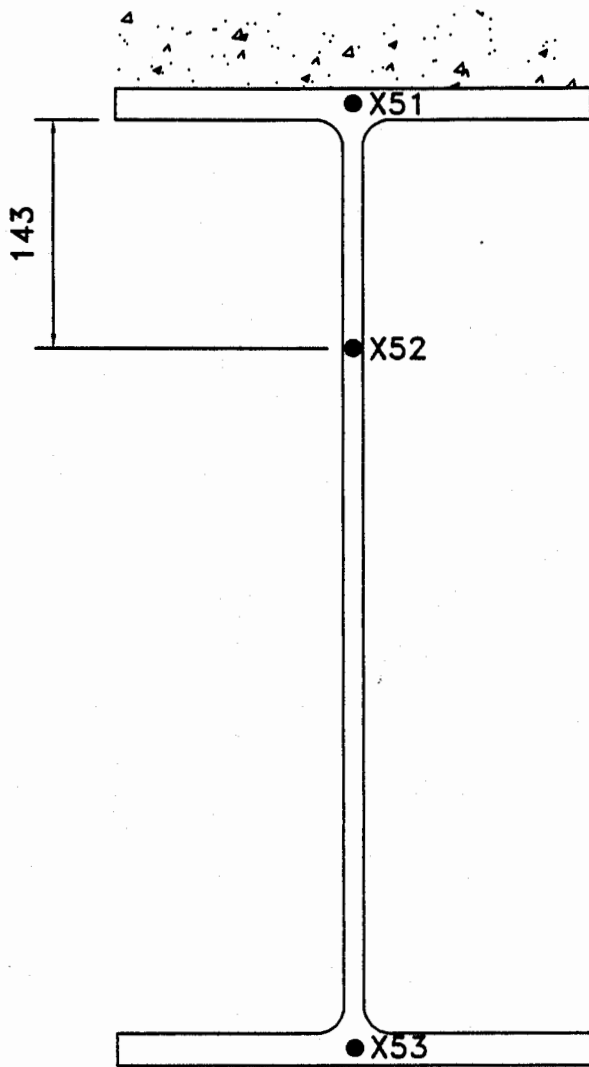
SECTION B-B
50mm FROM
END PLATE

C2-CONNECTION DETAIL AT COLUMN B2
PRIMARY BEAM : 356x171mmx51kg/m
SECTION THROUGH B-B VIEW LOOKING NORTH



SECTION C-C
50mm FROM
END PLATE

C2-CONNECTION DETAIL AT COLUMN B2
PRIMARY BEAM : 610x229mmx101kg/m
SECTION THROUGH C-C VIEW LOOKING SOUTH

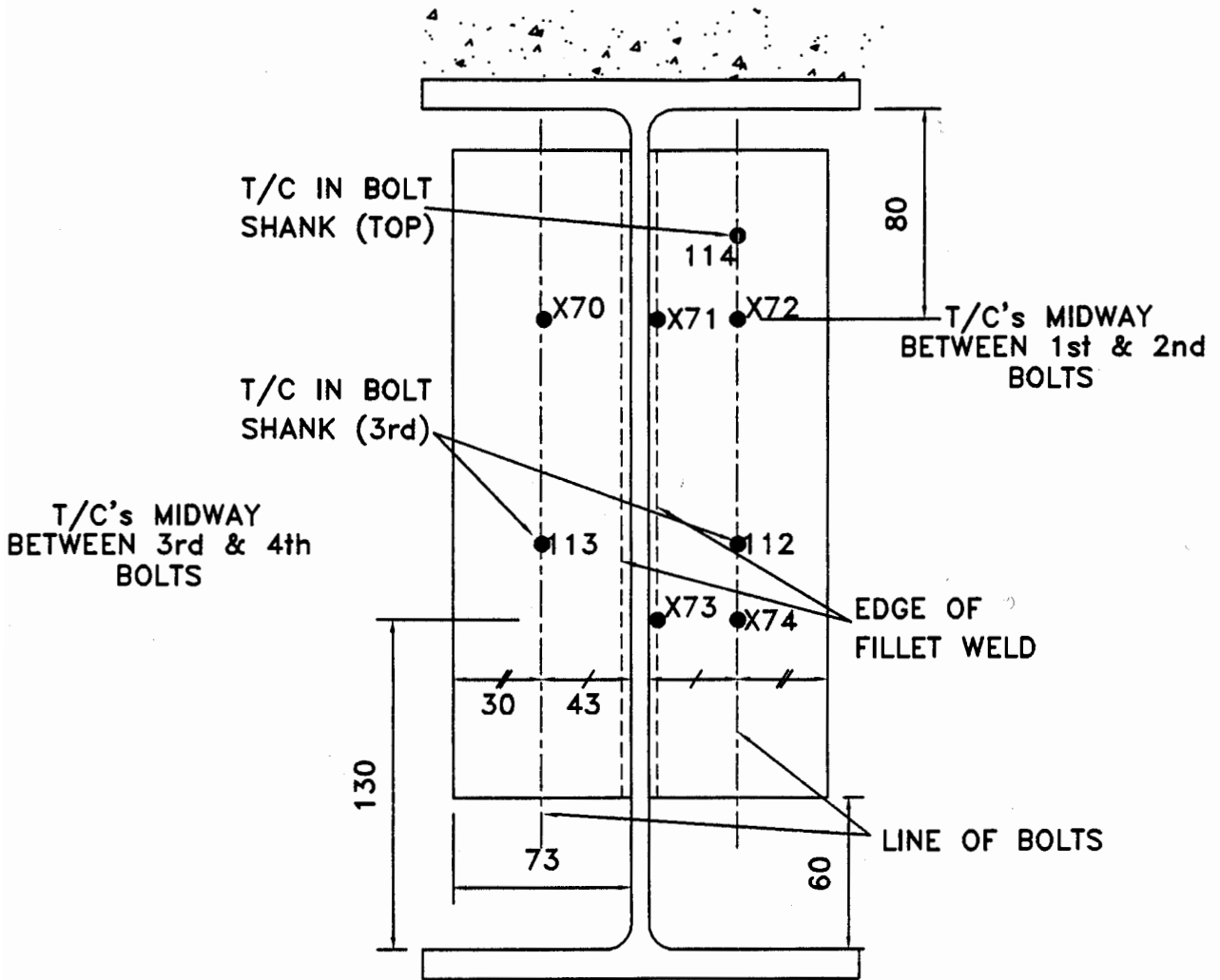


SECTION D-D
150mm FROM
END PLATE

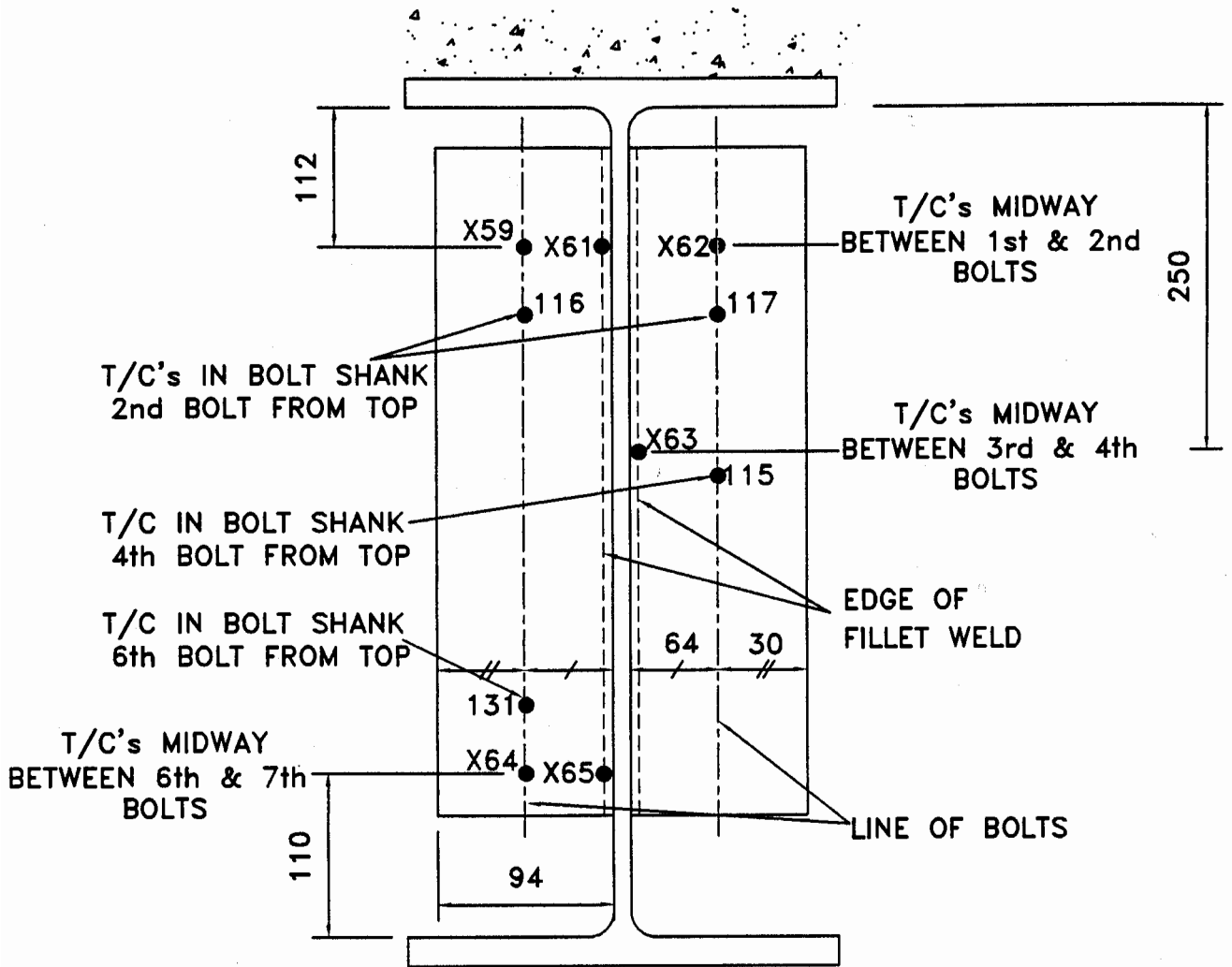
C2-CONNECTION DETAIL AT COLUMN B2
PRIMARY BEAM : 610x229mmx101kg/m
SECTION THROUGH D-D VIEW LOOKING SOUTH

WEST SIDE

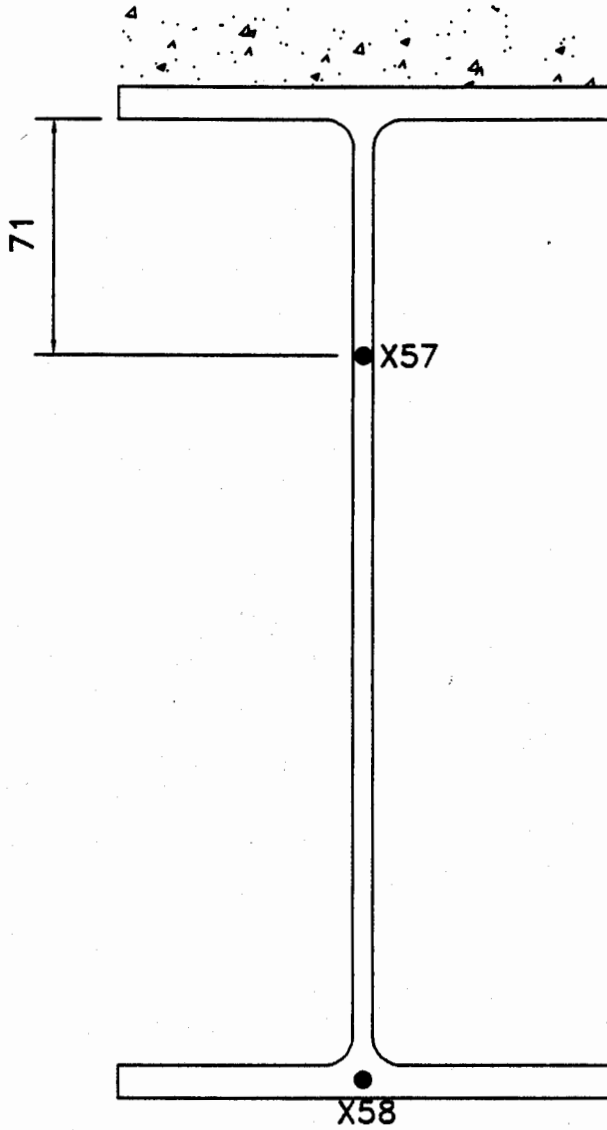
EAST SIDE



C2-CONNECTION DETAIL AT COLUMN B2
PRIMARY BEAM : 356x171mmx51kg/m (PB2)
VIEW LOOKING NORTH

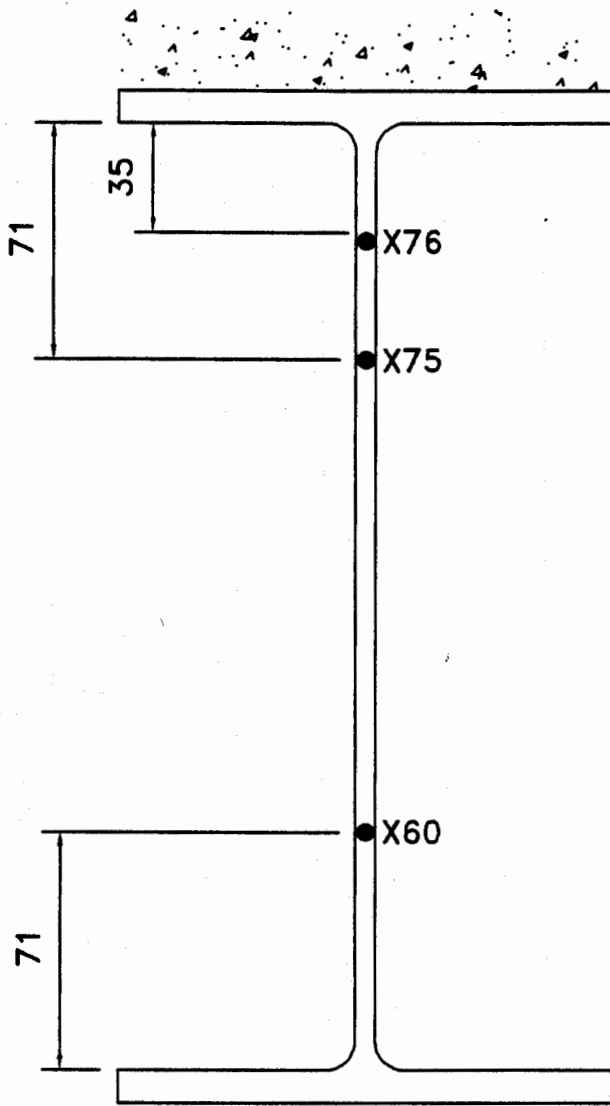


C2-CONNECTION DETAIL AT COLUMN B2
 PRIMARY BEAM : 610x229x101kg/m (PB2)
 VIEW LOOKING SOUTH



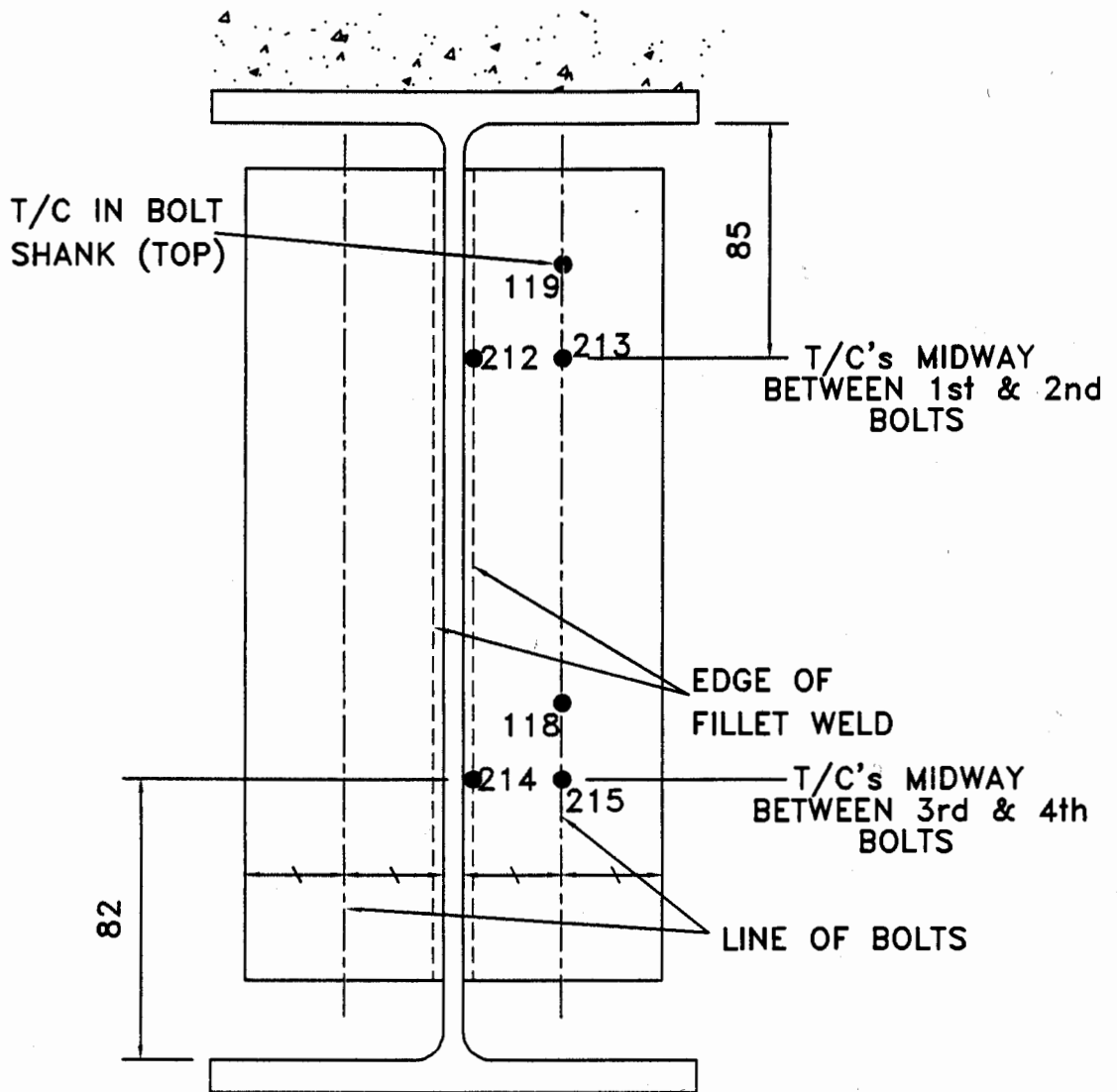
150mm FROM
END PLATE

C2-CONNECTION DETAIL AT COLUMN B2
SECONDARY BEAM : 305x165mmx40kg/m (SB3E)
VIEW LOOKING WEST

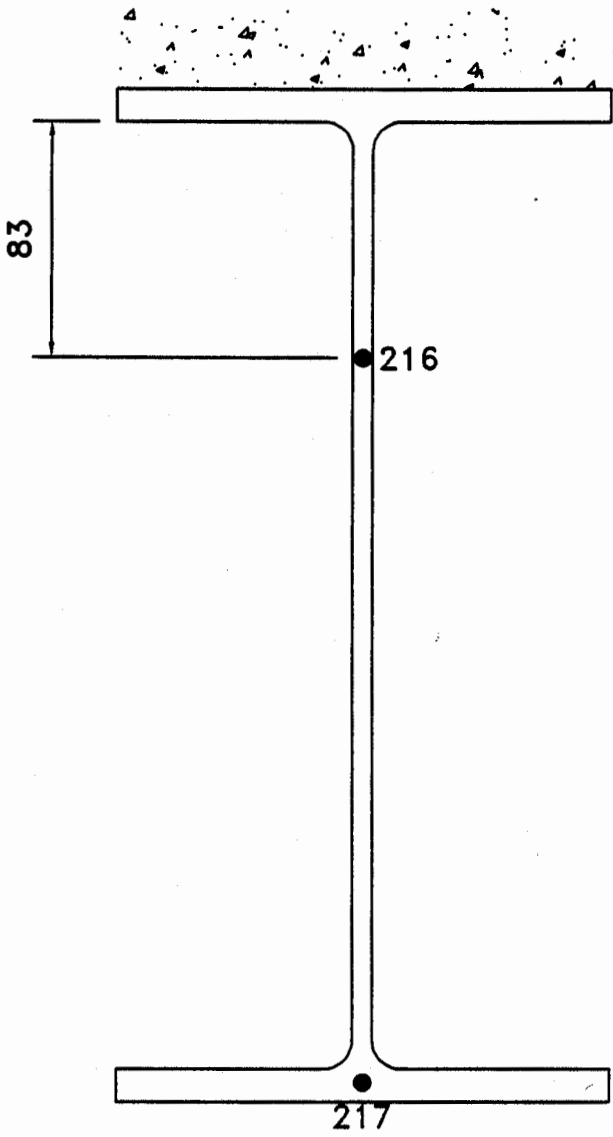


50mm FROM
END PLATE

C2-CONNECTION DETAIL AT COLUMN B2
SECONDARY BEAM : 305x165mmx40kg/m (SB3E)
VIEW LOOKING WEST

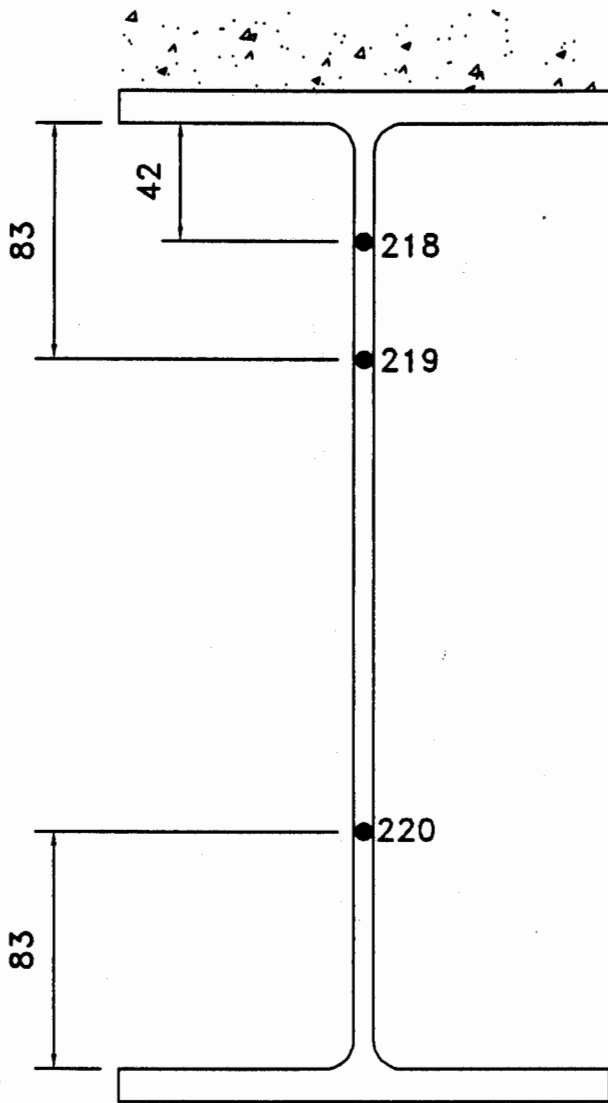


C2-CONNECTION DETAIL AT COLUMN B2
 SECONDARY BEAM : 305x165mmx40kg/m (SB3E)
 VIEW LOOKING WEST



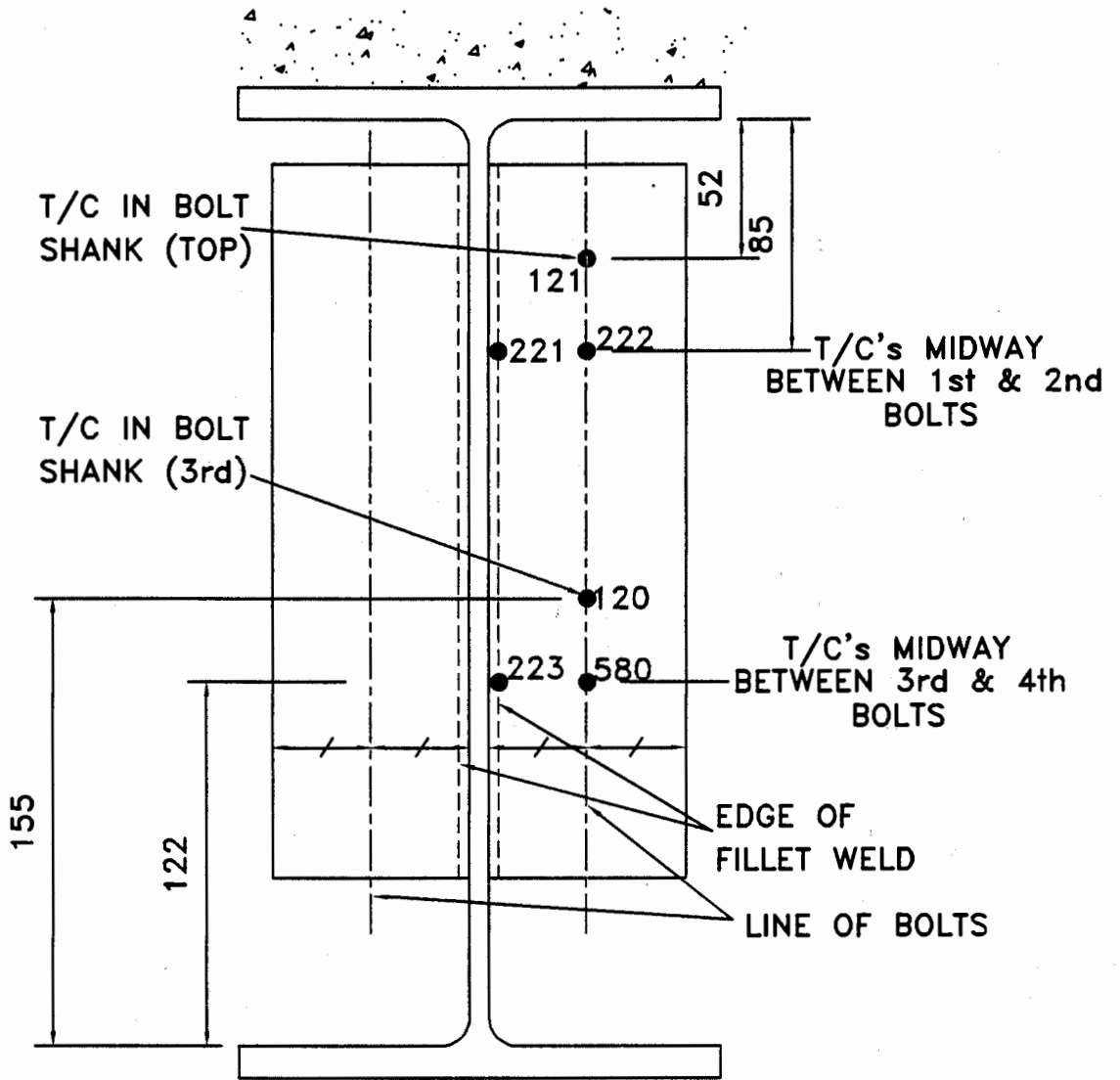
150mm FROM
END PLATE

C2-CONNECTION DETAIL AT COLUMN B2
SECONDARY BEAM : 356x171mmx51kg/m (SB3W)
VIEW LOOKING EAST

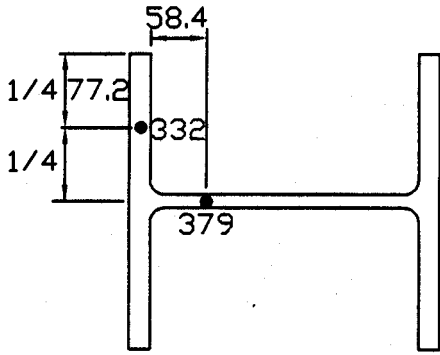


50mm FROM
END PLATE

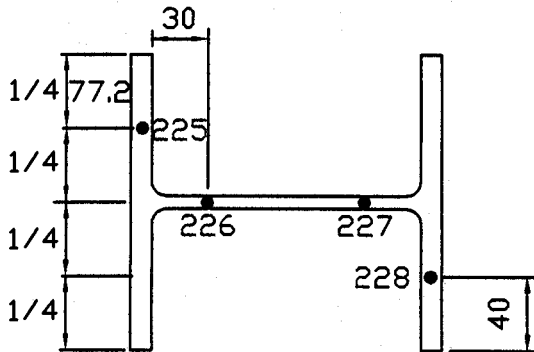
C2-CONNECTION DETAIL AT COLUMN B2
SECONDARY BEAM : 356x171mmx51kg/m (SB3W)
VIEW LOOKING EAST



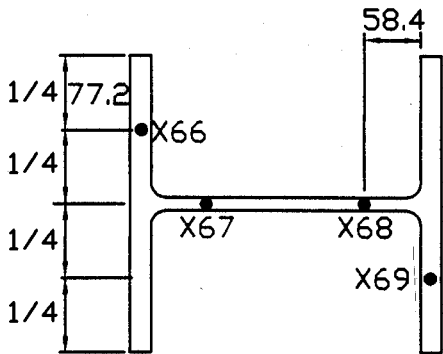
C2-CONNECTION DETAIL AT COLUMN B2
 SECONDARY BEAM : 356x171x51 kg/m (SB3W)
 VIEW LOOKING EAST



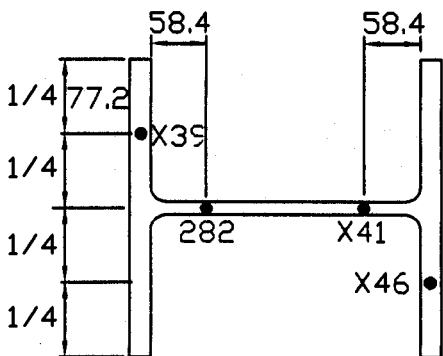
SECTION H-H



SECTION E-E
 POSITION OF FLANGE T/C's
 LOCATED BETWEEN 1st & 2nd BOLTS
 POSITION OF WEB T/C's
 LOCATED BETWEEN 2nd & 3rd BOLTS
 ON SOUTH SIDE AND 1st & 2nd BOLTS
 ON NORTH SIDE

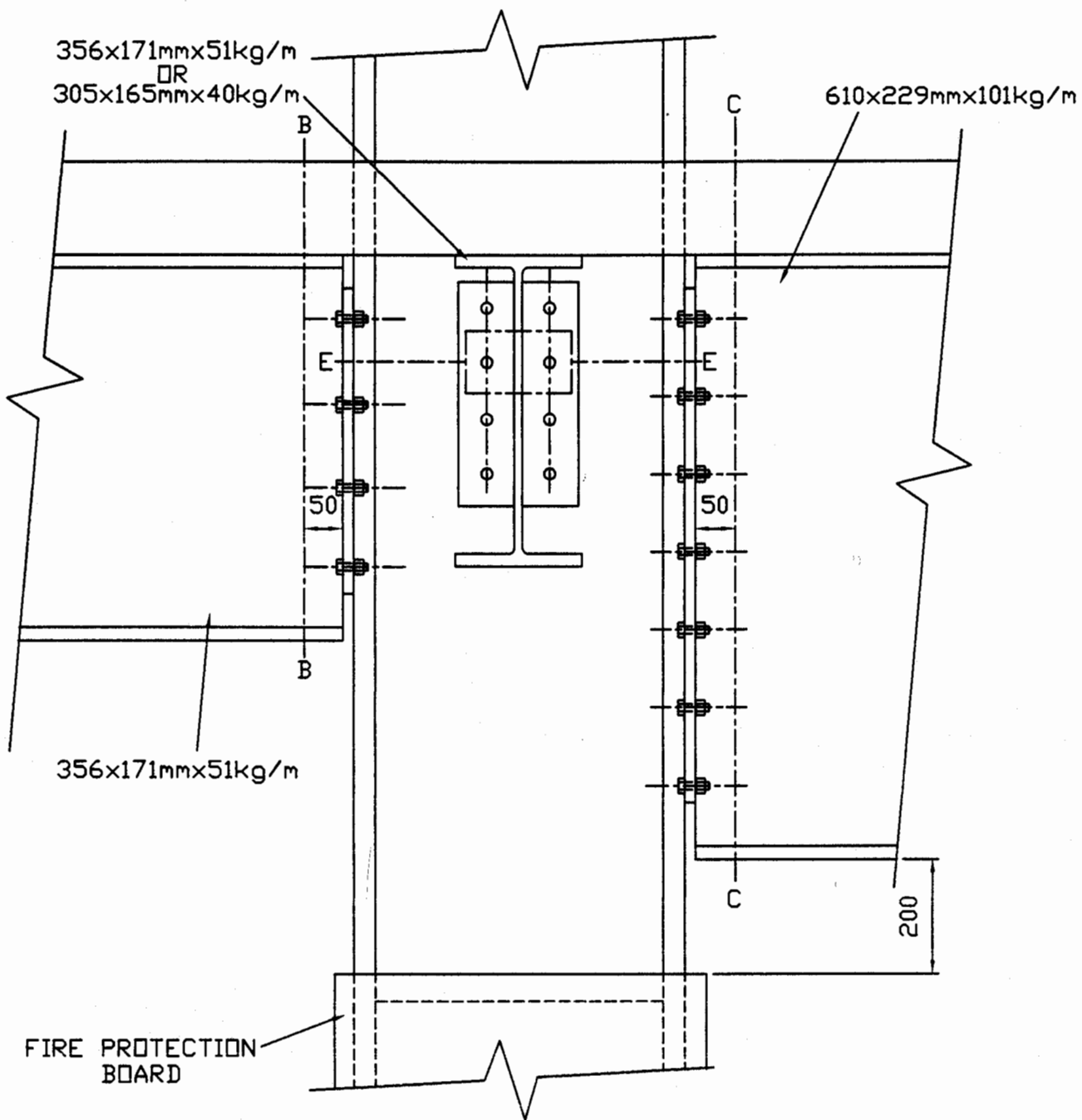


SECTION F-F
 (50mm BELOW LOWER FLANGE OF
 356x171mmx51kg/m PRIMARY BEAM)

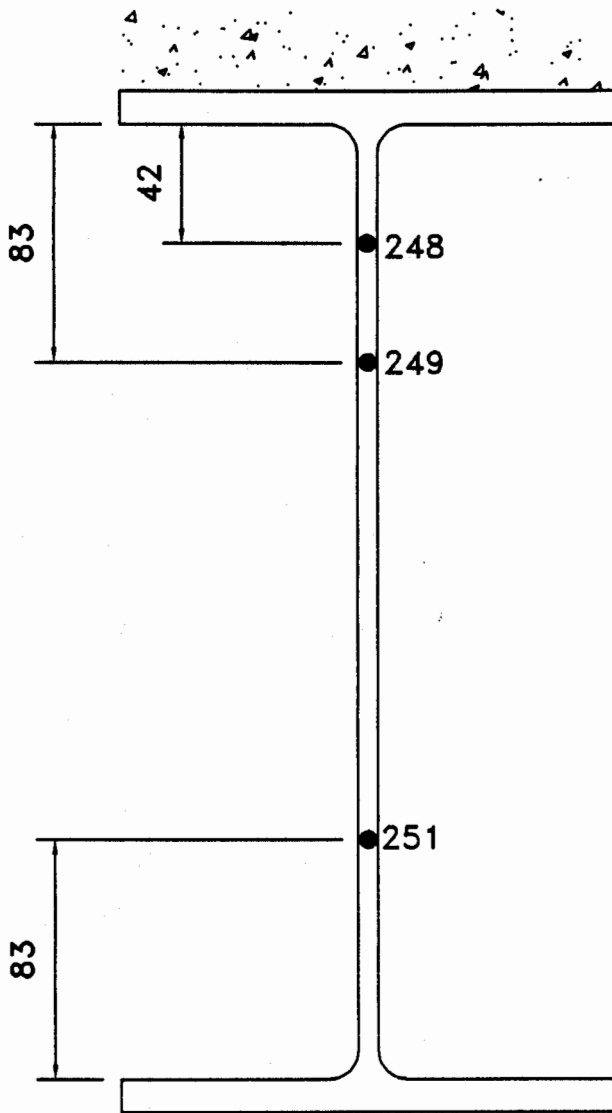


SECTION G-G
 (T/C's IN LINE WITH LOWER FLANGE
 OF 610x101kg/m PRIMARY BEAM)

DETAIL AT CONNECTION C2 ON COLUMN B2

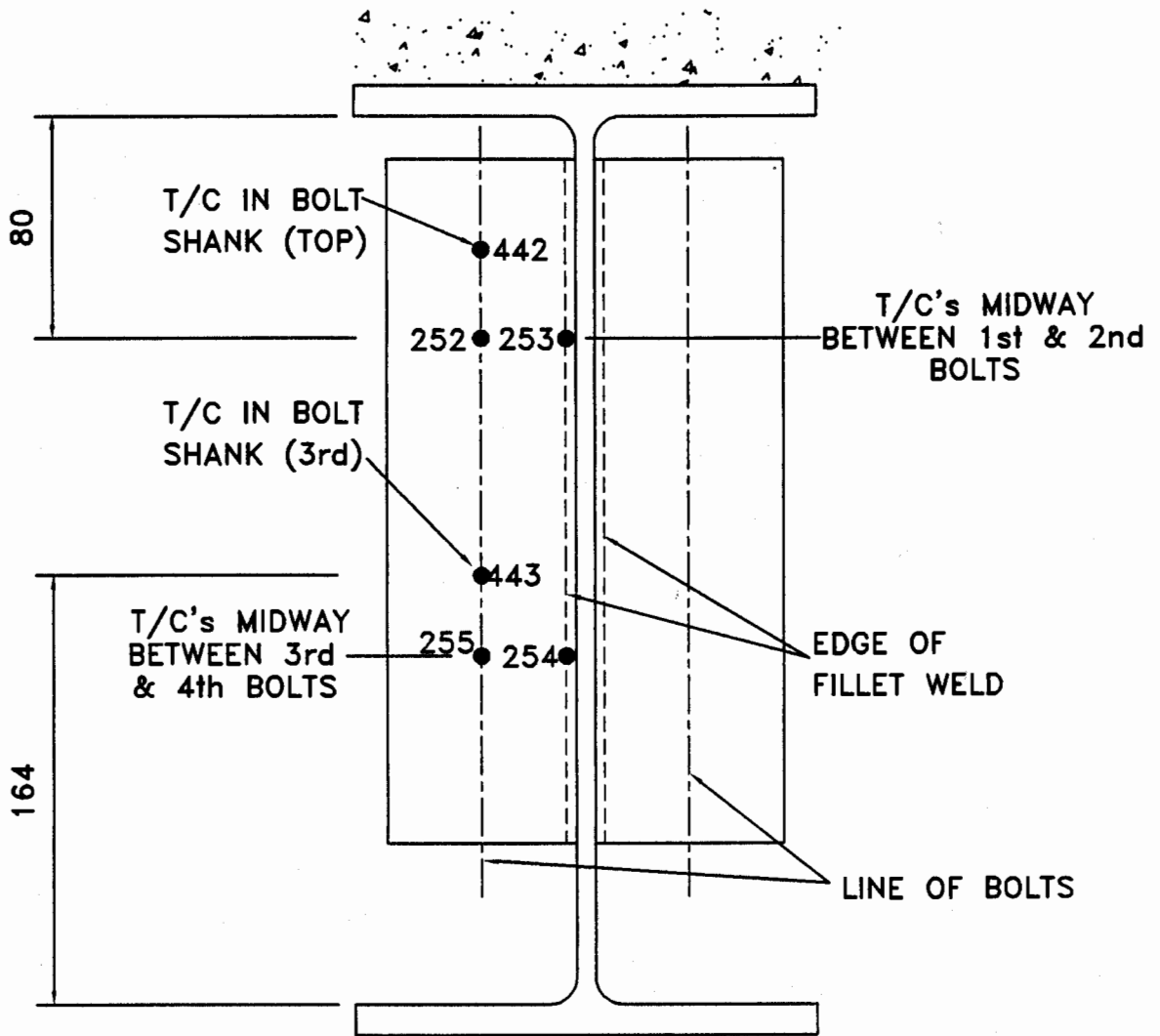


GENERAL ARRANGEMENT OF CONNECTION C3
 AT COLUMN B3 VIEWED EAST

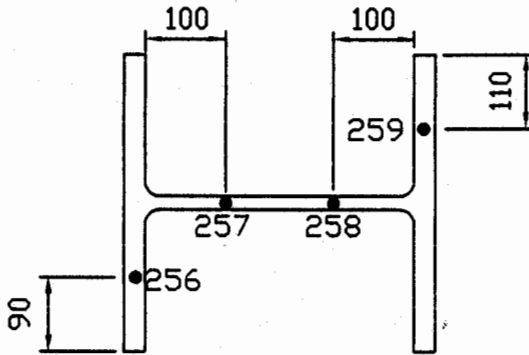
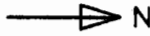


SECTION B-B
50mm FROM
END PLATE

C3-CONNECTION DETAIL AT COLUMN B3
PRIMARY BEAM : 356x171mmx51kg/m
SECTION THROUGH B-B VIEW LOOKING SOUTH



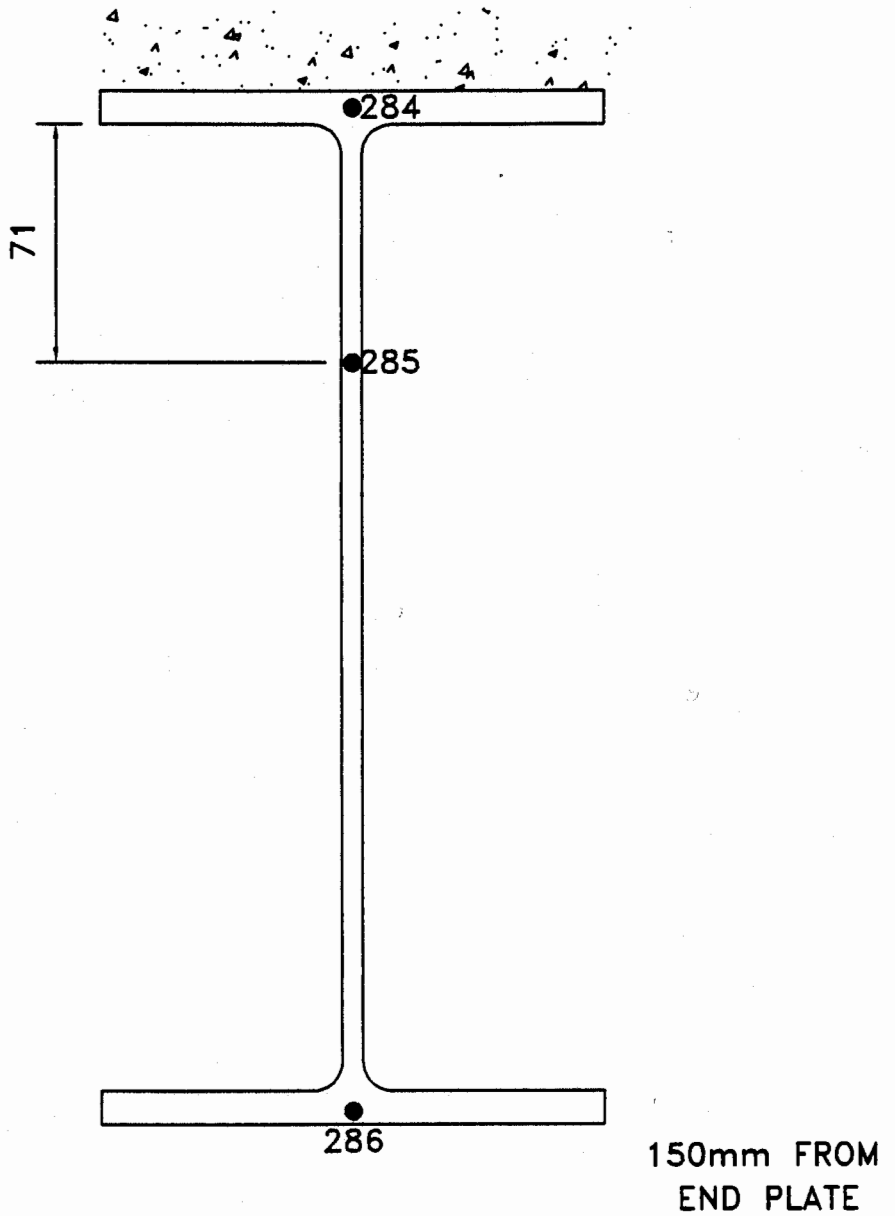
C3-CONNECTION DETAIL AT COLUMN B3
 PRIMARY BEAM : 356x171mmx51kg/m (PB3)
 VIEW LOOKING SOUTH



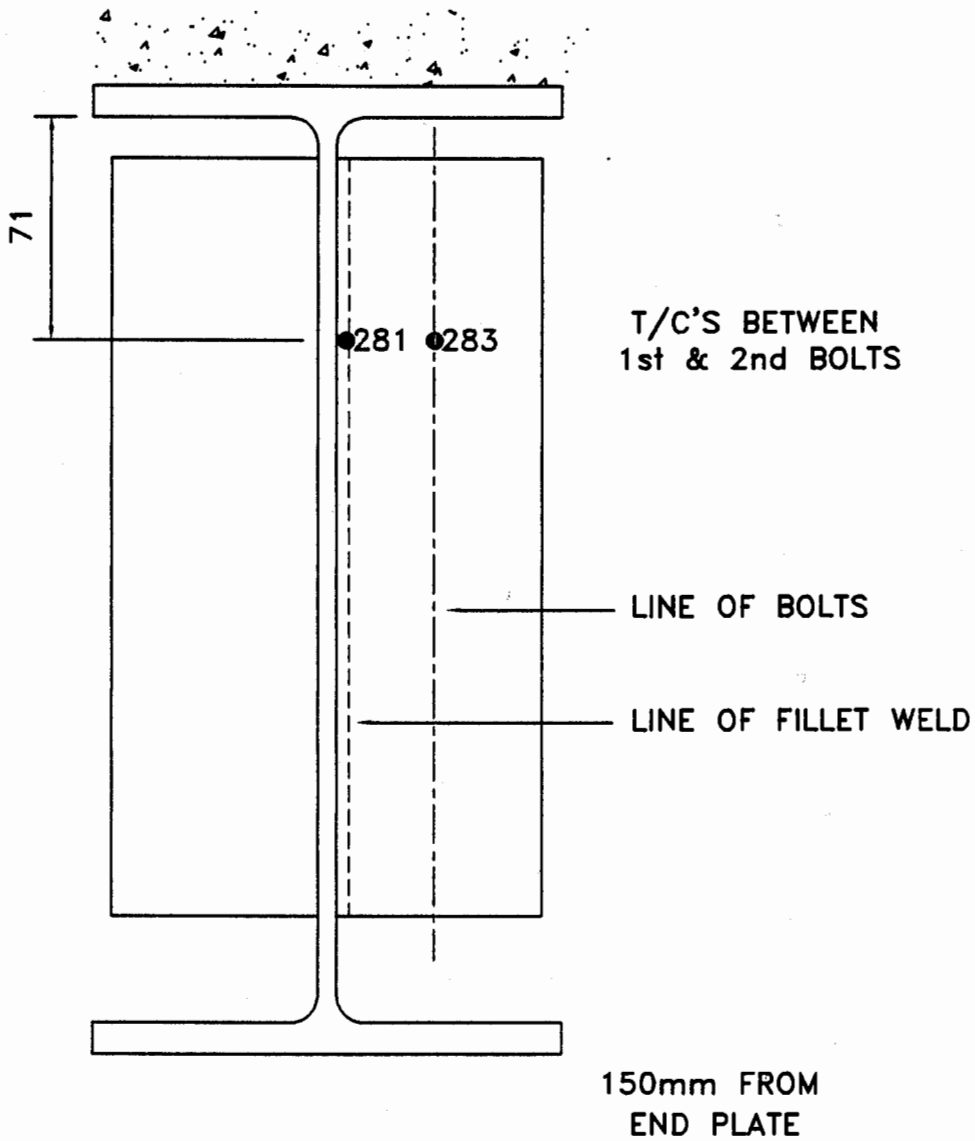
SECTION E-E

POSITION OF FLANGE T/C's
LOCATED BETWEEN 1st & 2nd BOLTS
POSITION OF WEB T/C's
LOCATED BETWEEN 2nd & 3rd BOLTS
ON NORTH SIDE AND 1st & 2nd BOLTS
ON SOUTH SIDE

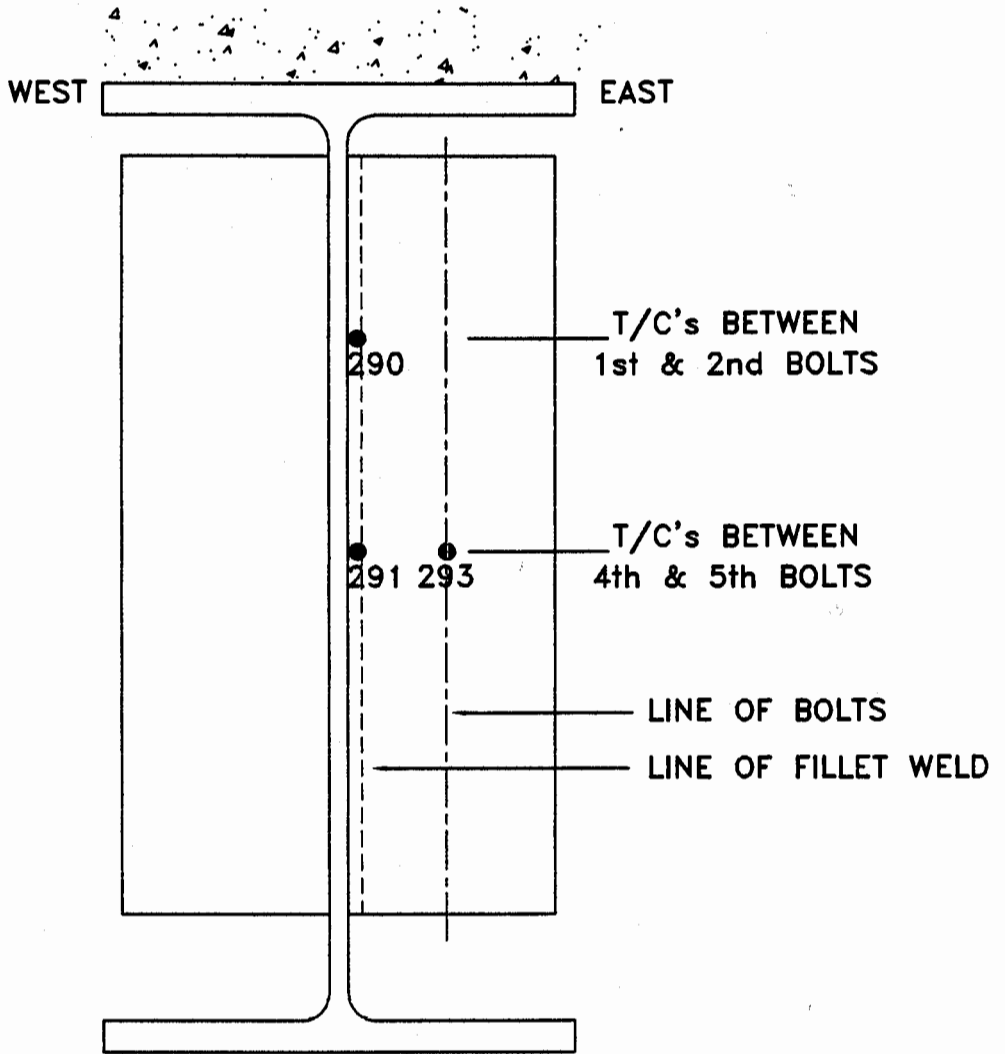
DETAIL AT CONNECTION C3 ON COLUMN B3



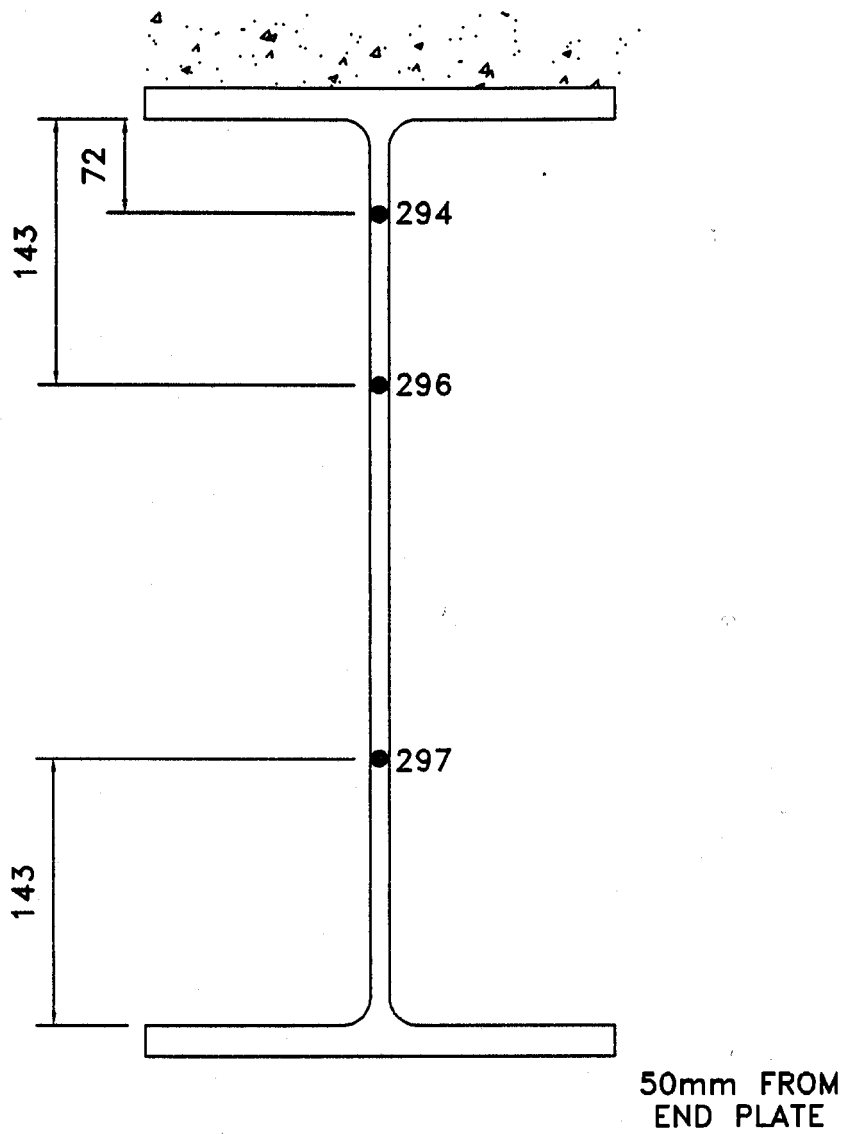
CONNECTION DETAIL AT COLUMN B3
SECONDARY BEAM (SB6E) : 305x165mmx40kg/m
VIEW LOOKING WEST



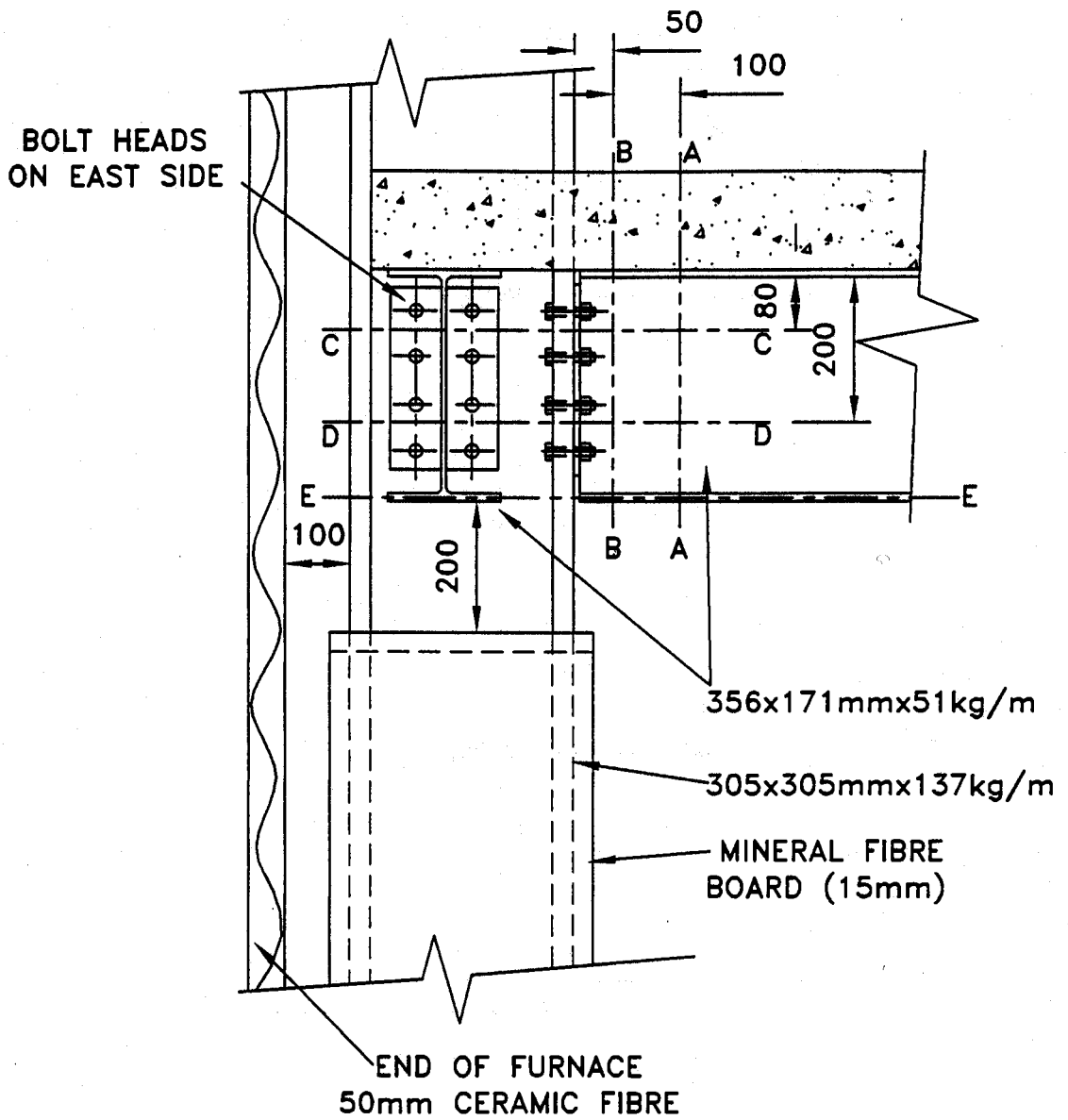
CONNECTION DETAIL AT COLUMN B3
 SECONDARY BEAM (SB6E) : 305x165mmx40kg/m
 VIEW LOOKING WEST



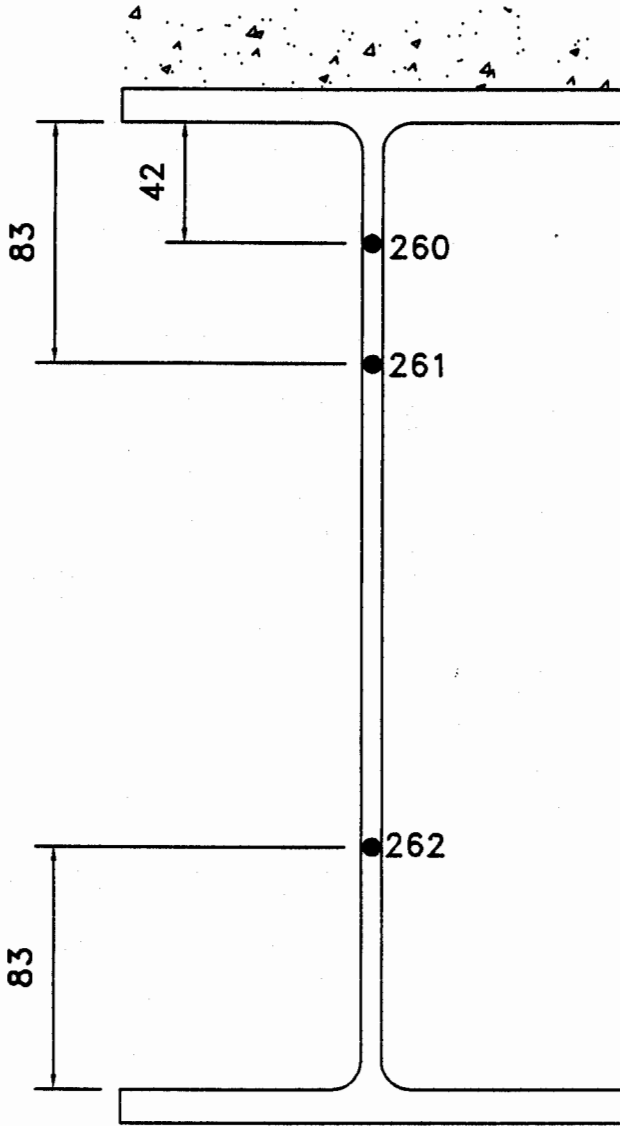
C3-CONNECTION DETAIL AT COLUMN B3
PRIMARY BEAM (PB5) : 610x229mmx101kg/m
VIEW LOOKING NORTH



C3-CONNECTION DETAIL AT COLUMN B3
PRIMARY BEAM (PB5) : 610x229mmx101kg/m
VIEW LOOKING NORTH

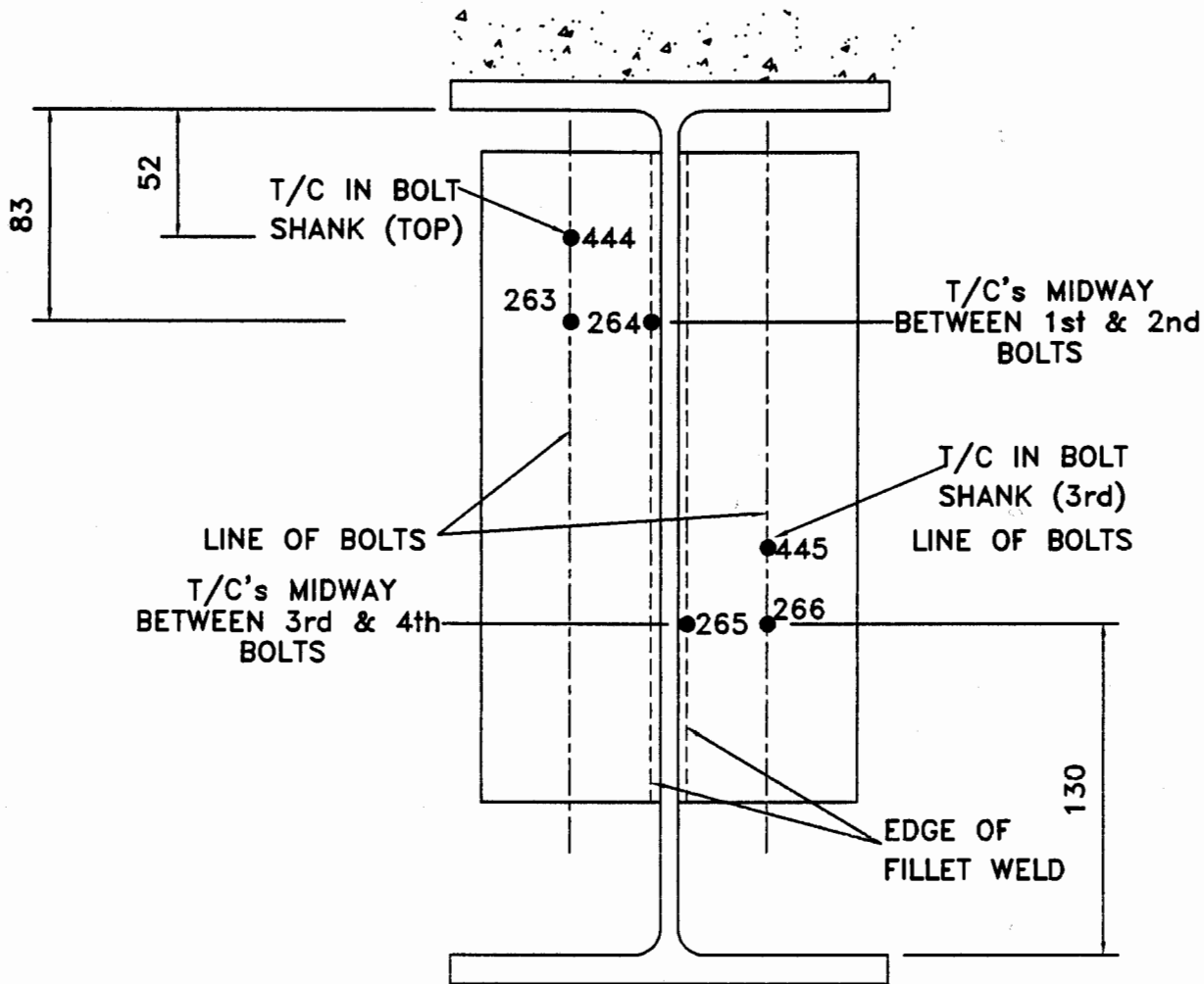


CONNECTIONS C1 AND C4 AT COLUMNS B1 AND B4
 GENERAL ARRANGEMENT VIEWED ON GRID LINES 1(WEST)
 AND 4 (EAST)

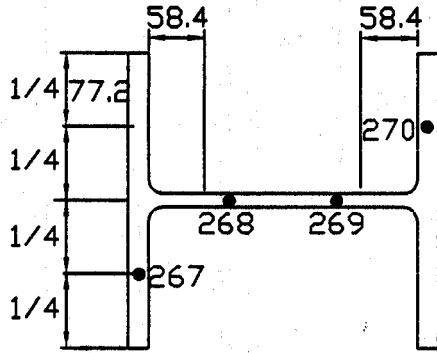
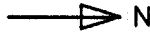


50mm FROM
END PLATE

C4-CONNECTION DETAIL AT COLUMN B4
PRIMARY BEAM : 356x171mmx51kg/m
VIEW LOOKING NORTH



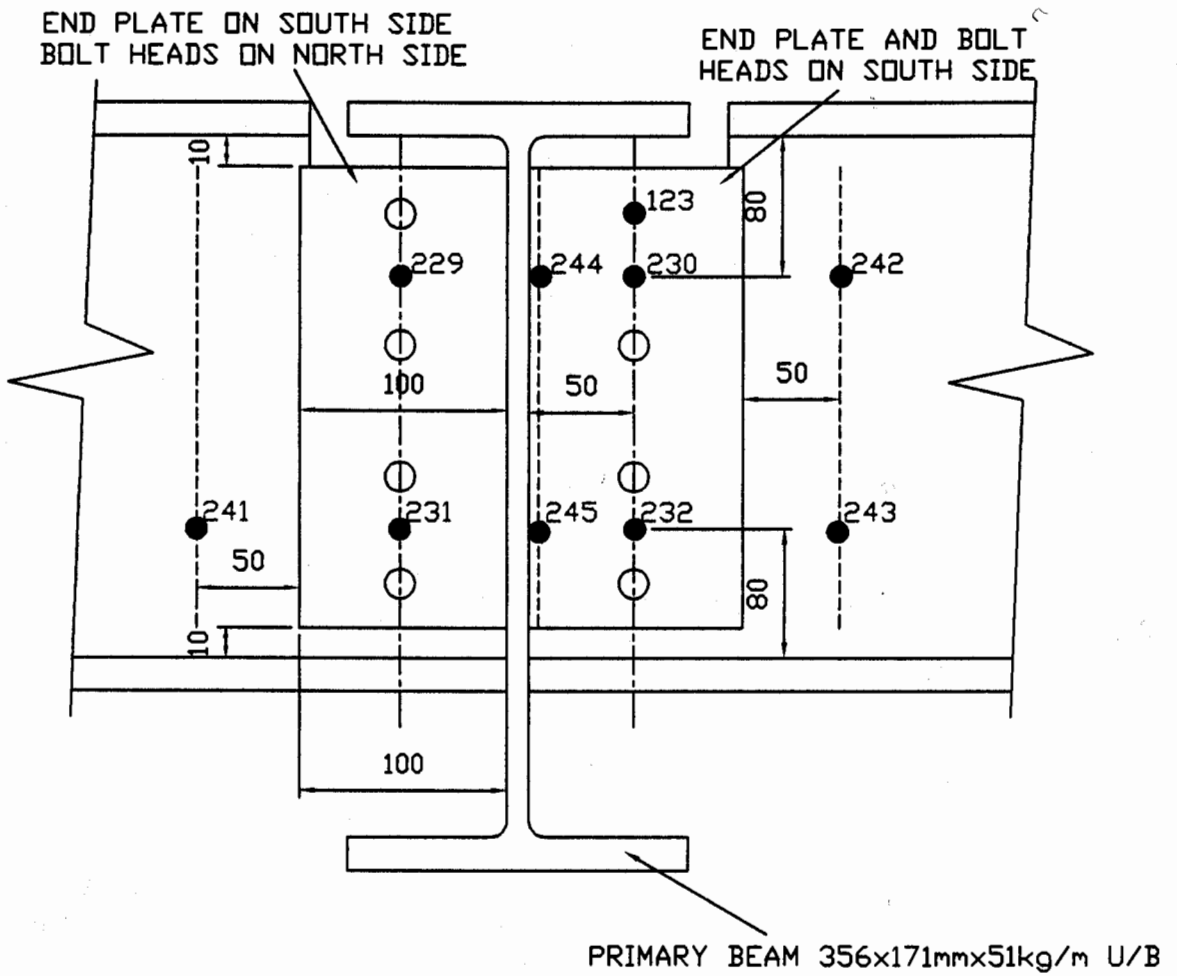
C4-CONNECTION DETAIL AT COLUMN B4
 PRIMARY BEAM : 356x171mmx51kg/m (PB3)
 VIEW LOOKING NORTH



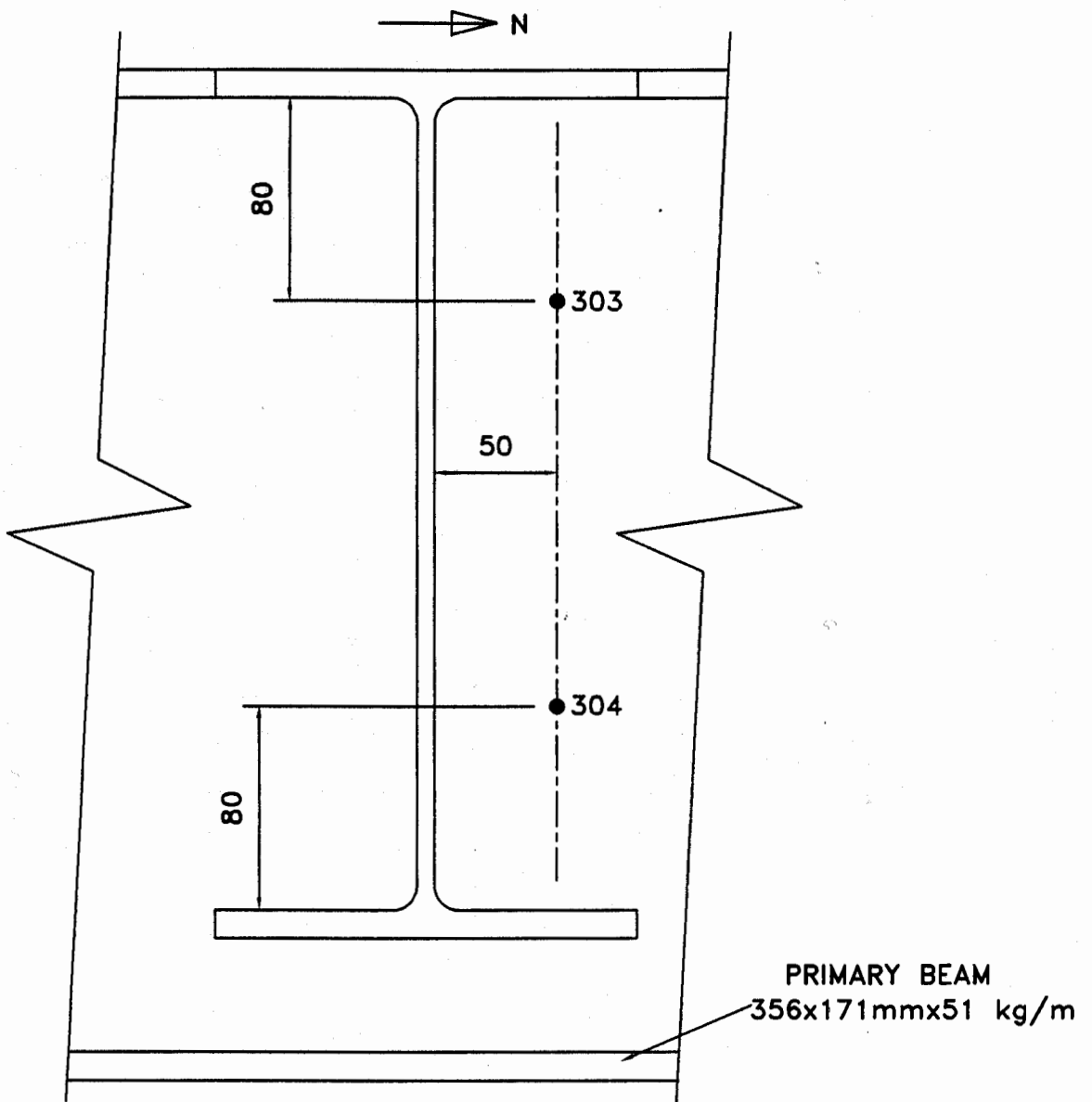
SECTION C-C

BETWEEN 1st & 2nd BOLTS

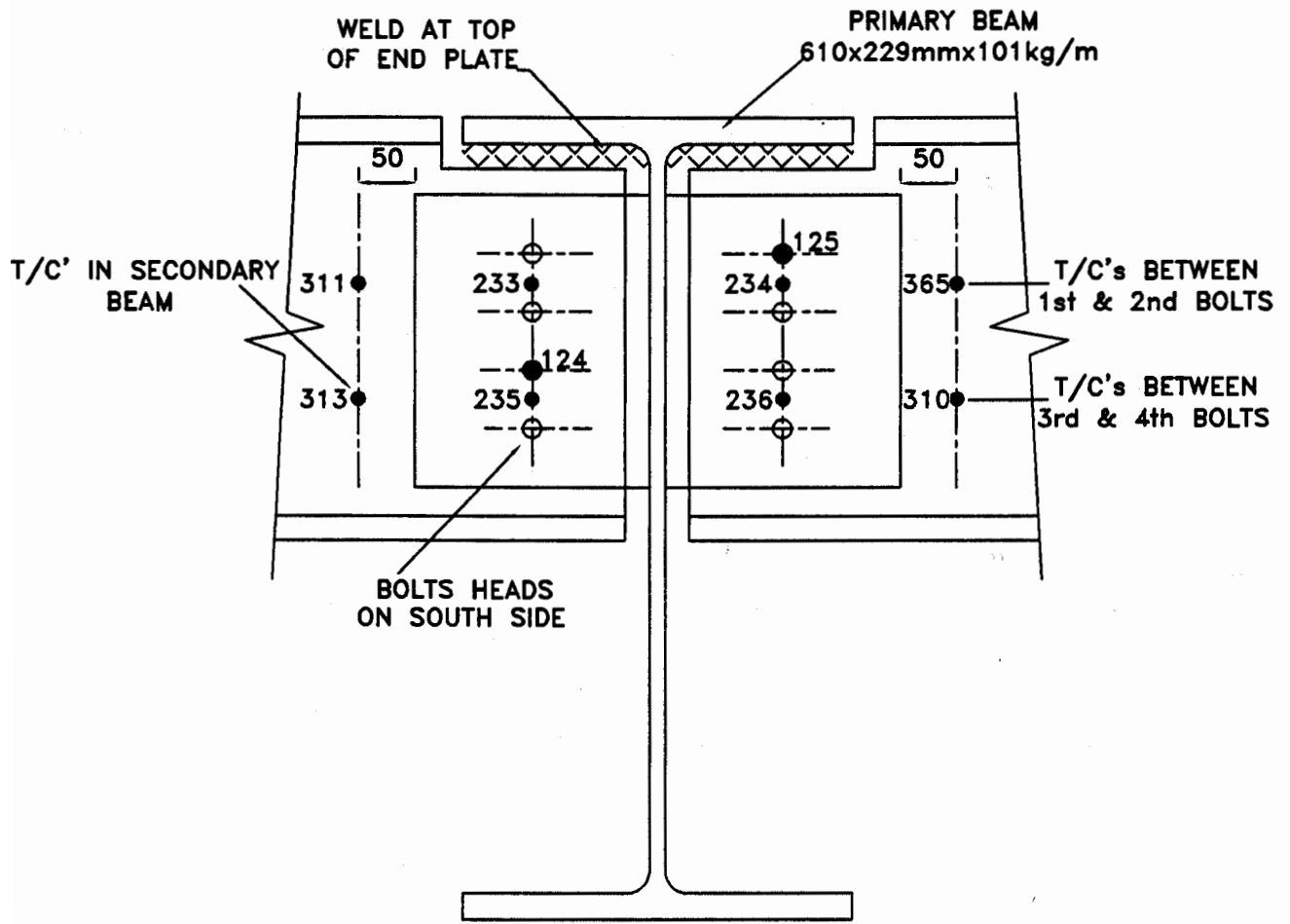
DETAIL AT CONNECTION C4 ON COLUMN B4



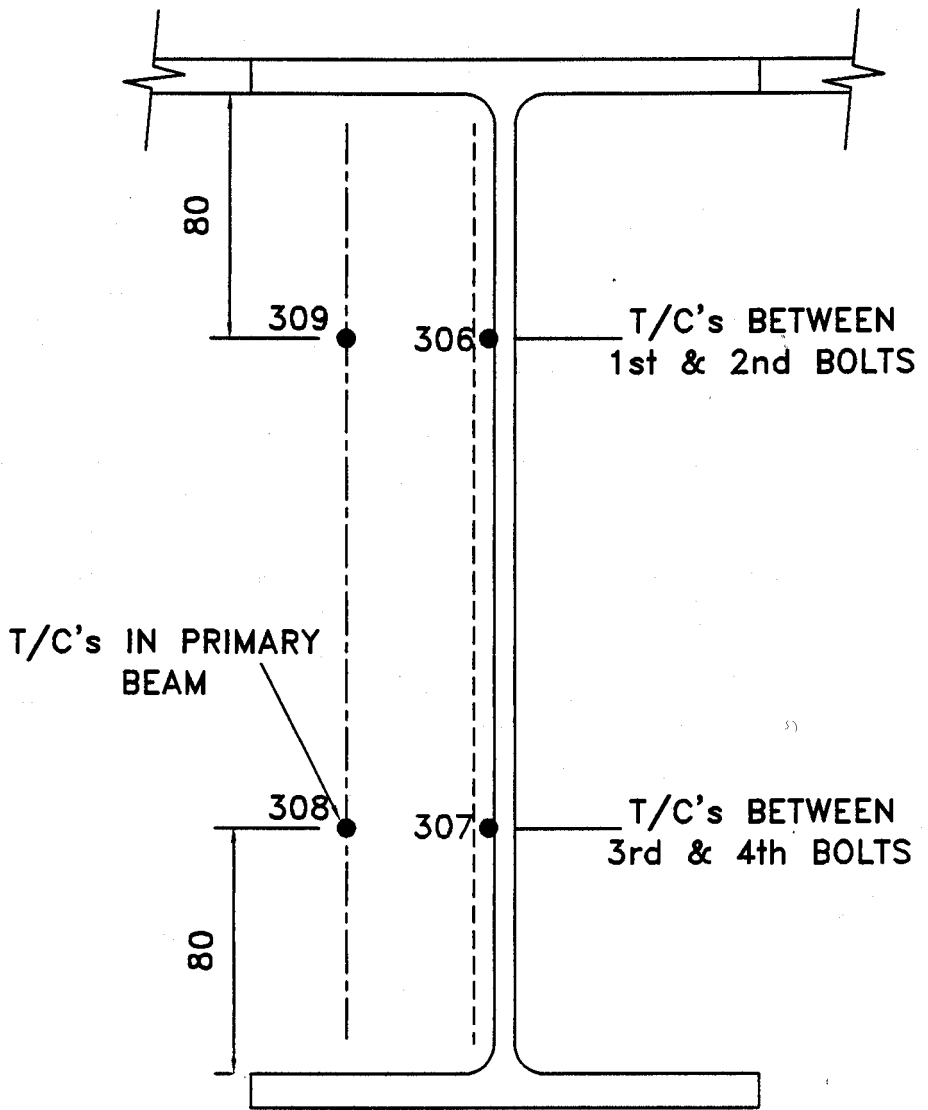
DETAIL AT FIN PLATE CONNECTION AT C1A
VIEW ON GRID LINE B LOOKING SOUTH



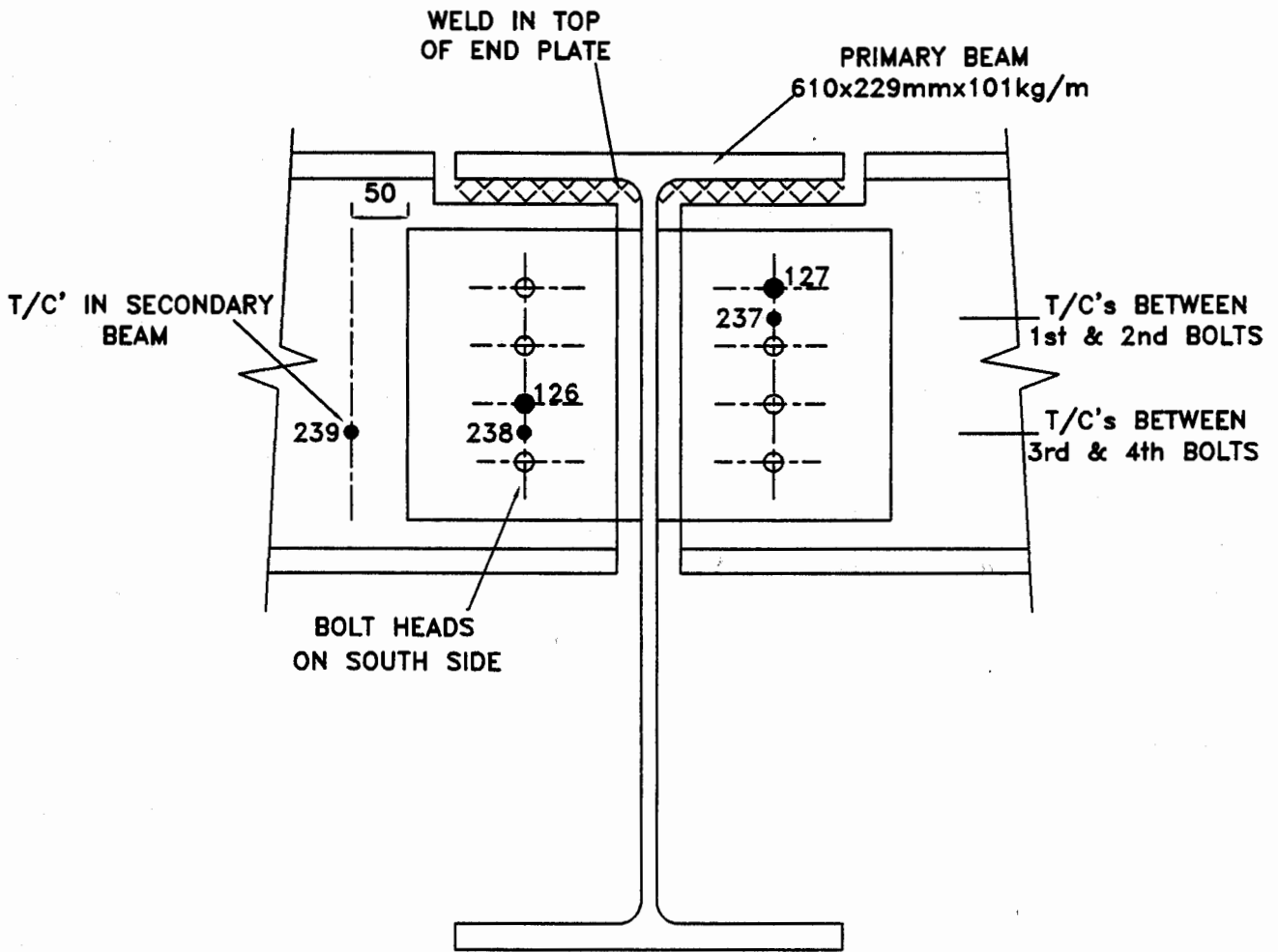
DETAIL AT FIN PLATE CONNECTION AT C1A
VIEW LOOKING WEST



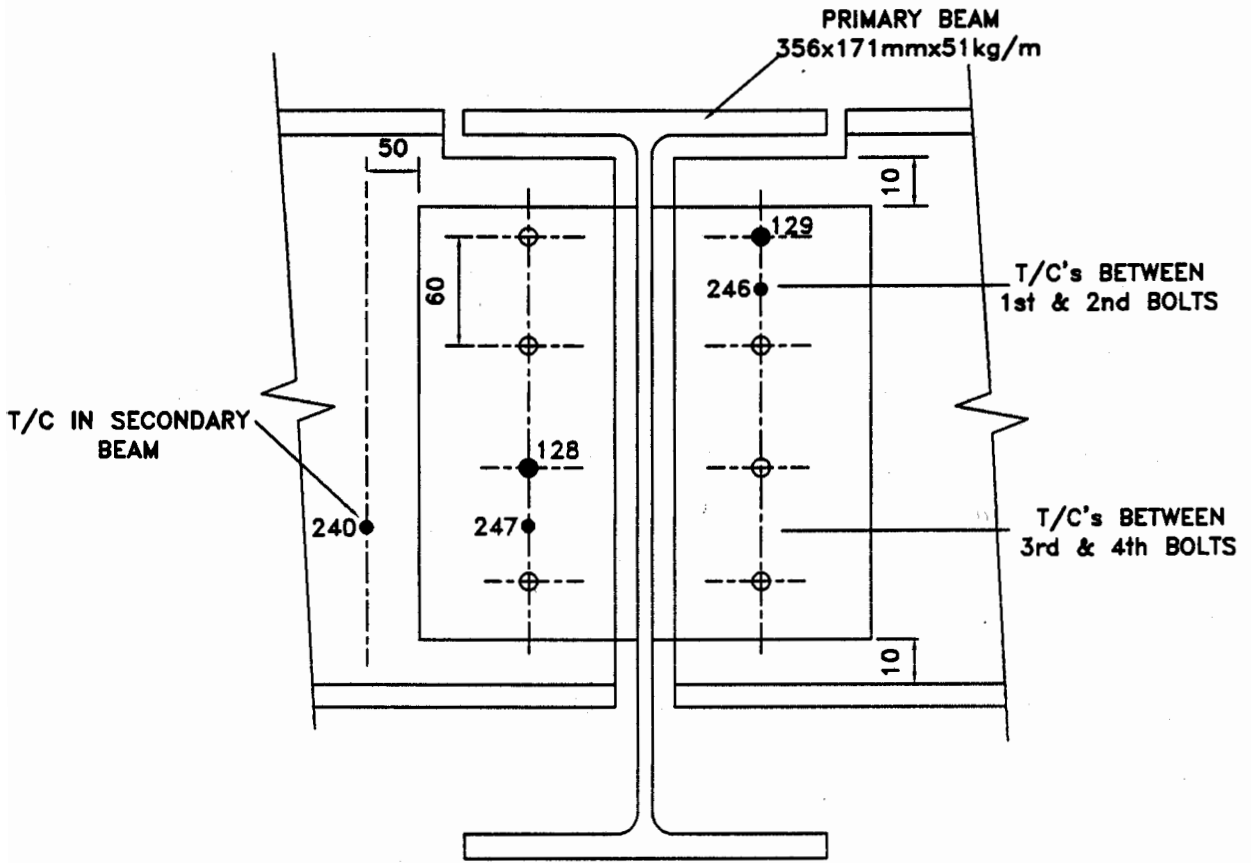
DETAIL AT FIN PLATE CONNECTION AT C2A
VIEW LOOKING NORTH



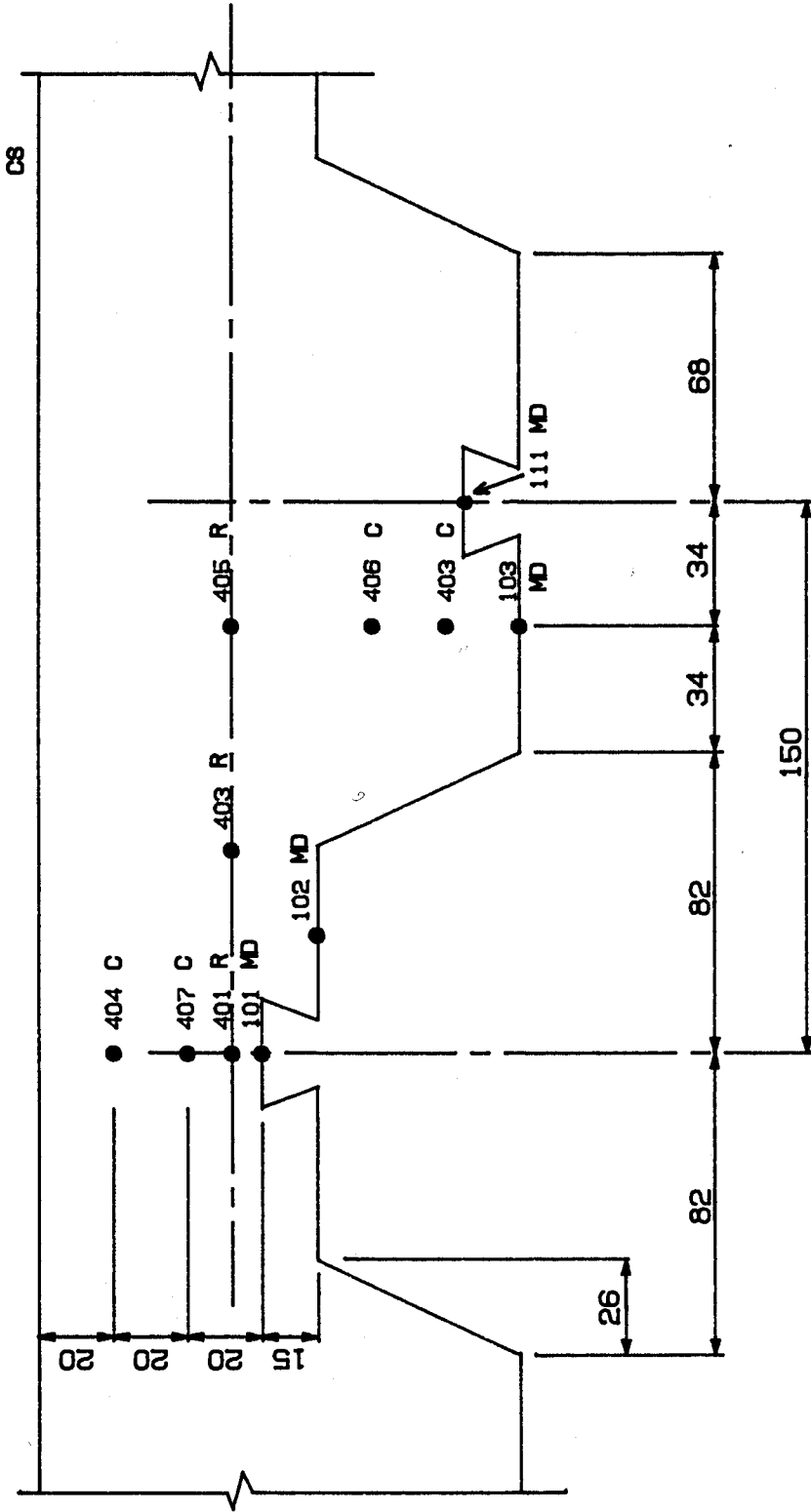
DETAIL AT FIN PLATE CONNECTION AT C2B
VIEW LOOKING WEST



DETAIL AT FIN PLATE CONNECTION AT C2B
VIEW ON GRID LINE B LOOKING NORTH



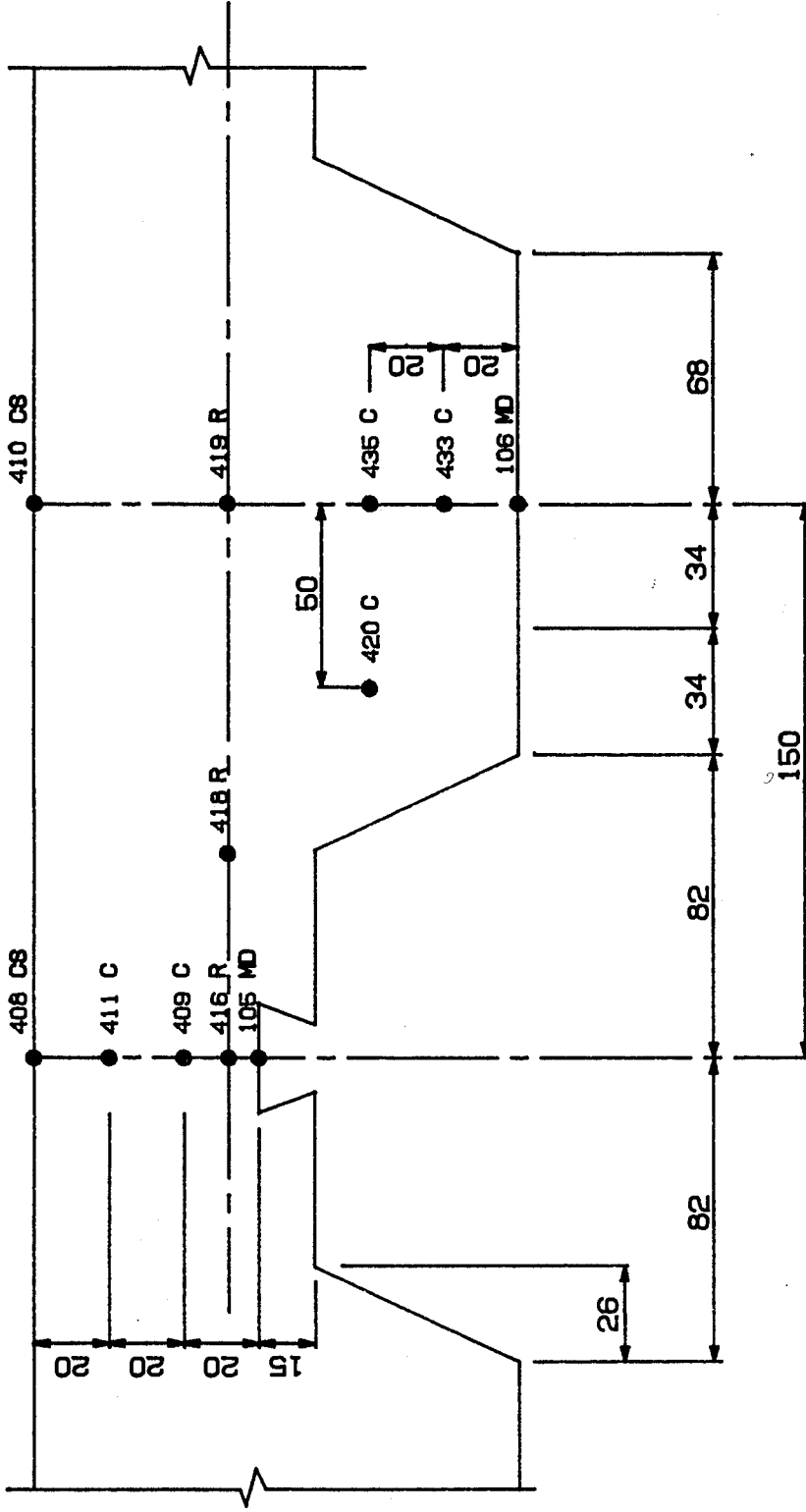
DETAIL AT FIN PLATE CONNECTION AT C3A
VIEW ON GRID LINE B LOOKING NORTH



- KEY
- 1. C - CONCRETE SURFACE
 - 2. C8 - CONCRETE SURFACE
 - 3. MD - METAL DECK
 - 4. R - REINFORCEMENT

11 THERMOCOUPLES

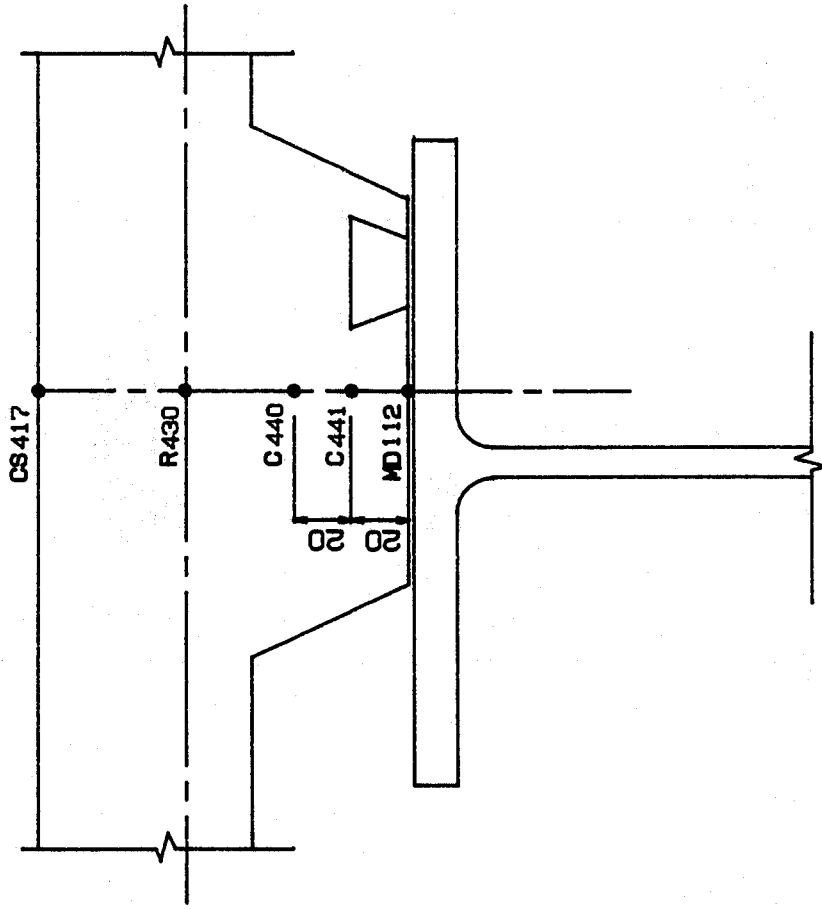
CONCRETE SLAB THERMOCOUPLE LOCATIONS
CS1



KEY
 C - CONCRETE
 1. CS - CONCRETE SURFACE
 2. MD - METAL DECK
 3. MD - METAL DECK
 4. R - REINFORCEMENT

12 THERMOCOUPLES

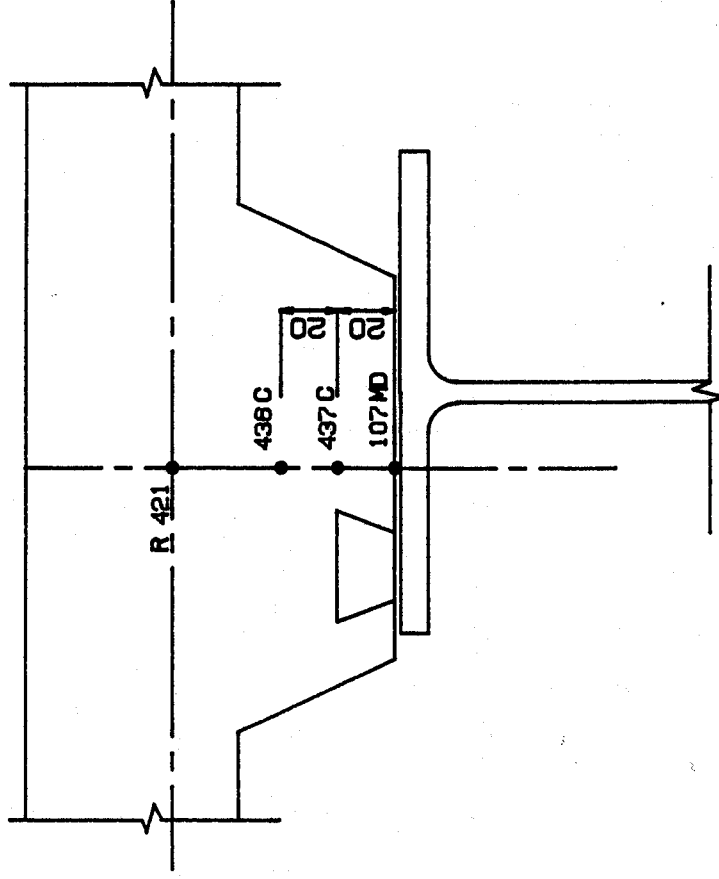
CONCRETE SLAB THERMOCOUPLE LOCATIONS
 CS2 :



KEY
 C - CONCRETE SURFACE
 1. CS - CONCRETE SURFACE
 2. MD - METAL DECK
 3. R - REINFORCEMENT

5 THERMOCOUPLES

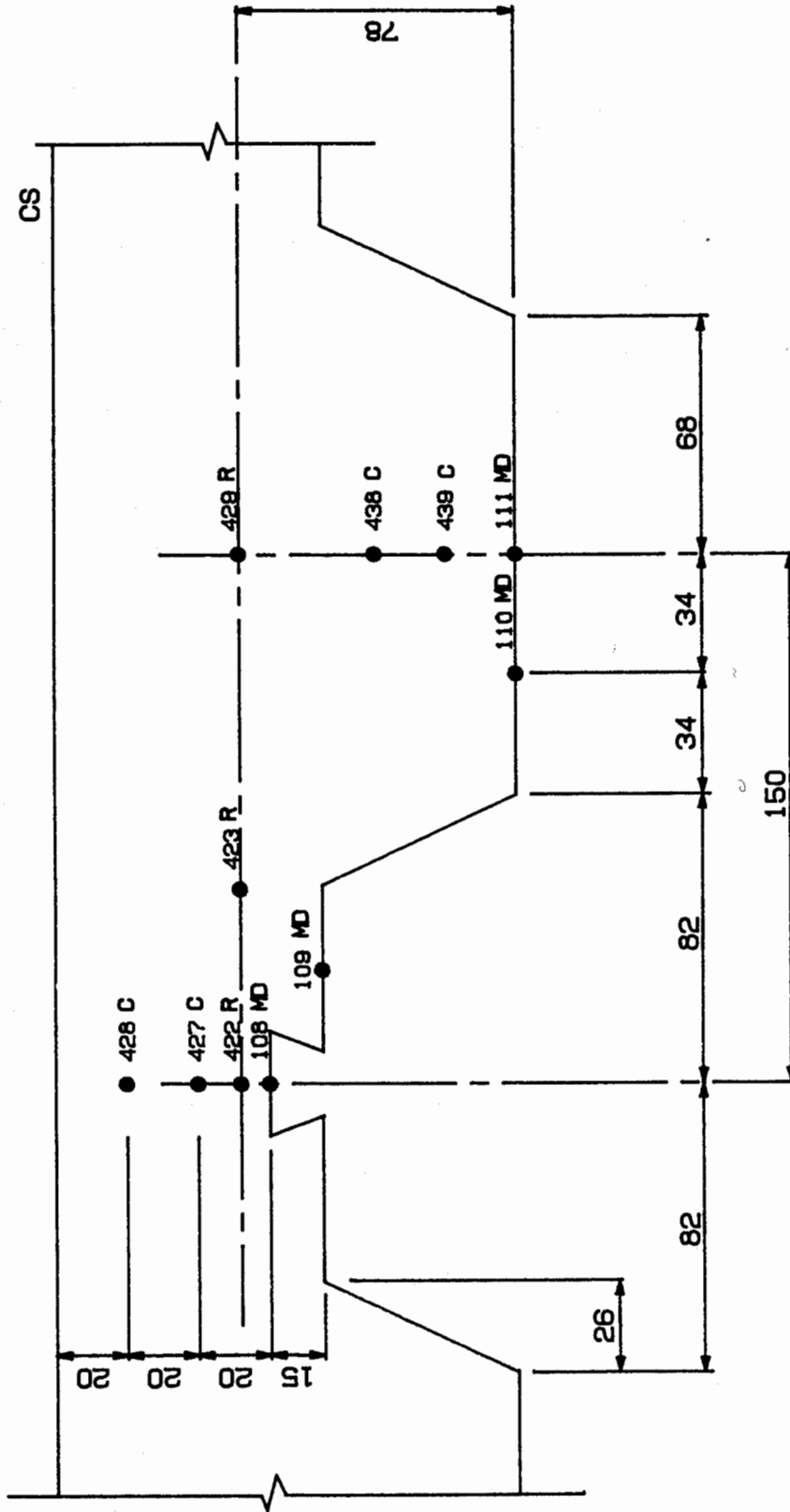
CONCRETE/BEAM THERMOCOUPLE LOCATIONS
 OVER PRIMARY BEAM : CB3
 610x229x101 Kg/m



KEY
 C - CONCRETE SURFACE
 1. CS - CONCRETE SURFACE
 2. MD - METAL DECK
 3. R - REINFORCEMENT

4 THERMOCOUPLES

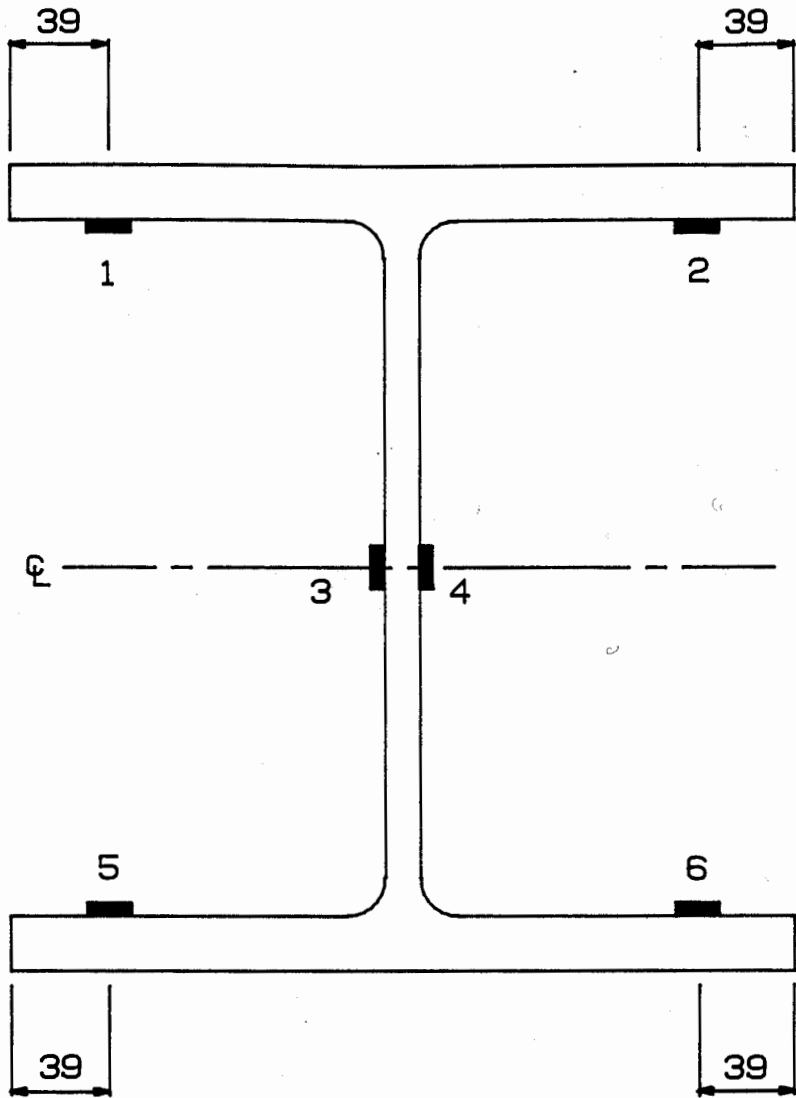
CONCRETE/BEAM THERMOCOUPLE LOCATIONS
 OVER PRIMARY BEAM : CB1
 356x171x51 Kg/m



- KEY
- CONCRETE SURFACE
 - 1. CS - CONCRETE SURFACE
 - 2. MD - METAL DECK
 - 3. R - REINFORCEMENT
 - 4. C - CONCRETE

11 THERMOCOUPLES

CONCRETE/BEAM THERMOCOUPLE LOCATIONS
CB2

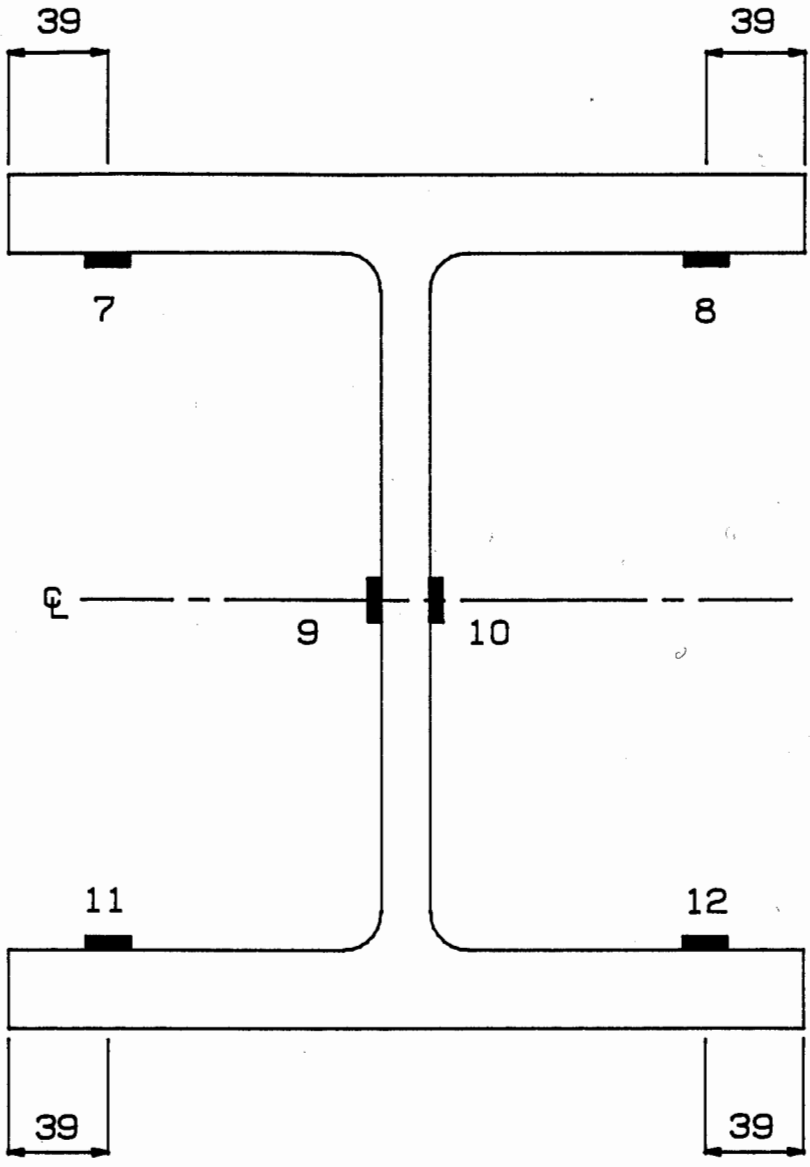


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B4 ON THE
FOURTH FLOOR, 500mm ABOVE THE TEST FLOOR

305x305x137 kg/m

Data File: PRO1 , Figure 2/50

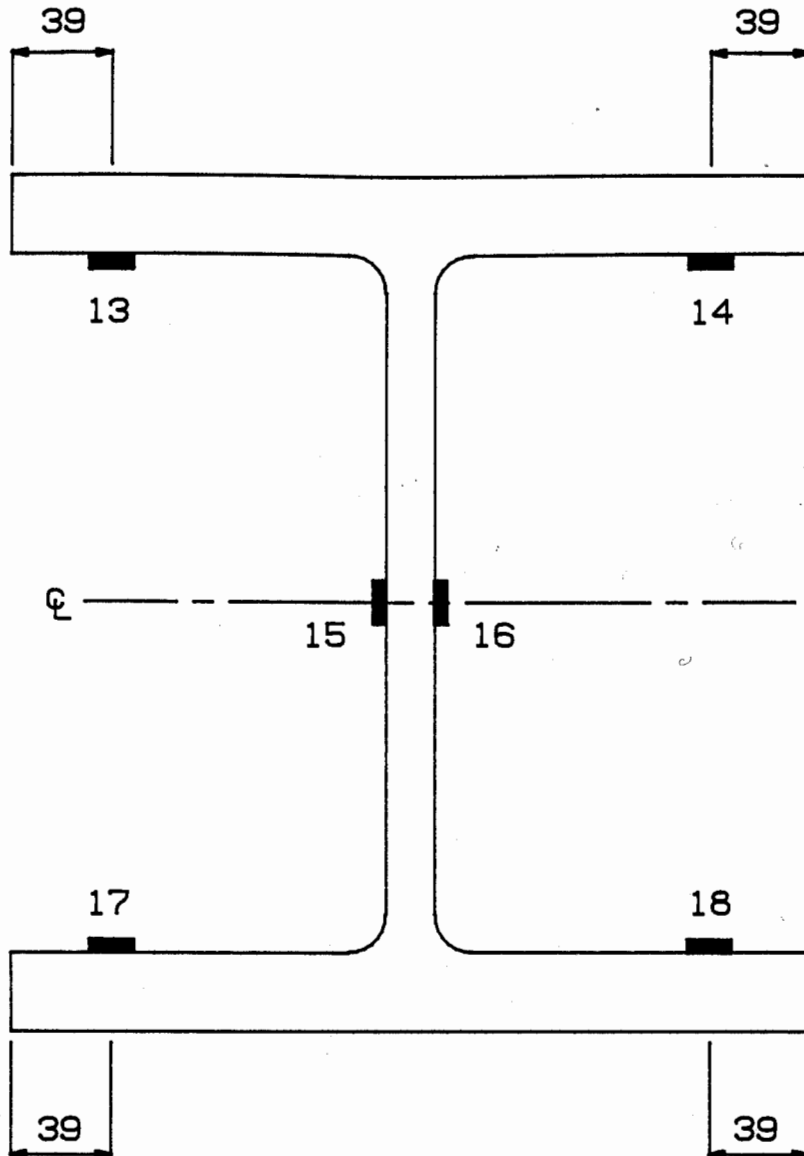


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B3 ON THE FOURTH FLOOR. 500mm ABOVE THE TEST FLOOR

305x305x198 kg/m

Data File: PRO2 , Figure 2/51

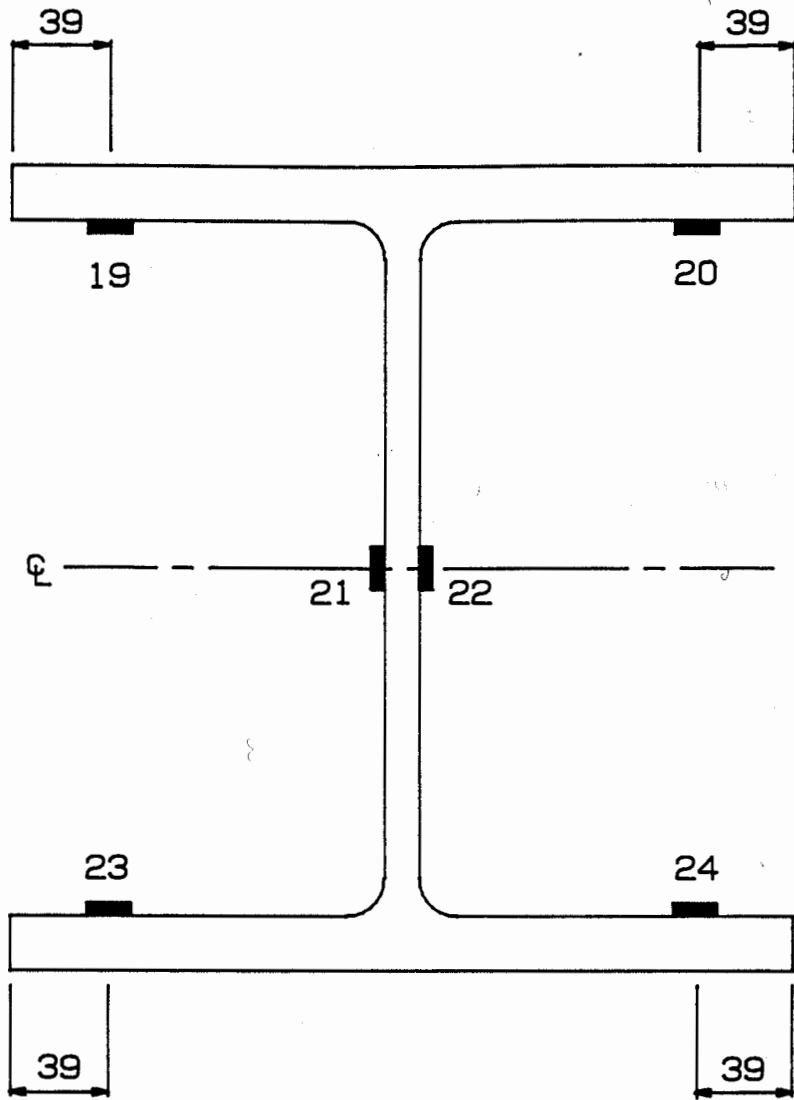


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B2 ON THE
FOURTH FLOOR, 500mm ABOVE THE TEST FLOOR

305x305x198 kg/m

Data File: PRO3 , Figure 2/52

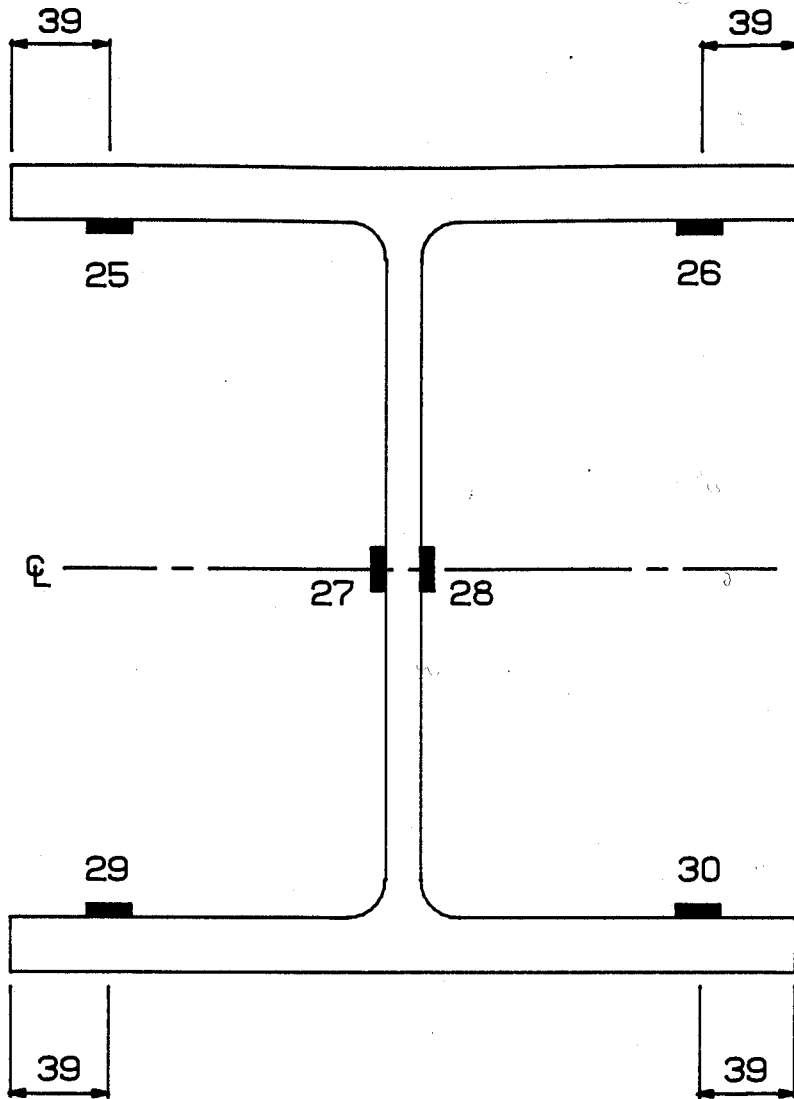


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B1 ON THE
FOURTH FLOOR. 500mm ABOVE THE TEST FLOOR

305x305x137 kg/m

Data File: PRO4 , Figure 2/53

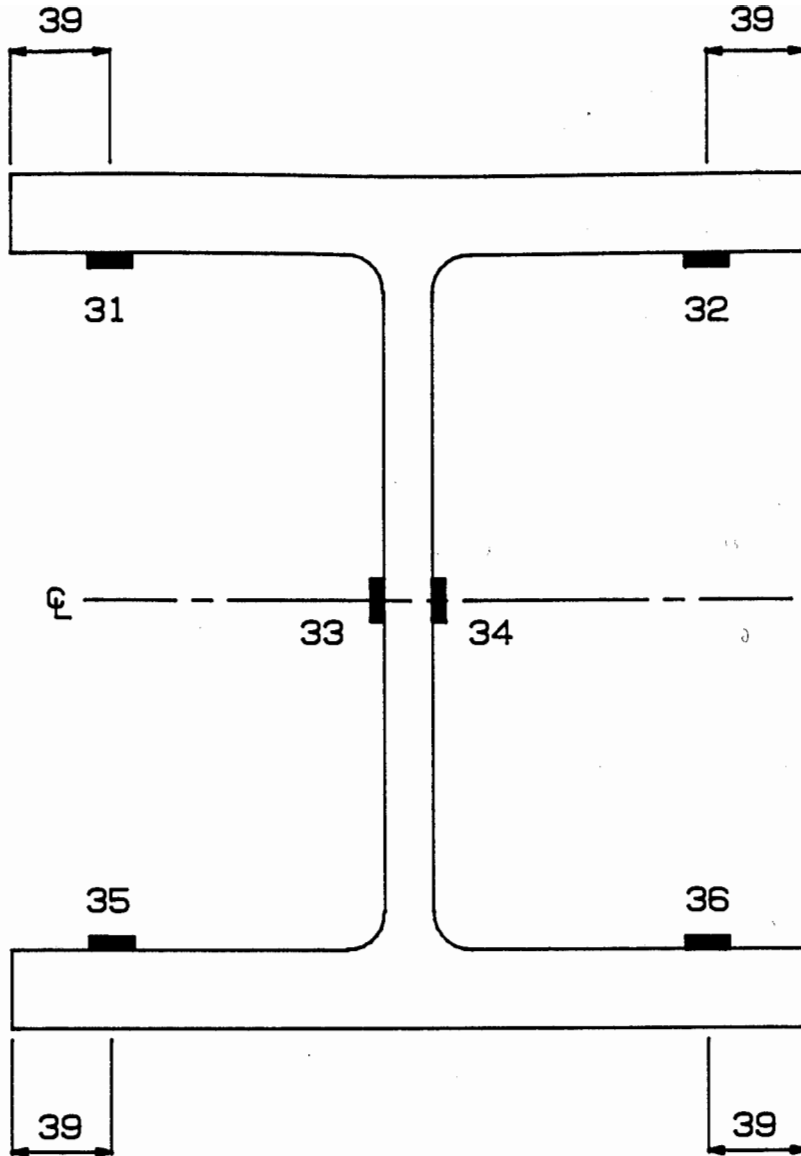


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B4 ON
THE SECOND FLOOR BELOW THE TEST FURNACE

305x305x137 kg/m

Data File: PRO5 , Figure 2/54

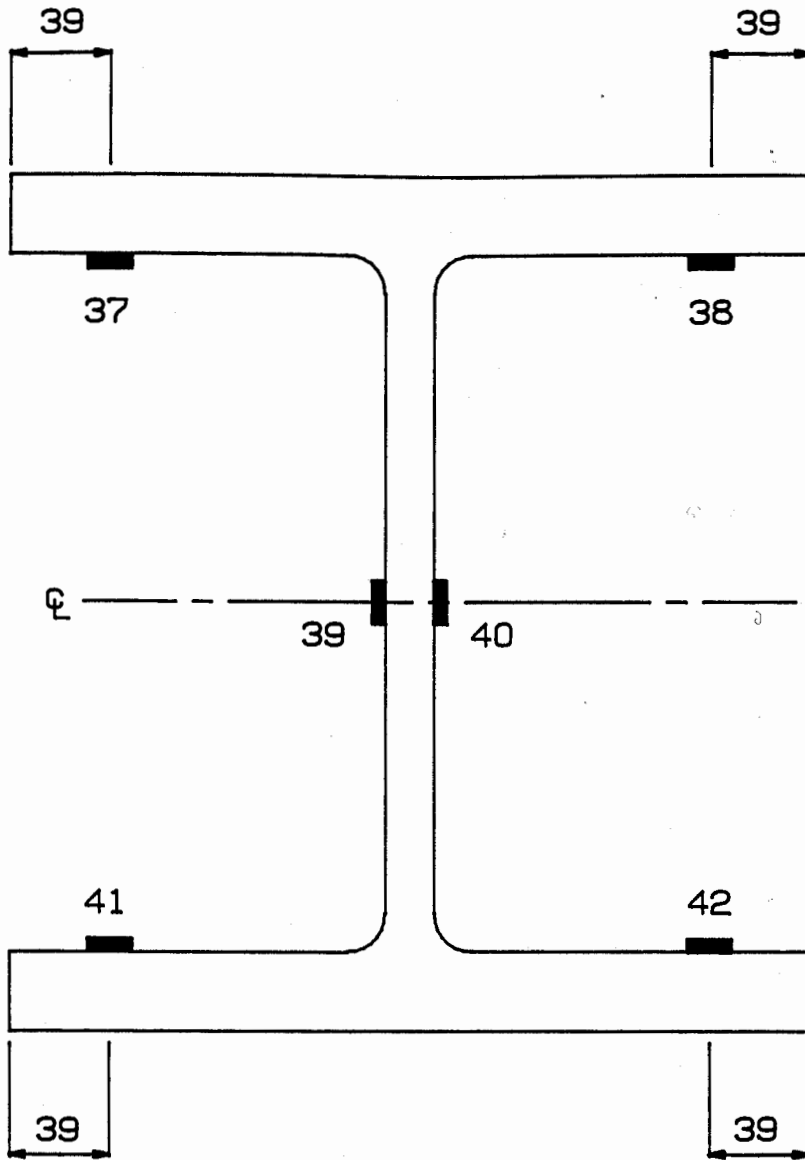


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B3 ON
THE SECOND FLOOR BELOW THE TEST FURNACE

305x305x198 kg/m

Data File: PRO6 , Figure 2/55

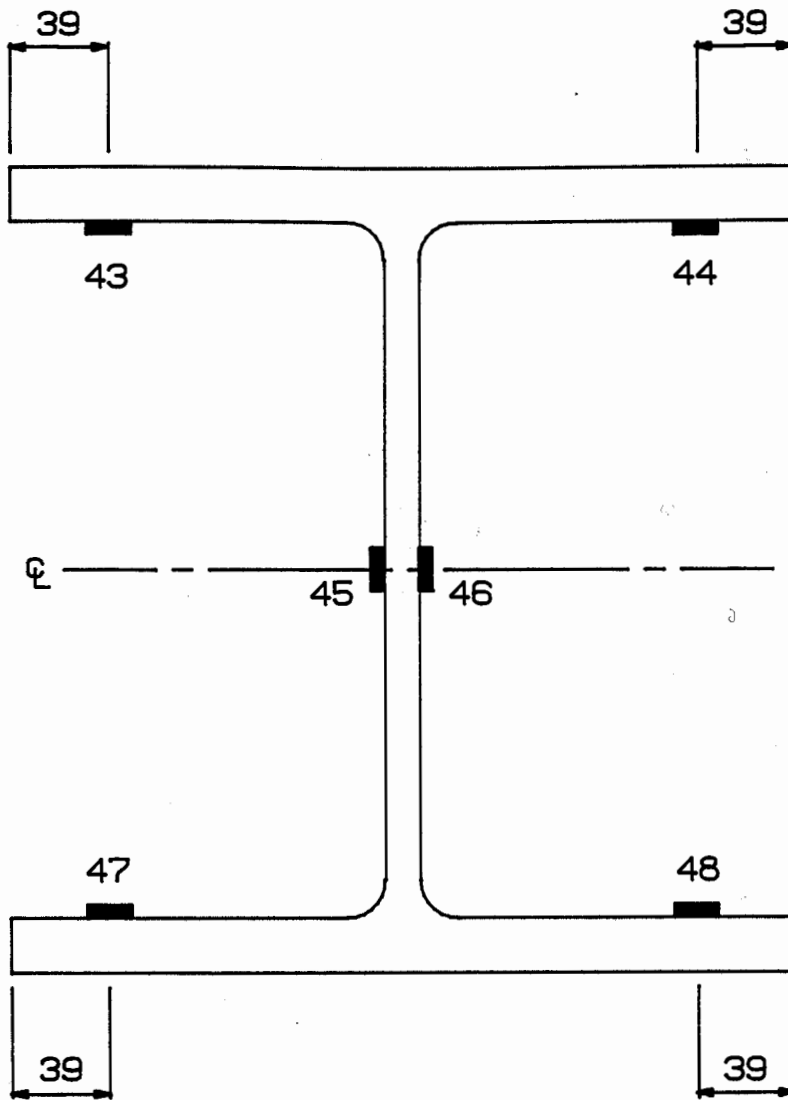


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B2 ON
THE SECOND FLOOR BELOW THE TEST FURNACE

305x305x198 kg/m

Data File: PRO7 , Figure 2/56

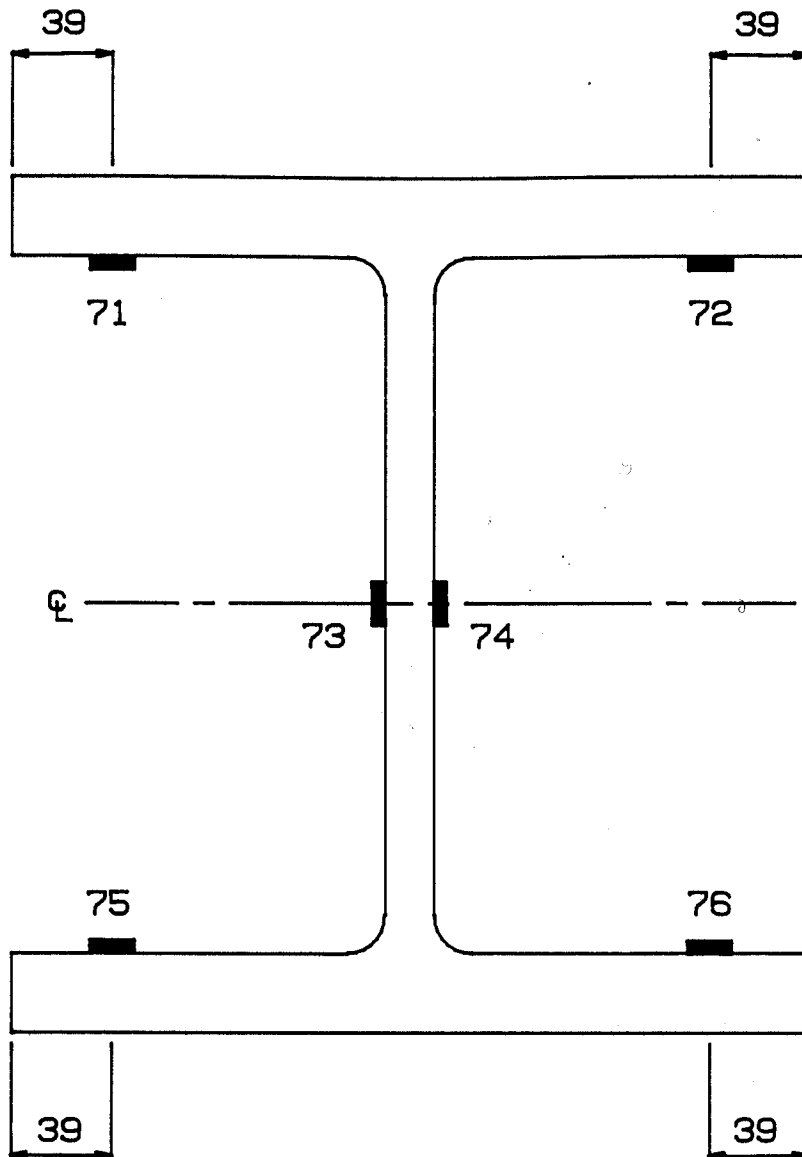


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B1 ON
THE SECOND FLOOR BELOW THE TEST FURNACE

305x305x137 kg/m

Data File: PRO8 , Figure 2/57

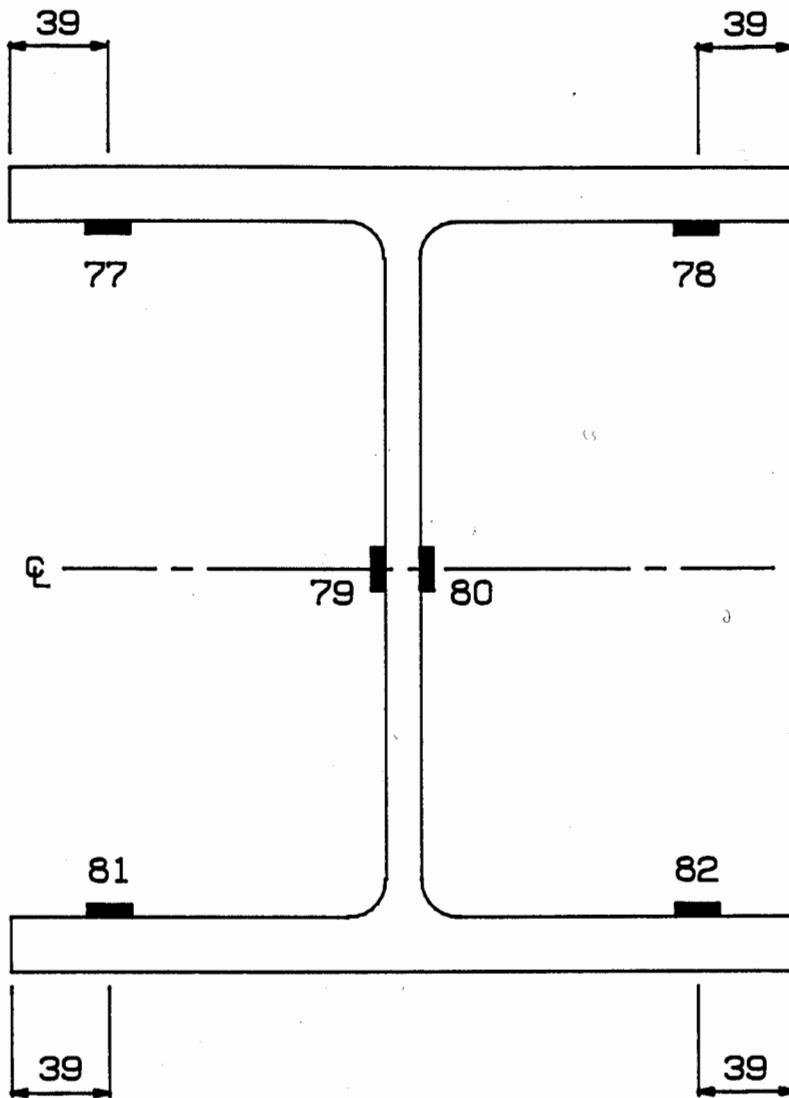


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B2 WITHIN THE TEST FURNACE, 2000mm ABOVE THE CONCRETE SLAB (MID-HEIGHT)

305×305×198 kg/m

Data File: PRO9 , Figure 2/58

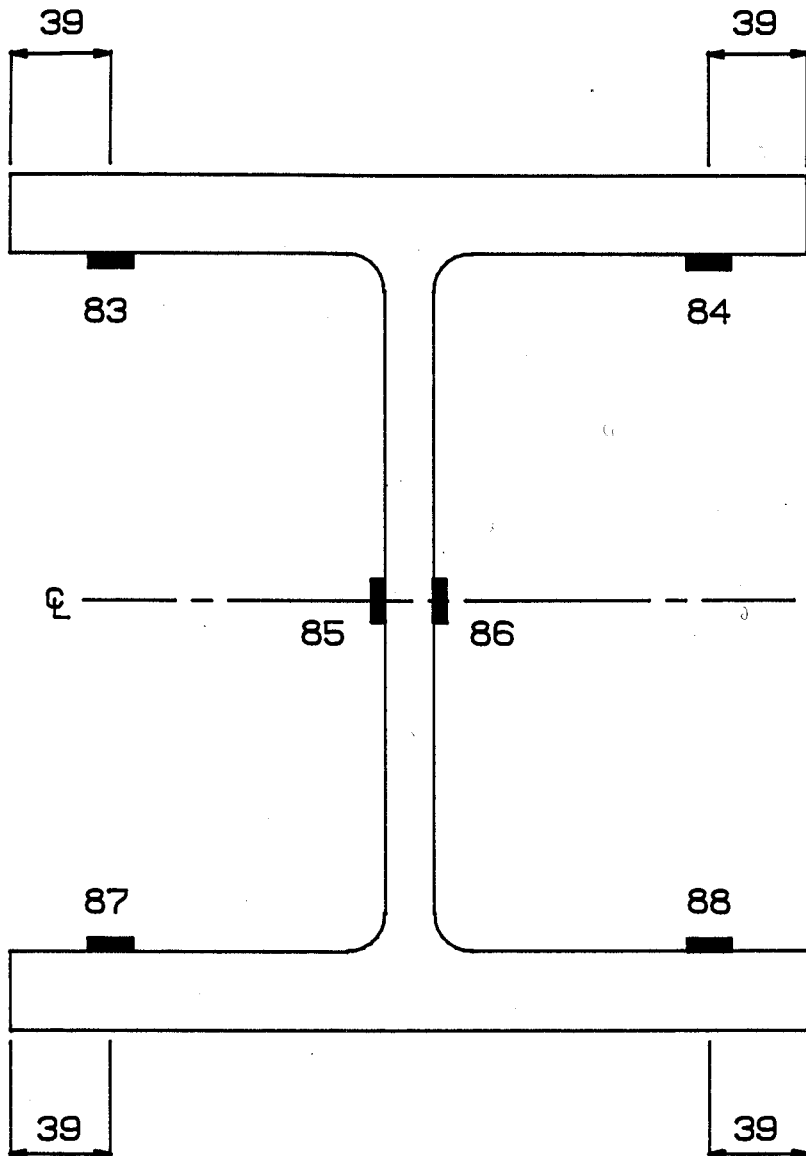


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B1 WITHIN THE TEST FURNACE. 2000mm ABOVE THE CONCRETE SLAB (MID-HEIGHT)

305x305x137 kg/m

Data File: PRO10 , Figure 2/59

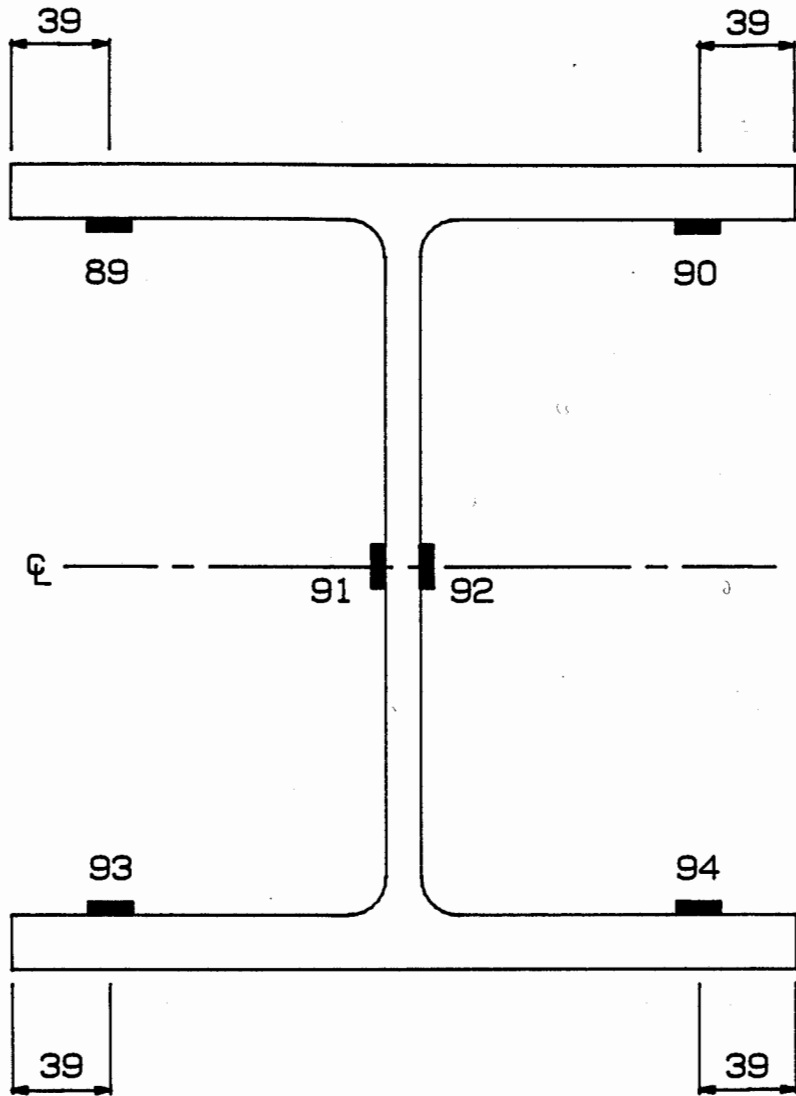


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B2 WITHIN THE TEST FURNACE, 500mm ABOVE THE CONCRETE SLAB

305x305x198 kg/m

Data File: PRO11 , Figure 2/60



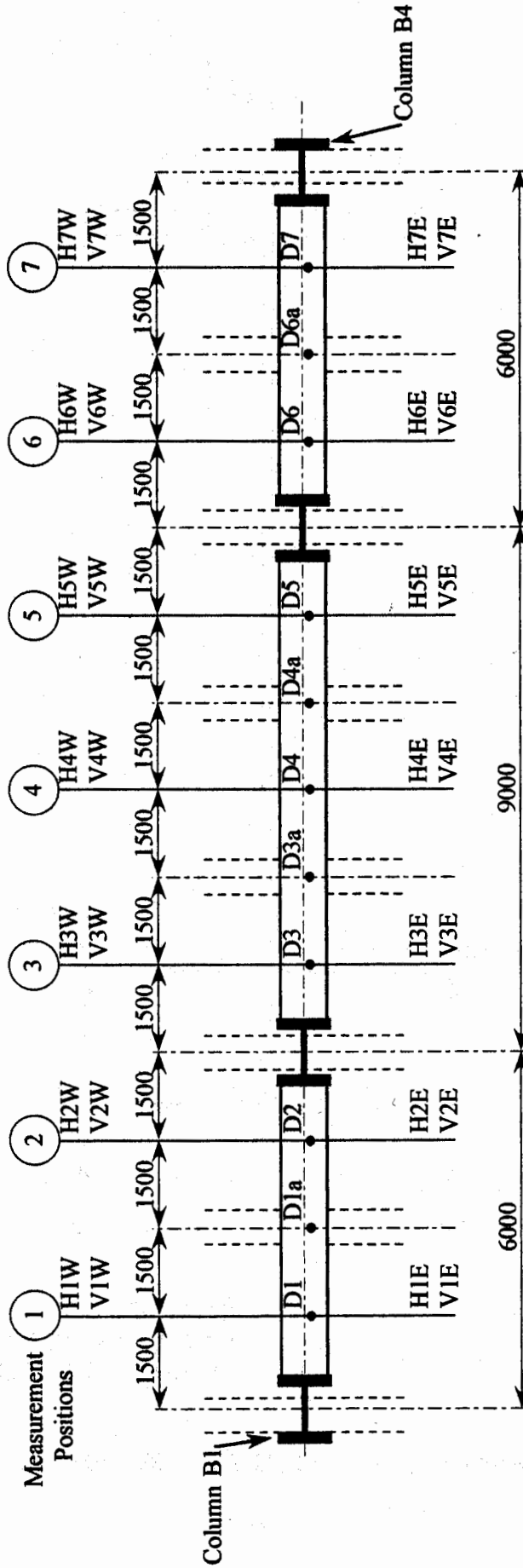
DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN B1 WITHIN THE
TEST FURNACE, 500mm ABOVE THE CONCRETE SLAB

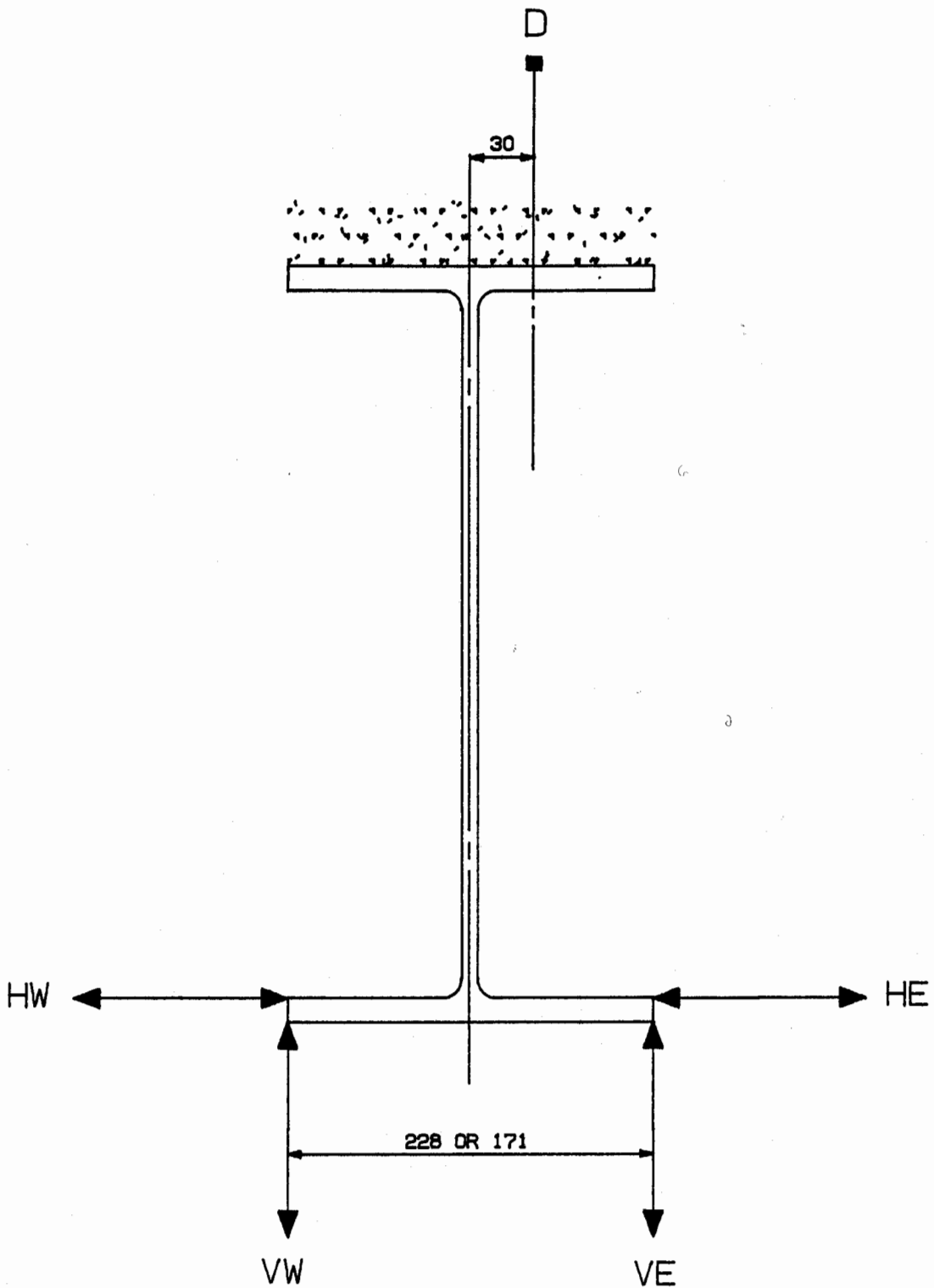
305x305x137 kg/m

Data File: PRO12 , Figure 2/61

Test 2 - Measurement Stations for the Primary Floor Beams



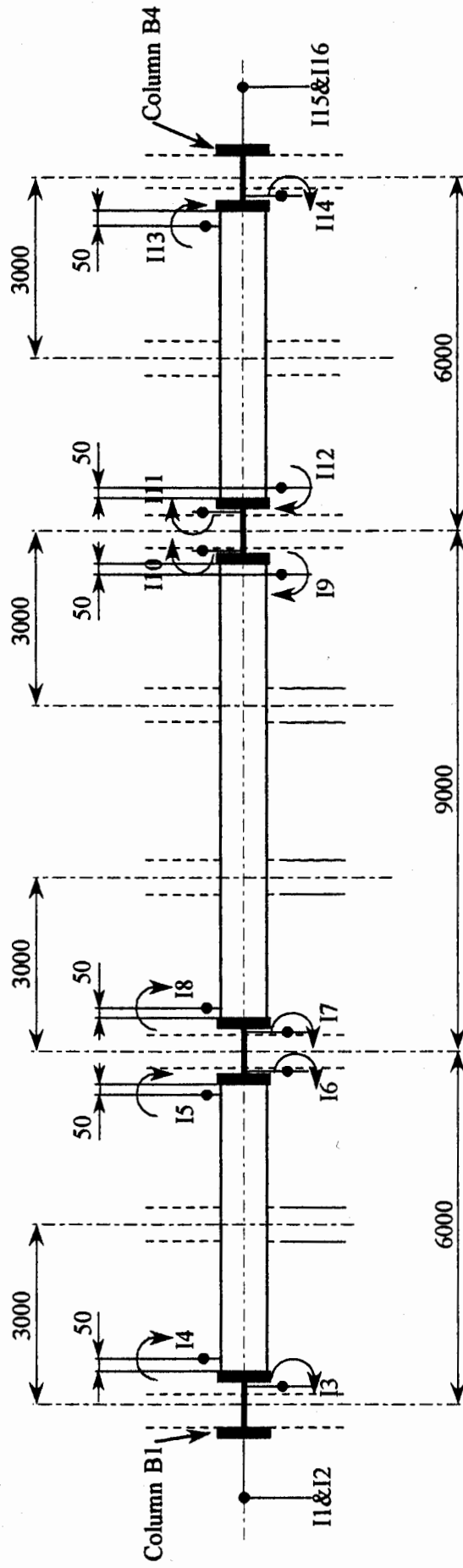
- D = Vertical Deflection
- H = Horizontal Deflection
- V = Vertical Deflection
- Top Flange
- Bottom Flange
- Bottom Flange



D - VERTICAL DEFLECTIONS: UPPER FLANGE
 V - VERTICAL DEFLECTIONS: LOWER FLANGE
 H - LATERAL DISPLACEMENTS: LOWER FLANGE

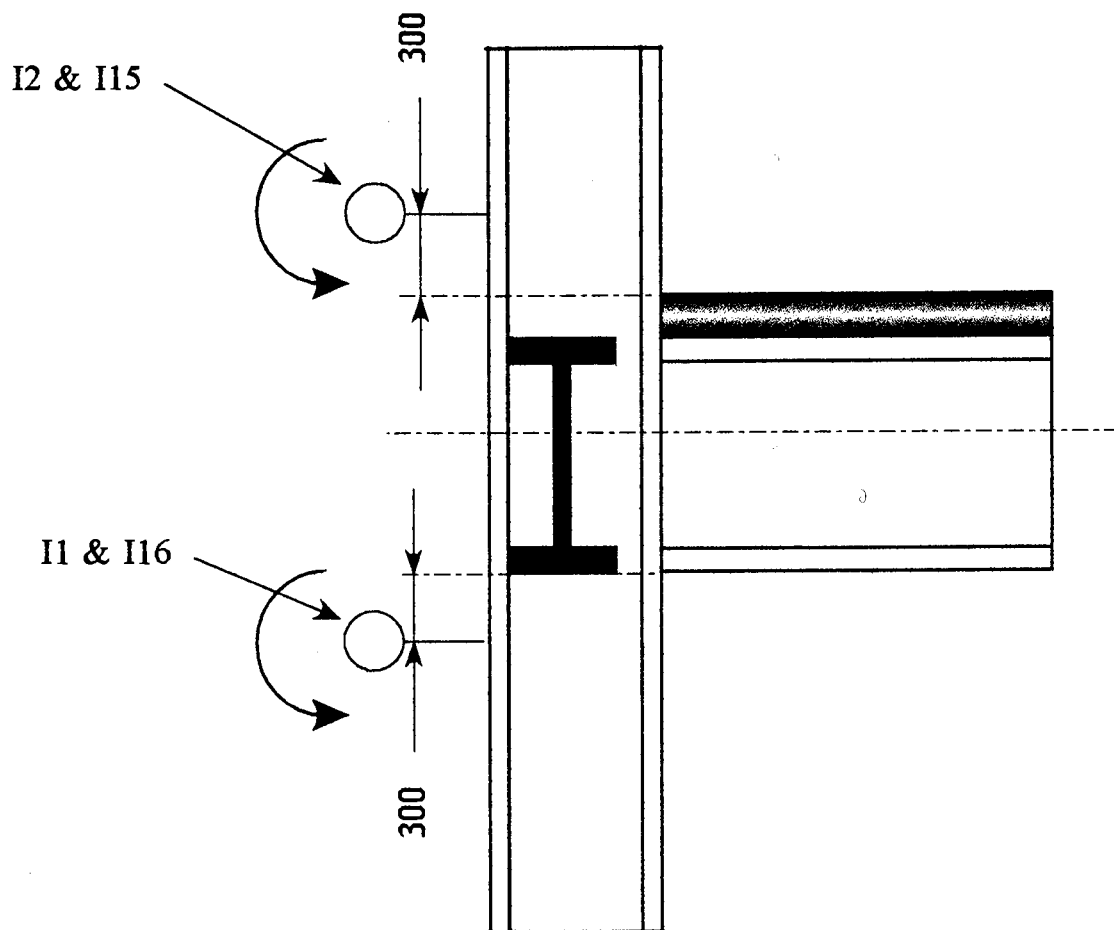
DETAIL VIEW OF INSTRUMENTATION LOCATIONS FOR THE PRIMARY BEAMS

Test 2 - Measurement Positions for Beam and Column Rotations



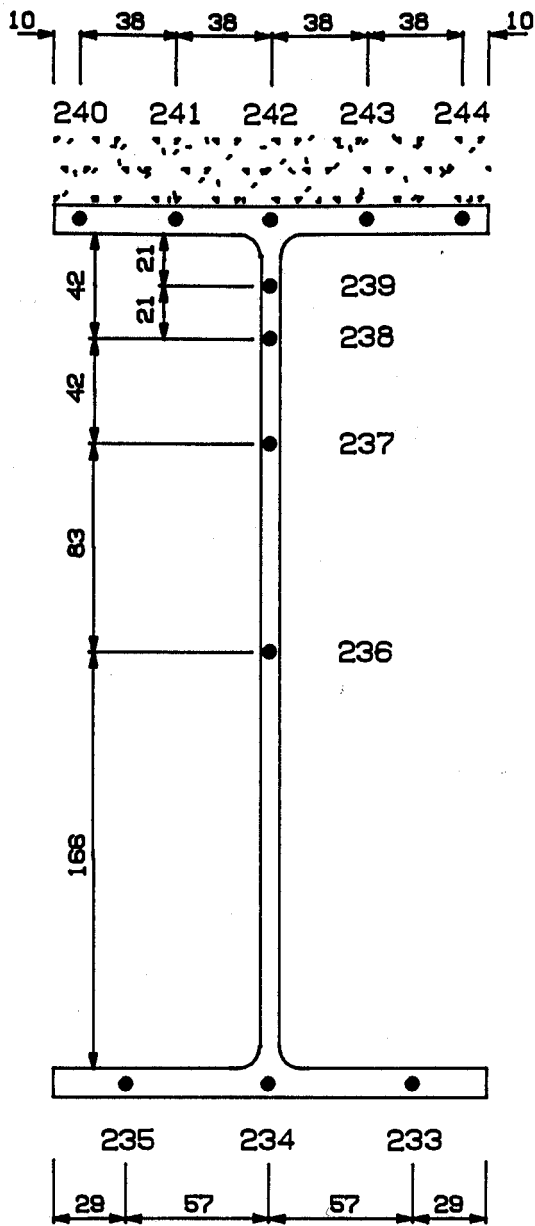
I = Clinometer Positions

Test 2 - Measurement Positions for Column B1 and B4 Rotations



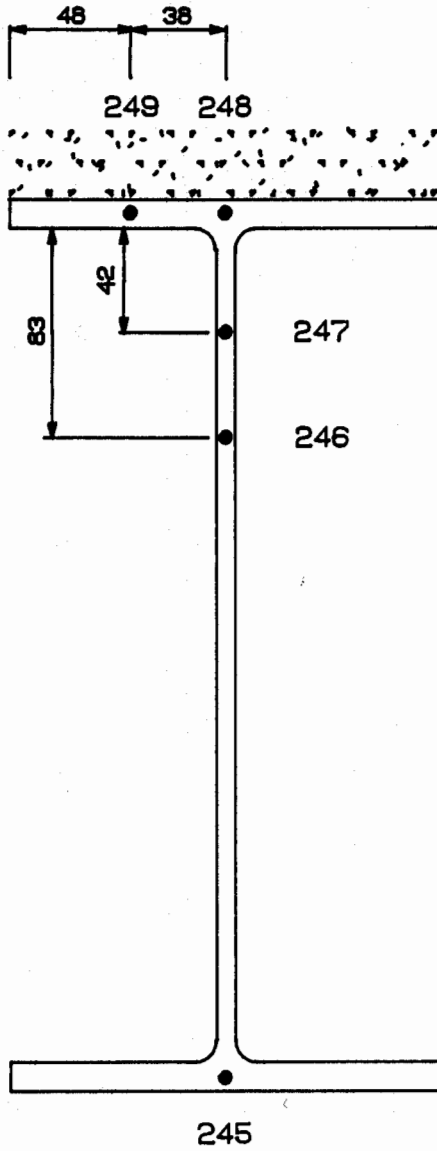
TEST 3

CORNER



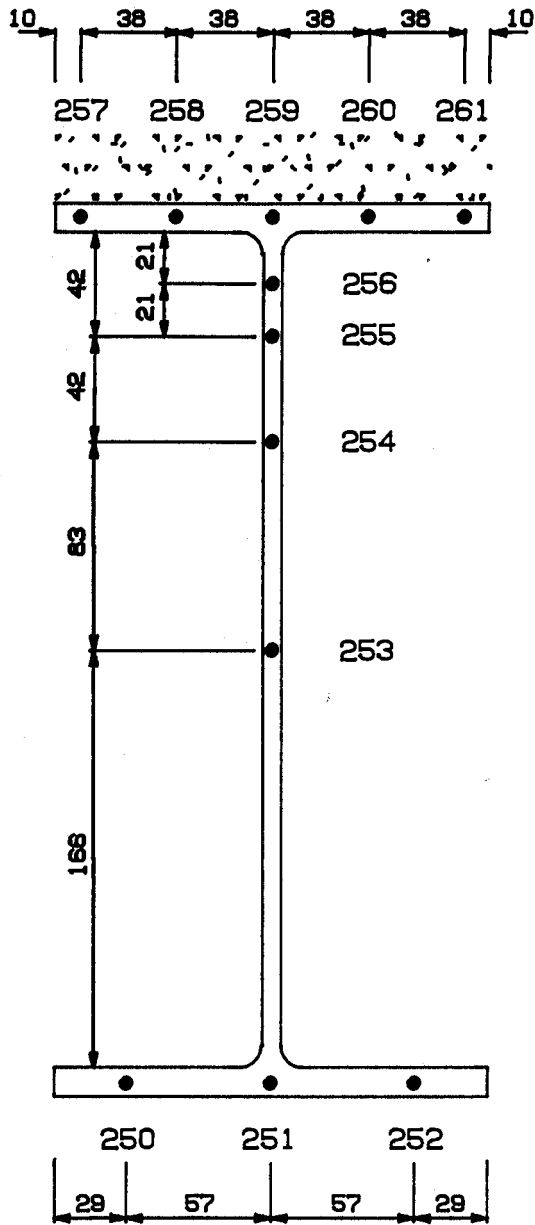
12 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON PRIMARY
 BEAM ON GRID LINE E, LOCATION G
 356x171x51Kg/m



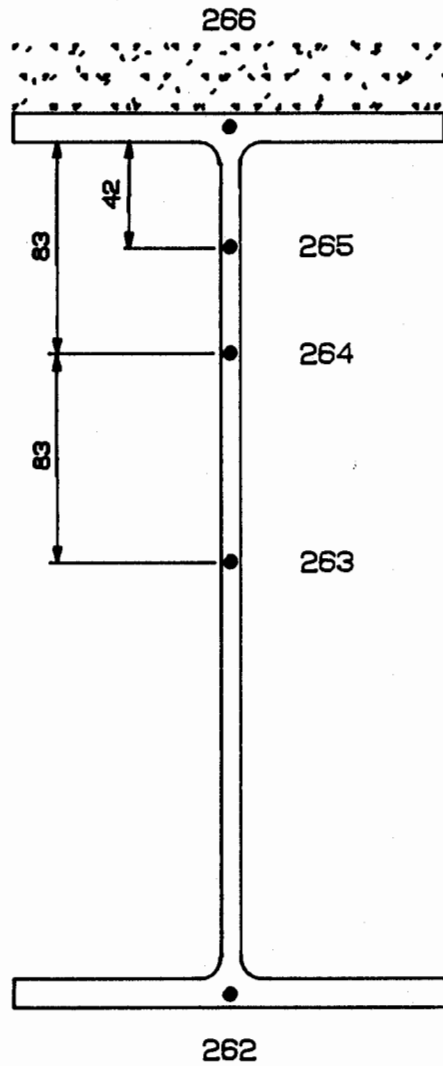
12 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON PRIMARY
 BEAM ON GRID LINE E, LOCATION H
 356x171x51Kg/m



12 STEEL THERMOCOUPLES

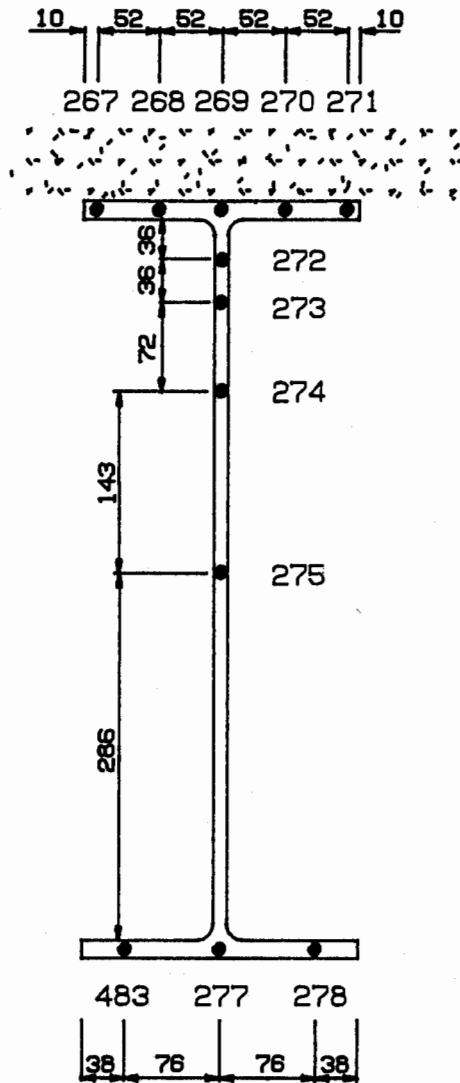
THERMOCOUPLE POSITIONS ON PRIMARY
 BEAM ON GRID LINE E, LOCATION I
 356x171x51Kg/m



5 STEEL THERMOCOUPLES

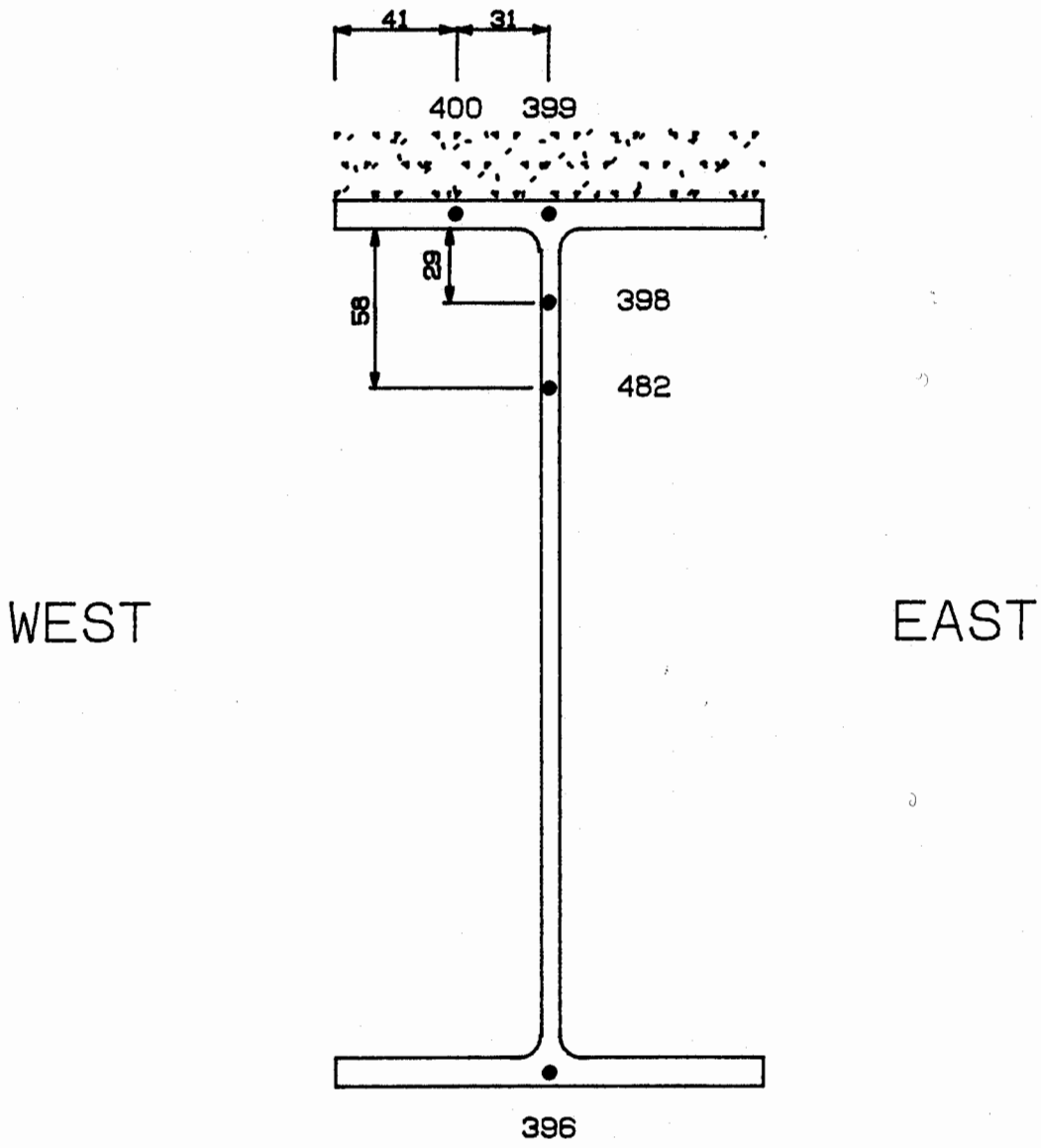
THERMOCOUPLE POSITIONS ON PRIMARY
BEAM ON GRID LINE E, LOCATION J
356x171x51Kg/m

Data File: PRO4 , Figure 3/4



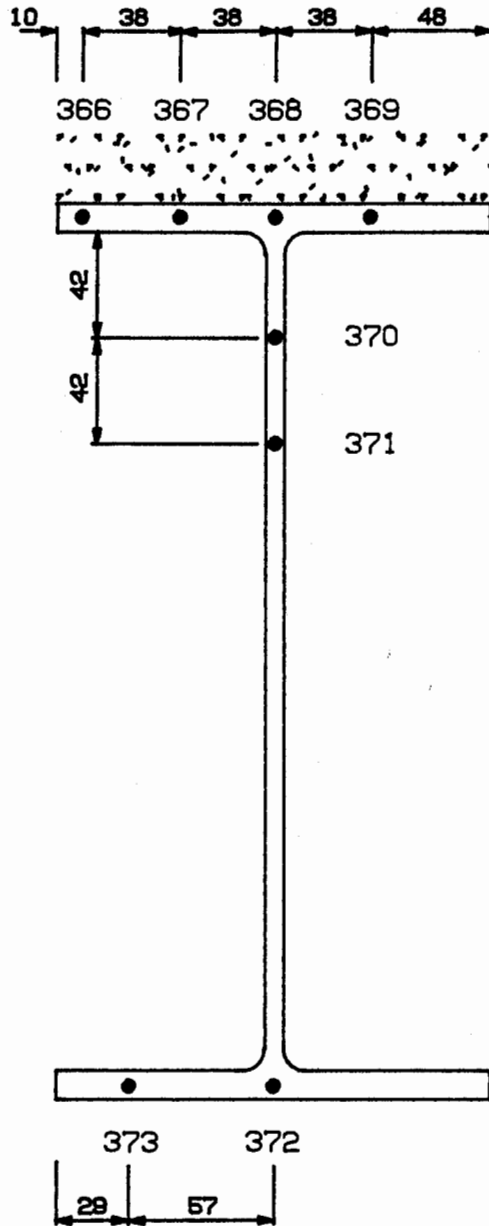
12 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON PRIMARY
 BEAM ON GRID LINE E, LOCATION K
 610x229x101Kg/m



5 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON SECONDARY BEAM ON
 GRID LINE E/F, LOCATION K
 254x146x31 Kg/m

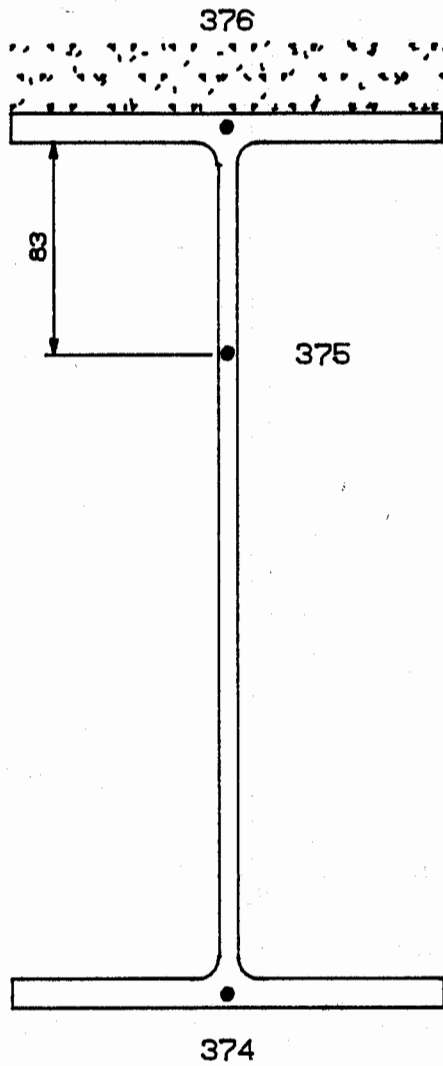


OUTSIDE
FURNACE

INSIDE
FURNACE

8 STEEL THERMOCOUPLES

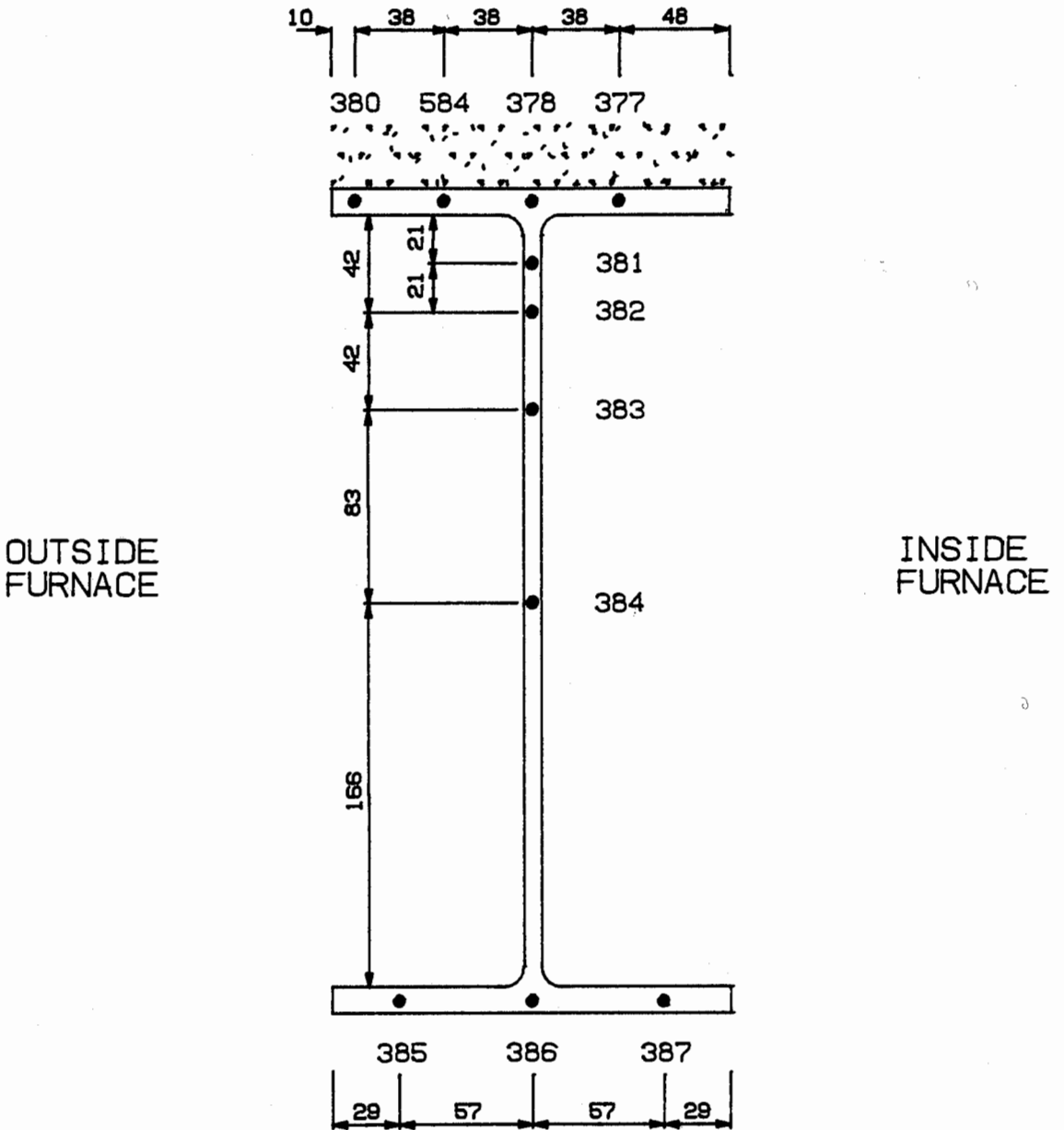
THERMOCOUPLE POSITIONS ON EDGE BEAM
ON GRID LINE F, LOCATION G
356x171x51Kg/m



3 STEEL THERMOCOUPLES

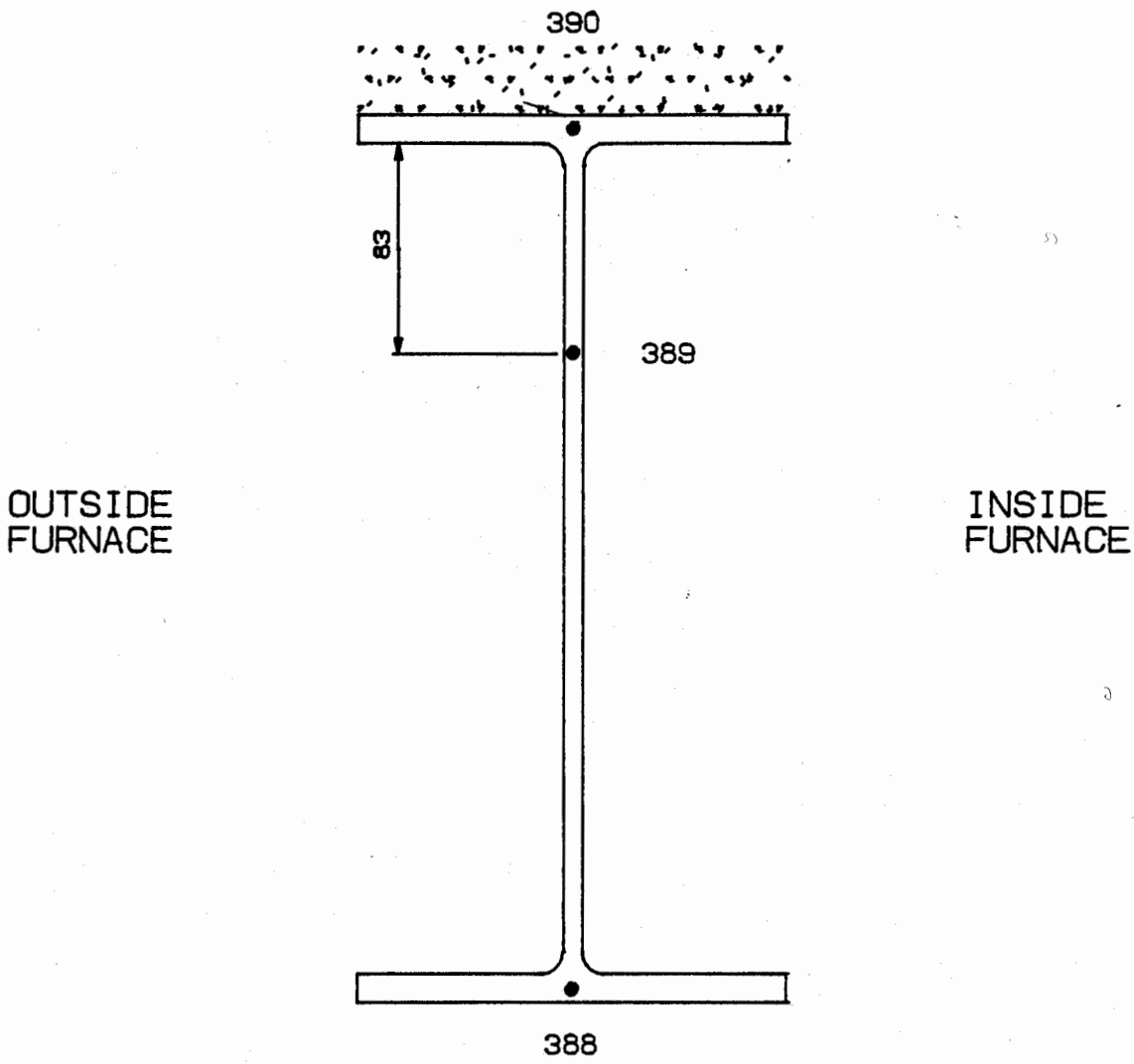
THERMOCOUPLE POSITIONS ON EDGE BEAM
ON GRID LINE F, LOCATION H
356x171x51Kg/m

Data File: PRO8 , Figure 3/8



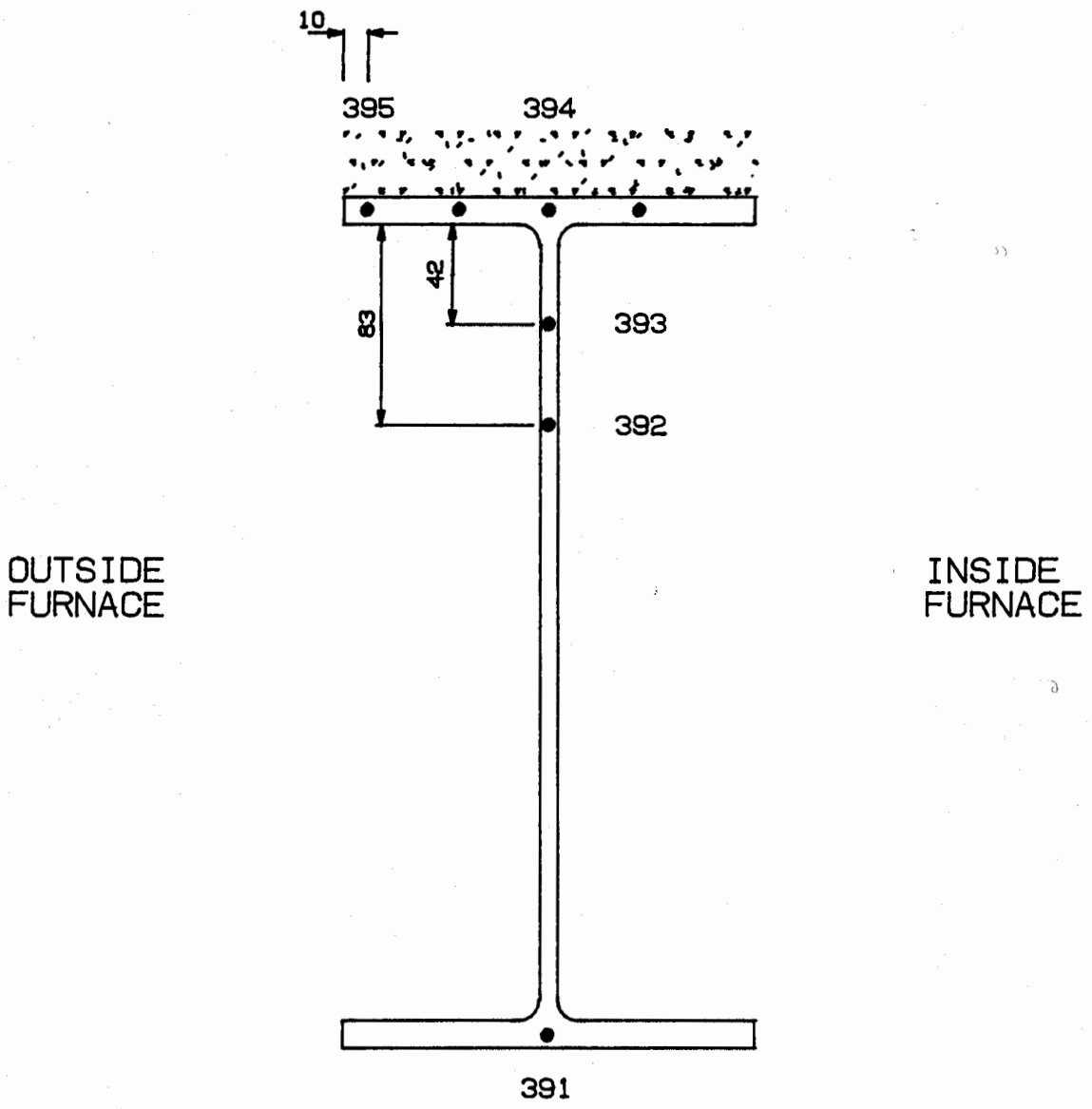
11 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON EDGE BEAM
 ON GRID LINE F, LOCATION I
 356x171x51Kg/m



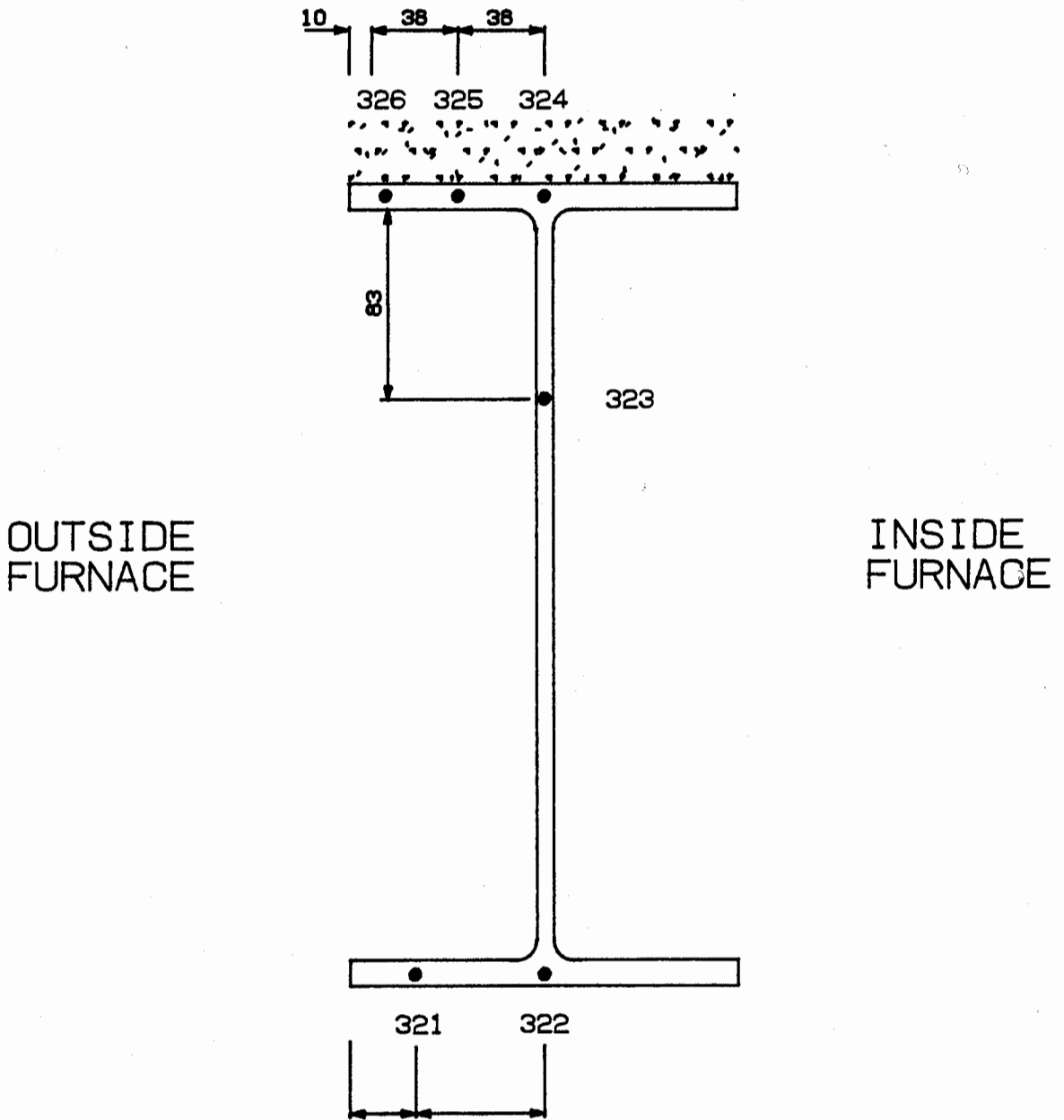
3 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON EDGE BEAM
ON GRID LINE F, LOCATION J
356x171x51Kg/m



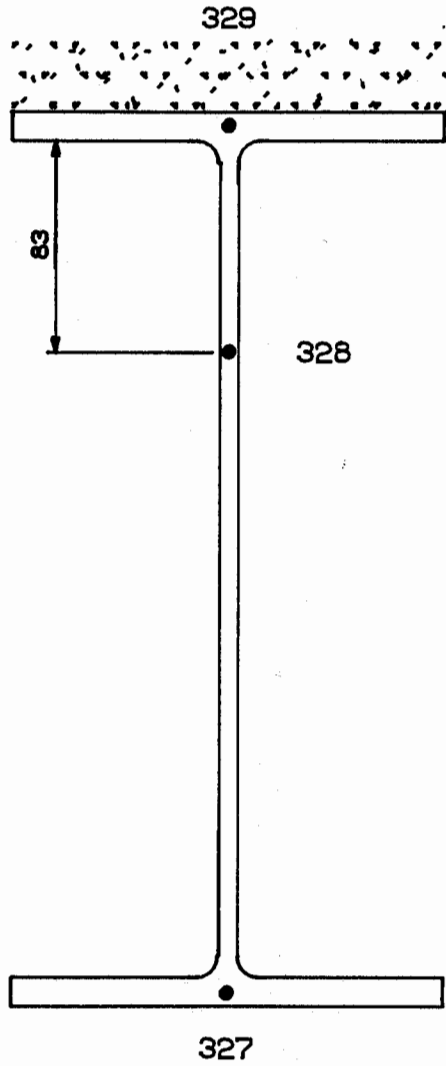
5 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON EDGE BEAM
 ON GRID LINE F, LOCATION K
 356x171x51Kg/m



6 STEEL THERMOCOUPLES

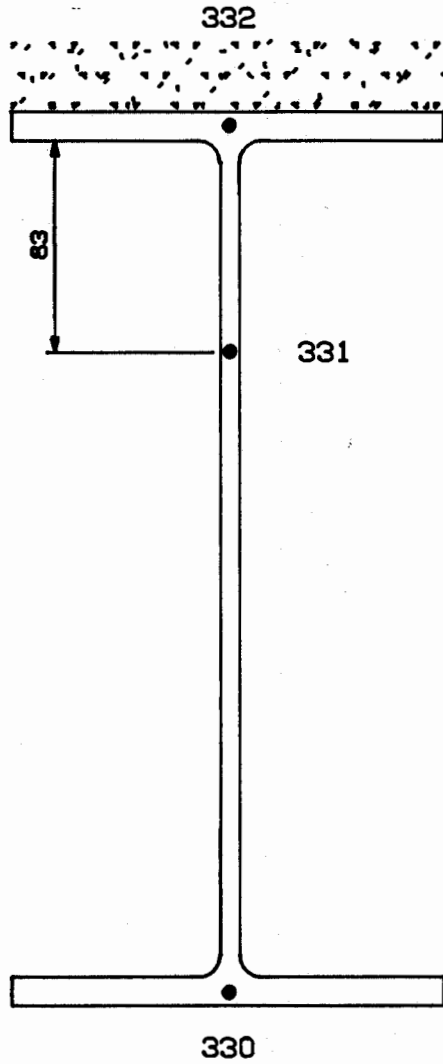
THERMOCOUPLE POSITIONS ON EDGE BEAM
 ON GRID LINE 1, LOCATION A
 356x171x51Kg/m



3 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON EDGE BEAM
ON GRID LINE 1, LOCATION B
356x171x51Kg/m

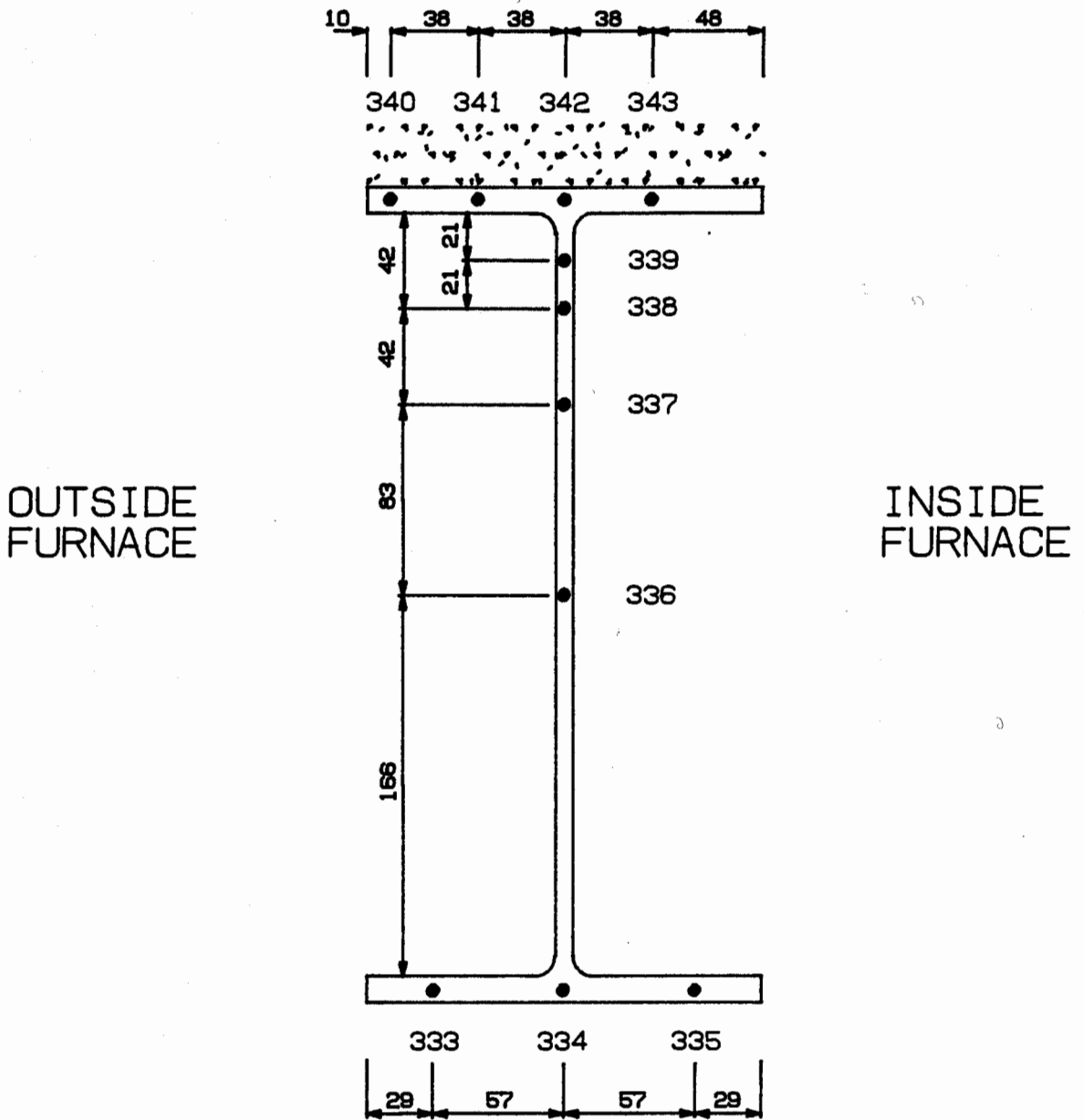
Data File: PRO13 , Figure 3/13



3 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON EDGE BEAM
ON GRID LINE 1, LOCATION C
356x171x51Kg/m

Data File: PRO14 , Figure 3/14

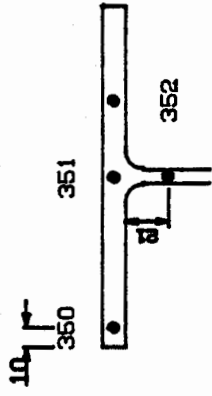


11 STEEL THERMOCOUPLES

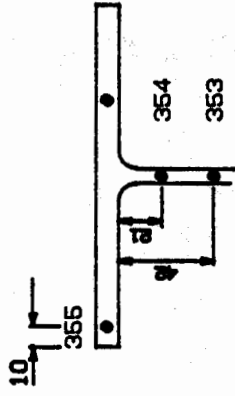
THERMOCOUPLE POSITIONS ON EDGE BEAM
 ON GRID LINE 1, LOCATION D
 356x171x51Kg/m

SECTION A-A

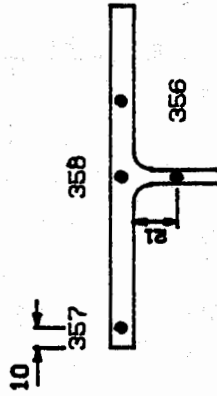
CERAMIC FIBRE
(POSSIBLY)



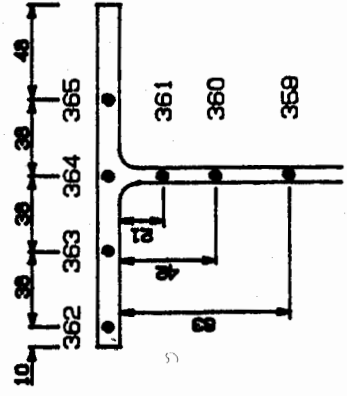
1-D (A)
3 STEEL THERMOCOUPLES



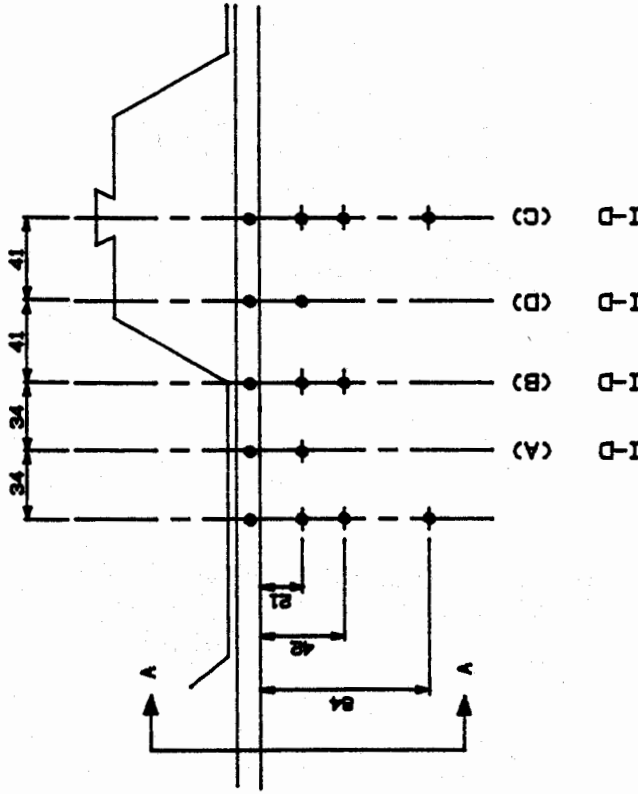
1-D (B)
3 STEEL THERMOCOUPLES



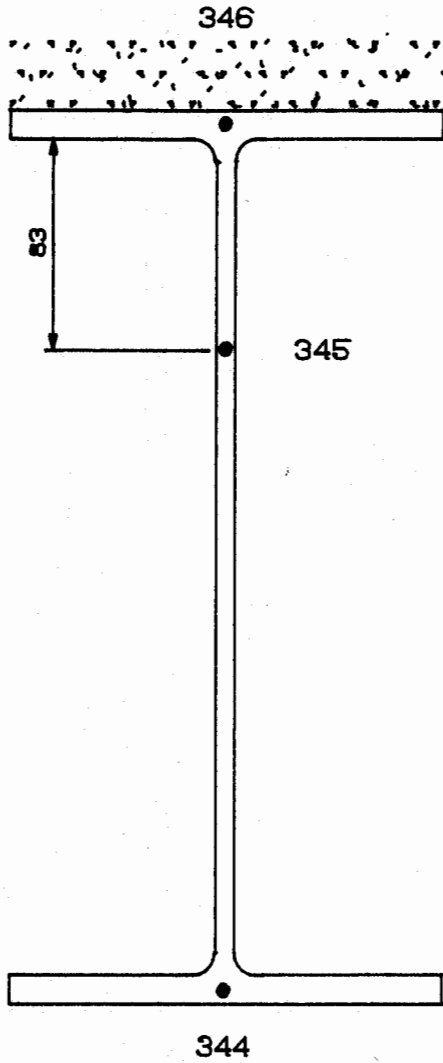
1-D (C)
3 STEEL THERMOCOUPLES



1-D (D)
7 STEEL THERMOCOUPLES



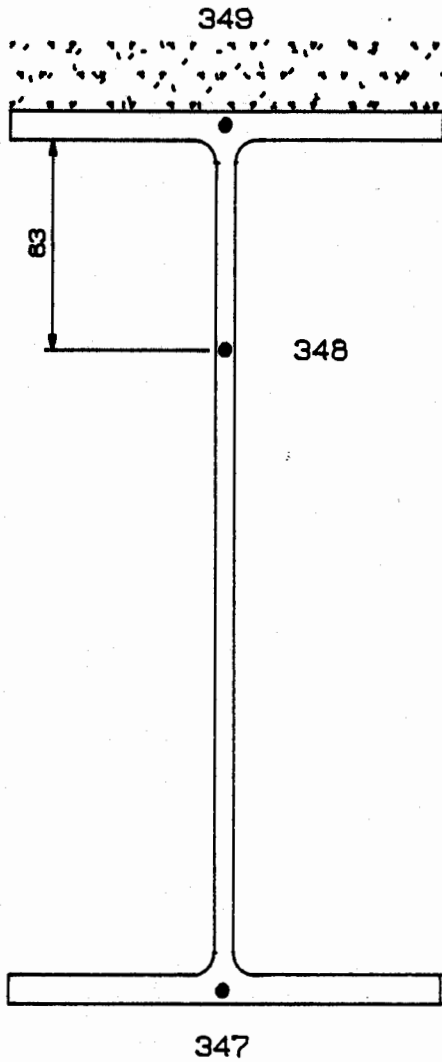
THERMOCOUPLE POSITIONS ON EDGE BEAM ON
GRID LINE 1, LOCATION D_{a-d}
356x171x51Kg/m



3 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON EDGE BEAM
ON GRID LINE 1, LOCATION E
356x171x51Kg/m

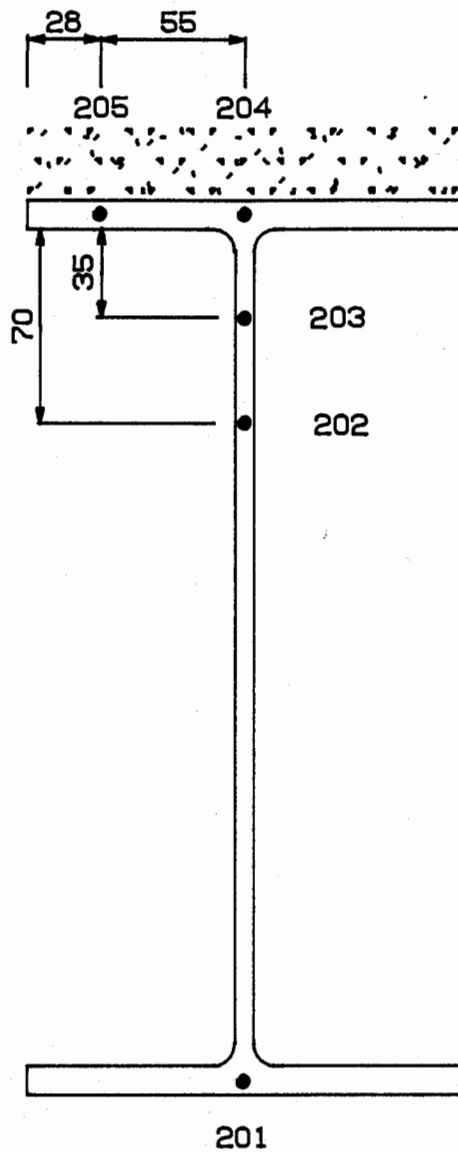
Data File: PRO17 , Figure 3/17



3 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON EDGE BEAM
ON GRID LINE 1, LOCATION F
356x171x51Kg/m

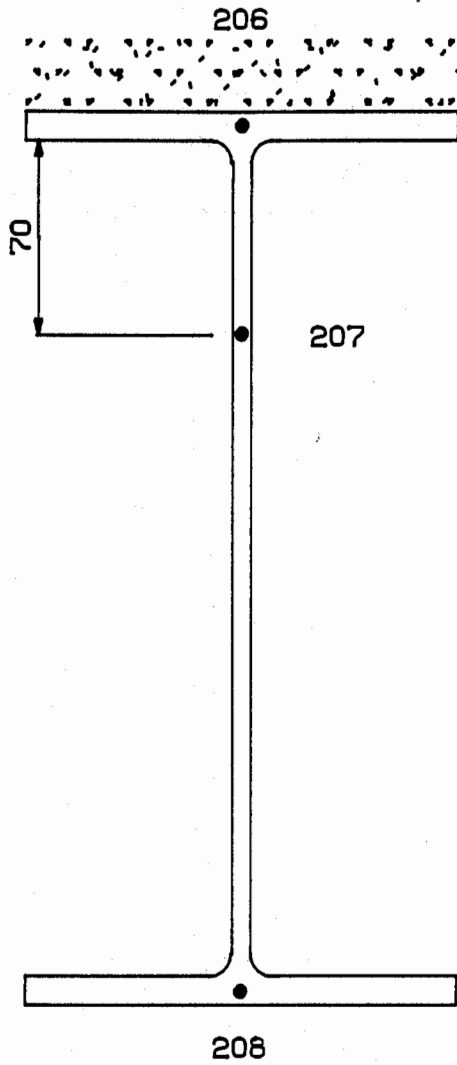
Data File: PRO18 , Figure 3/18



5 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON SECONDARY
 BEAM ON GRID LINE 1/2, LOCATION A
 305x165x40 Kg/m

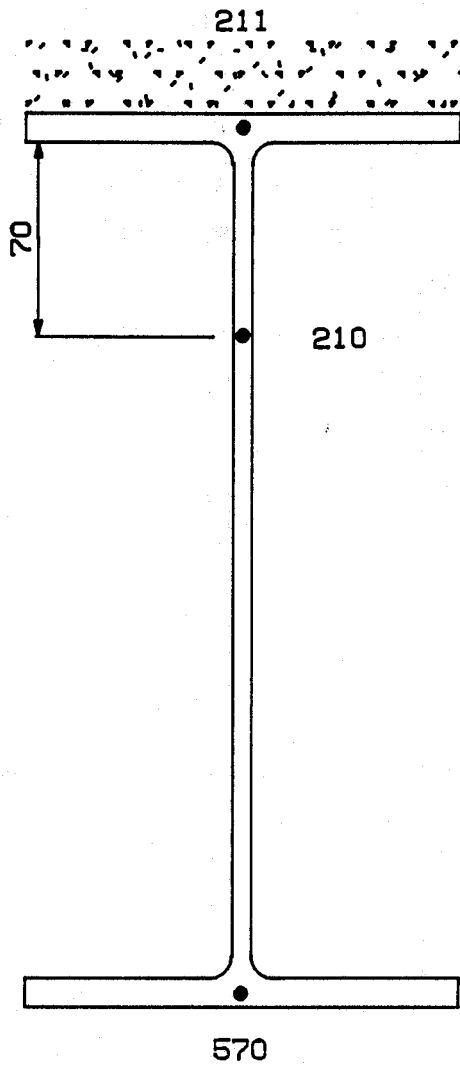
Data File: PRO19 , Figure 3/19



3 STEEL THERMOCOUPLES

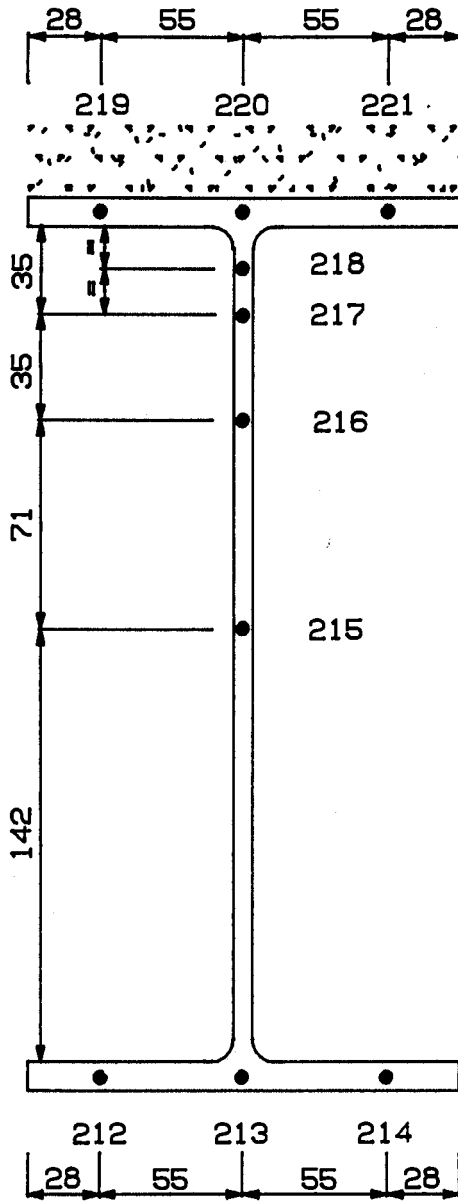
THERMOCOUPLE POSITIONS ON SECONDARY
BEAM ON GRID LINE LINE 1/2, LOCATION B
305x165x40 Kg/m

Data File: PRO20 , Figure 3/20



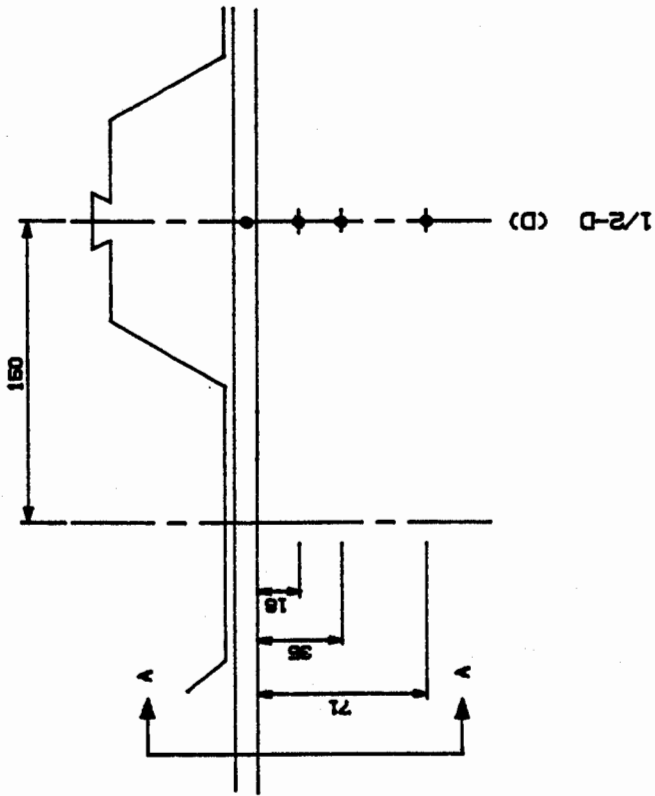
3 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON SECONDARY
BEAM ON GRID LINE 1/2, LOCATION C
305x165x40 Kg/m



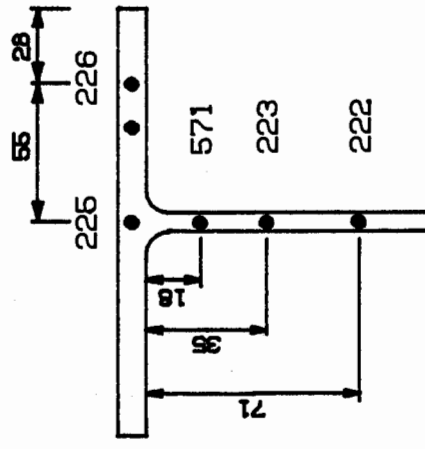
10 STEEL THERMOCOUPLES

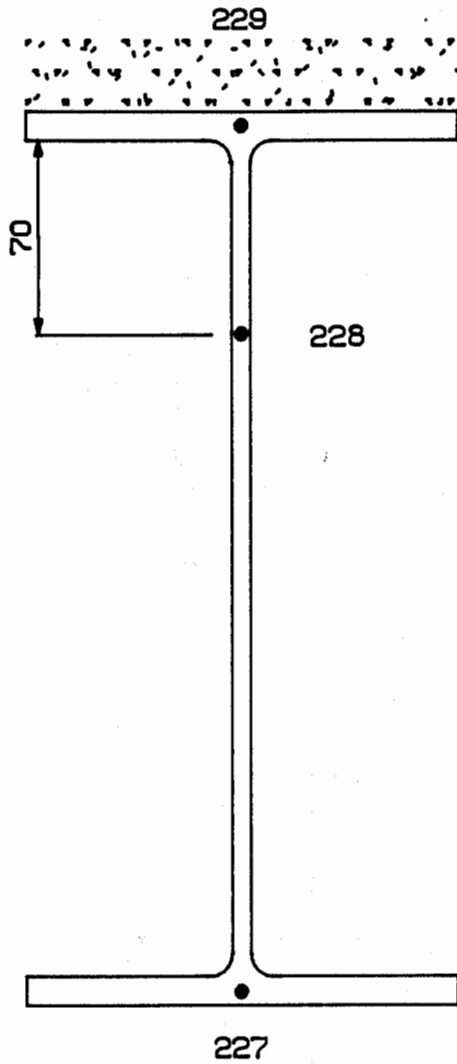
THERMOCOUPLE POSITIONS ON SECONDARY
 BEAM ON GRID LINE 1/2, LOCATION D
 305x165x40 Kg/m



THERMOCOUPLE POSITIONS ON SECONDARY BEAM
 ON GRID LINE 1/2. LOCATION D_{a-d}
 356x171x51Kg/m

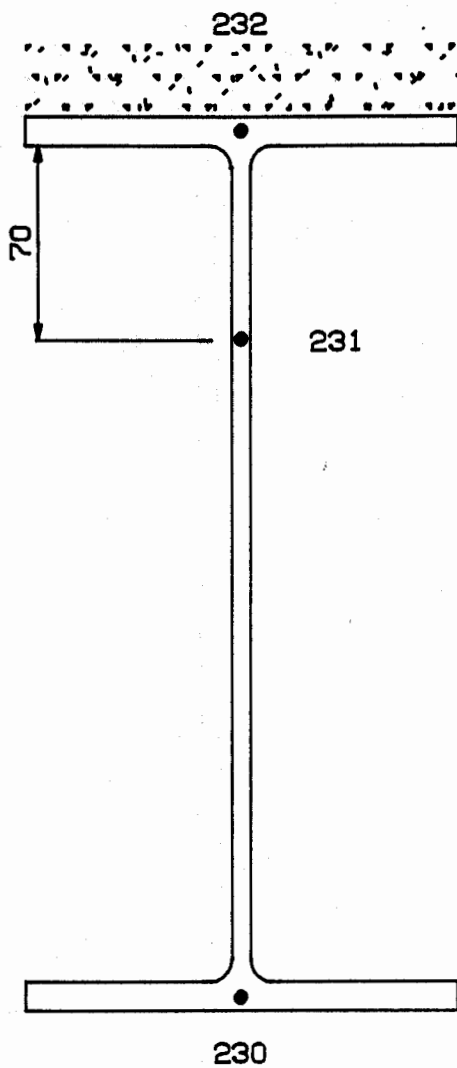
1/2-D (D)
 5 STEEL THERMOCOUPLES





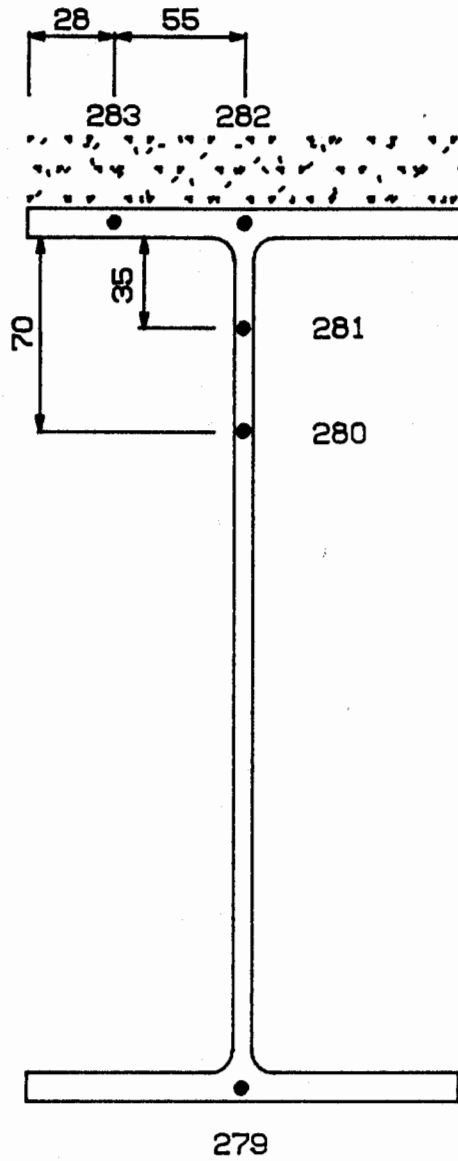
3 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON SECONDARY
BEAM ON GRID LINE 1/2, LOCATION E
305x165x40 Kg/m



3 STEEL THERMOCOUPLES

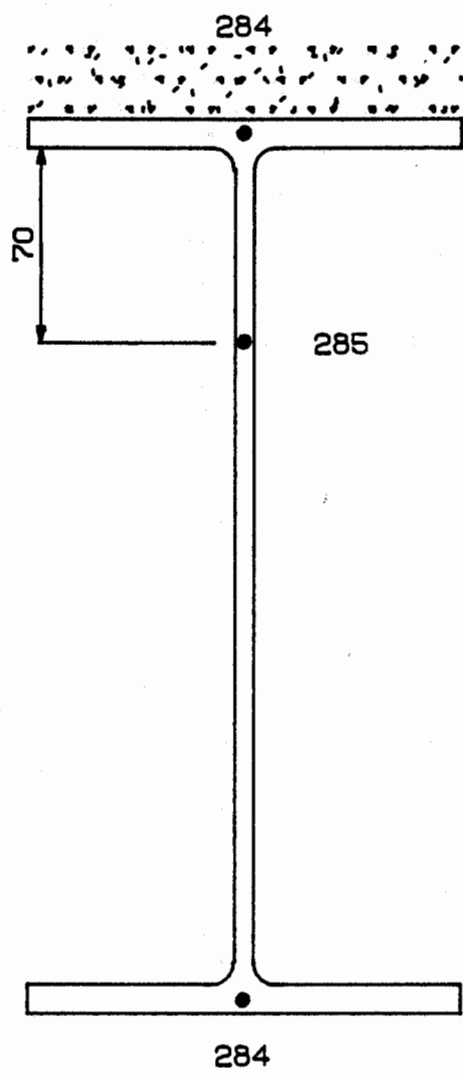
THERMOCOUPLE POSITIONS ON SECONDARY
BEAM ON GRID LINE 1/2, LOCATION F
305x165x40 Kg/m



5 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON SECONDARY
 BEAM ON GRID LINE 2, LOCATION A
 305x165x40 Kg/m

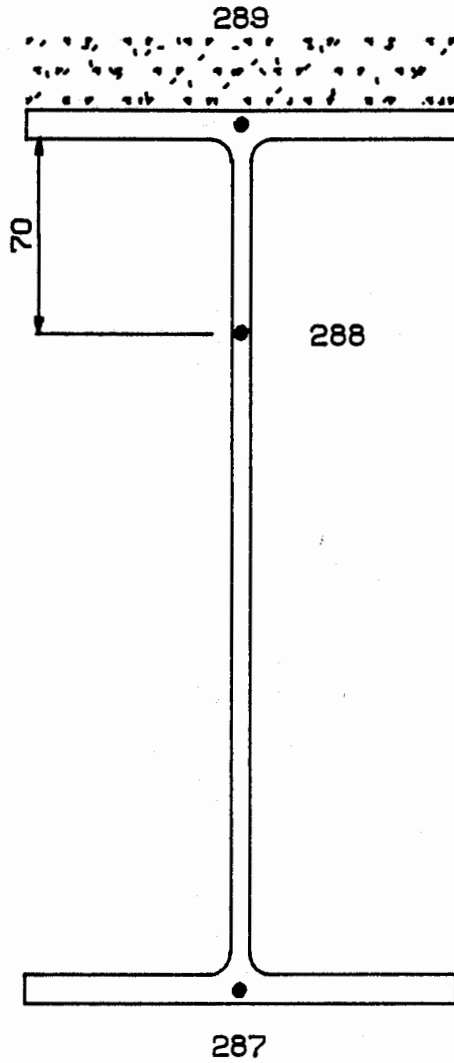
Data File: PRO26 , Figure 3/26



3 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON SECONDARY
BEAM ON GRID LINE 2, LOCATION B
305x165x40 Kg/m

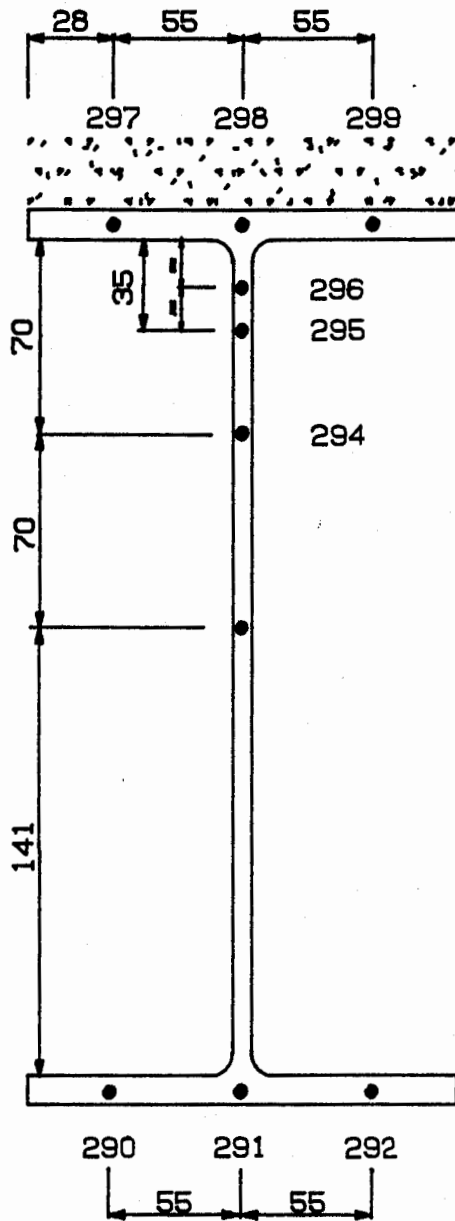
Data File: PRO27 , Figure 3/27



3 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON SECONDARY
BEAM ON GRID LINE 2, LOCATION C
305x165x40 Kg/m

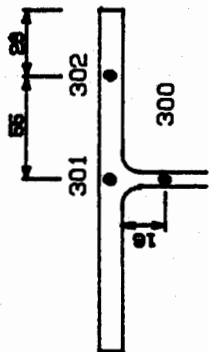
Data File: PRO28 , Figure 3/28



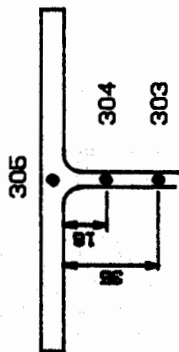
10 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON SECONDARY
 BEAM ON GRID LINE 2, LOCATION D
 305x165x40 Kg/m

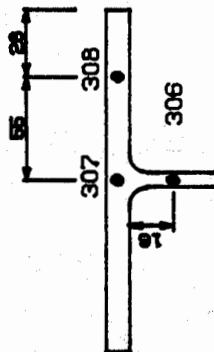
SECTION A-A



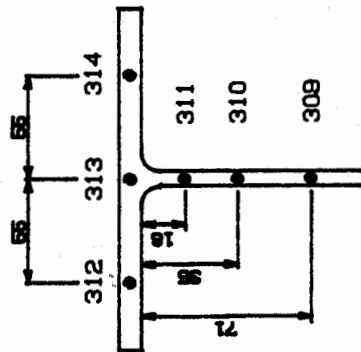
2-D (A)
3 STEEL THERMOCOUPLES



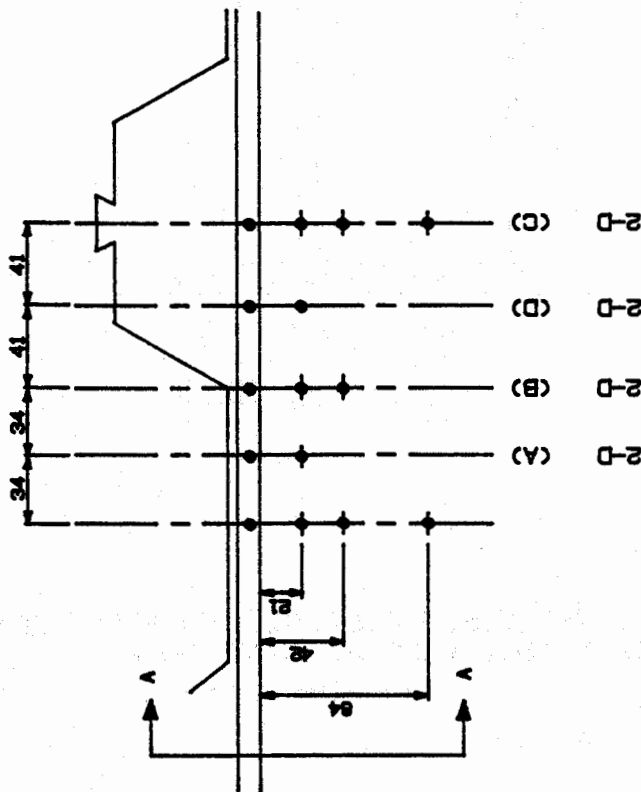
2-D (B)
3 STEEL THERMOCOUPLES



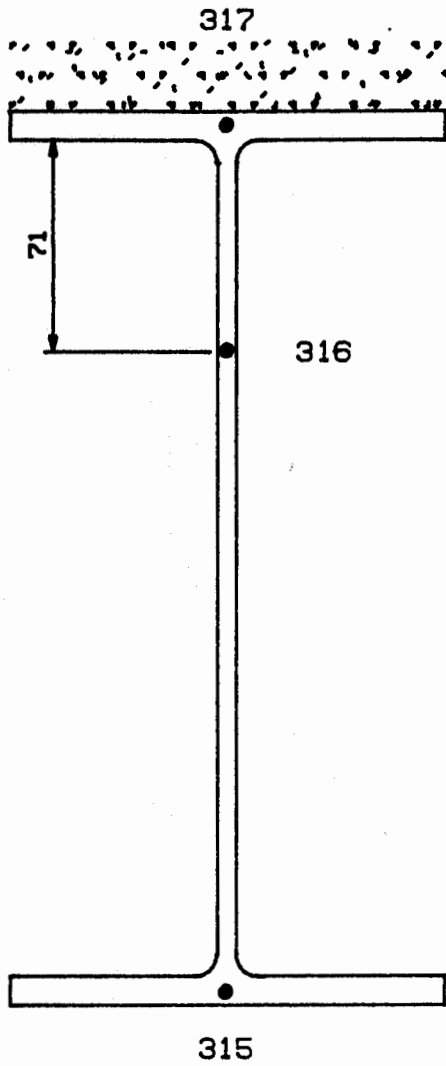
2-D (C)
3 STEEL THERMOCOUPLES



2-D (D)
6 STEEL THERMOCOUPLES



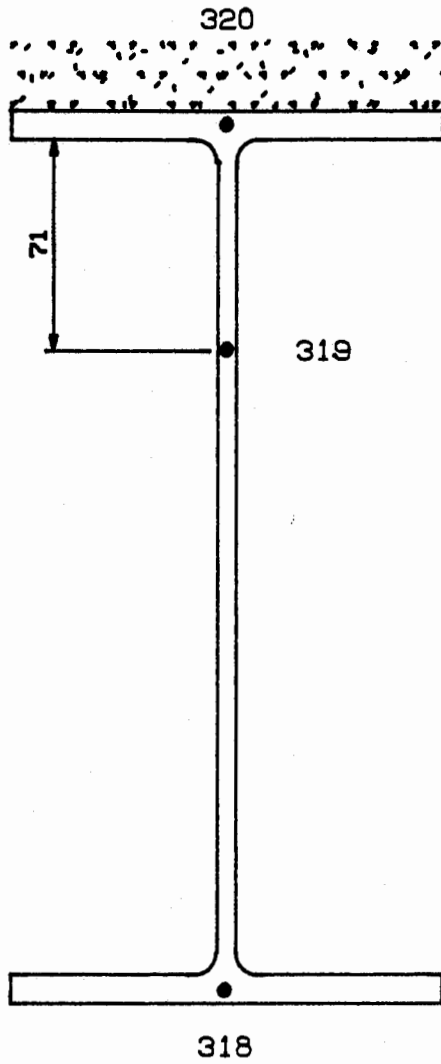
THERMOCOUPLE POSITIONS ON SECONDARY BEAM
ON GRID LINE 2, LOCATION D_{a-d}
305x165x40Kg/m



3 STEEL THERMOCOUPLES

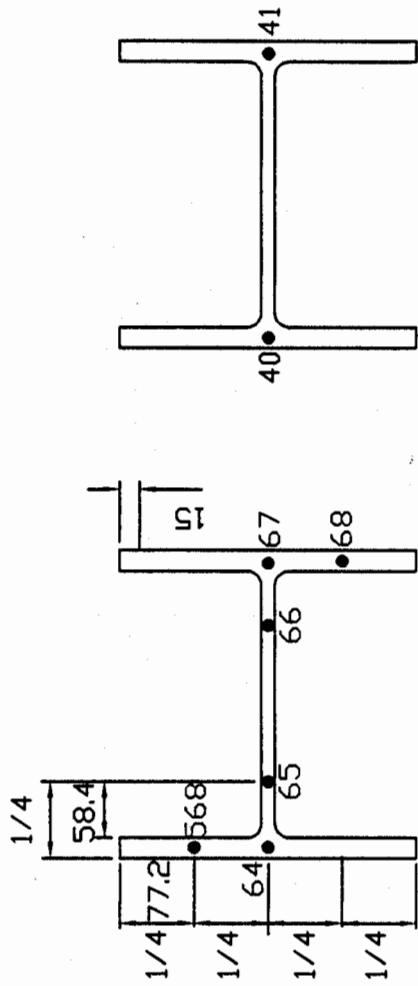
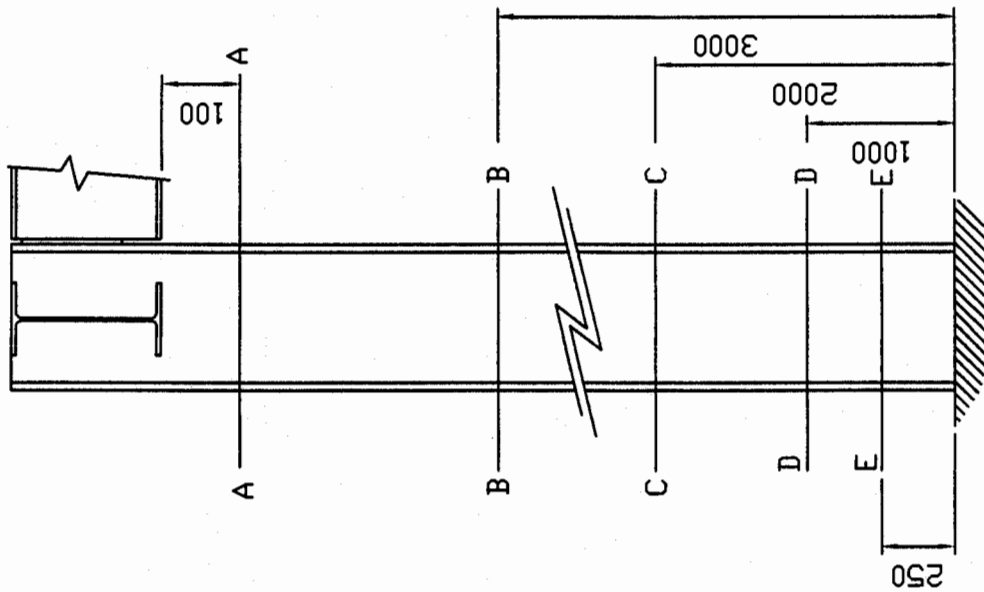
THERMOCOUPLE POSITIONS ON SECONDARY BEAM
ON GRID LINE 2, LOCATION E
305x165x40Kg/m

Data File: PRO31 , Figure 3/31



3 STEEL THERMOCOUPLES

THERMOCOUPLE POSITIONS ON SECONDARY BEAM
ON GRID LINE 2, LOCATION F
305x165x40Kg/m

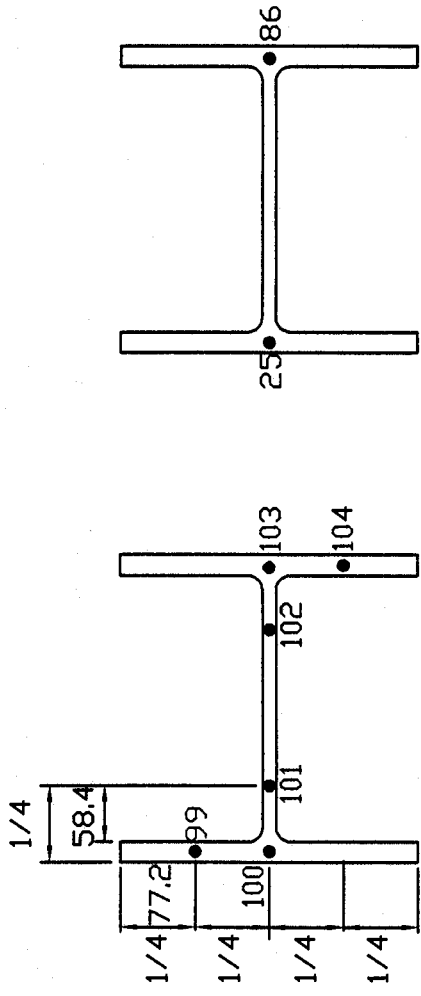
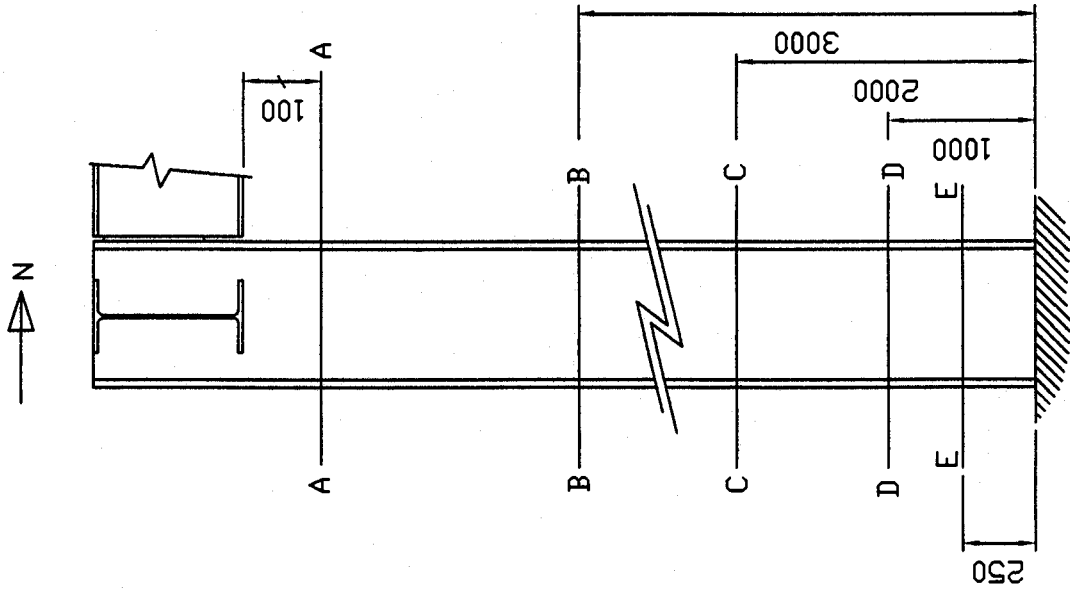


SECTION B-B

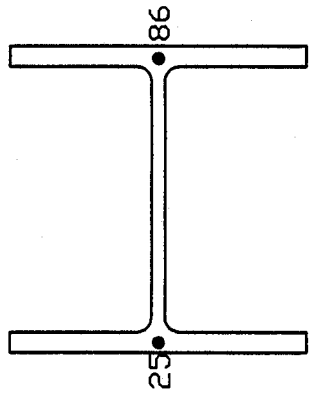
SECTION A-A

EDGE COLUMN AT 1E - 305x305mmx137kg/m

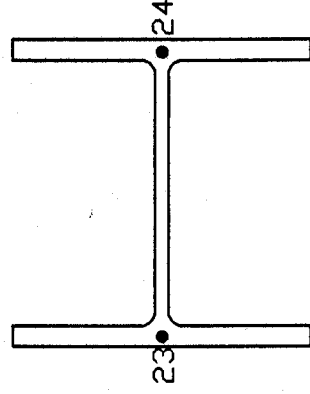
VIEW LOOKING WEST



SECTION C-C



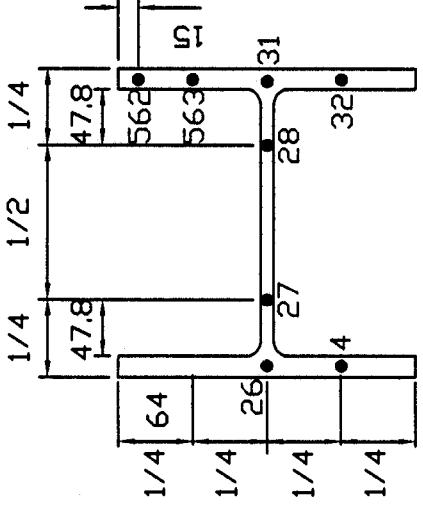
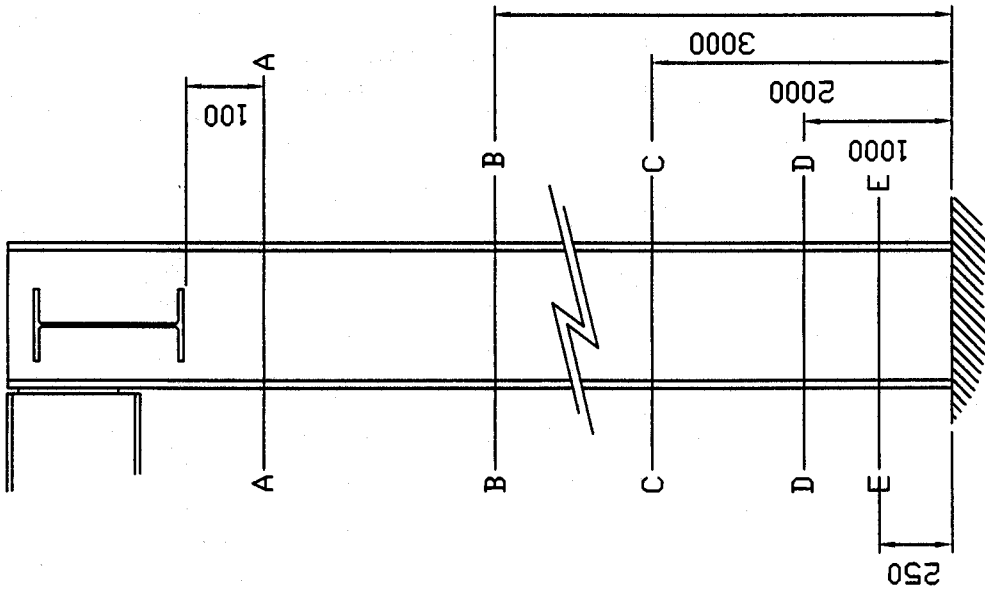
SECTION D-D



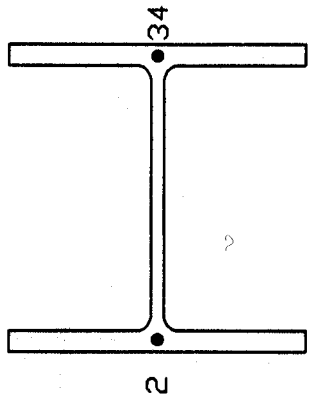
SECTION E-E

EDGE COLUMN AT 1E - 305x305mmx137kg/m

VIEW LOOKING WEST



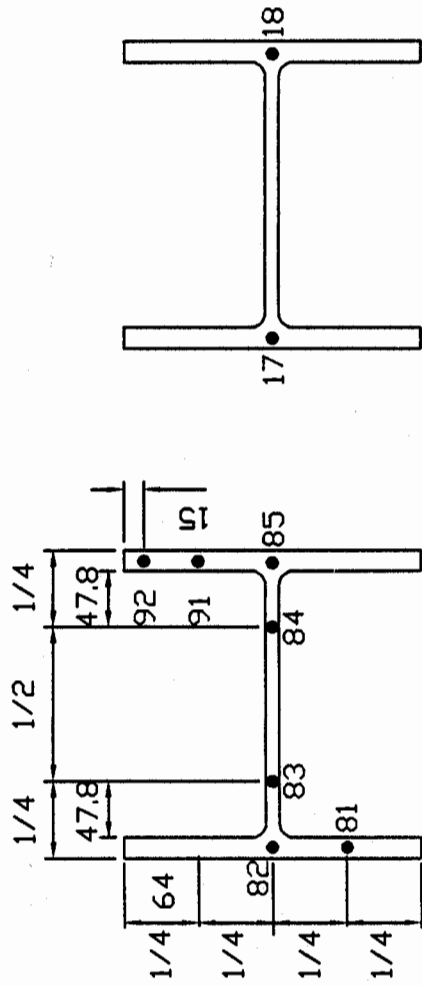
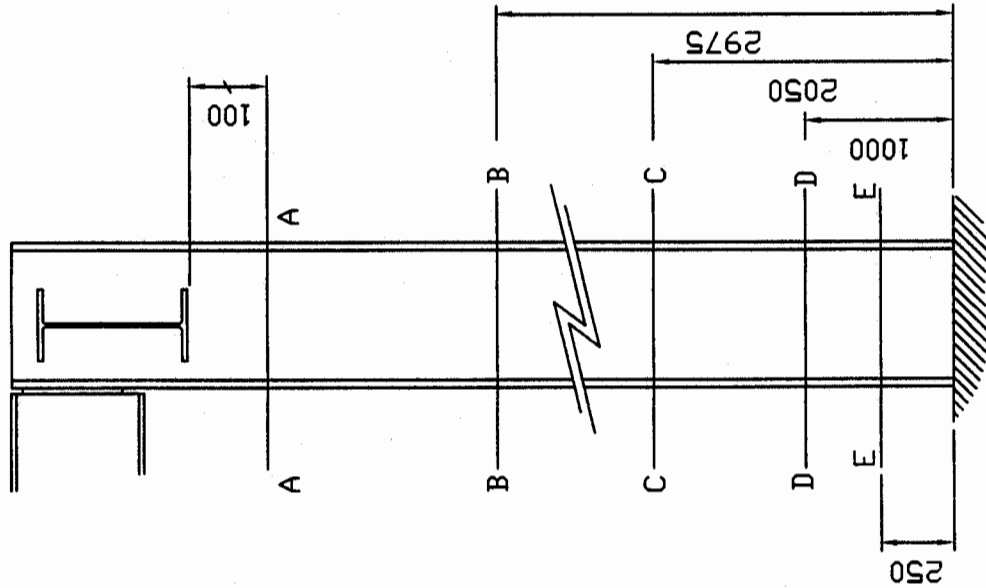
SECTION A-A



SECTION B-B

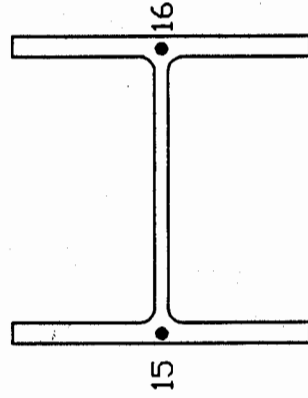
COLUMN AT 1F - 254x254mmx89kg/m

VIEW LOOKING EAST



SECTION C-C

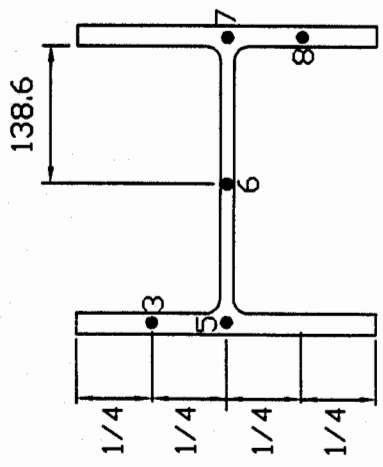
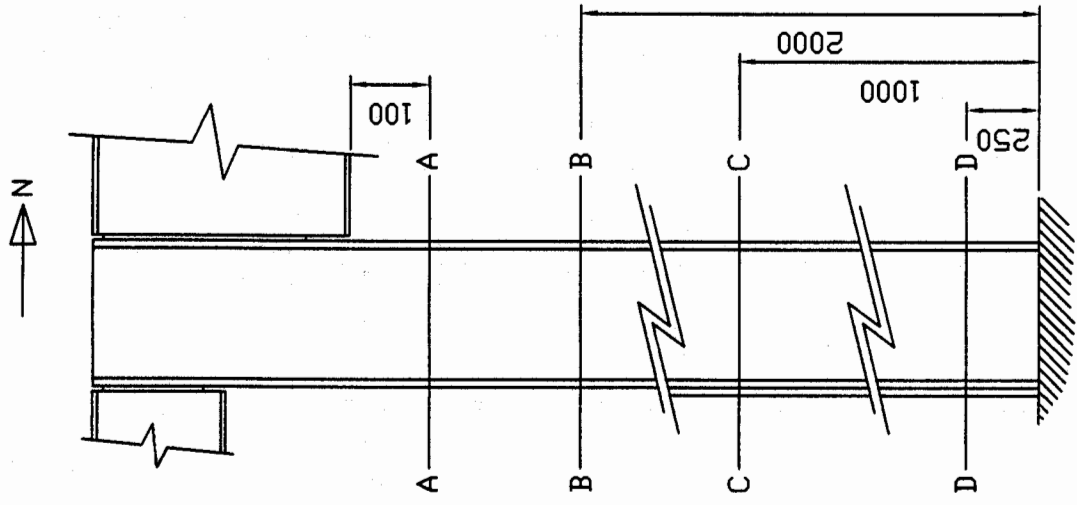
SECTION D-D



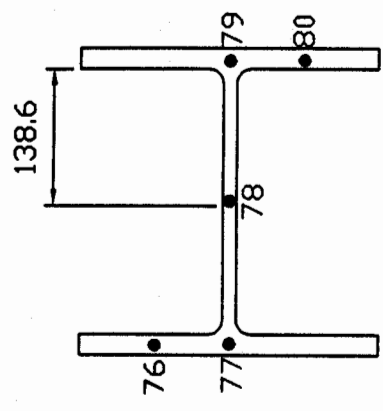
SECTION E-E

COLUMN AT 1F - 254x254mmx89kg/m

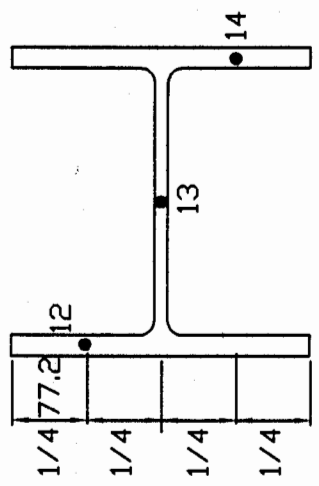
VIEW LOOKING EAST



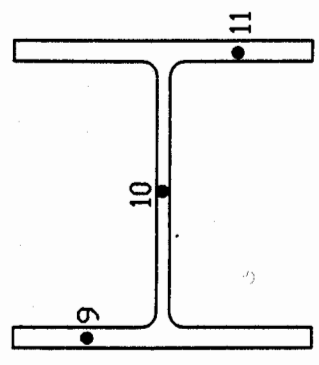
SECTION A-A



SECTION B-B



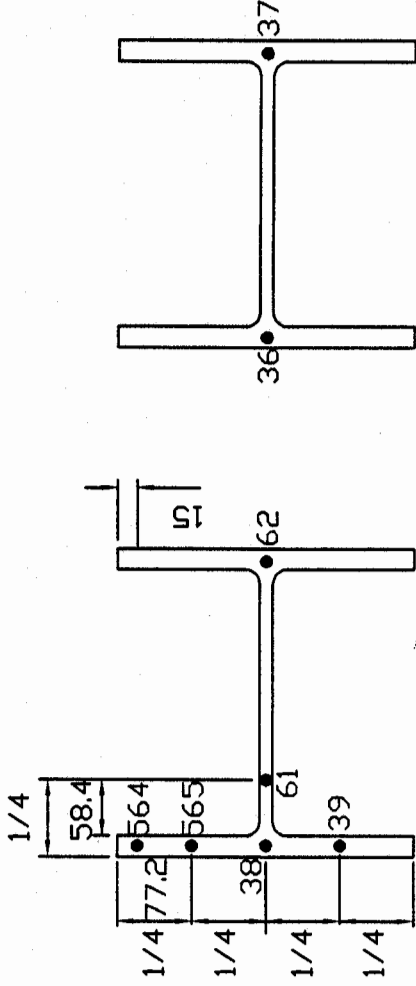
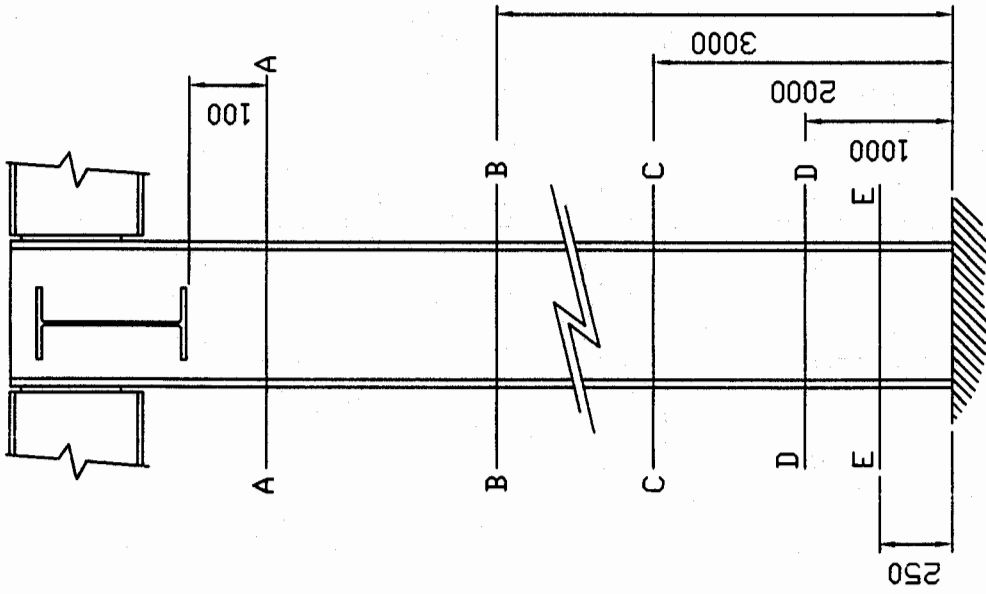
SECTION C-C



SECTION D-D

COLUMN AT 2E - 305 x 305mm x 137 kg/m

VIEW LOOKING WEST

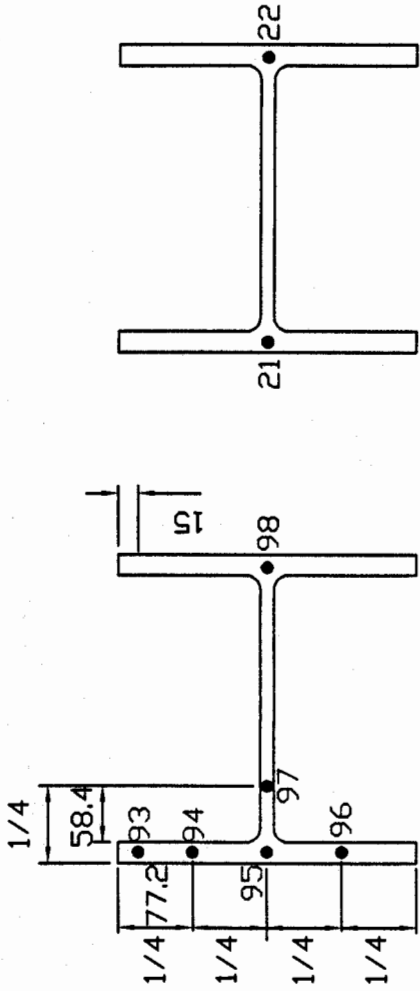
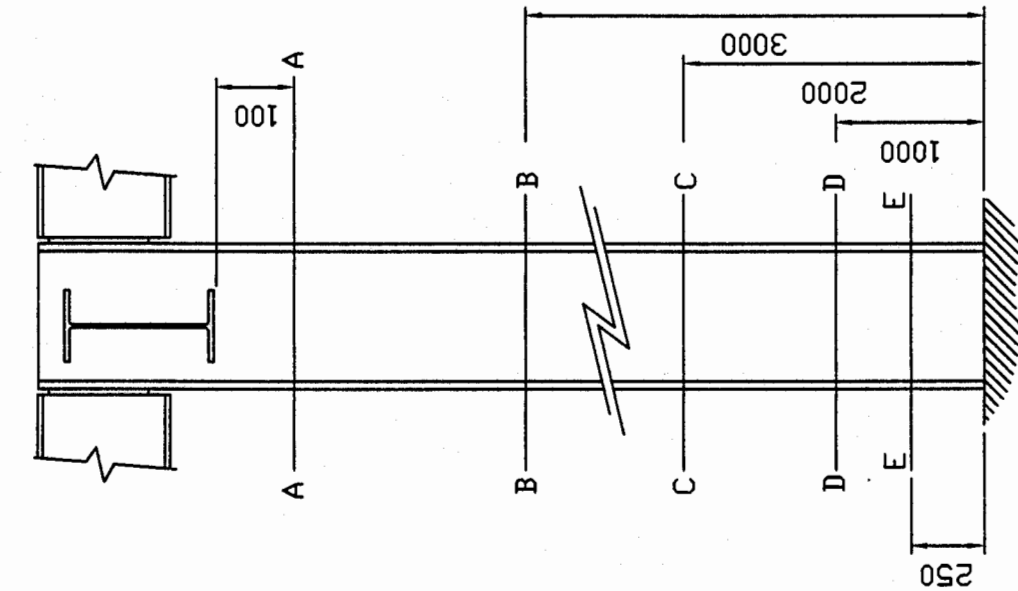


SECTION A-A

SECTION B-B

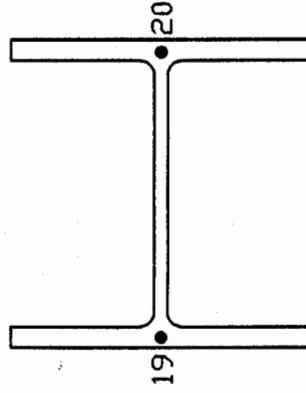
EDGE COLUMN AT 2F - 305x305mmx137kg/m

VIEW LOOKING EAST



SECTION C-C

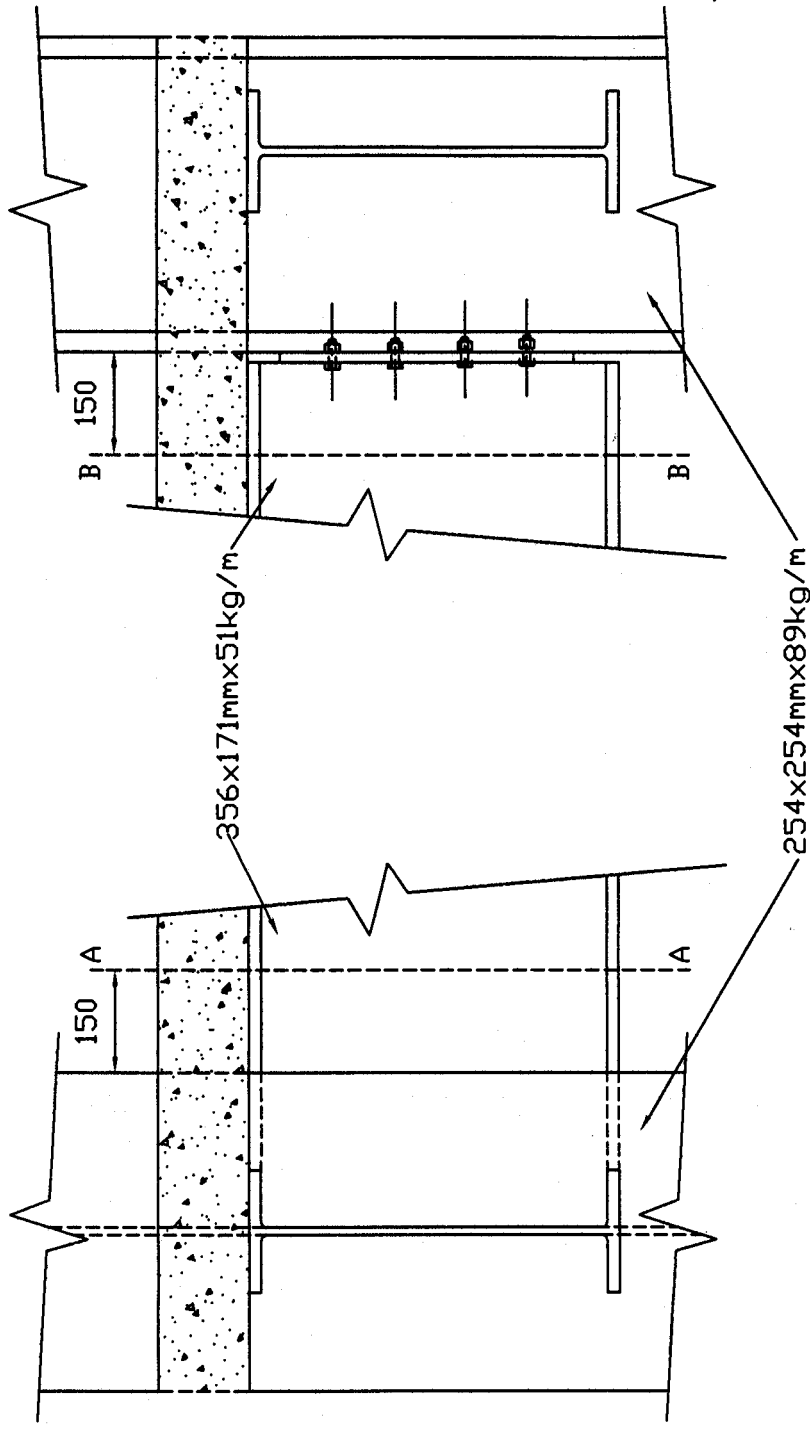
SECTION D-D



SECTION E-E

EDGE COLUMN AT 2F - 305x305mmx137kg/m

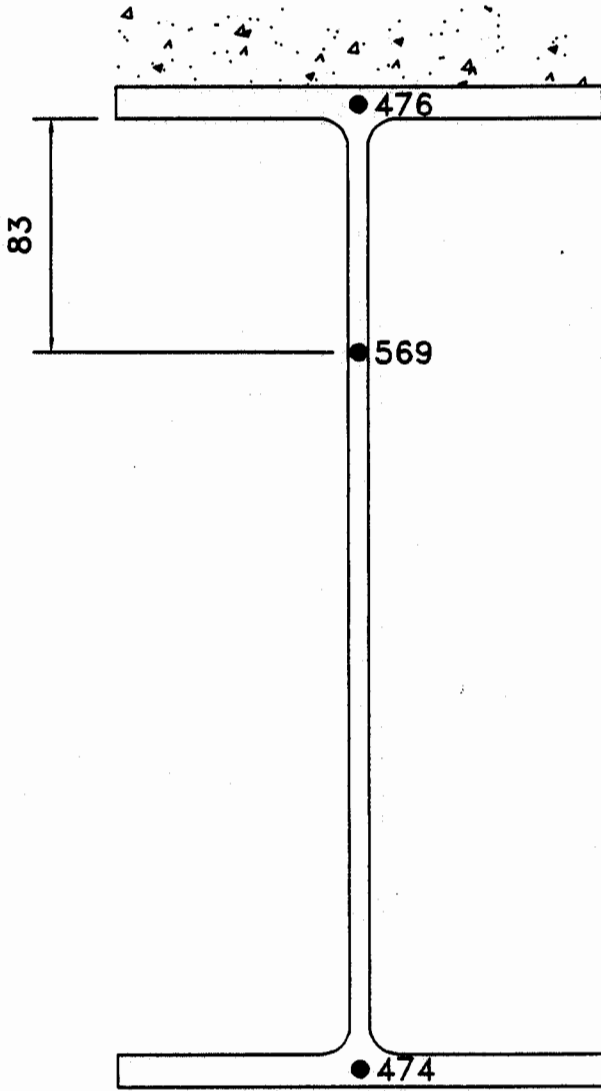
VIEW LOOKING EAST



VIEW LOOKING EAST

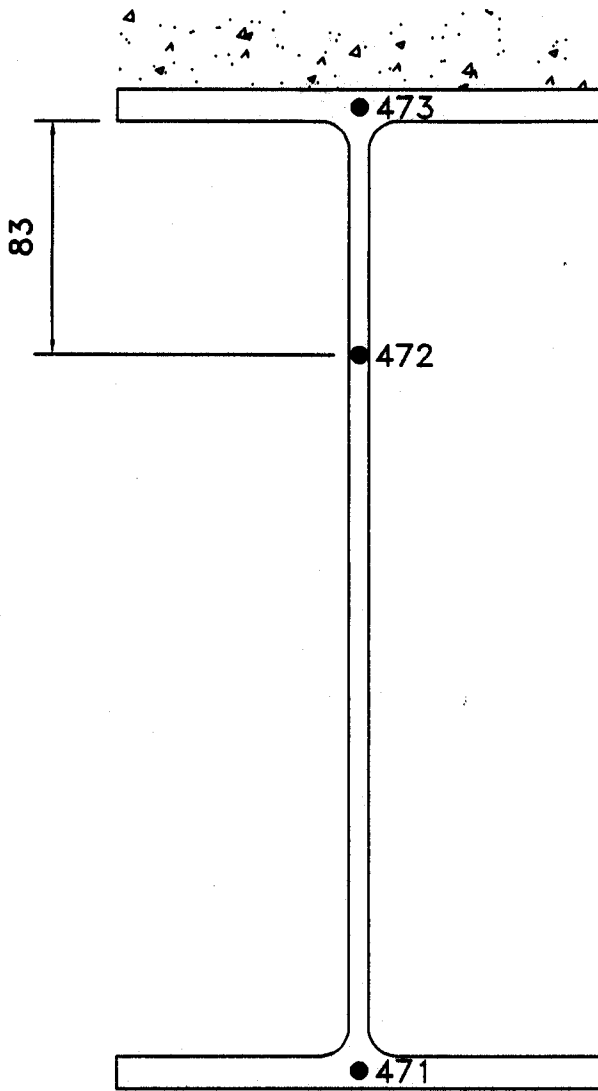
VIEW LOOKING SOUTH

GENERAL ARRANGEMENT AT CONNECTION F1



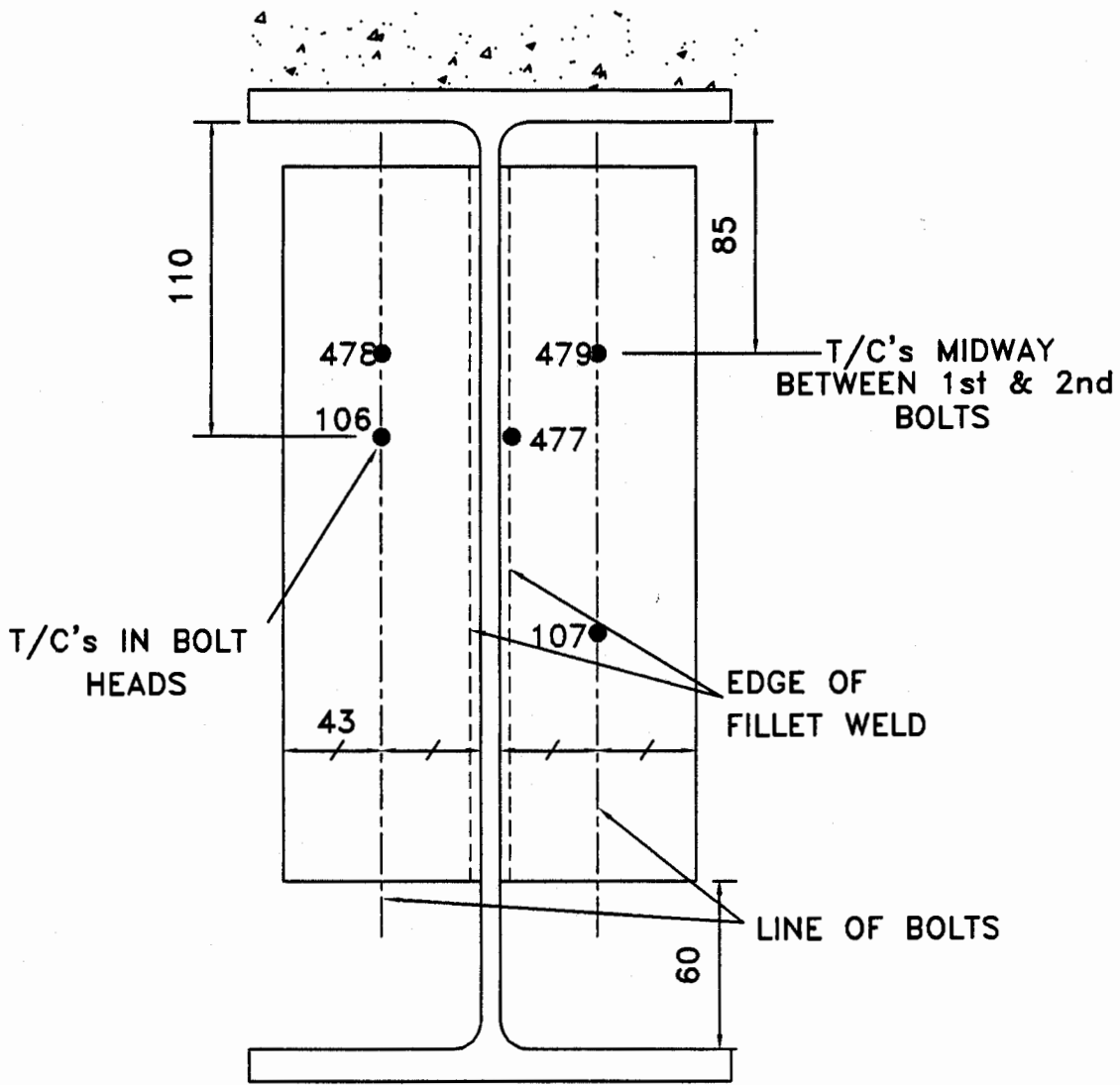
SECTION AT A-A

SECONDARY BEAM : 356x171mmx51kg/m
CONNECTION AT F1 VIEWED EAST

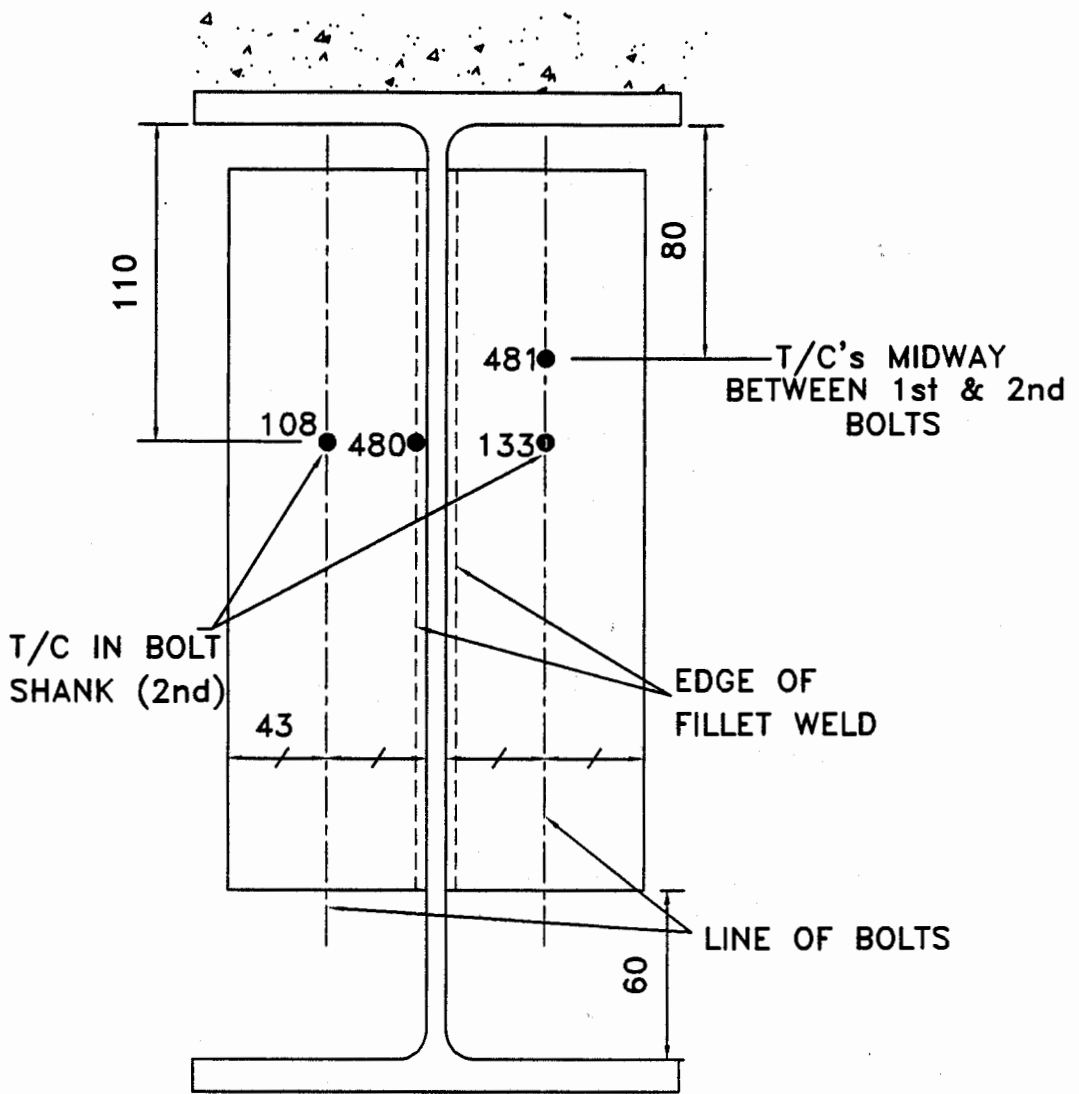


SECTION AT B-B

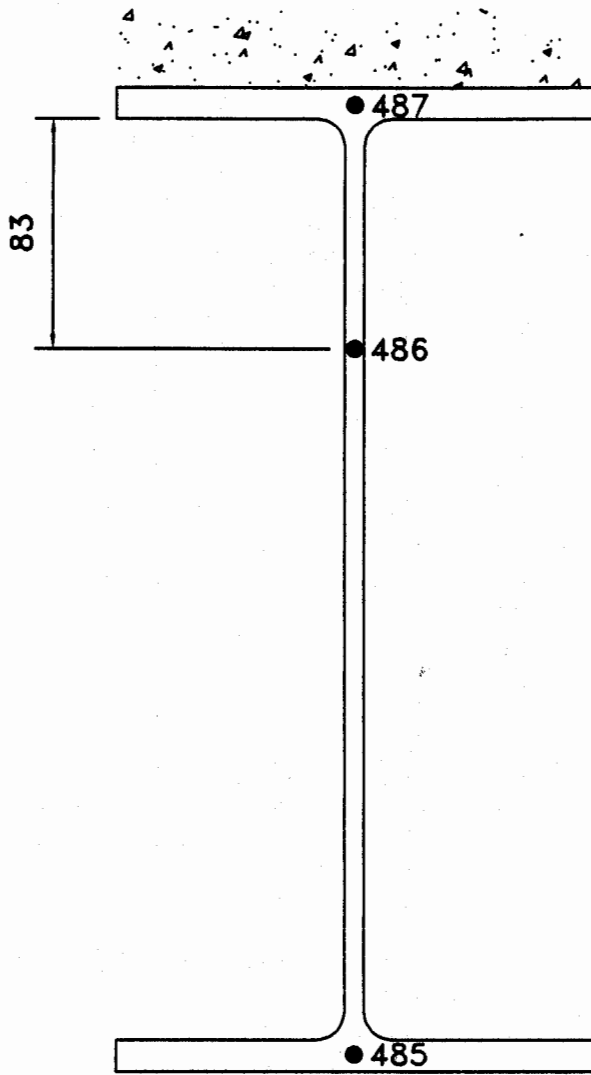
SECONDARY BEAM : 356x171mmx51kg/m
CONNECTION AT F1 VIEWED SOUTH



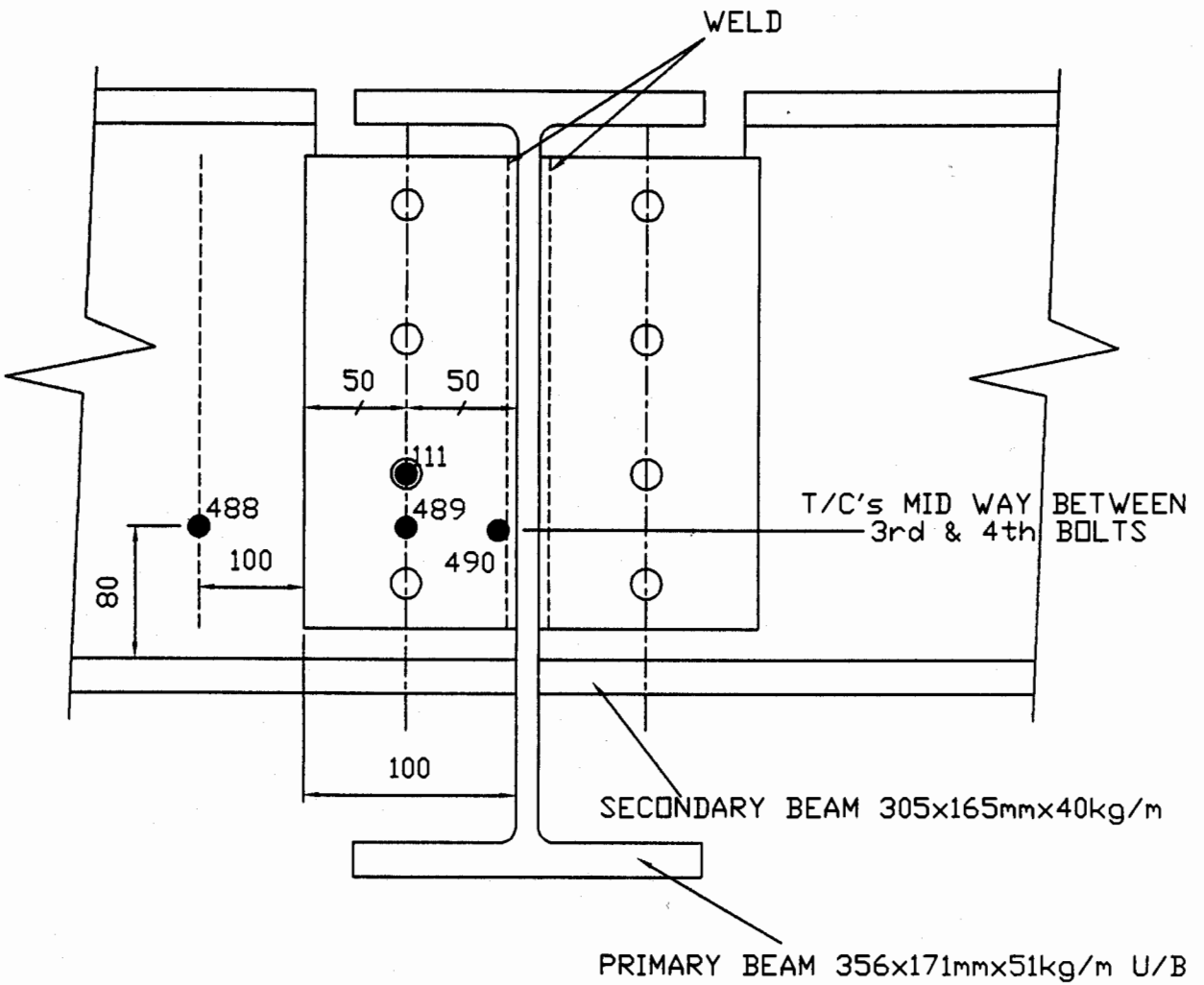
CONNECTION AT F1 : END PLATE
 SECONDARY BEAM : 356x171x51 kg/m
 VIEW LOOKING SOUTH



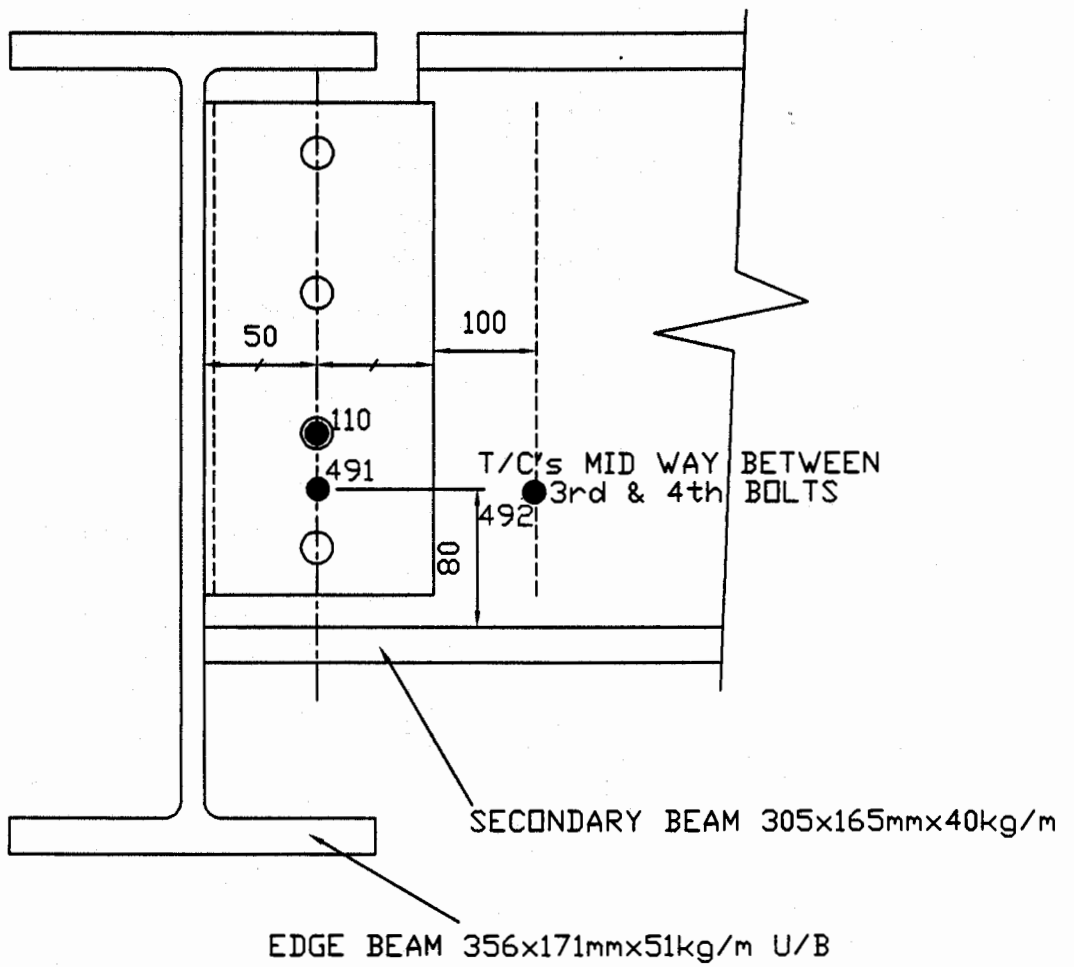
CONNECTION AT F1 : END PLATE
 SECONDARY BEAM : 356x171x51 kg/m
 VIEW LOOKING EAST



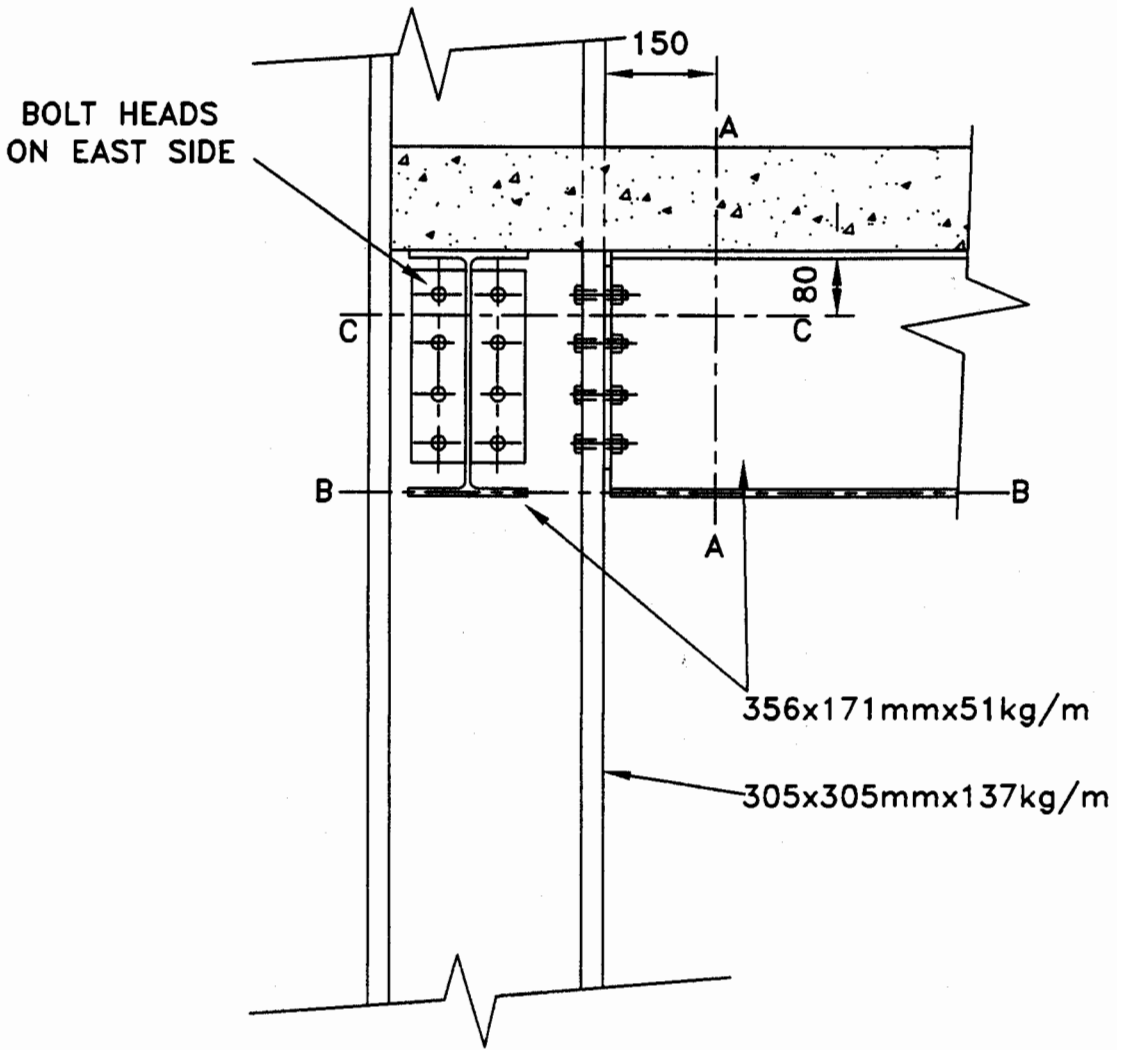
DETAIL AT FIN PLATE CONNECTION AT E-1/2
VIEW ON GRID LINE E 100mm FROM WELD
NORTH SIDE OF CONNECTION - 356x171mmx51kg/m



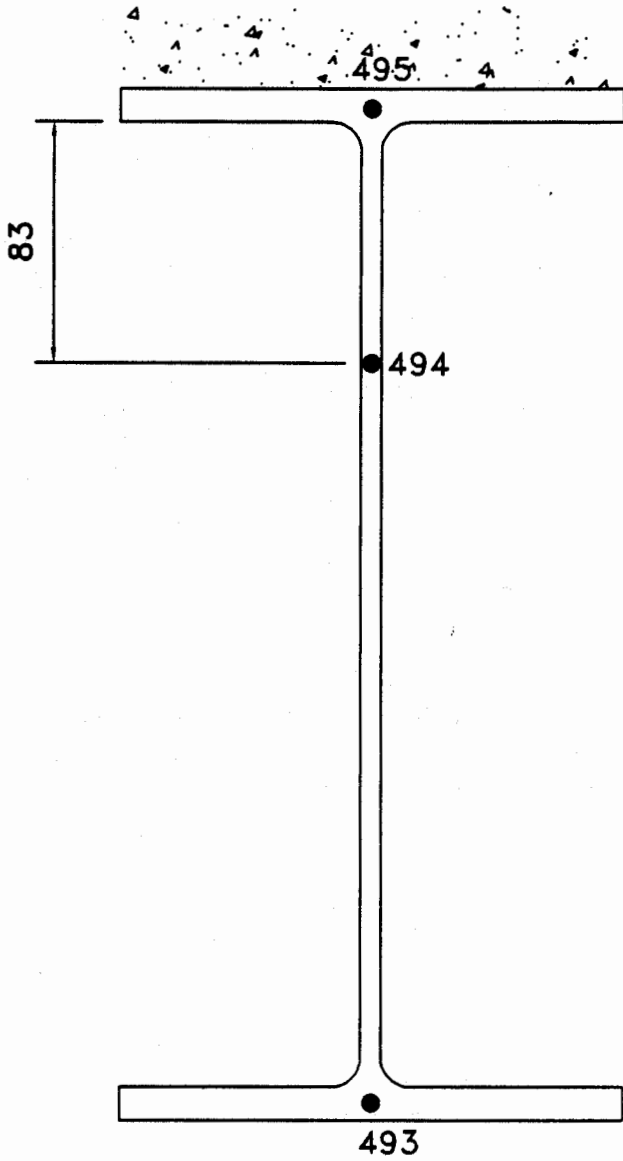
DETAIL AT FIN PLATE CONNECTION AT E-1/2
VIEWED LOOKING SOUTH



DETAIL AT FIN PLATE CONNECTION AT F-1/2
VIEWED LOOKING SOUTH



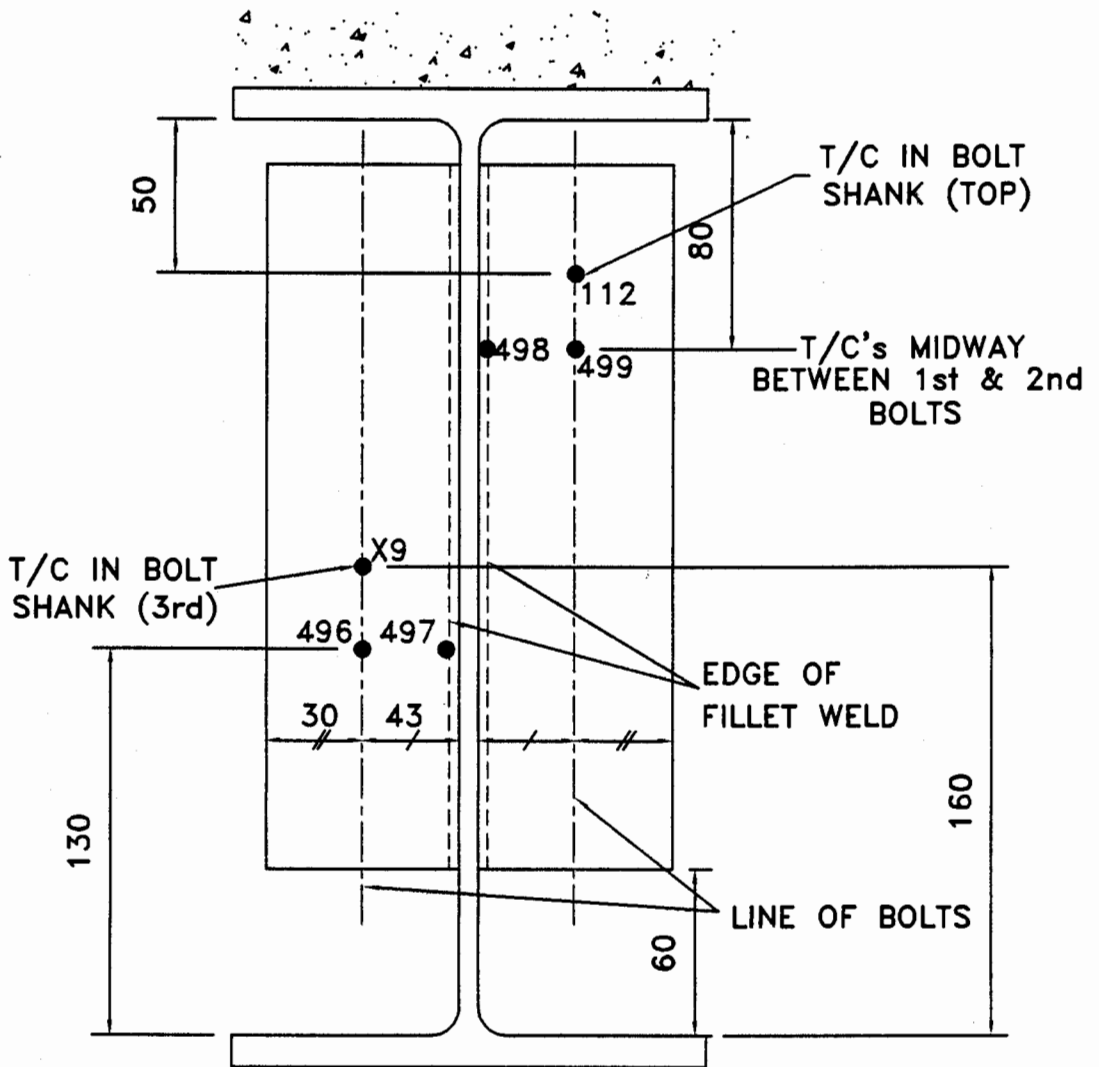
GENERAL ARRANGEMENT - CONNECTION AT COLUMN E1



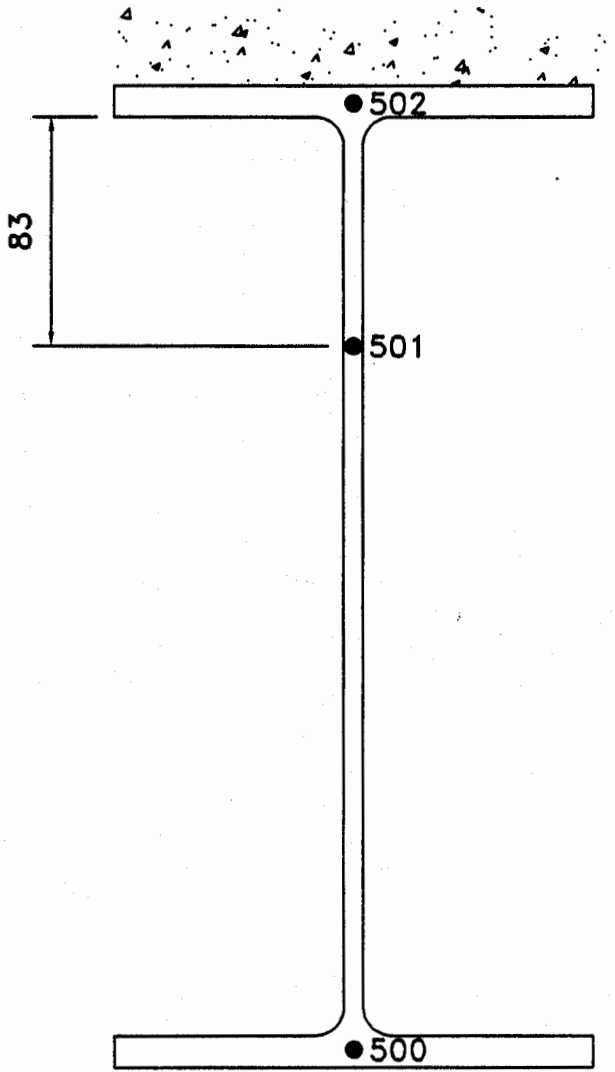
SECTION A-A
150mm FROM
END PLATE

CONNECTION DETAIL AT COLUMN E1
PRIMARY BEAM : 356x171mmx51kg/m
VIEW LOOKING SOUTH

Data File: PRO40 , Figure 3/40_1

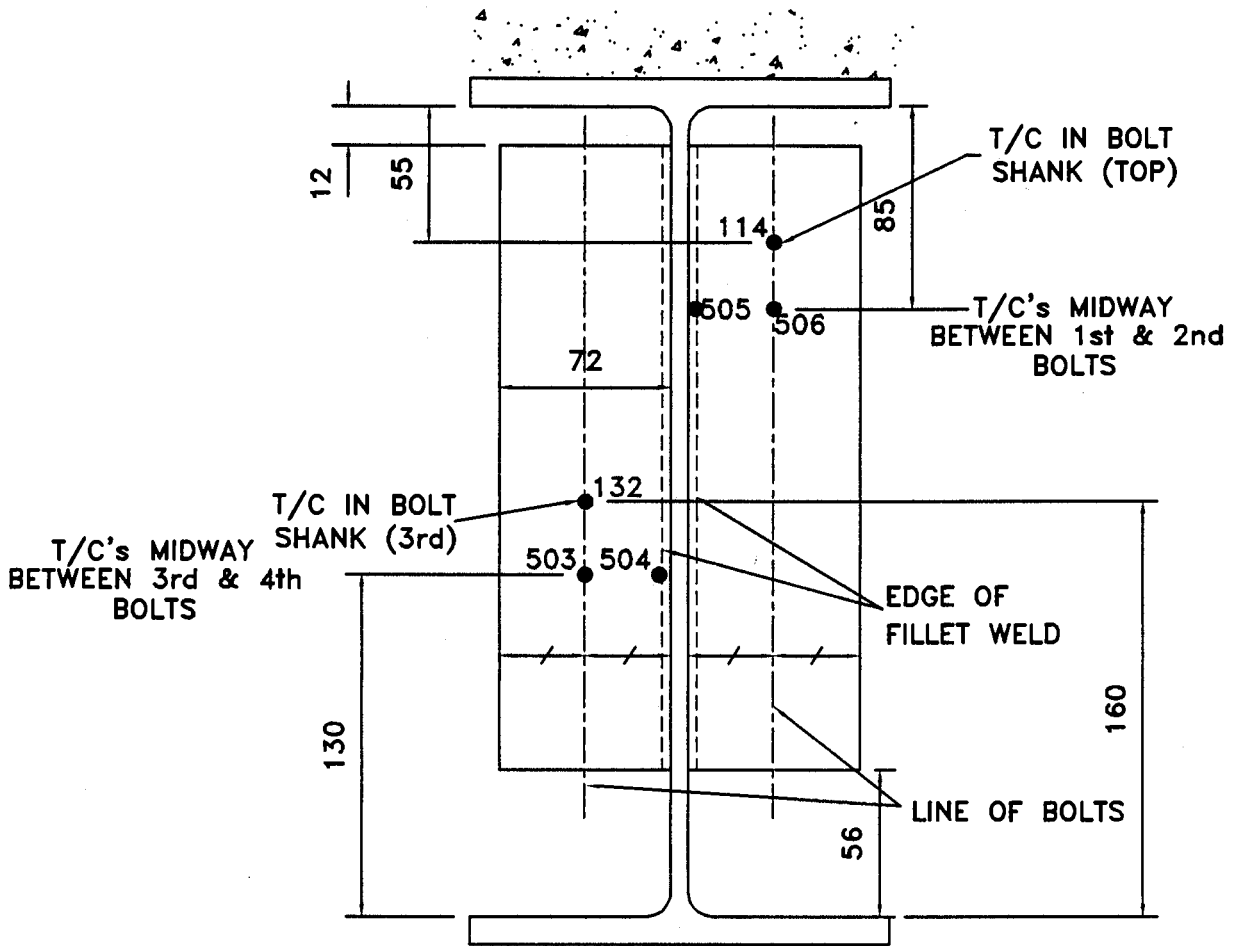


CONNECTION DETAIL AT COLUMN E1
 PRIMARY BEAM : 356x171x51 kg/m
 VIEW LOOKING SOUTH

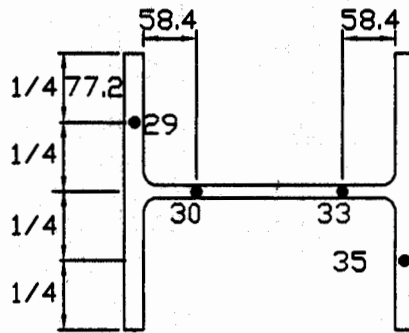
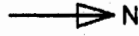


150mm FROM
ENDPLATE

CONNECTION AT COLUMN E1
EDGE BEAM : 356x171mmx51kg/m
VIEW LOOKING EAST

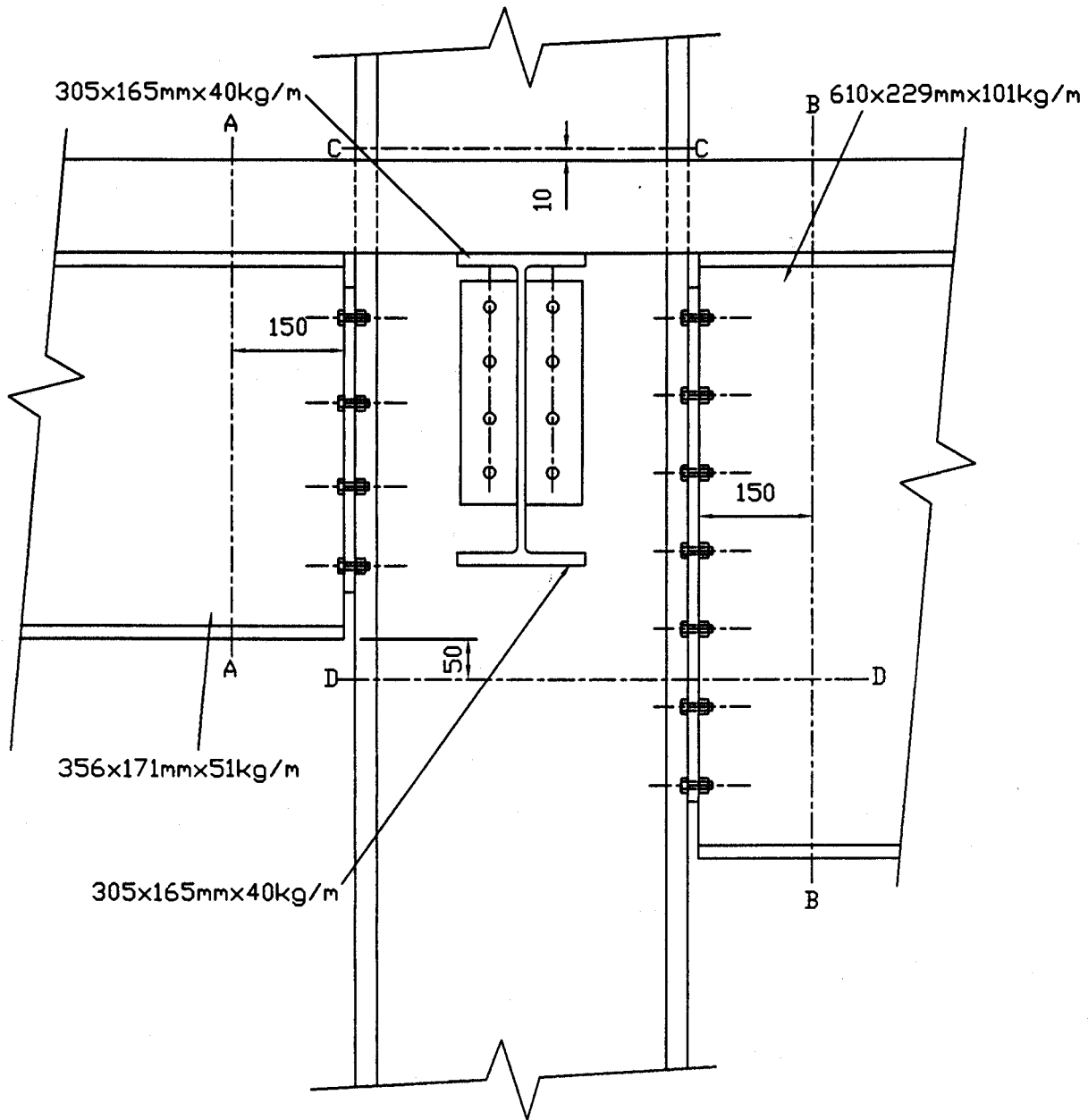


CONNECTION DETAIL AT COLUMN E1
 SECONDARY BEAM : 356x171mmx51kg/m
 VIEW LOOKING WEST

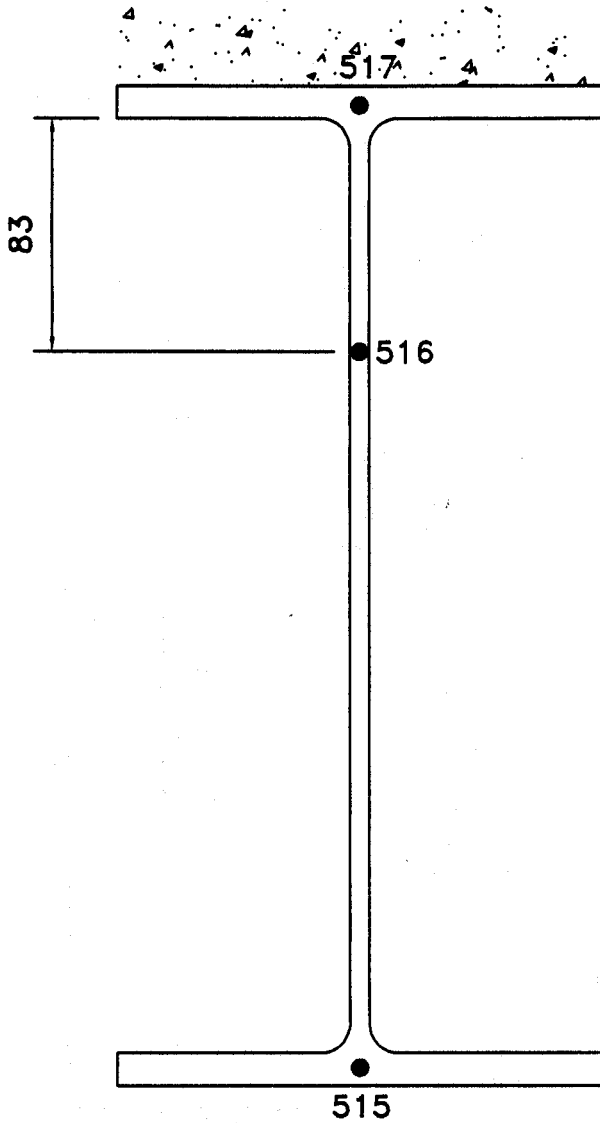


SECTION C-C
BETWEEN 1st AND 2nd BOLTS

DETAIL AT CONNECTION AT COLUMN E1

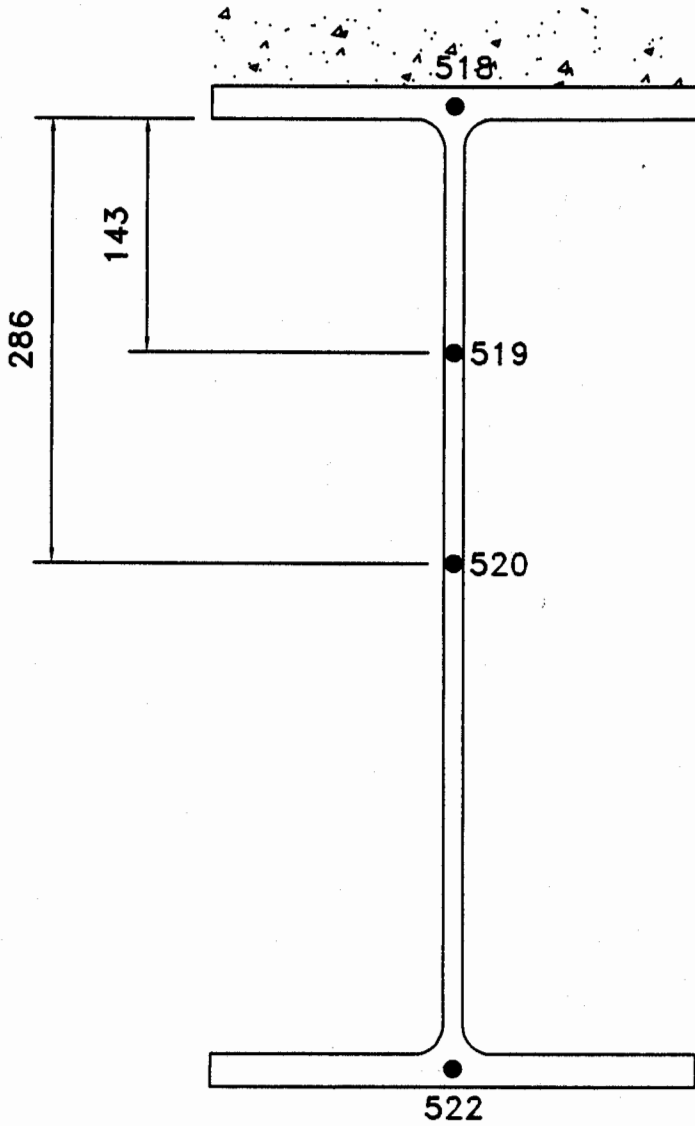


GENERAL ARRANGEMENT OF CONNECTION
 AT COLUMN E2 VIEWED ON GRID LINE 2
 LOOKING WEST



SECTION A-A
150mm FROM
END PLATE

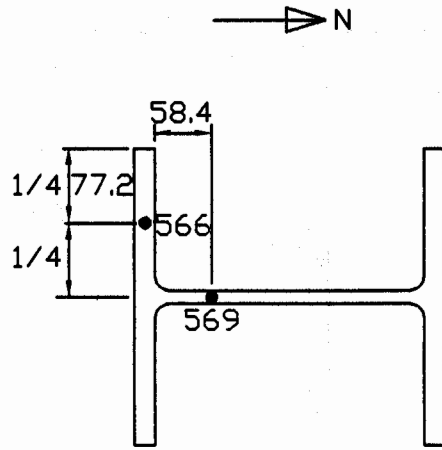
CONNECTION DETAIL AT COLUMN E2
PRIMARY BEAM : 356x171mmx51kg/m
VIEW LOOKING NORTH



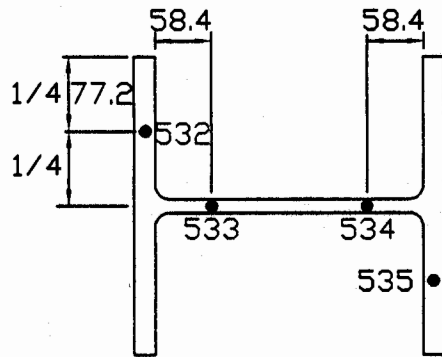
SECTION B-B
150mm FROM
END PLATE

CONNECTION DETAIL AT COLUMN E2
PRIMARY BEAM : 610x229mmx101kg/m
VIEW LOOKING SOUTH

Data File: PRO42 , Figure 3/42_2



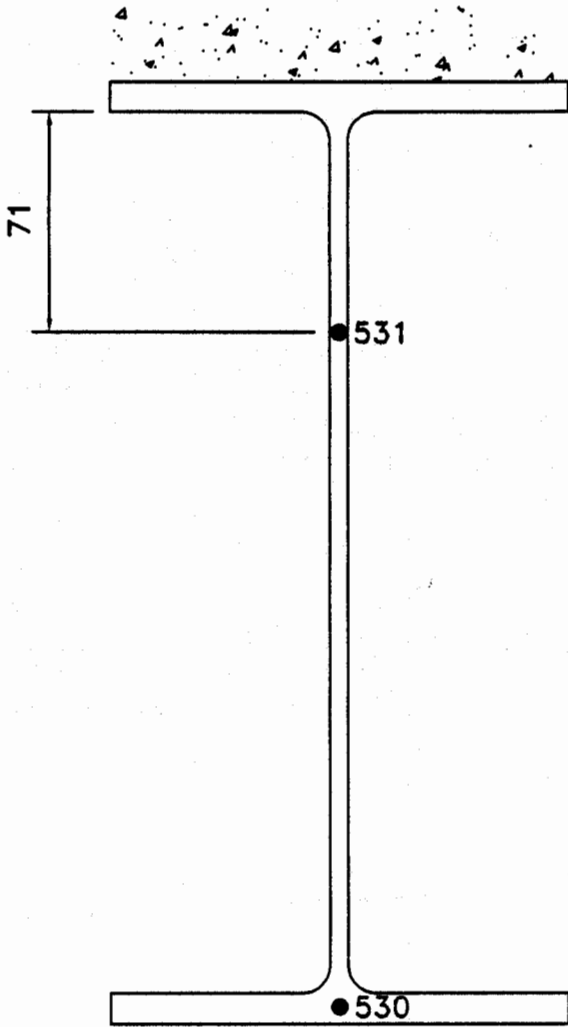
SECTION C-C



SECTION D-D

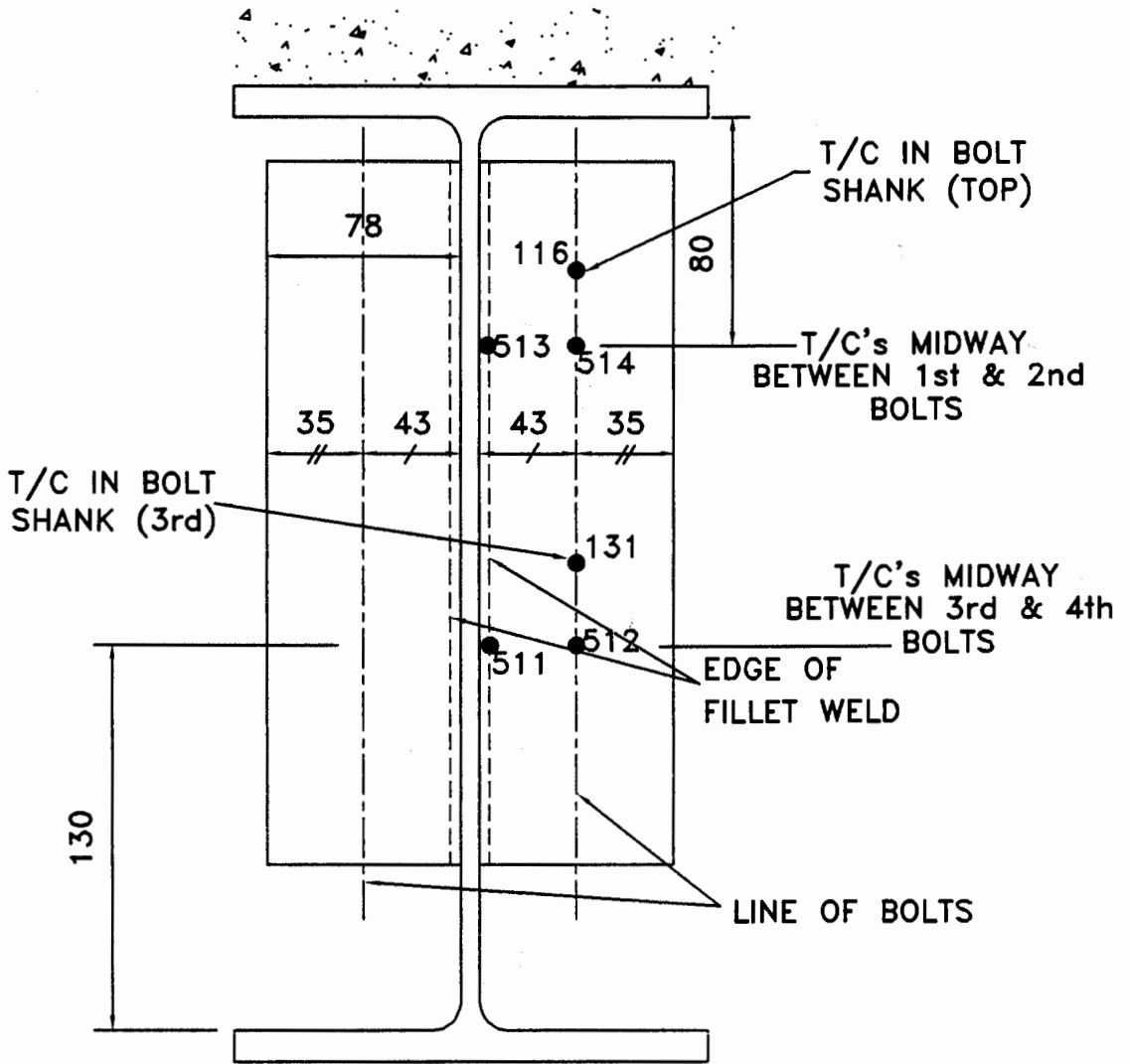
(50mm BELOW LOWER FLANGE OF
356x171mmx51kg/m PRIMARY BEAM)

DETAIL AT CONNECTION AT COLUMN E2

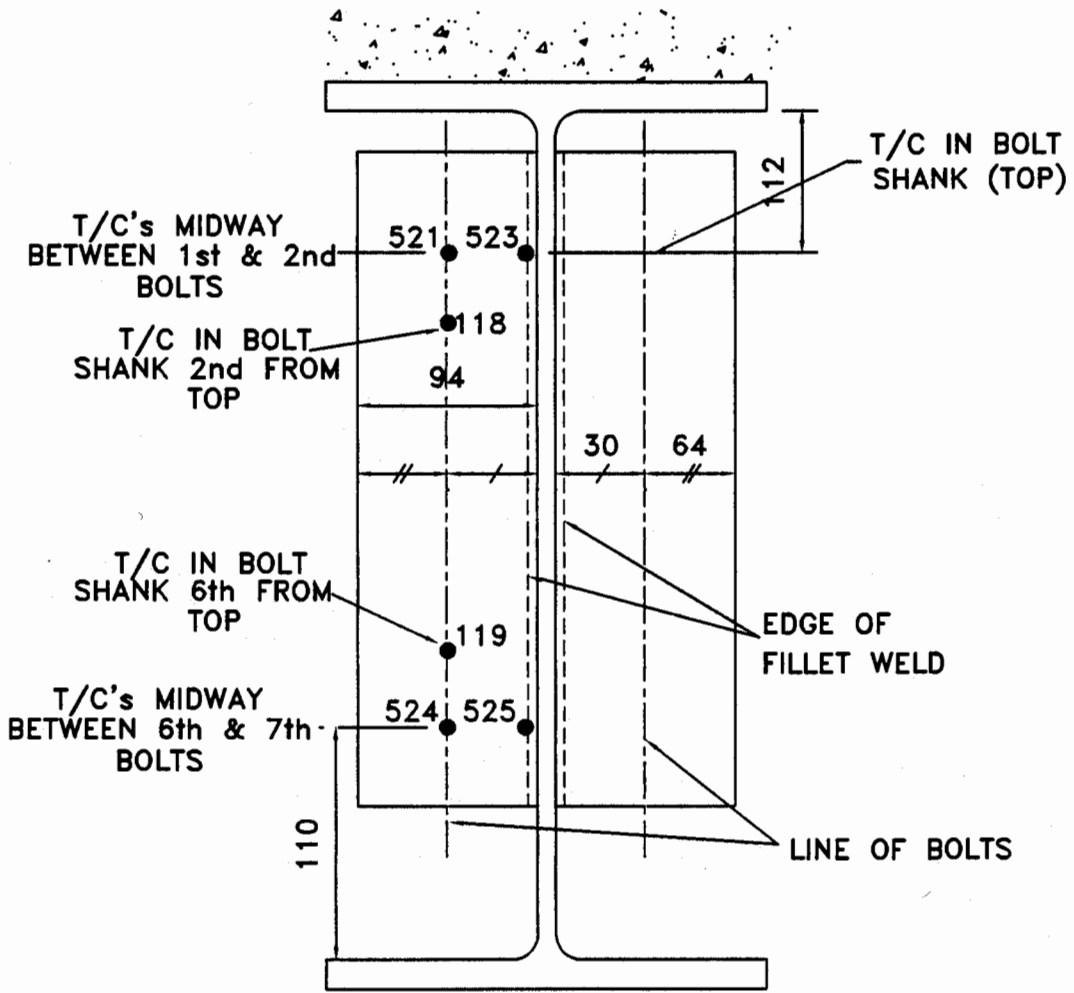


150mm FROM
END PLATE

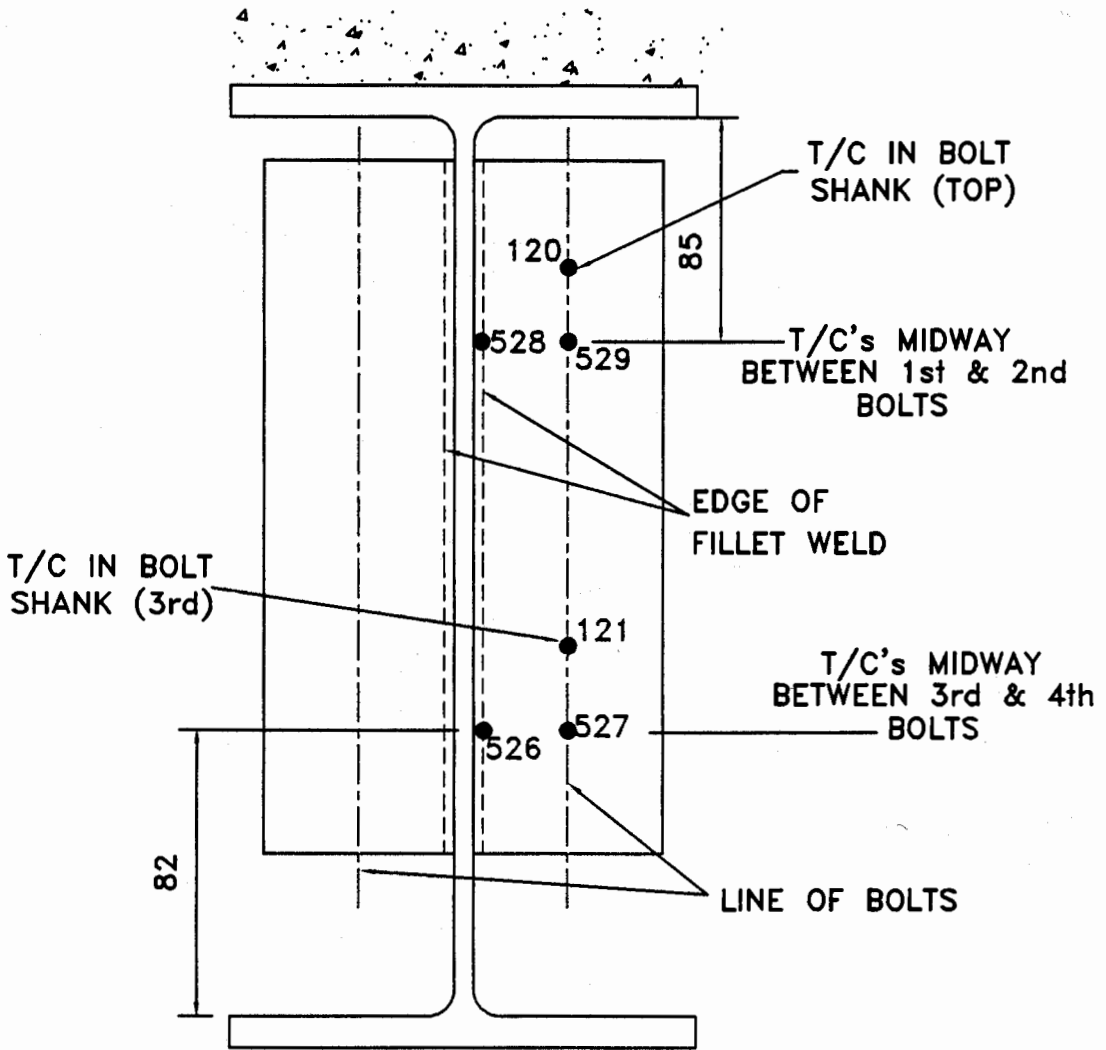
CONNECTION AT COLUMN E2
SECONDARY BEAM : 305x165mmx40kg/m
VIEW LOOKING WEST



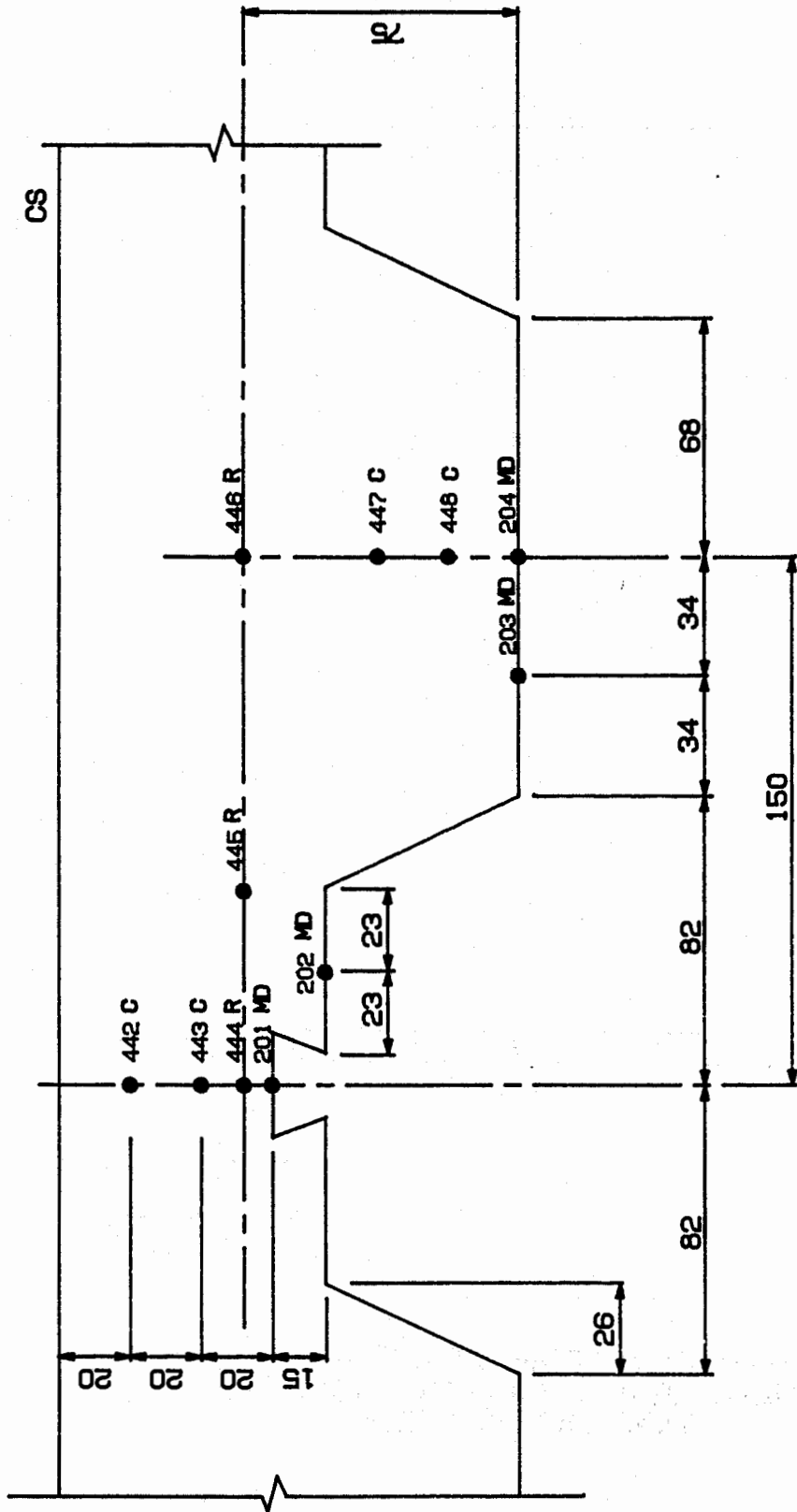
CONNECTION DETAIL AT COLUMN E1
 PRIMARY BEAM : 356x171x51 kg/m
 VIEW LOOKING NORTH



CONNECTION DETAIL AT COLUMN E2
 SECONDARY BEAM : 610x229x101kg/m
 VIEW LOOKING SOUTH



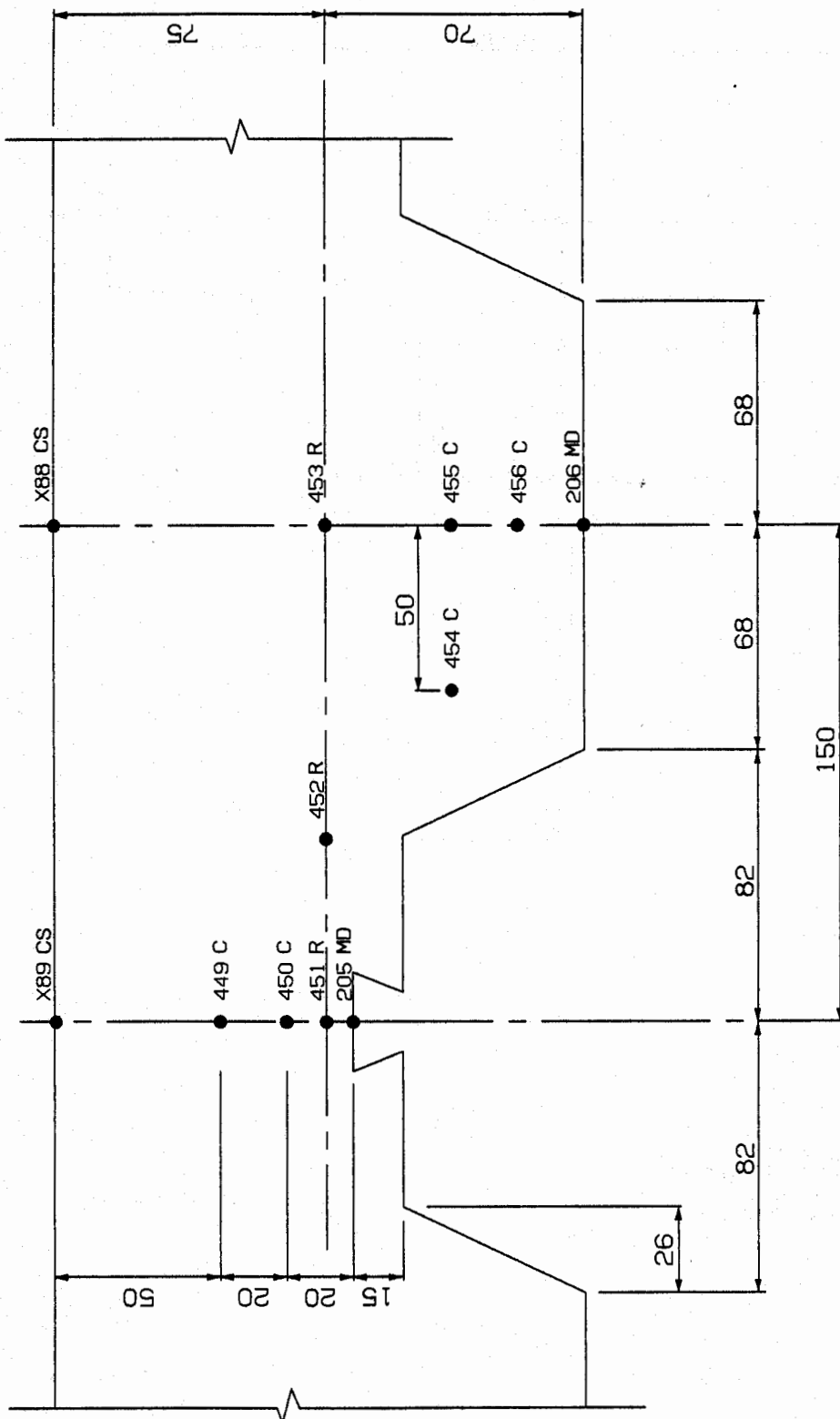
CONNECTION DETAIL AT COLUMN E2
 SECONDARY BEAM : 305x165x40kg/m
 VIEW LOOKING WEST



- KEY
- C - CONCRETE
 - CS - CONCRETE SURFACE
 - MD - METAL DECK
 - R - REINFORCEMENT

11 THERMOCOUPLES

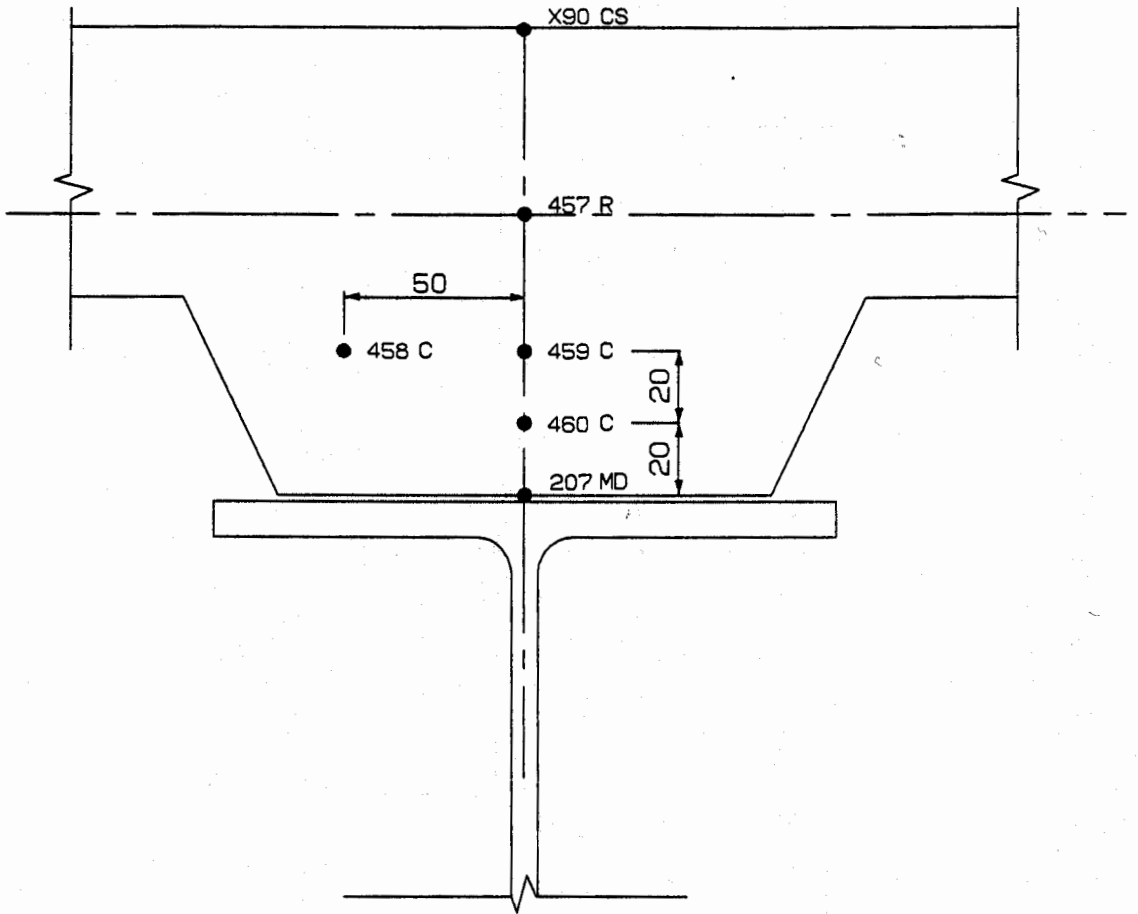
CONCRETE SLAB THERMOCOUPLE LOCATIONS
CS1



KEY
 C = CONCRETE
 1. CS = CONCRETE SURFACE
 2. MD = METAL DECK
 3. R = REINFORCEMENT

12 THERMOCOUPLES

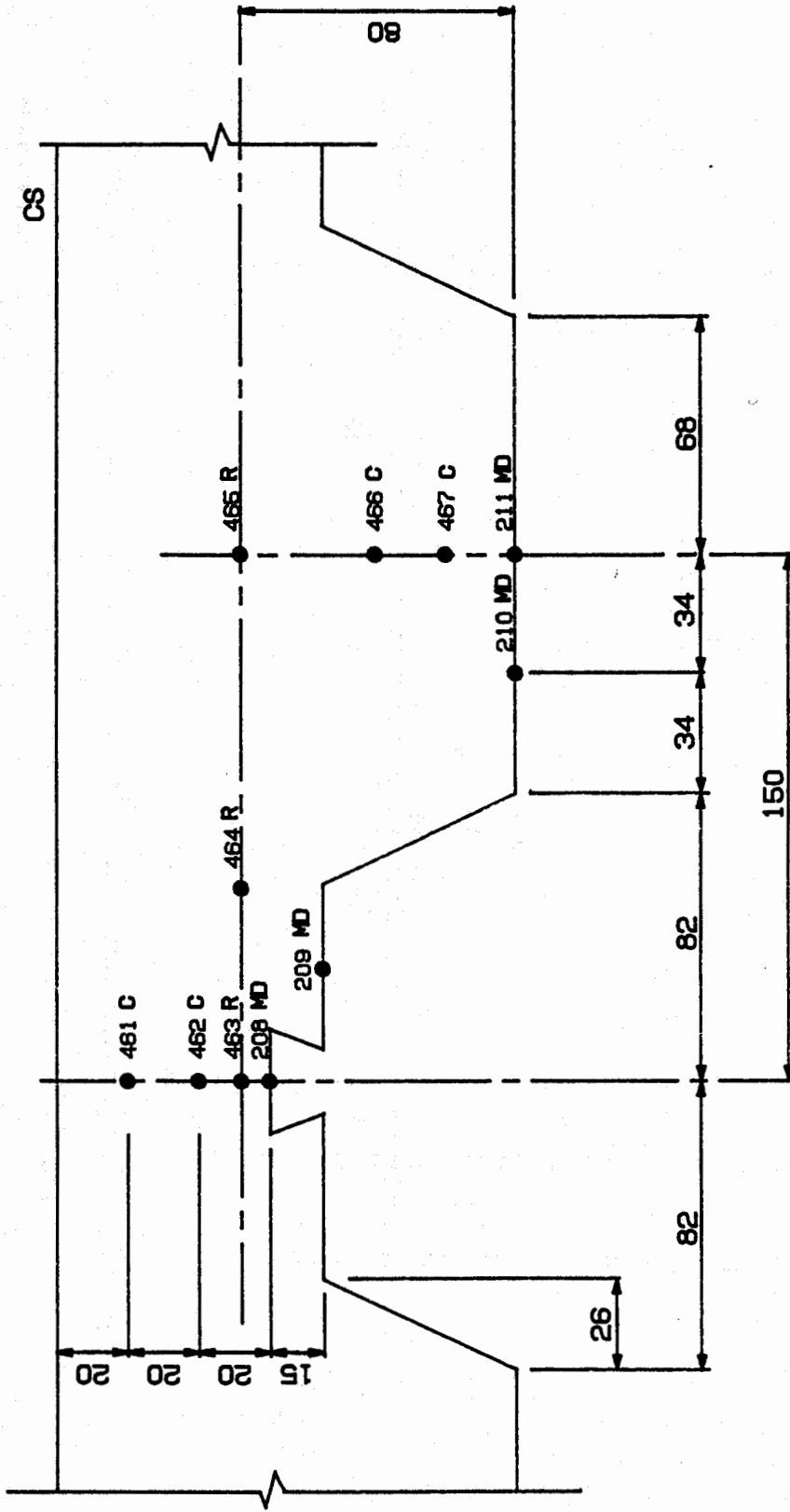
CONCRETE SLAB THERMOCOUPLE LOCATIONS
 CS2



- KEY
- 1. C = CONCRETE
 - 2. CS = CONCRETE SURFACE
 - 3. MD = METAL DECK
 - 4. R = REINFORCEMENT

6 THERMOCOUPLES

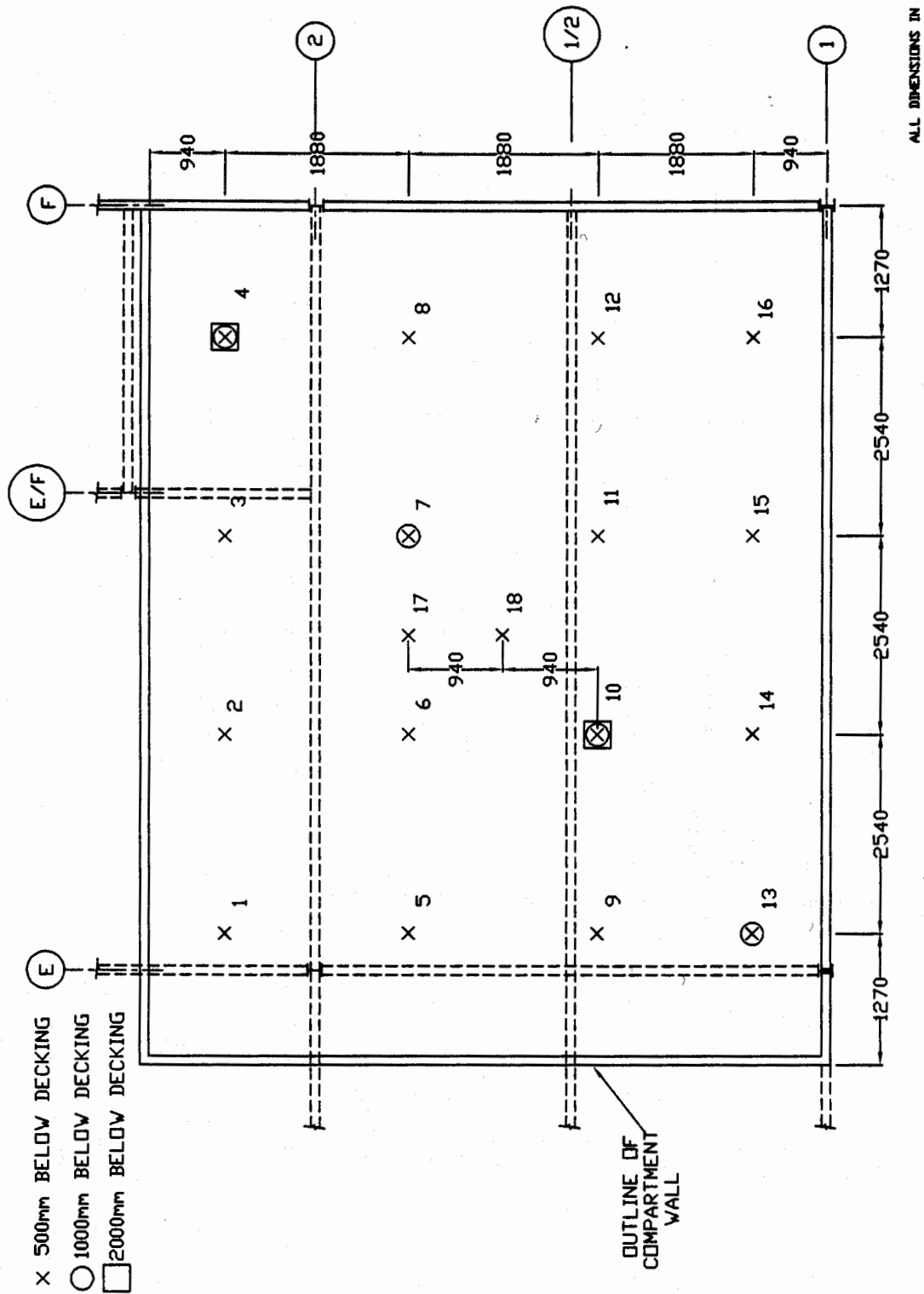
CONCRETE/BEAM THERMOCOUPLE LOCATIONS
 OVER PRIMARY BEAM : CB1
 356x171x51 Kg/m



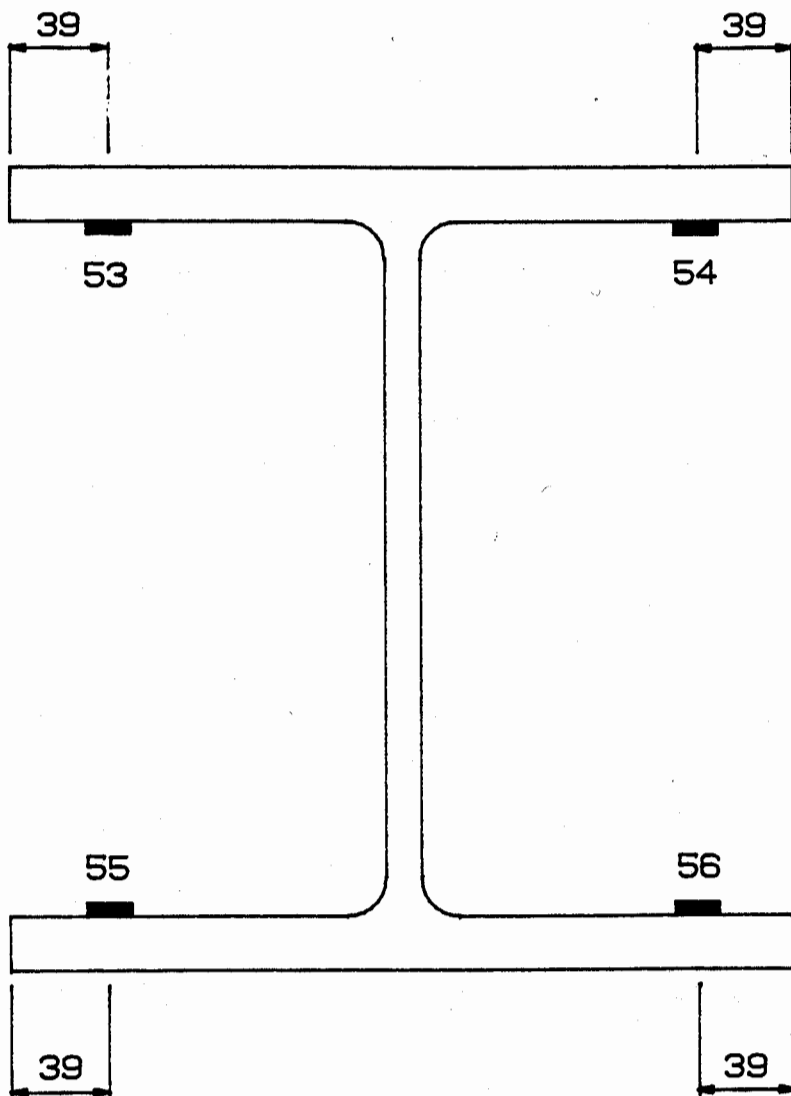
KEY
 1. C - CONCRETE SURFACE
 2. CS - CONCRETE SURFACE
 3. MD - METAL DECK
 4. R - REINFORCEMENT

11 THERMOCOUPLES

CONCRETE/BEAM THERMOCOUPLE LOCATIONS
 CB3



TEST 3 : LOCATIONS FOR MEASURING ATMOSPHERE TEMPERATURES

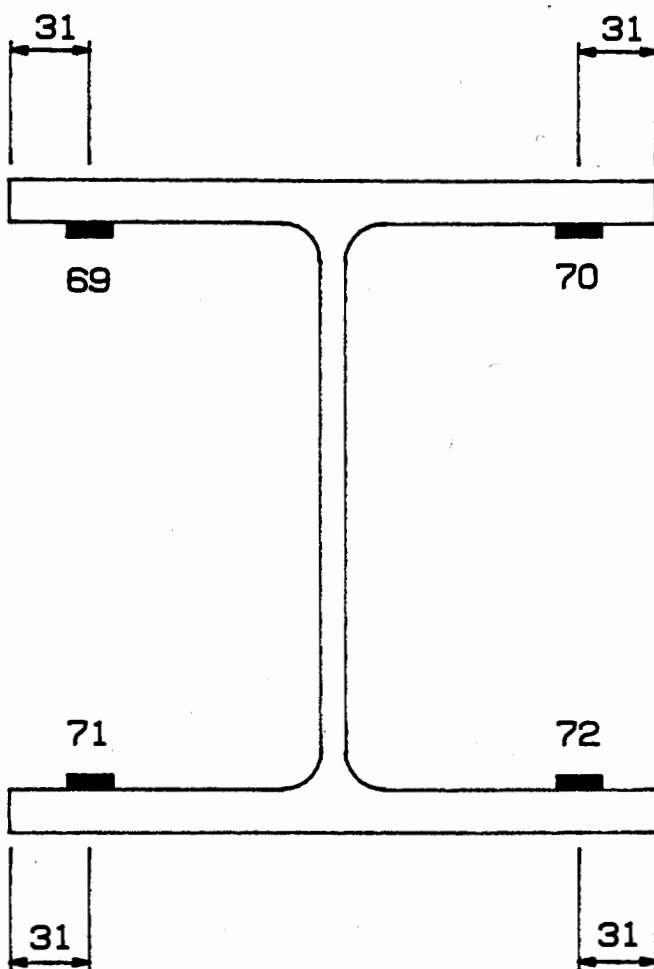


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN E1 300mm
ABOVE GROUND FLOOR SLAB

305x305x137 kg/m

Data File: PRO1 , Figure 3/49

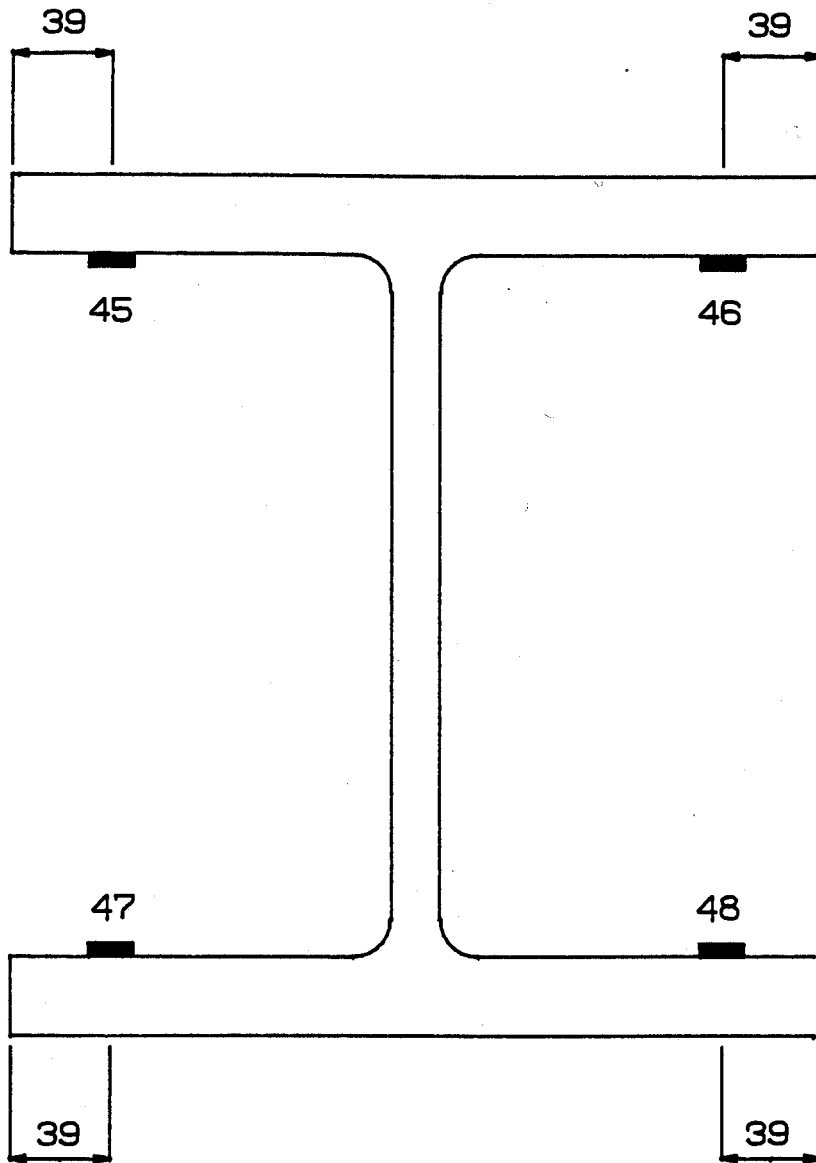


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN F1 300mm
ABOVE GROUND FLOOR SLAB

254x254x89 kg/m

Data File: PRO2 , Figure 3/50

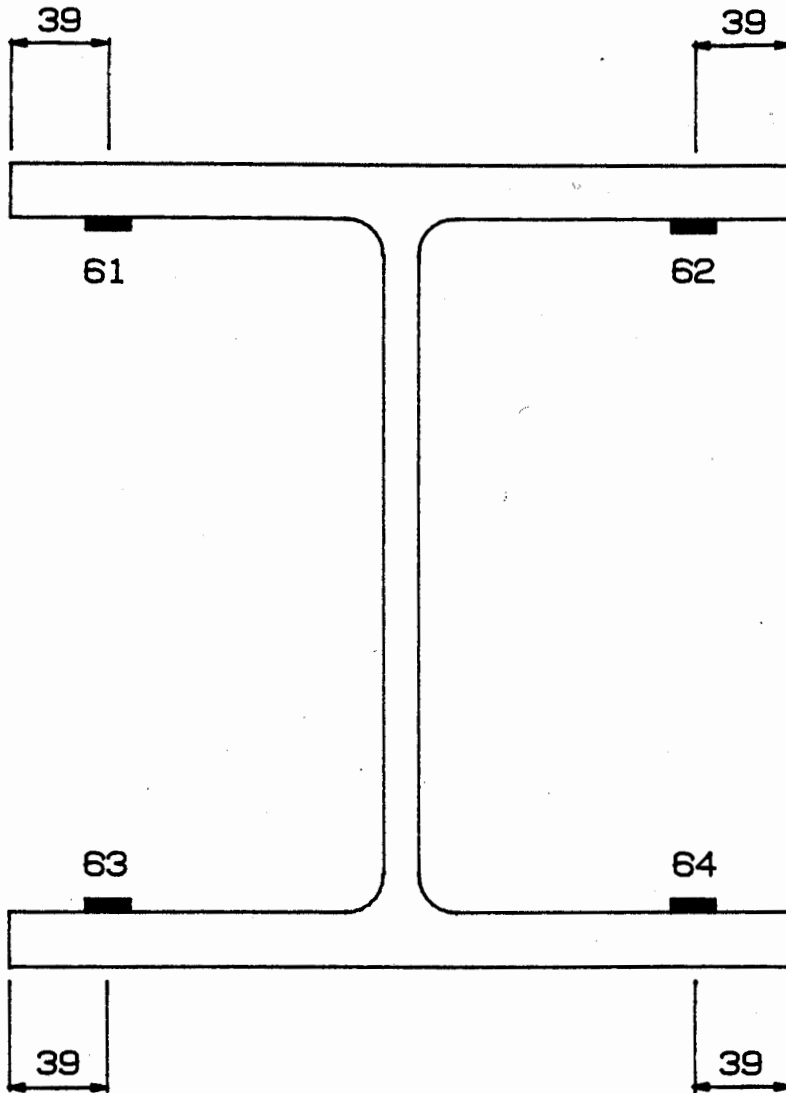


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN E2 300mm
ABOVE GROUND FLOOR SLAB

305x305x198 kg/m

Data File: PRO3 , Figure 3/51

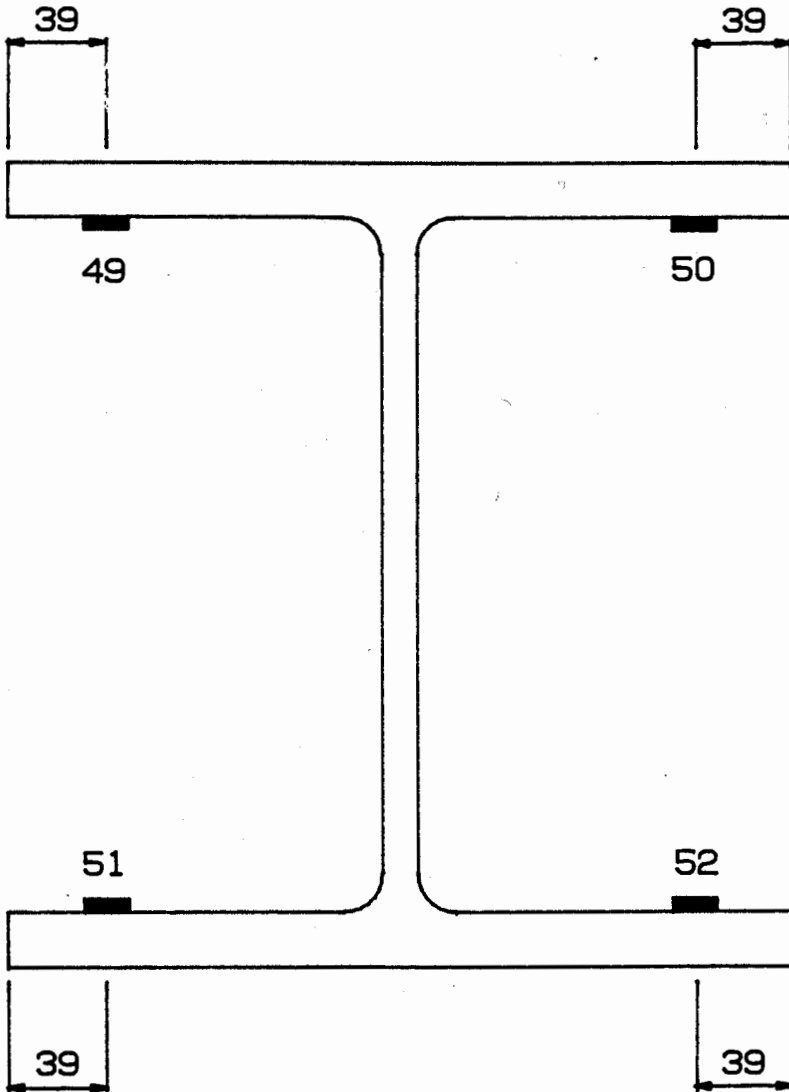


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN F2 300mm
ABOVE GROUND FLOOR SLAB

305×305×137 kg/m

Data File: PRO4 , Figure 3/52

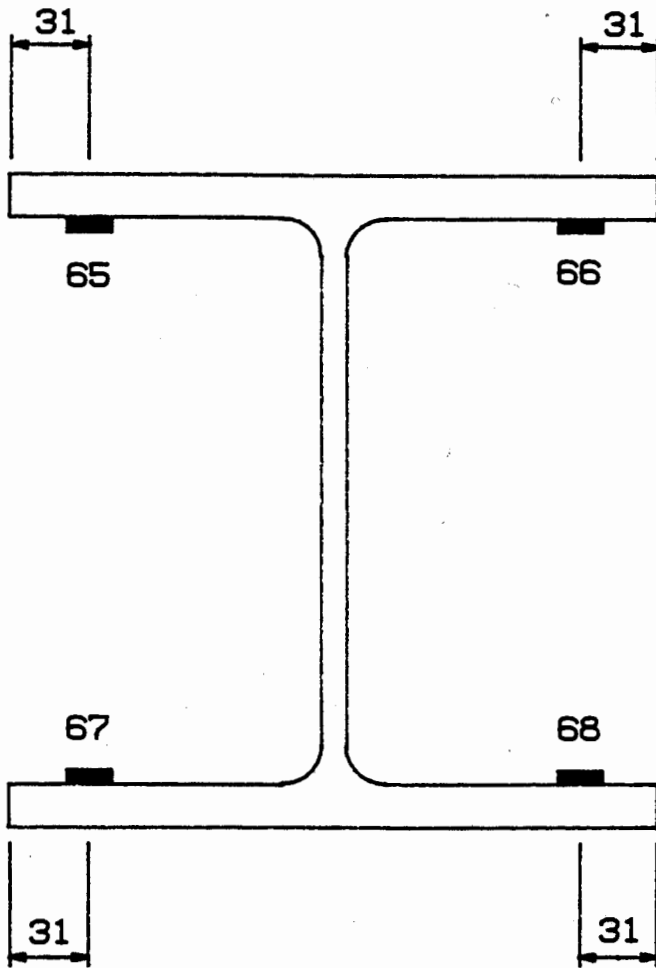


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN E1 300mm
BELOW FIRST FLOOR SLAB

305x305x137 kg/m

Data File: PRO5 , Figure 3/53

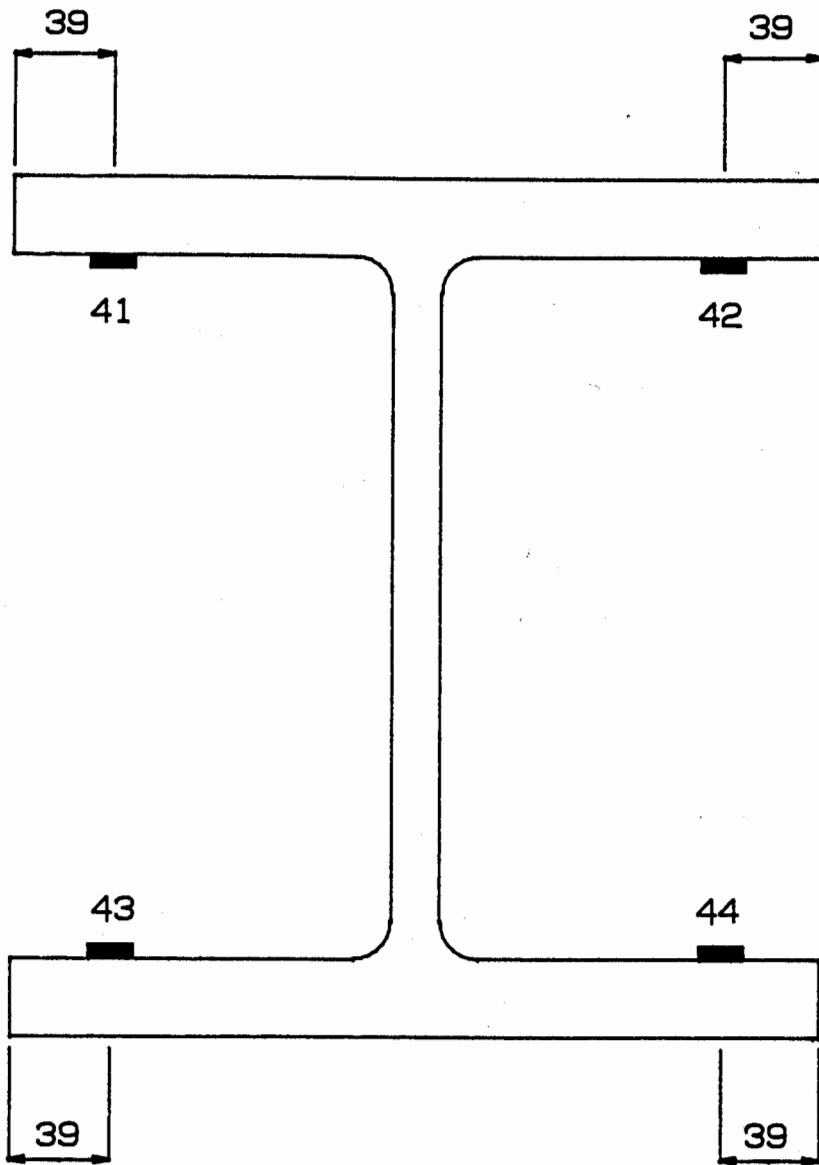


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN F1 300mm
BELOW FIRST FLOOR SLAB

254x254x89 kg/m

Data File: PRO6 , Figure 3/54

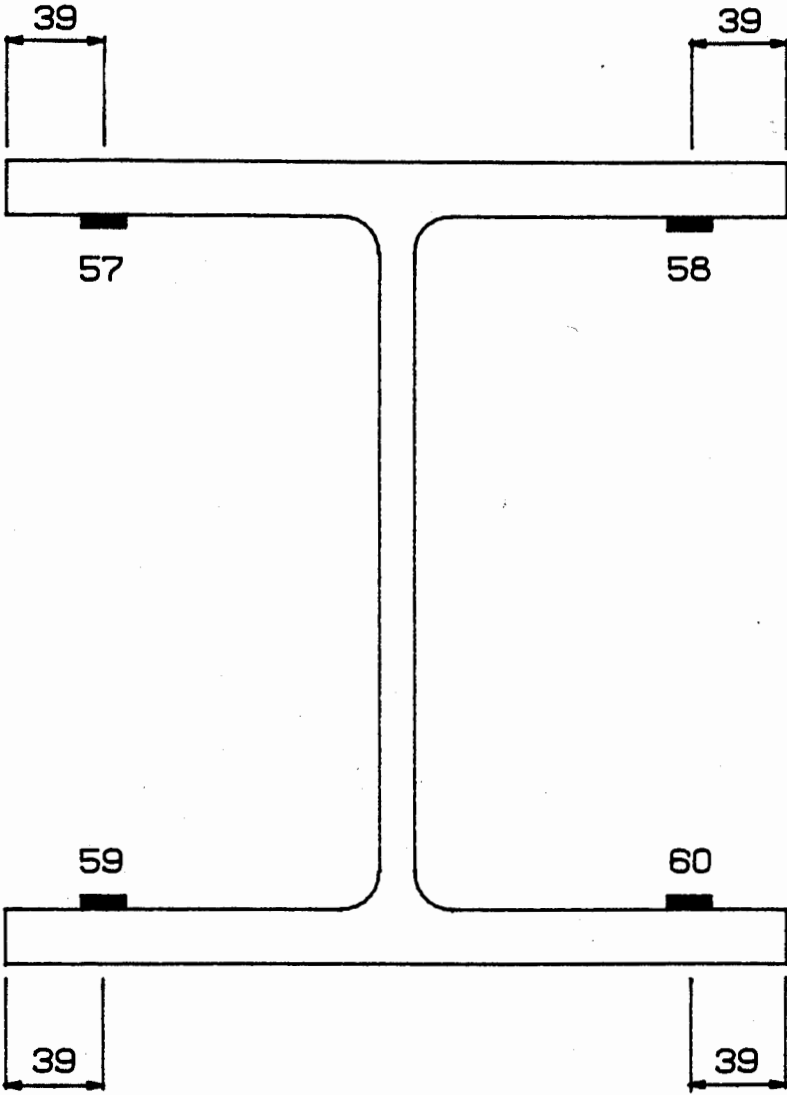


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN E2 300mm
BELOW FIRST FLOOR SLAB

305x305x198 kg/m

Data File: PRO7 , Figure 3/55

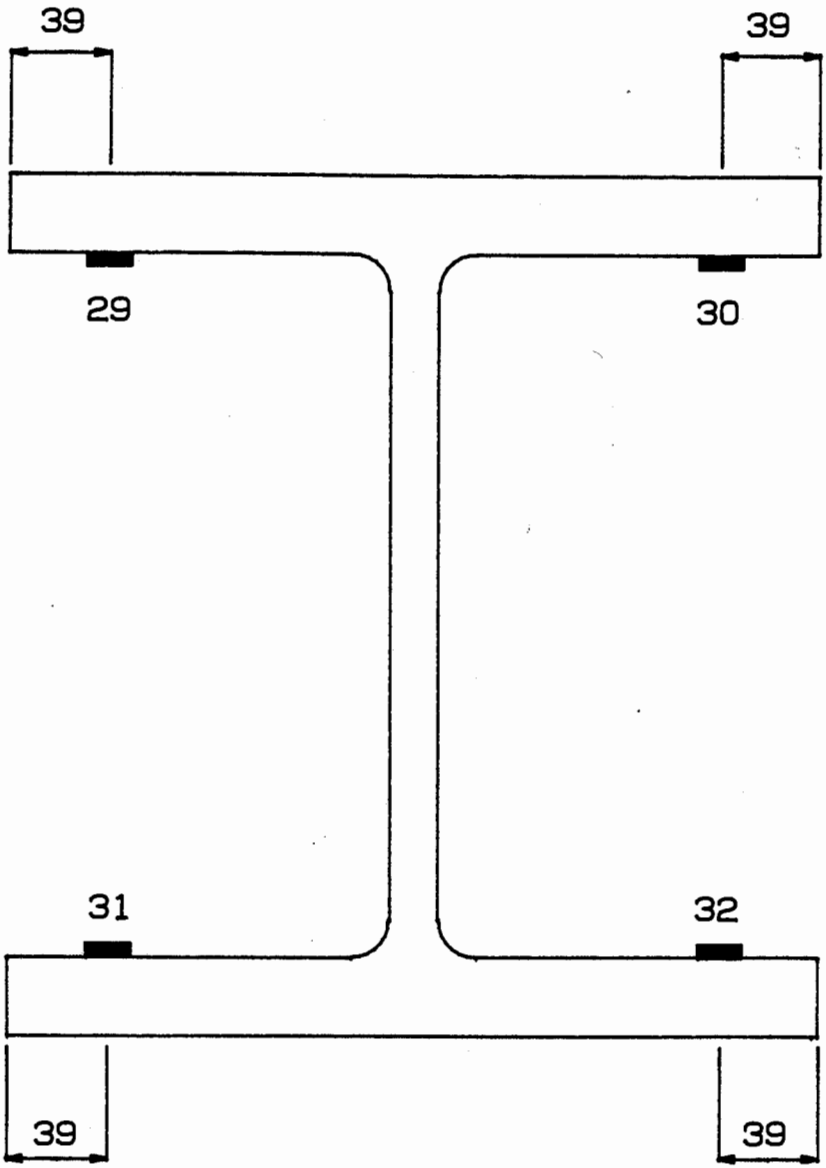


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN F2 300mm
BELOW FIRST FLOOR SLAB

305x305x137 kg/m

Data File: PRO8 , Figure 3/56

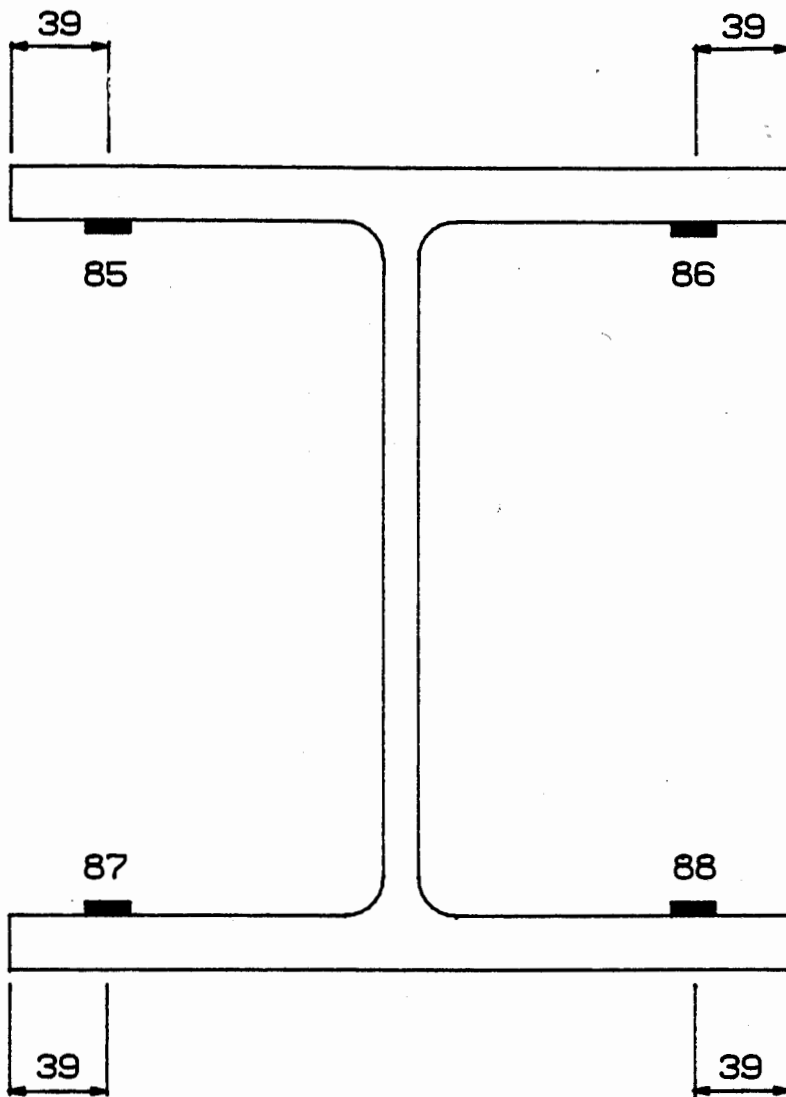


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN D1 500mm ABOVE FIRST FLOOR SLAB

305x305x198 kg/m

Data File: PRO9 , Figure 3/57

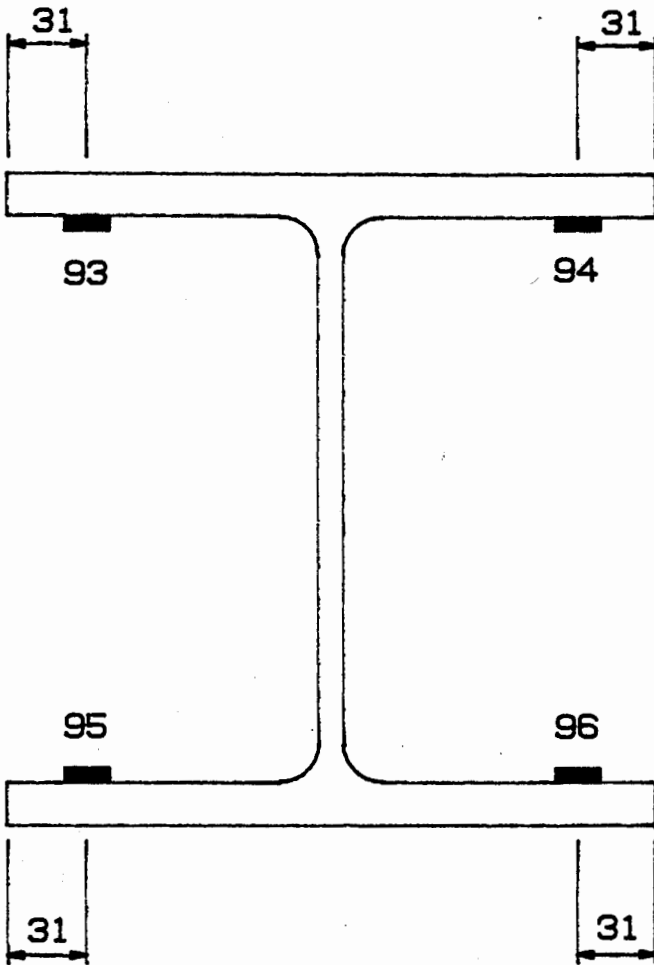


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN E1 500mm
ABOVE FIRST FLOOR SLAB

305x305x137 kg/m

Data File: PRO10 , Figure 3/58

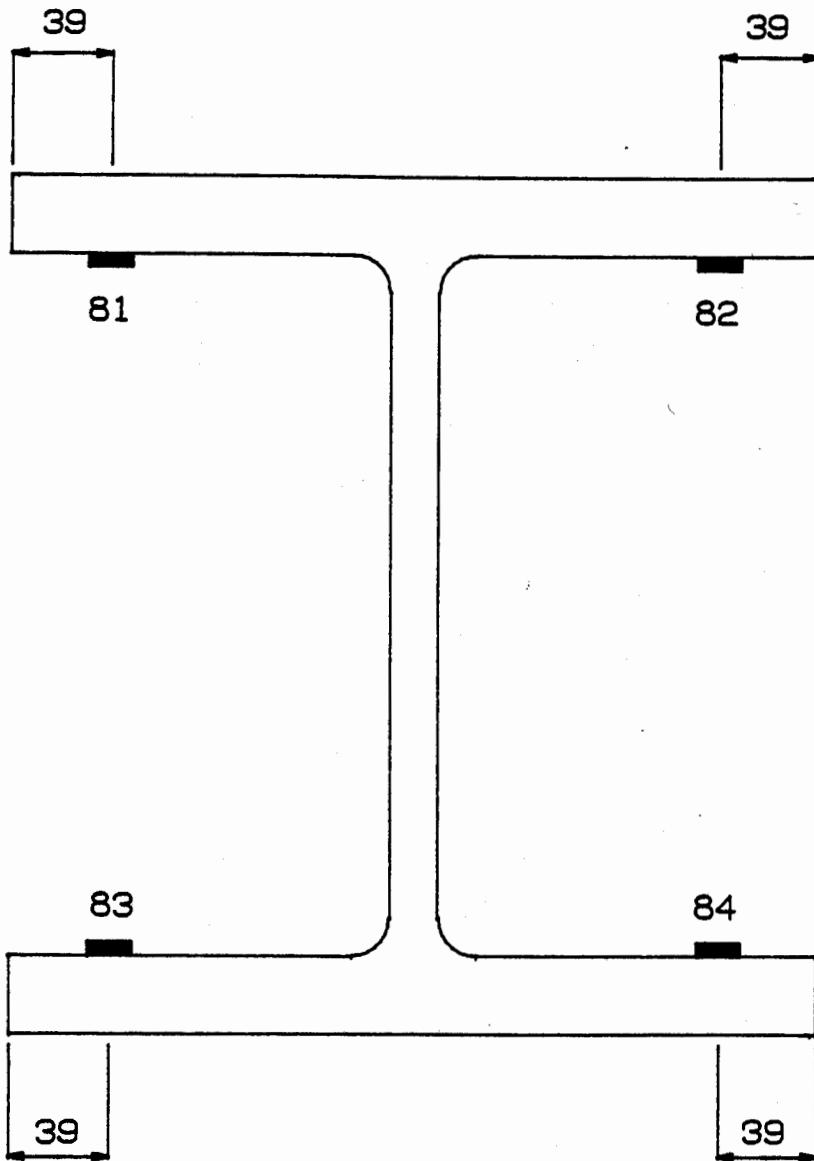


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN F1 500mm
ABOVE FIRST FLOOR SLAB

254x254x89 kg/m

Data File: PRO11 , Figure 3/59

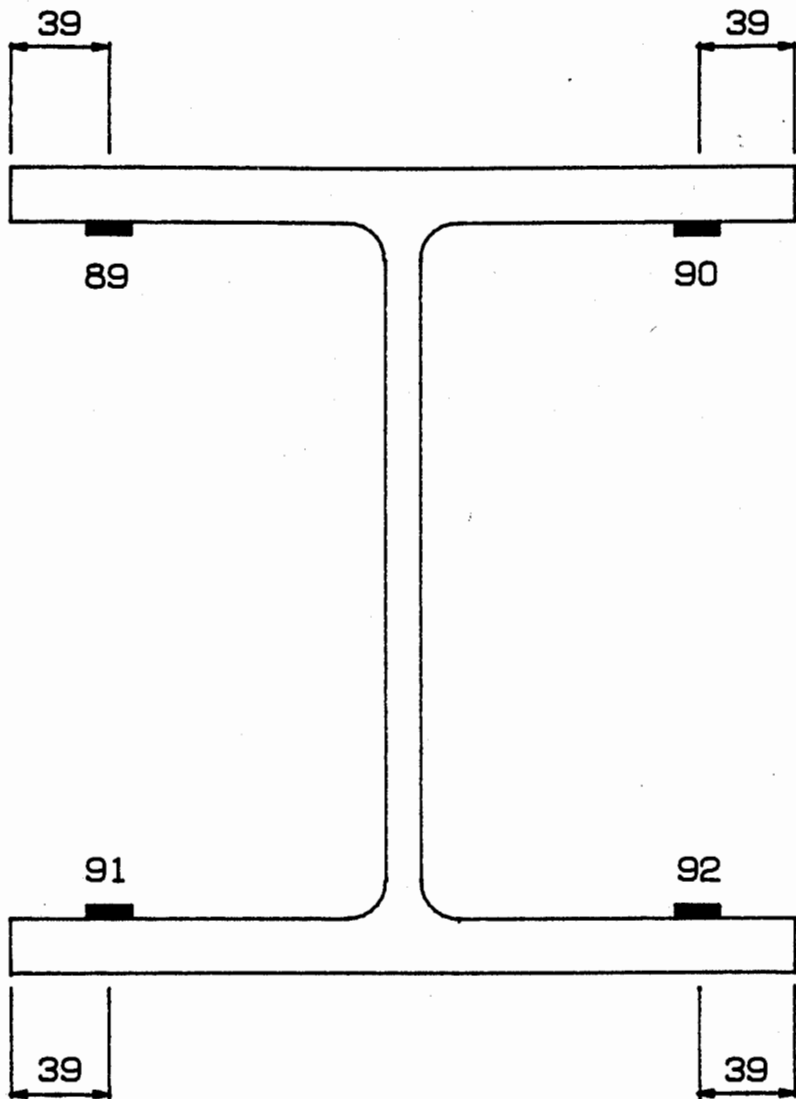


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN E2 500mm
ABOVE FIRST FLOOR SLAB

305x305x198 kg/m

Data File: PRO12 , Figure 3/60

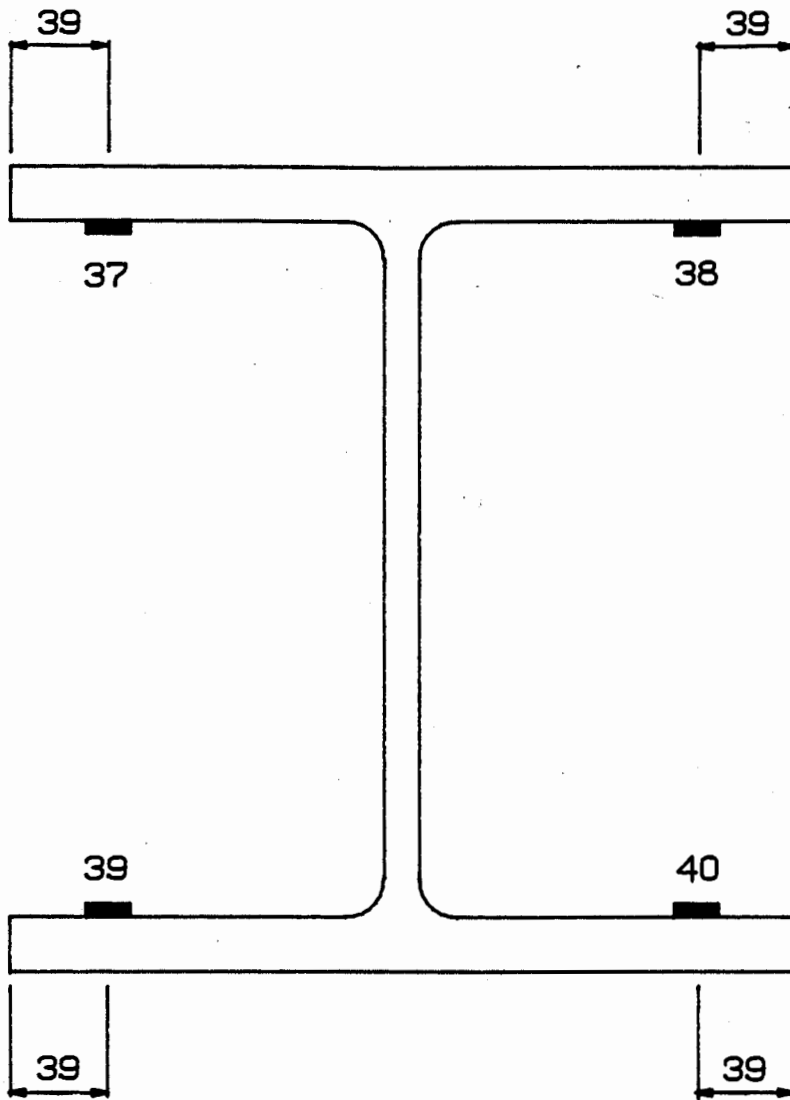


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN F2 500mm
ABOVE FIRST FLOOR SLAB

305x305x137 kg/m

Data File: PRO13 , Figure 3/61

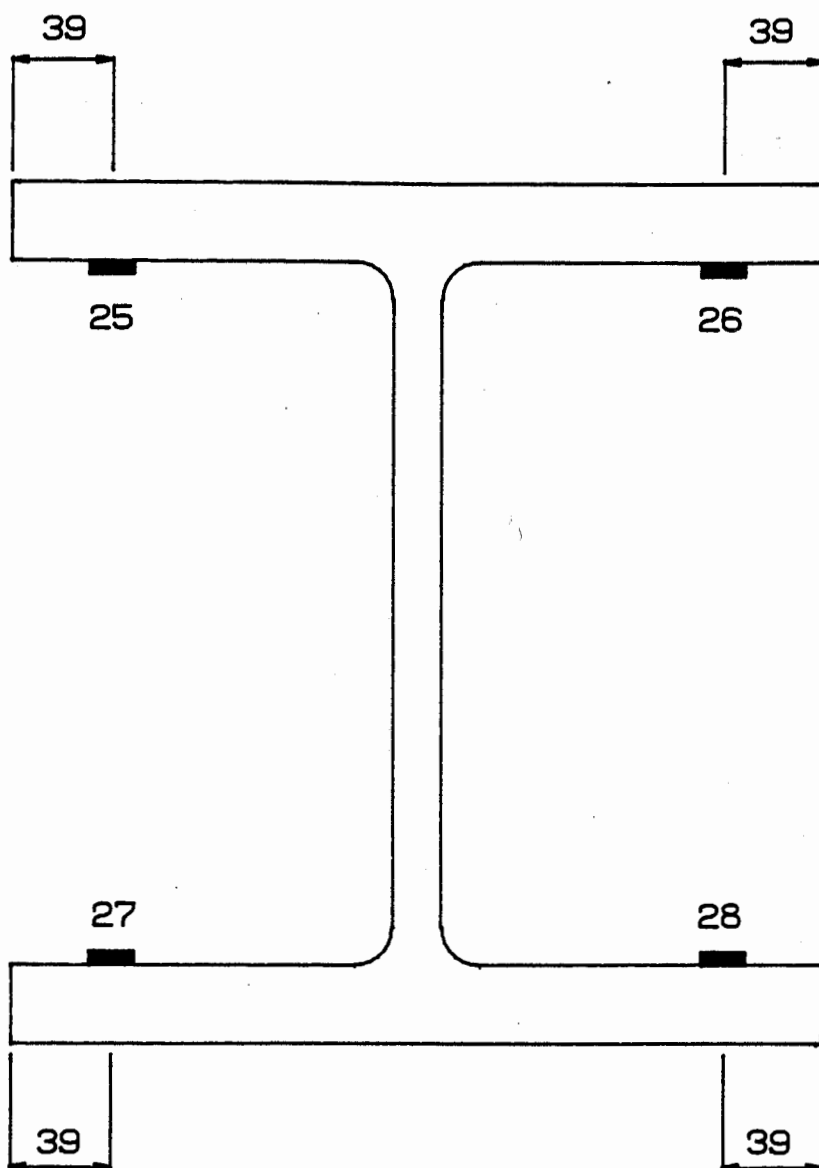


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN E/F-2/3
500mm ABOVE FIRST FLOOR SLAB

305x305x137 kg/m

Data File: PRO14 , Figure 3/62

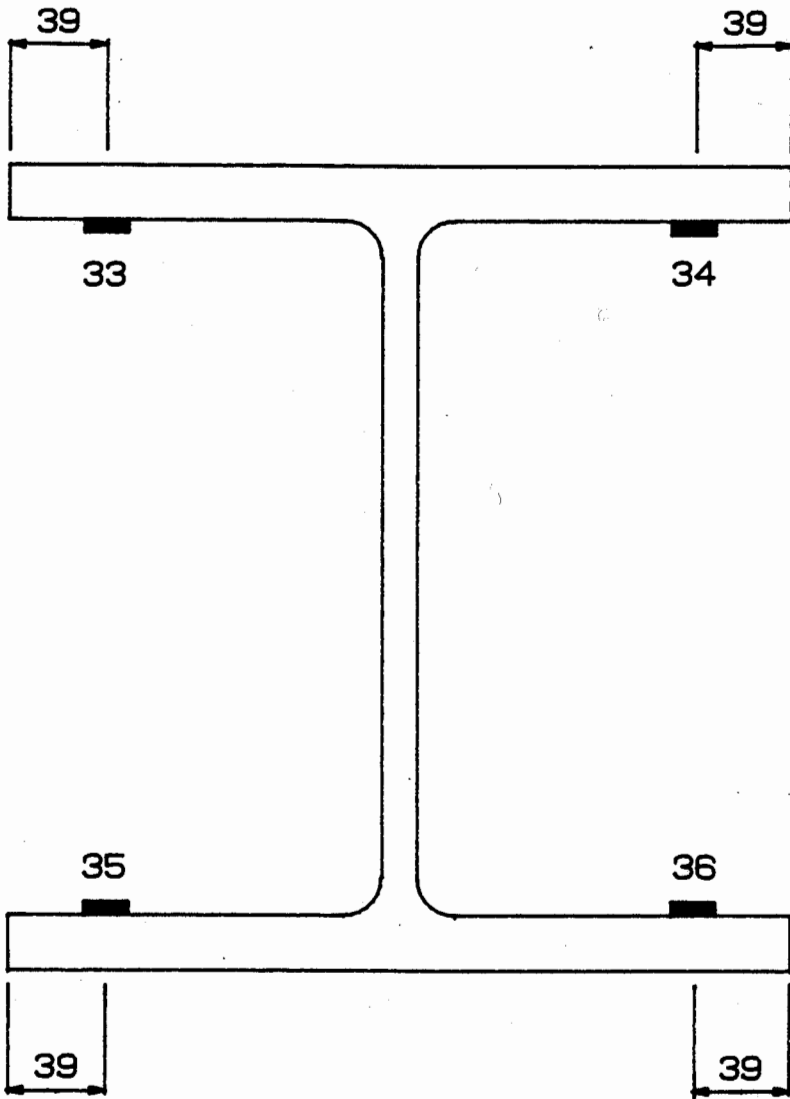


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN D1 500mm
BELOW SECOND FLOOR SLAB

305x305x198 kg/m

Data File: PRO15 , Figure 3/63

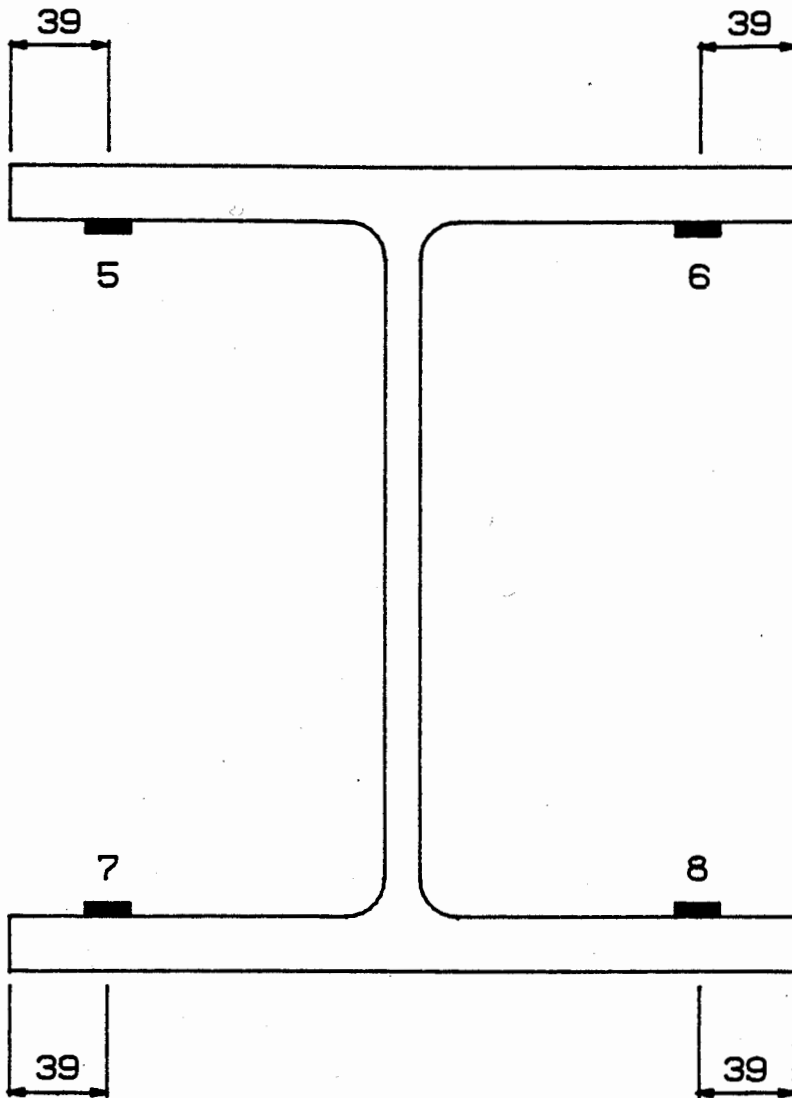


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN E/F-2/3
500mm BELOW SECOND FLOOR SLAB

305x305x137 kg/m

Data File: PRO16 , Figure 3/64

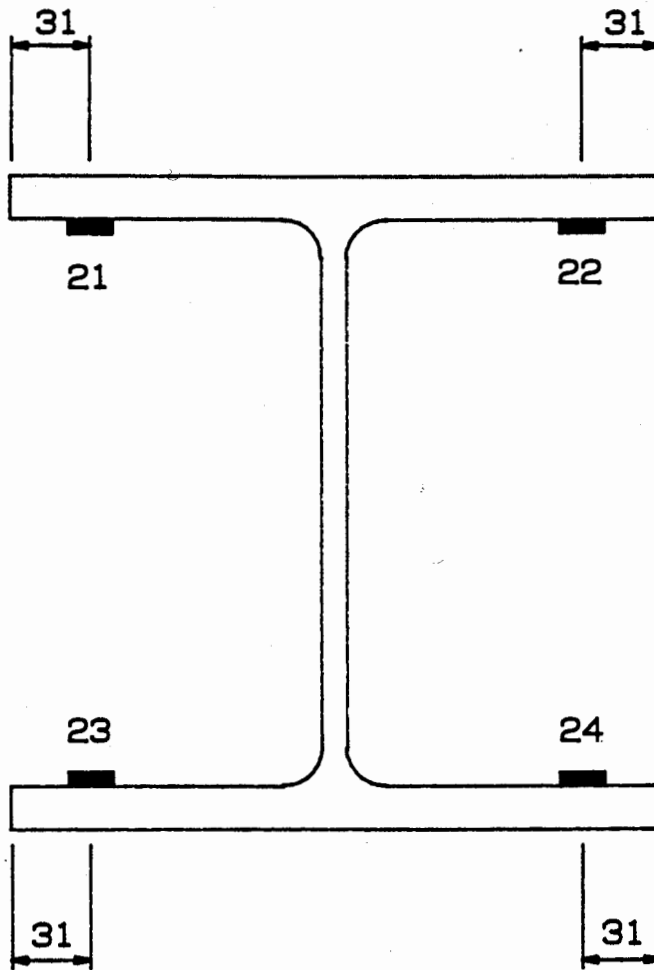


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN E1 500mm
ABOVE SECOND FLOOR SLAB

305x305x137 kg/m

Data File: PRO17 , Figure 3/65

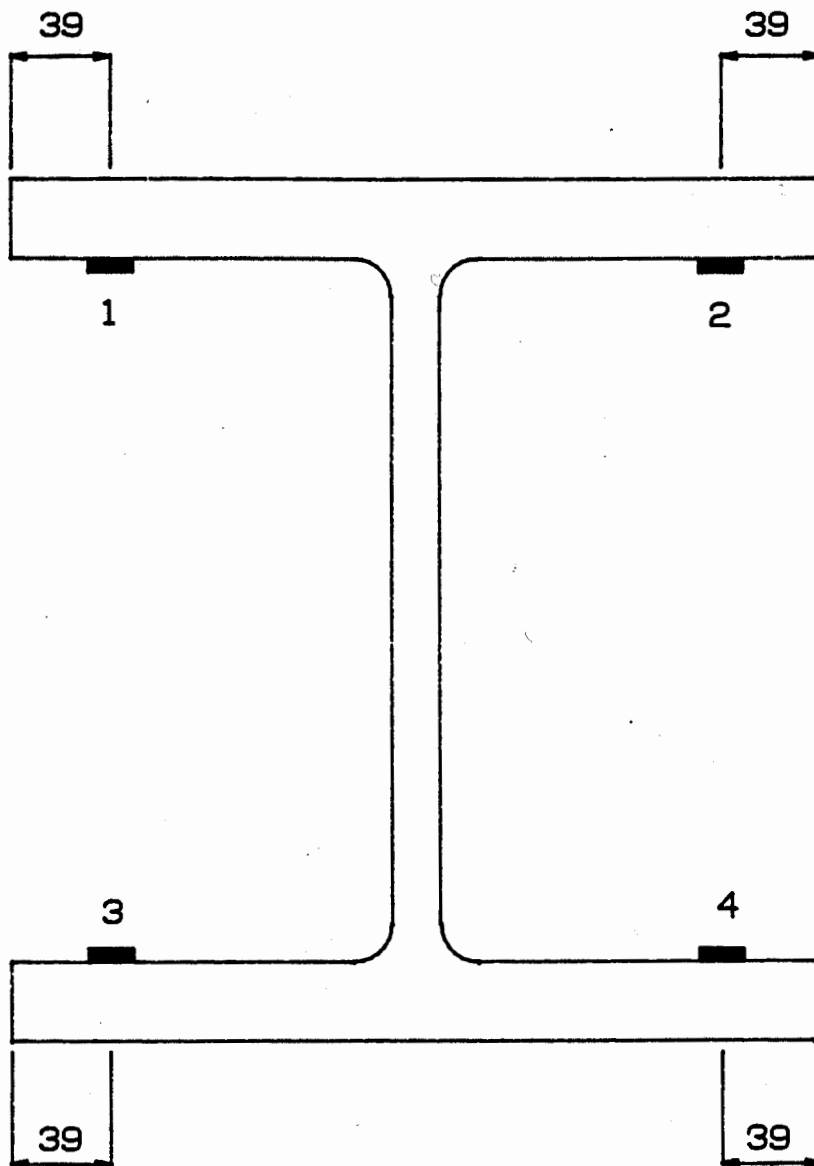


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN F1 500mm
ABOVE SECOND FLOOR SLAB

254x254x89 kg/m

Data File: PRO18 , Figure 3/66

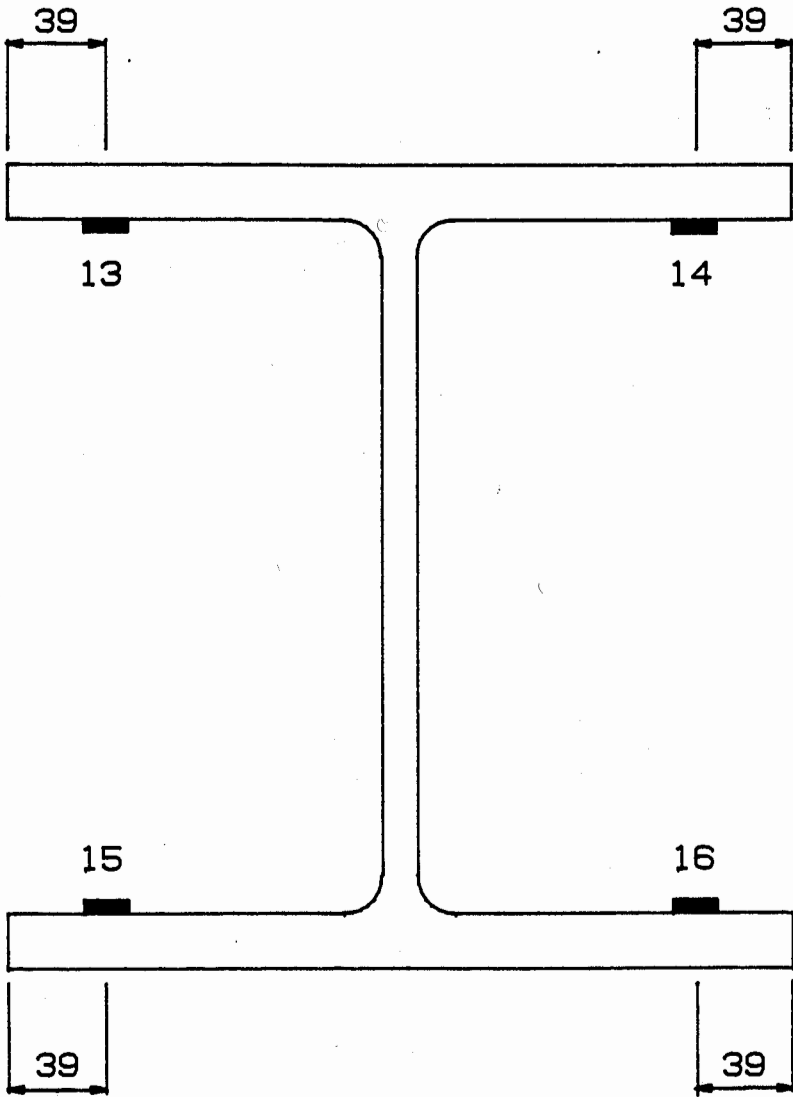


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN E2 500mm
ABOVE SECOND FLOOR SLAB

305x305x198 kg/m

Data File: PRO19 , Figure 3/67

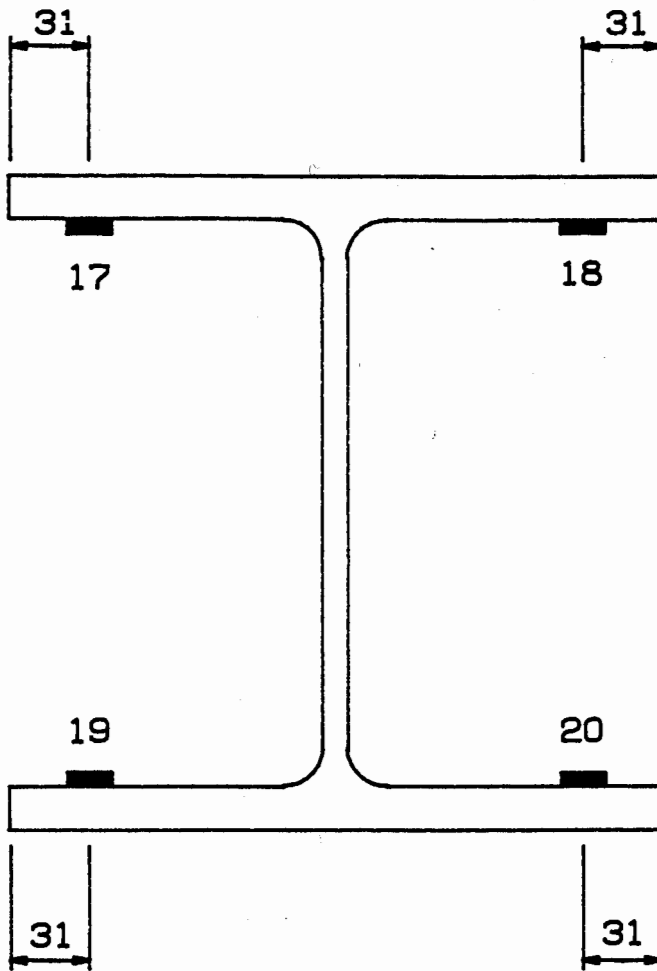


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN F2 500mm
ABOVE SECOND FLOOR SLAB

305x305x137 kg/m

Data File: PRO20 , Figure 3/68

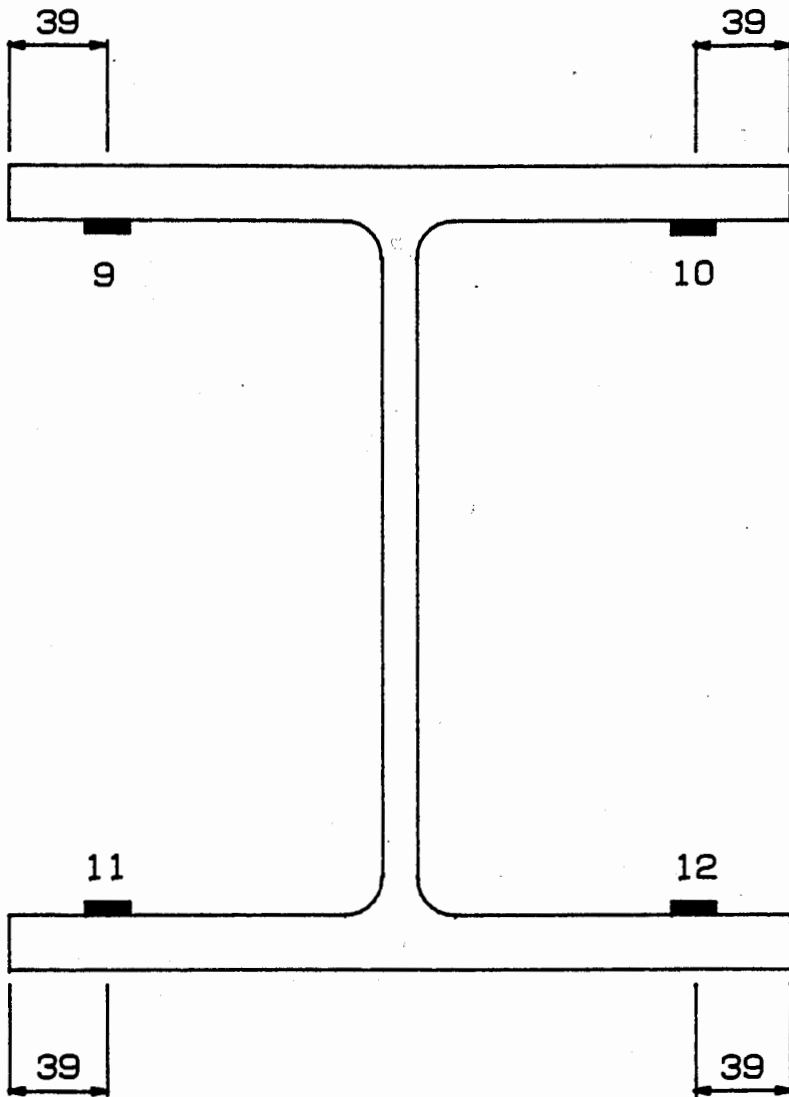


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN F1 500mm
BELOW THIRD FLOOR SLAB

254x254x89 kg/m

Data File: PRO21 , Figure 3/69

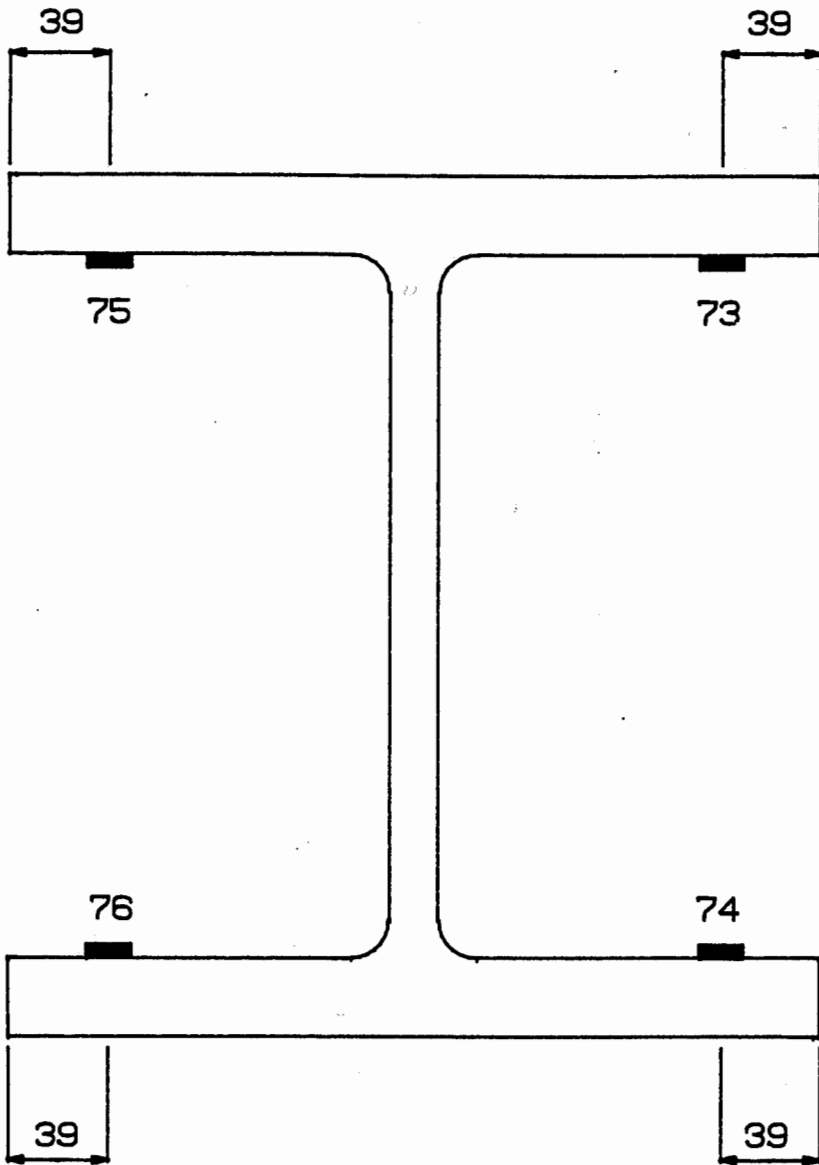


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT COLUMN F2 500mm
BELOW THIRD FLOOR SLAB

305x305x137 kg/m

Data File: PRO22 , Figure 3/70

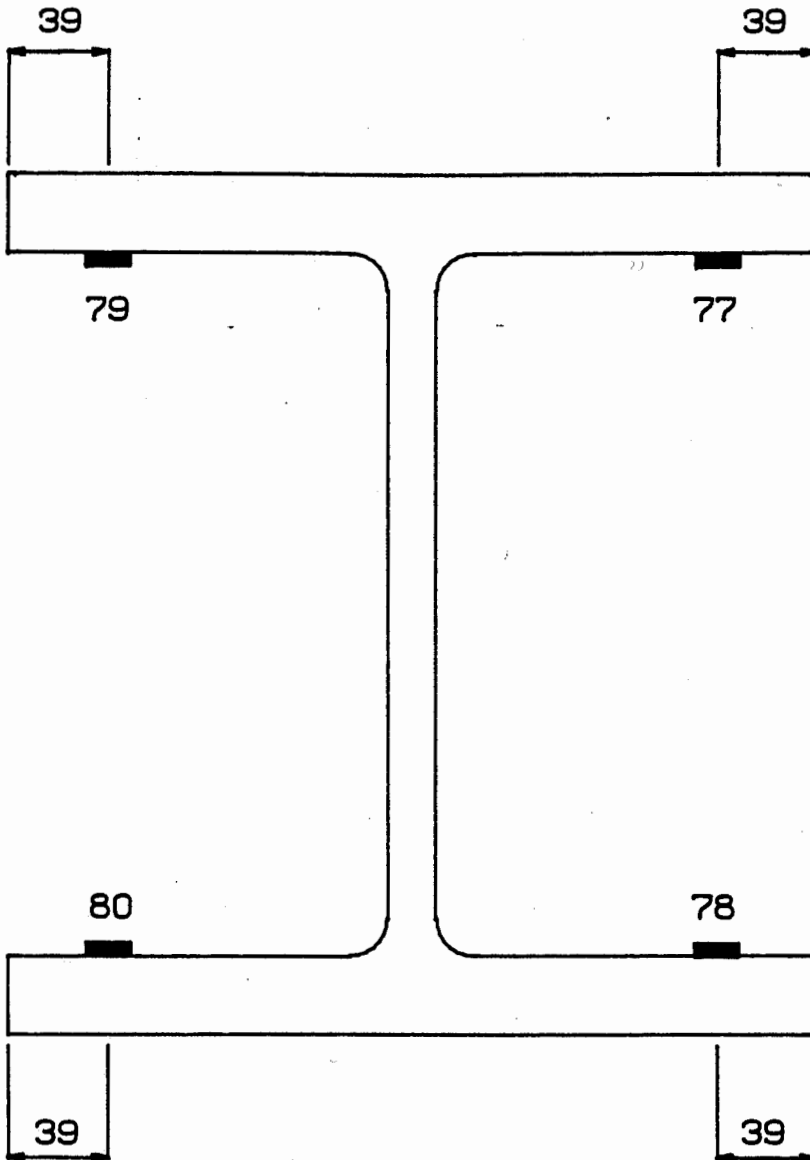


DIMENSIONS IN mm

STRAIN GAUGE LOCATIONS AT BEAM D/E-2 SUPPORTING
SECOND FLOOR SLAB. LOCATION B1

305x305x198 kg/m

Data File: PRO23 , Figure 3/71

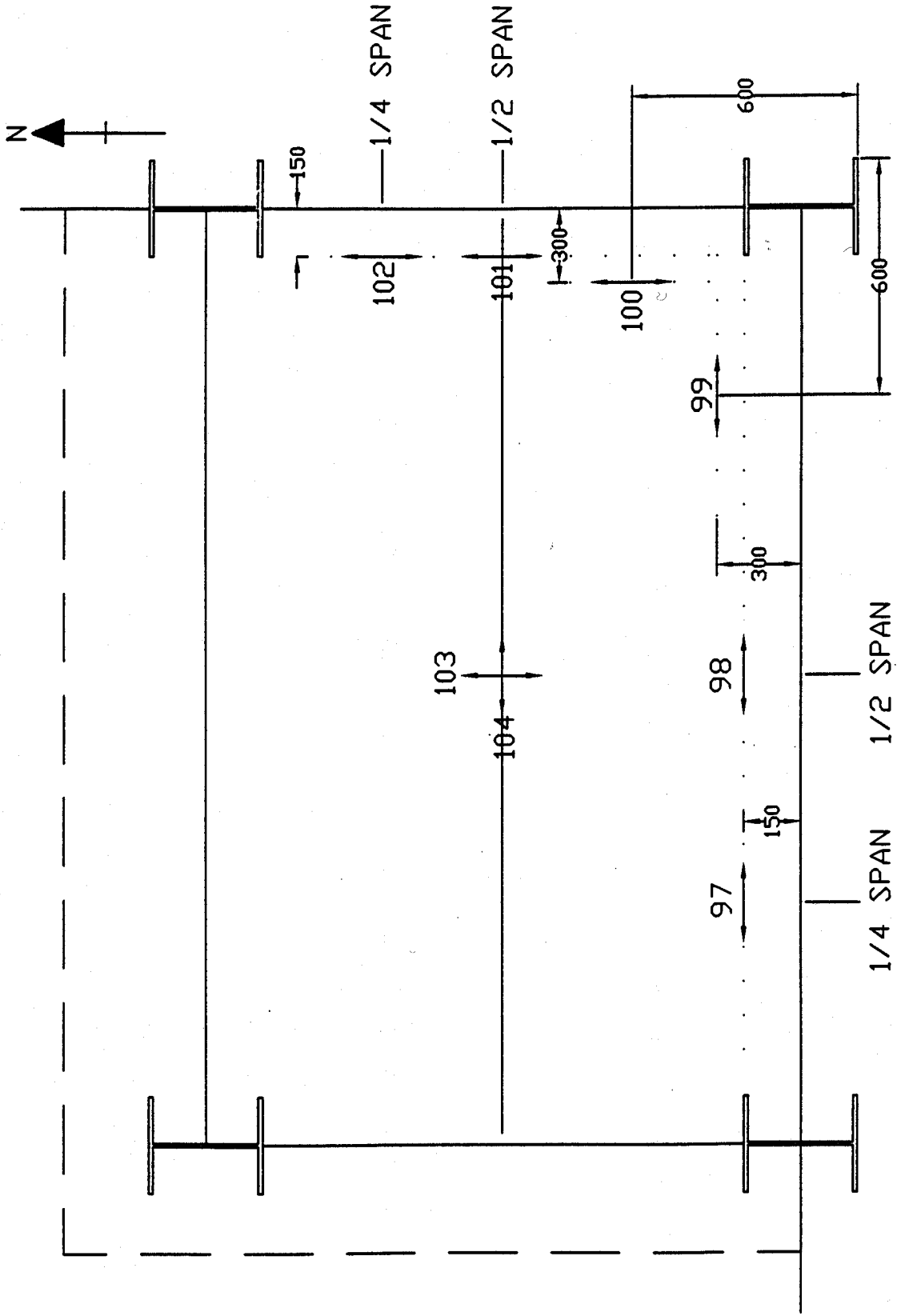


DIMENSIONS IN mm

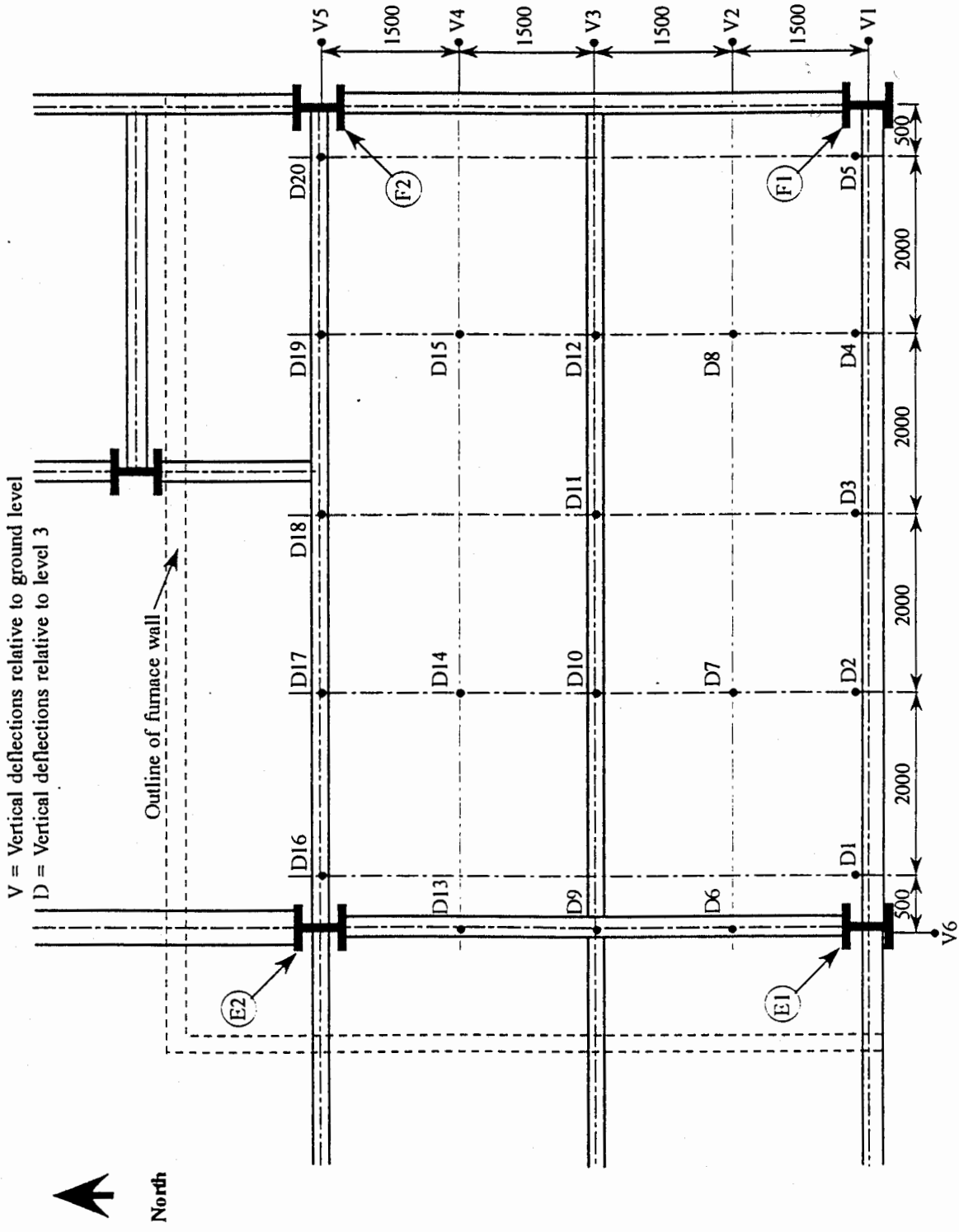
STRAIN GAUGE LOCATIONS AT BEAM D/E-2 SUPPORTING
SECOND FLOOR SLAB. LOCATION B2

305x305x198 kg/m

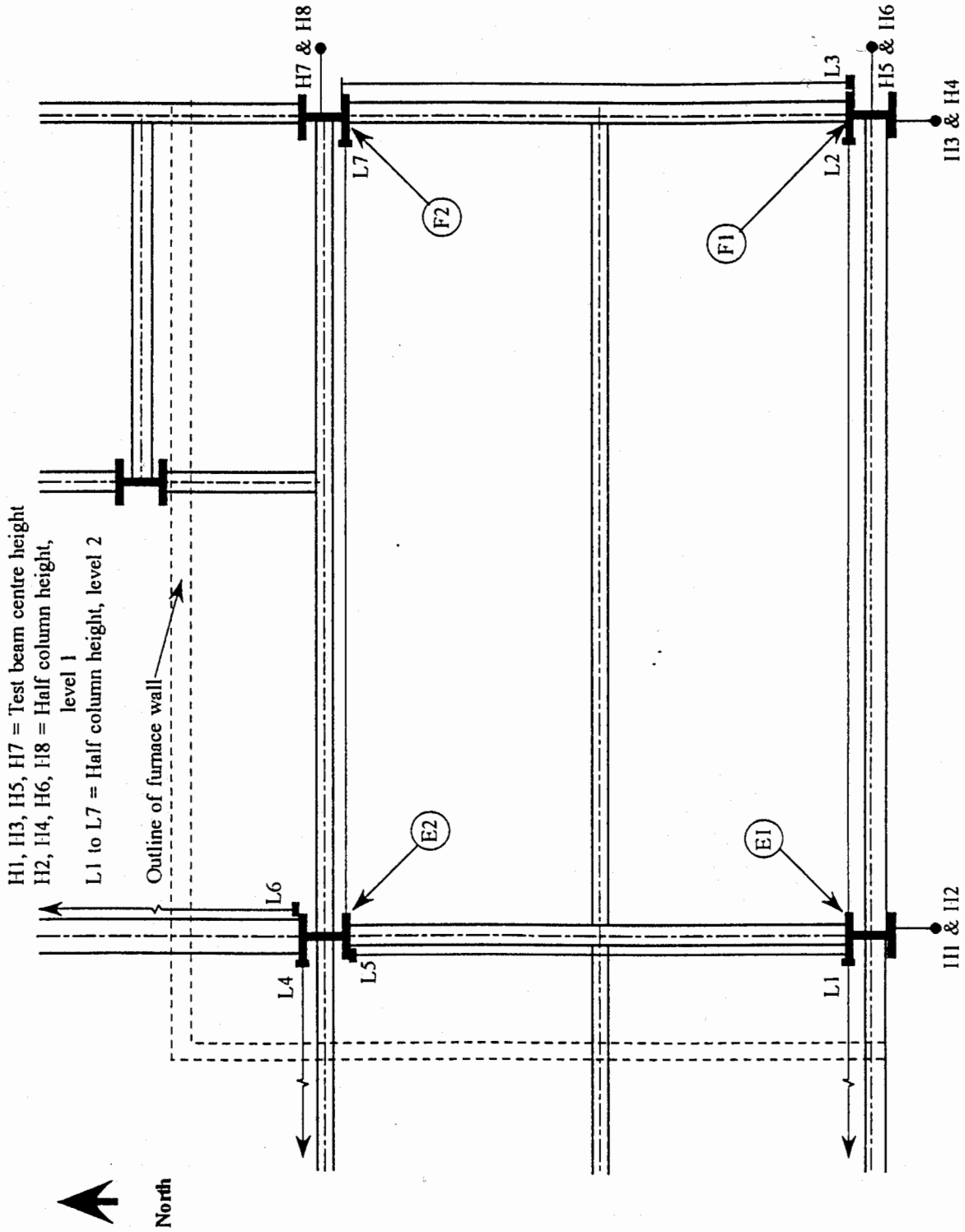
Data File: PRO24 , Figure 3/72



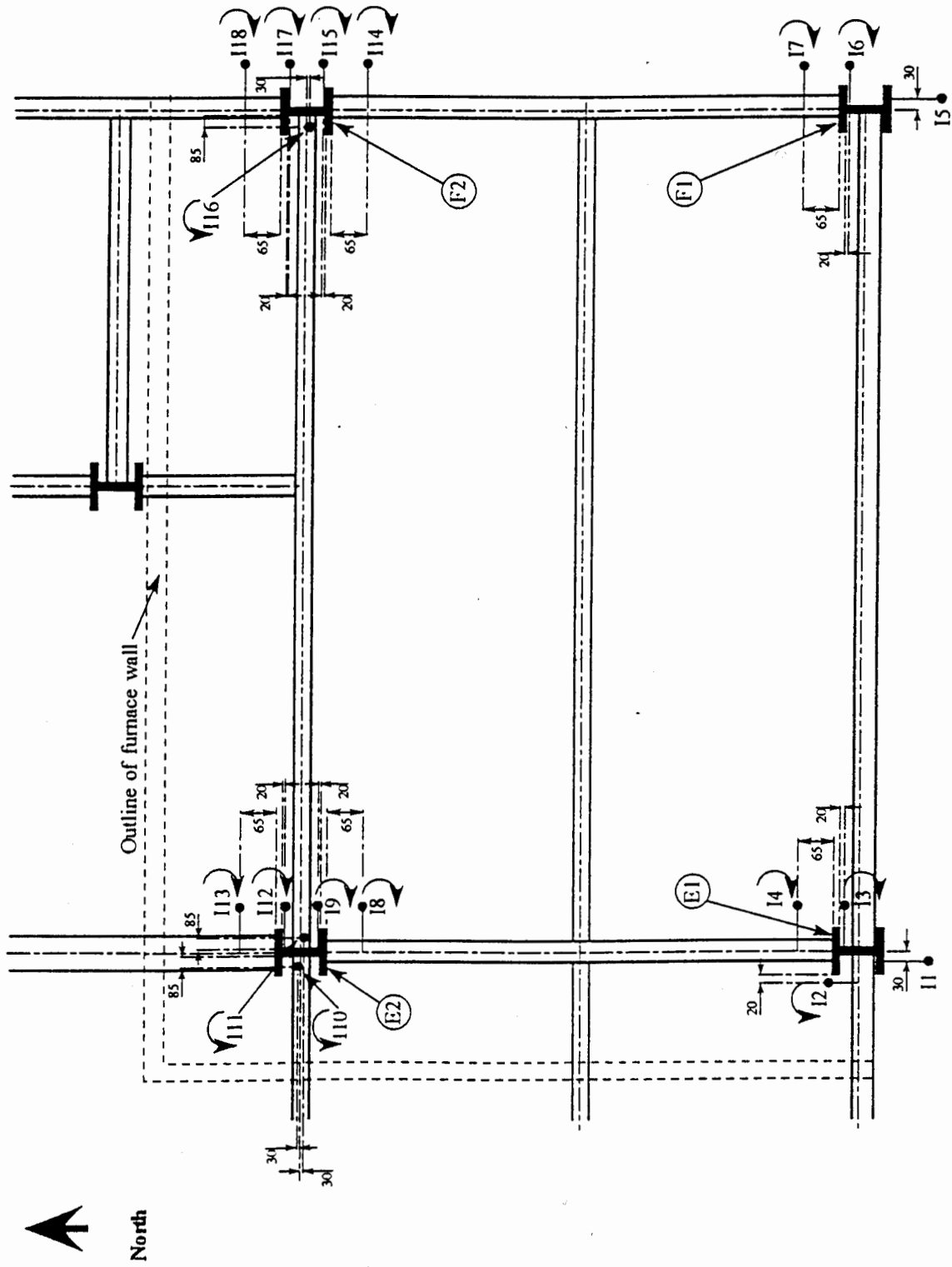
CONCRETE STRAIN GAUGE MEASUREMENTS ON THE SURFACE
OF LEVEL 2 SLAB (ABOVE THE TEST COMPARTMENT)



Test 3 - Transducer Positions for Measuring Vertical Deflections



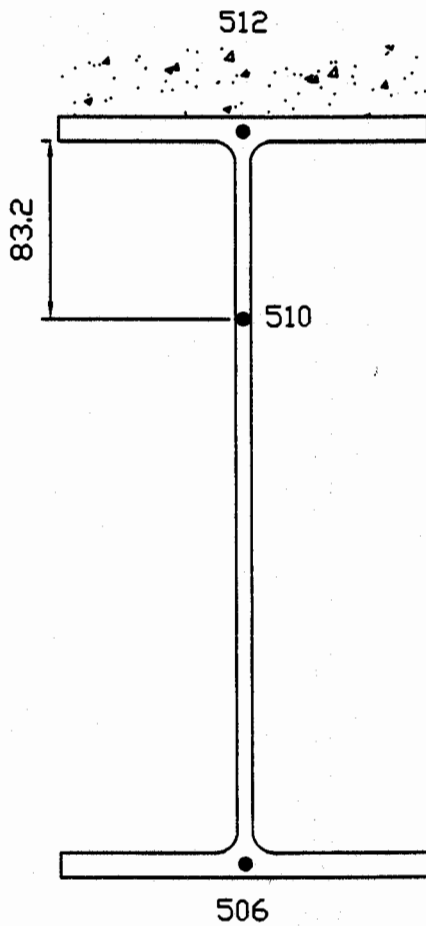
Test 3 - Transducer Positions for Measuring Horizontal Displacements



Test 3 - Clinometer Positions for Measuring Rotation at the Connections (Vertical Plane)

TEST 4

OFFICE FIRE (DEMONSTRATION)

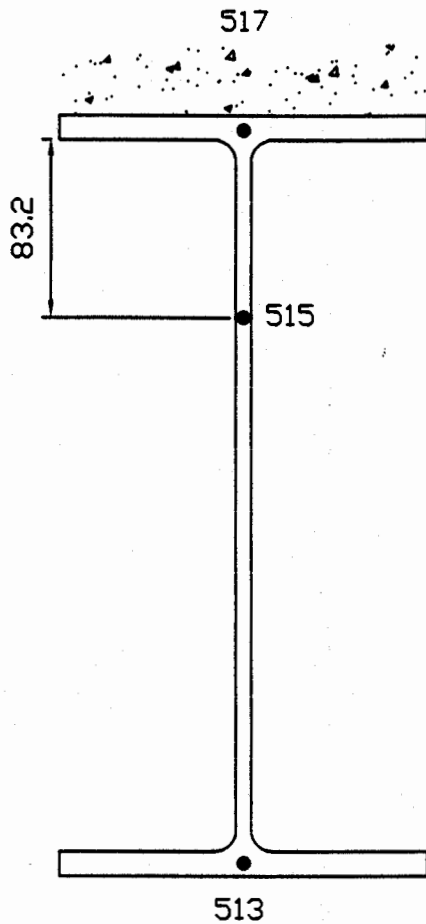


3 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON PRIMARY BEAM AT GRID LINE D POSITION B11

356 x 171mm x 51kg/m

Data File: PRO1 , Figure 4/1



3 STEEL THERMOCOUPLES

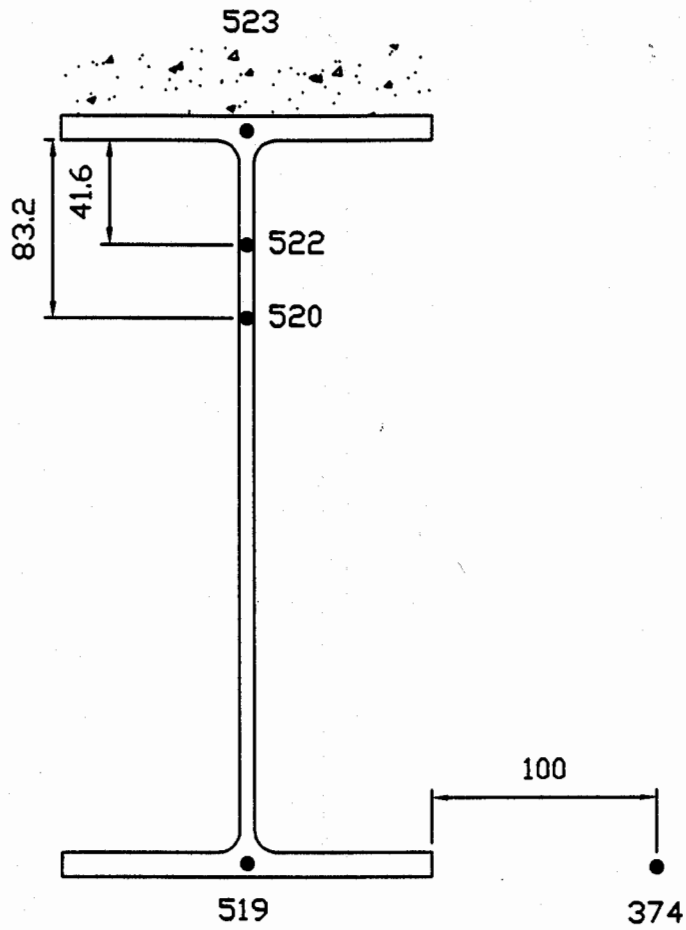
THERMOCOUPLE LOCATIONS ON PRIMARY BEAM AT GRID LINE E POSITION B12

356 x 171mm x 51kg/m

Data File: PRO2 , Figure 4/2

WEST

EAST



4 STEEL THERMOCOUPLES
1 ATMOSPHERE THERMOCOUPLE

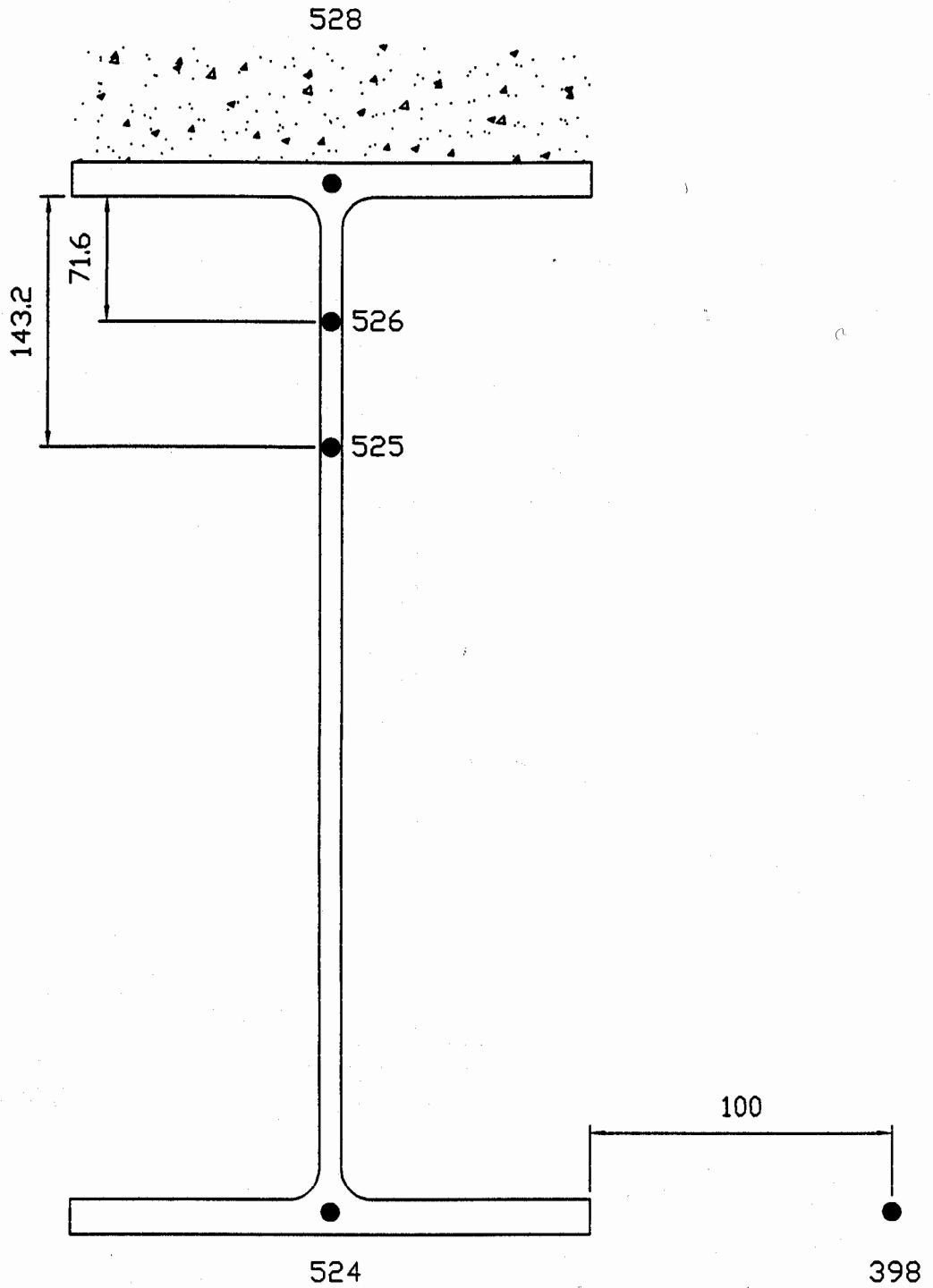
THERMOCOUPLE LOCATIONS ON PRIMARY BEAM (FACING NORTH)
ON GRID LINE E POSITION B14

356 x 171mm x 51kg/m

Data File: PRO3 , Figure 4/3

WEST

EAST

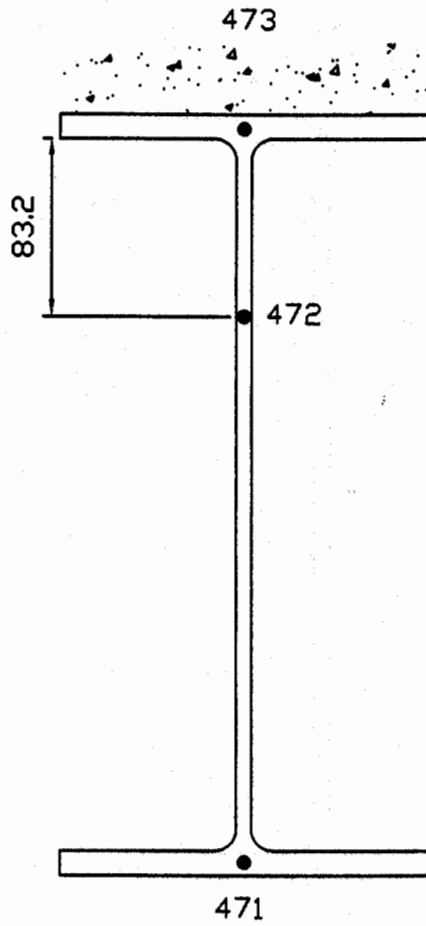


4 STEEL THERMOCOUPLES
1 ATMOSPHERE THERMOCOUPLE

THERMOCOUPLE LOCATIONS ON PRIMARY BEAM (FACING NORTH)
ON GRID LINE E POSITION B15

610 x 229mm x 101kg/m

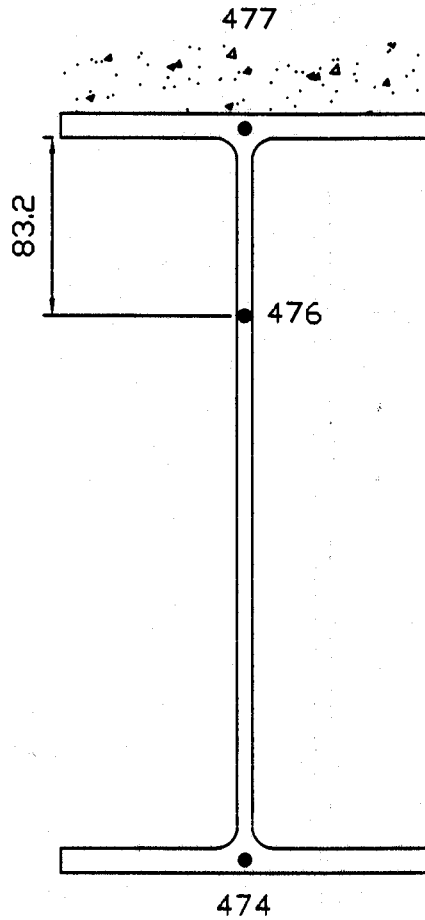
Data File: PRO4 , Figure 4/4



3 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON EDGE BEAM AT GRID LINE 4 POSITION B1
356 x 171mm x 51kg/m

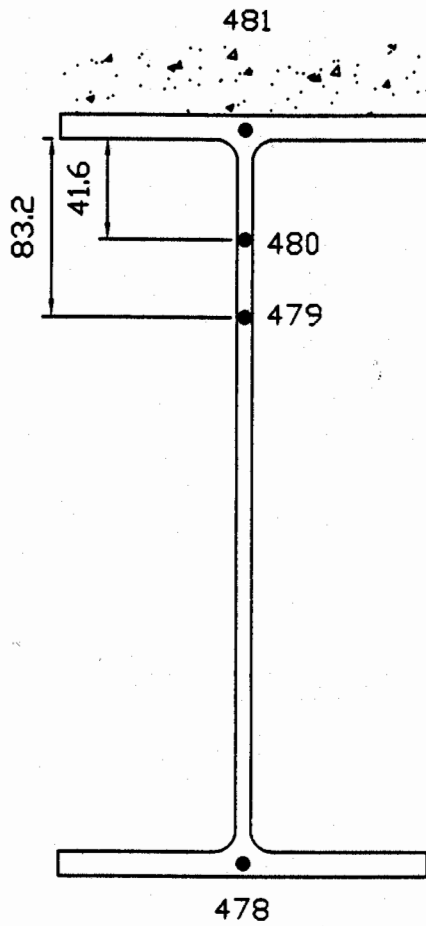
Data File: PRO5 , Figure 4/5



3 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON EDGE BEAM AT GRID LINE 4 POSITION B2
356 x 171mm x 51kg/m

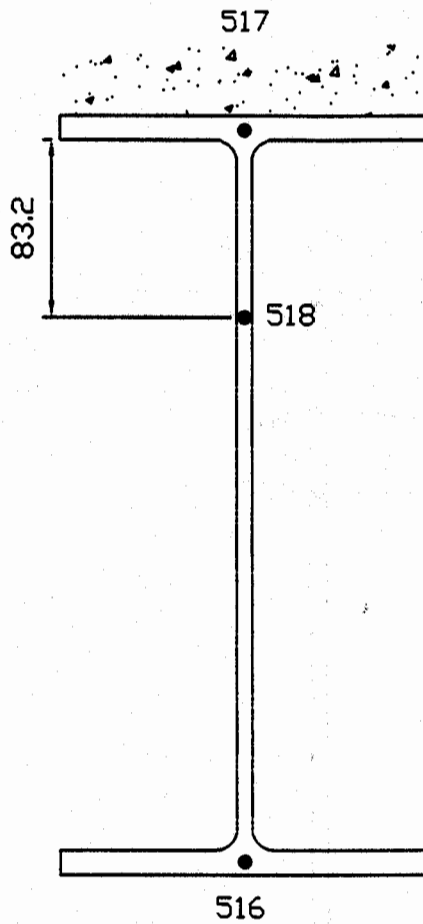
Data File: PRO6 , Figure 4/6



4 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON EDGE BEAM AT GRID LINE 4 POSITION B3
356 x 171mm x 51kg/m

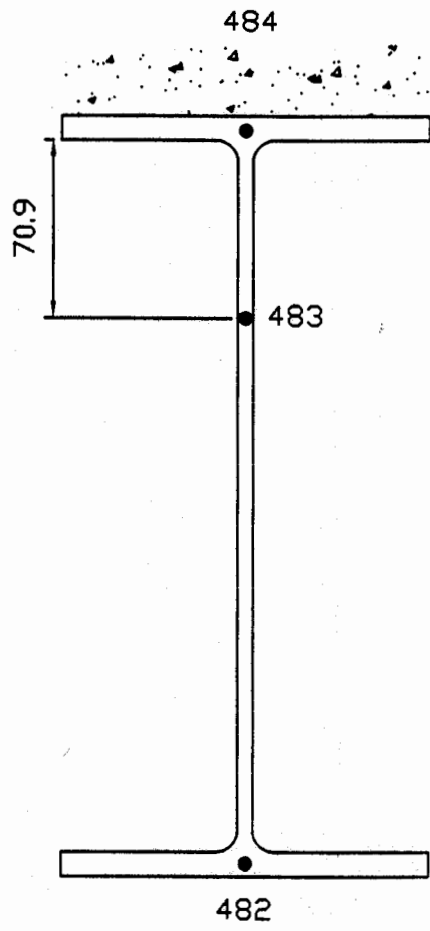
Data File: PRO7 , Figure 4/7



3 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON EDGE BEAM AT GRID LINE F POSITION B13
356 x 171mm x 51kg/m

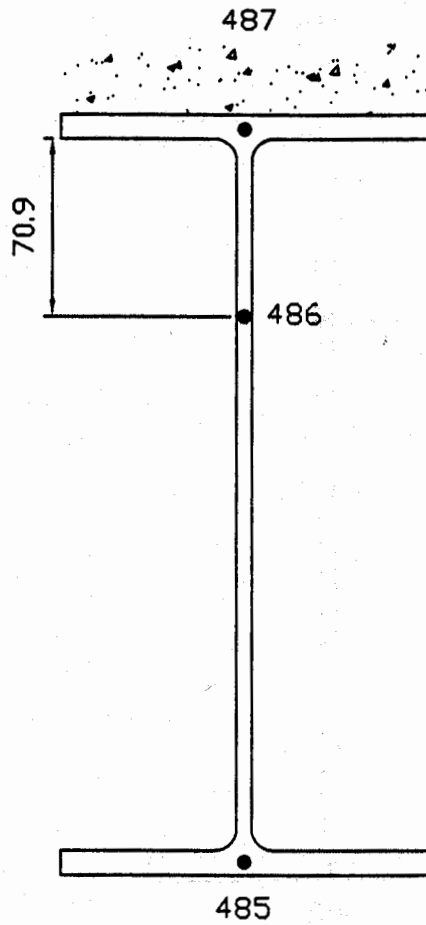
Data File: PRO8 , Figure 4/8



3 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT GRID LINE 3/4 POSITION B4
305 x 165mm x 40kg/m

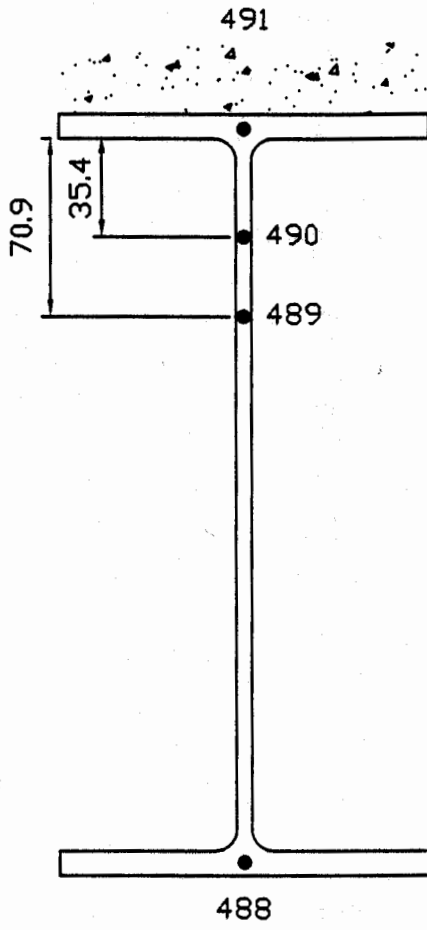
Data File: PRO9 , Figure 4/9



3 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT GRID LINE 3/4 POSITION B5
305 x 165mm x 40kg/m

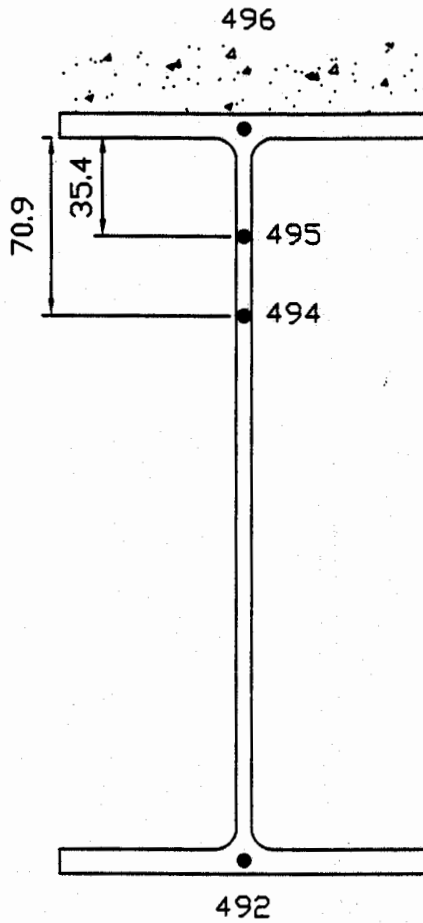
Data File: PRO10 , Figure 4/10



4 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT GRID LINE 3/4 POSITION B6
305 x 165mm x 40kg/m

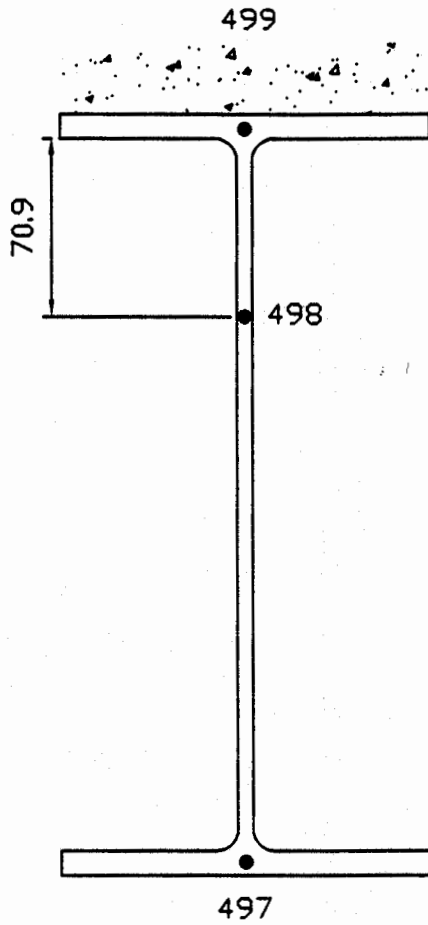
Data File: PRO11 , Figure 4/11



4 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT GRID LINE 3 POSITION B7
305 x 165mm x 40kg/m

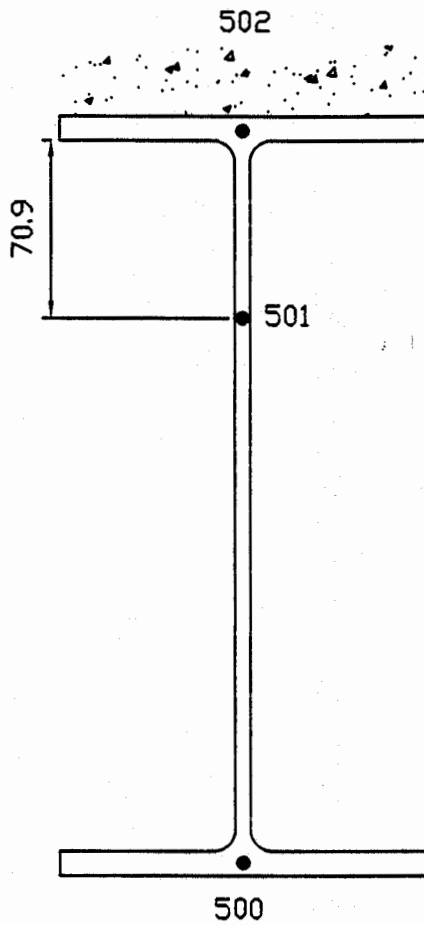
Data File: PRO12 , Figure 4/12



3 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT GRID LINE 3 POSITION B8
305 x 165mm x 40kg/m

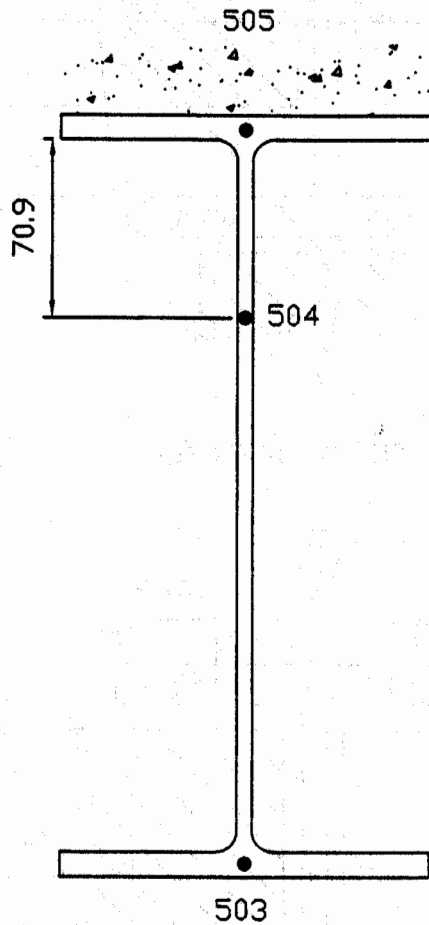
Data File: PRO13 , Figure 4/13



3 STEEL THERMOCOUPLES

THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT GRID LINE 3 POSITION B9
305 x 165mm x 40kg/m

Data File: PRO14 , Figure 4/14

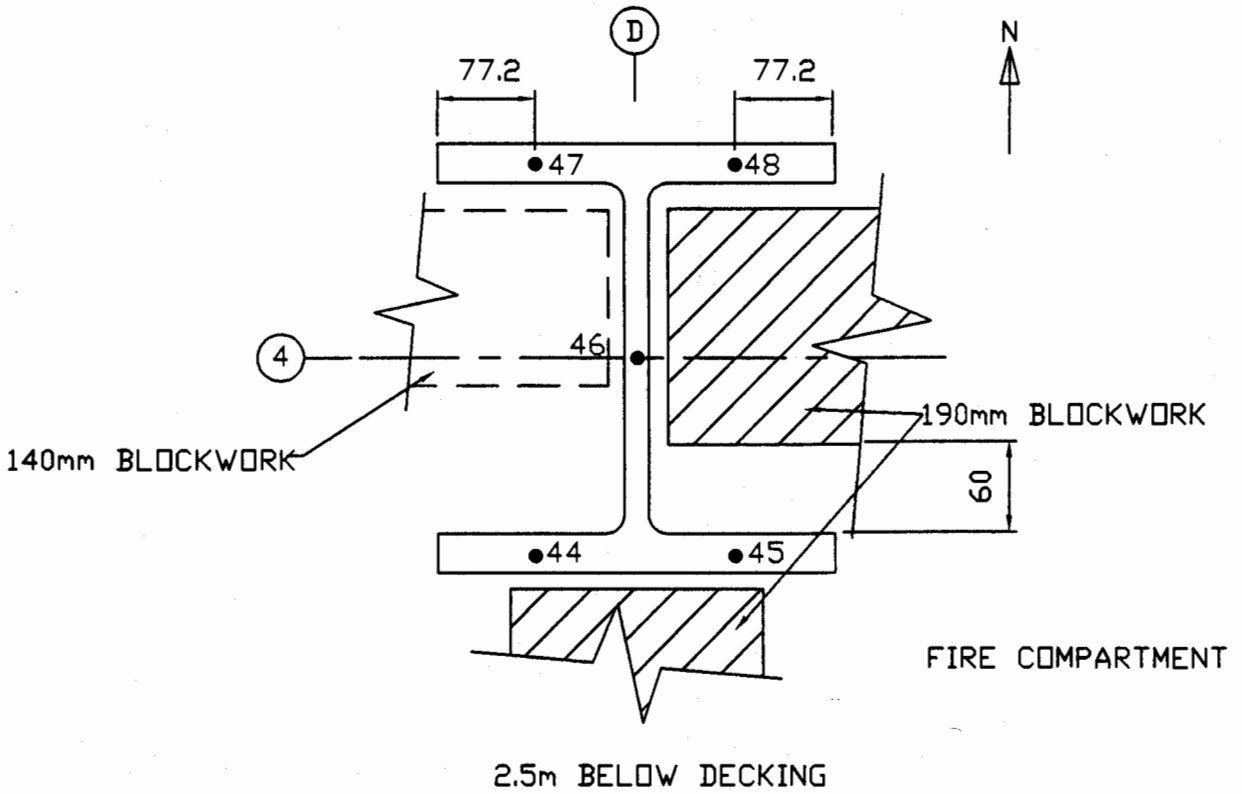
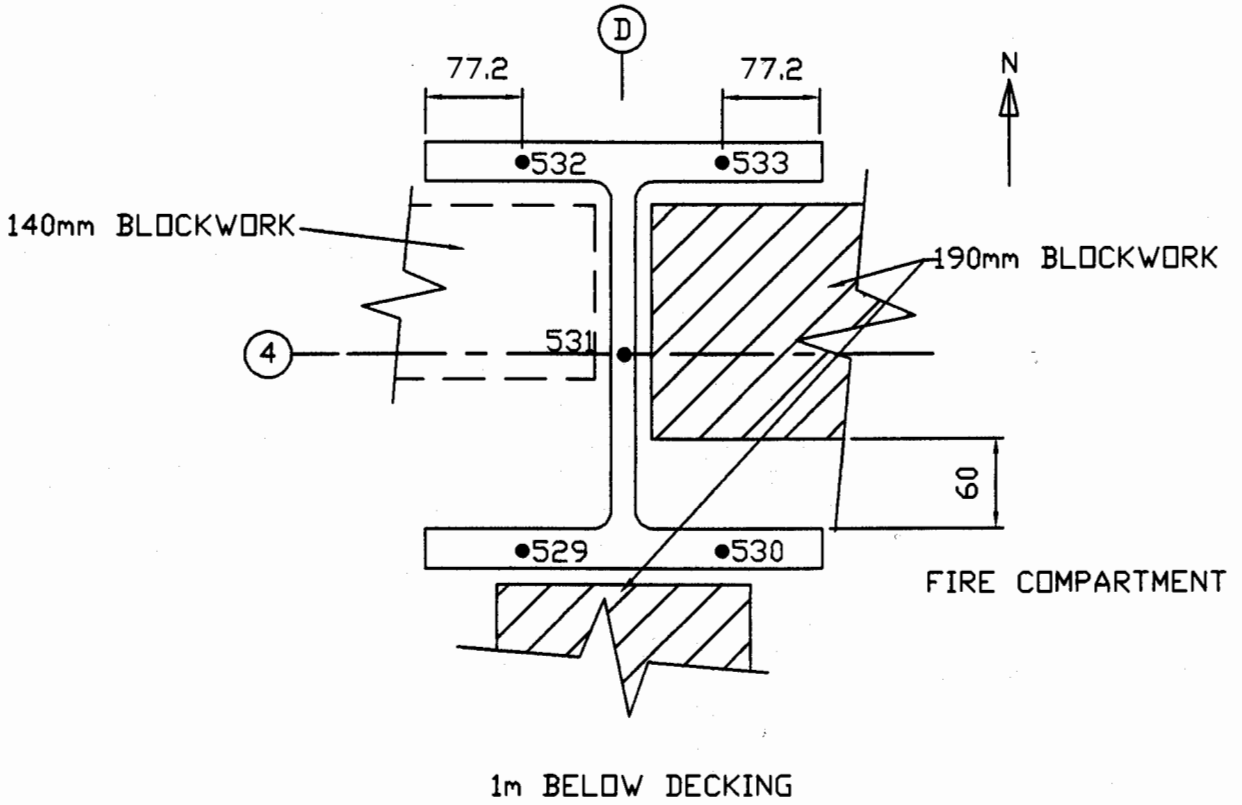


3 STEEL THERMOCOUPLES

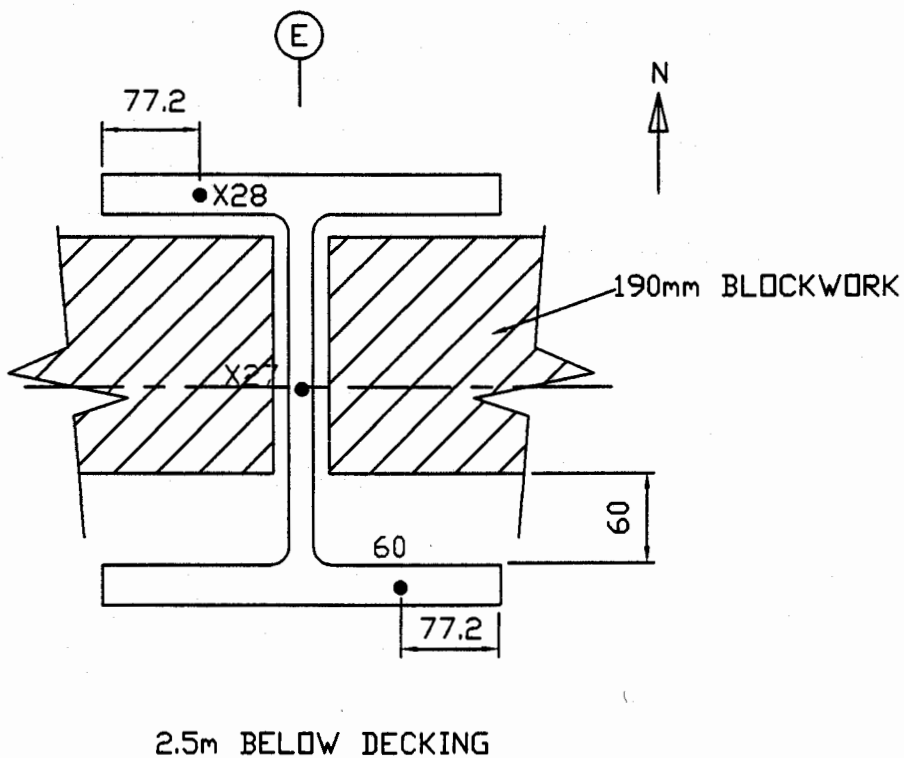
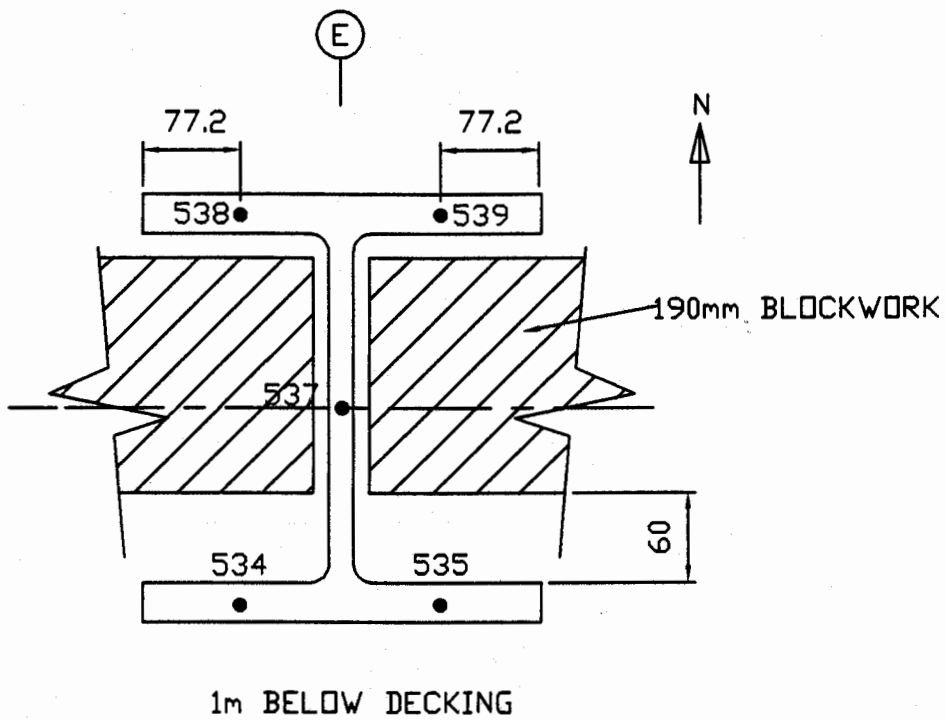
THERMOCOUPLE LOCATIONS ON SECONDARY BEAM AT GRID LINE 3 POSITION B10

305 x 165mm x 40kg/m

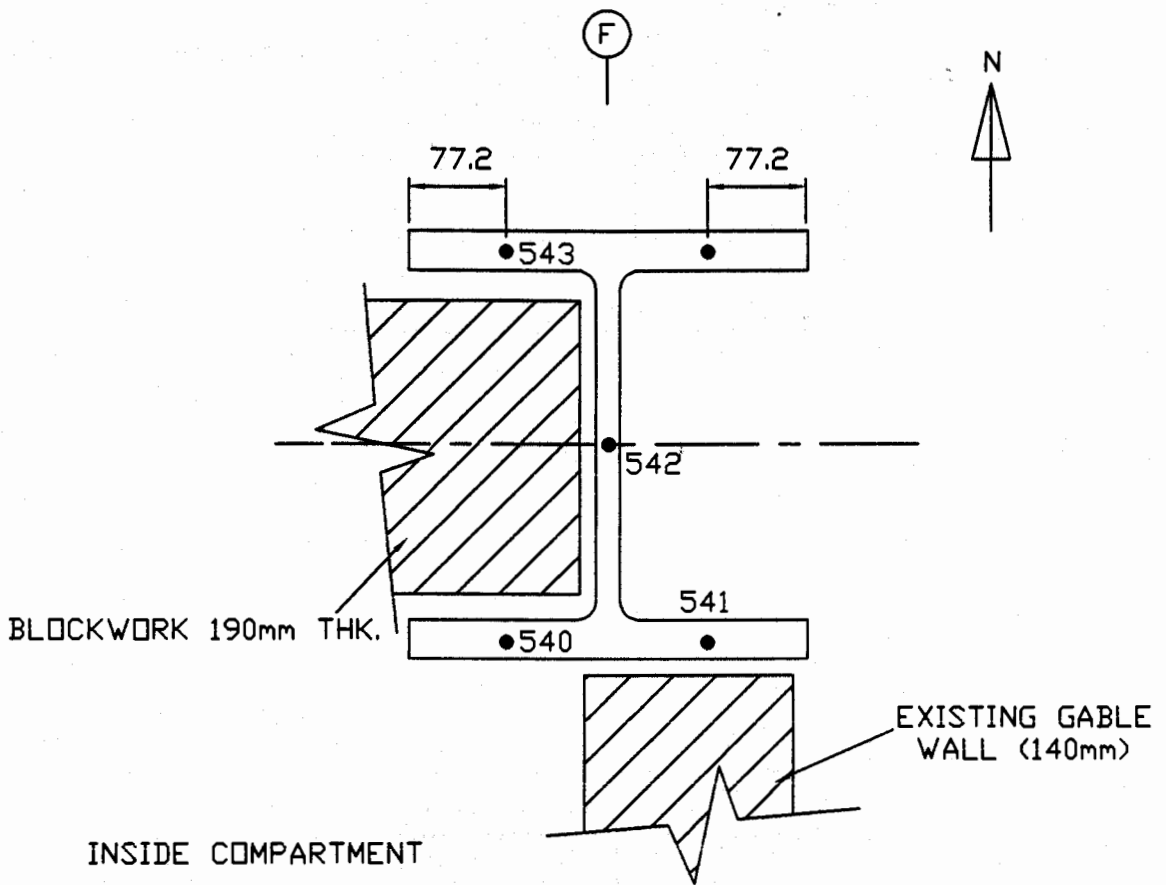
Data File: PRO15 , Figure 4/15



THERMOCOUPLE DETAIL AT COLUMN 4D
 305 x 305 x 198 kg/m

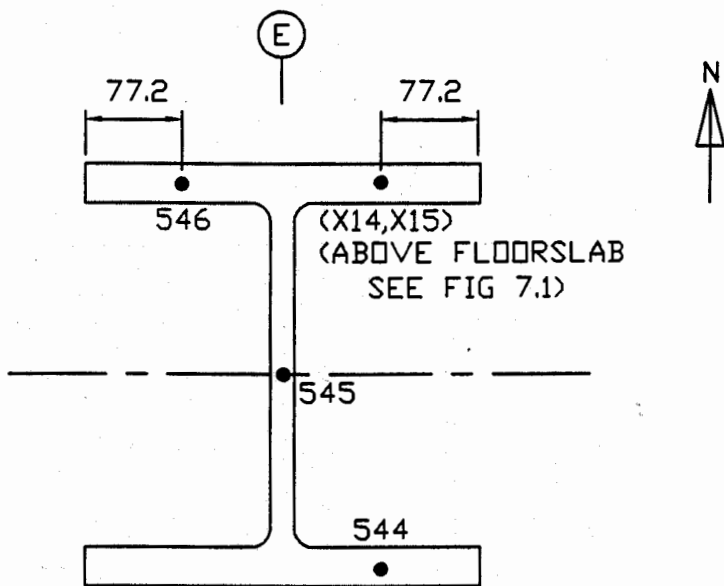


THERMOCOUPLE DETAIL AT COLUMN 4E
305 x 305x198 kg/m

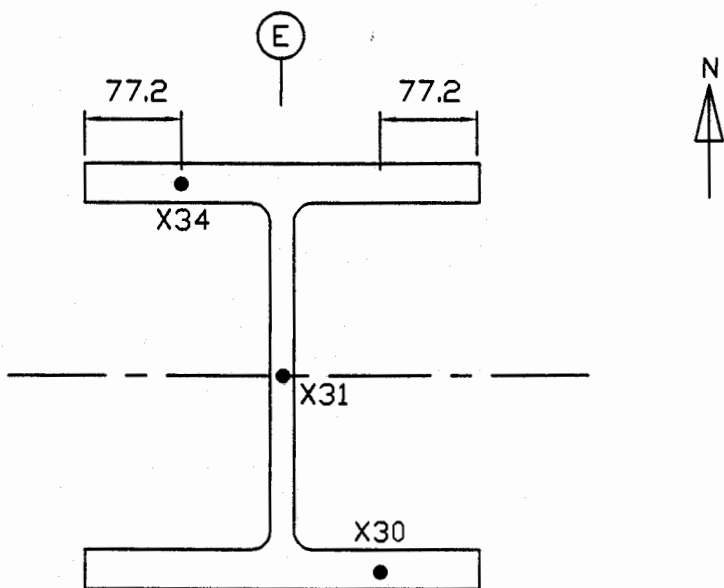


1m BELOW DECKING

THERMOCOUPLE DETAIL AT COLUMN 4F
 254 x 254 x 89 kg/m

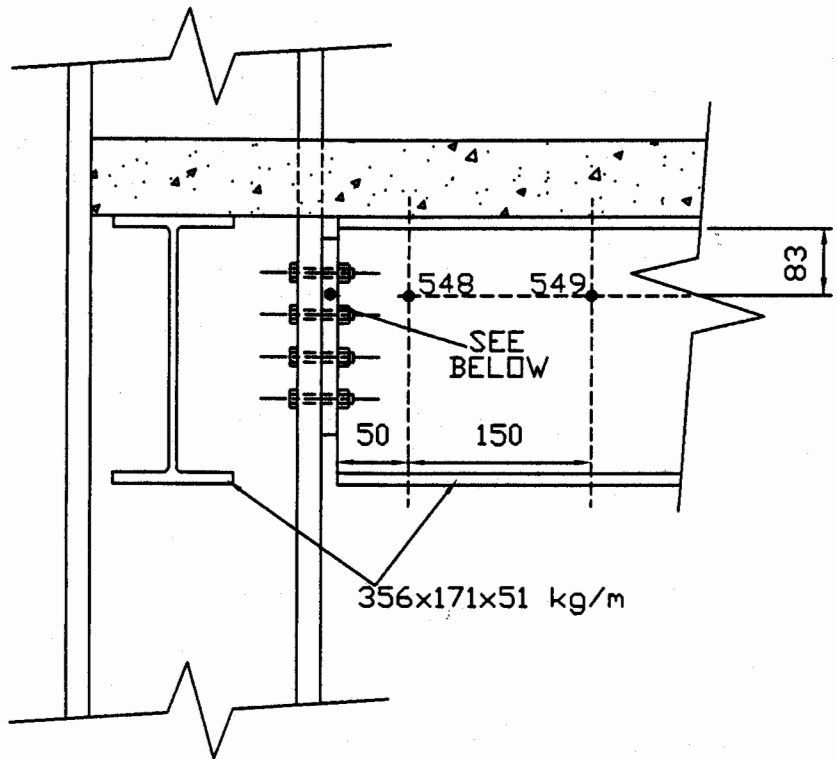


1m BELOW DECKING

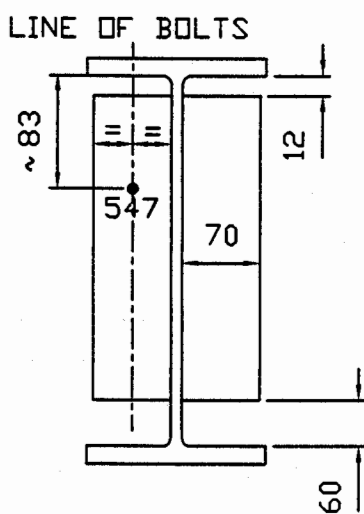


1m BELOW DECKING

THERMOCOUPLE DETAIL AT COLUMN 3E

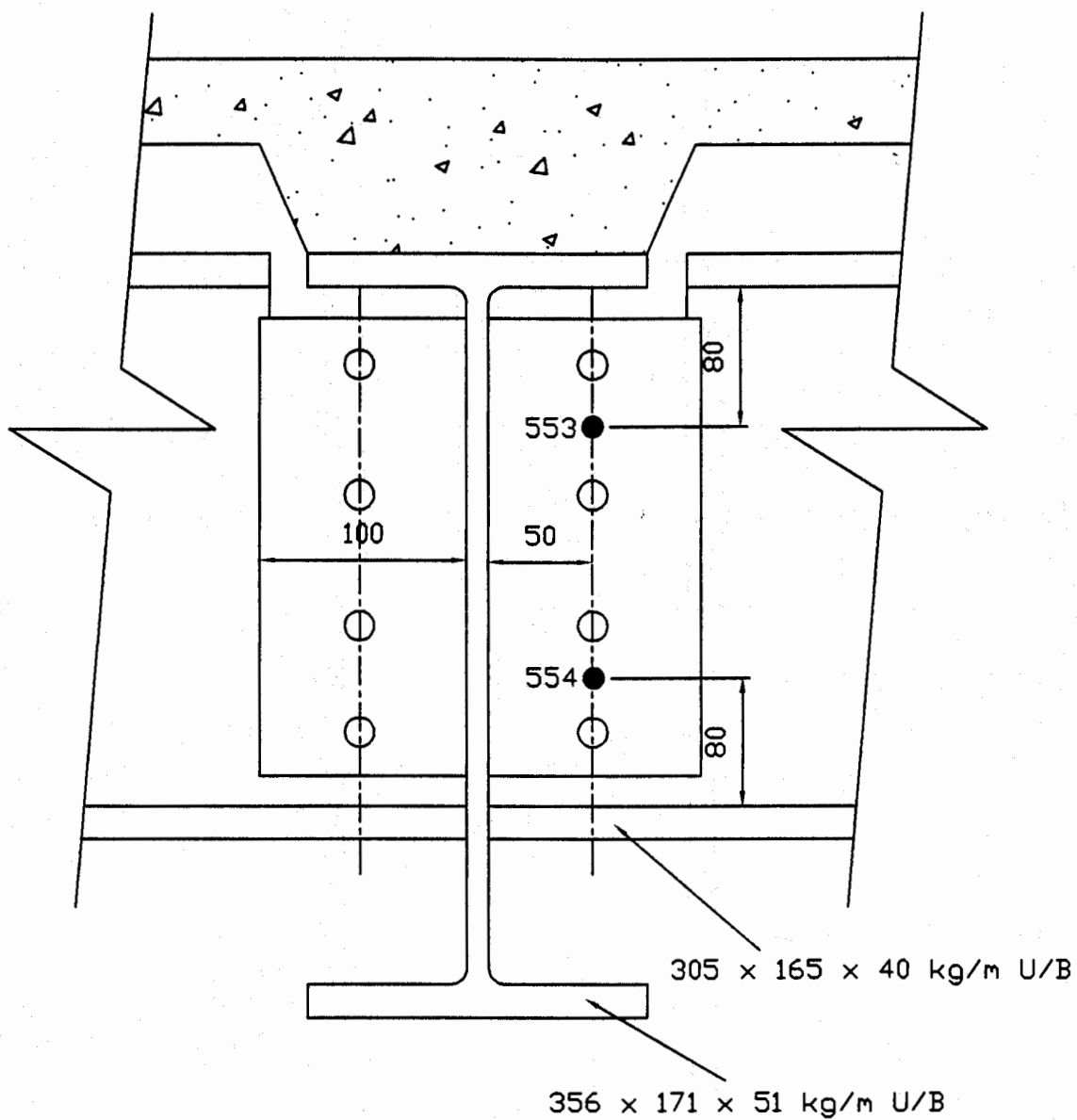


VIEW LOOKING EAST

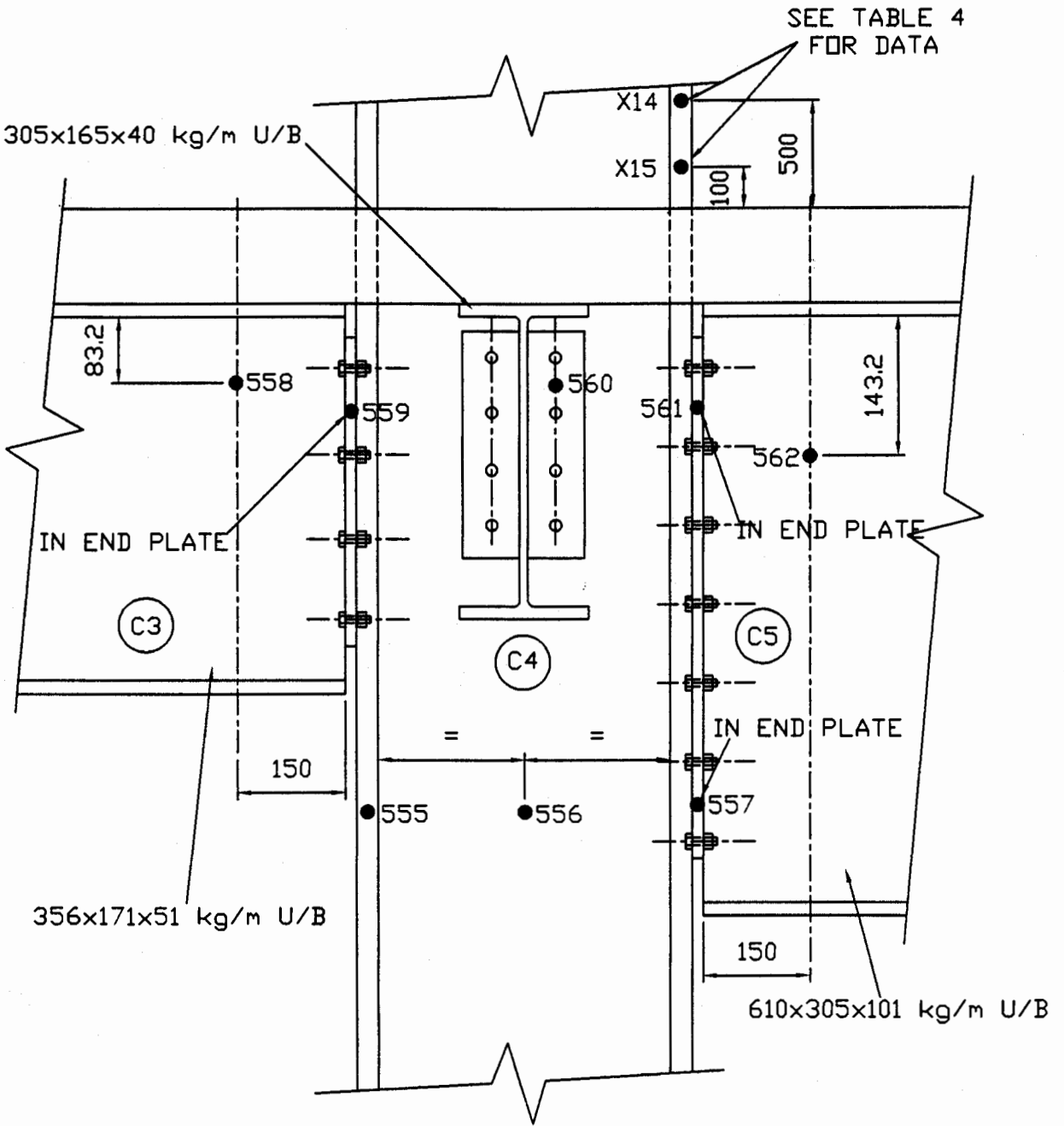


VIEW LOOKING NORTH

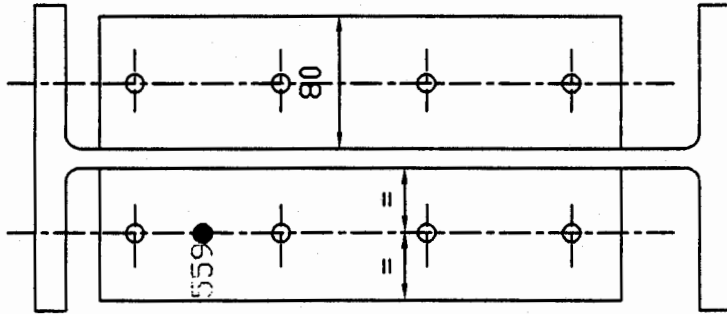
CONNECTION C1 AT COLUMN 4E



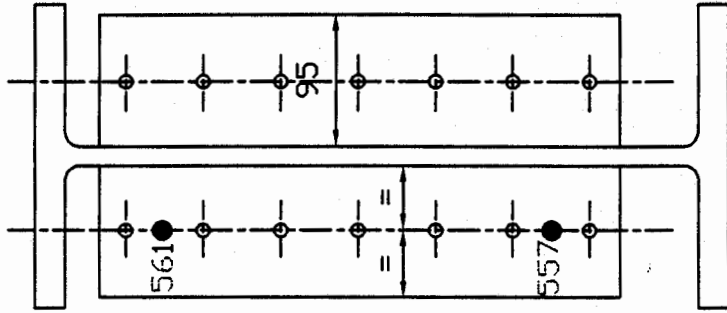
FIN PLATE CONNECTION C2 AT 3/4-E
 VIEW LOOKING NORTH



CONNECTION DETAIL C3, C4, AND C5 AT 3E LOOKING EAST



356x171x51 kg/m



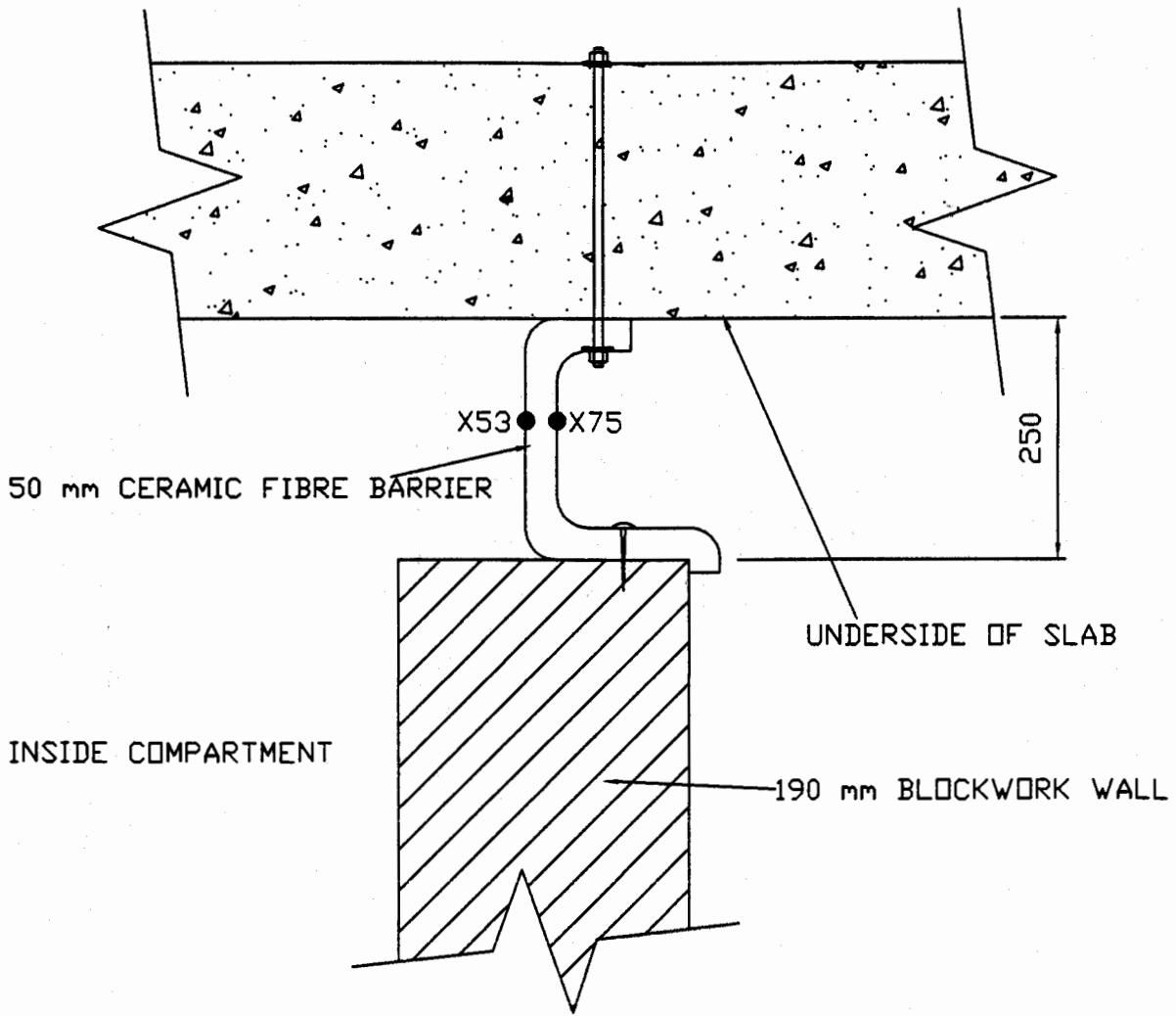
610x229x101 kg/m

CONNECTION C3 AT COLUMN 3E

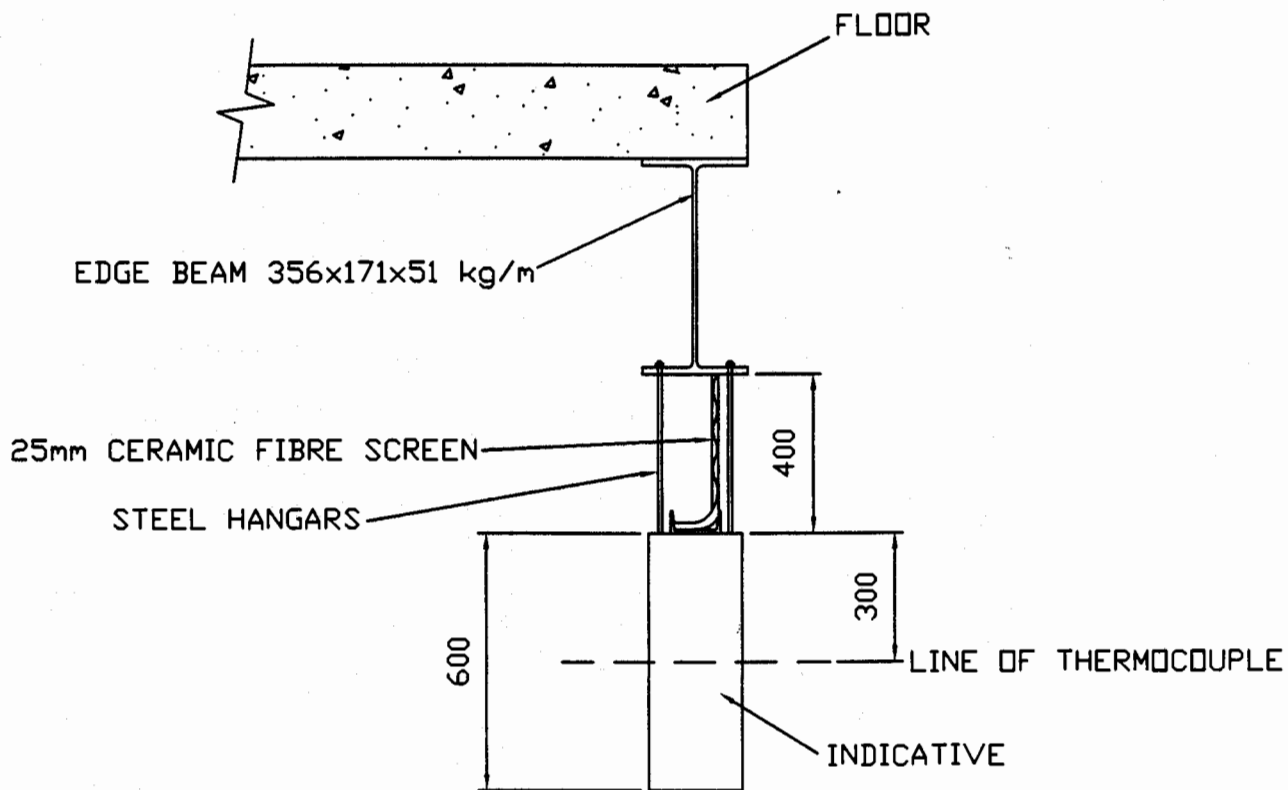
CONNECTION C5 AT COLUMN 3E

VIEW LOOKING SOUTH

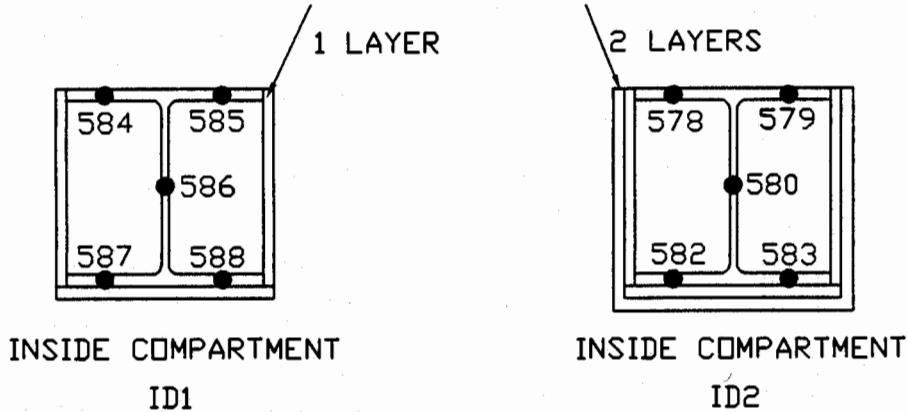
VIEW LOOKING NORTH



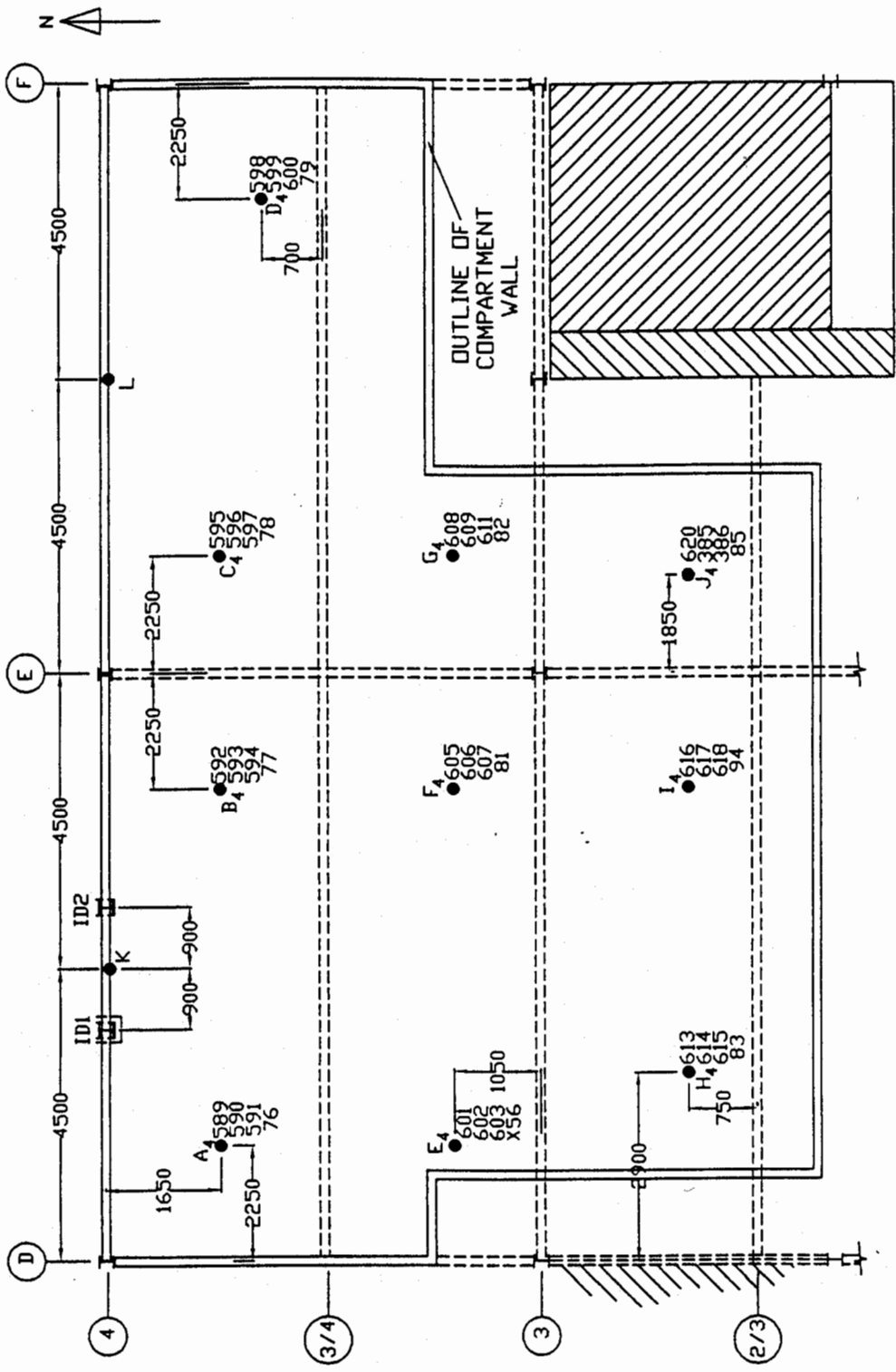
LOCATION OF THERMOCOUPLES ON THE SURFACE OF THE FIRE BARRIER



203x203x52 kg/m U/C's PROTECTED WITH 15mm MINERAL FIBRE BOARD

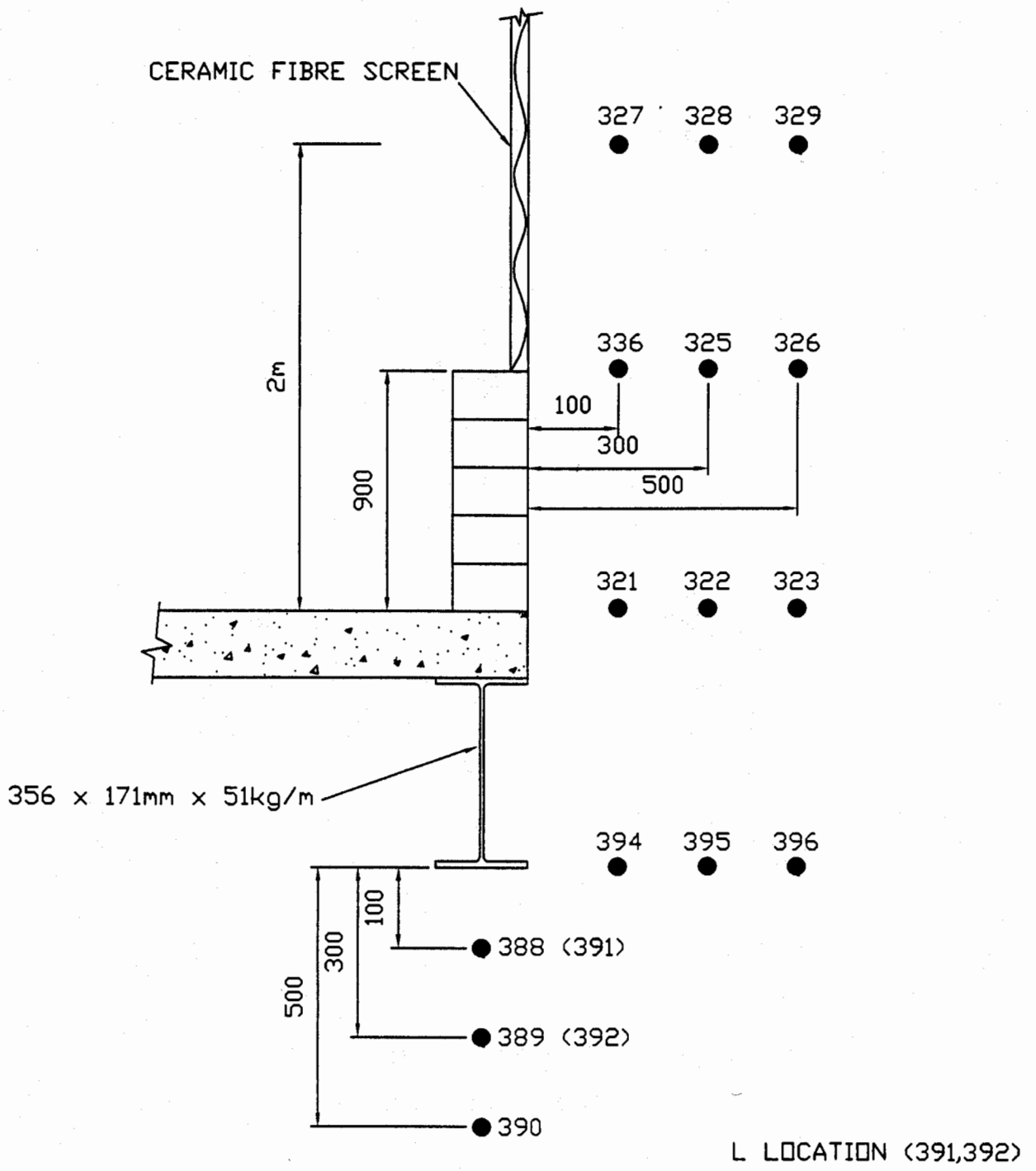


PARTIALLY PROTECTED STEEL INDICATIVES-LOCATION OF THERMOCOUPLES

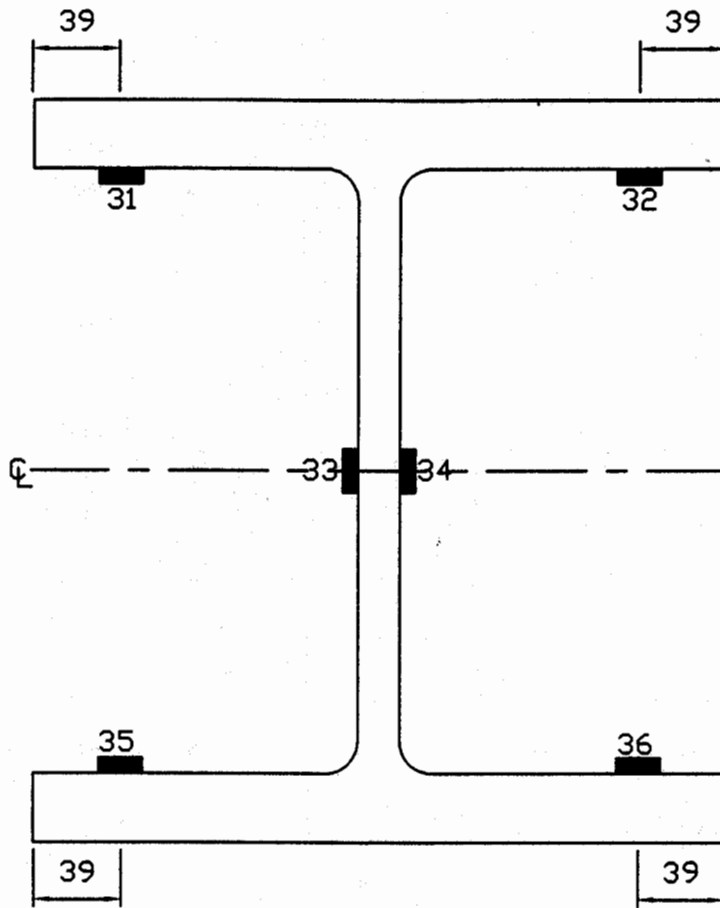


TEST 4 - LOCATION OF ATMOSPHERE THERMOCOUPLES

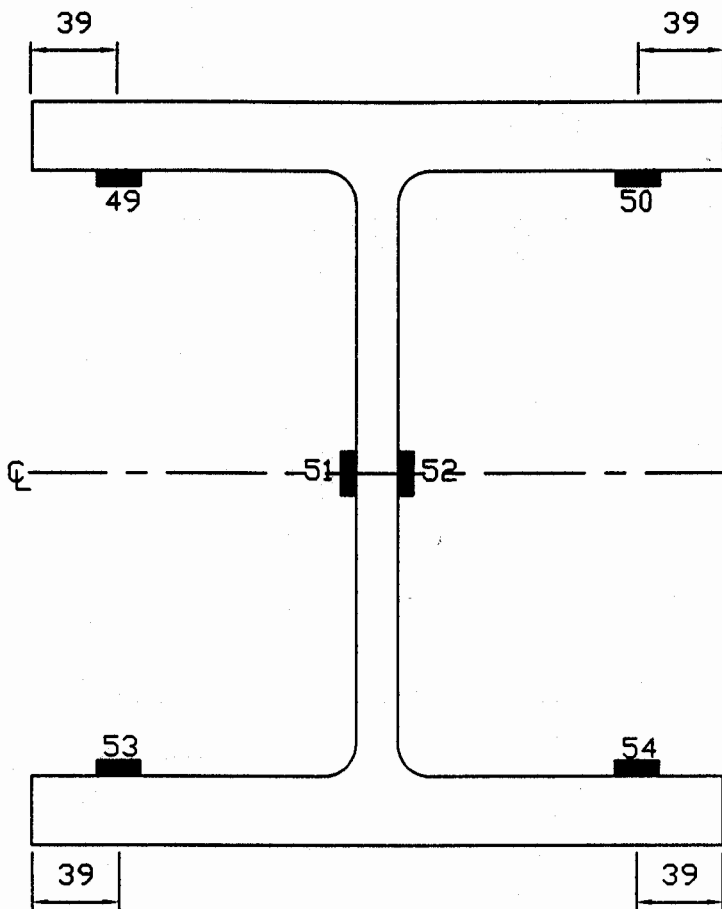
ALL DIMENSIONS IN MM



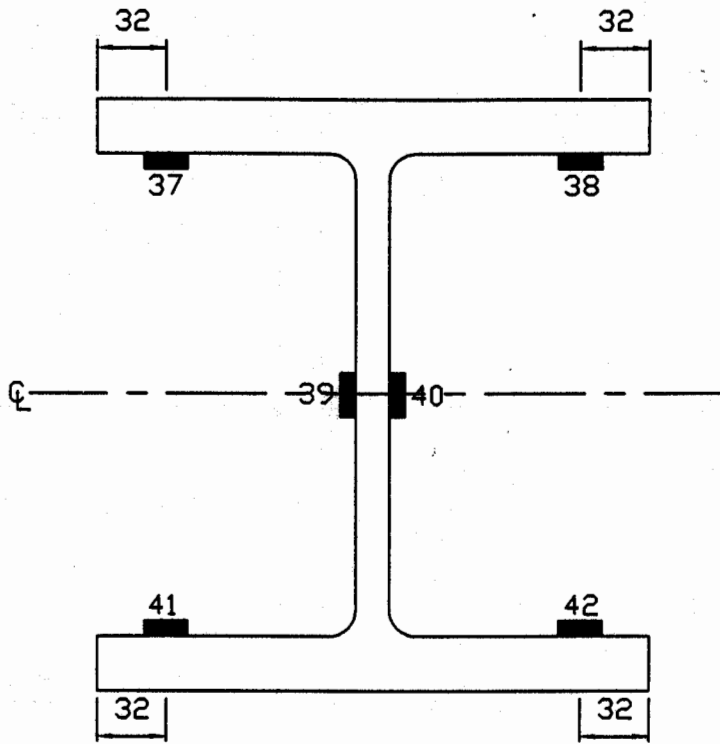
FACADE TEMPERATURES AT LOCATIONS K & L



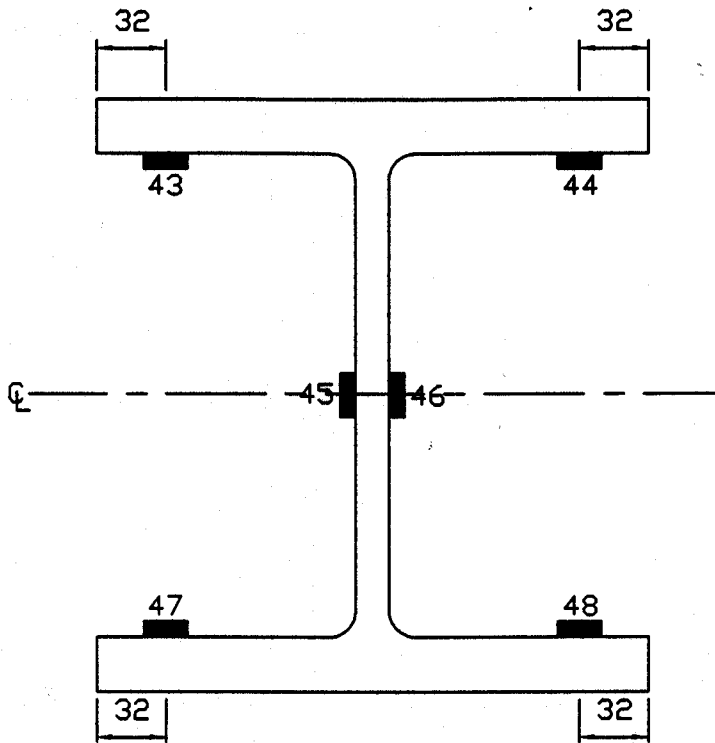
STRAIN GAUGE LOCATIONS ON COLUMN 3D AT LEVEL 1
305 x 305 x 198kg/m



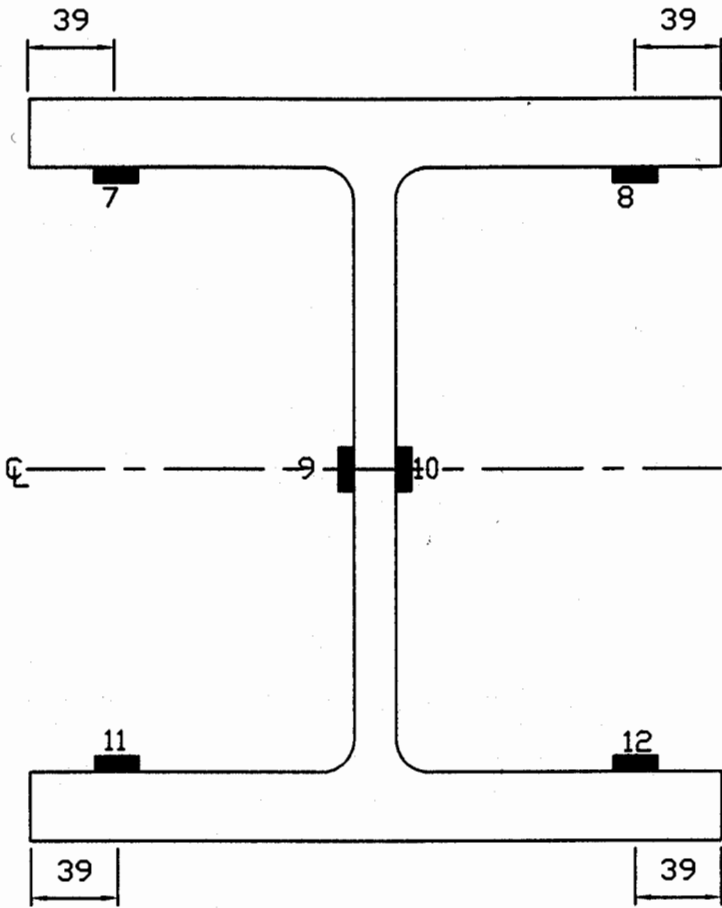
STRAIN GAUGE LOCATIONS ON COLUMN 3E AT LEVEL 1
305 x 305 x 198kg/m



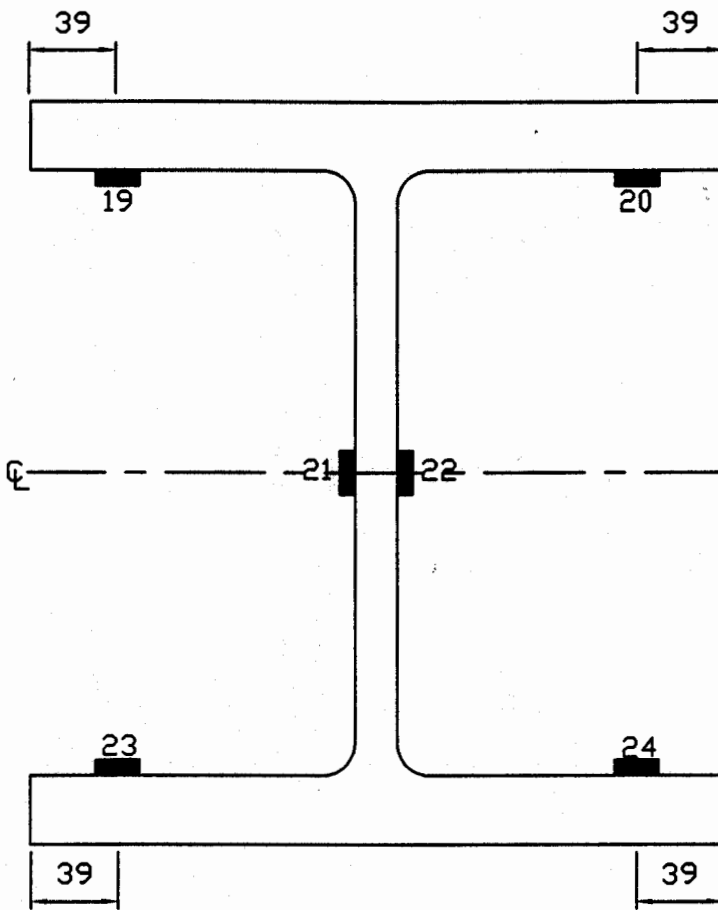
STRAIN GAUGE LOCATIONS ON COLUMN 4D AT LEVEL 1
254 x 254 x 89kg/m



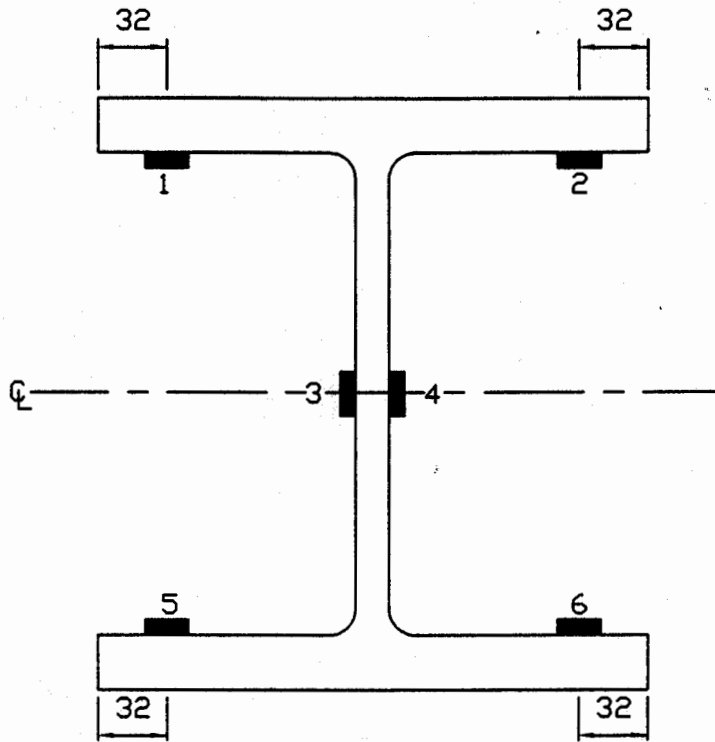
STRAIN GAUGE LOCATIONS ON COLUMN 4E AT LEVEL 1
254 x 254 x 89kg/m



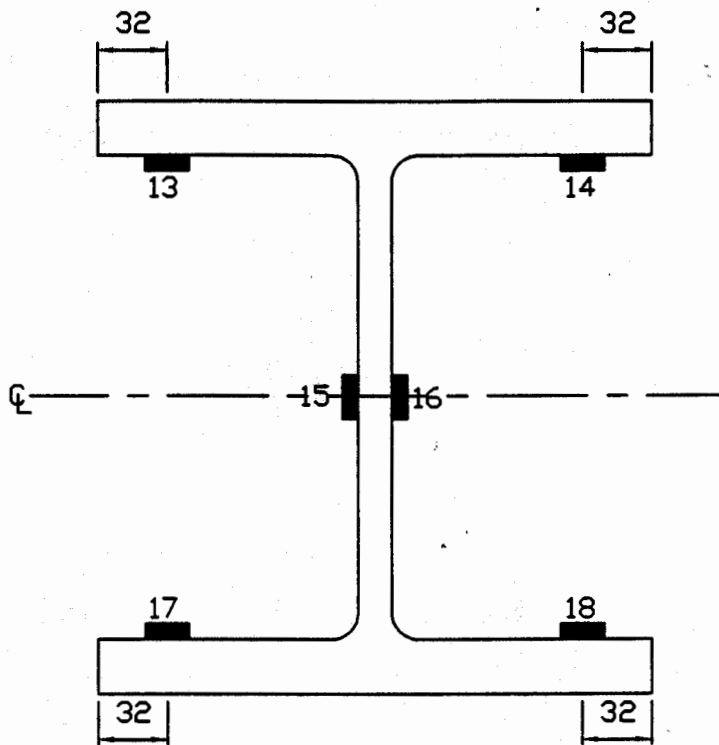
STRAIN GAUGE LOCATIONS ON COLUMN 3D AT LEVEL 2
305 x 305 x 198kg/m



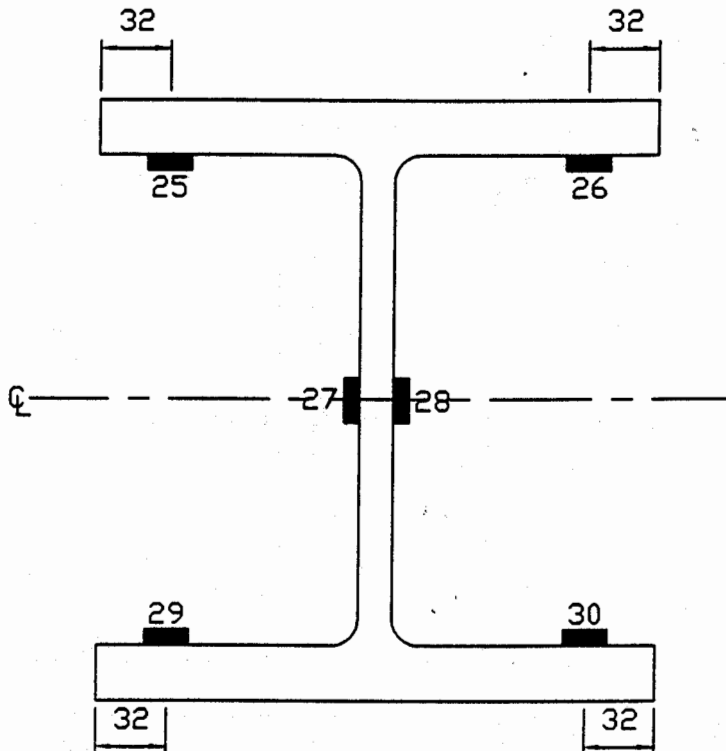
STRAIN GAUGE LOCATIONS ON COLUMN 3E AT LEVEL 2
305 x 305 x 198kg/m



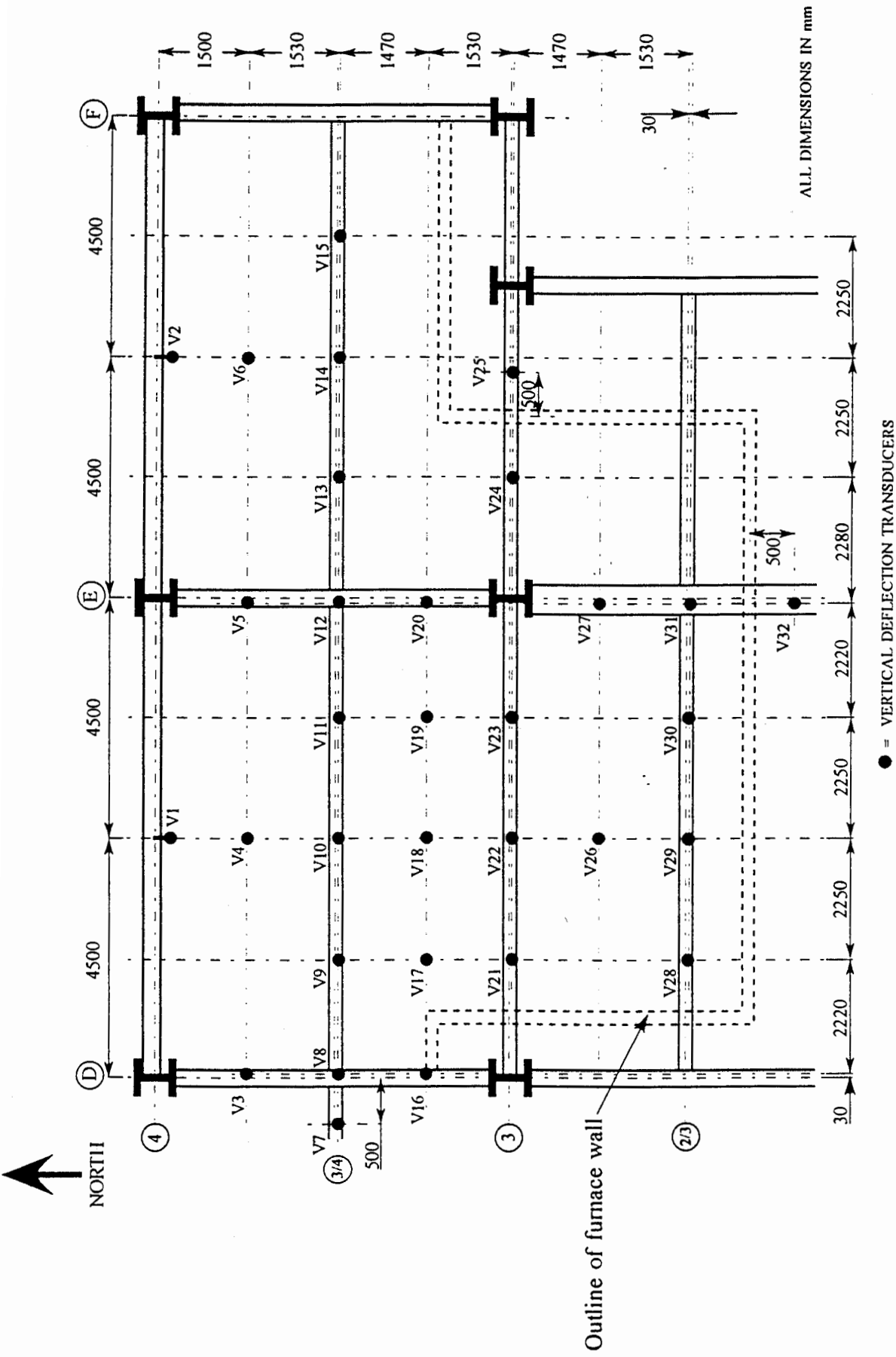
STRAIN GAUGE LOCATIONS ON COLUMN 4D AT LEVEL 2
254 x 254 x 89kg/m



STRAIN GAUGE LOCATIONS ON COLUMN 4E AT LEVEL 2
254 x 254 x 89kg/m



STRAIN GAUGE LOCATIONS ON COLUMN 4F AT LEVEL 2
254 x 254 x 89kg/m



Test 4 - Transducer Positions for Measuring Vertical Deflections