

<b>SAFETY CODE FOR IRON &amp; STEEL SECTOR</b>		
MINISTRY OF STEEL, GOVT. OF INDIA	<b>BARRICADING</b>	Doc. No: SC/11
		Rev no. : 00 Effective Date : --

### 1. Objective:

This safety code defines the process of deploying best practices in barricading at shop floor. It also provides guideline on engineering solutions on restriction of unwanted access to hazardous place at shop floor.

### 2. Scope:

The scope of work covers all steel plants in Iron and Steel sector.

### 3. Procedure:

#### 3.1 Deployment Methodology:

- i) Gap Identification and assessment of current practices.
- ii) Identifying critical areas to improve and prioritize.
- iii) Preparation of deployment plan
- iv) Review and monitoring the improvement and compliance of plan

#### 3.2 Process:

##### 3.2.1 Barricades:

- i) Barricades are used as warning devices, alerting people of the hazards in the construction sites. These are also used to control traffic movement on roads and to protect hazard prone vital installations like gas holders, electrical sub-stations etc.
- ii) Barricades are used to prevent un-authorized entry into hazardous area inside production departments.
- iii) Consultants, site-in-charge from Central Project Engineering Division and Operating Departments are responsible to ensure that the work site is properly barricaded.
- iv) Where required for protection of workers, public safety, or as required by laws, substantial barricades shall be provided for the areas where excavation, trenching, construction and demolition work are being performed.

- v) Barricades shall be provided to protect people from associated hazards and to prevent trespassing into vital installations as per the requirement of prevailing laws.
- vi) An opening measuring 30 cm or more in its least dimension, in any floor, platform, pavement or yard through which person may fall; such as hatch way, stair or ladder opening, pit , large manhole, should be barricaded.
- vii) Traffic flow shall be controlled by using appropriate barricades to guide the vehicles into desired lane.
- viii) All barricades shall be visible from a safe distance, to alert people well in advance.
- ix) Caution board, diversion board, shutdown board to be displayed at both ends of barricade.
- x) Two persons with red / green flag and whistle to be deputed at both ends of the barricades to regulate traffic.
- xi) Red light to be provided on the barricades if job is to be done after sunset at the site.
- xii) No material to project / spill beyond barricades.
- xiii) Only authorized persons shall remove the barricades once the job is complete.
- xiv) All extended open bars at construction site as well as at plants, other projected bars, valve spindle etc in the plants at man-height must be protected with Bar-cap, to cover the sharp projection of the bar.

### **3.2.2 Roles and Responsibility:**

#### **Project Manager/Head Of Department-**

- i) Deployment of Code of Practices at Sites/shop floor
- ii) Advice review and allocate recourse to close the gaps
- iii) Support departmental team to Implement the good practice to bridge the gaps in deployment in Code of Practices.

#### **Site In charge/ Team Leader:**

- i) Execute the barricading plan
- ii) Conduct site visit with site supervisors and deploy best practices at sites/Shop Floor

### 3.2.3 Type of barricades:

- i) Indicative Barricades:
- ii) Protective Barricades:

#### i) Indicative Barricades



#### ii) PROTECTIVE BARRICADING



### **BARRICADING SINAGE FOR ACCESS CONTROL-**



- i) Danger Flags are to be attached with a maximum spacing of 5m.
- ii) The size of the Danger Flag shall be of minimum A4 size (210 X 297 mm).

#### **3.2.3 Barricading hazardous areas within a production department :**

- i) Departmental head will ensure identification of all hazardous areas, within his/her department, which require permanent protective barricades to control and prevent entry of un-authorized persons.
- ii) All such areas shall be given unique identification numbers and ownership shall be assigned to officers/supervisors of the department. The owner of the hazardous area will also be responsible for installation and maintenance of the permanent protective barricades in his/her areas.
- iii) For any job requiring the removal and/or modification of the permanent barricade, written permission shall be taken from the owner of the barricade.
- iv) All permanent type protective barricades shall be designed, fabricated and erected to ensure safety and operational requirements.
- v) For newly constructed plant units, all hazardous areas requiring permanent protective barricades shall be identified during PSSR.

Before commission of the Plant unit, all corrective actions as per PSSR finding regarding barricades shall be implemented.

- vi) Status and conditions of permanent protective barricades shall be reviewed by the departmental head at regular interval.

### **3.2.4 Barricading Construction site:**

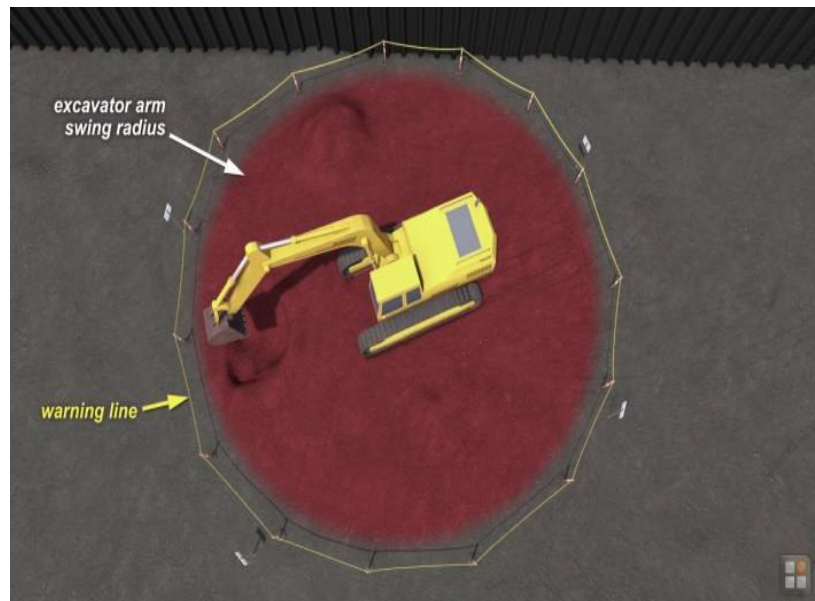
**3.2.4.1** Construction sites are to be barricaded using the appropriate barricades, as given in the following bullet points:

- i) The construction sites shall be provided with barricade all around its periphery as per standard guideline given in **annexure 6**.
- ii) Barricade with pre-colour coated profile sheets supported on angle, channel, hollow sections or 25mm diameter rebars depending upon availability. The height of barricades shall be minimum 1.0 m. Barricade with height more than 1.2 meter shall be approved by designers.
- iii) Barricades with scaffolding pipes. Vertical pipes shall be placed at about 2.0 m centre to centre and firmly grouted onto ground. All vertical and horizontal pipes shall be painted with black-yellow zebra fashion.

**3.2.4.2** Wherever construction debris is dropped without the use of an enclosed chute, the area is to be barricaded using either of the barricade standards given at **Annexure -2, 3 or 4** depending upon the availability of angle/square hollow section and pipes, with 1 meter clearance from the deposited materials.

**3.2.4.3** Areas with temporary wiring operating at more than 600 volts shall be barricaded with indicative barricade comprising "Red-White" safety tape, if the job requires at most one day to complete. If job requires longer time, then the site is to be barricaded with protective barricades as per the above-mentioned sketches. Plastic barriers must not be used to barricade the work area.

- 3.2.4.4** The swing radius of the rotating superstructure of cranes, excavator or other equipment is to be protected using minimum 50 mm wide 'Red-White' safety tapes. One strand of tape must run continuously from post to post at 1000 mm above ground. Another strand of tape is to run above 300 mm from the ground. Alternately, temporary steel frame barricades may also be used to barricade the swing radius. Danger sign as shown below is to be attached to the barricade.



- 3.2.4.5** All construction materials shall be barricaded with temporary steel barricade, as shown in the following figure. No part of any material shall protrude beyond the barricade.



### 3.2.5 Barricading at excavations site:

For road-side excavations, a protective barricade of at least 1200mm high must be erected around a trench that is 1.0 meter or more deep using standard drawing given in **Annexure-6** In other cases, indicative barricades with red-white tape in two layers may be used suitably, around the excavated pit at minimum 1.5m from the edge of excavation.



**PROTECTIVE  
BARRICADING**

### 3.2.6 Barricading at Demolition site:

- i) All the roads and open areas adjacent to demolition site shall be barricaded with caution board. Unauthorized entry to demolition site must be prevented.
- ii) Properly cover or securely barricade all the floors or roof openings / lift shaft entrances / doorways leading to staircases (where staircases are to be removed).
- iii) When floors are being removed, the area underneath shall be properly barricaded to prevent any other workman to work under the floor.
- iv) All floor openings / wall openings shall be adequately guarded / barricaded.
- v) During night, red light and/or luminescent danger signs shall be placed on and around the barricades.

**3.2.7 Barricading Roads :**

- i) Before working on road or along road side, the executing agency shall obtain approval for working on road from Safety Department. Barricade to control or to protect traffic is to be provided as per the norm mentioned below and to be approved by the site-in-charge and the safety officer of the concerned department before starting the job.
- ii) Executing agency shall make safe work procedure for the job with the help of the safety officer of the concerned department.
- iii) Care should be taken to block only one-half of road width at a time. Caution boards and boards indicating diversion are to be placed at both sides of barricade.
- iv) If entire road width is to be blocked, in addition to the caution board, the road diversion sign is to be prominently placed on both ends of the work area.
- v) If access by construction vehicles is required, the contractor or agency doing the work is responsible for properly replacing the barricades immediately after entry & exit of the construction vehicle.



- vi) If access to local office building is to be maintained beyond the point of the closure then an adequate opening shall be provided between the barricades to allow safe ingress and egress through the closure.
- vii) Drum painted white with red stripes at the middle and barricade with red / white safety tape may be used as barricade. However, barricades as shown either in the standard drawings given at **Annexure -2, 3 or 4** are preferable to drums.
- viii) Two persons with red / green flag and whistle to be deputed at both sides of the barricade to regulate traffic.
- ix) Red light to be provided if job is to be done after sunset. The cable for red lights shall be tied only with non-conductive material.

**3.2.8 Barricading for positive isolation:**

- i) For positive isolation, the entry of the personnel and the trucks and cranes to the working area shall be restricted by using barricades as shown in the standard drawing given at **Annexure-5**.
- ii) Separate gate shall be provided, for the entry of personnel and trucks.
- iii) The barricades shall have self closing door for entry of persons

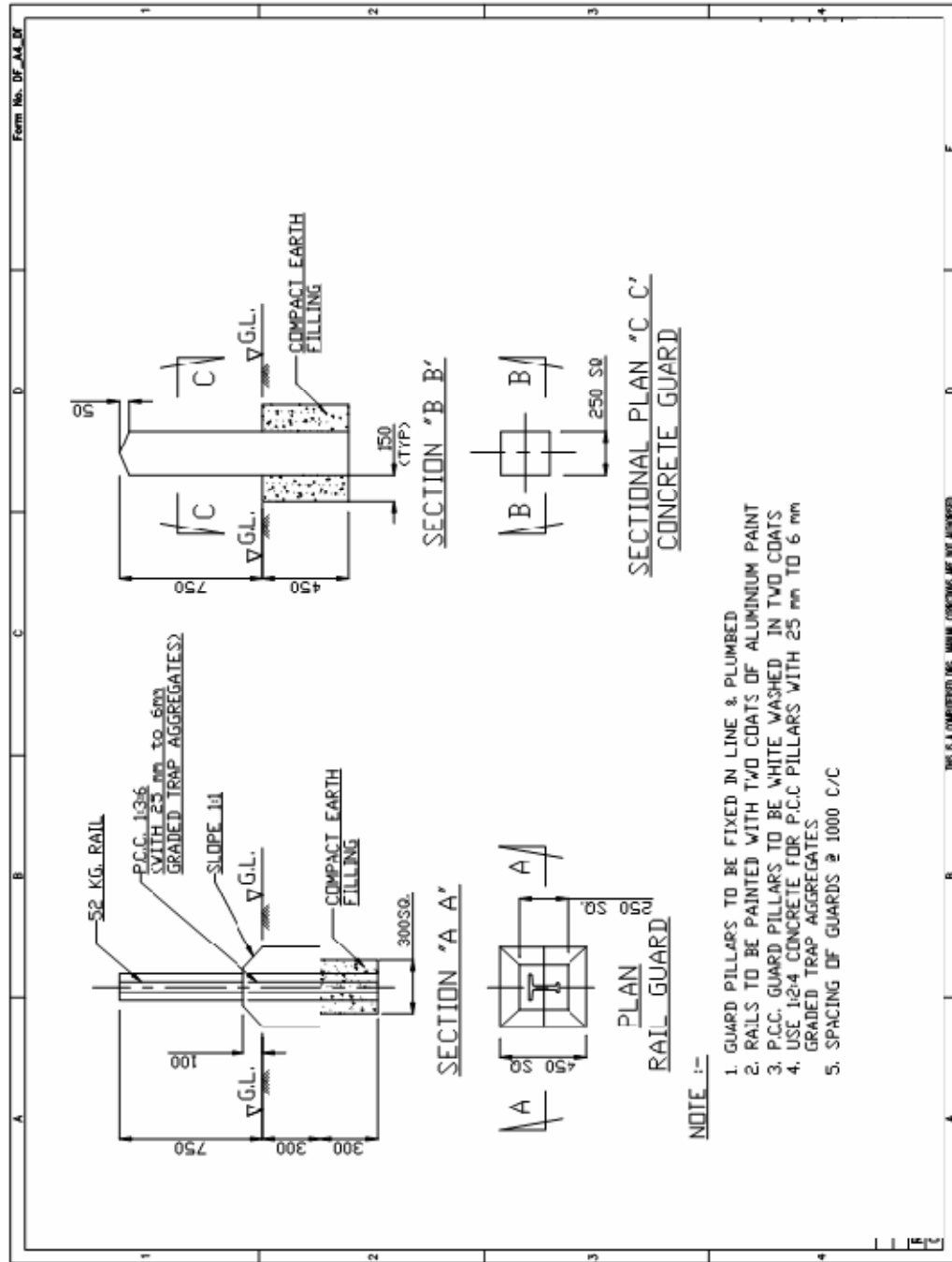
**3.2.9 Monitoring and Reviewing**

<b>Frequency</b>	As per audit schedule or as and when necessary
<b>Mechanism</b>	Audit
<b>Record</b>	Audit records
<b>Responsibility</b>	All Area Implementation committees

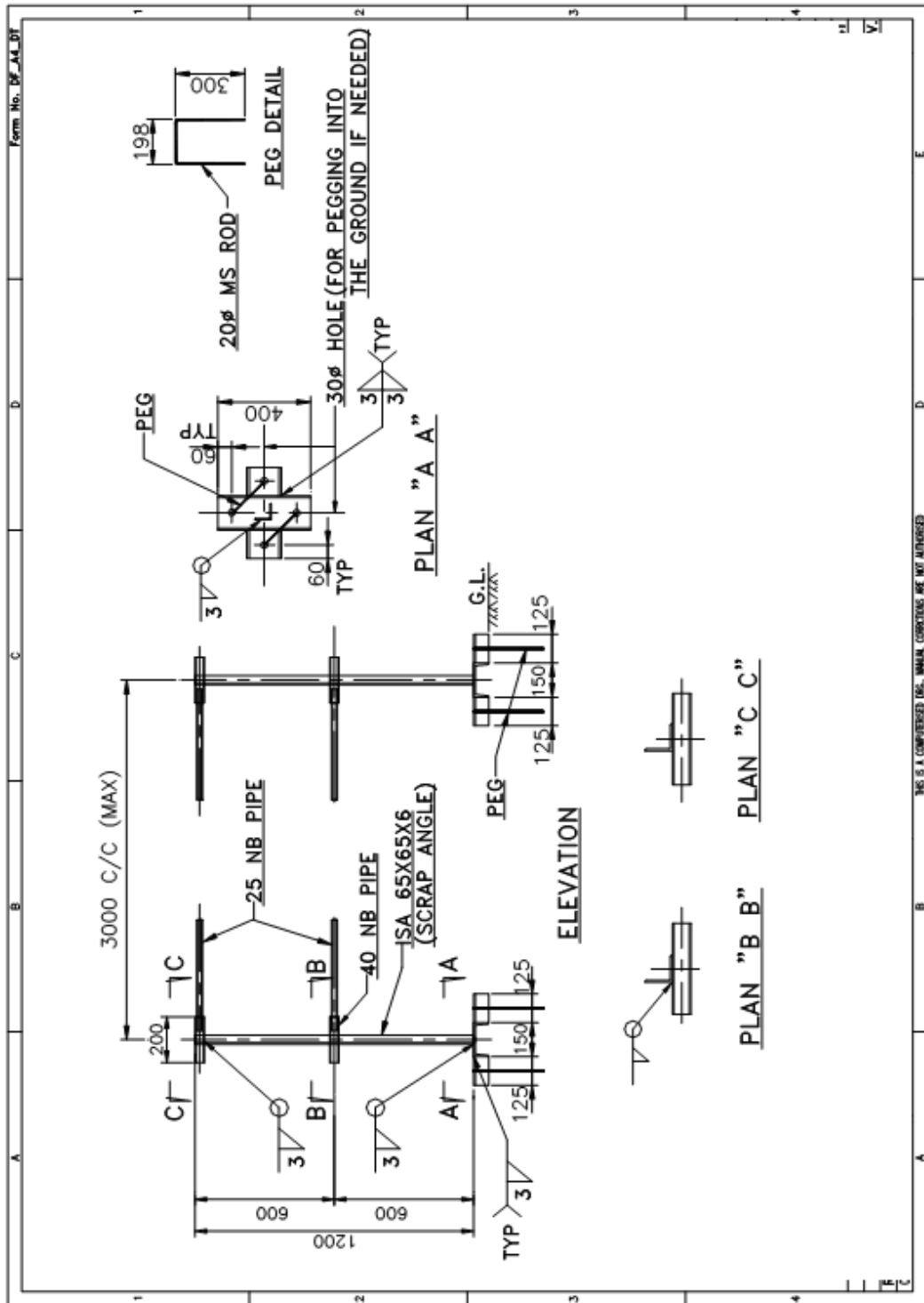
**Reference:**

1. IPSS:1-11-022-14
2. TSL Safety Standard: SS/ENGG-13, Version-06

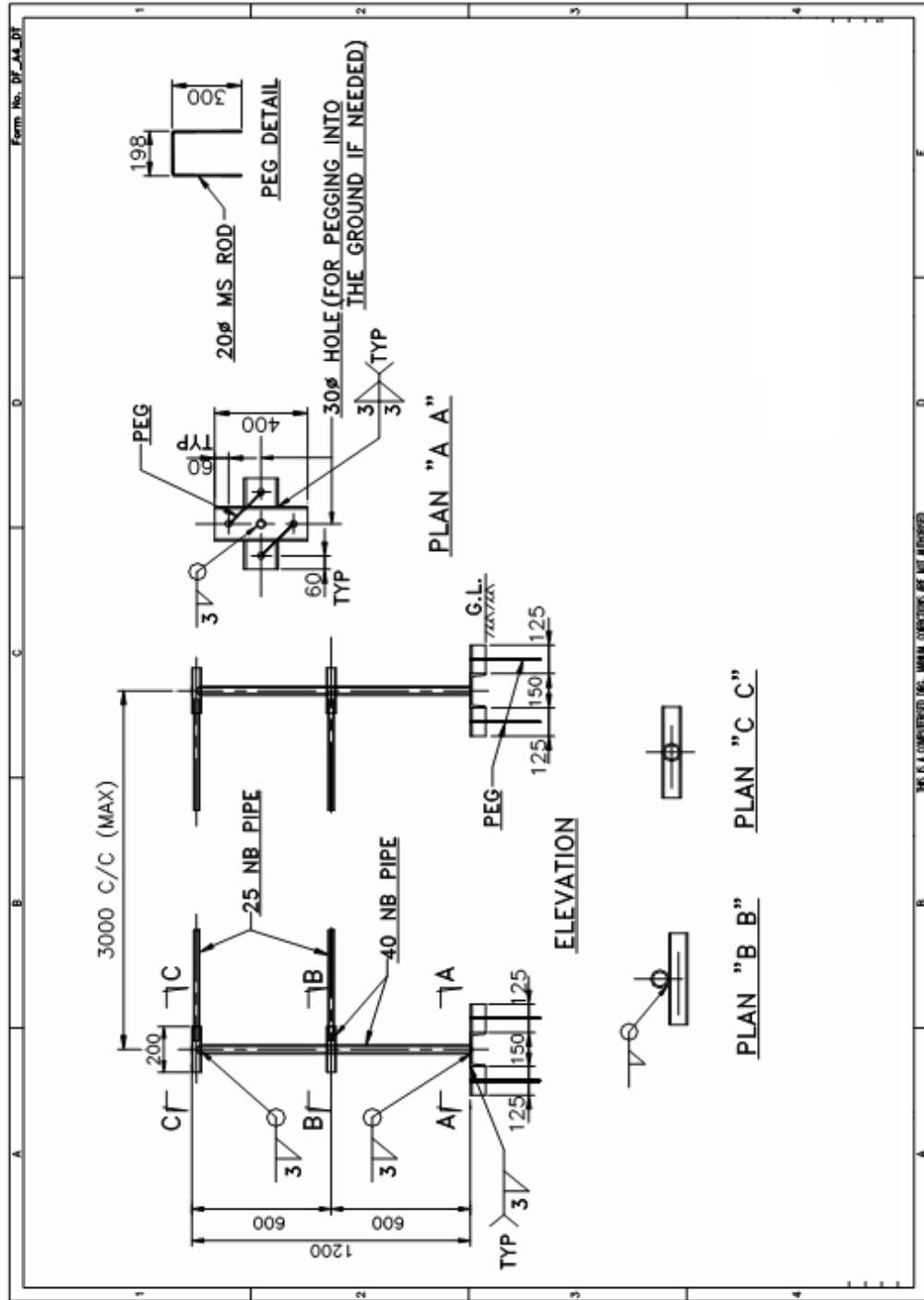
ANNEXURE-1



ANNEXURE-2

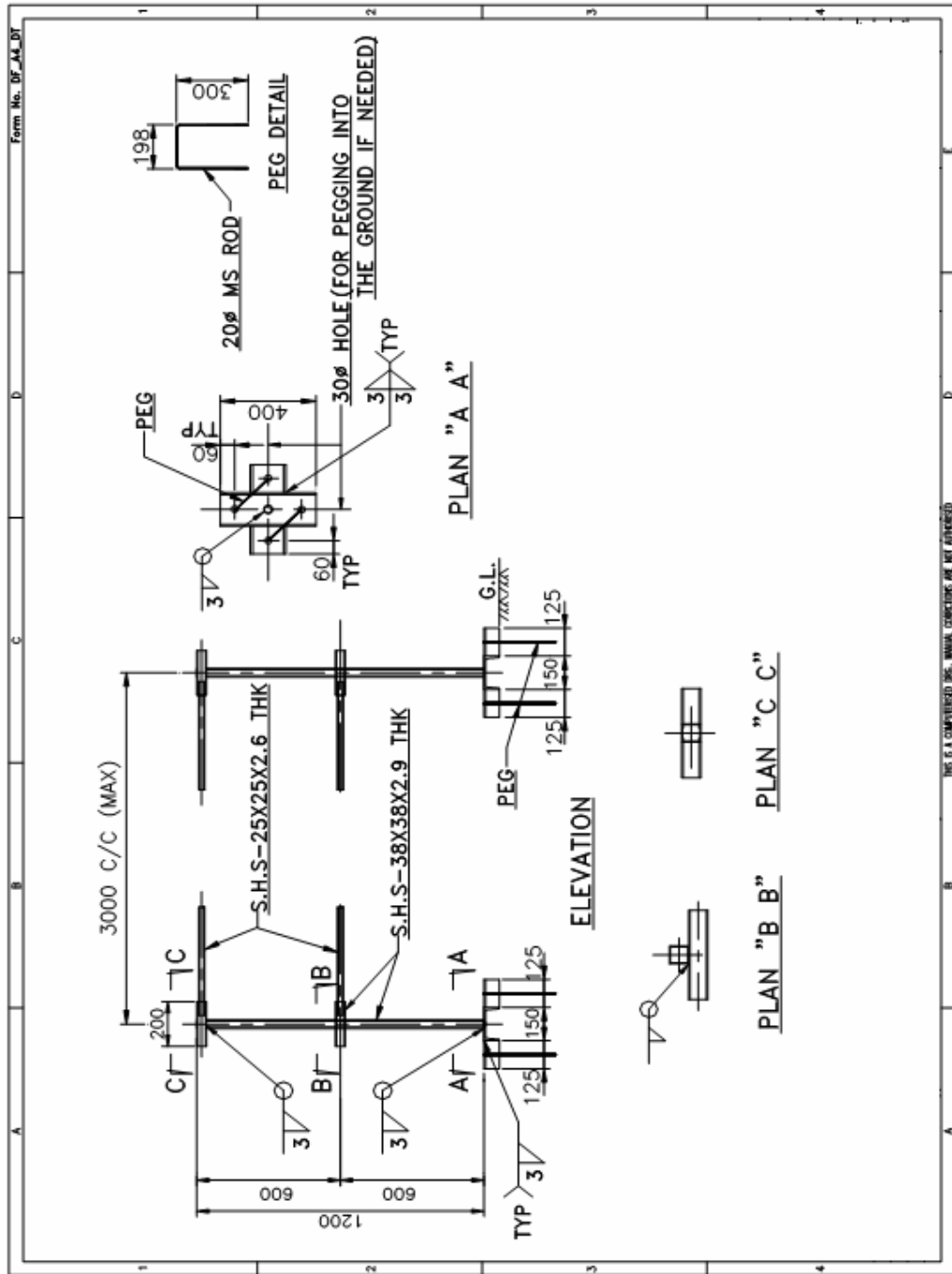


ANNEXURE-3

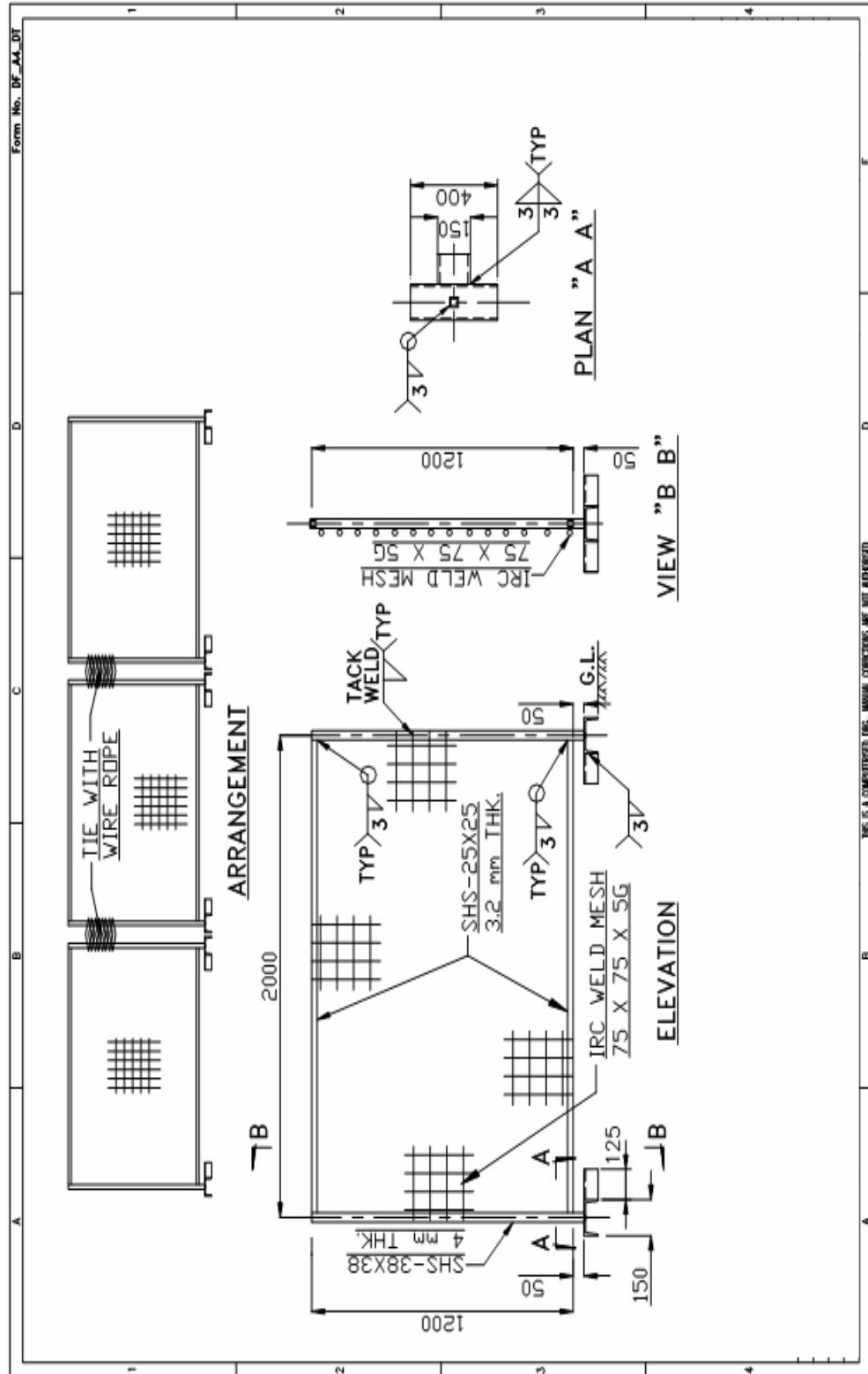


THIS IS A COMPUTERISED DRAWING. MANUAL CORRECTIONS ARE NOT ALLOWED.

ANNEXURE-4



ANNEXURE-5



ANNEXURE-6

