INTERNSHIP REPORT

ON

"BRIDGE DESIGN & CONSTRUCTION WORKS"

Submitted to

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE GWALIOR

(A govt. Aided Autonomous Institute under RGPV, Bhopal (M.P) Established in 1957)

IN PARTIAL FULFILLMENT FOR REQUIREMENT FOR THE AWARD OF THE DEGREE OF

BACHELOR of TECHNOLOGY

In

CIVIL ENGINEERING

2018 - 2022

Submitted By

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PUBLIC WORKS DEPARTMENT
BRIDGE CONSTRUCTION ZONE
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Date: May 20th, 2022

CERTIFICATE

This is to certify that **Mr. Aditya Kumar,** Student of Bachelor of Technology, IV Year, Civil Engineering Department from **Madhav Institute of Technology and Science, Gwalior** has successfully completed his field training from January 20th, 2022 to May 20th, 2022 under the guidance of **Shanul Saxena, Assistant Engineer** and **Naveen Malhotra, Sub Engineer**. He has acquired a thorough knowledge of bridge design & construction works.

The overall performance of **Mr. Aditya Kumar**, during the training period, has been found satisfactory.

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Sub Engineer
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Shanul Saxena
Assistant Engineer
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RECOMMENDATION

It is hereby recommended that the internship report entitled — **BRIDGE DESIGN & CONSTRUCTION WORKS** which is being submitted by **Aditya Kumar** completed under the guidance of **Dr. Jayvant Chaudhary** may be accepted in the partial fulfillment of the award of the degree of Bachelor of Technology in Civil Engineering.

for Head of the Department
Civil Engineering Department
M.I.T.S. GWALIOR

HEAD
Civil Engg. Deptt.
M.I.T.S. Gwalior

27/05/22

Guided by
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ACKNOWLEDGEMENT

When it comes to properly acknowledging someone's support and assistance, it may be a challenging undertaking, chiefly when the support offered is so wholehearted and unwavering.

I am eternally grateful to my renowned guide, **Dr. Jayvant Chaudhary**, Assistant Professor of Civil Engineering Department, MITS Gwalior.

Also, I would like to thank, Head of Civil Engineering Department, MITS Gwalior, and all other academics and staff members of MITS Gwalior's Civil Engineering Department for their unwavering support throughout the project.

I am really grateful to **Dr. R. K. Pandit**, Director of MITS Gwalior, for establishing an outstanding institutional environment and for giving all facilities and assistance in the preparation of my dissertation. I also acknowledge with gratitude to our supporting **Mr. VIKRAM** for providing the facilities needed for the accomplishment of this project.

I take great pleasure for my institute **Public Work Department, Bridge Zone, Bhopal** for providing the opportunities.

The environment of Organization has been valuable experience for me. It has provided an opportunity to learn at our own pace in discipline of interest. I would like to thank all those who helped me during different stages of completion of this project.

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21/05/2022

ABSTRACT

A flyover is a road or railway built on top of another. This allows both the routes to cross smoothly. It is a modern engineering invention which is considered to be the solution to traffic jams. Generally the number of vehicles is increasing every day. As a result, a major traffic jam occurs as these existing roads may not provide enough space for all vehicles.
It is also not possible to find a new place to build new roads. For this reason, experts have thought of building flyovers that can maintain smooth communication.

In Bhopal city, we have some flyovers like Veer Savarkar Flyover-Bridge, Airport Flyover, Aerocity Flyover, Singrauli Flyover etc.
These flyovers have significantly reduced our traffic jams in some areas. But still we need more flyovers in Bhopal city. Bhopal is a more populated city, there are traffic jams everywhere and it disrupts our normal life. Our development work has been hampered to a great extent due to traffic jams. More flyovers are desperately needed to reduce this. We no longer expect a city where people spend most of their time in vehicles stuck in traffic jams.

We want to see a city where people can reach their destination on time. Flyovers also reduce the scope of a mass transit system and a bus rapid transit which will have a huge impact on the serious traffic dilemma. In the age of globalization and technological progress, we cannot be left behind. Like other different countries of the world, we need more and more flyovers for easy and jam free communication.

ABSTRACT IN HINDI

फ्लाईओवर एक सड़क या रेलवे है जो दूसरे के ऊपर बनी होती है। यह दोनों मार्गों को सुचारू रूप से पार करने की अनुमति देता है। यह एक आधुनिक इंजीनियरिंग आविष्कार है जिसे ट्रैफिक जाम का समाधान माना जाता है। वर्त्तमान में वाहनों की संख्या में हर दिन इजाफा हो रहा है। नतीजतन, एक बड़ा ट्रैफिक जाम होता रहता है क्योंकि मौजूदा सड़कें सभी वाहनों के लिए पर्याप्त जगह प्रदान नहीं कर सकती हैं। नई सड़कें बनाने के लिए नई जगह तलाशना भी संभव नहीं है। इस कारण से विशेषज्ञों ने फ्लाईओवर के निर्माण के बारे में सोचा जो सुचारू संचार बनाए रख सकता है।

भोपाल शहर में वीर सावरकर फ्लाई ओवर-ब्रिज, एयरपोर्ट फ्लाईओवर, एरोसिटी फ्लाईओवर, सिंगरौली फ्लाईओवर आदि कुछ फ्लाईओवर हैं। इन फ्लाईओवरों ने कुछ क्षेत्रों में हमारे ट्रैफिक जाम की समस्या को काफी कम कर दिया है। लेकिन फिर भी हमें भोपाल शहर में और फ्लाईओवर की जरूरत है। भोपाल एक अधिक आबादी वाला शहर है, हर जगह ट्रैफिक जाम की समस्या रहटी है और यह हमारे सामान्य जीवन को बाधित करता है। ट्रैफिक जाम के कारण हमारा विकास कार्य एवं समय काफी हद तक बाधित है। इसे कम करने के लिए और फ्लाईओवर की सख्त जरूरत है।

हम अब ऐसे शहर की उम्मीद नहीं करते हैं जहां लोग ज्यादातर समय ट्रैफिक जाम में फंसे वाहनों में बिताते हैं। हम एक ऐसा शहर बनाना चाहते हैं, जहां लोग तय समय पर अपने गंतव्य तक पहुंच सकें। फ्लाईओवर एक मास ट्रांजिट सिस्टम और एक बस रैपिड ट्रांजिट के दायरे को भी कम करते हैं जो गंभीर यातायात दुविधा पर बहुत बड़ा प्रभाव डालेगा। वैश्वीकरण और तकनीकी प्रगति के युग में हम पीछे नहीं रह सकते। दुनिया के अन्य विभिन्न देशों की तरह, आसान और जाम मुक्त संचार के लिए हमें अधिक से अधिक फ्लाईओवर की आवश्यकता है।

List of Abbreviations

01	F.R.L	FINISHED ROAD LEVEL A ROAD EDGE
02	S.R.L	S.R.L
03	T.C.B	TOP OF COPING BEAM
04	CH	CHAINAGE
05	T.L.P	TOP OF LEVELLING PAD
06	B.B.S.	BAR BENDING SCHEDULE

CONTENT

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Flyovers, underpasses, overpasses etc. are some examples of engineering marvels that allow saving of effort and time of people, vehicles and even trains. Generally, flyovers are built over water bodies such as rivers, but bridges are meant to provide a roadway for pedestrians and vehicles on a railway line or even under a flyover. A flyover is a road or railway built on top of another. This allows both the routes to cross smoothly. It is a modern engineering invention which is considered to be the solution to traffic jams. Generally the number of vehicles is increasing every day. As a result, a major traffic jam occurs as these existing roads may not provide enough space for all vehicles.

Generally, the number of vehicles is increasing every day. As a result, a major traffic jam occurs as these existing roads may not provide enough space for all vehicles. It is also not possible to find a new place to build new roads. For this reason, experts have thought of building flyovers that can maintain smooth communication.These flyovers have significantly reduced our traffic jams in some areas. But still, we need more flyovers in Bhopal city.

It is also not possible to find a new place to build new roads. For this reason, experts have thought of building flyovers that can maintain smooth communication. Flyover is a concept that allows roads to be built over roads to facilitate faster movement of vehicles and people in this era of congested traffic in metro cities. M.P. P.W.D. Bridge Zone has given this project to M/S VKSC Infraprojects Limited.

There will be a flyover from Ganesh Mandir to Gayatri Mandir on one side of the road and Metro train on the other side and BRTS in the middle. BRTS will be divided into two parts in a part of 400 meters from Ganesh Mandir to Narmada Hospital Bari. This is because at the end point of the bridge in front of Ganesh Mandir it will be in the middle of the road which will direct the traffic coming from Habibganj ROB to the bridge. The 1800-meter-long bridge construction till the Gayatri Mandir was approved.

- The complete construction will be done for Rs 140 crore.
- The flyover will be 10 meters above the ground.
- The metro track will be 13 meters above the ground.

- One arm of the bridge will descend towards Bhopal Haat.

There will also be a metro station on the front side. In such a situation, the traffic of Gurudev Gupta intersection will change. The flyover will be 10 meters above the ground and the metro will be 13 meters above. The general arrangement drawing is ready so that the alignment of both does not cross anywhere. The construction of the bridge is expected to take two years but it is delayed due to COVID - 19.

The Central Government had approved the construction of 1800 meter long bridge from Mansarovar Complex to Gayatri Mandir from Central Road Fund (CRF). During the survey done for the bridge, it came to light that the work of making Rani Kamlapati Railway Station world-class is going on. This work will also be completed by the time the bridge is built. In such a situation, keeping in mind the increasing traffic, it was decided to build a flyover near the Ganesh temple in front of Rani Kamlapati Railway Station. According to PWD officials, this increased length of 700 meters will also be completed only in 140 crores approved by the Center. Now the flyover will be made of 2500 meters i.e. 2.5 km.

ORGANISATION PROFILE

2.1. Madhya Pradesh Public Works Department

Public Works Department (B&R) and Project Implementation Unit (PWD PIU) is an agency of the Madhya Pradesh Government which is responsible for planning, design, construction and also for the maintenance of government properties like ROBs, bridges, roads, flyovers and buildings. The main activities of Public Works Department (Bridge and Road&) are construction, upgradation and maintenance of National Highways, Major District Roads, Other District Roads, Village Roads and Bridges, Flyovers and ROBs in the State. The total length of the road network in the Public Works Department is about 61,616.00 kms.

2.2. M/S VKSC Infraprojects Limited Bhopal

This is a public company incorporated on January 31, 1996. It is classified as a Non-govt company. This company is registered at the Registrar of Companies, Gwalior. It has authorized share capital of Rs. 245,000,000 and its paid-up capital is Rs. 170,184,800. This company is involved in various department like real estate activities with property owned or leased. [This class includes purchase of property, sale of property, rent of property and operation of self-owned or leased immovable property such as apartment buildings and housing, non-residential buildings, developing and sub-dividing immovable property into lots, etc. It also includes the development and sale of land and also the cemeteries.

PROJECT TITLE : CONSTRUCTION OF FLYOVER FROM GAYATRI MANDIR TO DB MALL, BOARD OFFICE SQUARE, PRAGATI PETROL PUMP, MANSAROVAR COMPLEX UP TO GANESH MANDIR IN THE CITY OF BHOPAL (M. P.)

PROOF CONSULTANT : MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

SAFETY CONSULTANT: AICONS ENGINEERING PVT. LTD

EPC CONTRACTOR: M/S VKSC INFRAPROJECTS LTD, BHOPAL

CLIENT : THE CHIEF ENGINEER, MP PUBLIC WORKS DEPARTMENT, BRIDGE ZONE

PROJECT WORK

Reinforced Earth Walls (RE Walls) are later used to retain soil at different levels on both sides of the carriageway. RE Wall is a combination of earth and linear reinforcement in the form of strips, grids, rods, meshes etc. which are capable of withstanding large tensile stresses.

Fig. No. 01-Reinforced Earth Wall (RE Wall)

3.1. Elements of Reinforced Earth Wall construction are :

- Facia Panel/RE panel
- Reinforced Fill
- Drainage Media/Filter Media
- Reinforcement
- Crash Barrier

3.2. Precast RE Panel:

- The minimum grade of concrete for precast fascia panels should be M35.

- The minimum thickness of RE Wall Facia Panel shall be 180 mm.
- Ethylene propylene diene monomer (EPDM) pads are used to maintain spacing between RE panels.
- The joints between the pads should be covered from the inside with a geotextile strip at least 100 mm thick.

Fig. No. 02 - Reinforced Earth Wall EPDM Pads

3.3. Reinforced Earth Fill :

The reinforced earth fill material is essentially borrowed. The geotechnical properties of this fill material play an important role in the performance of the RE wall structure. Soil is borrowed from quarries, river beds etc. and the material borrowed will suit the quantity required. We must maintain the following properties of reinforced soil during construction.

The reinforced material should be free of organic material.

- The Grain size (Finer Than 75 micron less than 15%)
- Plasticity Index, PI < 6 and Cu >2
- Bulk Density as per design requirement
- OMC as specified in the design
- Drained Shear Strength Parameters (f >300)

Fig. No. 03 - Reinforced Earth Compaction Work

3.4. Drainage Media / Filter Media :

Filter media should be provided to avoid the development of hydrostatic pressure during RE wall construction. Usually, a drainage media of at least 600 mm width is used at the rear of the RE panel. Sometimes profiled blocks are also used for fascia with provision for granular drainage. Drainage is very important for any construction and when it comes to bridge construction it is mandatory.

3.5. Reinforcement Material :

There are various types of reinforcement that are used for the construction of reinforced soil wall. It can be either metal elements like strips, plates, bars, etc., or some polymeric elements like strips, grids, rods, meshes, etc. All the reinforcements are moved beyond the Rankine zone to the resistant zone to ensure the satisfactory bonding and anchoring. Reinforcement can provide resistance to tensile stress. Some important test which must be performed before construction for quality control of reinforcement material for RE wall construction are listed below.

- Tensile Strength
- Installation damage

- Creep Test
- Pullout Tests
- Raw material
- Carboxyl End Group(25000g/mol)
- Frequency of the Testing for Reinforced Soil Wall Construction:
- 1 set per 5000sqm Reinforced Earth wall facia or the two sets of samples whichever gets the higher
- The vertical distance of the reinforcement should be less then 800 mm.
- Length of reinforcement should not be less then 0.7H or 3.0m.

3.6. Reinforced Earth Wall / Reinforced Soil Wall Friction Slab :

Reinforced Soil Wall Friction Slabs are used for the transfer of lateral loads due to the impact of vehicles on the crash barriers. Normally the width of an the abrasive slab varies from 1.50-to 2.50 m and the thickness of the slab is 250 mm, depending on the type of the crash barrier provided. The bottom of the friction slab must match the bottom of the Granualar Sub Base.

3.7. Reinforced Earth Wall Construction Sequence :

Excavation: The earthen wall (RS wall) in the excavation of soil for reinforced soil should be as per the construction drawing provided. After excavation of the soil, compaction must be done to avoid any settlement in the foundation soil.

Leveling Pad : An initial leveling pad of 150 mm thick using M20 grade plain cement concrete of suitable width (300-350 mm) must be provided below the first row of the fascia layer.

The first layer of Fascia : It must be as per the design and drawing provided. During the first layer of the fascia placement, it is important to take extreme care to maintain the alignment of the facing element.

Drainage Material : The drainage materialor the filter media specification must be as per the design requirement. The drainage layer must be compacted well, and that is made a layer-wise.

Laying Reinforced Soil Behind Drainage Bay/Filter Media : Laying and compacting reinforced soil backfill behind the drainage zone.

Fig. No. 04 - Reinforcement Earth Wall

3.8. **Compaction of Reinforced fill** :

- The fill should be condensed up to 95% of the density, and the thickness of the condensed layer should not exceed 200 mm.
- All construction plants with a mass exceeding of 1500 kg should be placed at least should be 2.00 m away from the front of the wall.
- Vibratory roller weighing should not be more than 1300 kg per meter width, with a total weight of not more than 1500 kg
- Vibratory plate compactor with a maximum weight of 1000 kg.
- Vibro tamper weighing should not be more than 75 kg.

3.9. Place of Reinforcement :

- No construction equipment will go directly over the reinforcement.
- The reinforcement must not protrude from the face.
- A second layer of fascia should is placed over the fascia to interlock the geogrid.
- Where the panels are used reinforcement should be attached to the connectors embedded in the fascia.
- The faces of the blocks must be profiled for the inward batter of 2-4 degrees.

3.10. RE wall construction tolerance:

- In order to maintain the quality of work, we always have to remember the following construction and serviceability tolerances.

Fig. No. 05 - Precast RCC Fascia Panel

- All the dimensions of the precast Reinforced Cement Concrete fascia panels must be within ±5mm.
- The evenness of the front face should be ± 5 mm over 1500 mm.
- The maximum gap between the lengths of the two diagonals must be 5.00 mm.
- The thickness of Reinforced Soil Wall Facia Panel must be within ±5mm only.

3.11. Reasons for failure of the Reinforced Earth Wall :

- Inadequateor the improper leveling pad construction
- Compaction and the properties of reinforced fill that do not meet with the design requirement.

3.12. Abnormal Drainage System :

- Improper relation to fascia or the variance for the specifications or the drawings.
- Changes in the details of the connectio.
- Heavy compaction equipment within the limit of 1.50 m from the face of the panel.
- Filter material that does not meet with the required specifications.
- The primary batter is not provided in the panel to maintain the Reinforced Earth panel slope.

Following are the types of failure that may occur due to the lack of the above mentioned construction:

- Excessive settlement and bulging out from the face panel.
- Wall deformation/tilt and an uneven riding surface drainage blockage.
- Bending and eventually collapsing of panels/blocks leading to local failures.

CASE STUDY

Fig. No. 06 - Flyover Route Map

INSTALLATION PROCEDURE FOR PARAWEB REINFORCED SOIL RETAINING WALLS (RSRW) WITH DISCRETE PANELS AS FACIA

4.1. General

The work must be executed as per section 3100 of MoRT&H specifications. Material identification, storage and handling Paraweb must be supplied in coils / rolls and sealed with a packaging strip of unique colour assigned to the respective grade / strength. Each roll should be identified with the durable gummed label or the equivalent clearly legible on the outside. The label shall show the manufacturers name, the roll/lot no. and the year of manufacture.

While unloading or transferring the Paraweb from one location to another, damage to the core label, or the Paraweb itself shall be prevented. Extra care must be taken while performing this task as it can be resulted in financial loss. If the Paraweb is to be stored for an extended period of time as per the guide lines provided , it should be located and placed in a manner that ensures the integrity of the Paraweb. This may be accomplished by elevating the Paraweb off the ground, laying flat or standing on end while ensuring that the Paraweb is adequately covered and protected from ultraviolet raidation including sunlight, chemicals that have strong acids or bases, fire or flames including welding sparks & temperature in excess of 70° C.

4.2. Excavation

The foundation soil must be excavated to the lines and grades as mentioned in construction drawings only. Chages in the drawing can be resulted as the failure of the structure. The Safe bearing capacity (SBC) shall be verifed before placing the concrete for levelling pad and should be more than or equal to the design requirement. The excavated area shall be compacted to minimum 97% of modified Proctor density at +- 2% of optimum moisture content. The excavated area within the levelling pad location, where there are space restrictions for the roller to find access, can be compacted with a 100 kg plate

vibrator/vibro tamper. The surface on which the Paraweb is to be placed shall be free of any edge and protrusions that may damage the Paraweb.

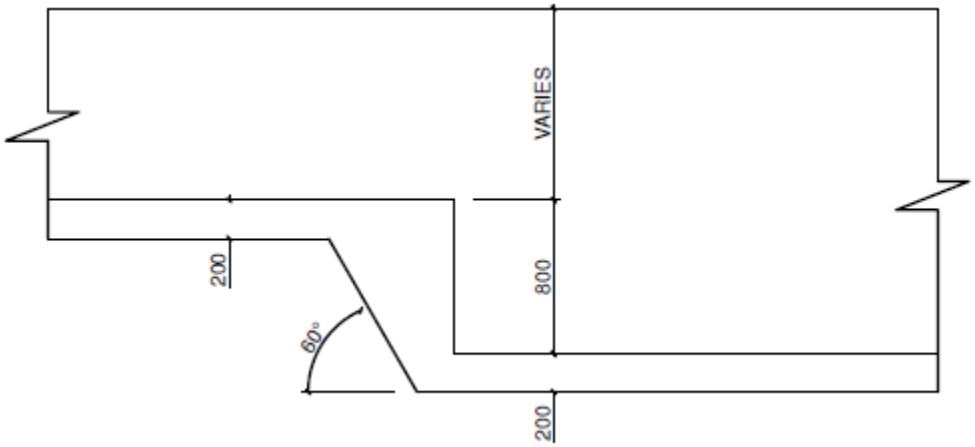

Fig. No. 07 - Levelling Pad (Footing) Elevation

4.3. Placement of levelling pad & Bottom Panels

Concrete levelling pad shall be cast in-situ as shown in the approved dwgs. The bottom panel shall then be placed over it in correct alignment. The panels used shall be cured for the period of 14 days. The bottom panels shall be propped from outside before placing the backfill soil.

The filling around the foundation of the abutment up to bottom of levelling pad for Reinforced Soil wall should be done in the layers not exceeding 200mm of the compacted thickness. Compaction should be done to achieve minimum of 97% Maximum Dry Density as per modified proctor test. The panels shall be installed with a backward lean of around 15-20mm (over a height of 1.6m). The lean recovers slowly as the panel rotates back to its vertical position during the compaction of the backfill soil. The correct lean to be provided to the panels needs to befinalized at the site and is governed by the characteristic properties of the backfill soil.

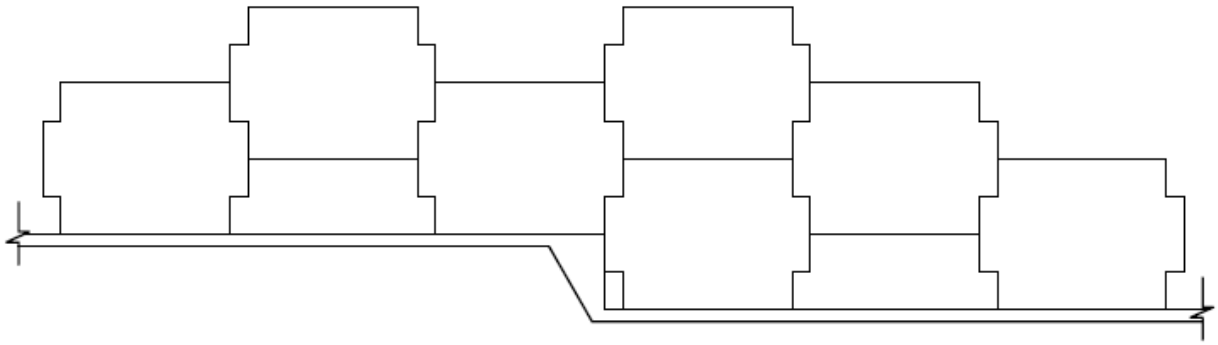

Fig. No.08 - Front Elevation

4.4. Paraweb Installation

The roll identification, orientation and location shall be verified with the construction drawing before unrolling of the Paraweb roll. Inspection for damage or defects shall be made during unrolling of the Paraweb rolls. Paraweb damage during handling and storage shall not be used. Paraweb should be laid at the proper elevation and the orientation as mentioned in the construction drawing. Correct orientation of the Paraweb is essential and shall be verified by the Site Engineer. After the panel is placed in position and filling is done upto the elevation of connection, commence laying of Paraweb of specified grade by looping it around the rear anchor bar allowing a 2.0m overlap. Pull the Paraweb towards the panel and by looping it around connection bar & return the Paraweb towards rear anchor. Repeat this sequence until the Paraweb has been loosly laid over whole area and then adjust the spacing by tightening the Paraweb.

Paraweb shall be laid only in quantities required for work to minimize undue damage risks. After a layer of the Paraweb has been placed, the succeeding layer of soil should be placed, compacted and prepared as the appropriate. After the soil layer has been placed, the next Paraweb layer should be placed. The process must be repeated for each subsequent layer of ParaWeb and soil compaction.

To ensure that the panels do not move and are firmly held in place during further operations hardwood wedges with the right combination shall be placed into the panel joints. One set should be placed in the vertical joints near the bottom of the panel being secured and another one near the shoulder. Care

should be taken that these wedges are atleast 150mm away from the corners of the panel.

Timber support clamps should be used to maintain the alignment of adjacent panels during fill placing and compaction. To ensure that the panels do not move and are firmly held in place during further operations hardwood wedges with the right combination shall be placed into the panel joints. One set should be placed in the vertical joints near the bottom of the panel being secured and another one near the shoulder. Care should be taken that these wedges are atleast 150mm away from the corners of the panel.
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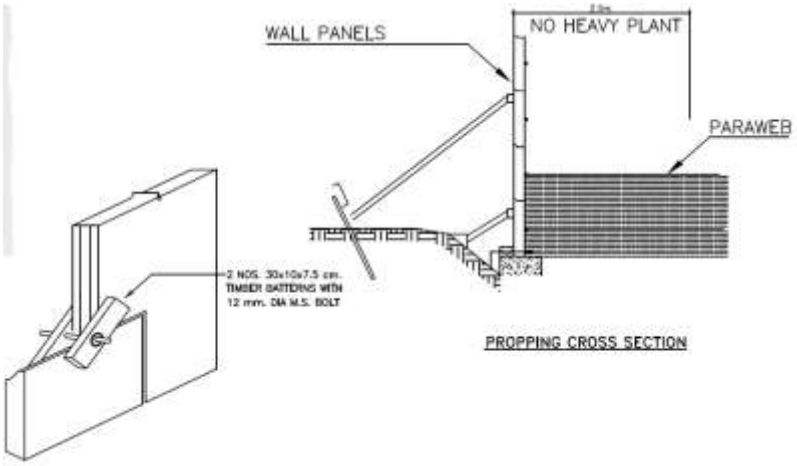


Fig. No. 09 - Backfill Placement

The backfill soil should be compacted for the minimum 97% of modified Proctor density. Moisture content of each layer of the soil shall be checked in accordance with IS: 2720 (Part-2) and unless otherwise mentioned, should be so adjusted, making due to the allowance for evaporation losses, so that at the time of compaction moisture content is in the range of 1% above to the 2% below. It is recommended that soils should be compacted in lifts not exceeding more than 200mm. The backfill within 2.0m from the face line should be compacted with the vibratory plate compactor of the weight not exceeding 1000 kg.

4.5. Drainage

The 600 mm wide drainage bay portion shall be filled with well-graded aggregate of size ranging between 19.1 mm to 9.5 mm. The portion of the drainage bay shall be compacted with 100 kg plate vibrator/vibro tamper. Backfill soil should be graded away from the structure and rolled at the end of each day's work to prevent the ponding of water on the surface of Reinforced Soil Mass. The site should be maintained such that the flow water will be properly drained away at both conditions like, during construction and after completion of work. If unexpected ground water springs are found during excavation and back filling the same shall be brought to the notice of Design Engineer.

Geotextile shall be cut to length and dimensions to wrap the circumference of the pipe with an overlap of 50mm. The overlap area will be stapled using staple pins, 200mm apart. The pipe sections shall be joined with subsequent lengths by using couplers. The drainage pipe should be laid at the longitudinal slope of 1 in 200, having outlets by using T-junction couplers at every 50m.
At locations of outlets of drainage pipe a gap in the panels to fit the outlet diameter of 160mm shall be provided.

The filter media of well-graded aggregate (19.1mm to 9.5mm) shall have a perforated PVC/HDPE pipe at the toe, wrapped with filter fabrics/non-woven Geotextile for drainage. Geotextile shall be cut to length and dimensions to wrap the circumference of the pipe with an overlap of 50mm. The overlap area will be stapled using staple pins, 200mm apart. The pipe sections shall be joined with subsequent lengths by using couplers. The drainpipe should be laid at the longitudinal slope of 1 in 200, having outlets by using T-junction couplers at every 50m.TM

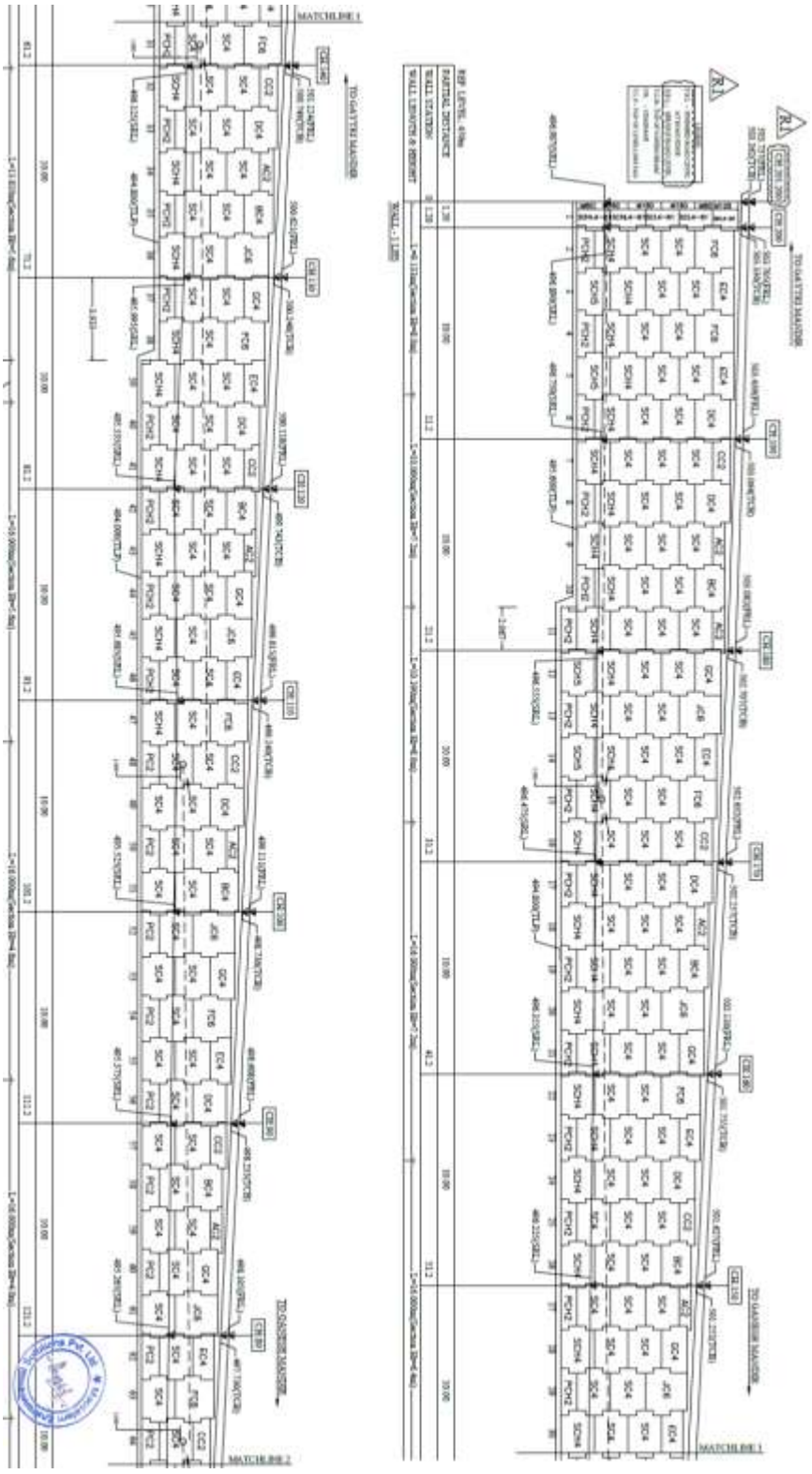


Fig No. 10
TYPICAL DETAILS OF REINFORCED SOIL WALL AT FLYOVER

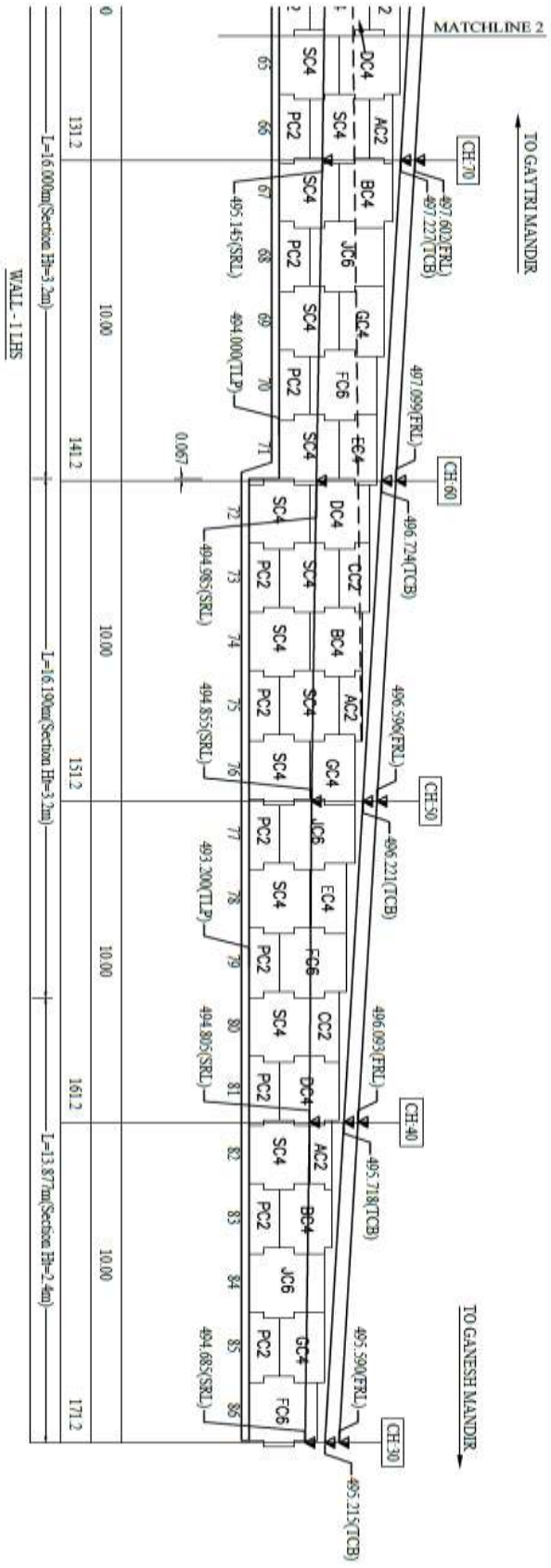


Fig. No. 11
TYPICAL DETAILS OF REINFORCED SOIL WALL AT FLYOVER

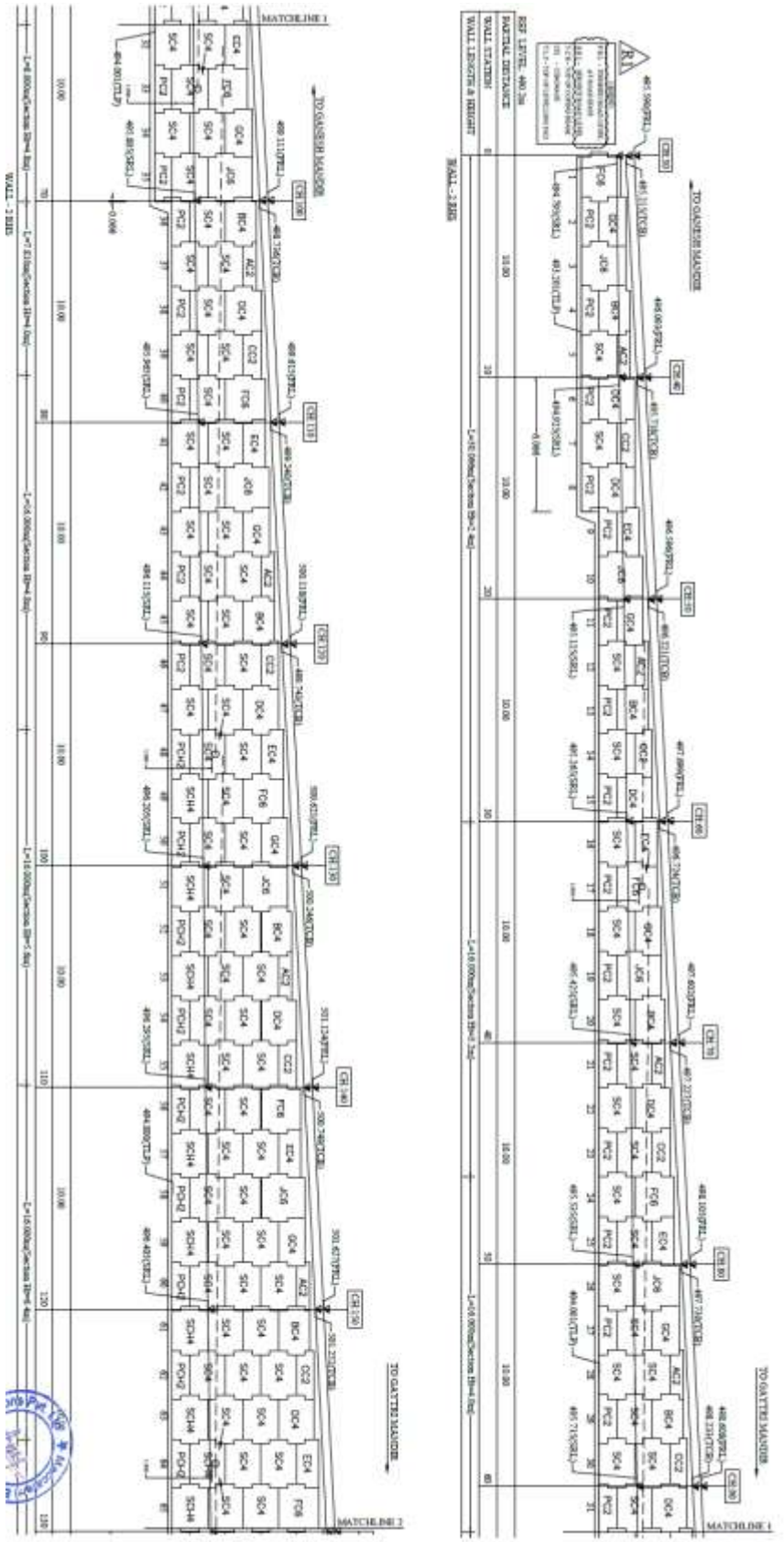


Fig. No. 12
TYPICAL DETAILS OF REINFORCED SOIL WALL AT FLYOVER

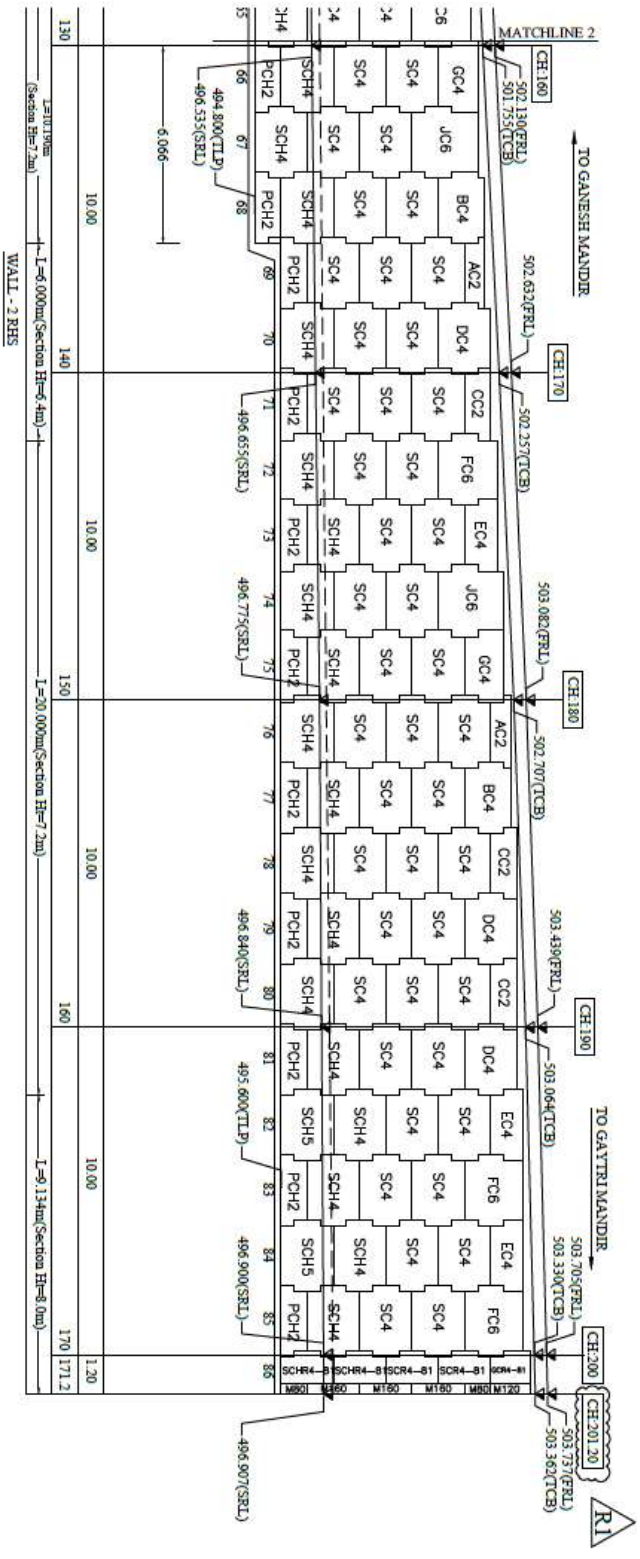


Fig. No. 13
TYPICAL DETAILS OF REINFORCED SOIL WALL AT FLYOVER

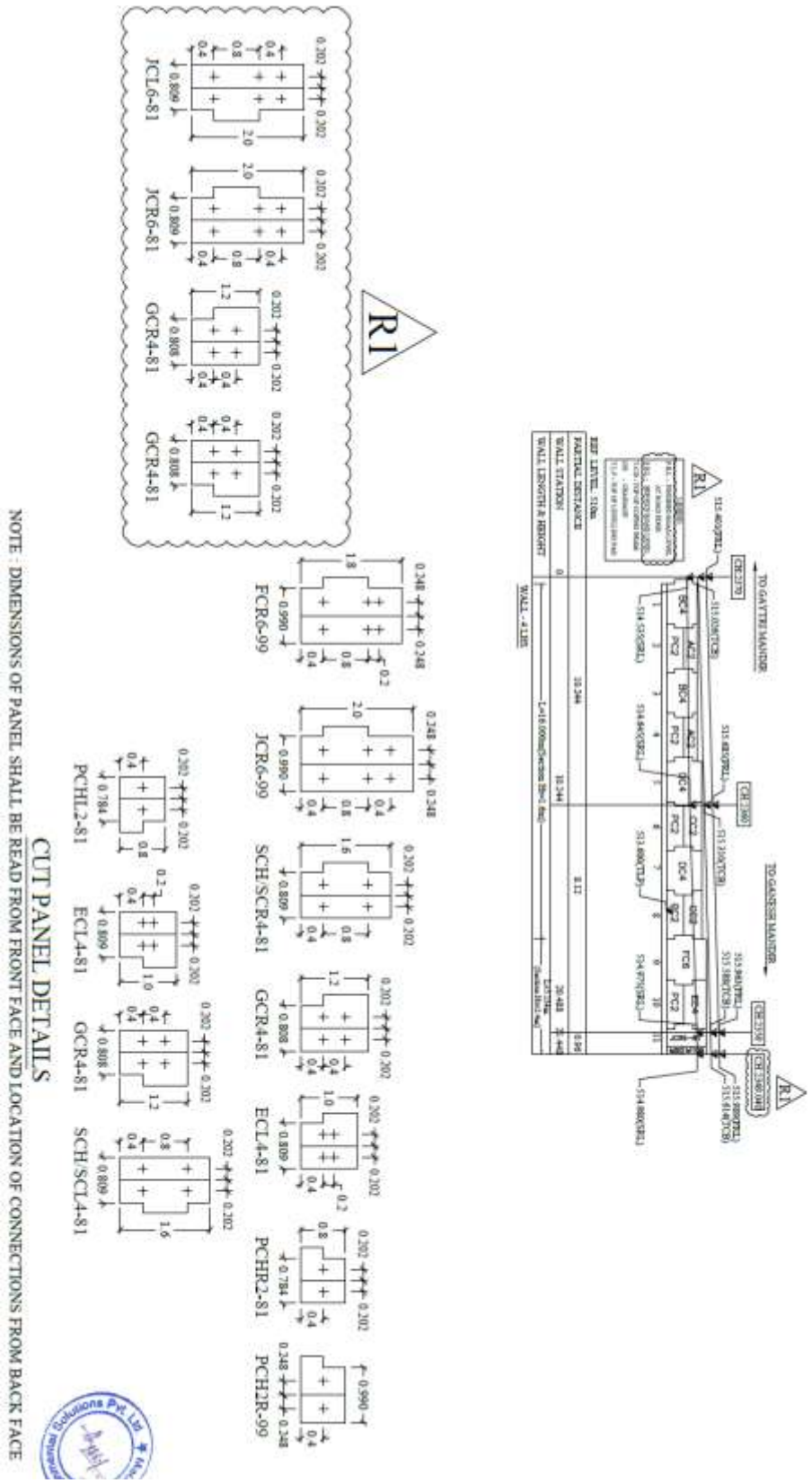


Fig. No. 14
TYPICAL DETAILS OF REINFORCED SOIL WALL AT FLYOVER

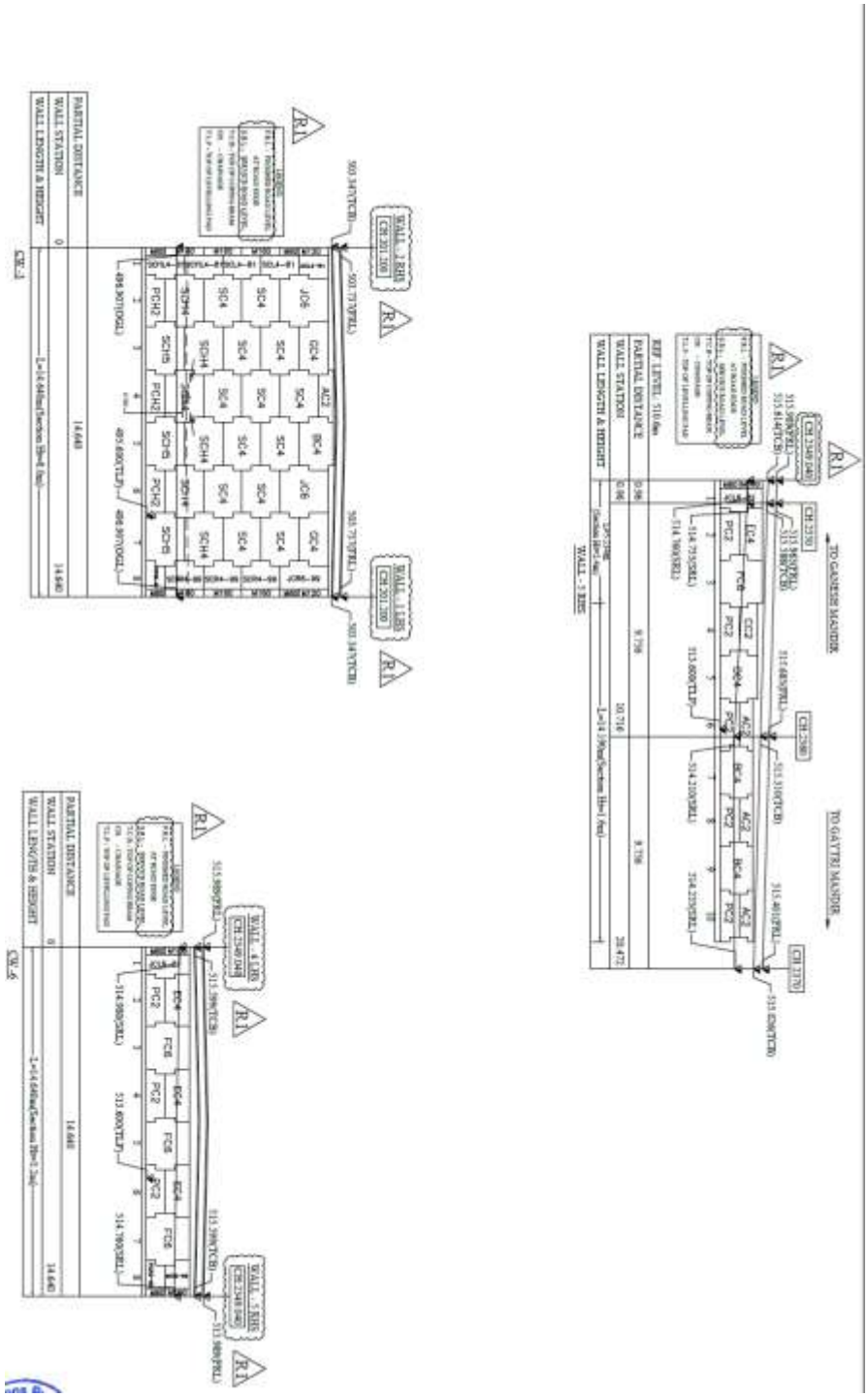


Fig. No. 15
TYPICAL DETAILS OF REINFORCED SOIL WALL AT FLYOVER

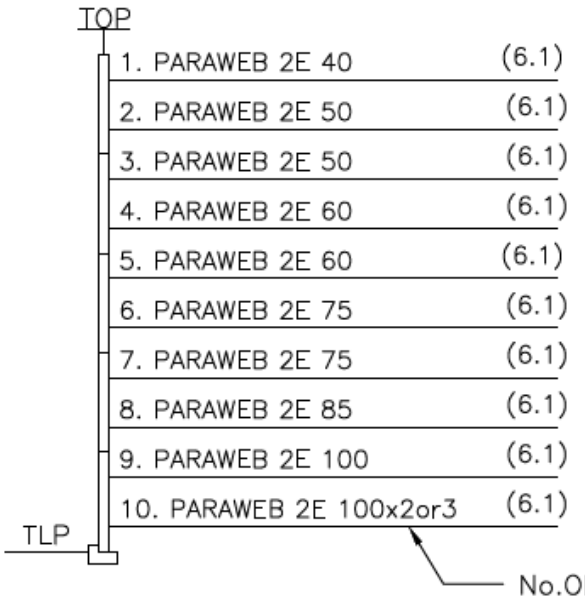


Fig. No. 16
SECTION HT- 8.0 m
SBC REQUIRED = 276.20 KN/Sq.m

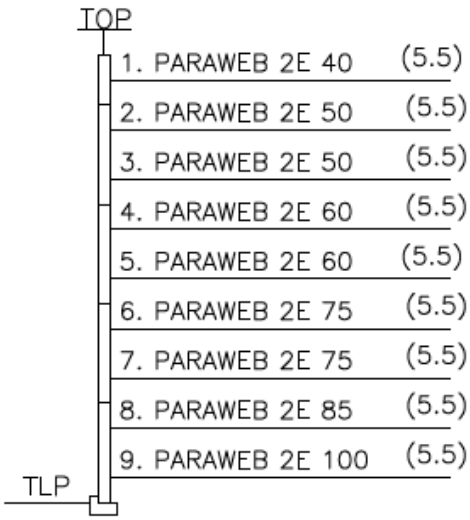


Fig. No. 17
SECTION HEIGHT- 7.2 m
SBC REQUIRED = 254.19 kN/Sq.m

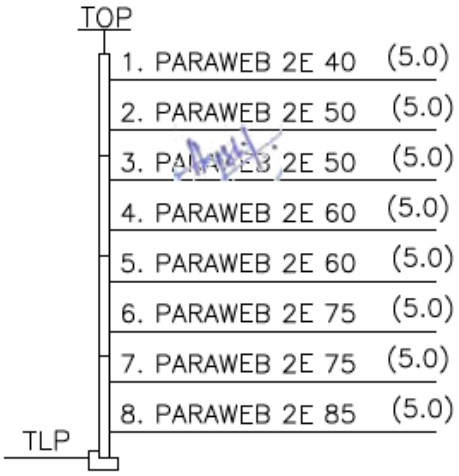


Fig. No. 18
SECTION HT- 6.4 m
SBC REQUIRED = 230.47 kN/Sq.m

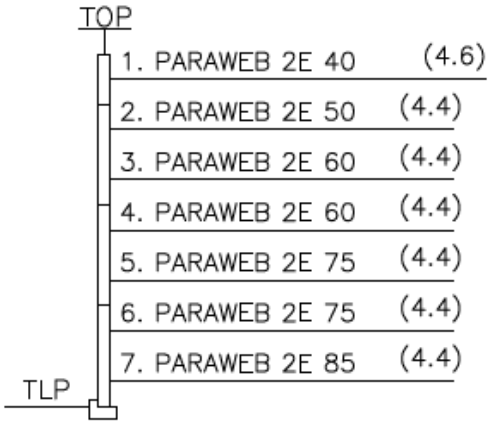


Fig. No.19
SECTION HEIGHT- 5.6 m
SBC REQUIRED = 208.78 kN/Sq.m

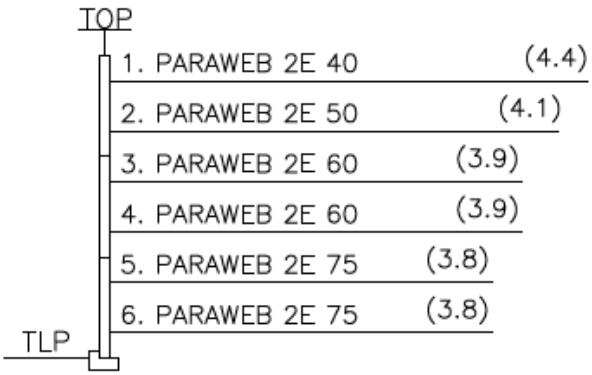


Fig. No. 20
SECTION HT- 4.8 m
SBC REQUIRED = 191.28 kN/Sq.m

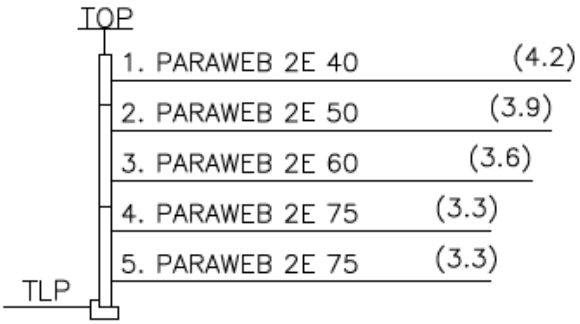


Fig. No.21
SECTION HEIGHT- 4.0 m
SBC REQUIRED = 171.24 kN/Sq.m

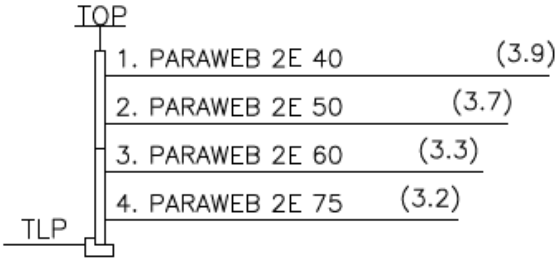


Fig. No. 22
SECTION HT- 3.2 m
SBC REQUIRED = 139.83 kN/Sq.m

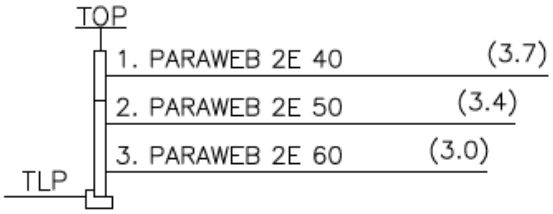


Fig. No.23
SECTION HEIGHT- 2.4 m
SBC REQUIRED = 114.35 kN/Sq.m

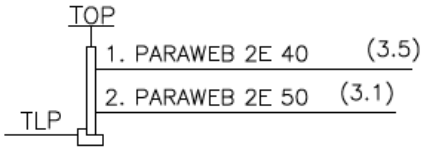
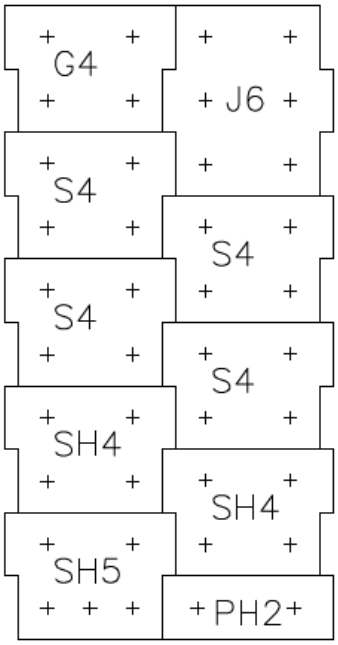
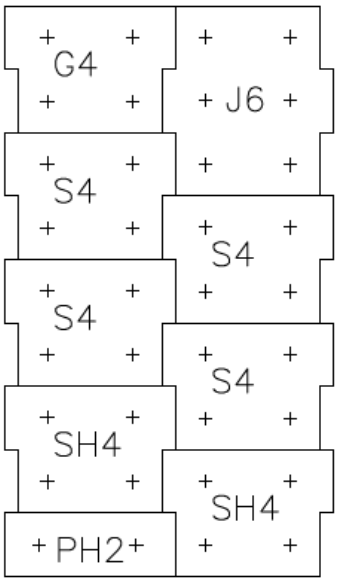


Fig. No.24 - SECTION HT- 1.6 m SBC REQUIRED = 85.46 kN/Sq.m



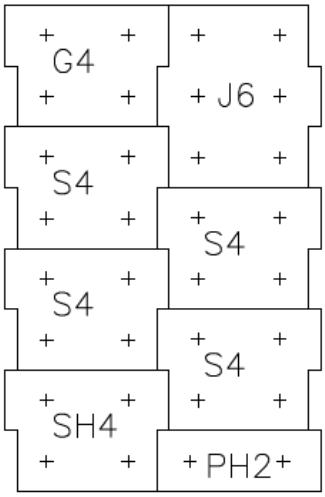
SECTION HT- 8.0m

Fig No.25



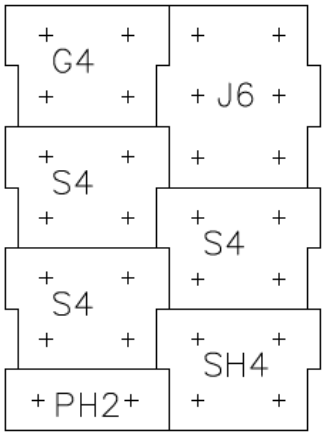
SECTION HT- 7.2m

Fig No.26



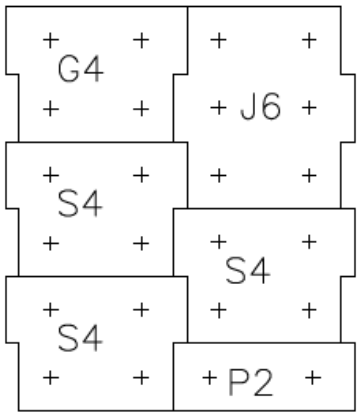
SECTION HT- 6.4m

Fig No.27



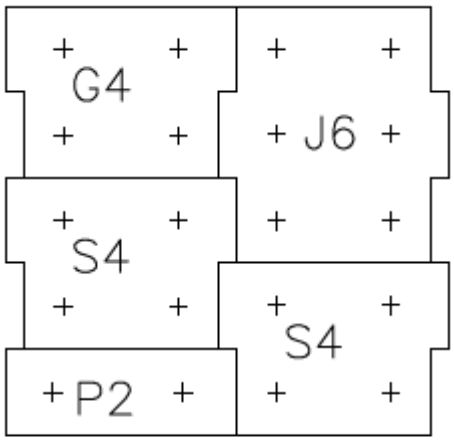
SECTION HT- 5.6m

Fig. No.28



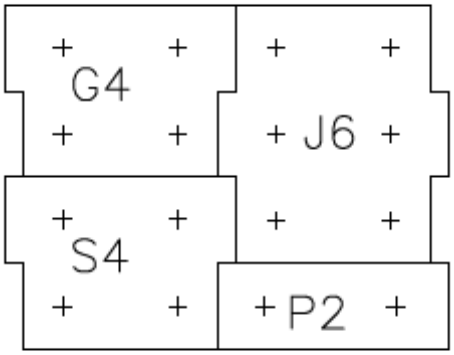
SECTION HT- 4.8m

Fig. No.29



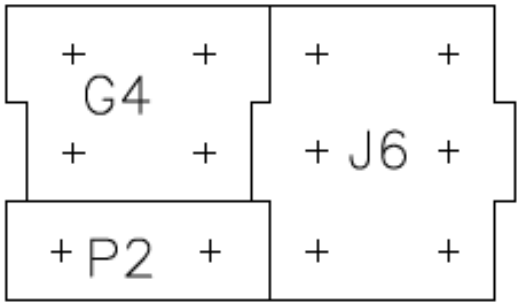
SECTION HT- 4.0m

Fig. No.30



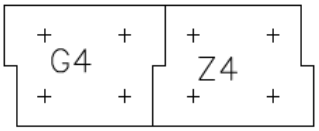
SECTION HT- 3.2m

Fig. No.31



SECTION HT- 2.4m

Fig. No.32



SECTION HT- 1.6m

Fig. No.33

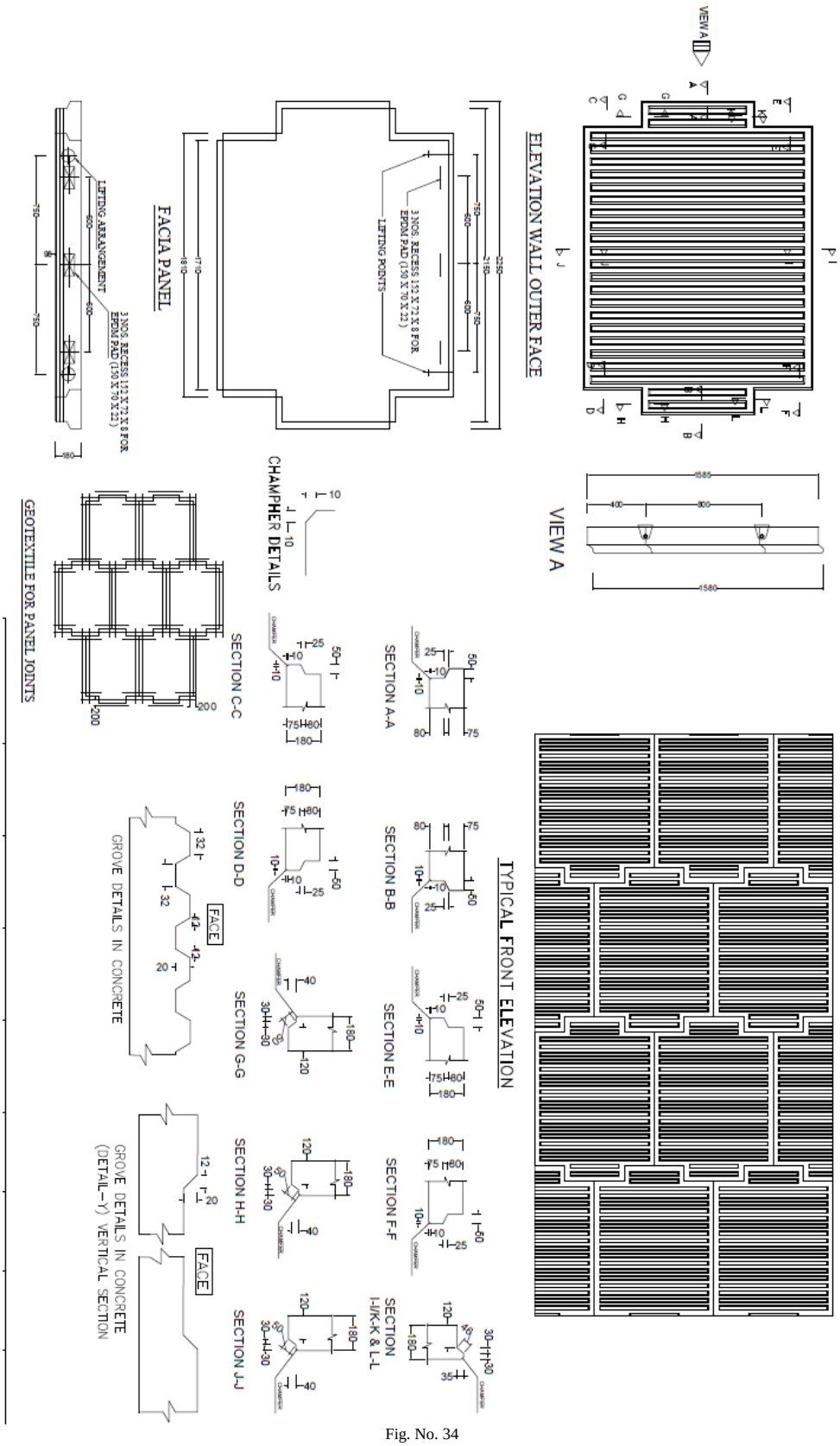


Fig. No. 34

PARAWEB REINFORCED SOIL WALL

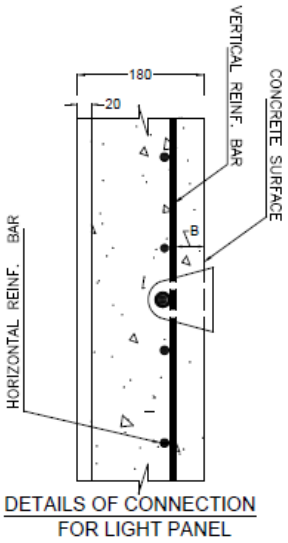
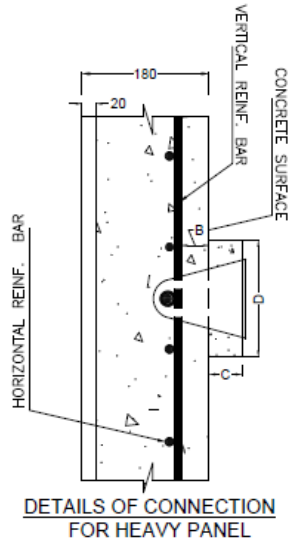


Fig. No. 35



(REFER TABLE NO.)

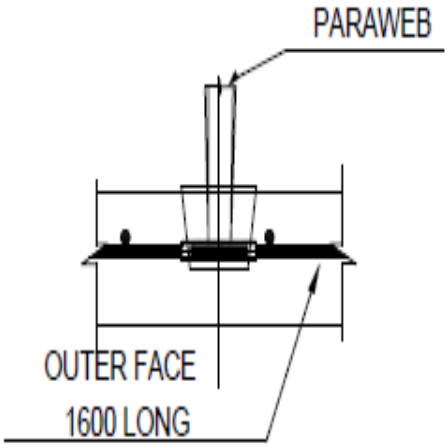
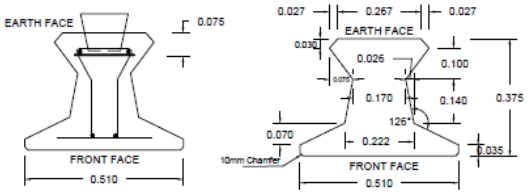
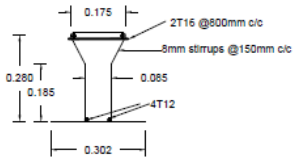


fig. No. 36

REINFORCEMENT BAR
DETAILS OF PARAWEB STRIP
CONNECTION WITH PANEL





CORNER PANEL REINFORCEMENT DETAILS (MacRes)

Fig. No. 37

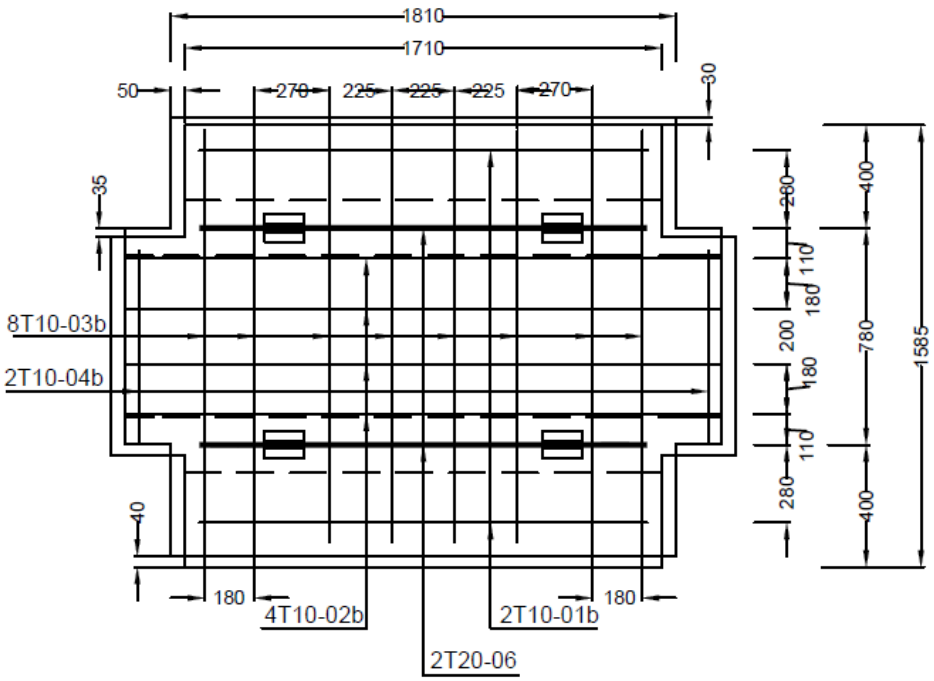
TYPE	B(MM)	C(MM)	D(MM)
LIGHT	50	-	-
HEAVY	50	40	200

Table No. 01

DETAILS OF CONNECTIONS

Note:

1. All Dimensions are in mm.
2. Minimum clear cover to reinforcement shall be 50mm.
3. Conflict between position of connection in reinforcement bars to be resolved by making minor adjustment to the reinforcement bar.
4. The notation of Reinf. Is follows: 7T8 – 01Ano. Type dia bar mark T-High strength deformed bars of Fe-500. GRADE (IS.1786).
5. Grade of concrete shall be M-35.
6. Recommended to lerances: Leading dimensions over 200mm (Including diagonals) = ±4mm dimensions 200mm and less = ±2mm
7. Heavy panel shall be used for paraweb above 75.



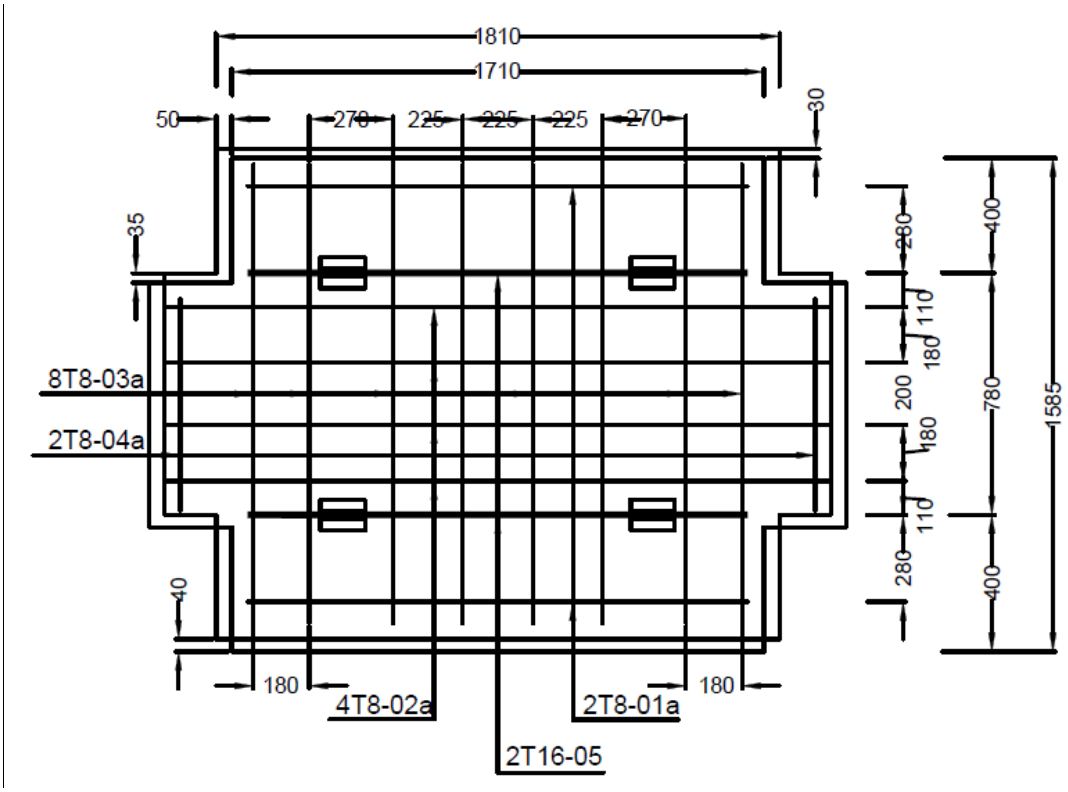
STANDARD HEAVY PANEL(SCH4)

Fig. No. 38

B.B.S. OF STANDARD HEAVY PANEL (SCH4)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T10	T20
01b	T10	2	1610	STRAIGHT	3.22	-
02b	T10	4	2150	STRAIGHT	8.60	-
03b	T10	8	1485	STRAIGHT	11.88	-
04b	T10	2	685	STRAIGHT	1.37	-
06	T20	2	1610	STRAIGHT	-	3.22
TOTAL LENGTH IN METERS					25.07	3.22
WT. PER METER IN KGS.					0.617	2.469
WT. PER DIA. IN KGS.					15.475	7.951
TOTAL WT. IN KGS.					23.426	

Table No. 02

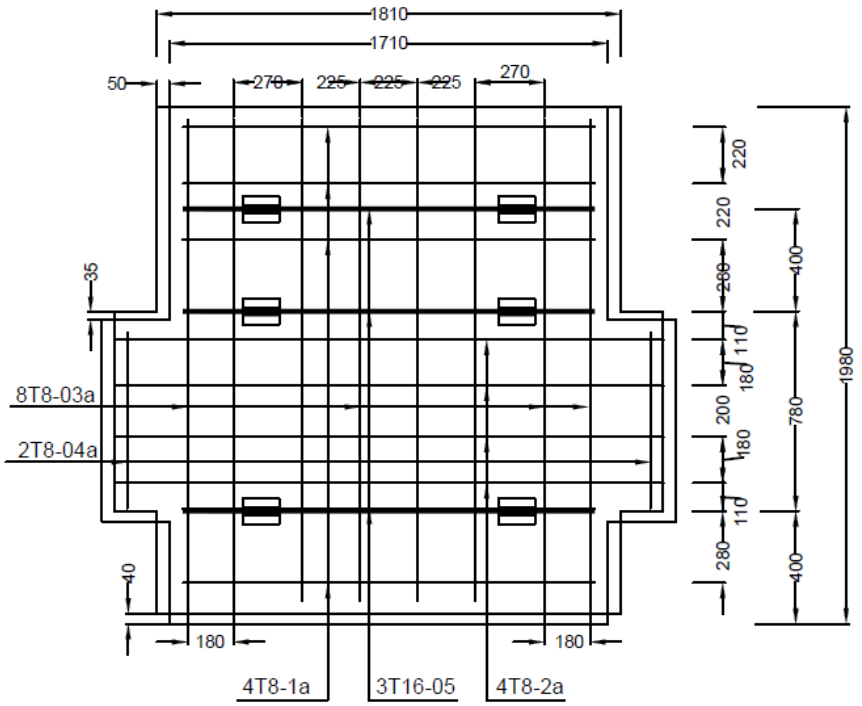


STANDARD PANEL (SC4)
Fig. No. 39

B.B.S. OF STANDARD PANEL (SC4)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T8	T16
01a	T8	2	1610	STRAIGHT	3.22	-
02a	T8	4	2150	STRAIGHT	8.60	-
03a	T8	8	1485	STRAIGHT	11.88	-
04a	T8	2	685	STRAIGHT	1.37	-
05	T16	2	1610	STRAIGHT	-	3.22
TOTAL LENGTH IN METERS					25.07	3.22
WT. PER METER IN KGS.					0.395	1.580
WT. PER DIA. IN KGS.					9.902	5.087
TOTAL WT. IN KGS.					14.989	

Table No. 03



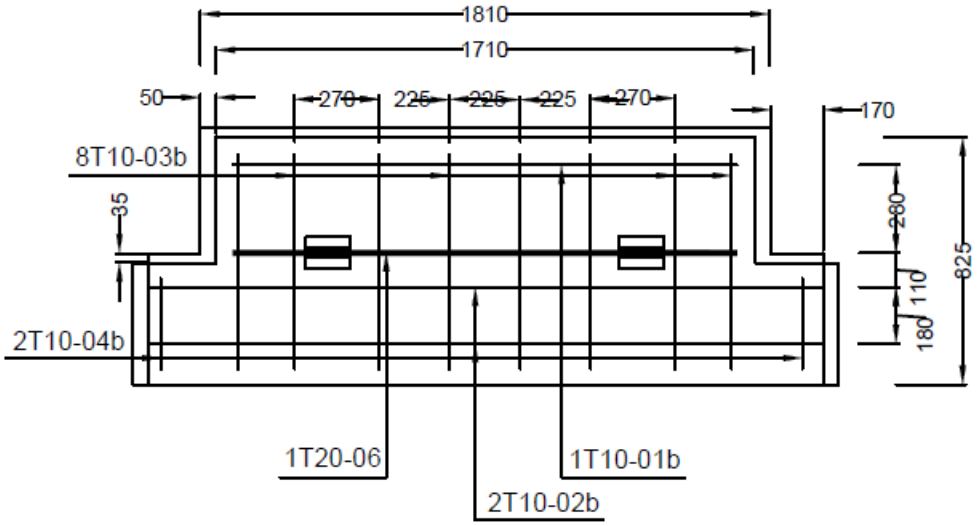
CRUCIFORM FACIA PANEL AT TOP (JC6)

Fig. No.40

B.B.S. OF CRUCIFORM FACIA PANEL (JC6)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T8	T16
01a	T8	4	1610	STRAIGHT	6.44	-
02a	T8	4	2150	STRAIGHT	8.60	-
03a	T8	8	1920	STRAIGHT	15.36	-
04a	T8	2	685	STRAIGHT	1.37	-
05	T16	3	1610	STRAIGHT	-	4.83
TOTAL LENGTH IN METERS					31.77	4.83
WT. PER METER IN KGS.					0.395	1.580
WT. PER DIA. IN KGS.					12.551	7.631
TOTAL WT. IN KGS.					20.184	

Table No.04



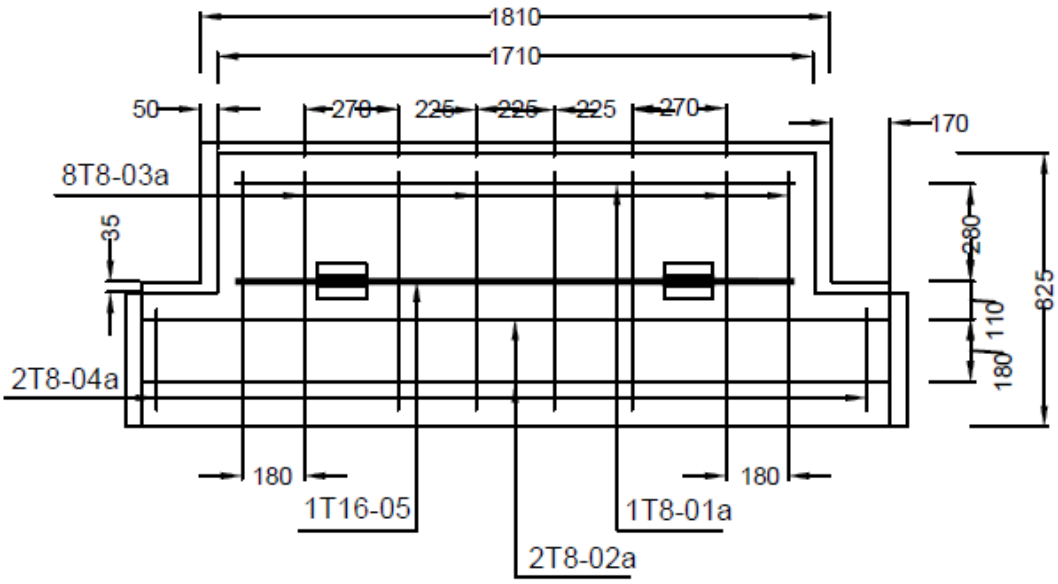
BOTTOM HEAVY PANEL AT TOP (PCH2)

Fig. No.41

B.B.S. OF STANDARD PANNEL (PCH2)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T10	T20
01b	T10	1	1610	STRAIGHT	1.61	-
02b	T10	2	2150	STRAIGHT	4.30	-
03b	T10	8	685	STRAIGHT	5.48	-
04b	T10	2	285	STRAIGHT	0.57	-
06	T20	1	1610	STRAIGHT	-	1.61
TOTAL LENGTH IN METERS					11.96	1.61
WT. PER METER IN KGS.					0.617	2.469
WT. PER DIA. IN KGS.					7.379	3.975
TOTAL WT. IN KGS.					11.358	

Table No.05



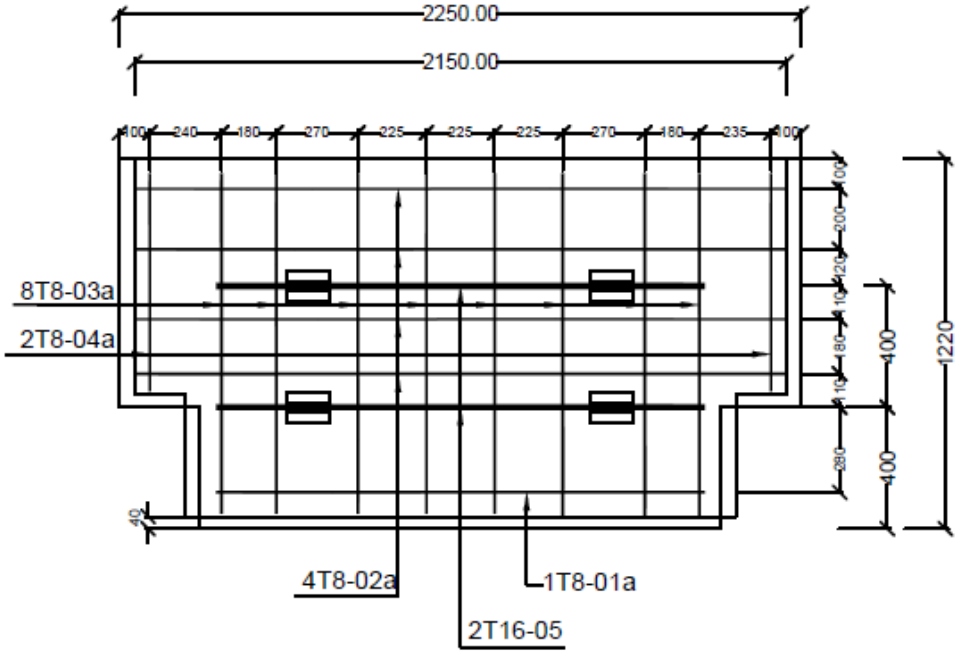
BOTTOM PANEL (PC2)

Fig. No.42

B.B.S. OF STANDARD PANEL (PC2)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T8	T16
01a	T8	1	1610	STRAIGHT	1.61	-
02a	T8	2	2150	STRAIGHT	4.30	-
03a	T8	8	685	STRAIGHT	5.48	-
04a	T8	2	285	STRAIGHT	0.57	-
05	T16	1	1610	STRAIGHT	-	1.61
TOTAL LENGTH IN METERS					11.96	1.61
WT. PER METER IN KGS.					0.395	1.580
WT. PER DIA. IN KGS.					4.724	2.543
TOTAL WT. IN KGS.					7.267	

Table No.06



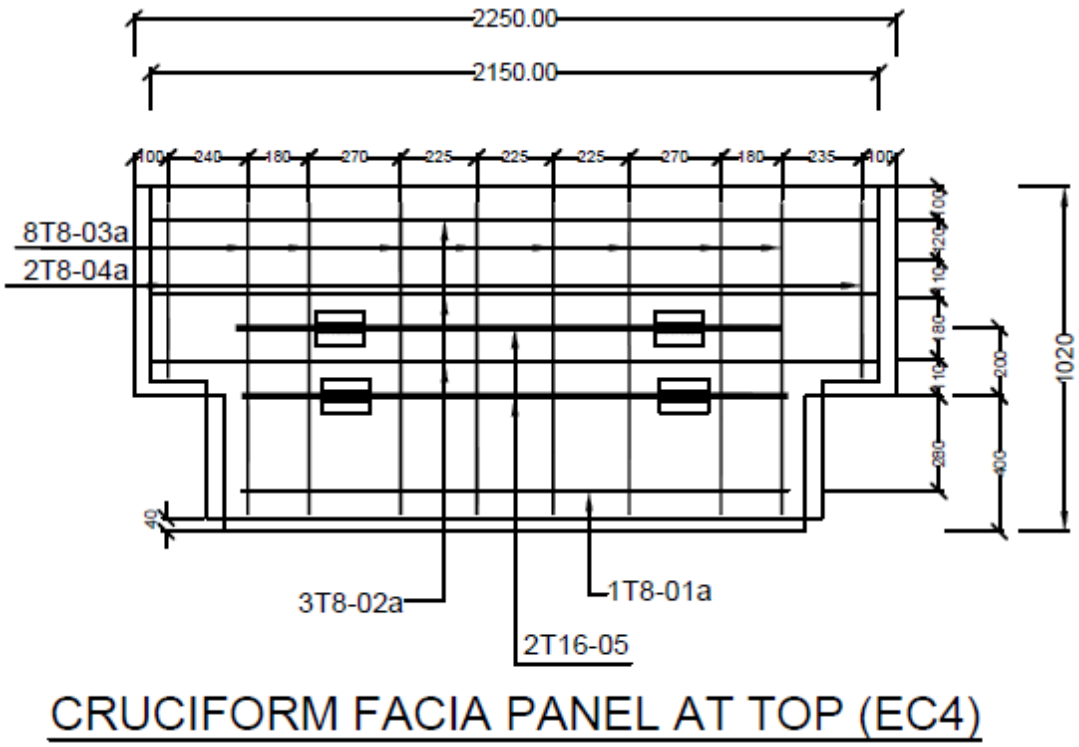
CRUCIFORM FACIA PANEL AT TOP (GC4)

Fig. No. 43

B.B.S. OF STANDARD HEAVY PANEL (GC4)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T8	T16
01a	T8	1	1610	STRAIGHT	1.610	-
02a	T8	4	2150	STRAIGHT	8.60	-
03a	T8	8	1120	STRAIGHT	8.96	-
04a	T8	2	685	STRAIGHT	1.37	-
05	T16	2	1610	STRAIGHT	-	3.22
TOTAL LENGTH IN METERS					20.54	3.22
WT. PER METER IN KGS.					0.395	1.580
WT. PER DIA. IN KGS.					8.113	5.087
TOTAL WT. IN KGS.					13.2	

Table No. 07



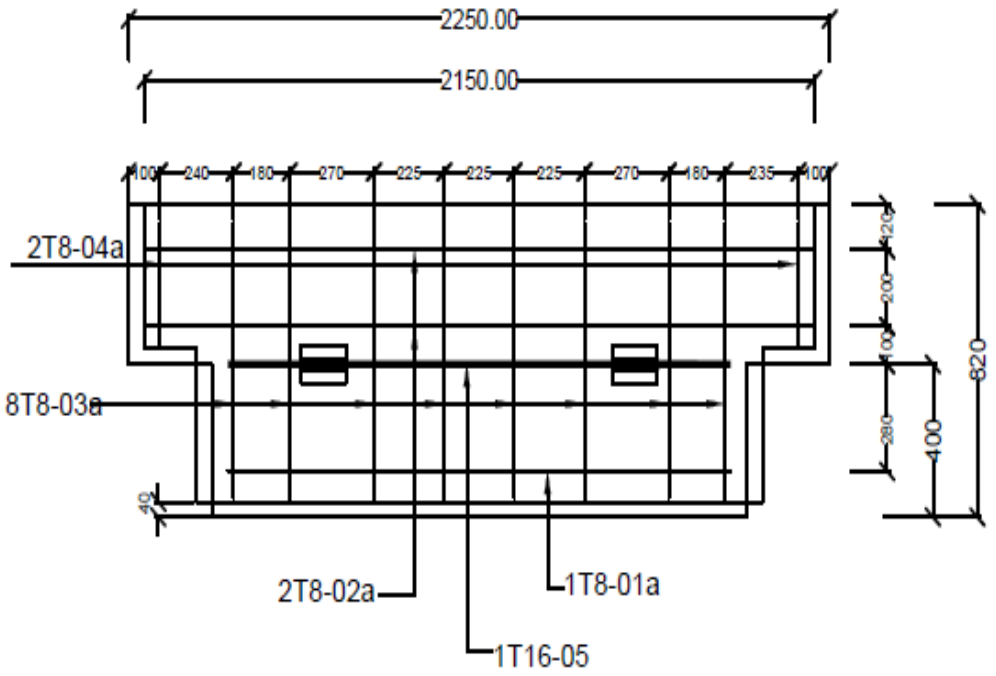
CRUCIFORM FACIA PANEL AT TOP (EC4)

Fig. No. 44

B.B.S. OF STANDARD HEAVY PANEL (EC4)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T8	T16
01a	T8	1	1610	STRAIGHT	1.61	-
02a	T8	3	2150	STRAIGHT	6.45	-
03a	T8	8	920	STRAIGHT	7.36	-
04a	T8	2	520	STRAIGHT	1.04	-
05	T16	2	1610	STRAIGHT	-	3.22
TOTAL LENGTH IN METERS					16.46	3.22
WT. PER METER IN KGS.					0.395	1.580
WT. PER DIA. IN KGS.					6.501	5.087
TOTAL WT. IN KGS.					11.588	

Table No. 08



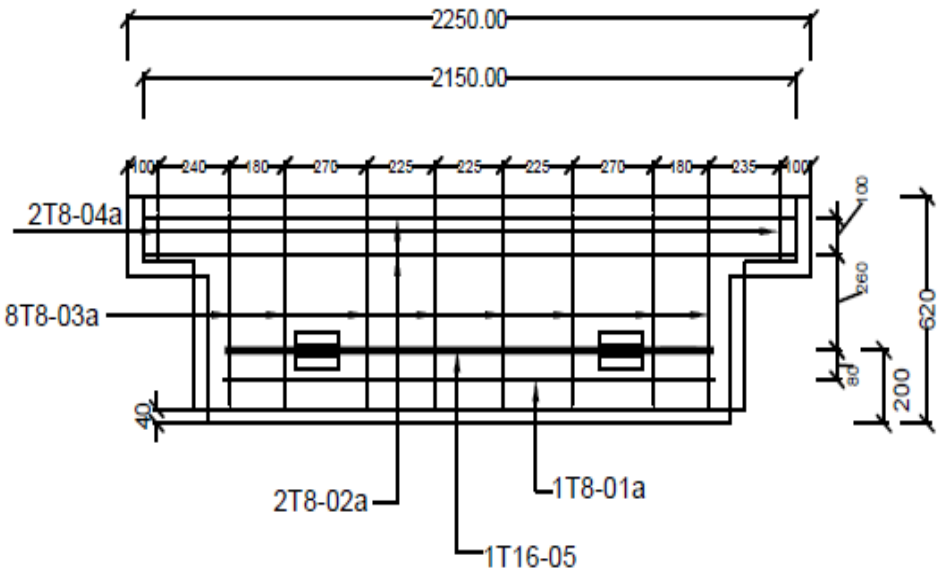
CRUCIFORM FACIA PANEL AT TOP (CC2)

Fig. No. 45

B.B.S. OF STANDARD HEAVY PANEL (CC2)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T8	T16
01a	T8	1	1610	STRAIGHT	1.61	-
02a	T8	2	2150	STRAIGHT	4.3	-
03a	T8	8	720	STRAIGHT	5.76	-
04a	T8	2	320	STRAIGHT	0.64	-
05	T16	1	1610	STRAIGHT	-	1.61
TOTAL LENGTH IN METERS					12.31	1.61
WT. PER METER IN KGS.					0.395	1.580
WT. PER DIA. IN KGS.					4.862	2.543
TOTAL WT. IN KGS.					7.405	

Table No. 09



CRUCIFORM FACIA PANEL AT TOP (AC2)

Fig. No.46

B.B.S. OF STANDARD HEAVY PANEL (AC2)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T8	T16
01a	T8	1	1610	STRAIGHT	1.61	-
02a	T8	2	2150	STRAIGHT	4.30	-
03a	T8	8	520	STRAIGHT	4.16	-
04a	T8	2	120	STRAIGHT	0.24	-
05	T16	1	1610	STRAIGHT	-	1.61
TOTAL LENGTH IN METERS					10.31	1.61
WT. PER METER IN KGS.					0.395	1.580
WT. PER DIA. IN KGS.					4.072	2.543
TOTAL WT. IN KGS.					6.615	

Table No. 10

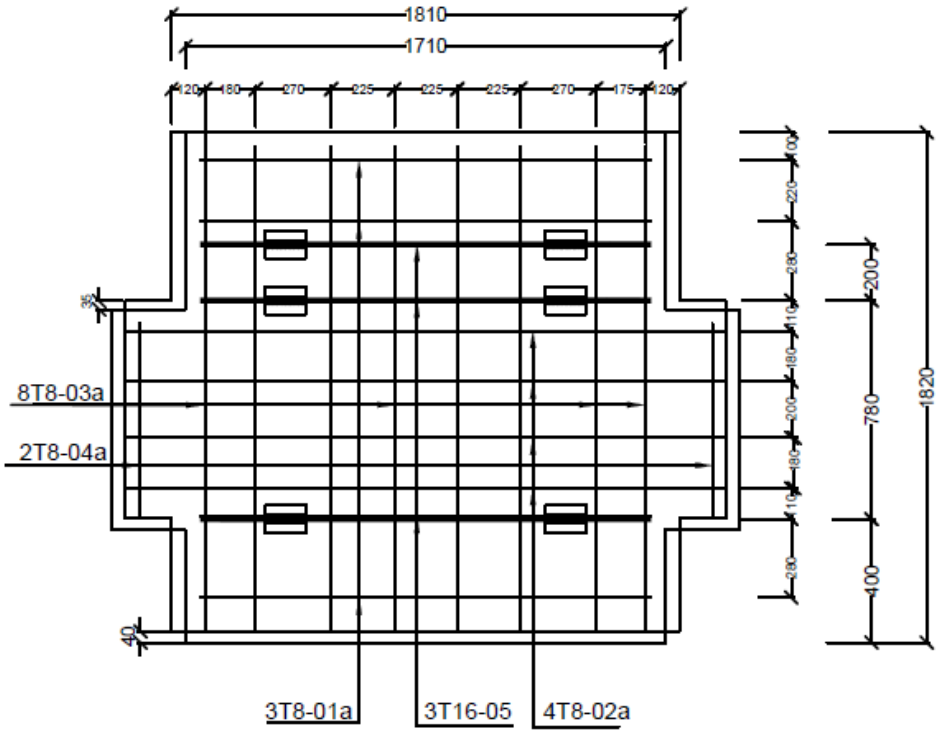
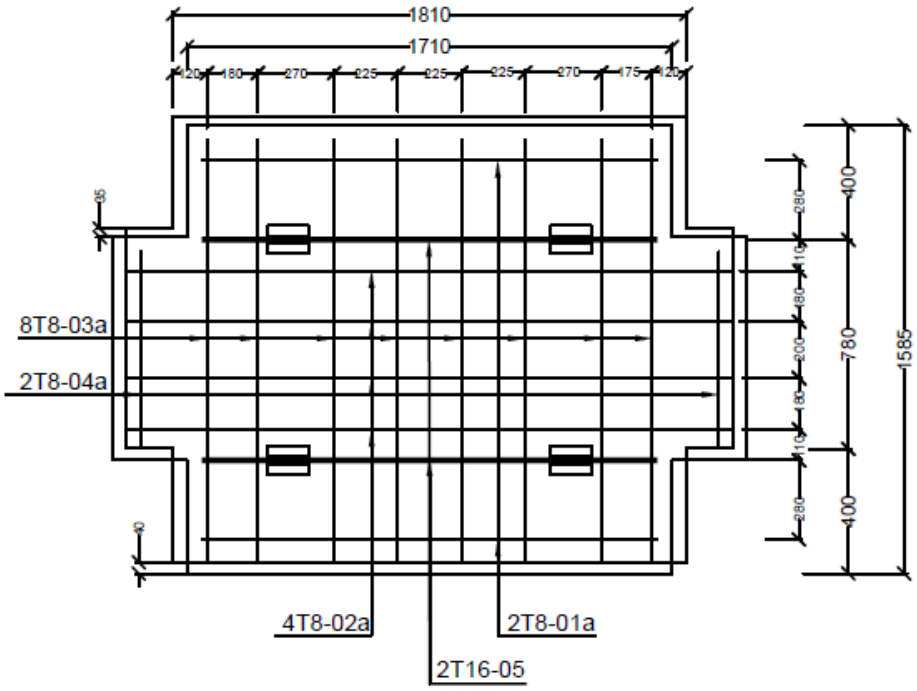


Fig. No. 47
CRUCIFORM FACIA PANEL AT TOP (FC6)

B.B.S. OF CRUCIFORM FACIA PANEL (FC6)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T8	T16
01a	T8	3	1610	STRAIGHT	4.83	-
02a	T8	4	2150	STRAIGHT	8.60	-
03a	T8	8	1720	STRAIGHT	13.76	-
04a	T8	2	685	STRAIGHT	1.37	-
05	T16	3	1610	STRAIGHT	-	4.83
TOTAL LENGTH IN METERS					28.56	4.83
WT. PER METER IN KGS.					0.395	1.580
WT. PER DIA. IN KGS.					11.281	7.631
TOTAL WT. IN KGS.					18.912	

Table No. 11



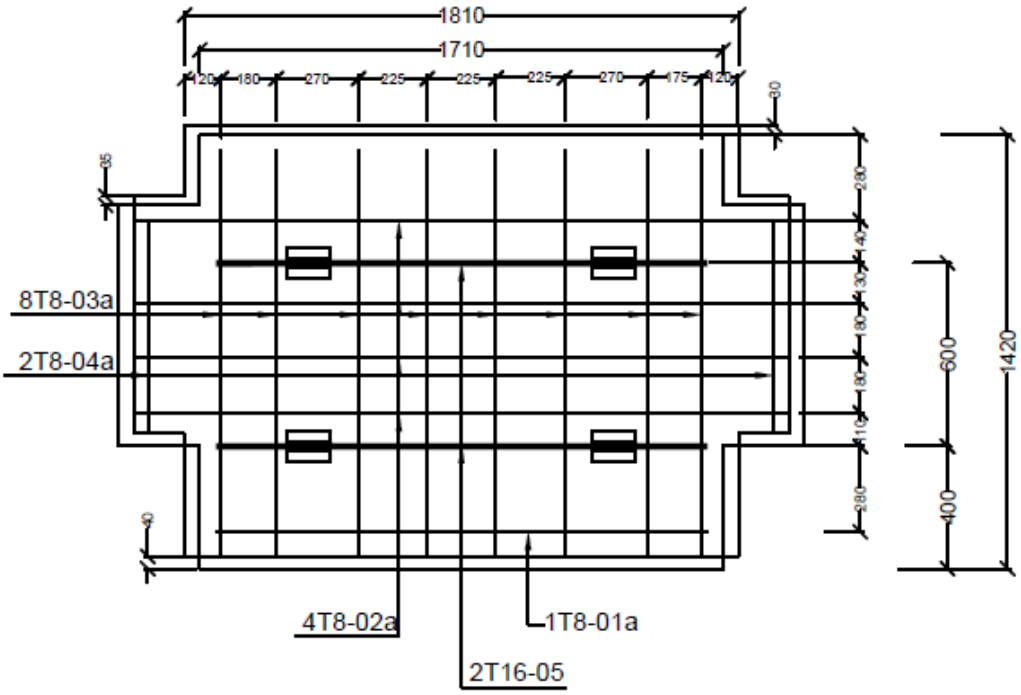
CRUCIFORM FACIA PANEL AT TOP (DC4)

Fig. No.48

B.B.S. OF SANDARD HEAVY PANEL (DC4)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T8	T16
01a	T8	2	1610	STRAIGHT	3.22	-
02a	T8	4	2150	STRAIGHT	8.60	-
03a	T8	8	1485	STRAIGHT	11.88	-
04a	T8	2	685	STRAIGHT	1.37	-
05	T16	2	1610	STRAIGHT	-	3.22
TOTAL LENGTH IN METERS					25.07	3.22
WT. PER METER IN KGS.					0.395	1.580
WT. PER DIA. IN KGS.					9.902	5.087
TOTAL WT. IN KGS.					14.989	

Table No. 12



CRUCIFORM FACIA PANEL AT TOP (BC4)

Fig. No. 49

B.B.S. OF STANDARD HEAVY PANEL (BC4)

BAR MARK	DIA(mm)	NO.	CUTTING LENGTH (IN mm)	SHAPE	TOTAL LENGTH(m)	
					T8	T16
01a	T8	1	1610	STRAIGHT	1.610	-
02a	T8	4	2150	STRAIGHT	8.60	-
03a	T8	8	1320	STRAIGHT	10.56	-
04a	T8	2	685	STRAIGHT	1.37	-
05	T16	2	1610	STRAIGHT	-	3.22
TOTAL LENGTH IN METERS					22.14	3.22
WT. PER METER IN KGS.					0.395	1.580
WT. PER DIA. IN KGS.					8.745	5.087
TOTAL WT. IN KGS.					13.832	

Table No. 13

STANDARD PANEL DETAIL

NOTE

1. DIMENSIONS OF PANELS SHALL BE READ FROM FRONT FACE (MOULD BASE) AND LOCATION OF LOOPS FROM BACK FACE (MOULD TOP) WHILE CASTING.
2. FOR ALL PANELS THE TOP CONNECTION SHALL BE 400mm FROM TOP OF PANEL.
3. THE DIMENSIONS FOLLOWED BY '*' SYMBOL ARE THE FRONT SIDE DIMENSIONS WALL OUTER / ELEVATION SIDE OF PANEL.
4. THE DIMENSIONS FOLLOWED BY '#' SYMBOL ARE THE BACK/EARTH SIDE DIMENSIONS OF PANELS.

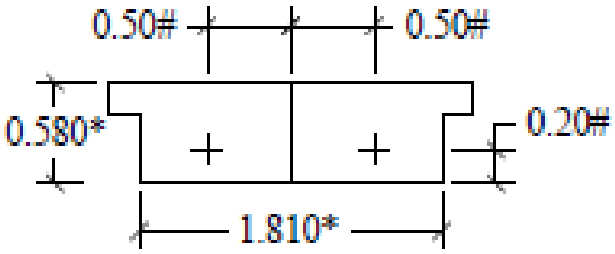


Fig. No.50
STANDARD PANEL (AC2)

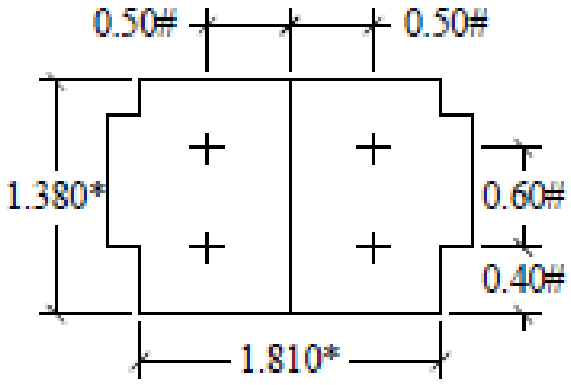


Fig. No.51
STANDARD PANEL (BC4)

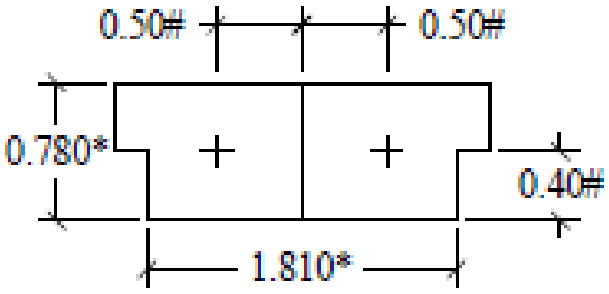


Fig. No.52
STANDARD PANEL (CC2)

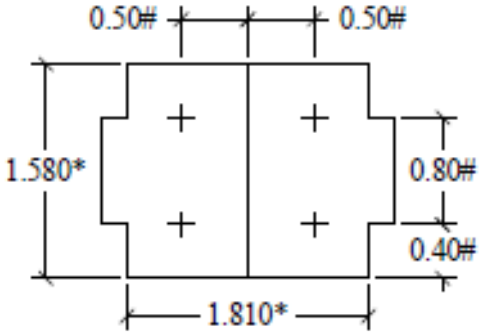


Fig. No.53
STANDARD PANEL (DC4**)**

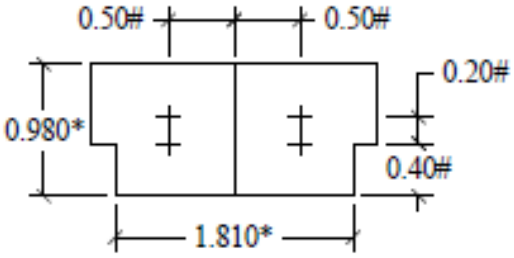


Fig. No.54
STANDARD PANEL (EC4**)**

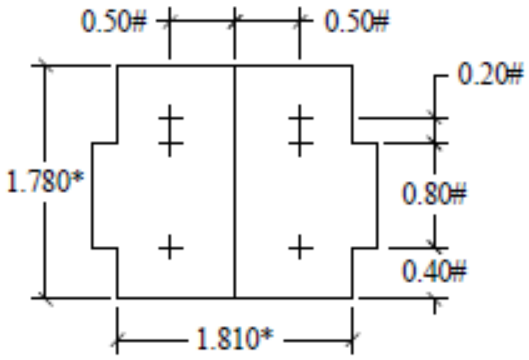


Fig. No.55
STANDARD PANEL (FC6)

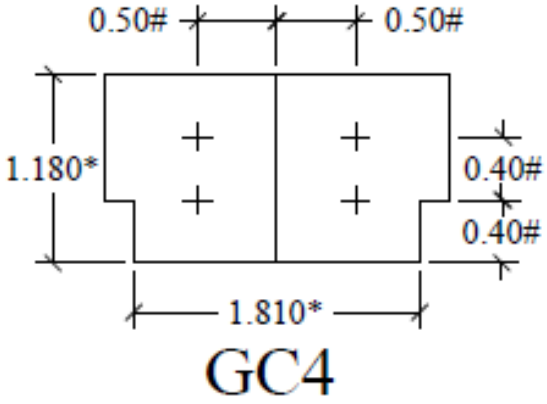


Fig. No.56
STANDARD PANEL (GC4)

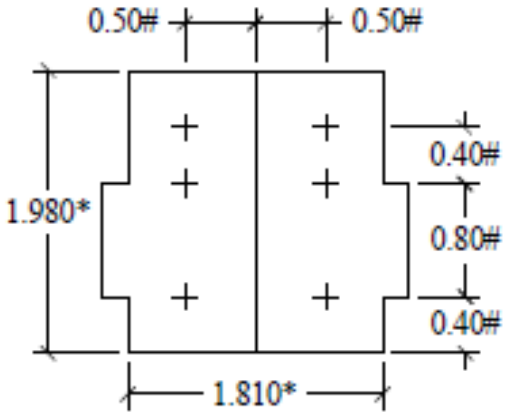


Fig. No.57
STANDARD PANEL (JC6)

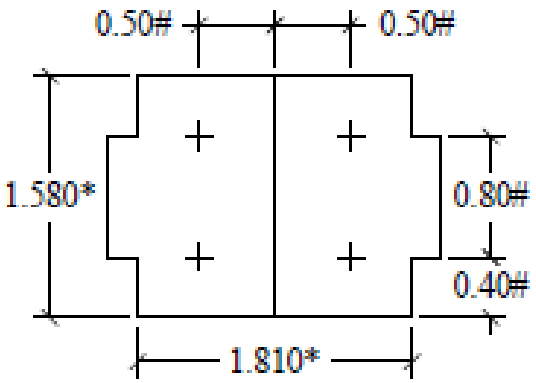


Fig. No. 58
STANDARD PANEL (SC4)

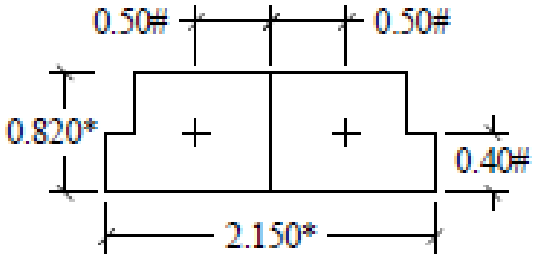


Fig. No.59
STANDARD PANEL (PC2)

Result

A flyover is a road or railway built on top of another. This allows both the routes to cross smoothly. It is a modern engineering invention which is considered to be the solution to traffic jams. Generally the number of vehicles is increasing every day. As a result, a major traffic jam occurs as these existing roads may not provide enough space for all vehicles.
It is also not possible to find a new place to build new roads. For this reason, experts have thought of building flyovers that can maintain smooth communication. In Bhopal city, we have some flyovers like Veer Savarkar Flyover-Bridge, Airport Flyover, Aerocity Flyover, Singrauli Flyover etc.

These flyovers have significantly reduced our traffic jams in some areas. But still we need more flyovers in Bhopal city. Bhopal is a more populated city, there are traffic jams everywhere and it disrupts our normal life. Our development work has been hampered to a great extent due to traffic jams. More flyovers are desperately needed to reduce this. We no longer expect a city where the people spend most of their precious time in vehicles stuck in traffic jams.
We want to see a city where the people can reach their destination on time. Flyovers also reduces the scope of a mass transit system and the bus rapid transit which will have the huge impact on the serious traffic dilemma. In the age of globalization and technological progress, we cannot be left behind. Like other different countries of the world, we need more and more flyovers for easy and jam free communication.

Conclusion

Generally, the number of vehicles is increasing every day. As a result, a major traffic jam occurs as these existing roads may not provide enough space for all vehicles. It is also not possible to find a new place to build new roads. For this reason, experts have thought of building flyovers that can maintain smooth communication.These flyovers have significantly reduced our traffic jams in some areas. But still, we need more flyovers in Bhopal city

We want to see a city where people can reach their destination on time. Flyovers also reduces the scope of a mass transit system and the bus rapid transit which will have the huge impact on the serious traffic dilemma. In the age of globalization and technological progress, we cannot be left behind. Like other different countries of the world, we need more and more flyovers for easy and jam-free communication.

As a student in Public Works Department Bridge Zone, Bhopal, I was given an auspicious opportunity to train for the flyover bridge construction, in which I was given a very cooperative and convenient way by the engineers and working people there, techniques and nuances of flyover bridge construction. was taught to me which proved to be very beneficial for me as a student, during this training I learned how to manage for future construction.
I express my gratitude to all my respected engineers and working persons, due to which I have been taught the qualities of building management so well.

REFERENCE

1. फ्लाईओवर के लिए गणेश मंदिर से नर्मदा अस्पताल तक दो हिस्सों में बंटेगा बी.आर.टी.एस., BRTS will be divided into two parts from Ganesh Mandir to Narmada Hospital for flyover - Dainik Bhaskar
2. https://www.zaubacorp.com/company/VKSC-INFRAPROJECTS-LIMITED/U70100MP1996PLC010441
3. https://www.constructioncivil.com/re-wall-construction-important-guidelines/
4. https://www.constructioncivil.com/re-wall-construction-important-guidelines/

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FORTNIGHTLY PROGRESS REPORT (FPR) FROM INDUSTRY MENTOR

Name of student	Aditya Kumar		Department	Civil Engineering	
Industry/Organization	P.W.D. (Bridge) OSL		Date/Duration	Jan 20 – Feb 03	
Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	• Understanding procedure of hydraulic survey. • Compilation of survey report and hyd. design calculation.				
OVERALL GRADE (Any one)	~~POOR/AVERAGE/GOOD/VERY GOOD~~/EXCELLENT ✓				
Name of Industry Mentor	Sharad Saxena				
Signature of Industry Mentor	SSaxena				

Receiving Date	27/05/22	Name of Faculty Mentor	Dr. Jayant Chaudhary	Sign	27/5/22

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Name of student	Aditya Kumar		Department	Civil Engineering	
Industry/Organization	P.W.D. (Bridge) BR		Date/Duration	Feb 04 - Feb 18	
Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	• Learning basics of structural bridge design.				
OVERALL GRADE (Any one)	~~POOR/AVERAGE/GOOD/VERY GOOD~~/EXCELLENT ✓				
Name of Industry Mentor	Sharad Saxena				
Signature of Industry Mentor	SSaxena				

Receiving Date		Name of Faculty Mentor	Dr. Jayant Chaudhary	Sign	Chaudhary 27/05/22

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Name of student	Aditya Kumar		Department	Civil Engineering	
Industry/Organization	P.W.D. (Bridges) Bpl.		Date/Duration	Feb 19 - March 05	
Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	Understanding the concepts of general arrangement drawings, components of bridges and Introduction to various IRC codes.				
OVERALL GRADE (Any one)	~~POOR/AVERAGE/GOOD/VERY GOOD~~/EXCELLENT ✓				
Name of Industry Mentor	Sharad Saxena				
Signature of Industry Mentor	Saxena				

Receiving Date		Name of Faculty Mentor	Dr. Jayant Chaudhary	Sign	Dhonare 27/05/22

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Name of student	Aditya Kumar		Department	Civil Engineering	
Industry/Organization	P.W.D (Bridge) BPL.		Date/Duration	March 06 - March 20	
Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	Structural design and analysis of different components of bridge foundation. ✓				
OVERALL GRADE (Any one)	~~POOR/AVERAGE/GOOD/VERY GOOD~~/EXCELLENT				
Name of Industry Mentor	Shanul Saxena				
Signature of Industry Mentor	Saxena				

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Industry/Organization	P.W.D. (Bridge), BR.		Date/Duration	March 21 - April 04.	
Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	• Testing of various material used in Bridge construction. Testing of cement i. Consistency test ii. Setting time test. a. Initial setting time. b. Final setting time. Testing of aggregate and concrete. i. Toughness of aggregate ii. Flakiness Index Test. iii. Elongation Index test. iv. Slump value test. • Observed defects during site visit :- Laitance and cracks				
OVERALL GRADE (Any one)	~~POOR/AVERAGE/GOOD/VERY GOOD~~/EXCELLENT ✓				
Name of Industry Mentor	Shanul Saxena				
Signature of Industry Mentor	Saxena				

Receiving Date		**Name of Faculty Mentor**	Dr. Jayant Chaudhary.	**Sign**	Chaudhary 27/05/22

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Name of student	Aditya Kumar		Department	Civil Engineering	
Industry/Organization	P.W.D. (Bridge), BR		Date/Duration	05-19 April	
Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	i. Classifications of projects. ii. Concrete calculation for Lintel. iii Bar bending schedule for Lintel. iv. Site work during form work and concrete work. ✓				
OVERALL GRADE (Any one)	~~POOR/AVERAGE/GOOD/VERY GOOD~~/EXCELLENT				
Name of Industry Mentor	Shanul Saxena.				
Signature of Industry Mentor	Saxena				

Receiving Date		**Name of Faculty Mentor**	Dr. Jayant Chaudhary	**Sign**	27/05/22

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FORTNIGHTLY PROGRESS REPORT (FPR) FROM INDUSTRY MENTOR

Name of student	Aditya Kumar		Department	Civil Engineering
Industry/Organization	P.W.D (Bridge) B&L		Date/Duration	DD/MM/YR -DD/MM/YR April 20 - May 0k.
Criterion	**Poor**	**Average**	**Good**	**Very Good** / **Excellent**
Punctuality/Timely completion of assigned work				✓
Learning capacity/Knowledge up gradation				✓
Performance/Quality of work				✓
Behaviour/Discipline/Team work				✓
Sincerity/Hard work				✓
Comment on nature of work done/Area/Topic	Pile foundation i. A thin-walled steel tube is hammered into the ground and earthmusk is removed. ii. Reinforced steel is set in the tube. iii. Pile is casted by the reverse concreting.			
OVERALL GRADE (Any one)	~~POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT~~ ✓			
Name of Industry Mentor	Anand Saxena			
Signature of Industry Mentor	ASaxena			

Receiving Date		Name of Faculty Mentor	Dr. Jayant Chaudhary	Sign	27/05/22

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Name of student	xxxxxxxxxxxx Aditya Kumar	Department	Civil Engineering
Industry/Organization	xxxxxxxxxxxxx P.W.D. Bridge, BRL	Date/Duration	DD/MM/YR -DD/MM/YR 05-20 May

Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓

Comment on nature of work done/Area/Topic	Bar Bending Schedule (BBS) for the Raft. ✓
OVERALL GRADE (Any one)	~~POOR/AVERAGE/GOOD/VERY GOOD~~/EXCELLENT
Name of Industry Mentor	Sharad Saxena
Signature of Industry Mentor	Saxena

Receiving Date	xxxx	Name of Faculty Mentor	Mr. Jayant Choudhary	Sign	xxx 23/05/22