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0.1 Circulation List

COPY NO.	COPY HOLDER
1	Manager Standards
Electronic copy (pdf) on Kenya Power server (http://172.16.1.40/dms/browse.php?fFolderId=23)	

0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name& Signature)
1	2015-08-12	To include drawings of the products	S Nguli	Dr. Eng. Kimemia

FOREWORD

This specification has been prepared by the Standards Department of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for Concrete Products (Hatari Slabs and Stay Blocks). It is intended for use by Kenya Power in purchasing the concrete products.

It shall be the responsibility of the supplier to ensure adequacy of the design and good engineering practice in the manufacture of the Hatari Slabs and Stay Blocks for KPLC. The supplier shall submit information which confirms satisfactory service experience with products which fall within the scope of this specification.

1. SCOPE

1.1 This specification is for Concrete Products Hatari Slabs (concrete cable covers) and Stay Blocks.

1.2 This specification covers the following sizes:

1.2.1 Hatari slab, LV

1.2.2 Hatari slab, HT

1.2.3 Stay block, 1/2" (12.5mm)

1.2.4 Stay block, 3/4" (19mm)

1.2.5 Stay block, 1" (25mm)

2. REFERENCES

The following documents were referred to during the preparation of this specification. In case of conflict, the requirements of this specification shall take precedence.

ESI 43 – 91	Stay Strands and Stay Fittings for Overhead Lines
BS 2484	British Standard Specification for Straight Concrete and Clayware Cable Covers.
BS 4483	Steel Fabric for the Reinforcement of Concrete
KS 02-95	Kenya Standard Specification for Natural Aggregates for Concrete
KS 1725	Kenya Standard Specification for Cement

Part1: Composition, Specifications and Conformity Criteria for Common Cement

ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories

3. TERMS AND DEFINITIONS

The definitions given in the reference standards shall apply.

4. REQUIREMENTS

4.1 OPERATING CONDITIONS

The concrete products shall be suitable for continuous outdoor operation in tropical areas with the following conditions.

a) Altitude: up to 2,200m above sea level;

b) Temperature: average of +30°C with a minimum of -1°C and max +40 °C;

c) Humidity: up to 95%;

d) Pollution: Design pollution level to be taken as "*Heavy*" (Pollution level III) for inland and "*Very Heavy*" (Pollution level IV) for coastal applications in accordance with IEC 60815.

e) Isokeraunic level: 180 thunderstorm days per year

4.1.1 The stay block shall be buried at depths of up to 2m in soils of various types to act as an anchor for stay wire on overhead lines.

4.1.2 The concrete stay blocks shall be used with stay rod sizes indicated in the table below:

Table 1: Correlating Stay blocks with stay rods

Stay block size	Stay rod	
	Size	Minimum failing load, kN
½''	6ft x $^5/_8$" & 6ft x ½''	52 kN
¾''	8ft x 3/4"	71.3 kN
1"	9ft x 1"	145 kN

4.1.3 The Hatari Slabs (cable covers) shall be laid above power cables buried underground in soils of various types. High voltage cables are buried at depths of up to 1.6m while low voltage cables are buried at depths of 0.5m.

4.1.4 The cable covers designated LV shall be used to cover cables operating at 240/415V (low voltage) while those designated HT shall be used to cover cables operating at higher voltages up to 66kV

4.2. DESIGN AND CONSTRUCTION

4.2.1. General

4.2.1.1 The products shall be made using Portland Cement conforming to KS1725, course aggregates not exceeding 10mm nominal size and conforming to KS02-95, clean river sand and drinking quality water free from any visual contamination.

4.2.1.2 The products shall not contain additional admixtures and pigments. The composition of cement, sand and course aggregates shall be such as to satisfy the requirement for transverse strength and ultimate failing load

4.2.1.3 The concrete stay blocks shall be reinforced while the cable covers shall contain no steel reinforcement

4.2.1.4 Steel moulds shall be used in the manufacture of the products so as to ensure a smooth texture externally. The mould shall be accurately made to produce units of the dimensions, profiles and shapes shown in the drawings.

4.2.1.5 The product shall be vibrated while on moulds to ensure a dense mass free from honeycombs or segregation and fill the forms and spaces between reinforcement (for concrete stay blocks) compactly and without voids. The vibrator used shall have a frequency of not less than 5000 cycles/minute and shall not be attached to or allowed to touch reinforcement during compacting.

4.2.1.6 Lettering shown on the drawings *(for cable covers)* shall be formed using accurately placed formers securely fixed in position. Cutting either uncured or hardened concrete shall not be permitted

4.2.1.7 Freshly placed concrete shall be suitably protected and shall be kept constantly damp for a period of at least four days after concreting. The concrete shall be allowed to dry slowly over a period of at least three days after wet curing is completed and further days to bring the total to twenty one days.

4.2.1.8 Steel reinforcement rods shall be welded at all points of crossing and all dimensions shall be as per the drawings. Alternatively, a welded reinforcing fabric of No. 5 SWG x 75mm square with the wires symmetrically placed about the centre would be accepted.

4.2.1.9 The underside of the cable cover and stay block shall be flat while the upper sides shall be peaked as shown on drawings.

4.2.1.10 The concrete cable cover shall have one end concave, the other convex (as shown in drawings) to provide a concave/convex joint resisting lateral displacement.

4.2.2. Dimensions

4.2.2.1 The cable covers are required in two sizes with dimensions as shown in table 2 and drawing SK No. 08424/1 and 2. Tolerances on length (L), width (W) and thickness at outer edges (H) shall be ±3mm and ±2mm respectively.

4.2.2.2 When tested the Hatari Slabs (concrete cable covers) shall withstand, without breaking, the loads given in table 2 below.

Table 2: Cable Cover Sizes and Transverse Strength

Category	Dimensions (LxWxH) mm	Average Breaking Load (kg)
HT	610 x 230 x 50	750
LV	305 x 150 x 40	300

4.2.2.3 The concrete stay blocks are required in three sizes with dimensions (including hole size) as shown in table 3 and drawing number 3 & 4. Tolerances on length (L), width (W) and thickness at outer edges (H) shall be ±3mm and ±2mm respectively.

4.2.2.4 When tested in accordance with ESI 43 - 91 the concrete stay blocks shall withstand, for a period of 1 minute, the ultimate failing loads given in table 3 below.

Table 3: Concrete Stay Blocks- Sizes and Ultimate Failing Load

Category (size of center hole)	Dimensions(LxWxH) mm	Ultimate failing load (kN)
½'' (12.5mm)	500 x 380 x 50, Drg No. 3	65
3/4" (19mm)	500 x 380 x 50, Drg No. 3	65
1" (25mm)	660 x 480 x 60, Drg No. 4	72

5. TESTS AND INSPECTION

5.1 Type and sample tests for the concrete stay blocks shall be in accordance with ESI 43-91.

5.2 The tests shall include:- dimensional verification,

(i)Porosity Test,
(ii)Crack Test (proof load)
(iii)Quality of finish (straightness)
(iv)Ultimate Failing load

5.3 Copies of previous Test Certificates and Test Reports issued by a third party testing laboratory that is accredited to ISO/IEC 17025 shall be submitted with the tender for the purpose of technical evaluation.

5.4 Routine and sample test reports for the concrete products to be supplied shall be submitted to KPLC for approval before delivery of the goods.

6. MARKING AND LABELLING

6.1 The upper side of each cable cover shall be marked longitudinally by means of impression with the words "HATARI KPLC" in accordance with drawing SK No. 08424/1 and 2.

The word 'HATARI' shall be impressed on one inclined face and the name KPLC on the other. The lettering shall be symmetrically spaced, 4mm deep and 20mm minimum height for LV cable covers and 40mm minimum height for HT cable covers.

The stay block shall be marked ½'', ¾'' or 1'' as appropriate on at the top, 4mm deep and 40mm minimum height.

Each cable cover and stay block shall carry an impression or embossment of the manufacturer's name or identifying mark.

6.2 The following information shall be marked on the manufacturer's certificate supplied with the cable covers and stay blocks:

- Name or trademark of manufacturer;
- The number and date of standard to which the concrete product complies;
- Type of binder constituent (s) used;
- Dimensions of the product;
- Property of " Kenya Power"
  (All in English Language)

7. DOCUMENTATION

7.1 The bidder shall submit its tender complete with technical documents required by Annex A (Guaranteed Technical Particulars) for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:

a) Guaranteed Technical Particulars;
b) Copies of the Manufacturer's catalogues, brochures, drawings and technical data;
c) Sales records for the last five years and at least four customer reference letters;
d) Details of manufacturing capacity and the manufacturer's experience;
e) Copies of required test reports by a third party testing laboratory accredited to ISO/IEC 17025. The test reports shall not be more than five years old and shall include:
   i. Resistance to proof load;
   ii. Verification of dimensions;
   iii. Straightness;
   iv. Ultimate load.
f) Copy of accreditation certificate for the testing laboratory;
g) Copy of the manufacturer's ISO 9001:2008 certificate or for local manufacturer's valid Diamond Mark of Quality Certificate issued by KEBS.

7.2 The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:

a) Guaranteed Technical Particulars,
b) Design Drawings with details of the concrete products to be manufactured for KPLC,
c) Quality assurance plan (QAP) that will be used to ensure that the design, materials, workmanship, tests, service capability, maintenance and documentation will fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001:2008 and for local manufacturers the Diamond Mark of Quality (KEBS).
d) Marking details and method to be used in marking the concrete products,

e) Manufacturer's undertaking to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the concrete poles for The Kenya Power & Lighting Company.

f) Packaging details (including packaging materials and their dimensions).

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ANNEX A: Guaranteed Technical Particulars *(to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, four customer reference letters, details of manufacturing capacity, the manufacturer's experience and copies of complete type test certificates and type test reports for tender evaluation, all in English Language)*

Tender No. .....

Clause number	Guaranteed Technical Particulars		Bidder's offer
1	Name and address of the Manufacturer		state
	Country of manufacture		state
	Manufacturer's Letter of Authorization		provide
	Model/Type Reference No. of the offered transformer		state
	Drawing Reference Number		state
	Manufacturer's warranty and guarantee certificate for the offered conductor		provide
2	Type and Size		state
3.	Reference Standard of manufacture		state
4.1	Service Conditions		specify
4.1.1	Design, manufacture and Test Standard		state
4.1.2	Design depth for stay block to buried		state
4.1.3	Size, designation and stay rod size		state
4.1.4	Depth at which cable covers are to laid		state
4.1.5	Voltage rating of cable covers	HT	state
		LV	state
4.2.1.1	Material and Standard of manufacture		state
4.2.1.2	Composition of Concrete mixtures		state
4.2.1.3	Reinforcement of stay block		state
4.2.1.4	Mode of compaction		state
4.2.1.5	Method of Permanent marking		state
4.2.1.6	Method of curing the stay block		specify
4.2.1.7	Material for reinforcement of stay blocks		Specify
4.2.1.8	Design for cable covers and stay block		Specify
4.2.2.1	Sizes and dimensions		Provide drawings
4.2.2.2	Design loads		Specify

4.2.2.3	Concrete stay blocks sizes	Specify
4.2.2.4	Ultimate failing loads	Specify
5.1	Test standards	state
5.2	List of copies of Design and Type Test Reports submitted (indicate Test Report Numbers, Testing Authority and contact addresses)	List
5.3	Copies of previous Test Reports from an ISO/IEC 17025	Specify
5.4	List Acceptance Tests to be witnessed by KPLC Engineers at the factory	List
5.5.	Inspection and Acceptance at KPLC stores	State compliance
	Replacement of rejected poles at no extra cost to KPLC	State compliance
6.1	Marking (indicate parameters and method of marking to be used during manufacture)	Specify
6.2	Packaging (indicate parameters and method of packaging to be used during and after manufacture)	Specify
6.3	Handling and storage instruction to be provided during delivery	Specify
7.1	Documents submitted with tender	list
7.2	Documents to be submitted to KPLC for approval before manufacture	specify
Other details required with the tender	List of catalogues, brochures, technical data, drawings and customer sales records submitted to support the offer.	specify
	Deviations from tender specifications and supporting data, test reports, technical documents etc.	specify

.....

Manufacturer's Name, Signature, Stamp and Date

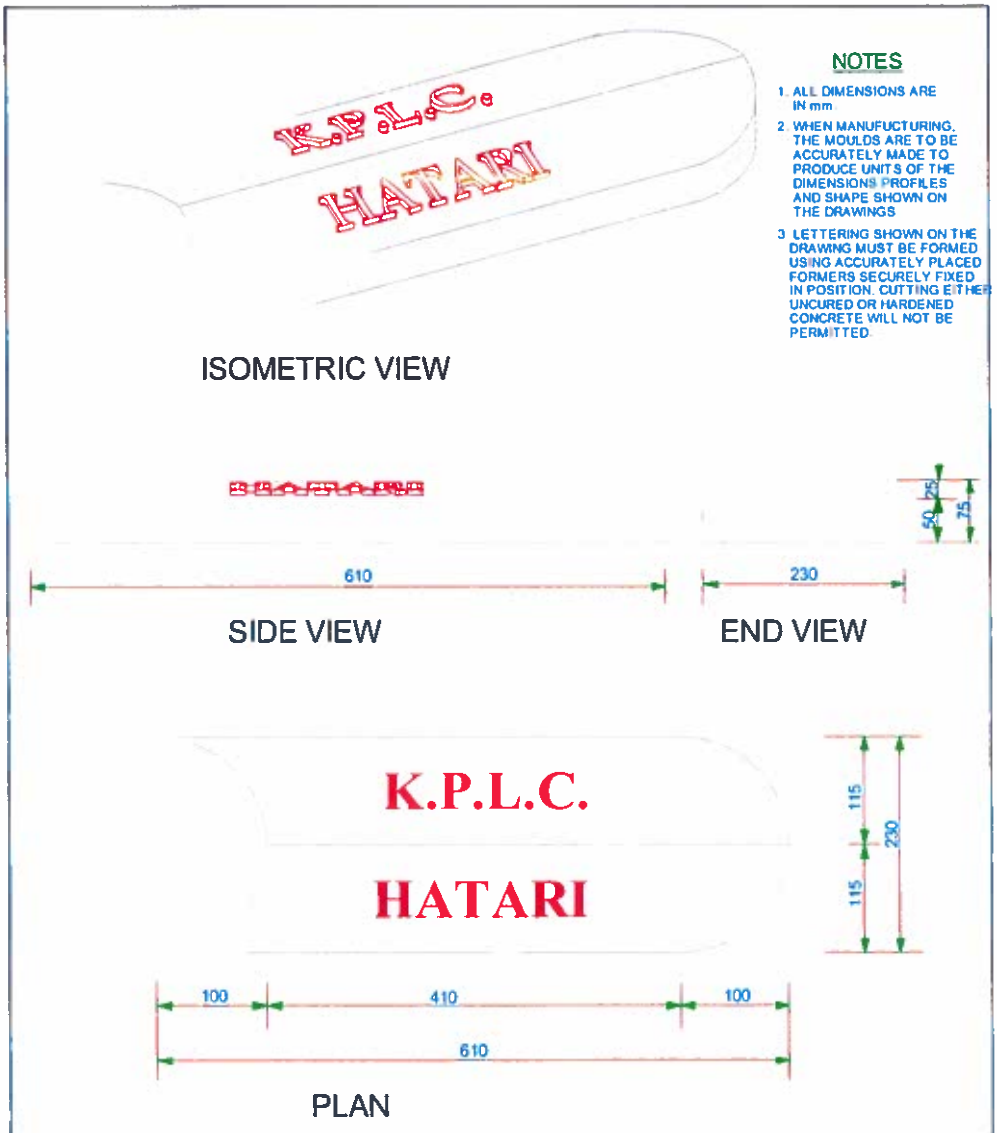


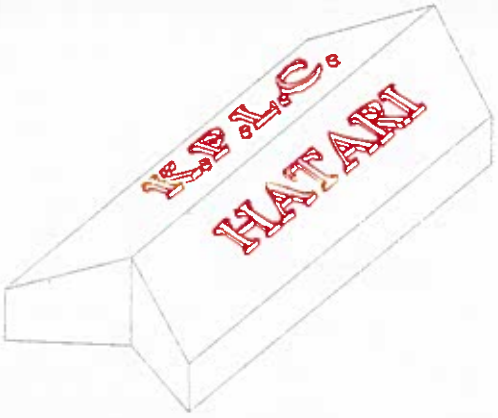
FIG :1 CONCRETE HATARI SLAB TO COVER H.T. CABLES

	DATE	SIGN	ISSUE	DESCRIPTION	DATE	SIGN
APPROVED						
CHECKED	26/03/02	S.K.K.				
DRAWN	17/11/01	J.M.K.				
SCALE						

K. P. & L. Co LTD

SK. NO. 08424 / 1

Issued by: Head of section, standards Development	Authorized by: Manager ,Standards
Signed:	Signed:
Date: 2016-05-31	Date: 2016-05-31



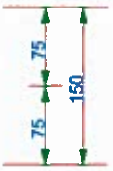
ISOMETRIC VIEW

NOTES

1. ALL DIMENSIONS ARE IN mm
2. WHEN MANUFUCTURING THE MOULDS ARE TO BE ACCURATELY MADE TO PRODUCE UNITS OF THE DIMENSIONS PROFILES AND SHAPE SHOWN ON THE DRAWINGS
3. LETTERING SHOWN ON THE DRAWING MUST BE FORMED USING ACCURATELY PLACED FORMERS SECURELY FIXED IN POSITION CUTTING EITHER UNCURED OR HARDENED CONCRETE WILL NOT BE PERMITTED

SIDE VIEW

END VIEW



PLAN

FIG: 2 CONCRETE HATARI SLAB TO COVER L.V. CABLES

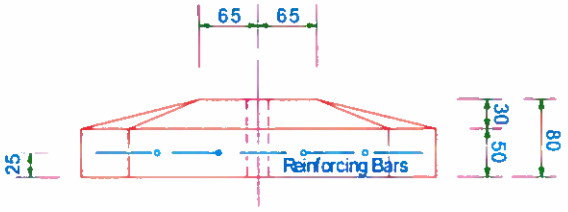
	DATE	SIGN	ISSUE	DESCRIPTION	DATE	SIGN
APPROVED						
CHECKED	26/03/02	S.K.K.				
DRAWN	16/11/01	J.M.K.				
SCALE						

K. P. & L. Co LTD

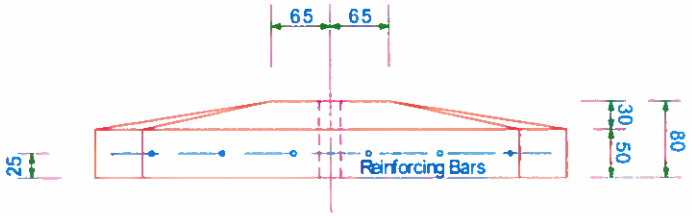
SK. NO. 08424 / 2

Issued by: Head of section, standards Development	Authorized by: Manager ,Standards
Signed:	Signed:
Date: 2016-05-31	Date: 2016-05-31

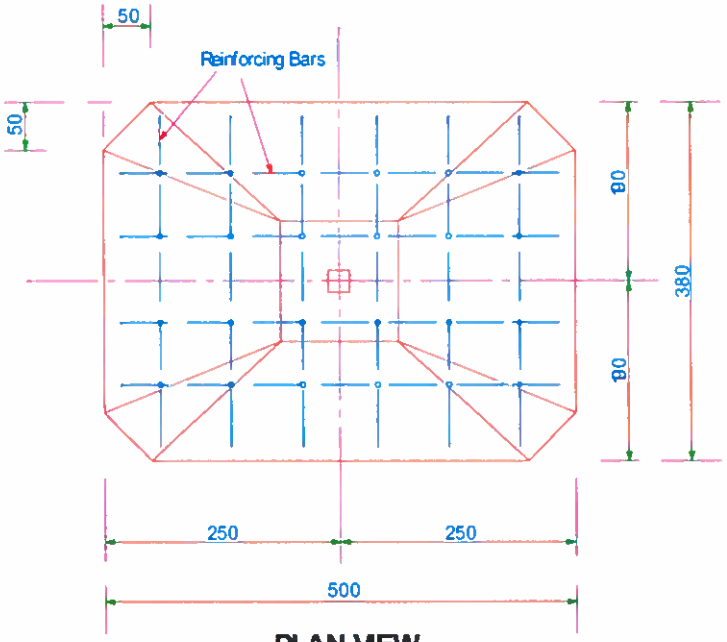
REINFORCED CONCRETE STAY BLOCK FOR M.V. O/H LINE



SIDE ELEVATION



FRONT ELEVATION



PLAN VIEW

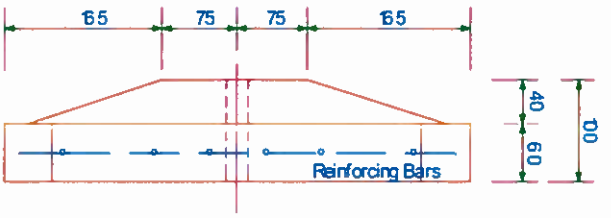
SCALE : 1: 5

Notes

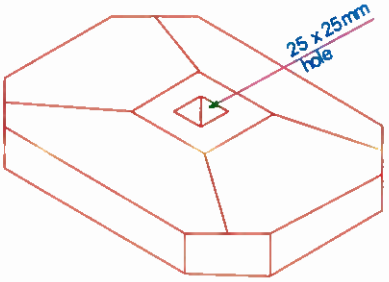
1. All dimensions are in mm.
2. Reinforcement rods should be welded at all points of points of crossing. Alternatively a welded reinforcing fabric of No. 5 gauge x 3" square would be accepted.
3. Concrete to be vibrated during manufacture.

Drg. No. 3			MANUFACTURING FAILING LOAD
REINFORCEMENT			
	NUMBER		
	LENGHT	ACROSS	
1/4"	4	6	6.5 KN TONs

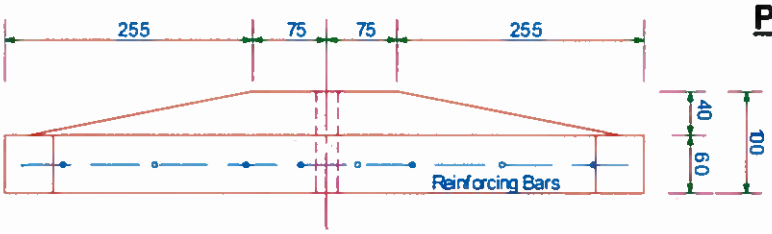
REINFORCED CONCRETE STAY BLOCK FOR H.T. LINE



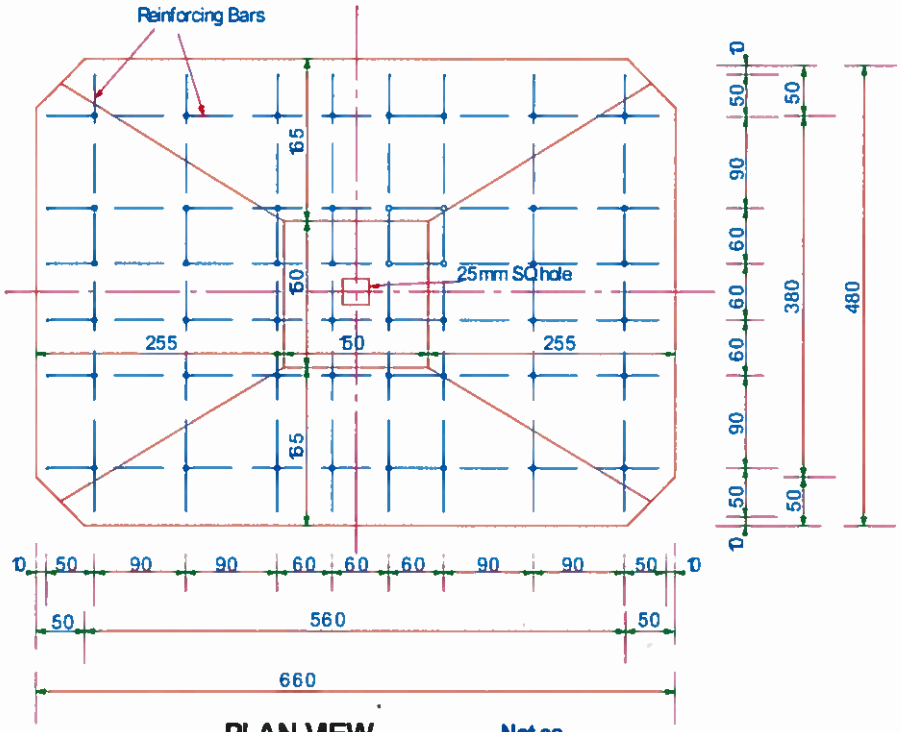
SIDE ELEVATION



PERSPECTIVE VIEW



FRONT ELEVATION



PLAN VIEW

Notes

1. All dimensions are in mm.
2. Reinforcement rods should be welded at all points of points of crossing. Alternatively a welded reinforcing fabric of No. 5 gauge x 3" square would be accepted.
3. Concrete to be vibrated during manufacture.

SCALE : 1:5

Drg. No. 4		
REINFORCEMENT		
	NUMBER A	
	LENGHT	ACROSS
¼"	8	6