EAST AFRICAN COMMUNITY

EDICT OF GOVERNMENT

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EAS 322 (2002) (English): Wood poles and blocks for power and telecommunication lines — Specification

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EAS 322:2002
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EAST AFRICAN STANDARD

Wood poles and blocks for power and telecommunication lines — Specification

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonising requirements governing quality of products and services in East Africa. It is envisaged that through harmonised standardisation, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to achieve this objective, the Partner States in the Community through their National Bureaux of Standards, have established an East African Standards Committee.

The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organisations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalisation of standards, in accordance with the procedures of the Community.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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Introduction

One of the important factors involved in the design and economical use of wood poles for the support of aerial communication and power lines is the value of the maximum fibre strength for the different species of timber used for wood poles. The fibre strength is affected by the amount of seasoning the wood poles have received. The growth characteristics of timber and their freedom from decay and other defects are of importance in the determination of the mechanical strength of the poles for assessing the safe loads in service.

In this respect, the attention of pole users is drawn to the difficulty of defining and working to precise requirements on all aspects of a natural product such as timber. Some properties have of necessity been specified in general terms only. It is therefore recommended that the supervision of seasoning tests and of preservation processes and the acceptance of poles should be assigned only to qualified and experienced inspectors.

In the preparation of this East African Standard, assistance was drawn from the following:

BS 1990-1:1984, *Wood poles for overhead power and telecommunication lines* published by British Standards Institution.

ANSI 05.1:979, *Specifications and dimensions for wood poles* published by American National Standards Institute.

In reporting the results of a test made in accordance with this East African Standard, if the final value observed or calculated is to be rounded off, it shall be done in accordance with EAS 124:1999

Wood poles and blocks for power and telecommunication lines — Specification

1 Scope

This East African Standard specifies materials and performance requirements for solid wood poles. The poles described herein are considered as simple cantilever members subject to transverse loads only.

2 Normative references

For the purposes of this East African Standard, the following references shall apply:

EAS 24:2001, *Glossary of terms used in timber industry*

EAS 324:2002, *Copper/chromium/arsenic compositions for timber preservations — Methods of timber treatment*

EAS 323:2002, *Specification for wood preservation by means of pressure creosoting*

EAS 124:1999, *Rounding off numerical values*

3 Definitions

For the purpose of this East African Standard, the definitions given in EAS 24 shall apply.

4 Felling

Trees shall be sawn off as close to the ground as possible and no timber shall be removed, trimmed or cut from the butt end so as to reduce its natural size. The ends shall be sawn to give a flat section and branches shall be dressed down flush with the trunk. Bark shall be removed as soon as practicable after felling except for eucalyptus, which requires a longer seasoning time.

5 Materials requirements

5.1 Species

Poles shall be made from the following species and will have a minimum fibre strengths of 39 Mpa:

	Trade name	*Botanical name*
a)	Redwood or scots pine	(Pinus sylvestris)
b)	Corsican pine	(Pinus nigra)
	Douglas fir	(Pseudotsuga menziesii)
	Dunkeld (hybrid)larch	(Larix eurolepis)
	European larch	(Larix decidua)
	European spruce	(Picea abies)
	Lodgepole pine	(Pinus contorta)
	Sitka spruce	(Picea sitchensi)
	East African pencil cedar	(Juniperus procera)
	Eucalyptus	(Eucalyptus saligna or Eucalyptus grandis)

NOTE The preferred dressed sizes of poles should be as given in Table 1 and Table 2.

5.2 Grading

5.2.1 Prohibited defects

a) Cross-breaks (cracks);

b) Decay, except as permitted for firm red heart in 5.2.2(a), defective butts in 5.2.3(d) and decayed knots in 5.2.3(f);

c) Dead streaks, except as permitted in 5.2.3(f);

d) Hollow butts or tops, except as permitted under hollow pith centers;

e) Marine borer damage;

f) Holes, open or plugged, except holes for test purposes, which shall be plugged;

g) Nails, spikes and other metal not specifically authorized by the purchaser.

5.2.2 Permitted defects

a) Firm red heart — Firm red heart not accompanied by softening or other disintegration (decay) of the wood is permitted.

b) Hollow pith centres — Hollow pith centres in the tops or butts and in knots are permitted in poles that are to be given full-length treatment.

c) Sapstain — Sapstain that is not accompanied by softening or other disintegration (decay) of the wood is permitted.

d) Scars — Turpentine acid face scars are permitted anywhere on the pole surface.

5.2.3 Limited defects

a) Bark inclusions — Depressions containing bark inclusions shall be not more than 50 mm in depth measured from the surface of the pole.

b) Compression wood — The outer 25 mm of all poles shall be free from compression wood visible on either end.

c) Dead streaks — A single, sound dead streak is permitted in East African pencil cedar, provided the greatest width of the streak is less than 25 % of the circumference of the pole at the point of measurement.

d) Defective butts — Hollowing in the butt caused by “splinter pulling” in felling the tree is permitted, provided that the area of such hollow is less than 10 % of the butt area. Also hollow heart does not occur closer than 50 mm to the side surface and provided that the depth of the hollow does not exceed 600 mm, measured from the butt surface.

e) Insect damage — Insect damage, consisting of holes 1.5 mm or less in diameter, or surface scorning or channeling is permitted provided there is no active infestation and the strength of the pole is not affected by the degree of damage.

f) Knots — At any cross section along the length of a pole no knot with a diameter measured at right angles to the length of the pole, which is greater than 1/5 of the circumference shall be permitted. Also the sum of knot diameters at the cross section shall not exceed 1/4 of the circumference of the pole.

NOTE The limitations of knots are based on past practice and satisfactory performance.

g) Scars (cat face) — No pole shall have a scar or turpentine cat face located within 600 mm of the groundline. Other sound scars are permitted elsewhere on the pole surface, provided they are smoothly trimmed and do not interfere with the cutting of any grain, and provided that

i) the circumference at any point on trimmed surface located between the butt and 600 mm below the groundline is not less than the minimum circumference specified at 1.5 m from the butt for the class and length of the pole (see Table 1 and Table 2) and

ii) the depth of the trimmed scar is not more than 50 mm, if the diameter is 250 mm or less, or 1/5 the pole diameter at the location of the scar if the diameter is more than 250 mm.

h) Shakes — Shakes in the butt surface which are not closer than 50 mm to the side surface of the pole are permitted, provided they do not extend to the groundline. Shakes or a combination of connected shakes which are closer than 50 mm to the side surface of the pole are permitted provided they do not extend further than 600 mm from the butt surface and do not have an opening wider than 3mm. Shakes in the top surface are permitted in poles that are to be given full length preservative treatment provided that the diameter of the shake is not greater than 50 % the diameter of the top of the pole.

i) Sweep — Pole shall be free from short crooks. A pole may have sweep in one plane and in one direction, provided that, a straight line joining the surface of the pole at the groundline and the edge of the pole at the top in 90 % or more of the inspected lot, shall not be distant from the surface of the pole at any point by more than 25 mm for each 1.5 m of length between these points (see Figure 1). In the rest of the inspected lot (i.e. 10 %), the poles may have a maximum deviation of 25 mm for each 1.5 m of length measured as above.

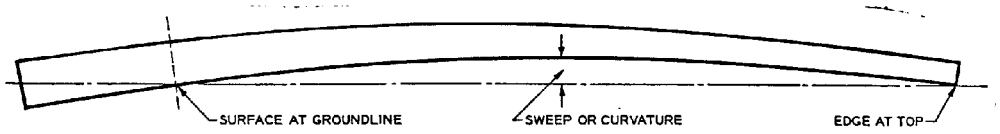


Figure 1 — Measurement of sweep in one plane and one direction

j) Slope of grain — Spiral grain shall not exceed a slope of 1 in 6.

k) Slits and checks — In the top, a slit or a combination of two single checks; each check terminating at the pith centre and separated by not less than 1/6 of the circumference, having one or both portions located in a vertical plane with 30° of the top bolt hole shall not extend downward along the pole more than 150 mm and in the butt, a slit or combination of two single checks shall not extend upward along the pole more than 600 mm. All other combination of checks or a split shall not extend downward along the pole more than 300 mm.

6 Dimensions and permitted tolerances

6.1 Size of poles

This East African Standard shall be applicable to preferred dressed sizes of poles as given in Table 1 and Table 2.

NOTE All circumferences and diameters are applicable to debarked and seasoned or dry poles.

6.2 Diameters

Many nominally round poles have a natural elliptical cross section; the diameter measurements of such poles shall be of the minor axes

6.3 Length

Length shall be measured between the extreme ends of the pole or in case of a pole with a sweep (see 5.2.3(i)); length shall be measured to the short end of the slope.

6.4 Tolerances

Poles shall be not more than 75 mm shorter or 150 mm longer than the nominal length (see 7.2).

6.5 Classification

The true diameter class shall be determined by measuring the diameter at 1.5 m from the butt end. This dimension will determine the true class of a pole, provided that its top diameter (measured at the minimum length point) is large enough.

Table 1 — Preferred dimensions of poles for power distributions

Pole class	Pole length m	Min. pole top diameter mm	Max. pole top dia mm	Min. dia 1.5 m from butt mm	Groundline Distance from the butt m *
Light	9	150	175	200	1.5
	10	150	180	210	1.8
	11	170	190	220	1.8
	12	180	200	240	2.0
	13	200	220	250	2.2
Medium	9	170	190	230	1.5
	10	180	200	240	1.8
	11	190	210	250	1.8
	12	195	220	260	2.0
	13	200	230	270	2.2
	14	210	240	280	2.2
Stout	9	190	240	285	1.5
	10	190	245	295	1.8
	11	195	250	305	1.8
	12	200	250	320	2.0
	13	210	255	330	2.2
	14	220	260	340	2.2
* The figures in this column are intended for use only when a definition of groundline is necessary in order to apply requirements relating to scars, straightness, etc.					

Table 2 — Preferred dimensions of poles for aerial telecommunications

Pole class	Pole length m	Pole top diameter Min. mm	Pole top diameter Max. mm	Min. dia 1.5m from butt mm	Groundline distance from the butt * m
Light	6	90	120	120	1.2
	7	90	120	130	1.2
	7.5	90	120	135	1.3
Medium	7	120	140	150	1.2
	7.5	120	140	155	1.3
	8	120	140	160	1.5
Stout	9	130	150	175	1.5
	10	130	150	185	1.5
	11	130	150	195	1.9
* The figures in this column are intended for use only when a definition of groundline is necessary in order to apply requirements relating to scars, straightness, etc.					

7 Manufacturing requirements

7.1 General

Outer bark shall be removed from all poles and inner bark shall not be permitted. All poles shall be round with no excessive removal of the sapwood.

7.2 Taper

The taper in a pole from top to the butt shall not exceed 10 mm per meter of the length of a pole.

7.3 Cut of ends

The butts of the poles shall be cut perpendicular to the central axis with a tolerance of 50 mm across the sawn surface. The top of the pole shall be cut with an inverted "V" section, each side of the "V" having a 30° slope to the pole axis or flat top cut; 90°± 5° perpendicular to the central axis and shall be bound with anti-cracking plate.

7.4 Trimming

Knots on the pole surface, whether partially or fully grown and branch stubs shall be trimmed close. Trimming may be done by shaving machine or by hand.

7.5 Shaving

If shaving is used, the depth of cut shall not be more than necessary to remove inner bark and to trim all branch stubs and overgrown knots smoothly and closely. There shall be no abrupt change in the contour of the pole surface between the groundline and the above ground sections. The lower 600 mm pole section may be trimmed to remove wood fibres causing butt flare, provided sufficient sapwood remains to obtain the minimum penetration requirements.

No sapwood shall be removed from the butt of the pole to 1 m above proposed ground level, the minimum sapwood thickness being 25 mm. The remainder of the pole should be trimmed to produce a rounded pole while maintaining a minimum sapwood thickness of 20 mm.

7.6 Drilling

Where practicable, poles shall be delivered predrilled to suit the different types of pole duties and configurations. Drilled holes shall be positioned at right angles to any pole top spilt. All drilling and fabrication shall be carried out before preservative treatment.

8 Stacking and preparation of poles at depots

All poles other than spruce shall be stacked in open formation, before and after dressing, on suitable skids so that the lowest timber of each stack is at least 250 mm above the ground. Sufficient dunnage or cross-timbers shall be used to distribute the total mass without imposing under strain on the poles at the lower layers. The surface of the seasoning ground under and around the stacks shall be well drained and kept free from bark, shavings, grass and weeds.

9 Moisture content

Preservation of species other than spruce shall not take place until the average moisture content of each batch of the poles is reduced to not more than 28 %. No individual pole in the batch shall have a moisture content greater than 30 %.

The moisture content of the poles shall be determined prior to treatment by the oven test method or any other suitable method in accordance with the method described in annex B of EAS 323.

Poles for preservation shall be protected against heavy and continuous rain.

10 Poles preservation

The following species shall be pressure impregnated with creosote in accordance with EAS 323 or with a copper/chromium/arsenic (CCA) mixture in accordance with EAS 324.

- Red wood
- Corsican pines
- Douglas fir
- Dunkeld larch
- Lodgepole pine
- East African pencil cedar
- Eucalyptus

When pressure impregnating in accordance with EAS 323, the coal tar creosote used shall comply with type 2 and the average net retention of preservative in a charge shall be not less than 115 kg/m^3.

When pressure impregnating in accordance with EAS 324, the copper/chromium/arsenic mixture shall have a solution strength not less than 3 % (m/v) and the average net retention of preservatives in a charge shall be not less than 14 kg/m^3

Since sitka spruce cannot be treated with preservative in the normal way by the procedures described in EAS 323 and EAS 324, it shall be treated using a suitable modification of one of the procedures described in those standards to meet the requirements for full sapwood penetration and net retention.

11 Marking and labelling

11.1 General

Each pole shall have a gouge or brand mark at least 50 mm long, 5 mm wide and 3 mm deep placed 3 m from the butt and shall be marked with certain information in characters not less than 25 mm high and gouged or branded 5 mm wide and 3 mm deep. Spacing between codes shall be between 20 mm and 30 mm. The coded information shall include the following:

a) the name or mark of the preserver and/or the depot supplying the pole;

b) pole length in metres;

c) pole class (*L* for light, *M* for medium and *S* for stout);

d) Species code, i.e.

CP Corsican pine,

SP Scots pine or Redwood,

EA East African pencil cedar,

SS Sitka spruce,

LP Lodgepole pine,

LD Larch Dunkeld,

E Eucalyptus and

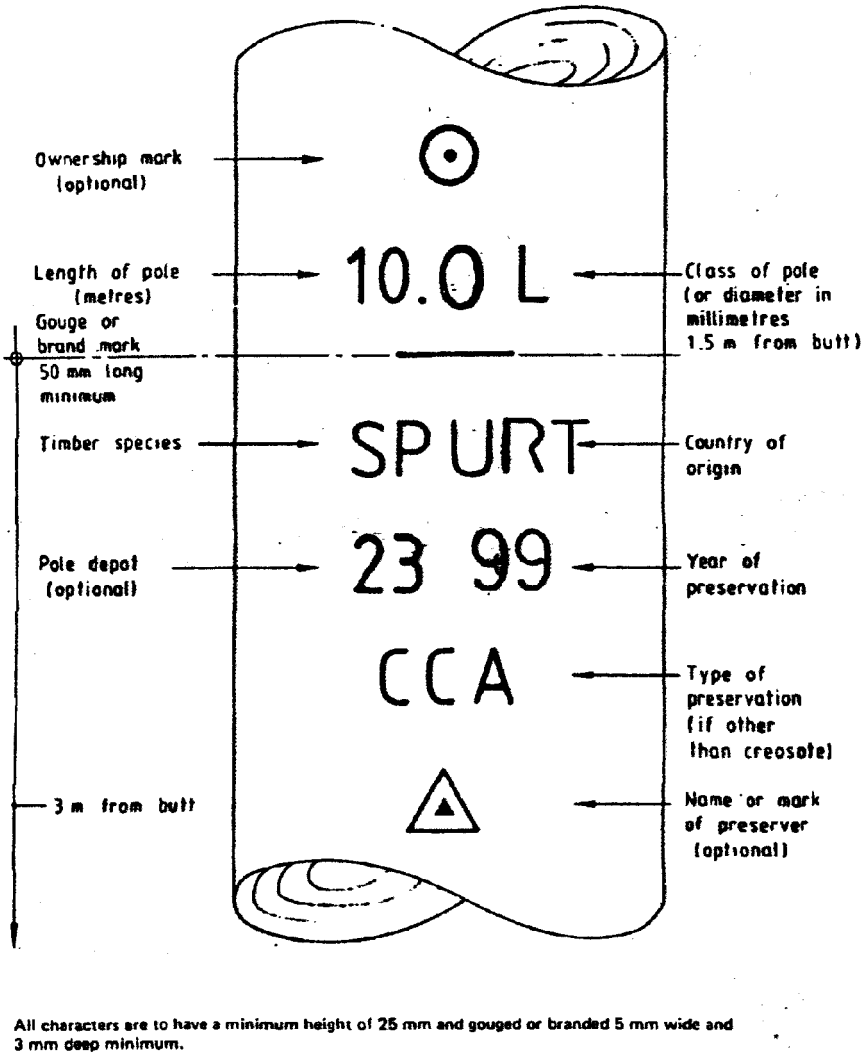
e) last two digits of year of preservation.

The layout of these markings is shown in Figure 2.

Pole treated with creosote shall carry no other distinguishing mark. Appropriate letters shall denote other forms of preservation.

11.2 In the butt end

Each pole shall also have the pole length in metres and the *pole class* impressed on the pole butt.



All characters are to have a minimum height of 25 mm and gouged or branded 5 mm wide and 3 mm deep minimum.

Figure 2 — Markings layout

Annex A

Stayblocks and brace blocks

A.1 Materials requirements

Preferably stayblock and brace blocks shall be sourced from Mninga (*angolensis pterocarpus* angolensis) or Mtundu *(croton macrostachys)* but species listed in 5.1 may be used with specified preservative treatment.

A.2 Dimensions and characteristics

The stayblocks and brace blocks may be cut from sawn timber or from the round timber to produce rectangular, round or half round sections, whichever is economical, from the available material. Stayblocks and brace blocks shall be in accordance with Figure 3 and figure 4 respectively; and with the following requirements:

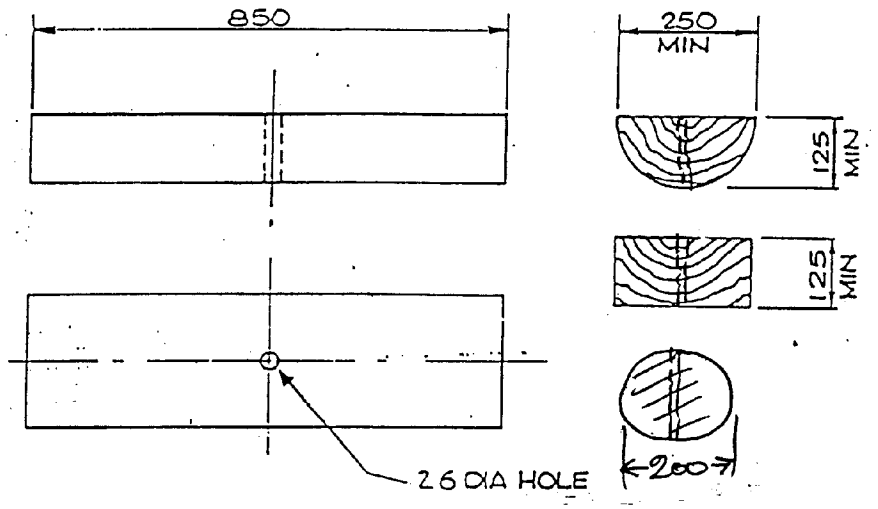
A.2.1 The width of stayblocks and brace blocks shall be as near as possible to the dimension stated but must be within the range of 200 mm to 300 mm. If it is convenient to cut stayblocks and brace blocks from larger size poles, then the side shall be cut as indicated in the figures to reduce the maximum width. The longitudinally cut surfaces of stayblocks and brace blocks shall be straight and clean-cut, while annual rings shall be approximately parallel to the wide face. Planing is not required. Wain is permitted on one face. The blocks shall be bored as indicated in Figures 3 and 4.

A.2.2 These stayblocks and brace blocks have been designed for a minimum failing load and resistance to uplift of 65 kN. Uplift calculations are based on installation of sand of density of 550 kg/m^3, which is considered to be representative of average worst ground conditions, with a minimum angle between stay pole of 30°.

A.3 Preservative treatment

The blocks shall be treated by either coal tar creosote in accordance with EAS 323 or copper/chromium/arsenic mixture in accordance with EAS 324 after fabrication using Bethel/Rueping processes.

Type 1



Type 2

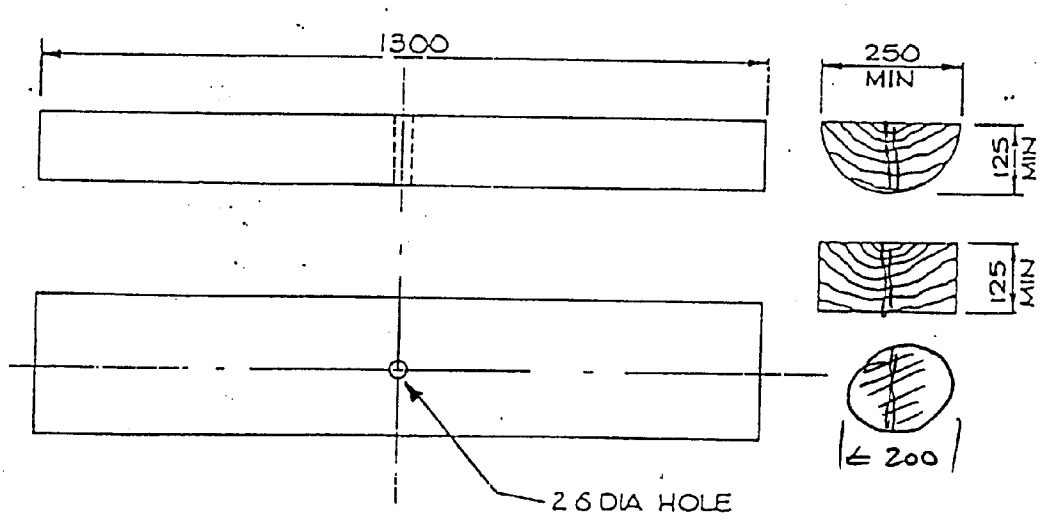


Figure 3 —Stayblocks dimensions

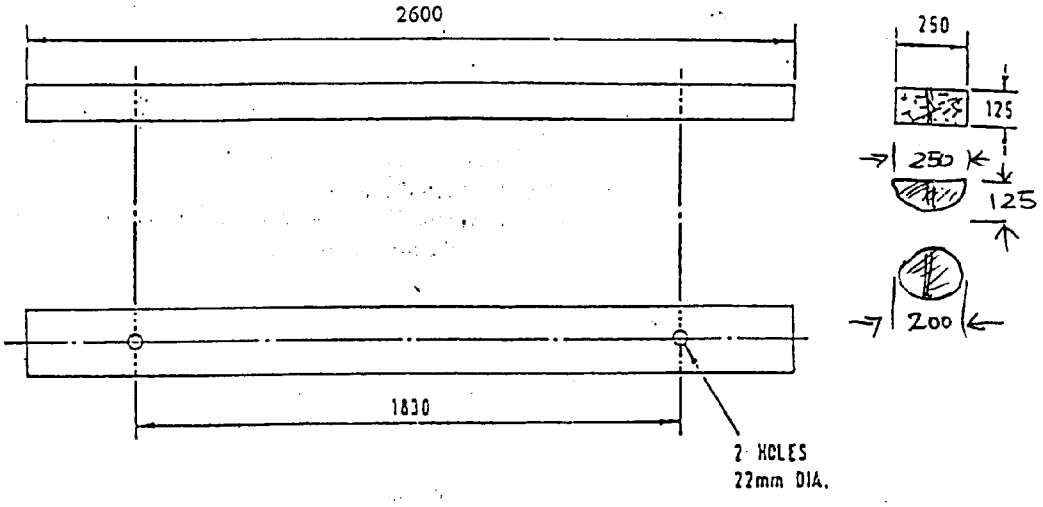


Figure 4 — Brace blocks dimensions