

CEB STANDARD 009-1 : 1995

Specification

for

**GALVANIZED "D" BRACKETS,
SHACKLE STRAPS, COTTER PINS & SPLIT PINS
FOR OVERHEAD LT DISTRIBUTION LINES**



CEYLON ELECTRICITY BOARD

SRI LANKA

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FOR OVERHEAD LT DISTRIBUTION LINES***

CEB Standard 009-1 : 1995

CEYLON ELECTRICITY BOARD

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CONTENTS

	Page
1. Scope	2
2. Applicable Standards	2
3. Basic Features	2
4. Additional Requirements	4
5. Information to be supplied with the Offer	4
6. Technical Literature and Drawings	5
7. Inspection and Testing	5
8. Sample Study	6
9. Annexure	6

SPECIFICATION FOR GALVANIZED "D" BRACKETS, SHACKLE STRAPS, COTTER PINS AND SPLIT PINS FOR OVERHEAD LT DISTRIBUTION LINES

1.0 SCOPE

This specification covers the design manufacture and testing of galvanized "D" Brackets Shackle Straps, Cotter Pins and Split Pins for use in the LT overhead power line system of the CEB.

2.0 APPLICABLE STANDARDS

The items supplied shall be in accordance with the latest editions of the standards specified below.

- | | | | |
|----|----------------|---|--|
| a) | B.S 4360 | - | 1990 Weldable structural steel |
| b) | B.S 729 | - | 1971 Hot dip galvanising on iron and steel. |
| c) | SLS 949 Part V | - | 1992 Dimensions of Hot Rolled Steel Bars for Structural & General Engineering Purposes |

3.0 BASIC FEATURES

3.1 General

3.1.1 Quality

The material shall be sound and free from any internal and external defects or surface flaws which might preclude its use for the purpose for which it is intended.

3.1.2 Grade of steel

The steel used for fabricating "D" Brackets, Shackle Straps and Cotter Pins shall be of grade 43DD and their chemical composition shall be as given in table 14 of BS 4360.

3.1.3 Mechanical properties

The minimum Tensile Strength, Yield Strength and Elongation of the Steel used for the fabricating "D" Brackets, Shackle Straps and Cotter Pins, shall be as given in table 15 of BS 4360.

3.2 Design

The design of the "D" Brackets, Shackle Straps, Cotter Pins and Split Pins shall be suitable for use with 90 mm dia. Insulators and the dimensions shall be as indicated in the Drawing No. DS/93/7606.

All items shall be smooth, corners rounded and free from sharp edges. All burrs shall be removed after shearing, drilling or punching and bending operations. The cut ends of the "D" Brackets and Shackle Straps shall be rounded off.

3.2.1 "D" Brackets

"D" Brackets shall be made out of 30 mm x 6 mm. Flat Iron bent at 90° as shown in Drawing No. D S/93/7606. The holes on the "D" Brackets shall be suitable to be used with 16 mm diameter cotter pin/bolt. The three sides of the "D" Bracket shall not be twisted and the cotter pin holes shall be in perfect alignment to enable the easy insertion of cotter pin/bolt.

3.2.2 Shackle Straps

Shackle Straps shall be made out of 30 mm x 6mm. Flat Iron according to drawing No. DS/93/7606. The holes on the shackle straps shall be suitable to be used with 16 mm dia. cotter pin/bolt.

3.2.3 Cotter Pins

Cotter Pins shall be of 16 mm dia. and 135 mm long suitable for use with "D Brackets and Shackle Straps as Insulator Pins in place of Insulator Bolts. It shall have a hexagonal/square/round head on the top and a 5mm hole at the bottom suitable for inserting the split pin specified in Clause 3.2.4, as per attached Drawing No. DS/93/7606.

3.2.4 Split Pins

Split Pins shall be 35 mm long, made of stainless steel or phosphor bronze, suitable for use with cotter pin specified in Clause 3.2.3 and as per attached Drawing No. DS/93/7606.

3.2.5 Galvanising

All Components of "D" Brackets, Shackle Straps and Cotter Pins shall be hot dip galvanised as per BS 729 and treated with Sodium Dichromate or Preton W20 solution immediately after galvanizing to prevent the formation of white rust.

The preparation for galvanizing and the galvanizing itself shall not distort or adversely affect the mechanical properties of the material.

All components shall be effectively galvanized to consist of a coating not less than 610 grammes of zinc per square meter of surface and the components shall have a galvanised coating of uniform thickness not less than 0.086mm.

3.2.5.1 Finish

The galvanizing coating on all items shall be smooth, continuous, uniform and free from flux stains and holes shall be free from nodules of spelter.

4.0 ADDITIONAL REQUIREMENTS

4.1 Markings

Manufacturer's identification marks and the letters "CEB" shall be punched on all "D" Brackets, Shackle Straps and Cotter Pins before galvanising.

4.1.2 Packing

"D" Brackets/Shackle Straps and Cotter pins shall be separately packed in palletised wooden boxes of max. dimensions of 1m x 1m x 1/2m.

Split pins shall be supplied in hardboard or wooden boxes and each box shall contain 100 Nos.

The item and the quantity shall be clearly marked on each box.

5.0 INFORMATION TO BE SUPPLIED WITH THE OFFER

Following shall be furnished with the offer.

- a) Completed schedule of Particulars.
- b) Complete dimensional drawings.
- c) Test certificates (for the steel to be used for the fabrication of the items offered) conforming to BS 4360.
 - i) Grade of steel and chemical composition
 - ii) Percentage elongation

- d) Test Certificate for galvanizing of the sample "D" Brackets/Shackle Straps and Cotter pins offered conforming to BS 729 from a recognized independent testing authority acceptable to CEB.

Failure to furnish the above particulars will result in the offer being rejected.

6.0 TECHNICAL LITERATURE AND DRAWINGS

The offer shall be accompanied with the dimensioned drawings of the items offered.

7.0 INSPECTION AND TESTING

The selected Bidder shall make necessary arrangements for inspection by the Engineer appointed by the Purchaser, and also to carry out the following tests and the Sampling Tests in his presence in the place of manufacture. One out of 1000 Nos, from each item will be tested.

- (a) Tensile tests
- (b) Elongation tests
- (c) Galvanising

7.1 Sampling Tests

Each batch of items supplied will be subjected to the following sampling Tests at the place of dispatch : -

- 1) Finish.
- 2) Checking whether the items are galvanised to the specified standard, minimum galvanized coating thickness of 0.086mm (610 g/m²) at any area.
- 3) Checking the adhesion of the galvanized coating
- 4) Checking of the specified dimensions and the correct alignment of the insulator bolt holes including pole bolt holes.

- 5) Checking whether the surfaces are smooth and burr free.
- 6) Chicking of the presence of white rust

The above Tests shall be carried out, for 25 "D" Brackets/Shackle Straps/Cotter Pins selected randomly from a batch of 5,000 numbers at the place of manufacture.

If two or more numbers of "D" Brackets/Shackle Straps/Cotter Pins are found defective then a second Sampling Test shall be carried out on the same basis. If two or more "D" Brackets/Shackle Straps/Cotter Pins are also found defective then the whole batch shall be rejected.

8.0 SAMPLE STUDY

Two Samples (non returnable) of each item offered shall be furnished with the offer.

9.0 ANNEXURE

A - Schedule of Particulars

Annexure - A**SCHEDULE OF PARTICULARS**

(The following information shall be furnished with the offer.)

- (a) Grade of the Steel used for manufacture of
 - i) "D" Bracket
 - ii) Shackle Straps
 - iii) Cotter Pins

- (b) Minimum Tensile Strength of the Steel used for manufacture of
 - i) "D" Bracket
 - ii) Shackle Straps
 - iii) Cotter Pins

- (c) Minimum Yield Strength of the Steel used for manufacture of
 - i) "D" Bracket
 - ii) Shackle Straps
 - iii) Cotter Pins

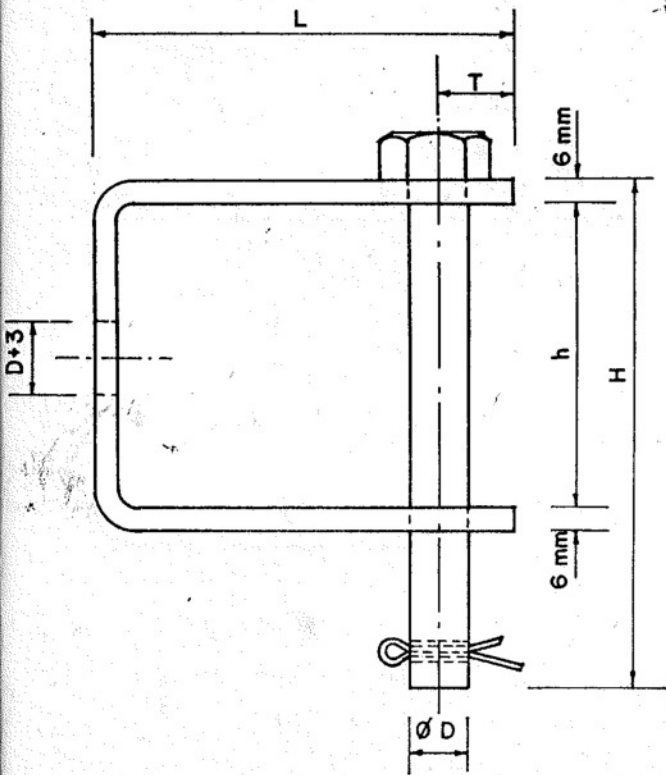
- (d) Minimum Elongation of the Steel used for manufacture of
 - i) "D" Bracket
 - ii) Shackle Straps
 - iii) Cotter Pins

- (e) Minimum Galvanized coating thickness
 - i) "D" Bracket
 - ii) Shackle Straps
 - iii) Cotter Pins

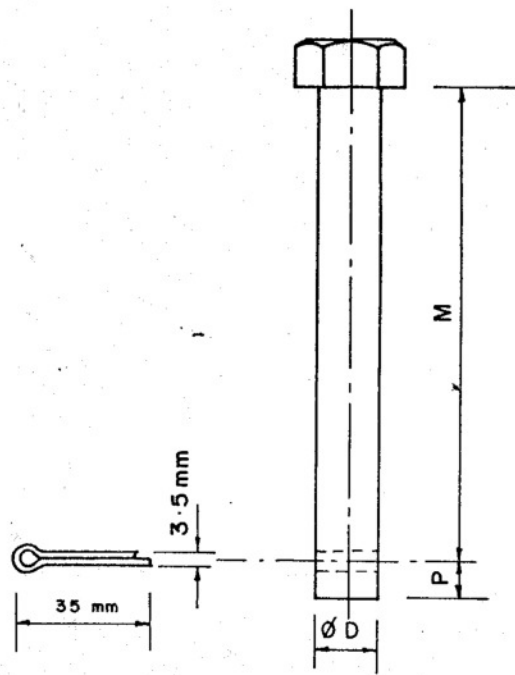
- (f) Weight of Galvanized coating per square meter
 - i) "D" Bracket
 - ii) Shackle Straps
 - iii) Cotter Pins

- (g) Name and country of manufacture of Steel

- (h) Name and country of manufacture of the items

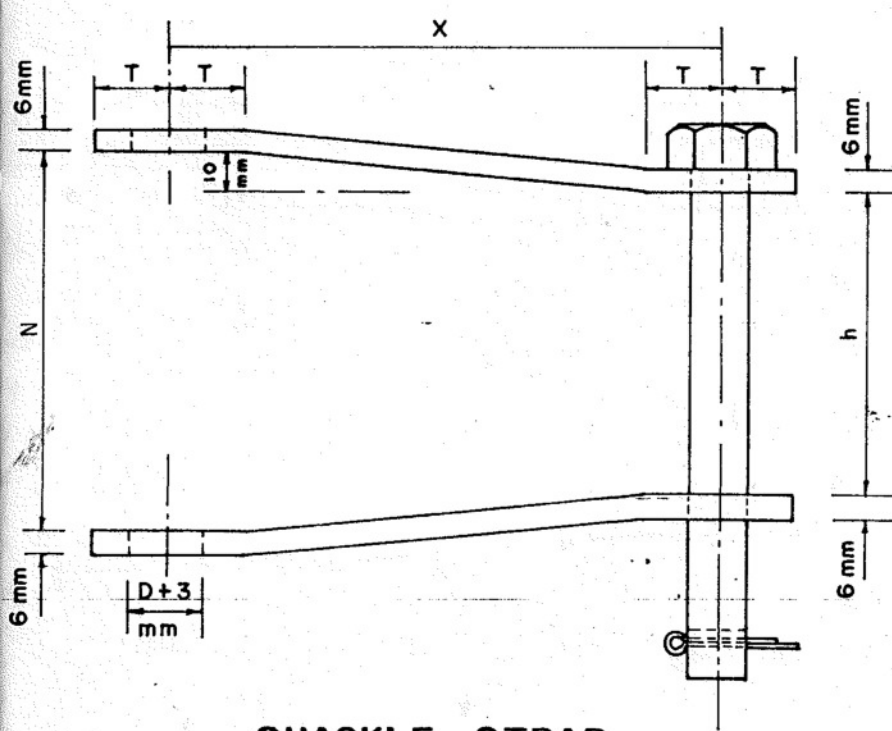


D - BRACKET



SPLIT PIN

COTTER PIN



SHACKLE STRAP

FLAT IRON SIZE 30mm. x 6 mm.

	FOR 63 mm INSULATOR	FOR 90 mm INSULATOR
H	95 mm	120 mm
h	55 mm	80 mm
L	90 mm	110 mm
T	15 mm	20 mm
D	12.5 mm	16 mm
M	85 mm	110 mm
N	75 mm	100 mm
P	10 mm	10 mm
X	143 mm	146 mm

Approved

Chairman
Specification committee

CEYLON
ELECTRICITY
BOARD

DISTRIBUTION STANDED

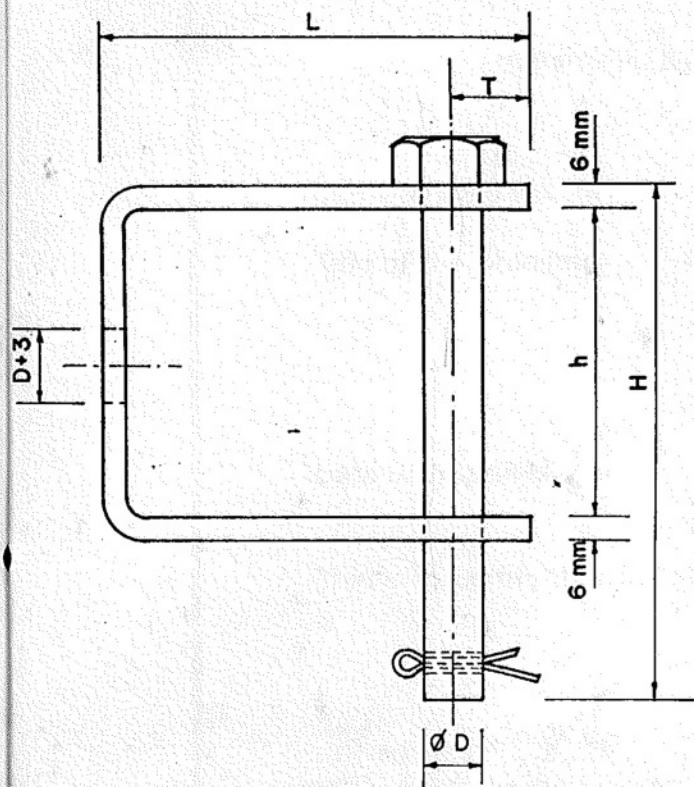
D-BRACKET, SPLIT PIN, COTTER PIN &
SHACKLE STRAP

Designed : <i>[Signature]</i>	Checked :	Scale : 1 : 200
Drawn : B. S. S. S.	Traced : Lalani	Date : 12-10-93
C. D. O. A.	C. E.	

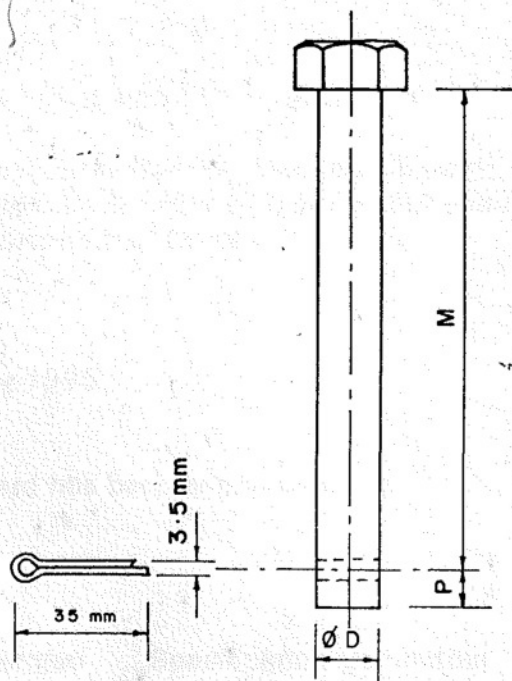
CENTRAL DRAWING OFFICE

DRAWER NO. 19 / 2

DRG. NO. DS / 93 / 7606

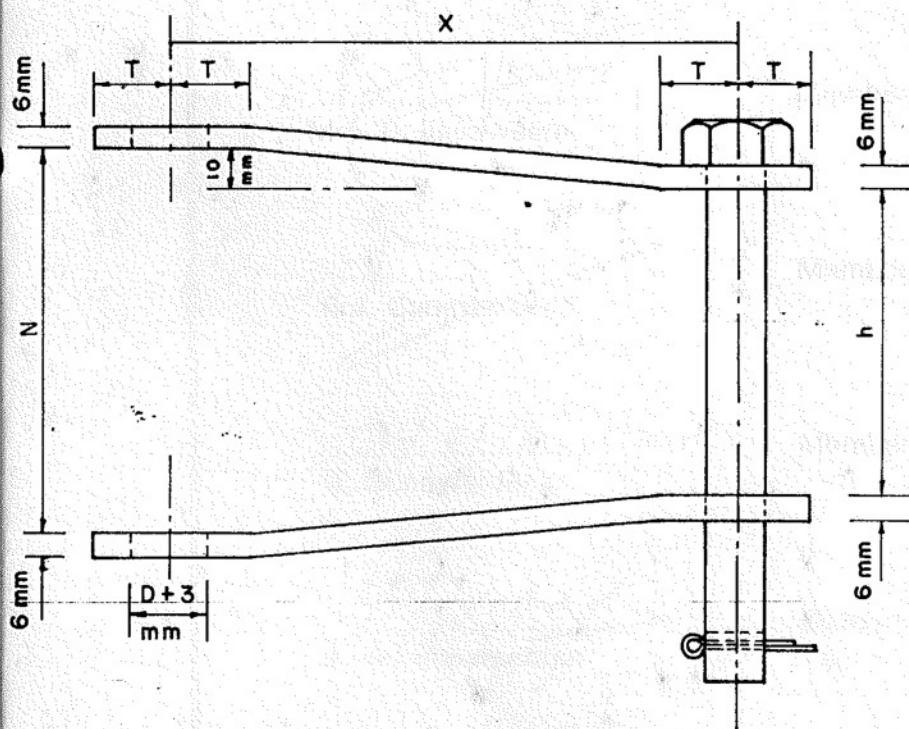


D - BRACKET



SPLIT PIN

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CEYLON
ELECTRICITY
BOARD

DISTRIBUTION STANDED

D-BRACKET, SPLIT PIN, COTTER PIN &
SHACKLE STRAP

Designed: *[Signature]* Checked: *[Signature]* Scale: 1:200
Drawn: *[Signature]* Traced: *[Signature]* Date: 12-10-93

C. D. O. A.

C. E.

CENTRAL DRAWING OFFICE

DRAWER NO. 19/2

DRG. NO. DS / 93 / 7606

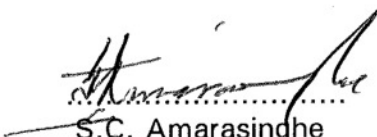
APPROVAL OF CEB STANDARDS

CEB Standard No. : *CEB Standard 009-1 : 1995*

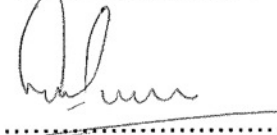
Title of the Standard : *Specification for "D" Brackets, Shackle Straps, Cotter Pins & Split Pins for overhead LT Distribution Lines*

Date of Approval : *May 1995*

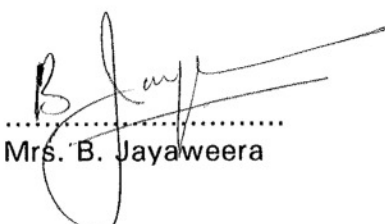
This is to certify that the above Standard has been approved by us.


.....
S.C. Amarasinghe

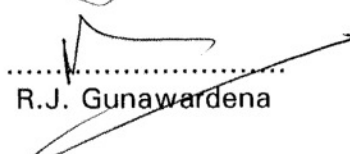
Chairman Specification Committee


.....
A.M. Tissera

Member Specification Committee


.....
Mrs. B. Jayaweera

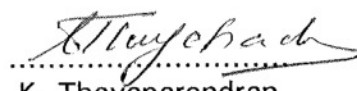
Member Specification Committee


.....
R.J. Gunawardena

Member Specification Committee

Out of the Island
.....
G. Gunawardena

Member Specification Committee


.....
K. Thayaparendran

Convenor Specification Committee

CEB Standard 009-1 : 1995 - "D" Brackets, Shackle Straps, Cotter Pins & Split Pins for Overhead LT Distribution Lines is approved for adoption in the CEB.


**General Manager,
Ceylon Electricity Board.**

25.5.31

Date :

8th October 1997

**THE PROPOSED AMENDMENTS TO THE CEB STANDARD 009 - 1 : 1995
SPECIFICATION FOR GALVANISED "D" BRACKETS, SHACKLE STRAPS,
COTTER PINS AND SPLIT PINS FOR OVERHEAD LT DISTRIBUTION LINES**

1. Clause 2.0 APPLICABLE STANDARDS

To add the following para to the clause;

***Tolerance on width and thickness shall be in accordance with SLS 949 Part V - 1992 -
Dimensions of Hot Rolled Steel Bars for Structural & General Engineering Purposes.***

2. Drawing No. "D&S/93/7606"

To replace the Drawing bearing No. "D&S/93/7606" by the Drawing bearing No.
"DS&S/97/7606".

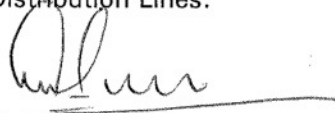
3. To replace the Drawing No. "D&S/93/7606" by Drawing No. **"DS&S/97/7606"** wherever it
appears in the Document.

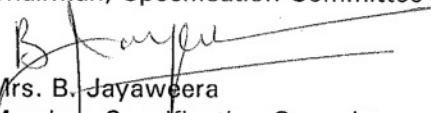
4. Clause No. 3.0 - Basic Features

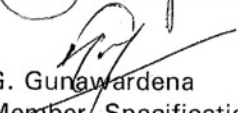
To add the following Clause to the end of the above clause.

**"3.2.6 - Fabricating Tolerances are indicated in the Drawing bearing No.
DS&S/97/7606"**

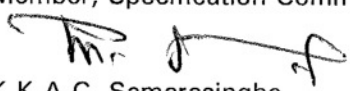
We recommend the above amendments to the CEB Standard 009 - 1 : 1995 Specification for
Galvanised "D" Brackets, Shackle Straps, Cotter Pins and Split Pins for Overhead LT
Distribution Lines.

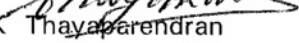

M. Tissera
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Out of the Country.
R.J. Gunawardena
Member, Specification Committee


K.K.A.C. Samarasinghe
Member, Specification Committee


K. Thayarajendran
Convenor, Specification Committee

The above amendments to the existing CEB Standard 009 - 1 : 1995 Specification for
Galvanised "D" Brackets, Shackle Straps, Cotter Pins and Split Pins for Overhead LT
Distribution Lines are approved.

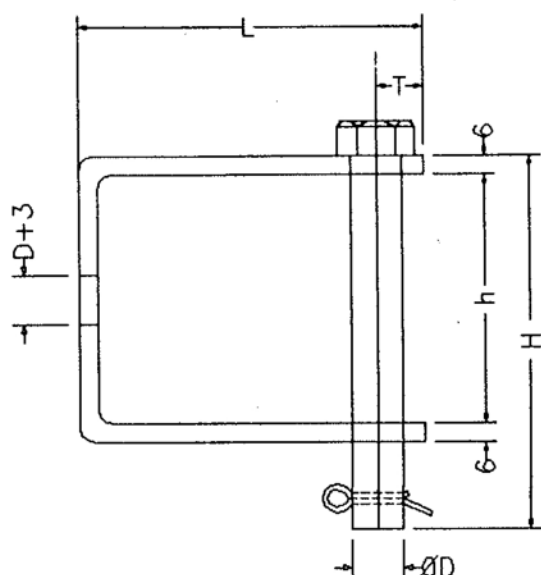

General Manager
CEYLON ELECTRICITY BOARD

amend/009_1

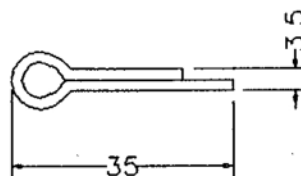
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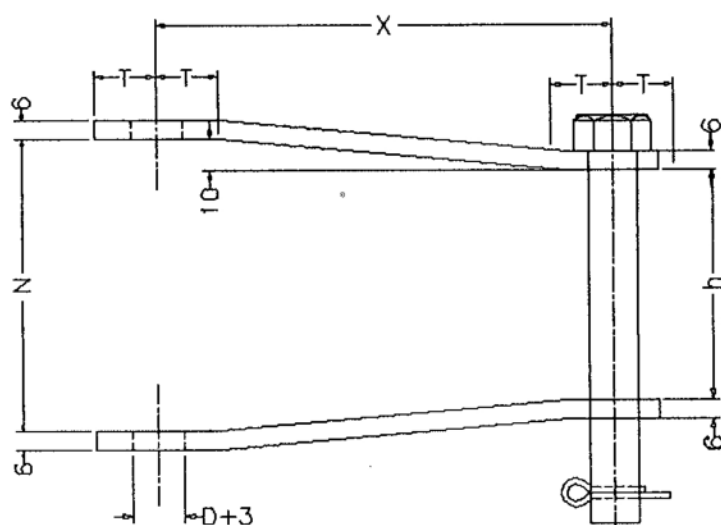
D BRACKET



SPLIT PIN



COTTER PIN



SHACKLE STRAP

* FLAT IRON SIZE 30 x 60

* ALL DIMENSIONS ARE IN mm.

	FOR 63 mm INSULATOR	FOR 90 mm INSULATOR
H	95 ± 2%	120 ± 2%
h	55 ± 2%	80 ± 2%
L	90 ± 2%	110 ± 2%
T	15 ± 2%	20 ± 2%
D	12.5 ± 2%	16 ± 2%
M	85 ± 2%	110 ± 2%
N	75 ± 2%	100 ± 2%
P	10 ± 2%	10 ± 2%
X	143 ± 1%	146 ± 1%

CEYLON
ELECTRICITY
BOARD

DISTRIBUTION STANDARDS & SPECIFICATIONS

SCALE :

D-Bracket, Split Pin, Cotter Pin & Shackle Strap

DRAWN : LALANI

DESIGNED

APPROVED

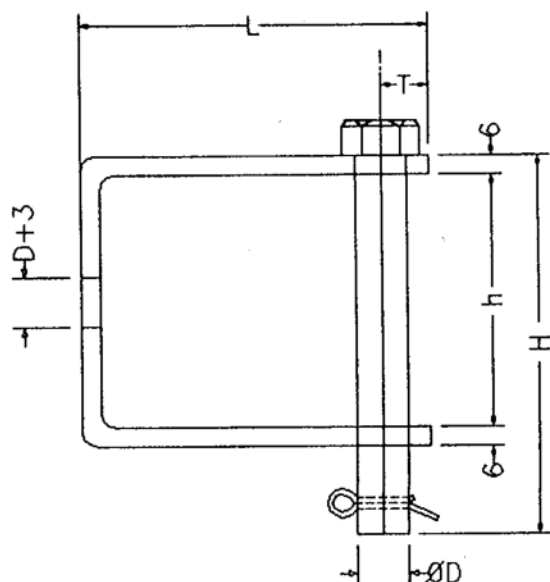
DATE : Oct. '97

Dist. Planning
Branch

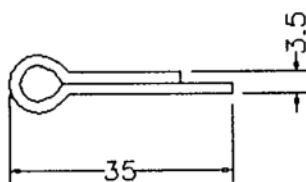
CHIEF ENGINEER (DS&S)

CHAIRMAN, SPECIFICATION COMMITTEE

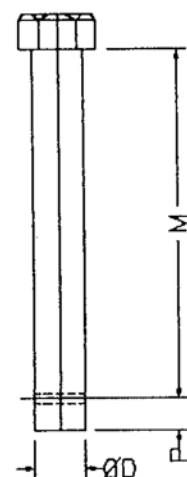
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CEB/DS&S/97/7606



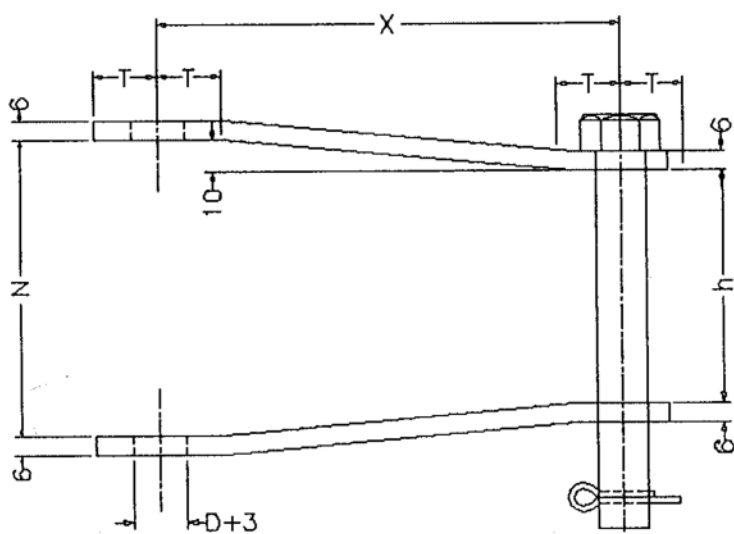
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CEYLON
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BOARD

DISTRIBUTION STANDARDS & SPECIFICATIONS

D-Bracket, Split Pin, Cotter Pin & Shackle Strap

DESIGNED

L. J. Fernando
CHIEF ENGINEER (DS&S)

APPROVED

[Signature]
CHAIRMAN, SPECIFICATION COMMITTEE

SCALE :

DRAWN : LALANI

DATE : Oct. '97

Dist. Planning
Branch

DRAWING NO:
CEB/DS&S/97/7606

Amendment Slip No. 1
effective from 16th Oct. 1997
to CEB Standard 009 - 1 : 1995

Specification for Galvanised "D" Brackets, Shackle
Straps, Cotter Pins and Split Pins for Overhead LT
Distribution Lines

REVISED TEXT

October 1997

1. Clause 2.0 APPLICABLE STANDARDS

To add the following para to the clause;

Tolerance on width and thickness shall be in accordance with SLS 949 Part V - 1992 -Dimensions of Hot Rolled Steel Bars for Structural & General Engineering Purposes.

2. Drawing No. "D&S/93/7606"

To replace the Drawing bearing No. "D&S/93/7606" by-the Drawing bearing No. **"DS&S/97/7606"**.

3. To replace the Drawing No. "D&S/93/7606" by Drawing No. **"DS&S/97/7606"** wherever it appears in the Document.

4. Clause No. 3.0 - Basic Features

To add the following Clause to the end of the above clause.

"3.2.6 - Fabricating Tolerances are indicated in the Drawing bearing No. DS&S/97/7606"