



TEST REPORT
STRUCTURAL ENGINEERING LABORATORY

PROJECT : REPORT ON TESTING OF CT PROPS

CLIENT : EXIMCORP INDIA PRIVATE LIMITED

MODEL NO. : CT PROPS 500 S/N

CONSULTANT : PROF. B N RAO

ASSISTED BY : MANIKANDAN L

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1. INTRODUCTION

M/s EXIMCORP INDIA PRIVATE LIMITED, CHENNAI had requested Structural Engineering Laboratory, IIT Madras, to carry out compression tests on CT props. The test was conducted under the guidance of undersigned in Structural Engineering Laboratory, IIT Madras. This report deals with the details of the test, observations made and the results obtained from the tests.


2. DESCRIPTION OF SPECIMENS

Table 1. Details of Telescopic CT Prop – 1 Specimen

Sl. No.	Type	Testing Condition	Qty	Length (m)
1	CT PROPS	Fully Closed Condition	1 No's	2.80
	500 S/N	Fully Extended Condition	2 No's	5.05

The telescopic CT prop consists of two pipes (inner and outer) with provision to adjust the height. The prop consists of endplates which are fixed at right angles to one end of inner and outer tube and there is a threaded portion on the top of base pipe, which is used to adjust the height. A slot is provided in the threaded portion for the locking pin, which is fastened using a collar nut. The prop has a coarse adjustment with the pin inserted into holes in the inner tube and a means of fine adjustment using the threaded collar. Details of typical prop specimen is shown in Figure 1.




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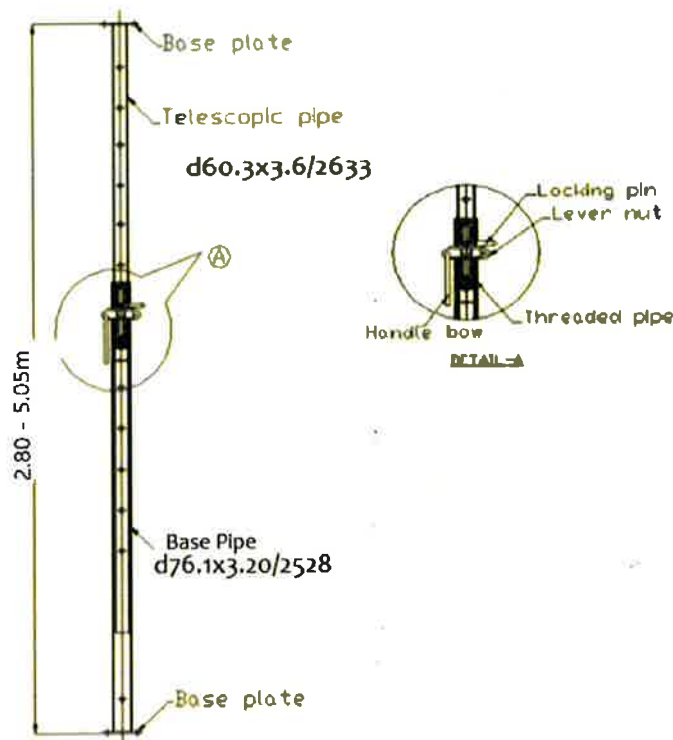


Fig. 1 – Description of the Specimens

3. TEST SET-UP

A typical test set-up was prepared for partially extended up to different length of 2.80 (FC) and 5.05 (FE) m. The axial load was applied through a compression testing machine (capacity 6000 kN) and was measured using load cell (capacity 500 kN). As per client requirement, the test was carried out with single specimen for each condition (height). At the base of the prop, steel square plate of size 450 mm length and thickness of 20 mm is placed above the load cell. Test photographs are given in annexure I. The deflections of prop were measured using a LVDT (Linear Variable Differential Transformer). All the measuring devices were well calibrated at the time of testing as per standards.





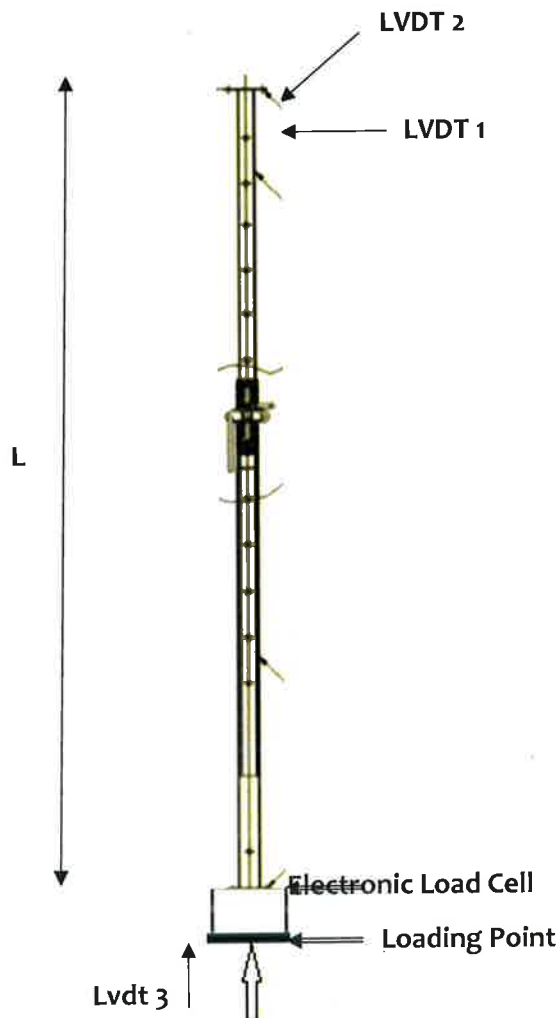
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4. TEST PROCEDURE

The load was applied gradually with a load control system which was monitored using load cell. The load was increased until the failure of specimen. The load at failure and the mode of failure for each specimen were observed and tabulated in Table 2. A typical test set-up of fully extended prop is shown in Figure 2.



Where,

l - Actual extension length of the prop

Fig. 2 – Typical Test setup



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5. CT PROPS 500 S/N

a) Data from Manufacturer

Sl. No	Part Name	Dimensions
1	Base pipe	d76.1x3.20/2528
2	Threaded pipe	d76.1x3.60/206
3	Telescopic pipe	d60.3x3.6/2633
4	Base plate	140/140/8
5	Lever nut	d154/41
6	Handle bow	202/20/10
7	Locking pin	d14/566

The props are adjustable telescopic props which consists of a base pipe and a telescopic pipe. The measured diameters of the base pipe and telescopic pipe are 76.1 mm and 60.3 mm, respectively and the thickness of the base pipe and telescopic pipe are 3.20 mm and 3.6 mm, respectively.

The height adjustment of telescopic props is done with the help of locking pin and the holes on the telescopic props. Details of actual props specimen in axial compression are shown in Figure 3.



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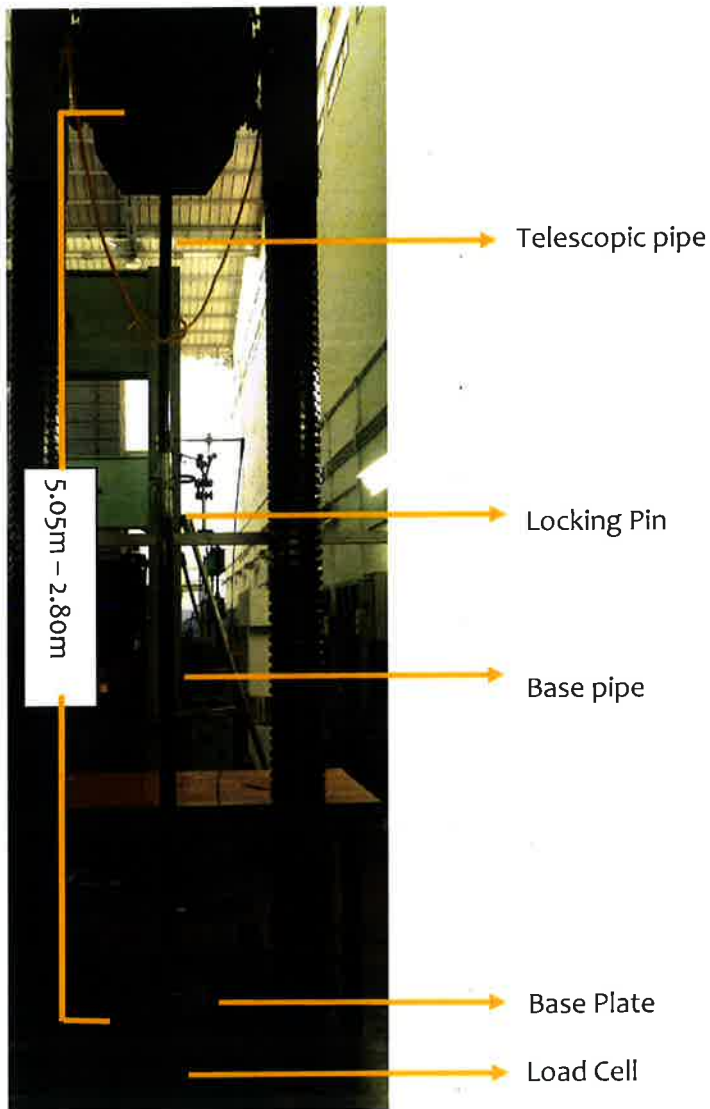


Fig. 3. – Actual Test Setup and Details for CT Props



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6. Test Results:

The results of the axial compression test on the four specimens are tabulated below. The load vs. deformation curve were plotted in Annexure II.

Table 2. Failure Load of Props

Sl. No.	Props Condition (m)	No. of Trails	Failure Load (kN)	Description of Mode of Failure
1	2.80 (FC)	T1	258.90	The ultimate failure was due to Pin failure as shown in Figure 4. There was no evidence of failure of lever nut and no buckling failure in the telescopic pipe.
4	5.05 (FE)	T1	48.55	The ultimate failure was due to buckling failure of CT prop as shown in Figure 5. There was no evidence of failure of lever nut, locking pin and threads in the collar location and no locking pin bend fail in the telescopic pipe.
		T2	48.24	

Where,

FC – Fully Closed Condition, FE – Fully Extended Condition

Note:

- The results relate only to the items tested
- Report shall not be reproduced, except in full, without the written approval of the lab
- Any correction invalidates this report

CONCLUSION

The failure load of fully extended 5.05m high of CT 500 SN props was obtained in the range of 48.22kN to 48.55kN with an Average of value of 48.39 kN The failure load of fully collapsed 2.80m high CT 500 SN props was obtained as 258.90 kN



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The failure of the specimens Occurred by buckling. The results are depicted in the load deflection Plots. The fully extended 5.05 m high props failed by buckling of Inner pipes and fully closed 2.80m high props failed by bending of pins.

According to clause 16.9.4 of BS 5975 – 2008, a minimum factor of safety against collapse of 2 is to be applied. Hence safe load for fully extended 5.05m high CT 500 SN props , based on the present tests carried out on 2 samples may be taken as 24 kN and safe load for fully Collapsed 2.80m high CT 500 SN props , based on the present tests carried out may be taken as 129 kN

Annexure I



Fig. 4. A view of Collar nut and Pin failure



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Fig. 5. A view of buckling failure

Annexure II

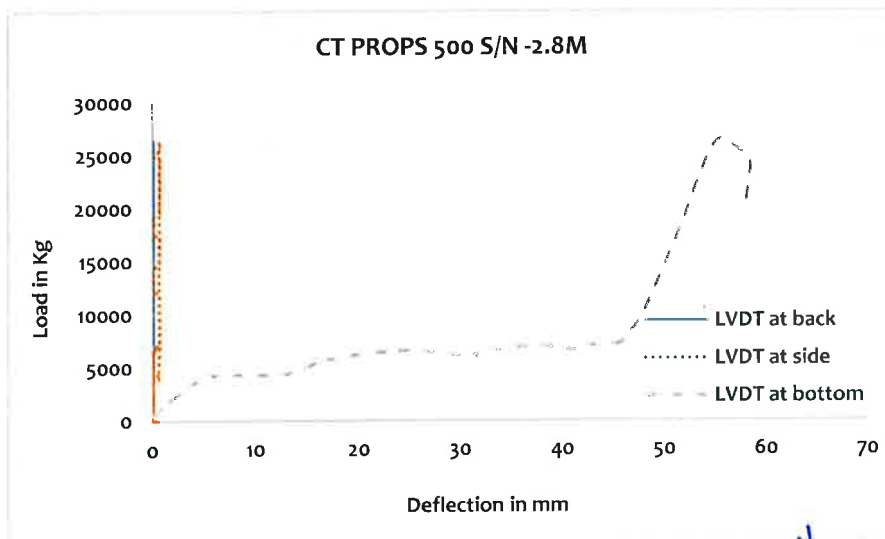


Fig. 6. Load vs. Deformation for 2.80 m height



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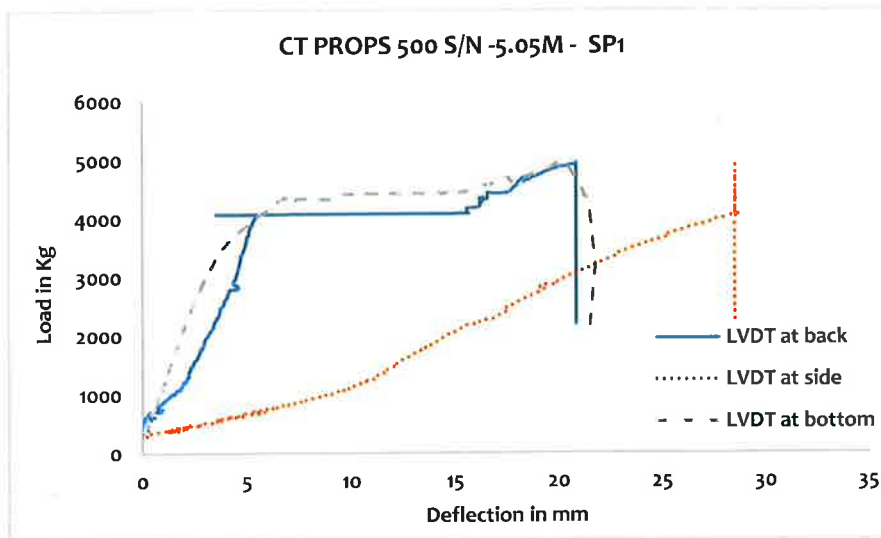


Fig. 7. Load vs. Deformation for 5.05 m height

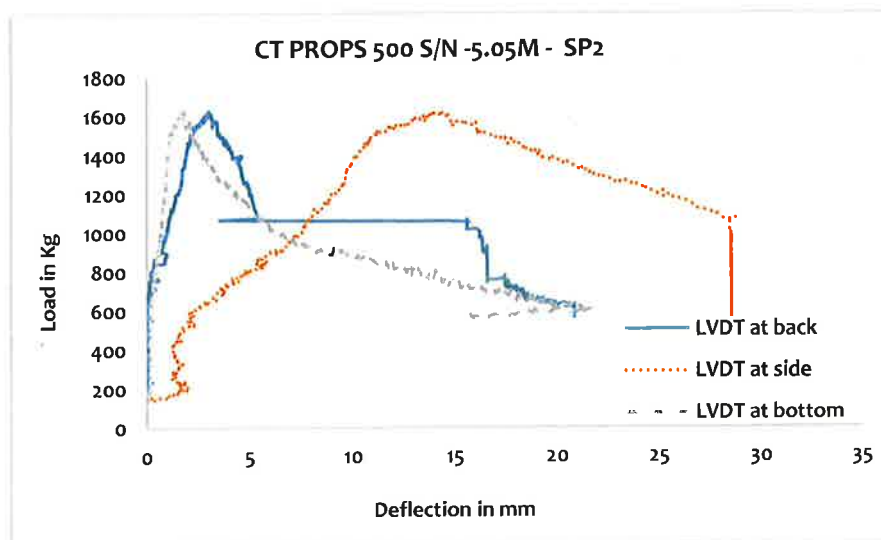


Fig. 8. Load vs. Deformation for 5.05 m height


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