TEST REPORT
STRUCTURAL ENGINEERING LABORATORY

PROJECT : **REPORT ON TESTING OF CT PROPS**

CLIENT : **EXIMCORP INDIA PRIVATE LIMITED**

MODEL NO. : **CT PROPS 410 S/N**

CONSULTANT : **PROF. B N RAO**

ASSISTED BY : **MANIKANDAN L**

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DEPARTMENT OF CIVIL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI – 600 036

DATE: 13-02-2019

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LABORATORY TEST REPORT

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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 410 S/N	Fully Closed Condition	2 No's	2.43
		Fully Extended Condition	2 No's	4.18

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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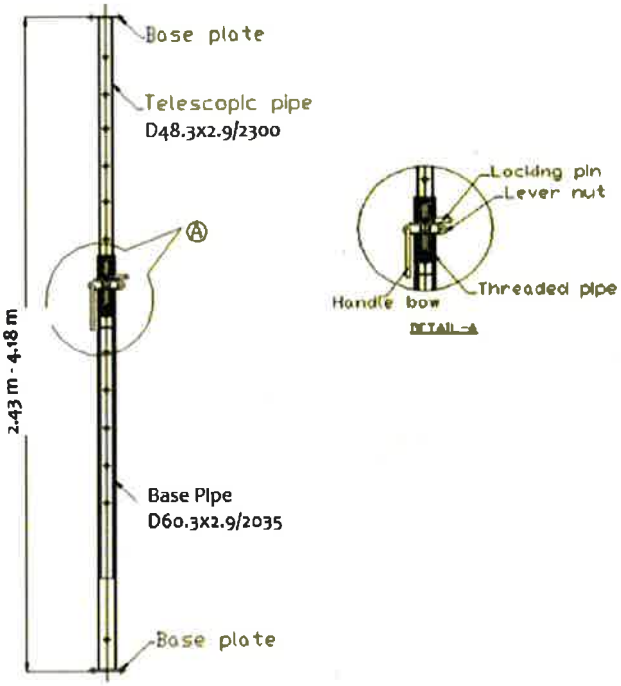

Fig. 1 – Description of the Specimens

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3. TEST SET-UP

A typical test set-up was prepared for partially extended up to different length of **2.43 (FC) and 4.18 (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.

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.

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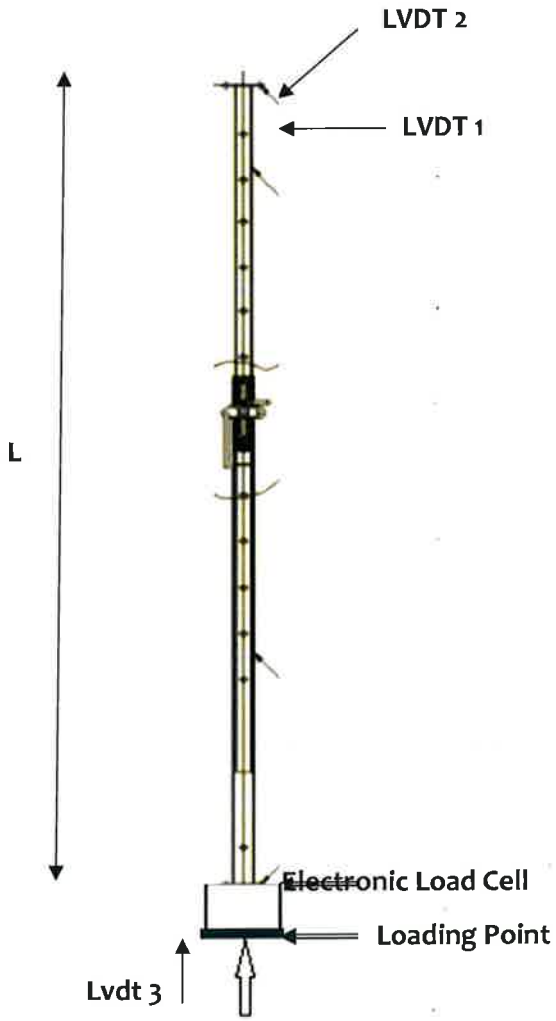

Fig. 2 – Typical Test setup

Where,

l - Actual extension length of the prop

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5. CT PROPS 410 S/N

a) Data from Manufacturer

Sl. No	Part Name	Dimensions
1	Base pipe	D60.3x2.9/2035
2	Telescopic pipe	D48.3x2.9/2300
3	Base plate	125/125/5
4	Threaded pipe	d60.3x3.6/240
5	Lever nut	d85x35
6	Handle bow	d12/218
7	Locking pin	d14/415

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 60.3 mm and 48.30 mm, respectively and the thickness of the base pipe and telescopic pipe are 2.90 mm and 2.9 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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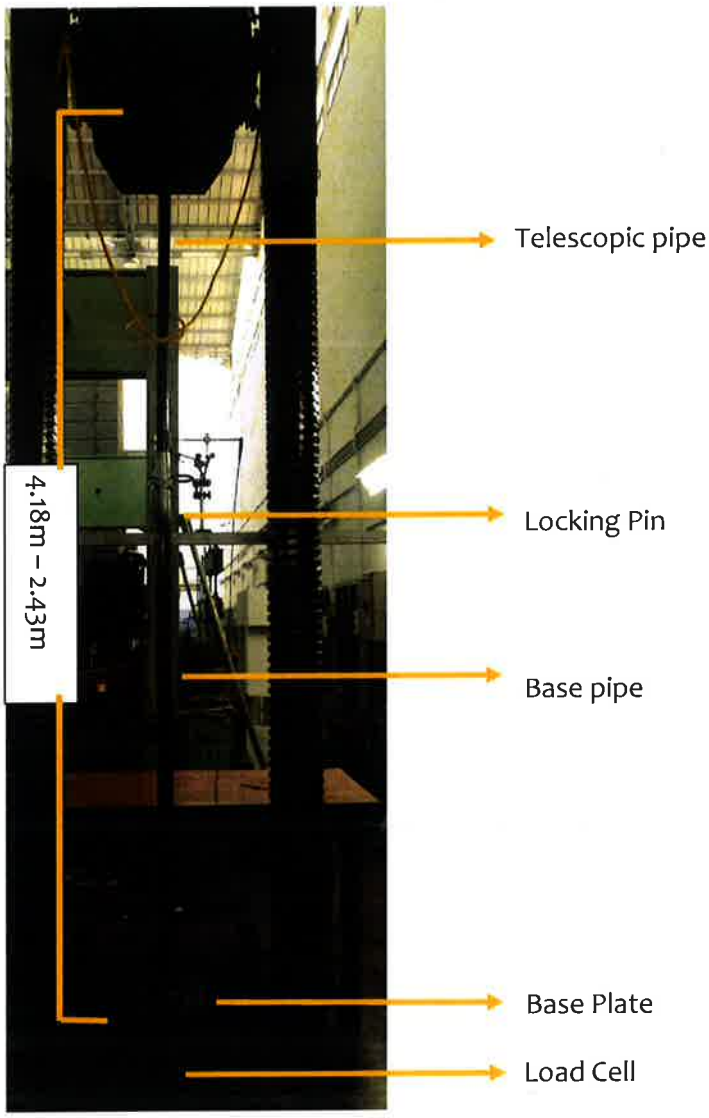

Fig. 3. – Actual Test Setup and Details for CT Props

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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	2.43 (FC)	T1	78.48	The ultimate failure was due to **Collar nut and Pin failure** as shown in Figure 4. There was no evidence of failure of lever nut and no buckling failure in the telescopic pipe.
		T2	65.82	
4	4.18 (FE)	T1	29.94	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	38.06	

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 4.18m high was obtained in the range of 29.94kN to 38 kN with an Average of value of 33.97 kN. The failure load of fully collapsed 2.43 m high CT 410 SN props was obtained in the range of 65. 82 kN to 78.48 kN with an average value of 72.15 kN.

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The failure of the specimens Occurred by buckling. The results are depicted in the Deflection Plots. The fully extended 4.13m high props failed by buckling of Inner pipes and fully closed 2.38m high props failed by bending of pins and collar nut failure. 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 4.18m high CT 410 SN props , based on the present tests carried out on 2 samples may be taken as 17 kN and safe load for fully Collapsed 2.43m high CT 410 SN props , based on the present tests carried out on 2 samples may be taken as 36 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

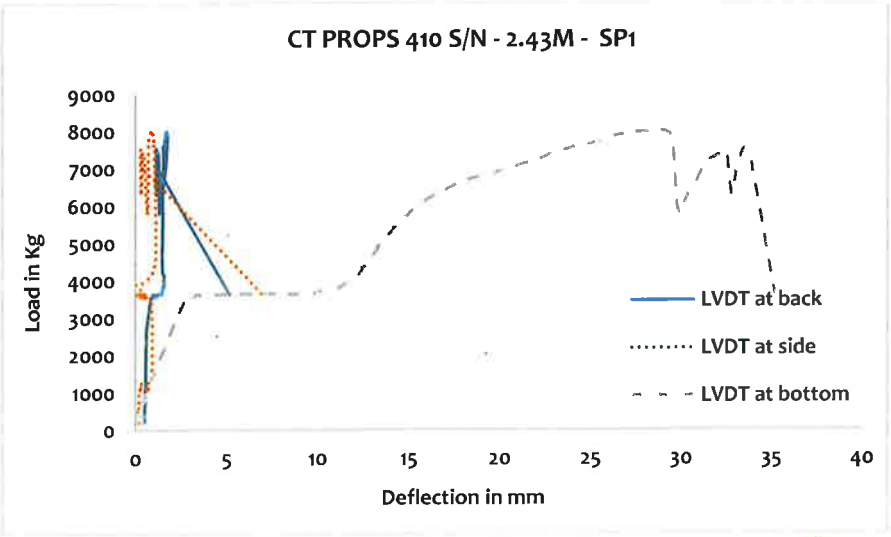

Fig. 6. Load vs. Deformation for 2.43 m height

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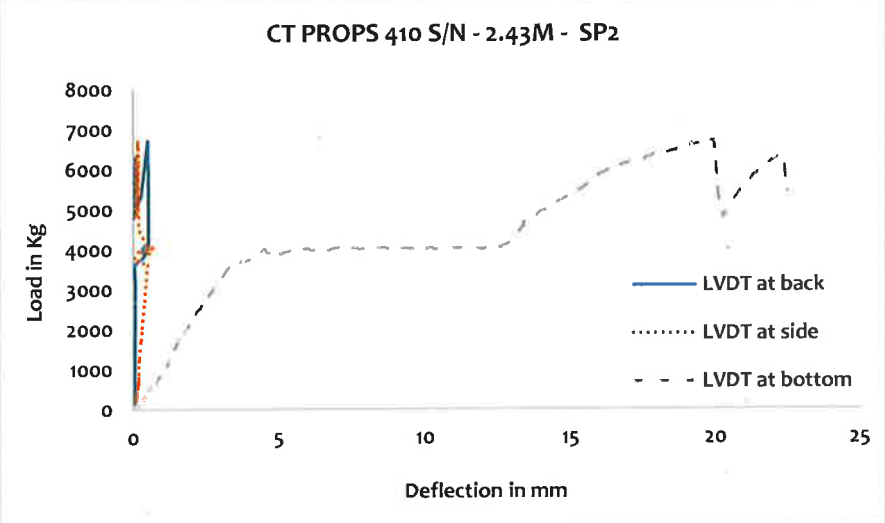

Fig. 7. Load vs. Deformation for 2.43 m height

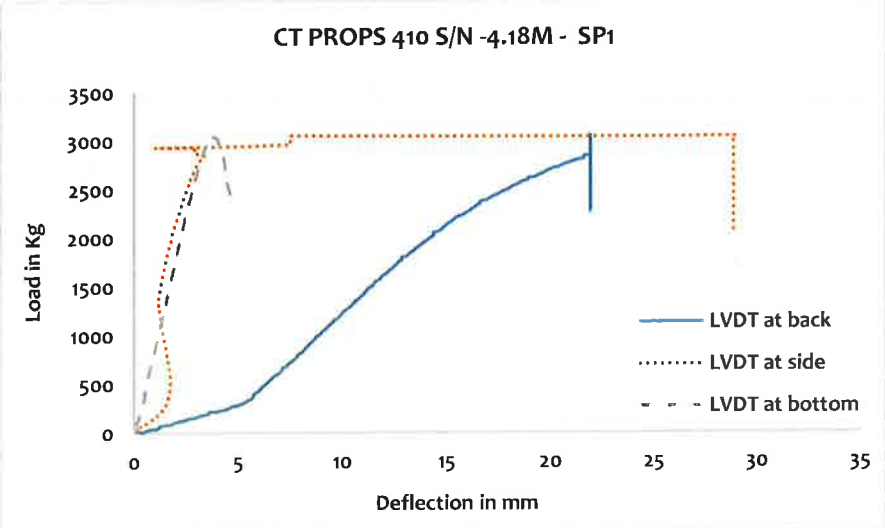

Fig. 8. Load vs. Deformation for 4.18 m height

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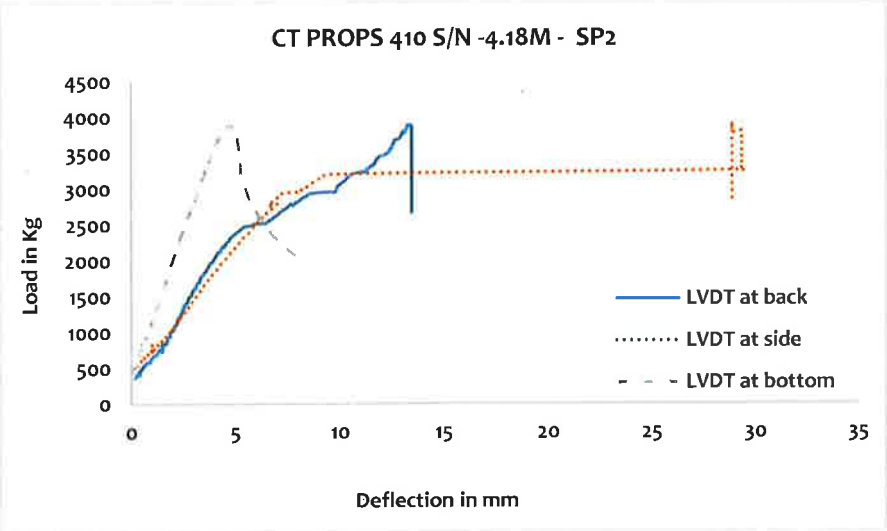

Fig. 9. Load vs. Deformation for 4.18 m height

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