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Publication details:
Report No. UNSW Water Research Laboratory Report No. 36

Publication Date:
1961

DOI:
https://doi.org/10.4225/53/578c33044aa96

THE UNIVERSITY OF NEW SOUTH WALES

WATER RESEARCH LABORATORY

REPORT No. 36

Pressure Tests on Pitch – Fibre Composition Pipes.

by

C.R. Dudgeon.

MARCH, 1961.

The University of New South Wales

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Report to Tyree Electrical Co.Pty.Ltd.

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1. INTRODUCTION

At the request of Tyree Electrical Co.Pty.Ltd., tests were undertaken to check the circumferential strength of samples of pitch bonded fibre pipes.

These pipes are manufactured by forming a fibre cylinder which is subsequently saturated with hot pitch. They are used overseas as sewer pipes and electrical ducts.

2. SAMPLES

Nine samples were supplied by the above mentioned company, whose representative reported that they had been cut from pipes imported from the U.S.A.

The samples were as follows:-

4" O.D., 1/4" wall thickness duct pipe - 3 off
4" O.D., 5/16" " " sewer pipe- 3 off
6" O.D., 1/2" " " " " - 3 off

All samples were cut to a length of 3"-0". The samples were prepared by Tyree Electrical Co.Pty.Ltd. and were tested as supplied.

3. TEST EQUIPMENT

To allow the tests to be carried out with as little delay as possible, a non-standard test rig was made up. It consisted of two steel end plates with rubber gaskets, a 1" dia. centre bolt, hand operated force pump and 0-300 p.s.i. and 0-1,000 p.s.i. pressure gauges connected to one of the end plates by 3/4" dia. piping.

4. TEST PROCEDURE

The sawn ends of the pipes were filed smooth and the pipes mounted one at a time between the end plates. The centre bolt was tightened sufficiently to prevent leaks at the ends of the pipe.

The pipe was filled with water, taking care to expel all air, and the pressure increased in 25 p.s.i. increments from 100 to 200 p.s.i. The pressure was then raised to the limit of the apparatus or failure, whichever occurred.

5. TEST RESULTS

Table I shows the results of tests on the nine samples. Note that samples 1,2,3,6,7,9 were tested on 16th February in the presence of the representative from Tyree Electrical Co. and samples 4,5,8 were tested at a later date.

All pipes withstood a pressure exceeding 200 lb/in^2. The pressure required to cause failure was considerably in excess of this value, and in many cases was not reached because of the development of leaks at the end seals.

TABLE NO.I

Sample No.	Description	Result of Test	
1	4" ø, 5/16" walls	350 psi	failed - split along pipe.
2	4" ø, 1/4" walls	450 psi	failed - split along pipe.
3	4" ø, 5/16" walls	550 psi	max. pressure not failed
4	4" ø, 5/16" walls	200 psi	exceeded
5	4" ø, 1/4" walls	200 psi	exceeded
6	4" ø, 1/4" walls	200 psi	exceeded. Air bleed screw fouled pipe and caused leak.
7	6" ø, 1/2" walls	200 psi	exceeded. Ends not square, causing leak at seal.
8	6" ø, 1/2" walls	200 psi	exceeded.
9	6" ø, 1/2" walls	370 psi	max. pressure not failed

6. COMMENTS

In evaluating the results several factors should be borne in mind:-

(a) Due to imperfections in preparation of the end surfaces, end effects caused by restraint at the end plates might have tended to cause the samples to withstand a higher pressure than longer lengths of pipe. However, as the sample length was 3 ft. compared with pipe diameters of 4 in. and 6 in. this effect should not have been large.

(b) Compressive loading in the samples caused by the tension in the centre bolt would tend to cause failure at pressures lower than in unrestrained pipes. Because the ends of the samples had not been turned square and smooth the tension in the through bolt had to be maintained at a high value to prevent leaks. This caused the pipe to bend in some cases.

(c) Pressures were not applied over a long period and creep effects were not studied.

7. CONCLUSIONS

The samples tested were capable of withstanding pressures exceeding 200 lb/in^2 despite unfavourable loading conditions.

No information was obtained on creep effects due to prolonged maintenance of high pressures or the adequacy of the taper joint system used with this type of pipe.