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LABORATORY NO. 747448-A

REPORT ON:

Test for Leakage of Dura-Seal Gasket (See Photo A)
Installation in Dura-Base Manhole

PURPOSE OF TEST:

To determine the degree of infiltration leakage past the seal, into the manhole, when a load is applied to the inserted pipe in a manner which forces the pipe to bottom in the gasketed hole.



METHOD OF TEST:

In order to make a proper alignment of pipe with the manhole it was decided to simultaneously test two manholes using one section of pipe with an end extending into each rubber gasketed manhole opening (See Photo B, C and D).



PHOTO B



PHOTO C

Dura Crete, Incorporated made the test set up which consisted of a frame work made of 6" I beams (See Photo B) on which the manhole bases rested, and which had a cross member at such a height which allowed installation of a hydraulic ram



PHOTO D

The load was applied along the top of the pipe through a 6" high wood beam which extended to within an inch of each manhole. The pipe was unsupported except for the 5 inches on each end bearing in the manhole openings.



PHOTO E

The load was applied by means of a hydraulic ram and pump combination which was calibrated in a laboratory testing machine prior to conducting the test (See Photos E and F).

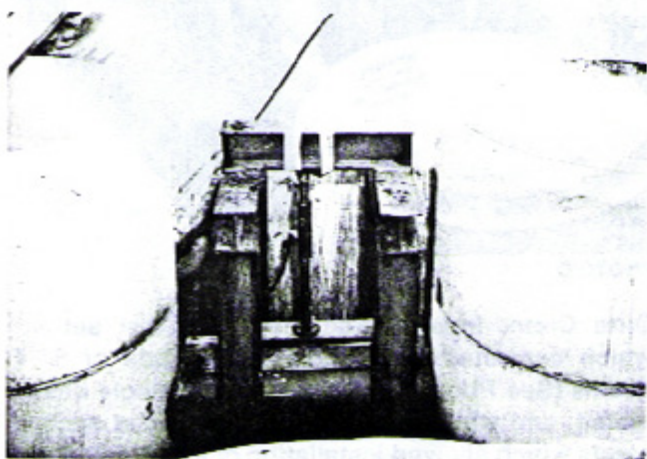


PHOTO F

For applying water pressure external to the set up, the Client dug a pit which was then lined with polyethylene and in which the complete test set up could be placed.

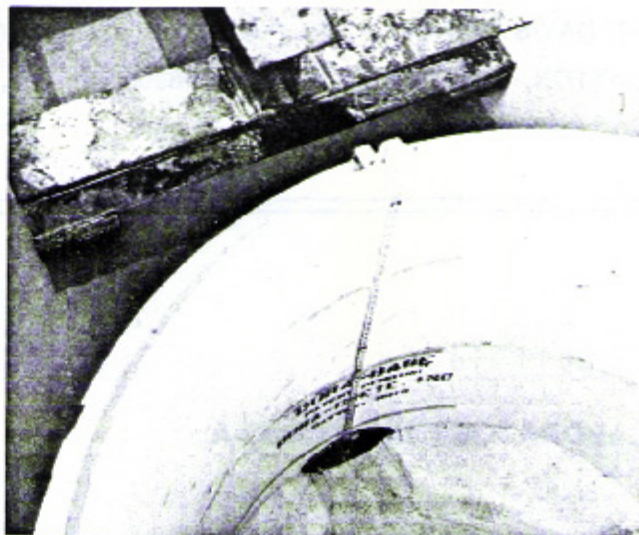


PHOTO G

The Client having assembled the test unit in the pit, we installed our ram for loading. Steel rules were attached for measuring vertical movement of the vitrified pipe within the manhole opening (See Photo I). Water was added in the pit to a depth of 4 feet above the bottom of the vitrified pipe after which testing was begun (See Photo H).



PHOTO H

The test was performed by applying the load in increments and recording the vertical movements of the pipe in each hole as well as making observations for leakage.

The loading ram having been centered midway between the manholes applied equal forces to each end of pipe.

SET UP CONDITIONS

Two (2) Lower Units	Dura-Base Manholes with Dura Seal Gaskets
Two (2) Upper Units	Manhole barrels
8" Vitrified Pipe	Extra Strength, Length cut to 53"
Pipe Supports	Gasketed Manhole Openings only
Loading	On top of pipe using a 6" wood beam
	41" long with force applied to center
Water Pressure	4 foot external head

Photographs of the set up and test were taken by photographer G. K. Biel for Dura Crete, Inc.

TEST RESULTS UNIT A				TEST RESULTS UNIT B			
FORCE, LB.	FORCE, LBS. ON EACH END	VERTICAL PIPE TOTAL MOVEMENT, INCHES	LEAKAGE	FORCE, LB.	FORCE, LBS. ON EACH END	VERTICAL PIPE TOTAL MOVEMENT, INCHES	LEAKAGE
0	0	0	None	0	0	0	None
300	150	0	None	300	150	0	None
400	200	1/64	None	400	200	1/64	None
500	250	1/64	None	500	250	1/64	None
720	360	1/32	None	720	360	1/32	None
1000	500	3/64	None	1000	500	3/64	None
1180	590	1/16	None	1180	590	1/16	None
1400	700	1/16	None	1400	700	1/16	None
1540	820	1/16	None	1640	820	1/16	None
1860	930	1/16	None	1860	930	1/16	None
2100	1050	1/16	None	2100	1050	1/16	None
2300	1150	1/16	None	2300	1150	1/16	None
3200	1600	5/64	1 pt./min (est.) (See Photo I)	3200	1600	5/64	None
3760*	1880	7/64	3 pts./min (est.)	3760*	1880	7/64	None
8880	4440 maximum		†	8880	4440 maximum		†

† Water in both units immediately, due to pipe break. Test unit after removing from the pit showed a full length break in pipe (See Photos J, and K).

* Loading was continued without interruption beyond this point with no estimates made of leakage in Unit A. Unit B showed no leakage prior to reaching the maximum load.



PHOTO I

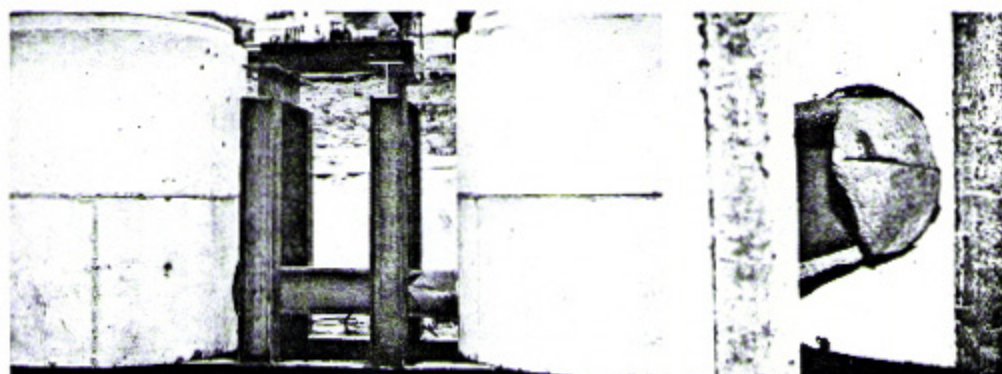


PHOTO J

PHOTO K

NOTE: A.S.T.M. (C-200) had the following minimum strength requirements for extra strength clay pipe.

Three Edge Bearing Method	—2200 lbs/linear ft.
Sand Bearing Method	—3300 lbs/linear ft.

This Laboratory has no data which would establish a strength relation between one of the standard test methods and the supporting of the pipe as used in this test.