UNSW SYDNEY

Head Losses in Self-sealing Pipe Coupling. October 1960.

Author:
Porman, B. W.; Vallentine, H. R.

Publication details:
Report No. UNSW Water Research Laboratory Report No. 26

Publication Date:
1960

DOI:
https://doi.org/10.4225/53/578c1ac5b84c1

License:
https://creativecommons.org/licenses/by-nc-nd/3.0/au/
Link to license to see what you are allowed to do with this resource.

Downloaded from http://hdl.handle.net/1959.4/56205 in https://unsworks.unsw.edu.au on 2024-03-19

The quality of this digital copy is an accurate reproduction of the original print copy

University of New South Wales Water Research Lab. Report 26

The University of New South Wales

WATER RESEARCH LABORATORY

Report on

HEAD LOSSES IN SELF-SEALING PIPE COUPLING

MLH 1894/43

Report by: B.W. Penman and H.R.Vallentine
Date: 17th October, 1960.

https://doi.org/10.4225/53/578c1ac5b84c1

INTRODUCTION:

The head loss characteristics of a self-sealing pipe coupling were investigated at the request of Uniseareh Ltd. on behalf of C.C. Engineering Industries Ltd., 223 Bridge Road, Glebe, who supplied the coupling. The tests were undertaken for a range of flows of fresh water at 60°F, with the coupling installed in the fully open position in 3/4-3/4 inch cement-lined pipe.

METHOD OF TEST:

The head losses for a range of flows through a 40 ft. test length of pipe, with a central joint, were determined from readings of piezometers at the upstream and downstream ends. A 20 ft. approach length ensured uniform flow conditions.

The coupling was then inserted at the central joint and the head loss determinations were repeated. From graphs of the two series of head losses, plotted against mean flow velocity, a graph of the difference in head losses was plotted. This represents the head losses due to the coupling alone.

The flow rate was varied over the range 15 g.p.m. to 50 g.p.m., its measurement being determined by the time taken for 300 lb of water to flow to a weighing tank.

The piezometers, consisting of tappings at 90° intervals around the pipe, leading to a junction with a single open tube, were read to the nearest 0.01 ft.

RESULTS:

Figure 1 shows the head loss-velocity curves, plotted logarithmically for the test length with and without the coupling, and for the coupling alone. The latter curve, derived from the first two has been extrapolated for a short distance.

THE UNIVERSITY OF NEW SOUTH WALES
WATER RESEARCH LABORATORY
LIBRARY

Figure 2 shows the head loss due to the coupling alone, plotted against discharge in imperial gallons per minute of fresh water at 60°F.

Figure 3 shows the head loss coefficient K, plotted against the Reynolds Number, $\frac{VD}{\nu}$, for D = 1-7/16 inch, where K is defined by the head loss equation

$$H = K \frac{v^2}{2g}$$

This figure enables head loss-discharge curves to be prepared for fluids of viscosity different from that of water.

Further testing would be required if the coupling is to be used with pipe diameter different from 1-7/16 inch.

EXPERIMENTAL RESULTS

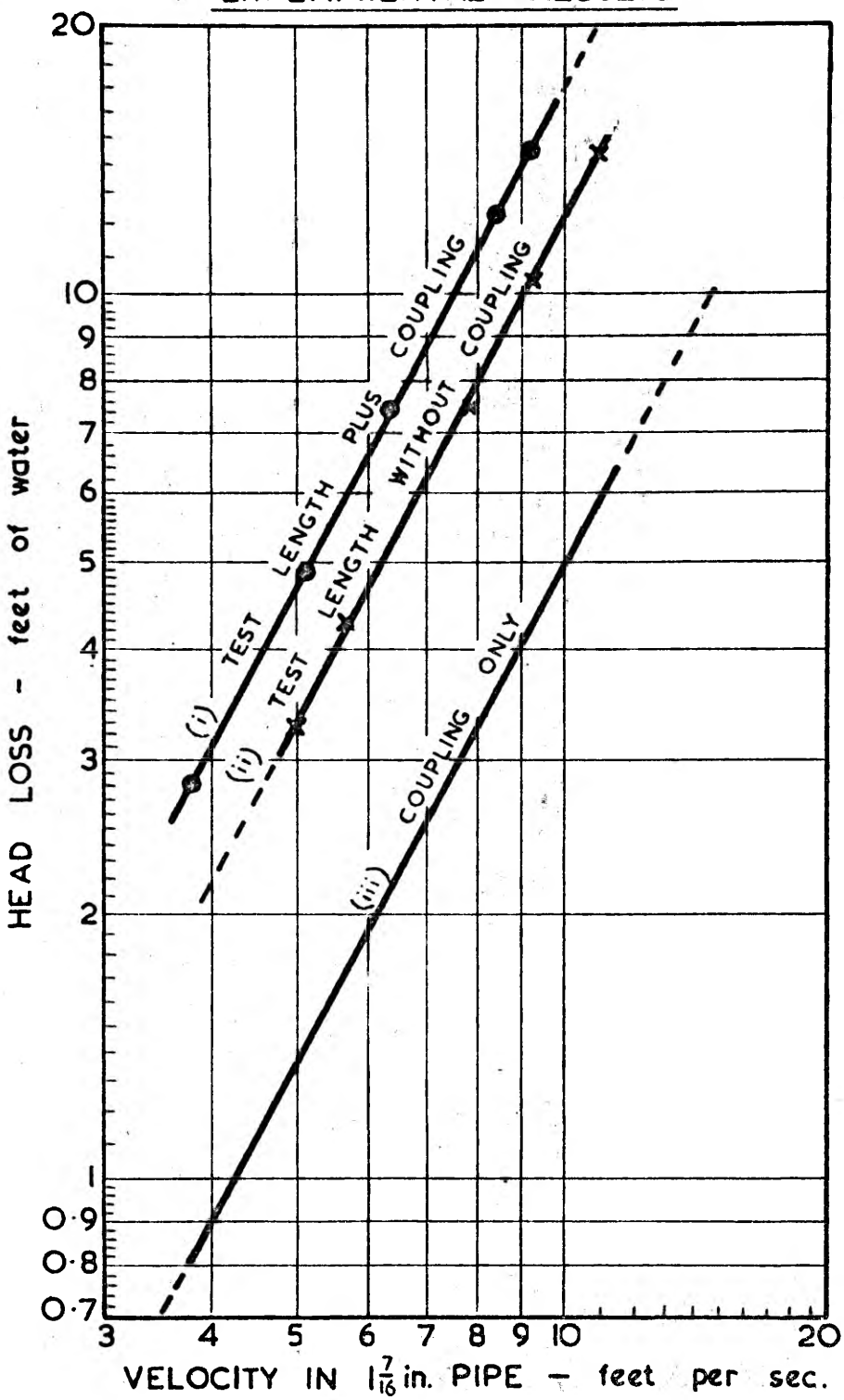


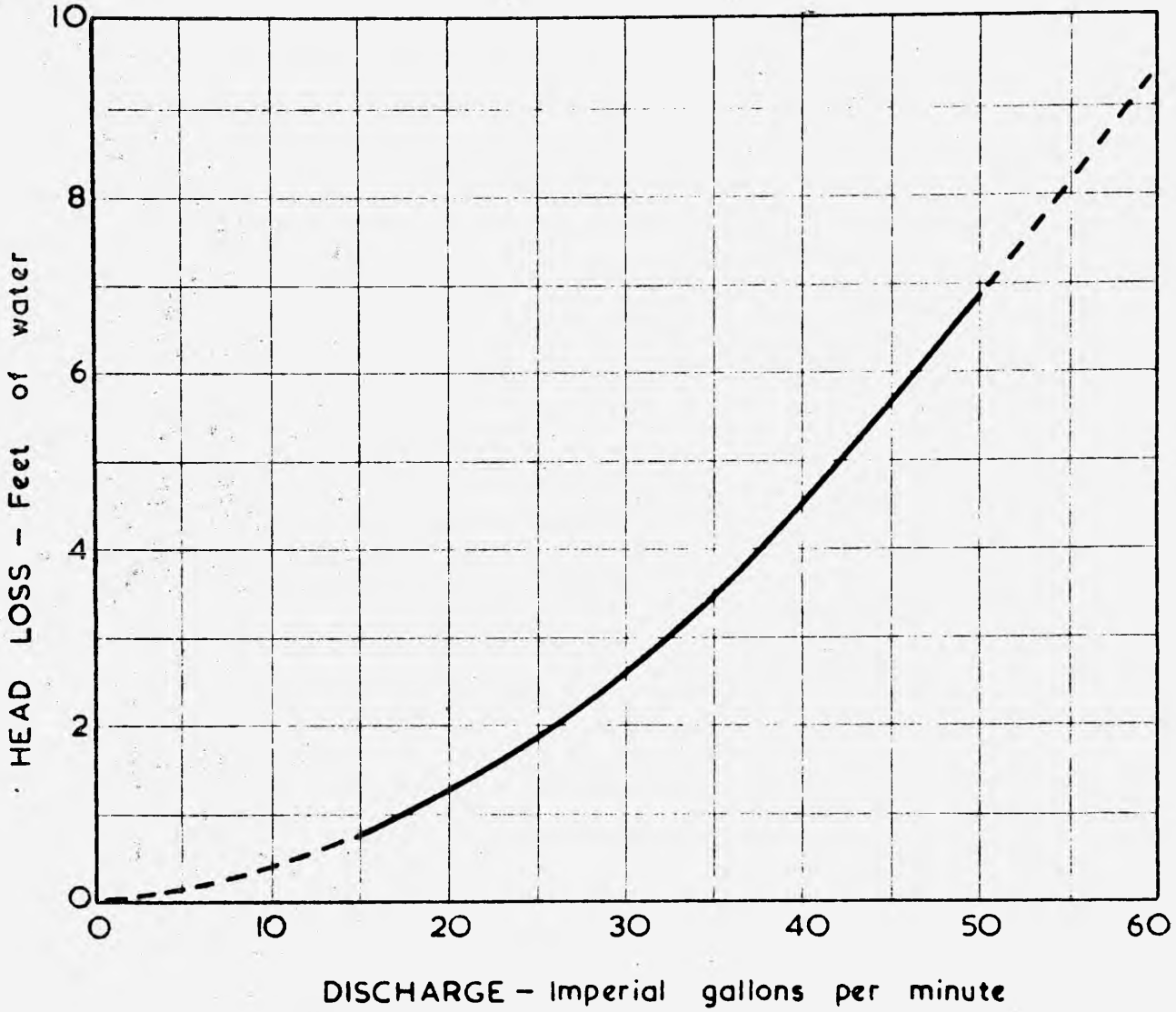
FIGURE No. 1.

THE UNIVERSITY OF NEW SOUTH WALES

WATER RESEARCH LABORATORY

TEST ON A SELF SEALING PIPE COUPLING C.C ENGINEERING INDUSTRIES LTD.	Scale :	Date : 20·10·60
	Drawn : H.Vallentine	CE-E-209
	Traced : P.A.	
	Checked : B.W.P.	

HEAD LOSS DISCHARGE CURVE



TEMPERATURE OF WATER 60° F.

Pipe Diameter (internal) $1\frac{7}{16}$ inches

Coupling Fully Open

FIGURE No. 2

THE UNIVERSITY OF NEW SOUTH WALES

WATER RESEARCH LABORATORY

TEST ON A

SELF SEALING PIPE COUPLING

C. C. ENGINEERING INDUSTRIES LTD

Scale	Date 19 10 60
Drawn B.W Porman	
Traced P A	CE-E-2096
Checked	

VARIATION OF HEAD LOSS COEFFICIENT WITH REYNOLDS NUMBER

for a wide open coupling
of internal diameter $D_c = 3$ inches
in a pipe of internal diameter $D_p = 1\frac{7}{16}$ inches

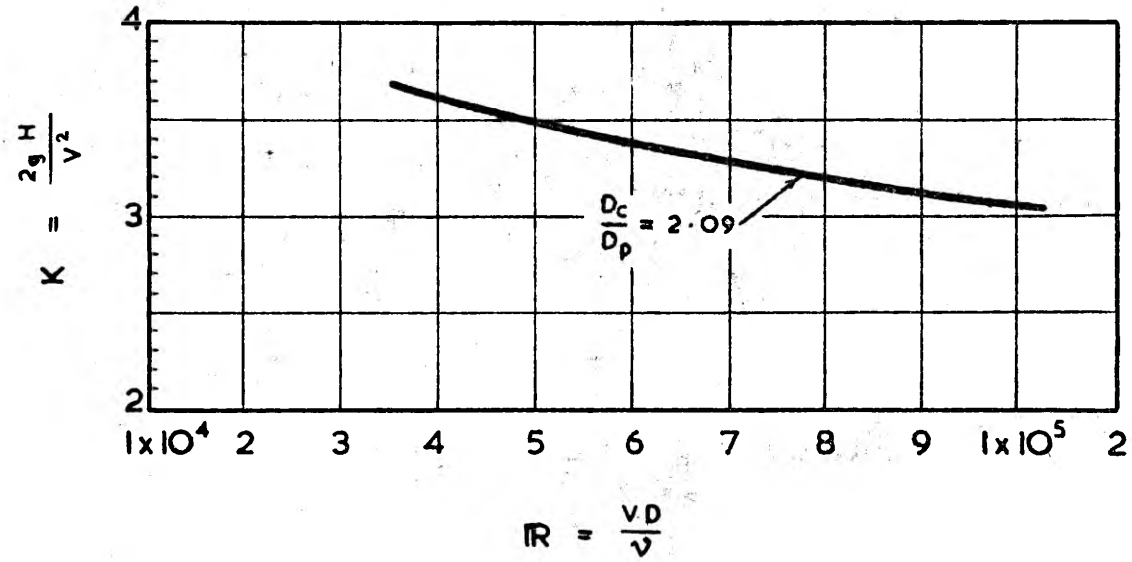


FIGURE No. 3.

THE UNIVERSITY OF NEW SOUTH WALES WATER RESEARCH LABORATORY		
TEST ON A SELF SEALING PIPE COUPLING C.C ENGINEERING INDUSTRIES LTD.	Scale: Drawn : H. Vallentine Traced : P. A. Checked: B.W.P.	Date : 21·10·60 CE-E-2098