HOME OFFICE
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Our reference: FIR/60 7/6/11
Your reference:

10th March, 1969.

Dear Chief Officer,

10/69

Manual of Firemanship, Part 3

47918

1. **Friction Loss in Pipes and Hoses**

When Part 3 of the Manual of Firemanship was being revised it was decided to include all hydraulic formulae with which firemen may be concerned. One of these is the formula for friction loss in pipes and hoses and, in the course of considering the most suitable way of presenting this formula in the Manual, it came to light that the friction loss formula in Bowman's "Hydraulics for Fire Engineers" was different from the standard formula taught in colleges and universities. This standard formula is generally accepted as the correct one for friction loss in pipes and is used by professional bodies including water undertakings.

Since the revised Part 3 of the Manual was published several chief officers have written to ask why the formula printed in the Manual differs from Bowman's, and I thought that in the circumstances it would be best to send a letter to all chief officers on the subject. I understand also that the Institution of Fire Engineers propose to publish an explanatory article in a future issue of the I.F.E. Quarterly.

The standard formula is as shown on page 46 of the Manual ($H_f = \frac{4flv^2}{D2g}$), but Bowman omits the '4' on top of the fraction and to compensate for this difference he uses friction factors (i.e. values for "f") which are approximately 4 times those used with the standard formula.

It is clearly desirable that the fire service should use the same formula as other professional bodies and it was accordingly decided that the standard formula should be included in the Manual of Firemanship.

2. **Capacity of ponds or lakes**

Another query which has been raised concerns the formula for calculating the capacity in gallons of a pond or lake; 4 x (surface area x average depth) (in ft.), which is included with other formulae for approximate fireground calculations in Appendix 'A'. The method of arriving at this formula is set out on page 14 and is a repetition of what is said in all previous editions of Part 3 of the Manual. The formula should not, however, be confused with the normal method of calculating the capacity of a regular-shaped container.

The capacity of ponds or lakes in gallons is obtained by multiplying the approximate surface area (ft.) x average depth (ft.) x $6\frac{1}{4}$, but as they usually have an irregular surface perimeter, sloping sides and an irregular base, an accurate calculation of the capacity is impracticable. It is, therefore, usual to take two-thirds of the calculated capacity, i.e. $\frac{2}{3} \times 6\frac{1}{4}$ (surface area x average depth) and for quick calculations for fireground purposes 4 x (surface area x average depth).

3. **Typographical errors**

The following typographical errors in the new edition have now come to light:

/Page 2

Page 2: bottom two lines: the words in brackets should read "(1 Imperial gal. = 1.2 U.S. gal.)".

Page 37: In the formula in heavy type at the top of the page: "Time (secs.)" should read "Time (mins.)".

Page 106: Line 4: The formulae for the volume of a sphere should read " $\frac{\pi d^3}{6}$ (or) $\frac{4\pi r^3}{3}$

Page 120: Line 14: the figure "2.514" should read "2.154".

Page 121: Line 7: the figure ".6916" should read ".6196".

The Stationery Office is being asked to insert a 'Corrigendum' slip in all future copies to be sold.

Yours sincerely,

To All Chief Fire Officers

No. 10/1969