

(g) *Loss of Pre-stress due to Creep and Shrinkage.*—

$$f_r = \frac{1}{\theta u(1 + \rho m)} \left\{ f_o + u m E_c \left[\left(\frac{\rho f_o}{1 + \rho m} + s \right) e^{-\theta \phi t} - s \right] \right\} \quad (22)$$

Time; months.	Residual stress f_r when the initial pre-stress f_o is:					
	100,000	80,000	60,000	40,000	20,000	0
0*	86,960	69,570	52,170	34,780	17,390	0
1	82,760	66,060	49,350	32,630	15,930	— 790
3	76,610	60,900	45,200	29,490	13,780	— 1940
6	71,160	56,300	41,470	26,670	11,850	— 2960
9	68,170	53,830	39,500	25,160	10,820	— 3510
12	66,620	52,520	38,440	24,360	10,280	— 3810
∞	64,830	51,040	37,240	23,450	9,660	— 4140

* These are the steel stresses immediately after release when the concrete has taken its load.

APPENDIX II.

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- ⁵ J. Amer. Concr. Inst. 1931, 7 (Proc. vol. 27), pp. 837–901.
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- ⁸ “The Plastic Flow of Concrete”, Ohio State Univ., Eng. Exp. Stat. Bull. No. 91, Sept. 1935.
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- ¹⁰ J. Amer. Concr. Inst. 1933, 4 (Proc. vol. 29), pp. 433–442.

OBITUARY.

FREDERICK JAMES JONES, M.V.O., I.S.O., was born at Dunedin, New Zealand, on the 24th May 1874, and died at Wellington, New Zealand, on the 25th March 1943. He was educated at Otago High School and Canterbury College and received his practical engineering training under Mr. J. H. Lowe, M. Inst. C.E., on the New Zealand Railways. In 1896 he was appointed Assistant to Mr. J. Burnett, M. Inst. C.E., District Engineer, Christchurch, and in 1898 became Assistant to Mr. F. W. Maclean, M. Inst. C.E., District Engineer, Dunedin. In 1900 he acted as Relieving District Engineer, under Mr. John Coom, Chief Engineer of the Railways, and in 1901 was appointed District Engineer at Grey-mouth. Subsequently he occupied a similar position at Wellington, Wanganui, Auckland, and Dunedin. In 1920 he was promoted to Super-

vising Engineer, in 1921 to Assistant Chief Engineer, and in 1924 to Chief Engineer, whilst from 1925 to 1928, when he retired, he was Chairman of the Board of Management, and held the rank of Honorary Colonel and Director of Railways with the Defence Department. From 1932 to 1935 he was Chairman of the Hutt River Board. His services were recognized in 1927, when he was appointed a Member of the Royal Victorian Order and a Companion of the Imperial Service Order.

Mr. Jones was elected an Associate Member of The Institution on the 4th February 1902, and was transferred to the class of Member on the 18th November 1913. He was also a member of the New Zealand Society of Civil Engineers, and served as President in 1925-26.

In 1906 he married Margaret Jane Davidson, and had four sons and four daughters.

CHARLES CLEMESHA SMITH was born at Leeds on the 30th September, 1867, and died at Wakefield on the 27th June, 1943.

He was educated at Yorkshire College and Leeds University, and received his professional training under articles with Messrs. Filliter and Rofe, Consulting Engineers, of Westminster and Leeds, for whom he subsequently served as resident engineer on reservoirs and other works for Leeds, Burnley, Wakefield and other cities, for the Leeds and Liverpool canal, and for the Trent Navigation.

In 1897 he was appointed Waterworks Engineer to the Wakefield Corporation and during the tenure of this office he was responsible for the design and execution of reservoirs, filtration, and water treatment works involving a total capital cost of £1,500,000, including the first two instalments of the Ryburn scheme, comprising a concrete dam 100 feet high, a pipe-line tunnel, and filtration plant. He was a pioneer in the treatment of moorland waters, and his researches into plumbo-solvency formed the foundation of work carried out by later investigators.

On his retirement, in 1933, he started a consulting practice and in addition to parliamentary work and reports on numerous reservoirs, he advised the Corporations of Hastings and Newport, Monmouthshire, on the construction of large impounding reservoirs.

Mr. Smith was elected an Associate Member of The Institution on the 6th February, 1894, and was transferred to the class of Member on the 21st March, 1905. He served on various Committees, notably the Floods Committee of The Institution and the International Commission on Large Dams. He was also a member of the Institution of Water Engineers and served as President in 1913-14, whilst in 1934 he received the distinction of appointment as Honorary Secretary of that Institution.

In 1897 he married Edith Croisdale Dixon, daughter of J. W. Dixon, and had one daughter.