Long-term cracking in reinforced concrete beams

J. M. ILLSTON & R. F. STEVENS

Dr Å. Holmberg, Consulting Engineer, Lund, Sweden

The Authors have studied crack spacings and crack widths in an extensive series. From the results of the Paper and reference 7 I have calculated mean values excluding the beams R_b and X and compared the results with values calculated according to the method for prediction given in reference 11.

53. The results are shown in Fig. 10 referring to beams stored in the laboratory. The only difference between observed and calculated values worth mentioning is that concerning maximal crack widths, w_{max}. A probable reason for the difference is the relatively high humidity, $RH=0{\cdot}65$. Mean values of crack spacings, s_m, and crack widths, w_m, are in accordance with the predictions.

Dr Illston and Dr Stevens

We thank **Dr Holmberg** for his comments and have read with interest the report by Holmberg and Lindgren[11] of a study of cracking in 12 concrete walls having differing diameters of reinforcement, amounts of reinforcement and locations of reinforcement. It is pleasing that the observed crack spacings and widths were reasonably similar in both series of tests.

55. There are differences in analysis between the tests. We found good agreement between crack spacing and width and 'effective' cover, and less good agreement with the factors of perimeter of bars and area of concrete around centroid of

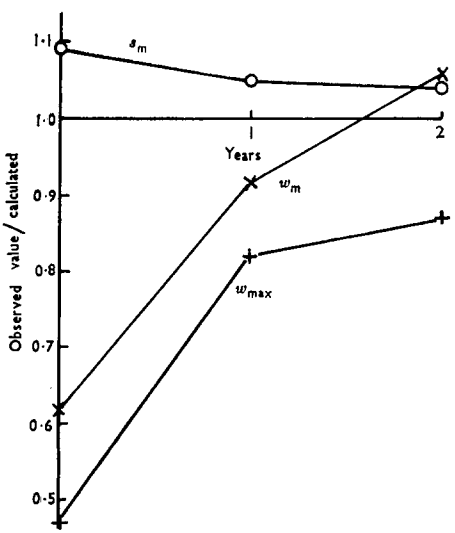

Fig. 10

Paper published: *Proc. Instn Civ. Engrs,* Part 2, 1972, **53**, Dec., 445–459.

steel used by Holmberg and Lindgren. In fact we tested the beams R_c and R_b to consider the effect of bar perimeters, and did not find it to be a significant factor. In a related study[12] Stevens analysed the tensile contribution of concrete in a beam after cracking and found that this was more related to the size of the beam than the area of concrete around the centroid of the reinforcement.

References

11. HOLMBERG A. and LINDGREN S. *Cracks in concrete walls.* D7, National Swedish Building Research, 1972.
12. STEVENS R. F. Deflexions of reinforced concrete beams. *Proc. Instn Civ. Engrs*, Part 2, 1972, **53**, Sept., 207–224.