

Some Aspects of the Behaviour of Plain Concrete in Compression and Tension

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Abstract: *Although direct tensile strength of concrete is of considerable significance in understanding its structural behaviour, relatively little attention has been paid to it until recent years. The reasons for this are briefly discussed. The significance of internal cracking and transverse tensile forces in direct compression, the concepts of fracture mechanics and their application to behaviour in direct compression and tension, the behaviour of concrete in flexural tension and the effect of flexural strain gradients on cracking are discussed. Experimental examination of the effect of centrally located holes on concrete plates subjected to direct tension, shows that large, inelastic tensile strains can occur. These strains are localised at and near the hole edges, the strain elsewhere remaining mainly elastic throughout the loading range. This paper discusses several aspects of the behaviour of plain concrete in compression and tension, and concludes that strain gradients created by the presence of holes cause localisation of cracks in the vicinity of the hole edges, retardation of critical cracking and the occurrence of progressive microcracking.*

Keywords: *Plain concrete, structural behaviour, compression, tension, cracks*