CHAPTER 2

OBJECTIVES AND SCOPE

2.1 Objectives and Scope of Present Investigation

The construction of concrete walls in buildings has been gaining importance over the years. These walls may be used as load bearing walls acting as integral part of the structure with cast in-situ concrete or pre-cast wall panels. The use of concrete walls in structures is due to the availability of high strength and high performance concrete at present. Use of thinner concrete walls in the structure not only improves the structural performance, but also increases the net available floor area of the building. Slender walls are susceptible to buckling apart from direct crushing. This is not a design criteria in the conventional concrete member. Jeung-Hwan Doh in 2002 has made a report on the behaviour of slender wall panels under the impact of direct load and buckling. His work is on conventional plain concrete of normal and high strength.

Fibre Reinforced Concrete is another special concrete which can be considered for concrete walls to enhance its performance. At present, latest generation concrete, SCC, is also used for constructing wall panels. Fibre Reinforced SCC (FRSCC) is another viable alternative to conventional concrete considering all the advantages of FRSCC. However, it is observed that very little work is reported on FRSCC walls. Keeping the research gap in view, an attempt is made
in this study to investigate the behaviour of SCC and FRSCC wall panels under crushing and buckling.

The Stress-Strain behaviour is one parameter that is very useful in predicting the behaviour of the material when it is subjected to different load systems. The studies on Stress-Strain behaviour not only helps in determining many physical properties but also helps in accurately predicting the same material in the form of different structural components. Keeping this in view, studies on the behaviour of FRSCC is also made as an integral component of the present investigations.

Considering the gaps in the available literature, the present investigations are aimed at producing standard grade (M30) FRSCC wall panels with Glass Fibers, Steel Fibers and Hybrid Fibers consisting of a mixture of Glass and Steel Fibers, and study their structural behaviour.

2.2 Phases of Present Investigation

The different phases of the present research work are as follows:

**Phase I**: Development of M30 grade SCC and obtaining its fresh and hardened properties.

**Phase II**: Development of

   (a) Glass Fibre Reinforced SCC (GFRSCC),

   (b) Steel Fibre Reinforced SCC (SFRSCC),

   (c) Hybrid Fibre Reinforced SCC (HFRSCC),

and study of fresh and hardened properties.
Phase III: Stress-Strain behaviour of the above FRSCC under unconfined and confined states and obtaining the parameters like Modulus of Elasticity, Ductility Factors and Plasticity Index, and developing mathematical models.

Phase IV: Study the structural behaviour of SCC and FRSCC wall panels under axial and eccentric loadings and comparing the ultimate load carrying capacities using the principles of strength of materials. Further, the ultimate loads for full scale wall panels are predicted using model analysis techniques.