

## EXPERIMENTAL RESEARCH ON CONCRETE STIFFENED STEEL PLATE SHEAR WALL

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### ABSTRACT

Steel plate shear wall (SPSW) and concrete stiffened steel plate shear wall (CSPSW) are manipulated as ductile structures and appropriate lateral-load resisting systems. CSPSW consists of an infill steel plate and a reinforced concrete panel attached to one side of the infill steel plate. In CSPSW, beams and columns are considered as boundary elements which develop pure shear of the infill steel plate. Although CSPSW is known as a good solution for tall buildings in a region of high seismic hazard, limited research has been fulfilled on this kind of shear wall so far. Hence, more experimental and numerical investigations are demanded to grasp the complicated behaviour of this system.

In this study, an experimental investigation into ductile concrete stiffened steel plate shear wall is conducted at Road, Housing & Urban Development Research Center, Tehran, Iran, and the test results and observations are discussed. In accordance with experimental results, the CSPSW specimen provides a stable cyclic manner and can reach inter-story drift of 6%. By proper design of CSPSW, it can be able to show an acceptable failure mode.

### INTRODUCTION

Steel plate shear wall (SPSW) is a system which resists story shear and overturning moment in high-rise buildings. The system consists of an infill steel plate and boundary elements, beams and columns. SPSW carries lateral loads by developing diagonal tension field; however, owing to compression field, the infill steel plate buckles. By buckling of the infill steel plate, stiffness of SPSW decreases markedly. For preventing buckling of diagonal compression, a reinforced concrete panel is attached to one side of the infill steel plate by shear connectors, bolts. This system is called concrete stiffened steel plate shear wall (CSPSW) (Astaneh-Asl, 2001 and 2002).