



Shear Strength of Post-installed Diagonal Anchor

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Summary

Post-installed anchor is widely spread for the seismic retrofit in existing RC and SRC buildings. Usually, anchor bars are vertically installed in a concrete surface. However, we think that post-installed anchor using diagonal anchor bars improves shear strength. In this research, we confirmed the shear strength of post-installed anchor using diagonal anchor bars through the structural test. In addition, we proposed the evaluation method of shear strength for various failure modes.

Keywords: seismic retrofit; post-installed anchor; indirect connection; shear strength; concrete cone failure; bearing failure.

1 Introduction

To strengthen reinforced concrete construction and the like against seismic events, design methods are being established to fit the interiors of existing structures with steel braces and seismic walls, as well as to retrofit existing structures with steel braces on exterior walls for seismic protection [1]. For example, when steel-braced frames are used for reinforcement, indirect connections using post-installed anchors are frequently employed, such that many post-installed anchors are required for each existing structure.

According to the “Commentary on Installation Guidelines for Seismic Retrofit of Existing Reinforced Concrete Structures from the Japan Building Disaster Prevention Association” [1] (hereinafter, Retrofit Installation Guidelines), a diagonal angle is decided upon for anchor bars in cases where post-installed anchors are expected to meet tensile resistance. On the other hand, no such angle is defined for cases where shear resistance is expected, but diagonal installation is normally avoided.

However, when shear resistance is expected in post-installed anchors, installing the anchor bars diagonally as shown in Fig. 1 changes the resistance mechanism such that the anchor bar is

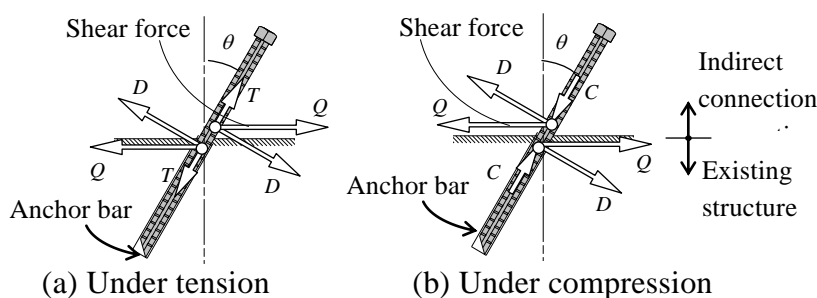


Fig. 1 Post-installed anchor subject to shear force

subject to forces (i.e., tensile or compressive forces) along the axial direction, which is predicted to produce great resistance. The present research tests a proposed shear strength evaluation method for diagonal post-installed anchors, suggested as a joining method for existing structures and reinforcement elements in seismic retrofitting of concrete construction.