

Shear characteristics of perfobond strip with SFRM based on push-out and pull-out tests

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1 Abstract

In order to sufficiently ensure the shear performance of perfobond strip connectors in steel-concrete hybrid structures, reinforcements are generally arranged inside the connection for enhancing the restraint effect around the perfobond strip. Alternatively, the restraint effect around the perfobond strip can be enhanced by using the steel fiber reinforced mortar (SFRM) for the connection. This study aims to investigate the shear characteristics of the perfobond strip combining with SFRM in the condition without the surrounding reinforcements. The push-out and pull-out tests are carried out, and the experimental parameters are the compressive strength of SFRM, the dimensions of the perfobond steel plate and the surrounding mortar block. The influences of experimental parameters including the test method on the shear characteristics of the perfobond strip are discussed from the experimental results.

Keywords: Connections of precast concrete members; perfobond strip; steel fiber reinforced mortar; push-out test; pull-out test; shear resistance.

2 Introduction

In the construction using precast concrete members, it is often required to connect precast concrete members together, or a precast concrete member to a steel one. In recent years, a method using the perfobond strip has been proposed for these connections. Fig.1(a) and (b) shows 2 examples of this method, Fig.1(a) is the connection between precast concrete slabs [1], and Fig.1(b) is the connection between precast concrete barriers of the bridge [2]. A major merit of this method is that, the omitting of the reinforcements inside these

connections maybe lead to reduce the dimensions of the connection and to shorten the construction period on site [1].

However, the shear force of perfobond strip maybe decreases suddenly after its shear fracture when the reinforcements are not arranged inside the connection [3]. Therefore, it is effective to combine the perfobond strip with high strength steel fiber reinforced mortar (hereafter called as SFRM) in order to enhance the restraint effect around the perfobond strip and to ensure the performance of concrete filling into the narrow space of the connection.