

Full-Scale Testing of SC Series



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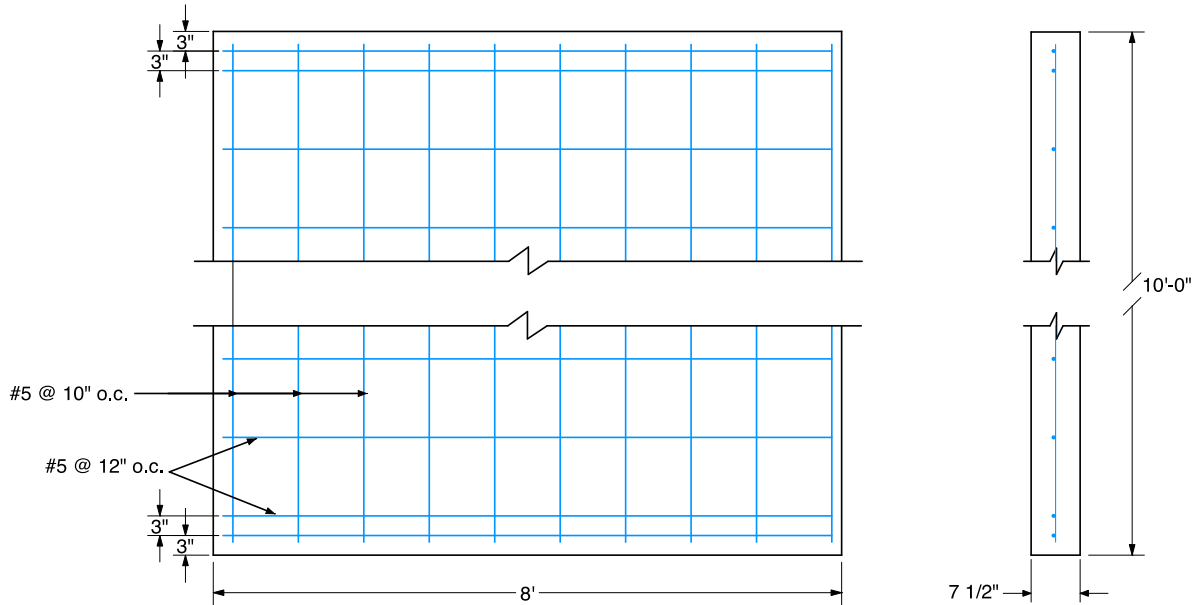
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1. Introduction

Three 7.5" thick x 8'-0" wide x 10'-0" tall reinforced concrete panels were cast in order to test a number of AdvanConn devices under various loading configurations. The panels were reinforced with one curtain of No. 5 Gr. 60 reinforcing bars spaced vertically at 10" o.c. and at 12" o.c. horizontally. The reinforcement was placed at mid-thickness. The average 28-day concrete strength was 4,610 psi. Near the ends, where the devices were to be installed, the spacing between the horizontal bars was reduced to 3" based on common practice. The reinforcement layout is illustrated in Figure 1a. The photograph in Figure 1b shows the panel reinforcement and formwork. The panels were designed to allow multiple tests on each panel or three interconnected panels.



(a) Panel reinforcement details



(b) Panels before concrete placement

Figure 1. Panel details

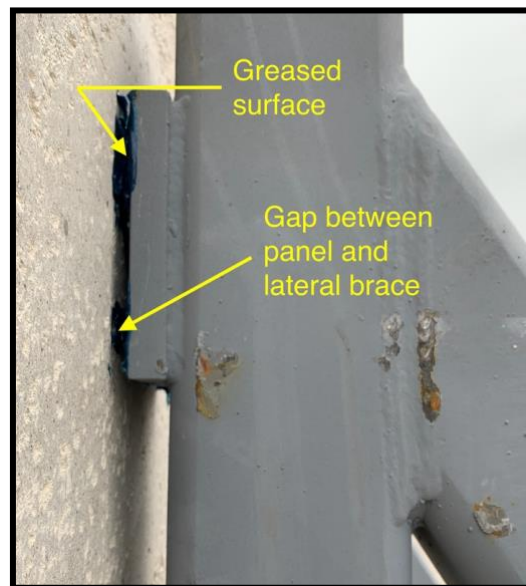
After adequate curing, each panel was tilted upright (Figure 2a) and connected to a 24" wide by 30" deep foundation reinforced with No. 5 Gr. 60 reinforcing bars, and braced as shown in Figure 2b. Approximately 1/8" gap was kept between the panel and lateral braces. The panel at the contact point to the brace was ground and greased (Figure 2c). The combination of having a gap and the greased surfaces eliminated any potential influence of friction between the panel and lateral bracing system on the test results. It should be noted that the tests were conducted without any grout between the panel and foundation.



(a) Panels before bracing



(b) Panels after installation of lateral braces



(c) Gap and greased surface

Figure 2. Overview of test panels and lateral bracing

The focus of this series of tests was on SC-a and SC-b. The plate dimensions and bolt gages are different between these two devices as shown in Table 1, but both devices use 3/8" thick plates. In the first series, Panel 2 was connected to Panels 1 and 3 with SC-a, as shown in Figure 3. SC-b was used to connect the panels for the second series of tests. The devices for the two tests were 4'-0" apart so testing of one device will not impact the result of the other device. Each device had a 3'-0" edge distance.

Table 1. Dimensions of connection plates

Device	Plate dimensions	Bolt gages
SC-a	13" wide x 6" deep	Horizontal gage = 10" Vertical gage = 3"
SC-b	15" wide x 11" deep	Horizontal gage = 12" Vertical gage = 8"

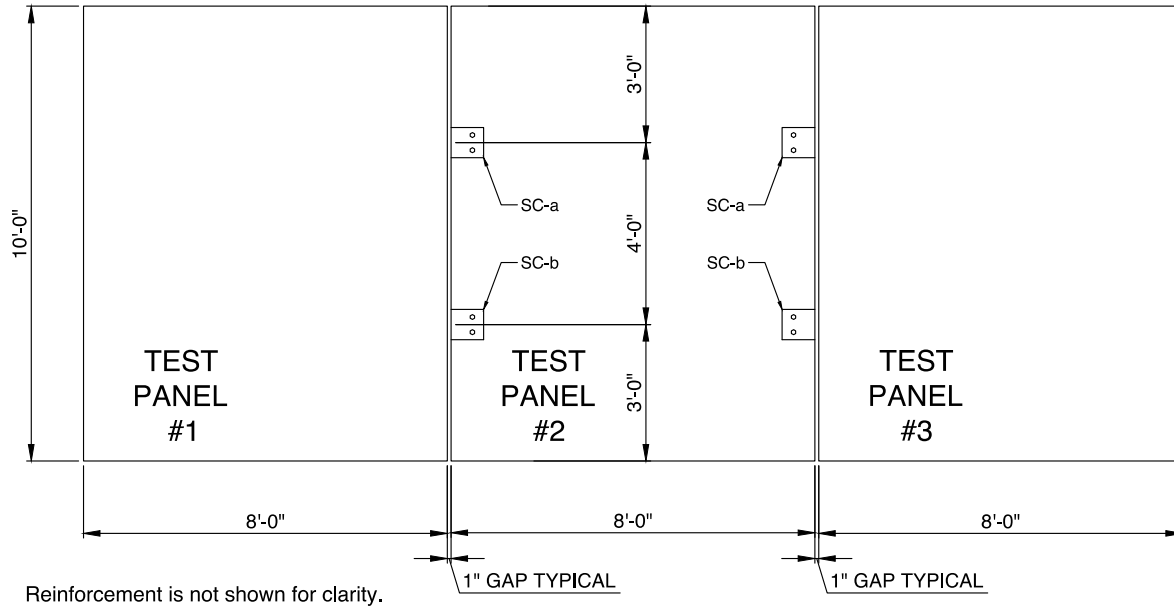


Figure 3. Locations of SC-a and SC-b

2. Test setup

The test setup is shown in Figure 4. Pockets had been cast in the foundation to accommodate hydraulic rams. A 60-kip hydraulic ram was placed vertically in a pocket in the middle of the Panel 2 to apply a vertical uplift force. The load was transferred to the panel through a bearing plate centered on the panel thickness. Each stationary panel (Panel 1 and Panel 3) was held in place by four 5/8" A193-B7 threaded rods that were threaded into anchors cast in the foundation and restrained at the top by two strong tie backs consisting of a pair of back-to-back channels.



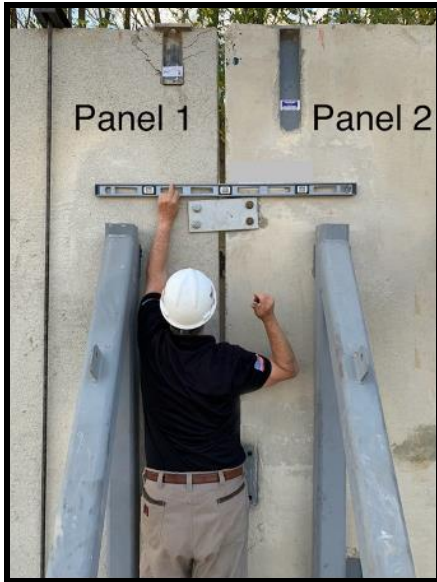
Figure 4. Test setup

3. Results and discussion

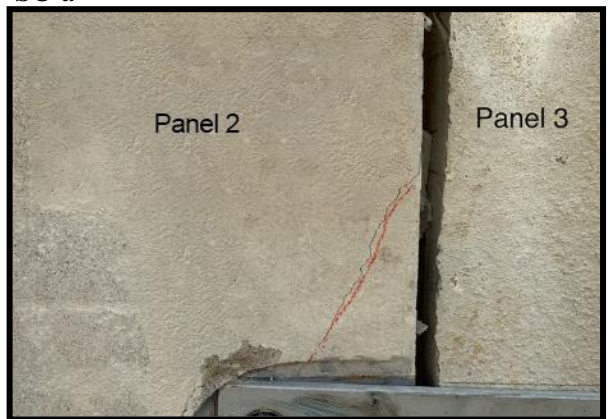
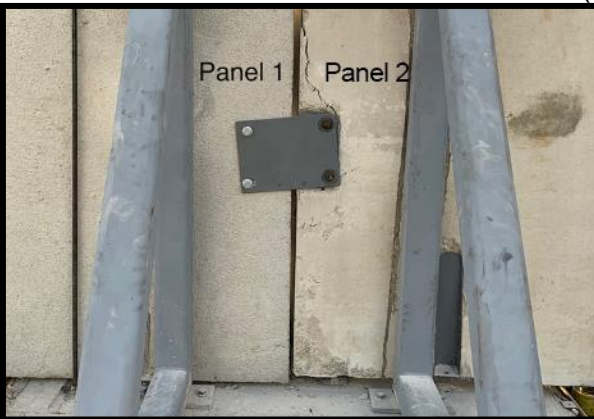
The maximum load resisted by each device is tabulated in Table 2. As evident from Figure 5, the connection plates in both devices rotated. This rotation is expected considering that the holes for the post-installed anchors (i.e., those in Panels 1 and 3) are slotted. Furthermore, the structural bolts (i.e., those in Panel 2) are not meant to be slip critical. No cracks were observed around SC-a, but diagonal cracks radiated from the top structural bolt which was subjected to tension as the plates rotated.

Table 2. Peak loads

Device	Maximum load (kips)
SC-a	10
SC-b	10



(a) SC-a



(b) SC-b

Figure 5. Condition of devices after resisting 10 kips

4. Summary and observations

Both SC-a and SC-b resisted 10 kips suggesting the larger bolt gages in SC-b did not affect the capacity. The larger connection plates and bolt gages in SC-b did not impact the capacity.