

BLOK-LOK LIMITED

30 MILLWICK DRIVE, WESTON, ONTARIO M9L 1Y3 • TELEPHONE (416) 749-1010 • FAX (416) 749-1017
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I n - s i t u L O A D T E S T R E P O R T

PROJECT NAME:	Hall of Justice		
PROJECT ADDRESS:	N Spring St, Los Angeles, CA		
DATE OF TESTING:	Nov 07, 2007	PRODUCT:	Spira-Lok Helical Ties
I N A T T E N D A N C E			
NAME	TITLE	COMPANY	
Greg Serrao		Nadel Architects	
Charlotte Sahara		Nadel Architects	
Albert Robelo		Nabih Youssef & Associates	
Alicia Ramos		LA County Dept of Public Works	
Stephen Franks		Blok-Lok Limited	

TEST # 1										
APPLICATION:	Test Tie Size:	HWT 10/155			TEST LOCATION:	Wall Component: Back-up				
	Entry through:	Material Face				Elevation: East, Interior				
	Back-up Material:	Poured Concrete				Floor: 2 nd Floor				
	Veneer Material:	Granite				Spring St Elevation				
COMMENTS:	Tie installed depths were: Loc 1, 4" ; Loc 2, 2" ; Loc 3, 2" ; Loc 4, 2.1/2" ; Loc 5, 2.1/2" ;									
PROCEDURE:	A pilot hole of 5/16" diameter was drilled into the wall to a penetration of approx 6" using a SDS Hammer Drill. A 6" long tie was installed into the pilot hole by means of the Blok-Lok Dry Set Installation Tool each to an embedment of as noted above. The Blok-Lok Load Test Unit was then attached to the exposed tie, and an axial load applied. Five locations were tested in this manner									
TEST RESULTS:	Pull Out Load	Loc 1	1700+	lbf	Loc 2	1400	lbf	Loc 3	1100	lbf
		Loc 4	1600+	lbf	Loc 5	1700+	lbf			

TEST # 2										
APPLICATION:	Test Tie Size:	HWT 10/155			TEST LOCATION:	Wall Component: Veneer				
	Entry through:	Material Face				Elevation: East, Interior				
	Back-up Material:	Poured Concrete				Floor: 2 nd Floor				
	Veneer Material:	Granite				Spring St Elevation				
COMMENTS:	The Spira-Lok ties could not be installed any deeper than 1" penetration into the granite, and in each case, they ground out at that point. The pilot hole at Loc 2 was increased to 11/32" dia									
PROCEDURE:	A pilot hole of 5/16" diameter was drilled into the wall to a penetration of approx 6" using a SDS Hammer Drill. A 6" long tie was installed into the pilot hole by means of the Blok-Lok Dry Set Installation Tool each to an embedment of 1" . The Blok-Lok Load Test Unit was then attached to the exposed tie, and an axial load applied. Four locations were tested in this manner									
TEST RESULTS:	Pull Out Load	Loc 1	1500	lbf	Loc 2	1000	lbf	Loc 3	1300	lbf
		Loc 4	1200	lbf						

TEST # 3											
APPLICATION:	Test Tie Size:	HWT 10/245				TEST LOCATION:	Wall Component: Back-up				
	Entry through:	Mortar Joint					Elevation: East				
	Back-up Material:	Multi wythe brick					Floor: 2 nd Floor				
	Veneer Material:	Brick					Internal Light Court				
COMMENTS:	The mortar was found to be generally soft and particularly at Loc 2 which could be due to water ingress near the window..										
PROCEDURE:	A pilot hole of 1/4" diameter was drilled into the wall to a penetration of approx 11.1/2" using a SDS Hammer Drill set to 30% hammer. A 10" long tie was installed into the pilot hole by means of the Blok-Lok Dry Set Installation Tool each to an embedment of 8.1/2". The Blok-Lok Load Test Unit was then attached to the exposed tie, and an axial load applied. Two locations were tested in this manner										
TEST RESULTS:	Pull Out Load	Loc 1	950	lbf	Loc 2	300	lbf	Loc 3		lbf	

TEST # 4											
APPLICATION:	Test Tie Size:	HWT 10/245				TEST LOCATION:	Wall Component: Back-up				
	Entry through:	Brick face					Elevation: East				
	Back-up Material:	Multi wythe brick					Floor: 2 nd Floor				
	Veneer Material:	Brick					Internal Light Court				
COMMENTS:	The back-up brick was found to be generally soft.										
PROCEDURE:	A pilot hole of 1/4" diameter was drilled into the wall to a penetration of approx 11.1/2" using a SDS Hammer Drill set to 30% hammer. A 10" long tie was installed into the pilot hole by means of the Blok-Lok Dry Set Installation Tool each to an embedment of 8.1/2". The Blok-Lok Load Test Unit was then attached to the exposed tie, and an axial load applied. Two locations were tested in this manner										
TEST RESULTS:	Pull Out Load	Loc 1	950	lbf	Loc 2	950	lbf	Loc 3		lbf	

TEST # 5											
APPLICATION:	Test Tie Size:	HWT 10/155				TEST LOCATION:	Wall Component: Veneer				
	Entry through:	Brick face					Elevation: East				
	Back-up Material:	Multi wythe brick					Floor: 4 th Floor				
	Veneer Material:	Brick					Internal Light Court				
COMMENTS:	The glazed veneer brick was found to be generally soft. Loc is possibly an anomaly.										
PROCEDURE:	A pilot hole of 1/4" diameter was drilled into the wall to a penetration of approx 3" using a SDS Hammer Drill set to 30% hammer. A 6" long tie was installed into the pilot hole by means of the Blok-Lok Dry Set Installation Tool each to an embedment of 2.1/2". The Blok-Lok Load Test Unit was then attached to the exposed tie, and an axial load applied. Five locations were tested in this manner										
TEST RESULTS:	Pull Out Load	Loc 1	500	lbf	Loc 2	700	lbf	Loc 3	210	lbf	
		Loc 4	550	lbf	Loc 5	500	lbf				

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TEST # 6			
APPLICATION:	Test Tie Size: HWT 10/75	TEST LOCATION:	Wall Component: Veneer
	Entry through: Material face		Elevation: East
	Back-up Material:		Floor: 10 th Floor Exterior
	Veneer Material: Terra Cotta		
COMMENTS:	Access to the exterior terra cotta was effected through a window to facilitate testing. As the terra cotta was found to be soft, a higher pull-out could be achieved with a smaller 1/4" dia pilot hole but this could not be tested due to lack of access at this time.		
PROCEDURE:	A pilot hole of 5/16" diameter was drilled into the wall to a penetration of approx 2" using a SDS Hammer Drill set to 30% hammer. A 3" long tie was installed into the pilot hole by means of the Blok-Lok Dry Set Installation Tool each to an embedment of 1.1/2". The Blok-Lok Load Test Unit was then attached to the exposed tie, and an axial load applied. One location was tested in this manner		
TEST RESULTS:	Pull Out Load	Loc 1	375 lbf

ADDITIONAL COMMENTS:	<p>Notes: lbf denotes pounds force in tension + denotes the test was not taken to failure</p> <p>From the test results, it was concluded that a 10mm dia x 330mm long (nominal 3/8" dia x 13" long) Spira-Lok Helical Tie should be used to make the connection between the granite veneer and poured concrete back-up. The procedure would entail drilling a 5/16" pilot hole from the interior of the wall through the concrete and into the granite to a total depth of approx 14". A clearance hole of 3/8" should then be drilled into the concrete to a depth of 7.1/2", leaving 2.1/2" for tie embedment in the concrete. The tie should then be installed until it is fully seated in the granite and cannot be driven further (approx 1" embedment in the granite). A trial installation was effected using this methodology. The Product Code for this Spira-Lok Helical Wall Tie is HWT10/330</p> <p>For installation into the multi-wythe brick at the Light Courts, a 10mm dia x 270mm long (nominal 3/8" dia x 11" long) Spira-Lok Helical Tie should be used The Product Code for this Spira-Lok Helical Wall Tie is HWT10/270</p> <p>The length of the Spira-Lok Helical Wall Tie to secure the Terra Cotta is still to be determined.</p> <p>Photographs of the testing are attached</p>
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Completed By: Stephen Franks	Date: November 08, 2007
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For Additional Information visit our website – www.blok-lok.com

PHOTOGRAPHS:



Hall of Justice, East Elevation

PHOTOGRAPHS:



Testing the Poured Concrete Back-up



Testing the Granite Veneer



Testing the Brick



Testing the Terra Cotta Veneer