



# Research & Development Highlights

## Renovation Strategies for Brick Veneer/Steel Stud Construction

### Part 1: Brick Ties

Technical Series 93-210

#### Introduction

Many multi-storey residential buildings have had problems over the last 10 years with the clay brick veneer/steel stud (BV/SS) enclosure system – in particular the lateral ties between the brickwork and the steel studs.

Repairs are expensive, and it is often difficult to know how serious the damage is, especially with corroding metal components – ties, stud system and self-tapping screws.

#### Research Program

This factsheet summarizes the results of an initial exploratory study on supplemental tie systems. The study is part of a larger project examining the best way to repair damaged BVISS wall systems.

#### Findings

The study demonstrated four interior retrofit systems and seven exterior retrofit methods (see Tables 1 and 2 on following pages).

Three of the four interior retrofit systems were feasible. INT2 would be practical only if large amounts of the interior gypsum board were removed.

All the exterior repair methods but EXTi are feasible and practical for tying brick veneer to steel studs. EXTi is expensive and aesthetically unacceptable, but it could be suitable if existing ties have to be removed and replaced.

#### Conclusions

Each method has its own advantages and disadvantages. The tables that follow provide useful comparisons between the systems tested.

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*Research Report: Renovation Strategies for Brick Veneer/Steel Stud Construction Task I: Brick Ties*

*Research Consultant: Building Engineering Group, University of Waterloo*

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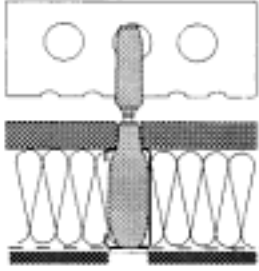
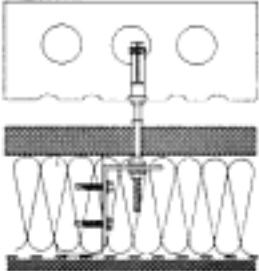
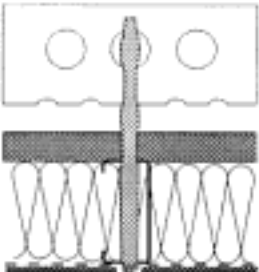
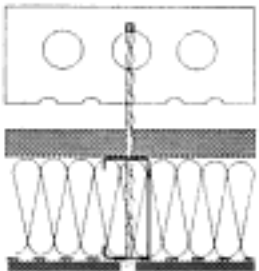
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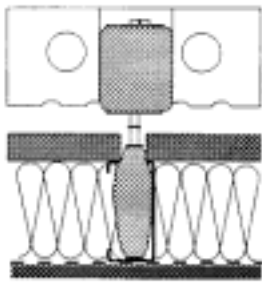
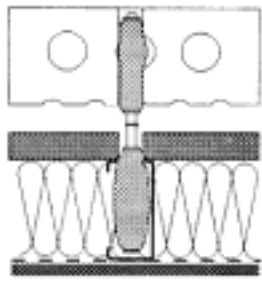
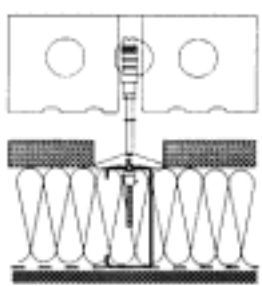
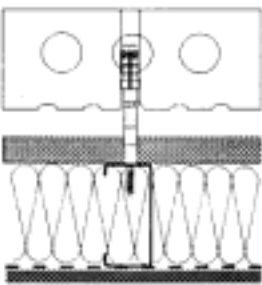
» publication est aussi disponible en français.

**Table 1. Comparison of Interior Retrofit Systems**

	Installation			Repair Characteristics					Costs		Legend
	Time	Visibility of Damage	Effect on Tenant	Strength of Connection	Ductility of Connection	Air Leakage	Potential for Corrosion	Thermal Bridging	Cost of Tie	Relative Cost of Making Good	
INT1 Cintec Cementitious Sock (22 mm)	•	•	-	•	-	•	+	-	\$9.00	•	
INT2 Dur-O-Wal Bracket and Expanding Anchor	•	-	-	+	+	+	+	-	\$4.00	-	
INT3 Dur-O-Wal Steel Stud Rod in Epoxy	•	+	-	•	-	•	+	-	\$3.00	+	
INT4 Blok-Lok Helifix HRT80	+	+	-	?	+	•	•	-	\$3.75	+	

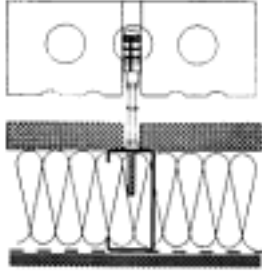
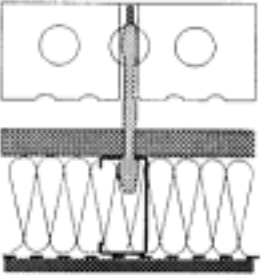
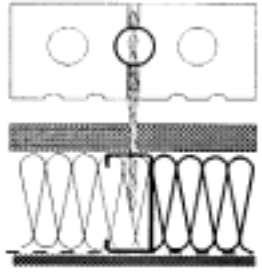
- Satisfactory, or of no relative difference
- + Relatively positive, or beneficial or better
- Relatively negative, or worse
- ? Not known, or still to be determined

**Table 2. Comparison of Exterior Retrofit Systems**

	Installation			Repair Characteristics					Costs		Legend
	Time	Visibility of Damage	Effect on Tenant	Strength of Connection	Ductility of Connection	Air Leakage	Potential for Corrosion	Thermal Bridging	Cost of Tie	Relative Cost of Making Good	
EXT1 Cintec Cementitious Sock (65 mm)	-	-	•	•	-	•	+	•	\$15.00	-	
EXT2 Cintec Cementitious Sock (22 mm)	•	-	•	•	-	•	+	•	\$9.00	•	
EXT3 Dur-O-Wal Toggle Clips and Expanding Anchor	•	•	•	?	•	•	•	•	\$3.00	+	
EXT4 Dur-O-Wal Threaded Bolt and Expanding Anchor	•	•	•	?	•	•	•	•	\$3.00	+	

- Satisfactory, or of no relative difference
- + Relatively positive, or beneficial or better
- Relatively negative, or worse
- ? Not known, or still to be determined

**Table 2. Comparison of Exterior Retrofit Systems (continued)**

	Installation			Repair Characteristics					Costs		Legend
	Time	Visibility of Damage	Effect on Tenant	Strength of Connection	Ductility of Connection	Air Leakage	Potential for Corrosion	Thermal Bridging	Cost of Tie	Relative Cost of Making Good	
EXT5 Dur-O-Wal Drill and Tap and Expanding Anchor	•	•	•	?	•	•	•	•	\$2.50	•	
EXT6 Dur-O-Wal Steel Stud Rod in Epoxy	•	+	•	•	-	+	+	+	\$3.00	+	
EXT7 Blok-Lok Helifix HRT80	•	+	•	?	+	•	•	•	\$3.75	+	

- Satisfactory, or of no relative difference
- + Relatively positive, or beneficial or better
- Relatively negative, or worse
- ? Not known, or still to be determined