











Results

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47 dwellings,
71 separate building levels,
1103 individual wall panels,
Thousands of sticks of timber







Key observations

- 34% average wall framing... higher than 14%-20% framing content generally assumed by regulators and industry.
- Unlikely to be getting expected performance across the whole wall
 - Construction R values across the whole wall area are lower than expected
 - Thermal bridging and framing Vs insulation as well as insulation install
- Some distinct 'weak points and blind spots'
 - Midfloors, corner junctions, internal wall junctions, un-insulatable areas
- Some areas of framing highest in those cold damp condensation prone areas: bathrooms, laundries, 'the back of your south facing cupboard'





















Blind Spots and Weak Points

How do these affect performance?















































R2.0 1.26 1.39		
	1.70	1.95
R2.2 1.30 1.44	1.81	2.06
R2.8 1.40 1.57	2.02	2.35

K-values	-		remains uninsulated			
	R2.0	1.26	1.39	1.70	1.95	
	R2.2	1.30	1.44	1.81	2.06	
1	R2.8	1.40	1.57	2.02	2.35	

RESULTS 25% Framing Whole-Wall R-Values	Insulation	As-Built with all 6 weak-points present	25% Framing with all 6 weak-points present	25% Framing with 5 weak-points resolved	25% Framing with floor slab edge insulated	25% Framing with all 6 weak- points resolved	
	R2.0	1.26	1.33	1.48	1.84	2.15	
	R2.2	1.30	1.38	1.55	1.97	2.29	
	R2.8	1.40	1.53	1.73	2.30	2.74	
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	Result 3 x Single	s - Wall Level 2 As-Built with all 6 weak- points present	x Two Leve As-Built with 5 weak-points resolved floor-slab edge remains	As-Built with floor slab edge insulated	As-Built with all 6 weak-points resolved	r F	Average Percentage 2 25% Framing with all 6 weak-points present	of 5 House 26-36% Fl 25% Framing with 5 weak-points resolved	Ses (Akl, Wg Area =110 -1 25% Framing with floor slab edge insulated	tn Chch) 45 m2 25% Framing with all 6 weak- points resolved
	_		uninsulated							
	R2.0	1.26	1.39	1.70	1.95		1.33	1.48	1.84	2.15
	R2.2	1.30	1.44	1.81	2.06		1.38	1.55	1.97	2.29
	R2.8	1.40	1.57	2.02	2.35		1.53	1.73	2.30	2.74
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47	7									



Results 1. As-built walls of typical timber construction achieve a <u>whole wall construction R-value</u> of between <u>R1.26 - R1.4</u>
2. If floor-slab edge is effectively insulated, walls achieve between <u>R1.70 - R2.0</u> (~ 30% - 40% increase)
3. If 5 common weak-points are resolved, walls achieve between <u>R1.39 - R1.47</u> (~15% increase)
4. If all 6 weak-points are resolved, walls achieve between R1.95 - R2.35 (~ 55% - 68% increase)
5. Reducing framing to 25% of net wall area, increases R-values by 5-10% (R2.0), 6-12% (R2.2), 9-16% (R2.8)
6. <u>Actual whole wall construction R-values</u> will be less than reported here as we have not accounted for losses from poorly fitted insulation (which was common) or air movement through the wall.
E3/AS1 1.14 c) There shall be no perimeter gaps between the <i>insulating material</i> and the framing members.
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In 'standard' 90 mm wall, as a minimum...



• Specify R2.8 bulk insulation in 90mm wall construction

- · Ensure vertical slab edge properly insulated
- Optimise framing where possible without compromising structural/weathertightness requirements
- Minimise complexity in the wall configurations (to eliminate internal and external corners)
- · Minimise the number and size of openings
- Address weak points and blind spots as part of the build process

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