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The Latest Homebond House Building Manual

A Critique

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The Homebond House Building Manual had the distinction of being called the 'bible' for many building during the boom. It was a commonly-used reference book, even for many builders and architects who never built housing estates and therefore had little need of a Homebond guarantee. One might design a construction detail of a dwelling differently, but one did it with an awareness of what the manual showed. It gave the insurance scheme great credibility and standing. This architect remembers reluctantly getting involved with an external wall insulation self-build project in rural Ireland in 2006 (far beyond his normal travel distance) because the local engineers wouldn't build anything that wasn't in the Homebond manual. The 6th edition came out just after TGD L(2008) and the new seventh edition has just hit the shelves, some months after the latest TGD L.

A sea change in knowledge and standards

Significantly the latest edition is the first since the boom. The Construction Industry Federation and Homebond (like the rest of the industry) have had time to think about the lack of construction quality that was such a hallmark of mass housing built in the boom, and how to do it better. The mediocre Acceptable Construction Details (ACDs)[1] came out after the manual's sixth edition, as did a remarkable series of papers (focusing on the 'performance gap') from Leeds Metropolitan University based on their study of the construction of the Stamford Brook housing estate near Manchester (which resulted in changes to UK building regulations). The passive house movement and ethos has also gained ground – indeed FÁS and MosArt recently created the world's first Passive house builder's course in Finglas in 2011, as many Construct Ireland readers will be aware. Finally there have been countless papers and exemplar projects in the UK, Ireland and further afield showing how mainstream housing construction can and should change. This writer, who owns a well-thumbed copy of the fifth edition, was therefore genuinely excited to part with €80 in Easons and sit down with the new manual to see if it encapsulated some of this sea change and would regain the place it had earned during the period of the 1991-2005 regulations. Sadly, as you will see, it has not.

The fifth edition related to TGD L(2005) and to energy efficiency standards for new dwellings more than 60% poorer than they are since December 2011. Think of all the industries where a 6% change would result in root and branch changes. A 60% change is seismic and demands a full re-evaluation and profound change and re-education on all sides. However the best way to explain the

[1] Limiting Thermal Bridging and Air Infiltration: Acceptable Construction Details; July 2008, a document produced by the Department of the Environment in conjunction with SEAI and Homebond

contents of the new book is that the building culture and technology of 2005 has been re-presented, dressed-up in the latest backstop values.slab insulation. It may be argued that the

Technical details

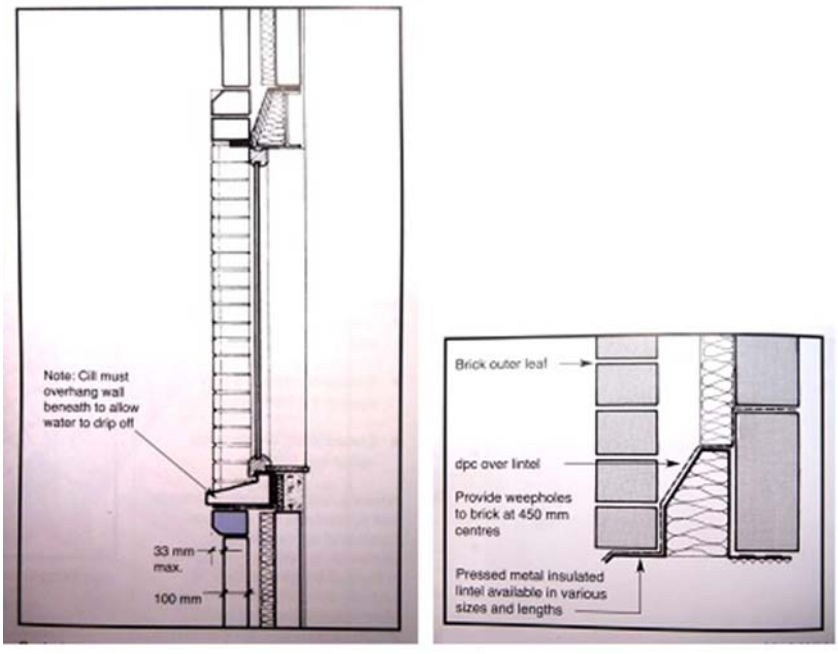
The section on airtightness is welcome but it is not integrated into the rest of the book. Detail after detail in the seventh edition is identical to the fifth: many, if not most, feature bad thermal bridges that could be easily resolved, such as can be seen in figure one. Incredibly, drawings show 100-100-100 cavity walls with 50mm partial-fill insulation, discredited hollow block with internal wall insulation, floor joists built into walls and duplex housing conditions that have been known to run with condensation. Details such as back sills and pressed metal lintels – which were relegated to what I consider the **'sin bin'** of appendix two of the ACDs due to their unacceptable thermal bridge impact – are presented here as good practice. There are no external insulation details shown, no full-fill wide cavities, no 'warm stud' approaches to timber-frame or joists, no closed panels or SIPs and no under slab insulation. It may be argued that the (mostly) re-used graphics show key concepts and designers and builders are expected to extrapolate from these, but why should they if they bought a new book? How does that help limit risk and deliver high quality buildings?

It may also be argued that the manual is fundamentally about avoiding settlement, cracks and leaks – not about the use of insulation – but this is also unacceptable. As energy efficiency standards rise and rise insulation and structure cannot be separated. They impact upon each other continuously and the solutions used must be integrated. Architecture students in college are taught that if you haven't drawn it you haven't thought about it. If the authors of the manual had drawn a wide cavity they would have seen that the window frame is too narrow to act as a fire-rated cavity closer. They would then have had the opportunity to discuss acceptable and non-acceptable cavity closers, and propose methods of holding the window in place: all practical issues builders need to know about. They would also have had the chance to talk about blown bead insulation and low thermal bridging cavity ties.

By not showing under slab insulation or external wall insulation the opportunity to discuss the structural implications of insulation continuity was lost. New details could have shown how thermal and structural continuity is possible with AAC or Foamglas blocks. Showing woodfibre sarking boards on a warm roof buildup could have given a chance to discuss the types of fixings necessary as well as the practical advantages for roofers, besides the reduction in repeat

FIGURE 1

outdated details
Extracts from the seventh edition of the Homebond House Building Manual



thermal bridges and improved decrement delay.

EPC & U-values

Builders and designers need practical guidance on what U-values are acceptable. The average maximum U-values (also known as 'backstop' U-values) in table one of TGD L in 2005 were better than the values most housing estate builders used – the overall heat loss method of proving compliance allowed relaxations, such as from 0.27 to 0.37 W/m^{2}K in the case of walls. In the 2011 update table one backstop values have become far more onerous – for instance the backstop is now 0.21 W/m^{2}K for walls – yet *to ensure* compliance building fabric components should be designed and built to a *far* higher standard again – close to 0.14 W/m^{2}K. This is a world apart from Boom-time values, as figure two makes graphically clear. This is because compliance with the whole-dwelling energy performance coefficient (EPC) value (calculated in DEAP) has been driving building fabric performance since TGD L(2008). Complying with backstop values is a second – and typically much easier – target.

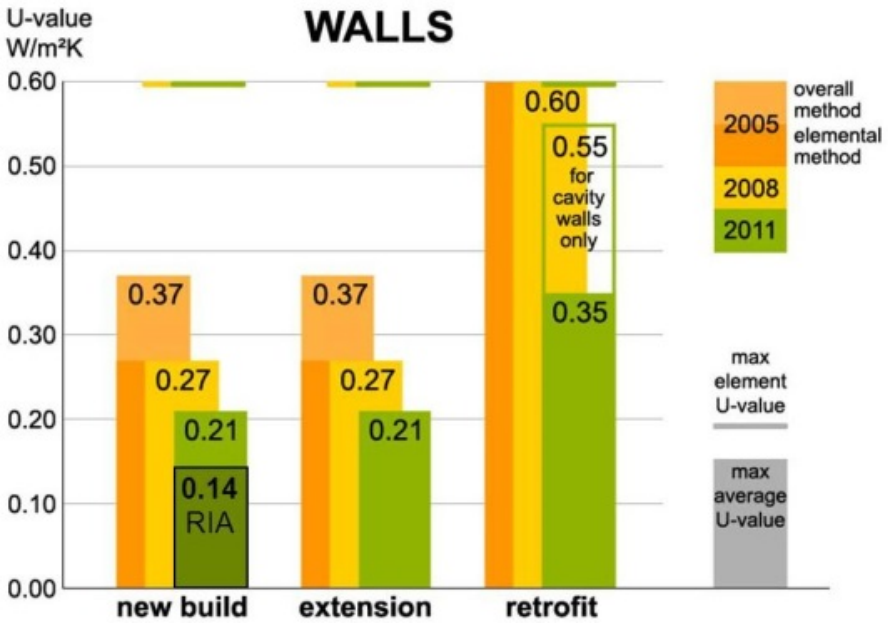
Of course it is *possible* to build a wall to 2012 0.21 W/m^{2}K but – without opting for an absurdly large renewable energy system – this would then almost certainly necessitate large levels of compensation in *all* other elements, resulting in a compliant but unnecessarily expensive dwelling. The best and most sustainable way to achieve compliance is always to minimise energy demand first through use of simple, 'dumb' technology that does not need a power source and has low maintenance requirement: i.e. appropriate, well-designed, well-applied insulation! This approach is often called a 'fabric first focus'.

The new manual gives a caveat at the bottom of page 469 without further explanation that "one or more of the backstop minimum performance levels outlined above may need to be exceeded". Elsewhere it warns that "by using the back stop value above, overall compliance with TGD L(2011) may not be achieved". But it's not a case that "one or more" value may need to be exceeded – in practical terms all of them should be! To not stress or explain such a crucial and complex issue is unacceptable

In contrast the Department of the Environment's own Regulatory Impact Analysis (RIA) document – which was published in summer 2010 when the latest changes to TGD L were out to consultation – made exactly this point very clearly. Amongst other features it shows a useful chart of nine house types listing the key performance characteristics needed for each to merely comply. Despite every backstop values being exceeded in *all* cases – for everything from heating systems to thermal bridging to airtightness, not just U-values – each of the nine dwellings just reach the maximum permitted EPC of 0.4. This author believes that much of the Industry doesn't yet understand this regulatory change. Sadly the seventh edition will not help.

FIGURE 2

the progression of wall U-values since 2005
Extract from Building Fabric Design, an RIAI CPD event



The text & taking a position

The manual's text has been revised to a greater extent than its details but it repeats much of the dry explanations found in TGD L. Unlike the government, Homebond has the ability to be selective; to take a strong position; and to rule-out or promote practices, or forms of construction and technology.

Indeed the manual does this in several places, such as in relation to fire or the construction of foundations or walls, but not when it comes to thermal performance. For instance, a builder may wish to build with internally insulated hollow blocks, and may find some guidance on this in TGD L, but the manual has the chance to educate the builder and show why this is a sub-standard form of construction and what other forms will serve the buyer or client better. If the manual were re-written with this approach it could become a voice for change and higher standards which – after 60% increases in standards of and a disastrous crash in construction – we all need.

This author feels that this edition will inadvertently encourage non-compliant construction. It may also increase the risk of claims against Homebond insurance itself. If the manual is intended to be used by those seeking related insurance, and is promoted as up-to-date and reliable and *yet is not*, it surely becomes a risk to its authors.

To ensure that the performance gap between required standards and the reality on Irish building sites that has been such a feature of the Boom starts narrowing, instead of widening further, we suggest this manual is either withdrawn and extensively revised, or the industry turns to new, more relevant, sources of guidance and training.

Construct Ireland wrote to Homebond prior to going to print to offer a right of reply to many of the points raised in the above article. A spokesperson said "We note your comments […] & will pass them to our technical department for review," adding that the review "will not be complete before your deadline". Construct Ireland has offered Homebond the chance to respond via the Construct Ireland website and awaits the organisation's response.

FIGURE 3

An edited version (to remove non envelope related data) of table 2 from the department of the environment's regulatory impact analysis document, which shows that wall U values as low as 0.14 and triple glazed windows may be required to comply with part L

Table 2 – Table of dwellings achieving compliance with TGD L 2010

				Detached			Semi-Detached			Terrace	Apartments	
Dwelling ID				1	2	3	4	5	6	7	8	9
Description		Note		Bungalow	Det 2st small	Det 2st large	SD small	SD med	SD large	Terr 3-storey	Apt small (mid-f	Apt duplex (2 top floors)
Num storeys				1	2	2	2	2	2	3	1	2
Total Floor Area				104	126	280	96	126	160	105	54	84
	Num fans/passive vents			Natural Ventilation with 3 extract fans, No Chimney, Draught Lobby included, 2 sides sheltered			Natural Ventilation with 3 extract fans, No Chimney, Draught Lobby included, 2 sides sheltered			As for Semi-detached	Natural Ventilation with 2 extract fans, No Chimney,No draught Lobby, 2 sides sheltered	
	Result of pressurisation test m3/hr			5m3/hr/m2			5m3/hr/m2			5m3/hr/m2	5m3/hr/m2	
Fabric	Door		Area	1.85			1.85			1.85	1.85	1.85
			U	1.5			1.5			1.5	1.5	1.5
	Ground floor		Area	114.4	69.3	154	52.8	63	88	38.5		
		eg. 110mm PIR under slab	U	0.15			0.15			0.15		
	Wall		Area	84.88	148.02	199.28	88.2	85.8	105.86	59.55	26.1	46.32
		eg. 150mm block cavity wall with 140mm EPS or 100mm PIR and 50mm PIR internal lining	U	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
	Roof		Area	114.4	69.3	154	52.8	63	88	38.5		46.2
		eg. 340mm mineral wool between and over joists or 150mm PIR between rafters and 60mm PIR under rafters	U	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Windows	E/W		Area	24.15	29.65	68.15	22.15	29.65	38.15	24.4	11.65	19.15
			U	1.1(Triple Glazed)	1.3 (Double Glazed	9(Triple)	1.2(double)	1.3(double)	1.2 (double)	1.1(triple)	0.9	.9 (triple)
			Window type ID	4	4	4	4	4	4	4	4	4
	Thermal bridging parameter[1]			0.06	0.05	0.08	0.05	0.05	0.06	0.06	0.05	0.05
	Area of solar collector, m2/cyl size	collector efficiency=.6, heat loss coeff=.3,		4.3m2, 300l cyl, 100mm insul	5.5m2, 320 l cyl 100mm insul	6.5m2, 450 l cyl, 100mm insul	4.3m2, 300 l cyl, 100mm insul	5.5m2, 320l cyl, 100mm insul	6.5m2, 360l cyl, 100mm insul	4.3m2, 300l cyl, 100mm insul	3m2, 200 cyl 100mminsul	4.0m2, 300l cyl, 100mm insul
	Solar Fraction %			55	57	50	56	57	57	54	53	57
	kWh/m2 from solar			12	12	7	13	12	11	12	15	14
	Primary circuit loss			360	360	360	360	360	360	360	360	360
Light	Low-energy light proportion %			100	100	100	100	100	100	100	100	100
HtUse	Living area fraction			0.25	0.25	0.20	0.31	0.25	0.24	0.29	0.43	0.33
SH	Control category			3	3	3	3	3	3	3	3	3
	Responsiveness category			1	1	1	1	1	1	1	1	1
	Central heating pump[2]			1	1	1	1	1	1	1	1	1
	Oil boiler - pump or Gas Boiler flue fan			1	1	1	1	1	1	1		
ER1	Efficiency of main htg system			91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.3
	Fraction from sec htg system			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Efficiency of sec htg system			80	80	80	80	80	80	80	80	80
	Fuel		Main htg s	mains gas	mains gas	mains gas	mains gas	mains gas	mains gas	mains gas	mains gas	mains gas
			Sec htg s	mains gas	mains gas	Wood Pellets in Bags	mains gas	mains gas	mains gas	mains gas	mains gas	mains gas
Compliance when gas fired boiler used												
Compliance	EPC			0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
CPC	CPC			0.37	0.37	0.35	0.38	0.38	0.38	0.38	0.39	0.38
Compliance when oil fired(91.3% efficient gas boiler replaced with 94% efficient oil boiler)												
	EPC			0.4	0.39	0.39	0.4	0.4	0.4	0.4	0.4	0.39
	CPC			0.46	0.45	0.42	0.46	0.46	0.46	0.46	0.46	0.45