

WORKMANSHIP AND DEFECTS IN HOUSING IN THE STATE OF VICTORIA, AUSTRALIA

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The incidence of defects and the quality of housing have been the subject of extensive research internationally for decades. In the State of Victoria, Australia, various voluntary schemes have been adopted and discarded by industry-based organisations and government legislation in an attempt to improve the quality of housing. A constant source of debate has been that of acceptable standards of workmanship. In an attempt to provide defined standards for acceptable levels of workmanship, "Guide to standards and tolerances" was first published in 1990. These were purportedly introduced to cover areas not included in the building regulations and the Australian Standards. This paper reviews the evolution of these guides to standards and tolerances in the context of their impact on the incidence of defects and the quality of housing in Victoria. An extensive survey of building inspection reports over a period of two decades and two Acts of Parliament enacted specifically for the purpose of improving the quality of housing found that the incidence of defects increased significantly. The increase in the incidence of defects is analysed relative to these guides becoming more comprehensive. The findings indicate that the increase in the incidence of workmanship defects is not attributed to the level of comprehensiveness of the guides but attributed to other reasons. These include large increase in volume of work, skill shortages and better informed consumers in respect of the building process and their rights.

Keywords: housing, building defect, workmanship, tolerance.

INTRODUCTION

The presence and incidence of defects in new house construction is associated with the level of quality in new housing. Defects in construction have been the focus of research for a number of decades. Examples of earlier international research into defects include Freeman (1974), Porteous (1985), and Reason (1990). More recent examples are Wardhna and Hadipriona (2003), Craig (2008) and Macarulla et al (2013).

In Victoria, research into housing defects has been limited but includes Robinson (1987), Georgiou et al. (1999, 2000) and Cross (2003). The focus of this paper is to report on the Victorian attempts at reducing the incidence of defects and improving the quality of housing. The paper reports on historical voluntary and legislated schemes intended to improve the quality of new housing and resulting in the introduction of the Guide to Standards and Tolerances. The use of these guides is evaluated through an extensive survey of 1401 home inspection reports over a period of two decades and two Acts of Parliament enacted specifically for the purpose of improving the quality of new housing. Because of page limitations and the complexity

of the topic, this paper does not fully analyse the guides and discuss other reasons for the increase of the incidence of defects which are the focus of further research.

Problem Statement

Until recently building specifications in Victoria used terms such as, "in a workmanlike manner" and "in a tradesman like manner". The problem has been one of quantifying acceptable standards. With the ever increasing use of lawyers in building disputes, there was a need to develop a better definition of acceptable standards of workmanship. Hence, the introduction of the guide and the on-going refinements to them. However, it is asserted that the introduction of the Guide to Standards and Tolerances have not necessarily helped to improve the quality of housing in Victoria. This paper reviews the Guides to Standards and Tolerances to determine whether their increased comprehensiveness has resulted in an increase in the incidence of defects. The research is a 'building block' on previous work (Georgiou et al, 1999) yet importantly provides the scope for it to be used in future research in the quest for improving house quality.

Recent attempts at improving quality

The first structured formal scheme for housing quality improvement was introduced in Victoria by the Master Builders Association of Victoria (MBAV) *Certified Homes Scheme* with revised specifications distinct from other housing constructed in Victoria. The Certified Homes Scheme was a voluntary scheme available to consumers. That is, a consumer could ask an MBAV member to construct their house to the 'Certified Home Scheme' standard. Key elements of the scheme were as follows:

- A register of all houses built under the scheme was kept by the MBAV
- Cost of registration was £12.10.0 (\$25.00) per house (1961 figures)
- The guarantee was by the builder to the house purchaser
- Scope of the guarantee was for structural defects only
- Period of guarantee was for two years from date of practical completion
- Builders were required to observe the minimum standards of material and workmanship as described in the MBAV specification

The scheme required 400 homes per year to be viable. By 1967, 1,112 were registered for an average of less than 200 houses per year. Hence, the scheme was discontinued in July 1967. Some of the reasons for the Scheme's lack of support were:

- Excessive administration costs
- Advent of standard specifications by long-term lending authorities (the Banks) eliminating need for the scheme.

In the absence of demand by consumers, builders did not see the need to continue the schemes, as it did not add to their business.

The failure of the Certified Home Scheme highlighted the fact that greater consumer awareness was required when building a house and that some form of government legislation would be required to assist and protect consumers. Even as the Certified Homes Scheme was in operation, the case for some form of government legislation continued to be promoted as the industry's preferred method of raising the standard of housing quality. The Victorian Government eventually introduced legislation in the form of the Local Government (House Builders Liability) Act 1973.

House Builders Liability Act 1973

This Act required builders to be members of an industry association for houses to be registered. Builders were only required to fulfil the membership criteria of the chosen industry association - the Master Builders Association or the Housing Industry Association (HIA). As well as being members of an industry association (MBAV or HIA), builders had to be approved by a guarantor fund. The HIA formed the House Builders Association Ltd (HBAV) and the MBAV formed the Master Builders Housing Fund Ltd as the two guarantor funds.

Under the new Act, builders were required to provide a guarantee for a period of six years. The first year covered major and minor defects, and thereafter only major defects. Also refer to Georgiou et al., 2000. An important difference between the two associations was that the HIA marketed their scheme as straight out insurance. Although documented evidence of this was not found, anecdotal confirmation of the practice was repeated by a number of people - including former employees of the Housing Builders Association Ltd. The perception created by this strategy was that once a house was completed it became the insurance company's responsibility. The MBAV maintained that the builder was always responsible for the quality of the house constructed. The fund would only meet its guarantee obligations in the event of default by the builder. This attitude was probably due to their experience with insurance companies involved with the Certified Homes Scheme.

Technical standards under the Act relied on the Uniform Building Regulations (UBR) as prescribed under the Local Government Act 1958. The UBR were prescriptive in composition. Both associations used their own standard contracts, which would in the future, cause anger and frustration to consumers. It should be noted that Australia switched to performance based regulations in 1990 in the form of the Building Code of Australia.

Consumer dissatisfaction continued to grow due to poor workmanship, contractual matters and dispute resolution mechanisms perceived as favouring builders. Differing standards of workmanship were apparent not only from builder to builder, but also by builders varying their standards from their own display homes (Ministry of Consumer Affairs, 1977). By 1983, the growing number of complaints meant changes needed to be made. The government asked a committee to review the House Builder's Liability Act 1973. The review committee comprised members from the Ministry of Consumer Affairs, industry bodies, and community and consumer representatives. In 1984 the Act was amended and the two industry funds were merged to form a non-profit company called the Housing Guarantee Fund Limited (HGF).

The HGF became the sole guarantor of new housing in Victoria. Its source of income would be derived from annual membership fees paid by builders and registration fees paid for each house registered with the fund for guarantee purposes. In this way, the fund was expected to accumulate sufficient funds to fulfil its obligations under the Act. As the two industry associations did not control the fund, the HGF would be able to view the housing industry as a whole. This was demonstrated in the 1996 annual report when it reported that for the twelve years after the Act came into operation, there were 250,000 houses constructed which were covered by a guarantee. These houses generated 12,754 written complaints or 5% of the total houses registered. Despite this significant milestone, dissatisfaction amongst some consumers continued and coupled with a natural evolutionary process, amendments continued to be made leading to the introduction of the *House Contracts Guarantee Act 1987*.

House Contracts Guarantee Act 1987

Despite amalgamating the MBHF and HBAL in 1984 into the HGF an undercurrent of dissatisfaction remained. As consumer awareness and sophistication grew so did the inadequacies of the Local Government (House Builders Liability) Act 1973.

Transferring responsibility for the HGF from the Ministry of Local Government to the Ministry of Consumer Affairs in 1985 did not achieve the desired results. New tighter legislation was required. This came in the form of the House Contracts Guarantee Act 1987 which became operational on 1st May, 1988.

It should be noted the two industry associations were concerned at what they believe to be a substantial tilt in favour of consumers. Some of the main features of the new Act were:

- Provide a seven year guarantee from the date of contract of Building Approval (whichever was earlier).
- Contracts would be required to stipulate financial arrangements such as deposits and progress payment schedules.
- Variations to the contract had to be in writing, signed and dated by both parties.

If the variations procedure was not followed it was possible that builders would not be able to recover costs for variations.

Provisions of the new Act would continue to be administered by the Housing Guarantee Fund Ltd (HGF). The HGF was a private non-profit company, which derived its income from annual registration fees by builders and a registration fee for every house constructed. The number of directors of the company was seven, four of whom were nominated by the HIA and MBAV, the other three by the Minister for Consumer Affairs. Consumer advocates believed this slanted proportional representation as evidence that the HGF was biased towards builders. Regardless, the voice of consumers was growing stronger and now had a unified voice and began making submissions to various forums.

One of the main reasons for consumer dissatisfaction was disputes about poor quality, workmanship and defects resulted in delays and costs. The HGF attempted to address the above issue by introducing in 1990, standards and tolerances guidelines and revising them in 1992. In addition, the HGF raised the standards that builders had to meet to be approved by the HGF. Regardless, consumers and politicians deemed the standards criteria were inadequate and continued to push for changes. This drive for change led to the dissolving of the HGF, introduction of the Building Act 1993 and private certification.

Builder Registration

Introduction of the Building Act 1993 required builders not only to be registered, but other building practitioners had to be registered as well. It also saw the process of building approvals process being privatised.

Charged with administering the Act was the newly formed *Building Control Commission* (BCC) known today as simply the Building Commission. The structure of the BCC comprised five boards:

- Building Advisory Council
- Building Regulations Advisory Committee
- Building Practitioners Board (responsible for registration of practitioners)

- Building Appeals Board
- Dispute Resolution

The operational aspect of the BCC will not be covered here as it is outside the scope of this paper. In addition to the 1993 Act, the *Domestic Building Contracts Tribunal Act 1995* (DBCTA) was also introduced and replaced the House Contracts Guarantee Act 1987. It should be noted that the quest for builder registration as a means of improving housing quality has a long history in Victoria. As long ago as 1945, the MBAV presented the government with a Draft Bill for builder registration (Keast, 1994). In addition to registration was the introduction and continued expansion of the *Guide to Standards and Tolerances* in an attempt to define acceptable workmanship standards. It is debatable whether their introduction achieved the aims expected of them. It should be noted that the DBCTA 1995 is still in force in Victoria as at 2013, but some changes are likely in the future.

THE STUDY

To derive data from the 1401 Home Inspection Reports prepared by Registered Architects, a coding classification system was developed. The coding system comprised 36 building envelope elements and 12 defect type categories. The building elements were grouped into the trades that performed that work. The objectiveness of the coding system was tested and verified by experts (Georgiou, 2010). The 770 houses built under House Contracts Guarantee Act 1987, recorded 1766 defects for an average of 2.29 defects per house. The 631 houses built by registered builders under the DBCTA 1995 recorded 2130 defects for an average of 3.38 defects per house.

Interestingly, Craig (2008) found houses constructed in the United Kingdom (UK) under the regime of the National House Building Council (NHBC) averaged 3.2 defects per house. One measure of the quality of a newly constructed house may be the absence of defects. In this study, 29% of the 770 HCGA house sample did not record any defects. Whereas, the 631 DBCTA house sample recorded a lower 22.2% of defect free houses. See Table 1.

Table 1 Key descriptive statistics for the sample

Category	No. of houses in sample	No. of defects in sample	No. of defect free houses	% of defect free houses
DBCTA houses (registered builders)	631	2130	140	22.2
HCGA houses (HGF approved builders)	770	1766	223	29.0
Total	1401	3896	363	25.9

Of the twelve defect type categories, the workmanship category recorded the largest increase. It jumped from 43.6% of the defects for the HCGA sample to 75.3% for the DCTA sample. This represents a significant increase of almost 73%. See Table 2.

Table 2 Summary of proportion of defect types for both cases

Defect type	Registered builders (BBCTA 1995)		HGF Approved builders (HCGA 1987)	
	Number	Percentage (%)	Number	Percentage (%)
Cracking	129	6.1	157	8.9
Damp	49	2.3	121	6.7
Drainage	25	1.2	75	4.3
External leaks	34	1.6	65	3.7
Incomplete	70	3.3	333	18.9
Internal leaks	54	2.5	23	1.3
Miscellaneous	0	0.0	9	0.5
Regulations	58	2.7	76	4.3
Structural adequacy	25	1.2	23	1.3
Water hammer	25	1.2	66	3.7
Window sill gap	58	2.7	48	2.7
Workmanship	1603	75.3	770	43.6
Total	2130	100.0	1766	100.0

The carpentry trade recorded a consistently high proportion of defects across both Acts. See Table 3. As carpenters are perceived as having a crucial input in the building process of a house, the required level of workmanship is reviewed as laid out in the guides.

Table 3 Distribution of defects by trade

Trade	No of HCGA defects	% of Defects	No of DBCTA defects	% of Defects
Site Works	107	6.1	75	3.5
Bricklayer	258	14.6	212	10.0
Carpenter	402	22.8	590	27.7
Electrician	42	2.4	63	3.0
Finishes	174	9.9	186	8.7
Plasterer	178	10.1	196	9.2
Plumber	455	25.8	581	27.3
Miscellaneous	150	8.5	227	10.6
Total	1,766	100.0	2130	100.0

DISCUSSION:

Standards and tolerances

It is worth repeating that the guides to standards and tolerances were introduced because of disagreement between experts on what constituted a defect and the severity of the defect. The guides were established to set parameters to aid resolution of

disputes. The guides were upgraded periodically because lawyers would vary interpretations and experts would go looking for, and locate defects to initiate a dispute. Whether the upgrading of the guides to become more comprehensive contributed to the increase in reporting of defects will be discussed later in this paper. It should be noted that the guides commenced in 1990 as a four page document, increased to seven pages in 1996, twenty-four pages in 2002 and the current 2007 version jumped to fifty-six pages. For this research, houses constructed up to and including 2004 were considered to match the eight and a half year period covered by the House Contracts Guarantee Act. Accordingly, for the period of this research, houses constructed by builders approved by the Housing Guarantee Fund (HCGA), the 1990 and 1992 Guides applied. For houses built after mid-1996 by registered builders (DBCTA), the 1996, 1999 and 2002 Guides applied.

An important feature of the Guides was purportedly that they have been covering areas not included in the Building Code of Australia (BCA) and Australian Standards. However, the more recent amendments refer to the BCA and Australian Standards. They are not intended to be a definitive standard for all situations, rather they are minimum standards.

Clearly there has been more than a doubling in the increase of defects in the DBCTA houses. Table 4 reproduces the exact wording in the guides applicable to the period of this research (1990 and 2002) including upgrades. It can be seen from Table 4 that the changes from 1990 to 2002 are not that onerous to account for such a significant increase to the incidence of defects. It is probable that some increase may have resulted from the refinement of the Guide. However this may be offset by the fact that jambs and doors are pre hung complete with latches and striker plates. Thus the skill required to hang doors has been reduced and in theory so should the risk of poor workmanship. The situation is similar for the other trades. Due to the space constraints for this paper, the other trades will not be covered here.

Other factors that may have contributed to higher incidence of defects include the large increase in the volume of work between the two periods without a corresponding increase in the labour force. That is, obvious skill shortages. For the period of the HCGA an average of 29,500 houses were constructed annually (ABS, 2010) and for the first part of the DBCTA an average of 40,213 houses were constructed (ABS, 2010), an increase of 10,713 or 36.3%. Unfortunately, the Australian Bureau of Statistics (ABS) construction labour force figures are all inclusive and housing figures are not segregated. There is a widespread anecdotal belief that more needs to be done to increase the housing labour force and more importantly the skill level. Consequently, education and training should be seen as an integral part of the attack on defective workmanship. The above are the focus of further research being carried out.

1990	2002
Doors	Doors
<p>Door handles and latches Door handles and latches will operate as intended by the manufacturer.</p> <p>Doors and door frames Unless specified in the contract, or where an increased clearance is required for:</p> <ul style="list-style-type: none"> -removable toilet doors; - return air ventilation for ducted heating or air-conditioning units; or - inlet ventilation to rooms where the only ventilation is provided by ventilated skylights <p>a maximum gap of 3mm will be allowed between the top and sides of the door and the door frame and a maximum gap of 20mm between the bottom of the door and the finished floor.</p> <p>Doors and windows which bind or jam as a result of the builder's work, will be considered major defects for contracts signed prior to May 1988. For contracts signed on or after 1 May 1988, doors and windows which bind or jam, as a result of the builder's work, may be considered defects providing the claim meets the time and dollar limits of the Act.</p> <p>Warpage of internal doors will not exceed 6mm over the door's length.</p>	<p>6.1 Door Handles and Latches Door handles and latches installed shall be fit for purpose and will operate as intended by the manufacturer. Defects occurring in the first three months of completion shall be the responsibility of the builder. Thereafter defects occurring will only be considered the builder's liability if the actions of the building have contributed to the defect.</p> <p>6.2 Doors and Door Frames This clause only applied to the 3 months maintenance period as specified under the contract.</p> <p>6.2.1 Internal Doors Unless specified in the contract, or where an increased clearance is required for:</p> <ul style="list-style-type: none"> removable toilet doors; return air ventilation for ducted heating or air-conditioning units; inlet ventilation to room where the only ventilation is provided by ventilated skylights and or/exhausts fans; between double swing doors and French doors. <p>Within the first three months an even gap to the sides and top of individual doors shall be consistent throughout to within 1mm and shall be not less than 2mm or exceed 5mm wide and a maximum gap of 20mm between the bottom of the door and the top of any finished floor covering unless otherwise specified.</p> <p>6.2.2 External Doors External doors shall be appropriate for their intended purpose and shall be installed in accordance with the manufacturer's recommendations.</p> <p>6.2.3 General Tolerances for twisting and bending in the first three months are as listed below.</p> <ol style="list-style-type: none"> 1. Twist. Twist in a door shall not exceed 5mm. 2. Bending. Bending in a door shall not exceed the following: <ul style="list-style-type: none"> (a) In the height of the door: <ul style="list-style-type: none"> (i) up to and including 2150mm high – 4mm, or (ii) over 2150mm and up to and including 2400mm high – 6mm. (b) In the width of the doors up to and including 1020mm wide – 2mm. <p>Doors which bind or jam, as a result of the builder's work, shall be considered defects.</p>
Fixing	Internal Fixing
<p>Gaps between mouldings, and between mouldings and other fixtures which exceed 1 mm and appear within the first 12 months will be considered defects. After the first 12 months a gap of more than 2mm is a defect.</p>	<p>Only gaps between mouldings, and between mouldings and other fixtures which exceed 1mm within the first 12 months will be considered defects.</p>

Table 4 Proportion of defects in carpentry fixing category

CONCLUSIONS

It cannot be stated categorically that the increasing comprehensiveness of the *Guide to Standards and Tolerances* has been a major contributor to the increase in the incidence of defects. Although it cannot be discounted that the greater level of detail provided in a manner that could be better understood by consumers may have had some impact. Other factors may also have contributed. These include the greater volume of work and ensuing skill shortages referred to above. In addition, inspections under the new private certification system may not be as rigorous as they were previously when local authority inspectors performed that function. Another factor may have been greater consumer awareness resulting from education programs by the Ministry of Consumer Affairs (now the Ministry of Fair Trading). An area that needs to be examined is that of education and training. At present, the Building Commission conducts technical inspections in response to consumer complaints. The data gained from the Building Commission inspections should be made available to educators and training providers to highlight areas needing greater emphasis. It is suggested that one measure by itself will not necessarily reduce the incidence of defects but rather a more cooperative holistic approach of all industry participants to change the culture from one of minimum standards to one of desirable standards.

The above may be used as a building block for future research into the quest for improved quality of new housing.

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