AN ANALYSIS OF LEAKY HOME STIGMA IMPACTS ON RESIDENTIAL PROPERTY VALUES

A Research Report Presented in Partial Fulfilment of the Requirement for the Master of Business Studies at Massey University

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EXECUTIVE SUMMARY

This research report was carried out to determine the opinions of a selected group of property professionals regarding leaky home stigma impacts on residential property values.

A mail questionnaire was sent to all public valuers, a sample of real estate salespersons and a small number of building consultants within New Zealand. These groups were selected for this study as they were thought to have a good level of expertise and were active participants in the market sector containing leaky homes.

The purpose of this research was to answer whether there was a leaky home stigma attached to remediated residential properties, and if the stigma existed, why this might be. This study also sought to establish a valuation guidance for practitioners on percentage of value loss from leaky home stigma.

A number of different statistical analysis methods were tested by using the Statistical Package for the Social Science (SPSS) in order to identify stigma impacts.

The research found that stigma did exist with respect to remediated leaky homes as compared to homes with no history of leaky home syndrome.

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1.0 INTRODUCTION

In New Zealand, during the period from the mid 1990's to now, the use of monolithic cladding became popular.

According to Building Research Association of New Zealand (BRANZ) monolithic cladding was defined as "cladding with the appearance of unbroken wall surface like traditional plastered masonry" (BRANZ Seminar Series, 2001). It was assumed that using monolithic cladding prevented moisture from penetrating to the substructure and relied on face sealing. The material was often confused with traditional stucco, which was similar in appearance. However traditional stucco application anticipated water penetration and used building paper or some other flashing material behind the wall surface to carry water down and out of the bottom of the wall.

In practice the monolithic cladding system proved it might not be weatherproof in exposed situations, and water might penetrate at the edges of wall openings where there was poor construction detailing and where the building had no eaves or limited overhang. Once the water penetrated through, the untreated framing timber could rapidly rot and endanger the structural integrity of the building. In addition there could be a health hazard because toxic mould might grow in the damp environment.

The Hunn report (2002) identified a complex and systematic failure within parts of the New Zealand building industry that had resulted in what was known as the leaky home syndrome.

This research report was carried out to ascertain the opinions of property professionals regarding leaky home stigma impacts on residential property values. There was very little research conducted in New Zealand on leaky homes stigma effects, and with the recent public awareness of its possible negative impacts on residential property values, this issue became topical.

A mail questionnaire was sent to all public valuers, a sample of real estate salespersons and a small number of building consultants within New Zealand. These groups were selected for this study as they were thought to have a good level of expertise and were active participants in the market sector containing leaky homes.

A number of different statistical analysis methods were tested by using the Statistical Package for the Social Science (SPSS) in order to identify stigma impacts.

The aim was to determine whether there is a leaky home stigma attached to remediated residential properties and establish a valuation guidance for practitioners on percentage of value loss from leaky home stigma.

Other questions that could be looked at under further research were:

- Were the views of selected property professional groups different from the views of the general public?
- Was market behaviour actually different from how people indicated they would behave?

2.0 LITERATURE REVIEW

2.1 Background of Leaky Home Syndrome

In New Zealand, during the period from the mid 1990's to 2003, there has been unprecedented demand for new homes mainly due to robust domestic economic growth and new migrants housing requirement.

According to Building Research Association of New Zealand (BRANZ) monolithic cladding was defined as "cladding with the appearance of unbroken wall surface like traditional plastered masonry" (BRANZ Seminar Series, 2001). Using monolithic claddings assumed that moisture would not penetrate to the substructure and relied on face sealing. The material was often confused with traditional stucco, which was similar in appearance. However traditional stucco application anticipated water penetration and used building paper or some other flashing material behind the wall surface to carry water down and out of the bottom of the wall.

The use of monolithic cladding became common during this period for a number of reasons. A wide range of colours and textures allowed architects a great deal of freedom with design. Moreover monolithic cladding provided good insulation and removed the need for building papering, thus lowering costs. It was also considered a light and durable material, thus speeding up the construction process.

However, in practice the monolithic cladding system proved that it might not be weatherproof in exposed situations, and water could penetrate at the edges of wall openings where there was poor construction detailing and where the building had no eaves or limited overhang. Once the water penetrated through, the untreated framing timber could rapidly rot and endanger the structural integrity of the building. In addition there could be a health hazard because toxic mould might grow in the damp environment (R. Hargreaves, personal communication, April 2003).

In New Zealand, from the mid 1990's the monolithic cladding buildings had been reported to be leaking and by earlier 2000 enough properties were affected to raise public awareness

about possible problems with the use of monolithic cladding system. The Hunn report (2002) identified a complex and systematic failure within parts of the New Zealand building industry that had resulted in what was known as the leaky home syndrome, and the follow up report of the Government Administration Committee's inquiry into the weathertightness of buildings in New Zealand (Hunn, 2003) outlined the associated recommendations to the Government.

The scope of leaky home problems was very difficult to define, but it was understood that approximately 220,000 homes had been built in New Zealand over the last 10 years. Around 35 to 40 percent of these had a "monolithic" plaster finish. This suggested that some 75,000 to 90,000 homes could be at risk (Consumer, October 2002). Among these, many weathertightness problems had occurred in the Auckland region, especially associated with multi-unit speculative housing and very complex high cost single-family homes (Murphy, 2000). The latest statistic of affected dwellings by weathertightness problems from the Weathertight Homes Resolution Service (WHRS) (BIA, August 2003) showed that by the end of July 2003 the WHRS had received 926 applications from homeowners covering 1,793 individual dwellings, of which 47.4% were from Auckland territory.

The "cost to cure" was also difficult to estimate, but evidence suggested that it might be substantial. According to the Weathertightness Overview Group of the Building Industrial Authority (Hunn, 2002), the cost would be in the range of $120 million to $240 million if 50% of the monolithic-clad apartment dwellings required repair at an average cost of $20,000 backdated over the past decade. Similar developments and individual homes would account for many million dollars more.

Another important aspect about leaky home syndrome was its "hidden nature" within the walls of buildings. There was no guarantee that water corrosion at one inspection hole did not exist further down the length of the timber frame. Therefore the degree of the potential leaking problem and repair could only rely on the "best efforts" of contractors and engineers. As a result of this "hidden nature", fixing problems could be complicated, because where the framing timber was involved it was not just a matter of replacing the exterior cladding. Furthermore, an increasing number of New Zealanders lived in apartments, units and townhouses. This suggested that decisions about remediation might

need to be taken by groups of owners rather than individuals and there were likely to be arguments about responsibility for repairs. (R. Hargreaves, personal communication, April 2003).

In practice, the respective roles and responsibilities of architects, main contractors, subcontractors, specialist sub-trades and project managers, councils and developers became very complicated, hard to define, and it seemed no one took overall responsibility. In the end, homeowners might have to bear most of the cost as builders and developers closed down $100 companies and building guarantees were perhaps found to be underfunded. In addition high costs of litigation might discourage many homeowners from utilising this option.

In short, the problems were substantial and more research was required to determine the full extent and impact of leaky home syndrome in New Zealand.

Finally in many respects the current situation in New Zealand, with respect to leaky buildings, mirrored the North American experience as reported by Ricketts (1999). The main difference was that the North American problem was identified much earlier, particularly in Canada. The Barrett Report (1998) was commissioned by the British Columbia Government after major weathertightness problems were identified with condominiums in the Vancouver area. In the USA there was more emphasis on consumers engaging in class action lawsuits against the large building supply manufacturing companies. Groups such as Homeowners Against Deficient Dwellings (HADD) (2000) maintained websites to help owners to act with concerted effort and provide consumer information. It was clear from the Canada/USA experience that the resolving the weathertightness problem in buildings was a costly and very time consuming business (R. Hargreaves, personal communication, April 2003).

2.2 Overseas Studies

Only a limited number of studies have examined leaky home stigma impacts on residential property values. However Randall Bell (1997) discussed a number of concepts that could be applied to leaky home stigma (see 3.2 for detail illustration). The following literature review provides some guidance on the levels of value loss from stigma.

Kilpatrick, Brown and Rogers (1999) reviewed the performance of exterior insulation finish systems (EIFS) and property value in the United States, Canada and Europe. They argued that future maintenance costs and the impacts of stigma must be considered when valuing EIFS properties. They also concluded that a parcel with no actual cost to cure, but with a public perception of contamination, would suffer a value loss – stigma. For residential properties, measuring stigma would probably require sales comparison analysis, and would most likely vary from one geographic market to another.

Johnson, Salter, Zumpano and Anderson (2001) investigated the effect of EIFS on sales price and marketing time in Montgomery, Alabama, in the USA. The original data set consisted of 2,716 conventional residential dwellings sold in 1998 within this area. The Heckman two-stage process was used to test for the selection bias. Both the hedonic pricing methodology (for estimating the effect of EIFS on property sale prices) and duration modelling (for ascertaining the effect of EIFS on property marketing time) were employed. The results indicated that the market was not discounting EIFS clad homes, but that the presence of EIFS significantly extended a property's marketing time. They further concluded that the presence of such outcome would be indicative of inefficient local real estate markets and as more information about EIFS problems filtered through the markets there would be downward pressure on selling price.

Simons and Throupe (2003) outlined the issues of toxic mould effects on property values using contingent valuation analysis (CVA) for determining prospective buyer attitudes toward toxic mould. Their research design examined a random sample of 200 homeowners in South Carolina, the USA between November and December 2002. The preliminary results indicated that only 58% of prospective homebuyers with full information would provide a bid to buy a home with mould contamination and those who do bid would

significantly discount their bids. This reduction in bid value was regarded as a way to measure the value loss on this type of property. Calculated property value loss due to toxic mould was believed to be between 20 and 37%.

Rickard (1999) looked at the impact of post tension structure (PTS) on property values in Calgary, Canada. He surveyed 114 Calgary property management companies with a thorough questionnaire and the research results showed that there was a loss in value from PTS and stigma occurred both before and after the repairs were undertaken. The evidence suggested that once the presence of PTS was known stigma extended to all properties built during the susceptible period in Calgary.

A wider review of the literature indicated that the concept of stigma had received attention over the past decade in academic discussion of environmental issues. The same market forces commonly affected properties damaged by structural or geotechnical problems, construction defects and the like (Sanders, 1996). Also, previous discussions commonly defined stigma as a residual loss even after completion of necessary repair as a result of increased risk or uncertainty regarding future events (Sanders, 1996, Arens, 1997, Syms, 1995 and Wilson, 1993). This reflected "the resistance of buyers to purchase a property that has been damaged or (where there remains a question about the adequacy of the repairs) market perceptions, the fear of future related issues arising, or simply the real or perceived trouble of owning a property with a history of being damaged" (Bell, 1997, p254).

Various valuation approaches for studying stigma's effect were discussed in previous studies. It was generally agreed that case studies involving sales of previously damaged properties provided a reliable method of evaluating stigma, even if case study properties were not locationally or physically comparable to the subject (Patchin, 1994).

Arens (1997) examined the approach to the valuation of defective properties. In his case study of a contaminated site, he developed a simple and logical valuation model to extract the stigma effect on property value directly from the marketplace, which was estimated at 8% of the before-condition value. In another case study, Patchin (1994) indicated that a stigma effect on a contaminated site might be of 21% to 69% of the unimpaired value.

One of interesting issues arising from previous studies on the effects of stigma was about its time-specific nature. Some researchers believed that a residual loss of stigma could eventually disappear, and such a loss should be viewed as temporary and any compensation should be minimal. Among these researchers, Kiel and McClain (1996) examined house prices in a area surrounding a proposed incinerator in the USA. The results showed that while proposing an incinerator did negatively impact house values, prices rebounded after the project was cancelled and residents did not attach any stigma to the site.

Other researchers argued that market value was measured at a specific point in time, and the fact that a real loss had occurred was more important than the speculative presumption that the owner might eventually recover the full value of the property (Sanders, 1997). As both Wilson (1993) and Mundy (1992) pointed out, stigma was a perception problem, and public perceptions were often not logical, and most certainly, not easy to reverse.

2.3 New Zealand Studies

In New Zealand, no studies have examined leaky home stigma impacts on property values, but similar research on the effects of high voltage overhead transmission lines (HVOTL's) on urban property was studied by the Valuation Department (1984), in which it found that proximity to an electrical transmission line was generally associated with diminished selling prices. Callanan and Hargreaves (1995) examined the effect of transmission lines on property values in the Wellington area using a statistical analysis of sales data. The research found that stigma was attached to properties close to the transmission lines and the effect diminished to a negligible amount after one hundred metres.

Similar research on this topic was also carried out by Sandy Bond (1995). A questionnaire survey was sent to homeowners and tenants (796) who lived within 300 metres of the HVOTL's and both real estate salespersons (17) and valuers (12) who worked in the Newlands area, Wellington. The survey results indicated that those who lived closer to the HVOTL's had more negative attitudes than those who lived further away. Areas of concerns ranked in decreasing order included: property values, health and aesthetics. Furthermore, the decline in value was assessed at around 10%.

McCarthy (1997) investigated pugging effects on farm value. A case study of comparison sale analysis and a questionnaire survey to 44 experts of the Central Districts (North Island) Branch of New Zealand Institute of Valuers (NZIV) were used for this study. The research results indicated that the reduction in land value would be within the range of 0% to 5% with minimal pugging damage and 6% to 15% with severe pugging damage.

3.0 DATA AND METHODOLOGY

3.1 Research Objectives

This research aimed to obtain the opinions of property professionals with respect to leaky home stigma impacts on residential property values.

Specific objectives were:

1) To determine whether there was a leaky home stigma attached to residential properties.
2) To explore the reasons why it might be.
3) To ascertain the scale and extent of leaky home stigma. Did it occur before the repairs were undertaken, after or both? Which residential properties were most affected? What percentage of value was lost?
4) To measure some other specific nature of leaky home stigma. Would it gradually diminish over time? Should it be viewed as temporary? How would the market, media and the use of treated framing timber affect it?

3.2 Research Concept and Hypothesis

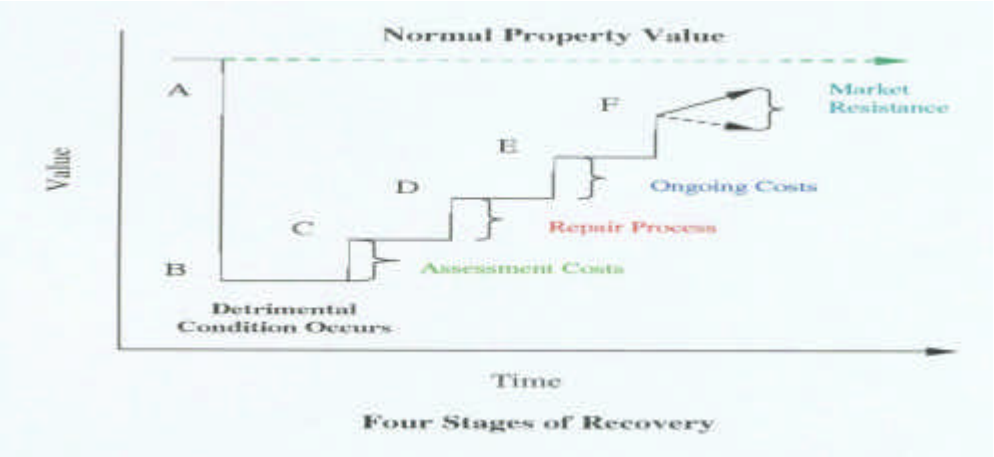
The concept of stigma is defined as a residual loss even after completion of necessary repair as a result of increased risk or uncertainty regarding future events (Sanders, 1996, Arens, 1997, Syms, 1995 and Wilson, 1993).

Stigma reflects the resistance of buyers to purchase a property that has been damaged or (where there remains a question about the adequacy of the repairs) market perceptions, the fear of future related issues arising, or simply the real or perceived trouble of owning a property with a history of being damaged (Bell, 1997).

By definition, the conceptual framework of stigma is described as a "negative intangible" caused by:

- Fear of hidden remediation costs;
- The "trouble" factors associated with the work involved in remediation;
- The fear of public liability;
- The "trouble" factors associated with compensation;
- Ongoing expenses to insurance, debt servicing, monitoring and repairing; and
- Market considerations to diminished price, increased marketing time, due diligence costs, health issues of toxic mould and dampness.

Theoretically value losses from leaky home syndrome might result from tangible the cost-to-cure (or "correct") and intangible market resistance (stigma). This was best illustrated by Bell's **Four Stages of Recovery** theory for detrimental properties, which was also known as **Bell Chart.**



Assessment Costs

Upon the discovery of the detrimental conditions, the value might fall from Point A to Point B. The value during this period was usually the lowest, as a potential buyer would likely require a very significant discount to entice them to purchase a property where the extent of damage was unknown. The cost at this stage was mainly an engineering study.

Repair Process

Upon the completion of a study, the value would generally increase to Point C. If repairs were required, the repair process would not only include the repair costs themselves, but also contingencies, carrying costs and a project incentive to entice the buyers to purchase a damaged property.

Ongoing Costs

Upon the completion of the repair process, the value would increase to Point D. Ongoing costs at this stage included absorption costs, loss of utility, continuing oversight or maintenance, additional financing or insurance costs and any other restrictions or costs.

Market Resistance

After considering the present value of any ongoing costs, the value would generally increase to Point E. In some conditions a market resistance remained even after the repairs were completed. This is indicated as Point F and known as stigma, and is more subjective and less easy to measure.

As stigma might exist in each of the four recovery stages and be extremely difficult to measure/quantify at the first three recovery stages as cost to cure had to be quantified and deducted from any market value loss, this study only considered the stigma impacts on property values at the fourth recovery stage.

Accordingly leaky home stigma in this research was defined as **an intangible value loss on remediated leaky homes as compared to homes with no history of leaky home syndrome**.

3.3 Research Methodology

In order to achieve the stated research objectives, the following research methods were employed:

Literature Review

A literature review was conducted to identify previous research and evidence about leaky home stigma. Due to the limited research carried out on leaky home stigma, a wider literature review of stigma effect on defective properties, contaminated sites and high voltage electricity transmission lines (HVTL's) was examined in order to establish an overall knowledge of the valuation and research methods used on such issues.

Collection of Data

A questionnaire survey was forwarded to relevant experts including valuers, real estate salespersons and building consultants.

It was believed that the experts might provide valuable insight about market reaction to an affected property including whether properties sold for less than market values of undamaged properties and experienced a longer marketing time.

The mail survey was conducted within New Zealand.

Analysis of Data

Information contained in the questionnaire was analysed with the aid of Statistical Package for the Social Sciences (SPSS).

3.4 Questionnaire Design

Two letters and one questionnaire were designed for the purposes of this research. The covering letter on Massey University letterhead was attached to the 6-page questionnaire and reply paid return envelope. A reminder letter was mailed out some 20 days later. Please refer to the Appendices for a copy of letters and questionnaire.

The main purpose of the covering letter was to briefly introduce the researcher and the objectives of this research project, and to encourage people to complete the questionnaire.

The reminder letter was designed for targeting late respondents.

The questionnaire on leaky home stigma consisted of:

Part A: Background on Leaky Home Syndrome

The concept of monolithic cladding was reviewed together with the history of leaky home syndrome over the past 10 year period. The main purpose of Part A was to introduce some preliminary background information on leaky home syndrome to respondents.

Part B: Reasons Why Leaky Home Stigma Might Exist

In this part, the objective was to test the reasons why people or markets shun remediated leaky homes. Respondents were asked to rank the importance of each factor considered when appraising a remediated leaky home as judged by their experience and knowledge.

A Likert - type format of five importance scales from very important to not important was used. This would allow the researcher to determine the percentage of positive and negative responses for each question by combining the ends of the scale, such as combining Very Important with Moderate Importance and combining Not important and Little Importance.

Questions 1 to 5 were regarding future ongoing expense. Questions 1&2 tested the importance of bank willingness and debt servicing costs, question 3 was concerned with the importance of insurance costs, question 4 was about future remediation work and question 5 was about monitoring cost.

Questions 6 to 11 were related to future market considerations. Question 6 was about the importance of marketing time, question 7 regarded sale price, question 8 related to due diligence costs, question 9 was about life span, question 10 tested health issues of toxic mould and dampness, and question 11 was about compensation claims.

Part C: Scale and Extent of Stigma

This comprised the most important part of this research. In this section, respondents were asked to give their the most appropriate response to each question.

Question 12 was designed to confirm the key question "is there a residual loss in value from leaky home stigma?". Question 13 tried to answer the question "if stigma exists, does it occur before or after the repairs are undertaken, or both?". Question 14 was designed to gauge the respondents' perceptions regarding "which residential properties are most affected by leaky home stigma". Question 15 was about the percentage of value loss from leaky home stigma.

Part D: Additional Leaky Home Stigma Issues

Under this section, some specific features of leaky home stigma were explored. Likert – type format of five scales of agreement from strongly agree to strongly disagree were used to test the level of agreement respondents had with them by combining the ends of the scale, such as combining Strongly Agree with Agree and combining Strongly Disagree and Disagree.

Questions 16 & 17 were designed to identify stigma's time movement feature. Question 18 tested its market movement feature, and questions 19 & 20 were about media and treated framing timber effects on leaky home stigma.

Part E: Background Questions

This part aimed to test the respondents' demographic profile. As a robust research requirement, this contained basic information of selected survey samples and formed the preliminary condition of survey results.

Question 21 was about the respondents' experience with leaky home syndrome, question 22 was about respondents' occupation, question 23 related to respondents' years in current occupation, question 24 was about the respondents' level of education and question 25 was about the regions where respondents usually work.

3.5 Sample Selection

1,362 questionnaires were sent out. The names of real estate salespersons were sourced from an existing database of Graham Crews, Department of Finance, Banking & Property, Albany Campus, Massey University. The valuers together with a small number of building consultants were identified from the list of public valuers on the Valuation Registration Board list.

4.0 ANALYSIS AND RESULTS

4.1 Analysis of Response Rate and Respondents' Demographic

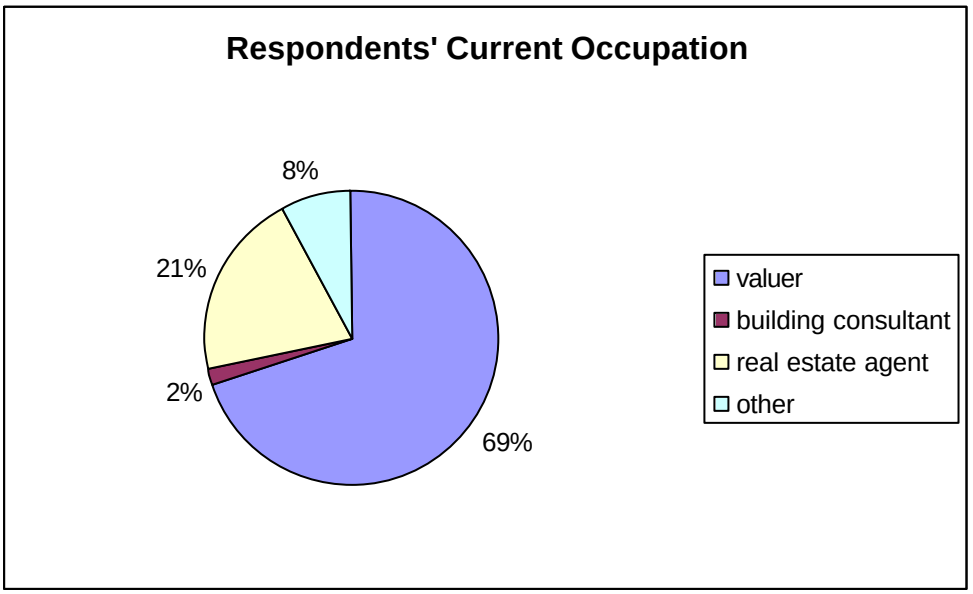
A total of 1,362 questionnaires were sent out on 7 August 2003 and by the survey closure date of 15 September 2003, the total number of questionnaires returned was 525. Among the returned questionnaires, 109 were returned for various reasons because of a change of address or because the person did not have the required knowledge on leaky home stigma, leaving the balance, **416, as valid returns**.

Thus the overall valid response rate was calculated at 33.2%. This was considered within normal expectations and a total of 416 valid return questionnaires would provide a robust statistical analysis by examining them with computer assisted statistical analysis software such as SPSS.

Q22. Respondents' current occupation

Two thirds of the respondents in our study (69%) identified themselves as valuers and one fifth (21%) were real estate agents. Building consultants made up only 2% of the samples, and the rest (8%), identified themselves as others. This is shown in **Figure 1**.

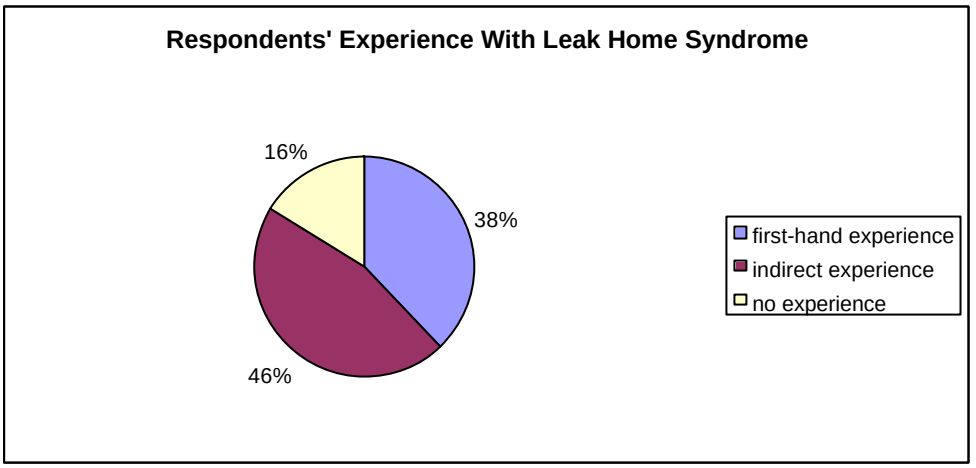
Figure 1: Respondents' Current Occupation



Q21. Respondents' experience with leaky home syndrome

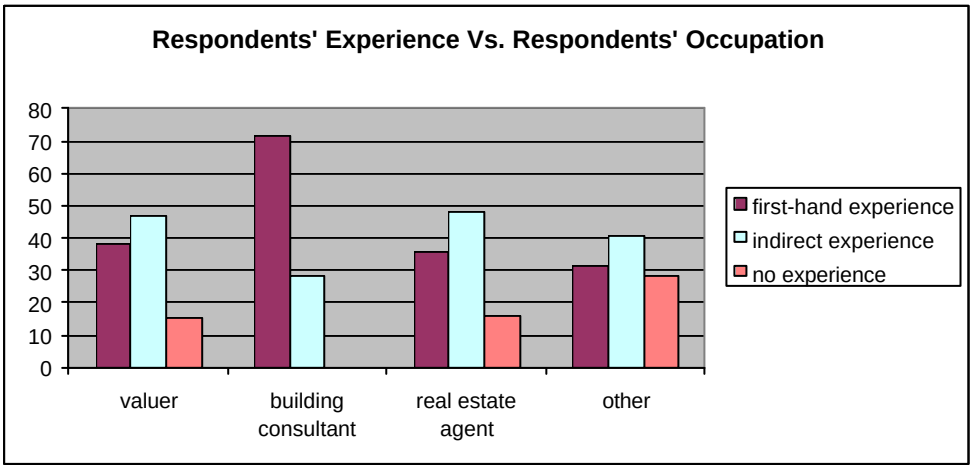
Among the respondents more than one third (38%) had first-hand experience with leaky home syndrome, while 46% said they had indirect experience and 16% said they had no experience at all. This is shown in **Figure 2**.

Figure 2: Respondents' Experience With Leaky Home Syndrome



Further analysis on the relationship between respondents' experience and occupation indicated that there was nearly the same distribution pattern between valuers and real estate salespersons, with 38% of valuers identifying themselves as having first-hand experience and 47% saying they had indirect experience compared with 36% of real estate salespersons identifying themselves as having first-hand experience and 48% saying they had indirect experience. There were only 7 respondents who identified themselves as building consultants and among those five said they had first-hand experience, while the other two said they had indirect experience. This is shown in **Figure 3**.

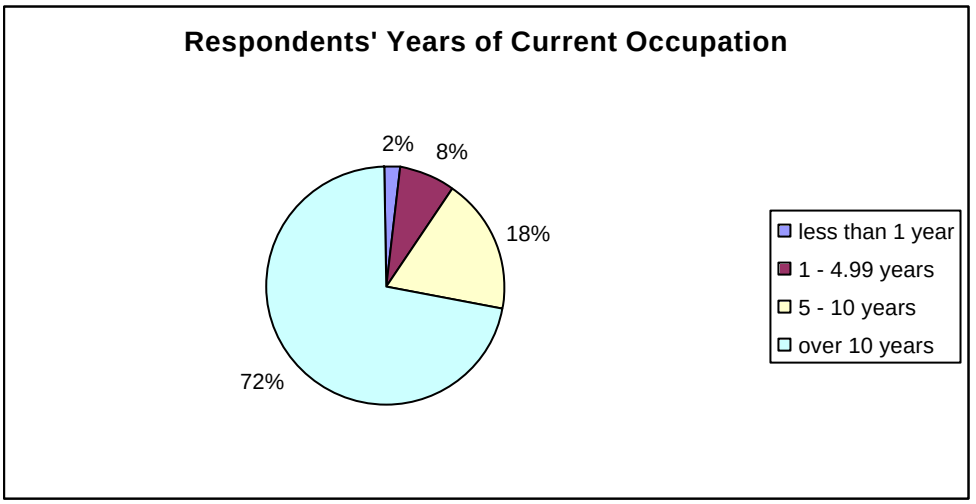
Figure 3: Respondents' Experience Vs. Respondents' Occupation



Q23. Respondents' years of current occupation

With respect to the question "how long have you been employed in your current occupation", more than two thirds (71%) of the respondents said they had been employed in the current occupation over 10 years, while 18% had been employed in their current occupation between 5-10 years. The rest, nearly 10%, were identified as in their current occupation less than 5 years. This is shown in **Figure 4**.

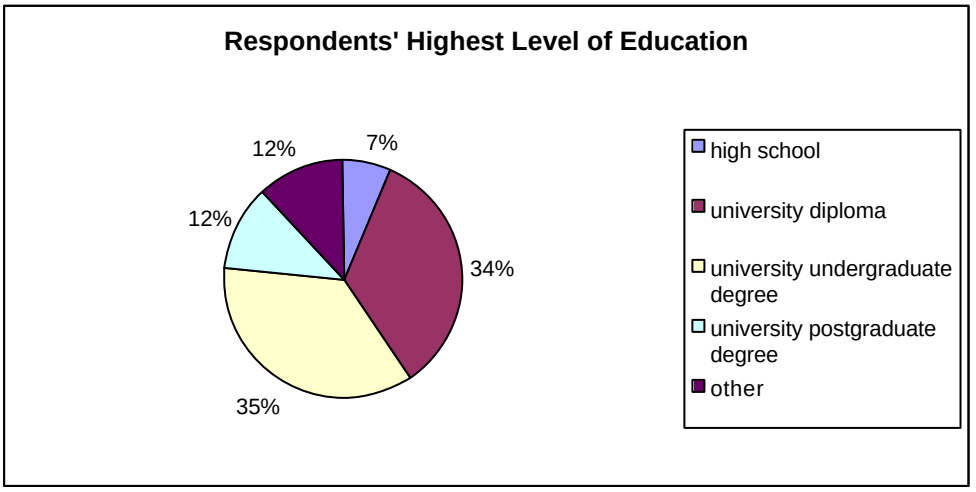
Figure 4: Respondents' Years of Current Occupation



Q24. Respondents' highest level of education

Respondents' highest level of education was also investigated. The vast majority – seven out of ten (69%) – said they had university diploma/degree. The results are shown in **Figure 5**.

Figure 5: Respondents' Highest Level of Education



Q25. Regions where respondents usually work

Finally, respondents were asked where they usually work. The results are given in **Table 1**.

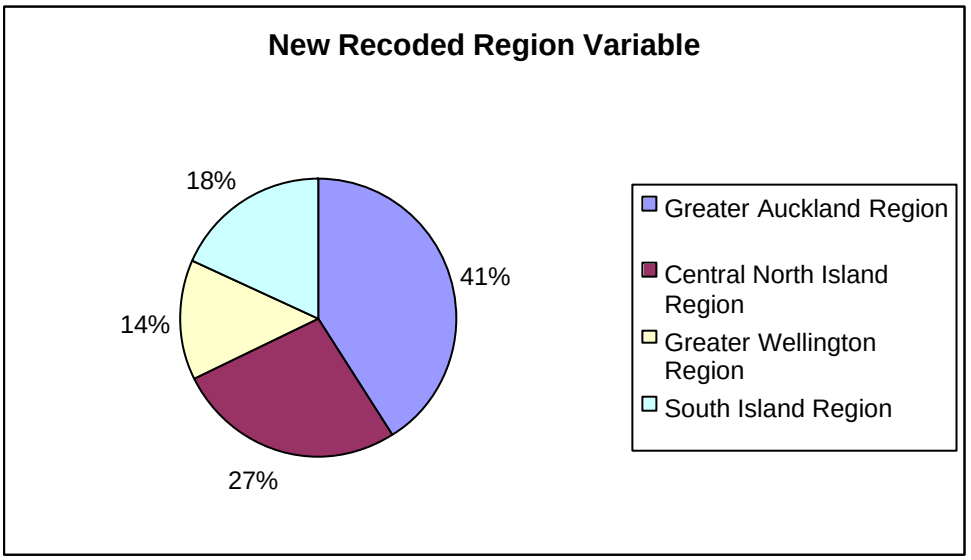
Table 1: Regions Where Respondents Usually Work

	Region	No. of Respondents	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	1 Northland	21	5%	5%	5%
	2 Auckland	148	36%	36%	41%
	3 Waikato	36	9%	9%	50%
	4 Bay of Plenty	44	11%	11%	60%
	5 Gisborne	5	1%	1%	62%
	6 Hawke's bay	19	5%	5%	66%
	7 Taranaki	6	1%	1%	68%
	8 Wanganui	7	2%	2%	69%
	9 Manawatu	16	4%	4%	73%
	10 Wairarapa	3	1%	1%	74%
	11 Wellington	31	7%	8%	82%
	12 Nelson & Bays	9	2%	2%	84%
	13 Marlborough	4	1%	1%	85%
	15 Canterbury	39	9%	9%	94%
	16 Timaru/Oamaru	5	1%	1%	95%
	17 Otago	16	4%	4%	99%
	18 Southland	3	1%	1%	100%
	Total	412	99%	100%	0%
Missing	20 DK	3	1%	0%	0%
	21 NA	1	0%	0%	0%
	Total	4	1%	0%	0%
Total		416	100%	0%	0%

DK – don't know; NA – not applicable

This variable had been recoded as the number of categories was large (18 categories in total) and some of the areas (such as Wairarapa, Marlborough, Timaru/Oamaru and Southland) had relatively few cases. In this study Northland and Auckland were combined to make as a new category of the Greater Auckland Region; Waikato, Bay of Plenty, Gisborne, Hawke's Bay and Taranaki were combined to make a new category of the Central North Island Region; Wanganui, Manawatu, Wairarapa and Wellington were combined to make a new category of the Greater Wellington Region; And finally Nelson & Bays, Marlborough, West Coast, Canterbury, Timaru/Oamaru, Otago and Southland were combined to make a new category of the South Island Region. The results from new recoded region variable are shown in **Figure 6**.

Figure 6: Analysis of New Recoded Region Variable



4.2 Analysis of Future Outgoing Expense Considerations

As discussed in Part 3.2, one of the key considerations in measuring stigma's negative intangible effects was its future ongoing expense to insurance, debt servicing, monitoring and repairing. The survey contained five questions regarding this topic.

Q1. Bank willingness on lending

A total of 416 respondents were in the survey, 2 respondents chose the question as "not applicable" and a total of 414 samples were regarded as valid. Among the 414 valid samples, 231 respondents chose "very important", 147 respondents chose "moderate importance", 18 respondents chose "neither important nor unimportant", 14 respondents chose "little importance" and 4 respondents chose "not important". The SPSS analysis results were shown in **Table 2**.

Table 2: Bank Willingness On Lending

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	231	56	56	56
	2	moderate importance	147	35	36	91
	3	neither important nor unimportant	18	4	4	96
	4	little importance	14	3	3	99
	5	not important	4	1	1	100
	Total		414	100	100	
Missing	8	NA	2	0		
Total			416	100		

When the above results were measured by percentages, 56% of the respondents chose "very important" and 36% answered "moderate importance", giving a total 91% stating that banks' willingness of lending on remediated leaky homes was important when appraising leaky home stigma impacts on residential property value.

Q2. Debt servicing costs

For this question a total of 6 responses were treated as missing values and 410 samples were regarded as valid. Among the 410 valid samples, 106 respondents chose "very important", 143 respondents chose "moderate importance", 87 respondents chose "neither important nor unimportant", 45 respondents chose "little importance" and 29 respondents chose "not important". The SPSS analysis results are shown in **Table 3**.

Table 3: Debt Servicing Costs

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	106	25	26	26
	2	moderate importance	143	34	35	61
	3	neither important nor unimportant	87	21	21	82
	4	little importance	45	11	11	93
	5	not important	29	7	7	100
	Total		410	99	100	
Missing	8	NA	5	1		
	9	DK	1	0		
	Total		6	1		
Total			416	100		

From the above table only 26% of the respondents chose debt servicing costs with remediated leaky homes as "very important". In fact, 21% chose "neither important nor unimportant", while 18% of answered "little or not important". Overall 61% of the respondents took it into account as an importance factor.

Q3. Insurance costs

A total of 416 respondents were in the survey and 414 samples were regarded as valid. Among the 414 valid samples, 208 respondents chose "very important", 141 respondents chose "moderate importance", 32 respondents chose "neither important nor unimportant", 26 respondents chose "little importance" and 7 respondents chose "not important". The SPSS analysis results were shown in **Table 4**.

Table 4: Insurance Costs

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	208	50	50	50
	2	moderate importance	141	34	34	84
	3	neither important nor unimportant	32	8	8	92
	4	little importance	26	6	6	98
	5	not important	7	2	2	100
	Total		414	100	100	
Missing	8	NA	1	0		
	9	DK	1	0		
	Total		2	0		
Total			416	100		

Clearly, in answer to this question, half of the respondents (50%) said it was "very important", while 34% identified it as of "moderate importance", giving a total of 84% believing that it was an important consideration.

Q4. Future remediation work

A total of 416 respondents were in the survey and 415 samples were regarded as valid. Among the 415 valid samples, 298 respondents chose “very important”, 109 respondents chose “moderate importance”, 7 respondents chose “neither important nor unimportant”, 1 respondent chose “little importance” and no respondents chose “not important”. The SPSS analysis results are shown in **Table 5**.

Table 5: Future Remediation Work

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	298	72	72	72
	2	moderate importance	109	26	26	98
	3	neither important nor unimportant	7	2	2	100
	4	little importance	1	0	0	100
	Total		415	100	100	
Missing	8	NA	1	0		
Total			416	100		

A majority (72%) of the respondents chose that future remediation work was “very important” and 26% said it was of “moderate importance”. In contrast, only 2% identified it as of “neutral or little importance” and no respondents said it was “not important”.

Q5. Weathertightness consultation costs

A total of 416 respondents were in the survey and 413 samples were regarded as valid. Among the 413 valid samples, 132 respondents chose “very important”, 200 respondents chose “moderate importance”, 45 respondents chose “neither important nor unimportant”, 32 respondents chose “little importance” and 4 respondents chose “not important”. The SPSS analysis results are shown in **Table 6**.

Table 6: Weathertightness Consultation Costs

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	132	32	32	32
	2	moderate importance	200	48	48	80
	3	neither important nor unimportant	45	11	11	91
	4	little importance	32	8	8	99
	5	not important	4	1	1	100
	Total		413	99	100	
Missing	8	NA	1	0		
	9	DK	2	0		
	Total		3	1		
Total			416	100		

Clearly one third of the respondents (32%) claimed that it was “very important”, while nearly half of the respondents (48%) said it was of “moderate importance”. A total of 80% agreed that it was an important consideration.

4.3 Analysis of Future Market Considerations

As discussed in Part 3.2, future market considerations to diminished price, increased marketing time, due diligence costs, health issues of toxic mould and dampness were another aspect to consider when measuring stigma effects. Six questions regarding this topic were collected in this survey. They were:

Q6. Marketing time

A total of 416 respondents were in the survey and 415 samples were regarded as valid. Among the 415 valid samples, 195 respondents chose "very important", 176 respondents chose "moderate importance", 28 respondents chose "neither important nor unimportant", 12 respondents chose "little importance" and 4 respondents chose "not important". The SPSS analysis results were shown in **Table 7**.

Table 7: Marketing Time

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	195	47	47	47
	2	moderate importance	176	42	42	89
	3	neither important nor unimportant	28	7	7	96
	4	little importance	12	3	3	99
	5	not important	4	1	1	100
	Total		415	100	100	
Missing	9	DK	1	0		
Total			416	100		

When measured in percentages, 47 percent chose it was "very important" and 42 percent said it had "moderate importance". A total of 89% agreed that it was an important consideration.

Q7. Sale price discount

A total of 416 respondents were in the survey, 2 samples were treated as missing values and 414 samples were regarded as valid. Among the 414 valid samples, 232 respondents chose "very important", 133 respondents chose "moderate importance", 25 respondents chose "neither important nor unimportant", 18 respondents chose "little importance" and 6 respondents chose "not important". The SPSS analysis results are shown in **Table 8**.

Table 8: Sale Price Discount

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	232	56	56	56
	2	moderate importance	133	32	32	88
	3	neither important nor unimportant	25	6	6	94
	4	little importance	18	4	4	99
	5	not important	6	1	1	100
	Total		414	100	100	
Missing	9	DK	2	0		
Total			416	100		

When measured in percentages, 56% ranked it as “very important”, while 32% said it was of “moderate importance”. Overall 88% indicated that it was an important factor.

Q8. Due diligence costs

A total of 416 respondents were in the survey, 2 samples were treated as missing values and 414 samples were regarded as valid. Among the 414 valid samples, 186 respondents chose “very important”, 169 respondents chose “moderate importance”, 32 respondents chose “neither important nor unimportant”, 21 respondents chose “little importance” and 6 respondents chose “not important”. The SPSS analysis results are shown in **Table 9**.

Table 9: Due Diligence Costs

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	186	45	45	45
	2	moderate importance	169	41	41	86
	3	neither important nor unimportant	32	8	8	93
	4	little importance	21	5	5	99
	5	not important	6	1	1	100
	Total		414	100	100	
Missing	8	NA	1	0		
	9	DK	1	0		
	Total		2	0		
Total			416	100		

When measured in percentages, 45% identified it as “very important”, while 41% claimed it was “moderate importance”. Overall 86% ranked it as an important factor.

Q9. Life span

A total of 416 respondents were in the survey, 5 samples were treated as missing values and 411 samples were regarded as valid. Among the 411 valid samples, 136 respondents chose “very important”, 174 respondents chose “moderate importance”, 64 respondents chose “neither important nor unimportant”, 32 respondents chose “little importance” and 5 respondents chose “not important”. The SPSS analysis results were shown in **Table 10**.

Table 10: Life Span

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	136	33	33	33
	2	moderate importance	174	42	42	75
	3	neither important nor unimportant	64	15	16	91
	4	little importance	32	8	8	99
	5	not important	5	1	1	100
	Total		411	99	100	
Missing	8	NA	3	1		
	9	DK	2	0		
	Total		5	1		
Total			416	100		

Only one third of the respondents (33%) chose it as “very important”, 42% said it was of “moderate importance”. Overall 75% agreed that it was an important consideration and 16% treated it as a neutral factor.

Q10. Health issues of toxic mould and dampness

A total of 416 respondents were in the survey, 1 respondent left the question as “not applicable”, 2 respondents chose “don’t know”, giving a total of 3 were treated as missing values and 413 were regarded as valid. Among 413 valid samples, 164 respondents chose “very important”, 186 respondents chose “moderate importance”, 32 respondents chose “neither important nor unimportant”, 27 respondents chose “little importance” and 4 respondents chose “not important”. The SPSS analysis results were shown in **Table 11**.

Table 11: Health Issue Of Toxic Mould And Dampness

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	164	39	40	40
	2	moderate importance	186	45	45	85
	3	neither important nor unimportant	32	8	8	92
	4	little importance	27	6	7	99
	5	not important	4	1	1	100
	Total		413	99	100	
Missing	8	NA	1	0		
	9	DK	2	0		
	Total		3	1		
Total			416	100		

When measured by percentages, 40% agreed that it was “very important”, while 45% said it had a “moderate importance”. Overall 85% said it was an important consideration.

Q11. Compensation claims

A total of 416 respondents were in the survey, 5 samples were treated as missing values and 411 samples were regarded as valid. Among the 411 valid samples, 252 respondents chose “very important”, 114 respondents chose “moderate importance”, 25 respondents chose “neither important nor unimportant”, 18 respondents chose “little importance” and 2 respondents chose “not important”. The SPSS analysis results are shown in **Table 12**.

Table 12: Compensation Claims

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	very important	252	61	61	61
	2	moderate importance	114	27	28	89
	3	neither important nor unimportant	25	6	6	95
	4	little importance	18	4	4	100
	5	not important	2	0	0	100
	Total		411	99	100	
Missing	8	NA	2	0		
	9	DK	3	1		
	Total		5	1		
Total			416	100		

When measured by percentages, 61% said it was “very important”, while 28% chose “moderate importance”. Overall 89% agreed that it was an important consideration.

4.4 Analysis Of Reasons Why Stigma Exists

When the survey questionnaire was designed, it was the researcher's intention to explore the reasons why stigma might exist. After the conceptual framework of stigma was carefully defined as a "negative intangible" loss on a remediated leaky home in this study (see section **3.2**), it was the researcher's hypothesis that during the fourth recovery stage (Bell's Four Stages of Recovery Theory) ongoing expense and market considerations were the main considerations that caused people or markets to shun remediated leaky homes. Other considerations, such as fear of hidden remediation costs, the "trouble" factor associated with the work involved in remediation and fear of public liability, were of secondary importance or might not even exist as the damaged homes had been already remediated at this stage.

With respect to the technique used in assessing the importance order of each factor against the others, it was considered difficult to ask the respondents to rank the order of importance of one element against all eleven others and other advanced survey methods should be applied.

In this survey respondents were asked to rank the importance degree of each factor or question as it would be important to them when appraising a remediated leaky home as judged by their experience and knowledge. In other words respondents were asked to place the importance degree against all the others in an overall consideration. It could be argued that the results of this section should be subjected to further research as the survey method used here was not academically sophisticated. However, in general it gave a good overall picture of the reasons why people or markets might shun remediated leaky homes. The summarised survey results of section 4.1 and 4.2 are shown in **Table 13.**

Table 13: Summary Of The Reasons Why Stigma Might Exist

Question No.	Question	Very Important	Moderate Importance	Total Importance
1	Willingness of Bank Lending	55.8%	35.5%	91.3%
2	Debt Servicing Costs	25.9%	34.9%	60.8%
3	Insurance Costs	50.2%	34.1%	84.3%
4	Future Remediation Work	71.8%	26.3%	98.1%
5	Weathertightness Consultation Costs	32.0%	48.4%	80.4%
6	Marketing Time	47.0%	42.4%	89.4%
7	Sale Price Discount	56.0%	32.1%	88.1%
8	Due Diligence Costs	44.7%	40.8%	85.5%
9	Life Span	33.1%	42.3%	75.4%
10	Health Issue of Toxic Mould and Dampness	39.7%	45.0%	84.7%
11	Compensation Claims	61.3%	27.7%	89.0%

When the above table was sorted by total importance, which combined the percentages of "very important" and "moderate importance", it was found that first five important factors were future remediation work (98%), followed by willingness of bank lending (91%), then marketing time (89%), compensation claims (89%) and sale price discount (88%). It was interesting to note that debt servicing costs (61%), life span (75%) and weathertightness consultation costs (80%) were at the bottom, while insurance costs (84%), toxic mould/dampness (85%) and due diligence costs (86%) were of moderate importance when taking into account leaky home stigma impacts on remediated residential property values. This is shown in **Table 14**.

Table 14: Reasons In Overall Importance Order

Question No.	Question	Very Important	Moderate Importance	Total Importance
4	Future Remediation Work	71.8%	26.3%	98.1%
1	Willingness of Bank Lending	55.8%	35.5%	91.3%
6	Marketing Time	47.0%	42.4%	89.4%
11	Compensation Claims	61.3%	27.7%	89.0%
7	Sale Price Discount	56.0%	32.1%	88.1%
8	Due Diligence Costs	44.7%	40.8%	85.5%
10	Health Issue of Toxic Mould and Dampness	39.7%	45.0%	84.7%
3	Insurance Costs	50.2%	34.1%	84.3%
5	Weathertightness Consultation Costs	32.0%	48.4%	80.4%
9	Life Span	33.1%	42.3%	75.4%
2	Debt Servicing Costs	25.9%	34.9%	60.8%

When the Table 13 was sorted by “very important”, we found that future remediation work was still at the top (72%), followed by compensation claims (61%), then sale price discount (56%), willingness of bank lending (56%) and insurance cost (50%). Marketing time (47%), due diligence costs (45%) and toxic mould/dampness (40%) were toward the middle, while life span (33%), weathertightness consultation costs (32%) and debt servicing costs (26%) were at the bottom. The results are shown in **Table 15**.

Table 15: Reasons In “Very Important” Order

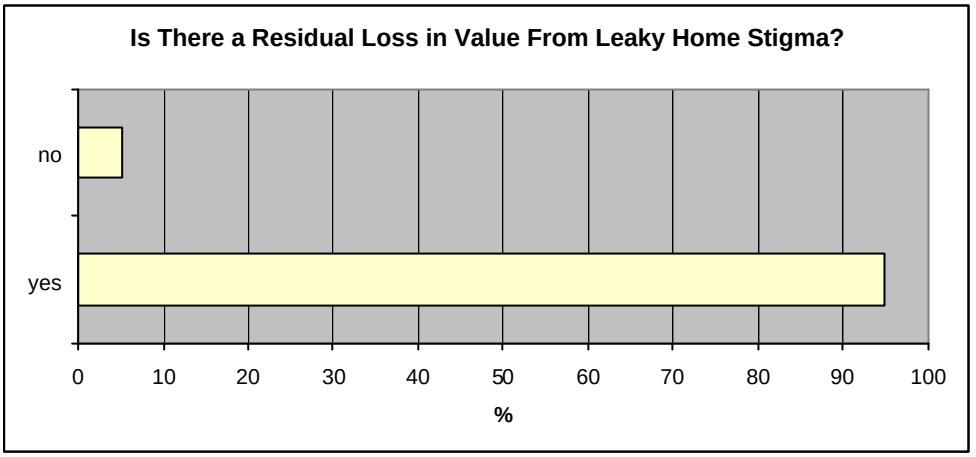
Question No.	Question	Very Important	Moderate Importance	Total Importance
4	Future Remediation Work	71.8%	26.3%	98.1%
11	Compensation Claims	61.3%	27.7%	89.0%
7	Sale Price Discount	56.0%	32.1%	88.1%
1	Willingness of Bank Lending	55.8%	35.5%	91.3%
3	Insurance Costs	50.2%	34.1%	84.3%
6	Marketing Time	47.0%	42.4%	89.4%
8	Due Diligence Costs	44.7%	40.8%	85.5%
10	Health Issue of Toxic Mould and Dampness	39.7%	45.0%	84.7%
9	Life Span	33.1%	42.3%	75.4%
5	Weathertightness Consultation Costs	32.0%	48.4%	80.4%
2	Debt Servicing Costs	25.9%	34.9%	60.8%

4.5 Analysis of Scale and Extent of Stigma

Q12. Is there a residual value loss from leaky home stigma?

To this question, 95% of the respondents chose "yes", and only 5% said "no". The results are illustrated in **Figure 7**.

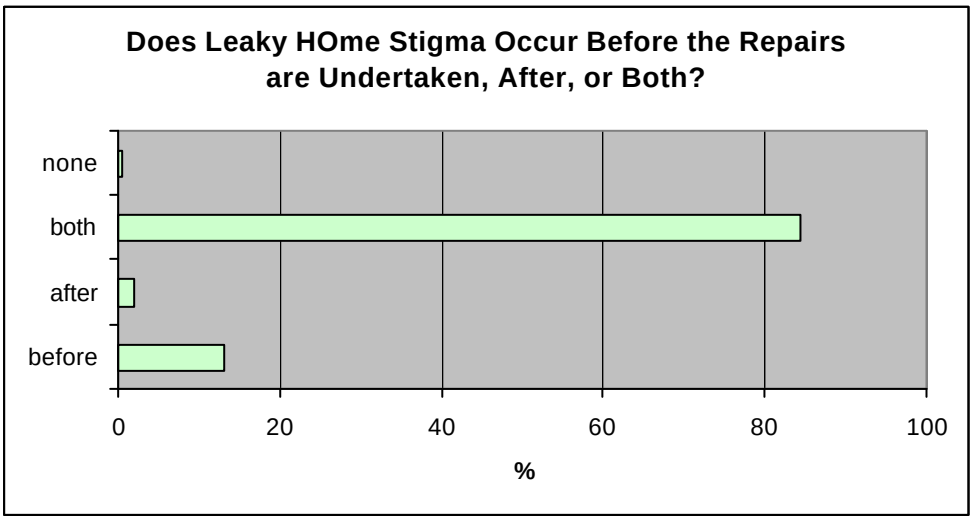
Figure 7: Is There A Residual Loss in Value From Leaky Home Stigma?



Q13. Does leaky home stigma occur before the repairs are undertaken, after, or both?

The vast majority (85%) indicated it occurred both before and after the repairs were undertaken, while 13% said it occurred before the repairs. Only 2% claimed it occurred after the repairs and 0.5% chose "none". This is shown in **Figure 8**.

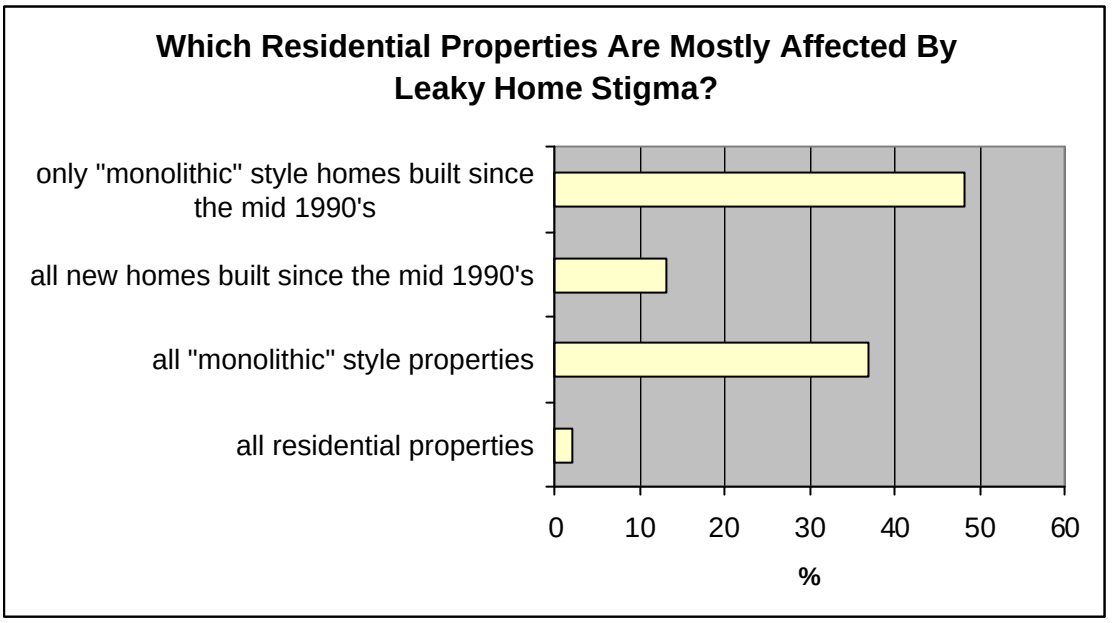
Figure 8: Does Leaky Home Stigma Occur Before The Repairs Are Undertaken, After, Or Both?



Q14. Most affected residential properties

One third of the respondents (37%) in the study said that leaky home stigma most affected "all monolithic style properties", while nearly half of the respondents (48%) chose "only monolithic style homes built since the mid 1990's". The rest, 13% said it would most affect "all new homes built since the mid 1990's" and only 2% claimed that it would affect "all residential properties". The results are shown in **Figure 9**.

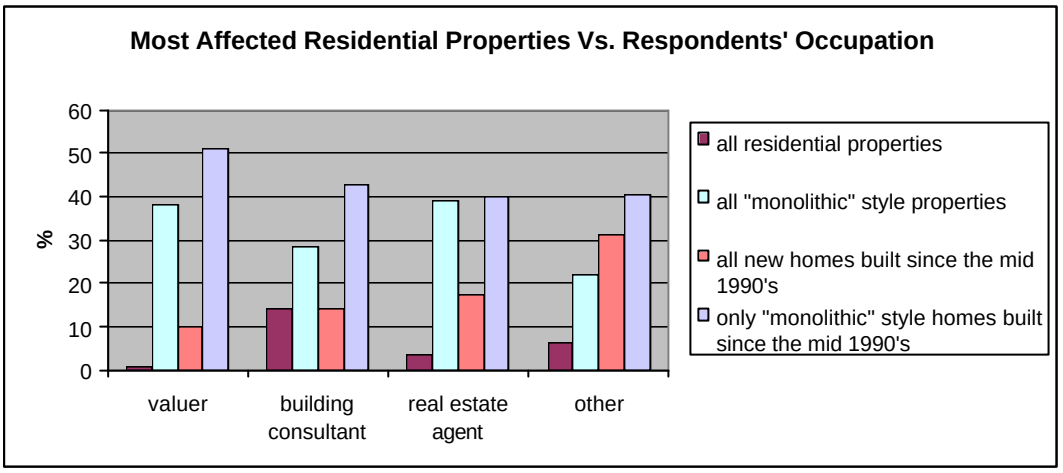
Figure 9: Which Residential Properties Are Most Affected By Leaky Home Stigma?



Clearly, among homes built since the mid 1990's monolithic style properties are the benchmark in identifying leaky home stigma.

Further analysis indicated that 38% of valuers said that it would most affect “all monolithic style properties”, while 51% chose “only monolithic style homes built since the mid 1990’s” and only 10% said “all new homes built since the mid 1990’s”. In contrast, 39% of real estate agents said it would most affect “all monolithic style properties”, 40% chose “only monolithic style homes built since the mid 1990’s” and 18% said “all new homes built since the mid 1990’s”. This is shown in **Figure 10**.

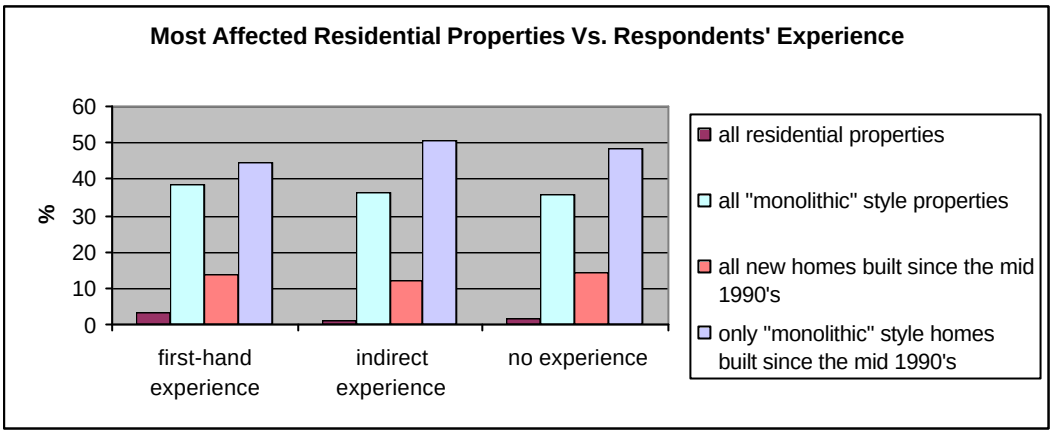
Figure 10: Most Affected Residential Properties Vs. Respondents’ Occupation



This might imply that valuers chose “only monolithic style homes built since the mid 1990’s”, while real estate agents tended to see no difference between new and old monolithic style homes. But the general relationship between the two variables was very weak as indicated by a lambda value of 0.003. Lambda is a measure of association to nominal variables and it is based on the proportionate reduction of error (PRE) model. This value indicated that knowing the respondents’ occupations allowed for only 0.3% fewer errors than if the respondents’ occupations were not known.

Further analysis of respondents’ experience with leaky home stigma showed that 38% of the respondents with first hand experience chose “all monolithic style properties”, 14% said “all new homes built since the mid 1990’s” and 45% chose “only monolithic style homes built since the mid 1990’s”. Contrasted to respondents with indirect experience, 36% percent chose “all monolithic style properties”, 12 % said “all new homes built since the mid 1990’s” and 51% chose “only the monolithic style homes built since the mid 1990’s”. The results are shown in **Figure 11**.

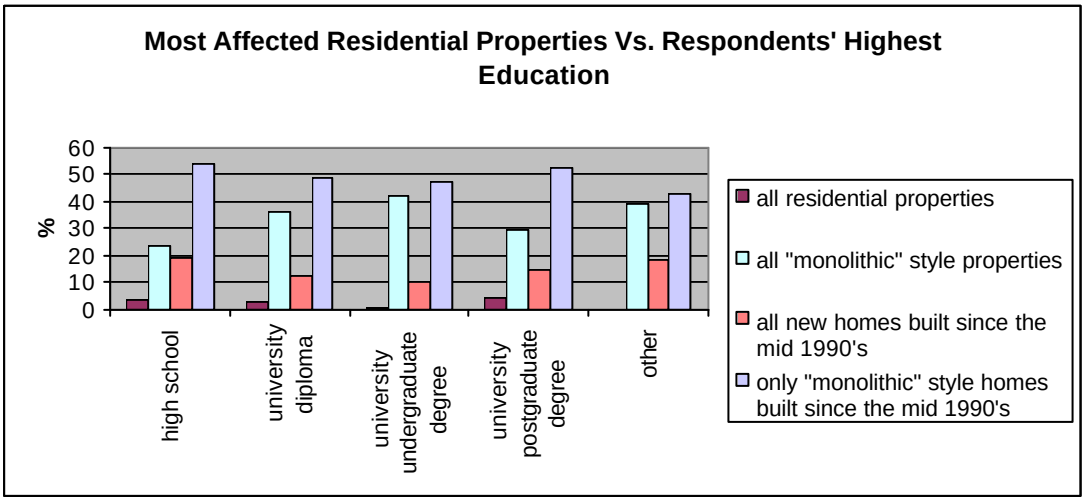
Figure 11: Most Affected Residential Properties Vs. Respondents' Experience



The results might imply that respondents with first hand experience did not see as much difference of leaky home stigma between new and old monolithic style homes as did respondents with indirect or no experience. Again the relationship between these two variables was weak as measured by a calculated lambda of 0.007.

Next the effect of respondents' highest level of education on their opinion of most affected properties was analysed. More than half of the respondents with lower (high school) or higher (postgraduate) level of education chose "only monolithic style homes built since the mid 1990's", while those with a medium level of education (university diploma/degree) tended to choose not much difference between new and old monolithic style homes. The results are shown in **Figure 12**.

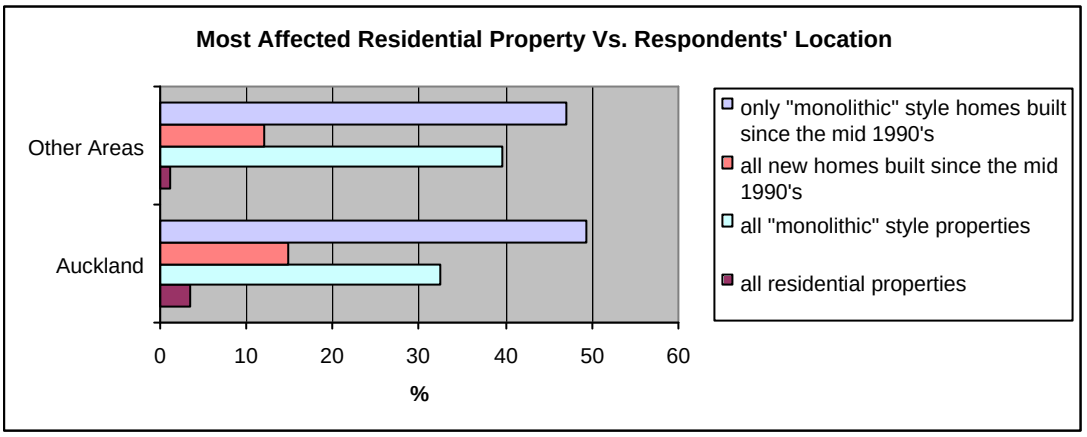
Figure 12: Most Affected Residential Properties Vs. Respondents' Highest Level Of Education.



However the relationship between the two variables was weak as indicated by a lambda value of 0.011.

Finally the location effect on most affected residential properties was tested. The results showed that location effect was limited as indicated by a lambda value of 0.006. The results were shown in **Figure 13**.

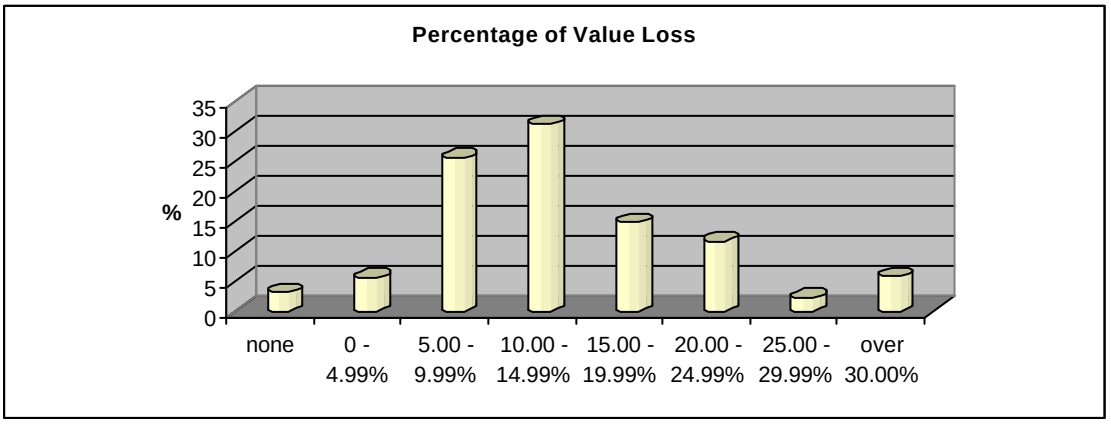
Figure 13: Most Affected Residential Properties Vs. Respondents' Location



Q15. Percentage of value loss with respect to remediated leaky homes?

One quarter of the respondents (26%) believed the percentage of value loss from leaky home stigma with respect to remediated leaky homes was between 5 to 9.99%, while nearly one third (31%) chose between 10 to 14.99%. 15% of the respondents said it was between 15 to 19.99% and 12% claimed it was between 20 to 24.99%. About 6% of the respondents chose that it was over 30% and the rest were spread thinly across a wide variety of other percentage groups. The survey results are summarised in **Figure 14**.

Figure 14: Percentage of Value Loss



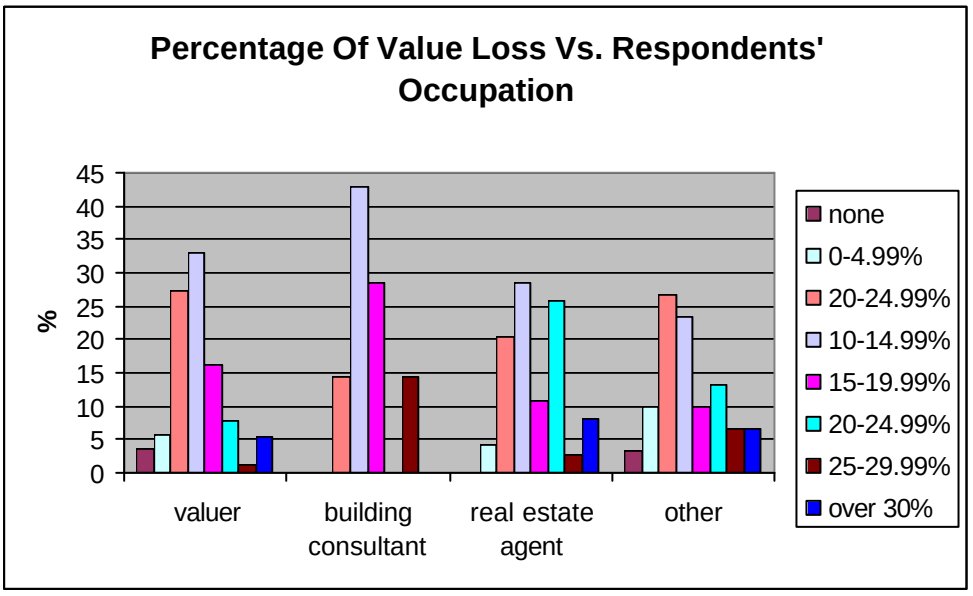
The calculated mean was 4.22 with a standard deviation of 1.57. This could be interpreted as respondents believing that the average loss of value was 13.60%, with 67% of respondents indicating that it was between 7.85% and 21.45%. The statistics are shown in **Table 16**.

Table 16: Statistical Analysis Of Percentage Of Value Loss

Number of valid responses		359
Invalid response		57
Mean		4.22
Std. Deviation		1.57
Variance		2.46
Range		7
Percentiles	25	3
	50	4
	75	5

Detailed analysis indicated that among valuers, 33% said that the percentage of value loss was between 10 to 15%, 27% chose that it was between 5 to 10% and only 8% said that it was between 20 to 25%. In contrast, 28% of real estate agents said that it was between 10 to 15%, 20% chose that it was between 5 to 10% and 26% said that it was between 20 to 25%. The results are summarised in **Figure 15**:

Figure 15: Percentage of Value Loss Vs. Respondents' Occupation



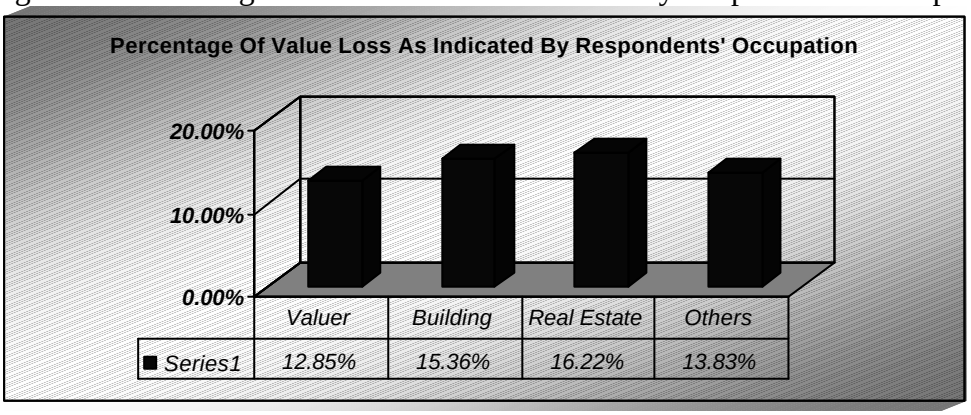
The calculated descriptive statistics are summarised in **Table 17.**

Table 17: Statistical Analysis Of Percentage Of Value Loss Vs. Respondents' Current Occupation

Respondents' current occupation	Mean	Std. Deviation	Number of respondents
valuer	4.07	1.50	246
building consultant	4.57	1.27	7
real estate agent	4.74	1.59	74
other	4.27	1.82	30
Overall	4.24	1.56	357

Clearly valuers noted a lower percentage of value loss than real estate agents, with a mean of 4.07 (12.85%) for valuers as compared to a mean of 4.7 (16.22%) for real estate agents. The overall effects are shown in **Figure 16**.

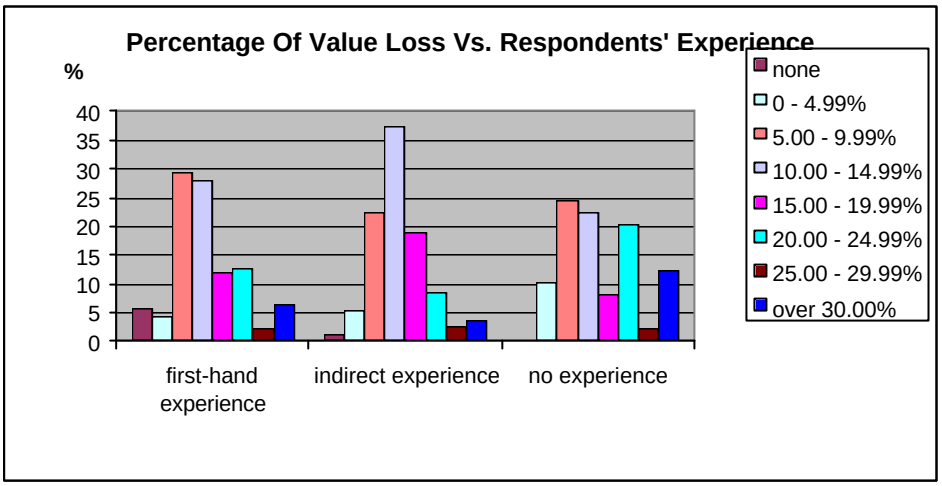
Figure 16: Percentage of Value Loss As Indicated By Respondents' Occupation



Further statistical analysis through analysis of variance (ANOVA) showed that the significance level of the Levene's Test was 0.064 (more than 0.05) and that the variances were considered equal for respondents' current occupation. However the statistical significance between the two variables was only 0.011, which would mean that if percentage of value loss and respondents' occupation were unrelated to each other, we might expect samples that would generate this amount of explained variance about one in 100 samples.

Further analysis of respondents' experience with leaky home stigma showed that 29% of the respondents with first hand experience chose a percentage of value loss between 5 to 10% and 28% believed that it was between 10 to 15%, while among people with indirect experience 23% chose that it was between 5 to 10% and 37% chose that it was between 10 to 15%. The results are shown in **Figure 17**.

Figure 17: Percentage of Value Loss Vs. Respondents' Experience

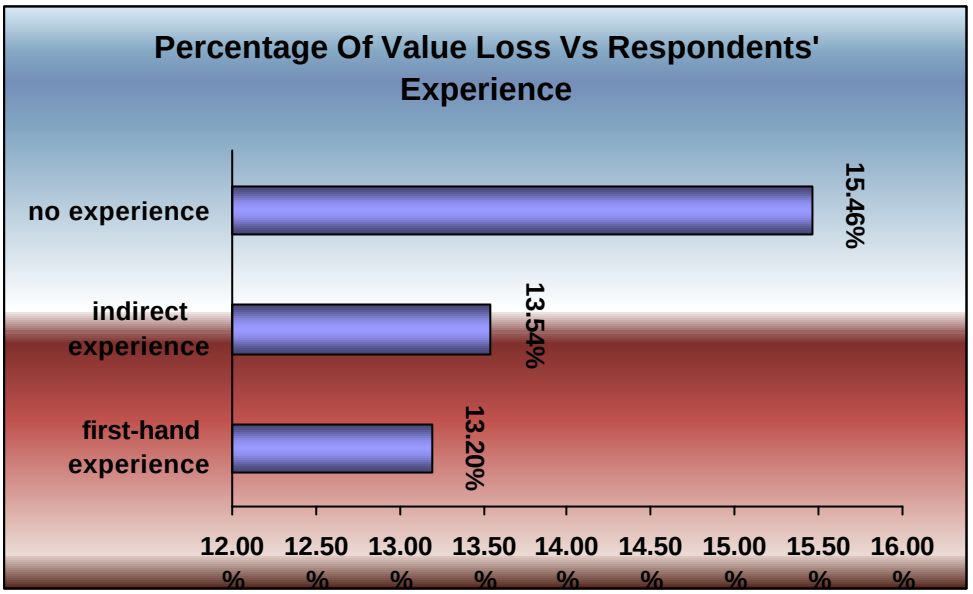


Clearly respondents with direct experience placed a lower percentage of value loss than people with indirect or no experience. But the dispersion of people with indirect experience was more centralised than the other two groups. Detailed statistical analysis is shown in **Table 18** and **Figure 18**.

Table 18: Statistical Analysis Of Percentage Of Value Loss Vs. Respondents' Experience

Respondents' experience	Mean	Std. Deviation	Number of respondents
first-hand experience	4.12	1.67	143
indirect experience	4.21	1.36	164
no experience	4.59	1.85	49
Overall	4.23	1.57	356

Figure 18: Percentage of Value Loss Vs. Respondents' Experience



Finally the location effects on the percentage of value loss due to leaky home stigma were tested. The results showed that among the four recoded regions, the respondents from the South Island region indicated a lowest percentage of value loss from leaky home stigma, followed by the respondents from the Greater Wellington region and the Greater Auckland region. It was interesting to find that respondents from the Central North Island region indicated the highest percentage of value loss from leaky home stigma. This was shown in **Figure 19** and **Table 19**.

Figure 19: Percentage Of Value Loss Vs. Respondents' Location

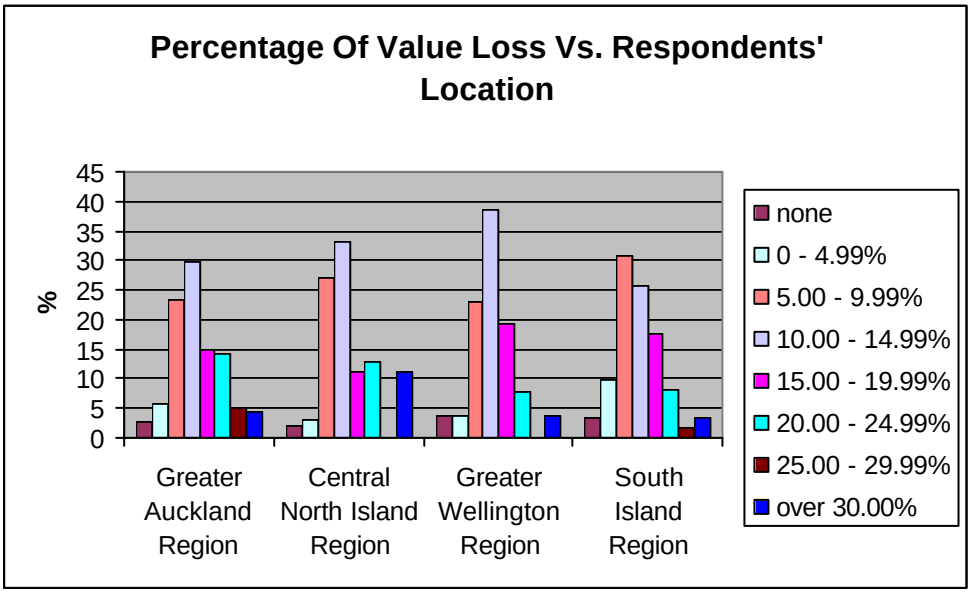


Table 19: Statistical Analysis Of Percentage Of Value Loss Vs. New Recoded Region Categories

New Recoded Region Categories	Mean	Std. Deviation	Number of respondents
Greater Auckland Region	4.32	1.57	141
Central North Island Region	4.42	1.68	100
Greater Wellington Region	4.08	1.37	52
South Island Region	3.92	1.47	62
Overall	4.24	1.56	355

The Levene's significance level was 0.115 and the statistical significance of the explained variance was 0.182. The variances were considered equal for each 4 location groups and 18% of variance on percentage of value loss had been explained by the new recoded location variable.

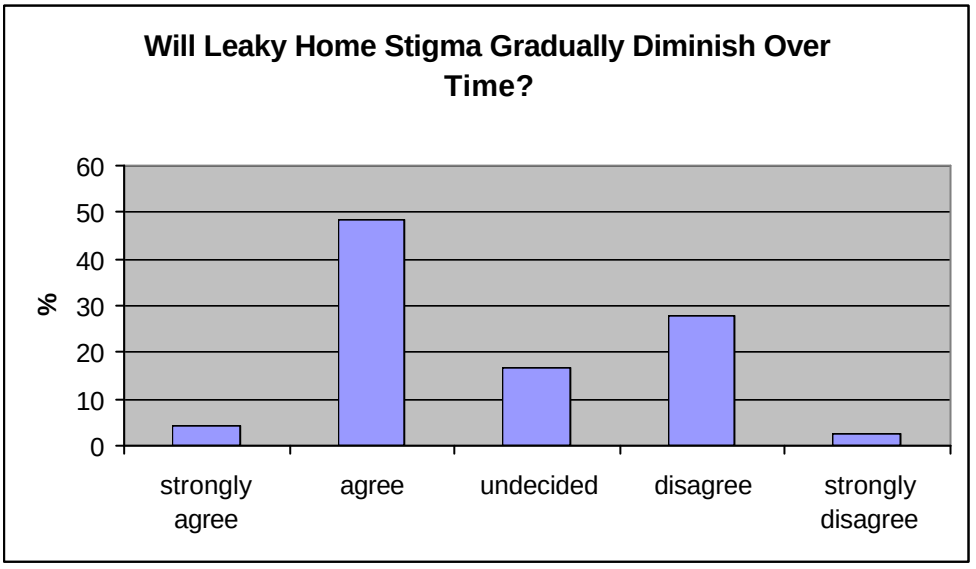
4.6 Analysis of Others Specific Nature of Stigma

Historic studies showed that stigma often changed over time and other factors such as market condition, media and political policy also had an influence. Five questions regarding this topic were posed in this survey. They were:

Q16. Will leaky home stigma gradually diminish over time?

To this question, half of the respondents (53%) chose "agree" while a quarter of the respondents (30%) chose "disagree" and the rest (17%) chose "undecided". This was shown in **Figure 20**.

Figure 20: Will Leaky Home Stigma Gradually Diminish Over Time?

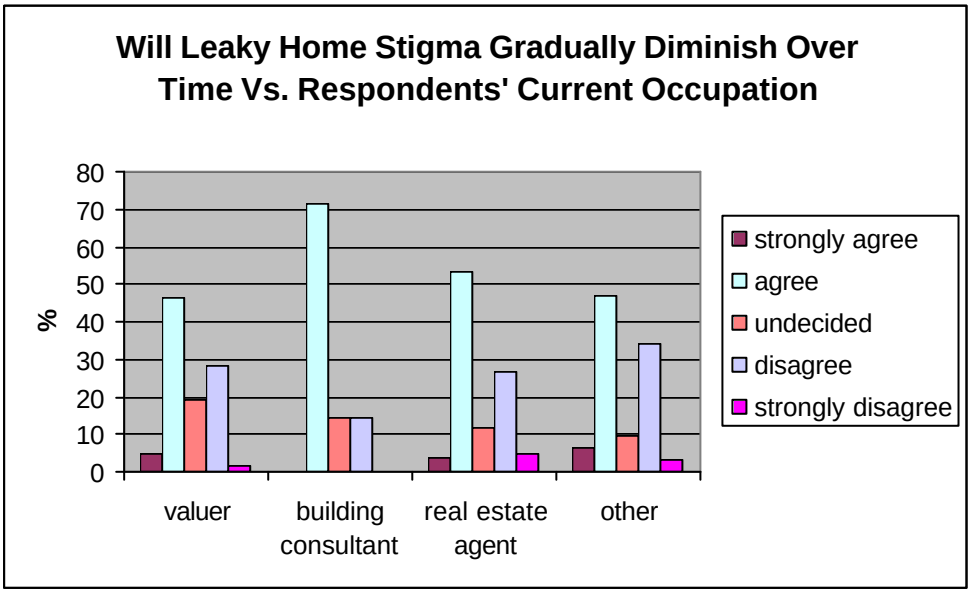


Further analysis showed that there was not much difference between valuers and real estate salespersons when answering this question. 47% of valuers chose “agree” and 28% chose “disagree”. By contrast to 54% of real estate salespersons said “agree” and 27% chose “disagree”. Statistical analysis showed that valuers had a mean of 2.75 with a standard deviation of 0.97 for this question and real estate agents had a mean of 2.75 with a standard deviation of 1.04. This is illustrated in **Table 20** and **Figure 21**.

Table 20: Statistical Analysis Of Stigma Diminishing Over Time Vs. Respondents’ Current Occupation

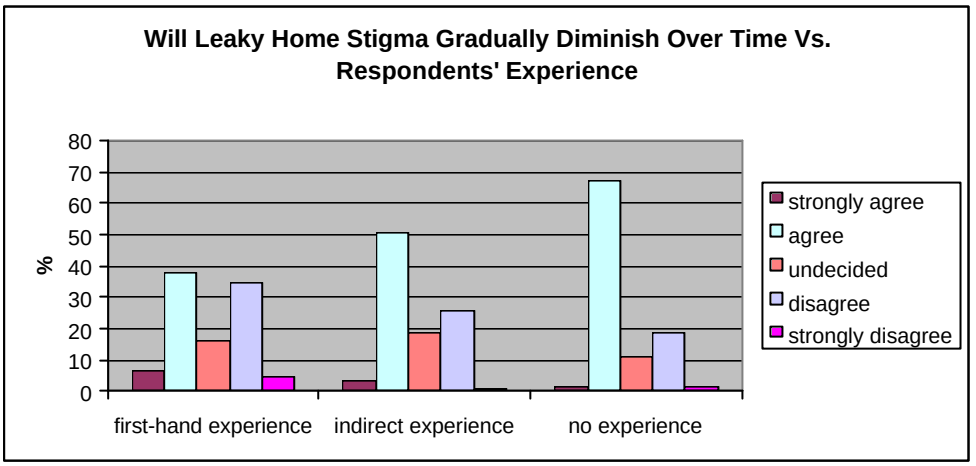
Respondents’ current occupation	Mean	Std. Deviation	Number of respondents
valuer	2.76	0.97	285
building consultant	2.43	0.79	7
real estate agent	2.76	1.04	86
other	2.81	1.09	32
Overall	2.76	0.99	410

Figure 21: Will Leaky Home Stigma Diminish Over Time Vs. Respondents’ Occupation



Further analysis on the effect of respondents' experience showed that the respondents with first-hand experience tended to choose either "agree" (38%) or "disagree" (35%) in contrast the respondents with indirect experience of whom 51% chose "agree" and 19% chose "disagree". Clearly people with no experience were most likely to agree with this question when compared to people with indirect or first-hand experience. This is shown in **Figure 22**.

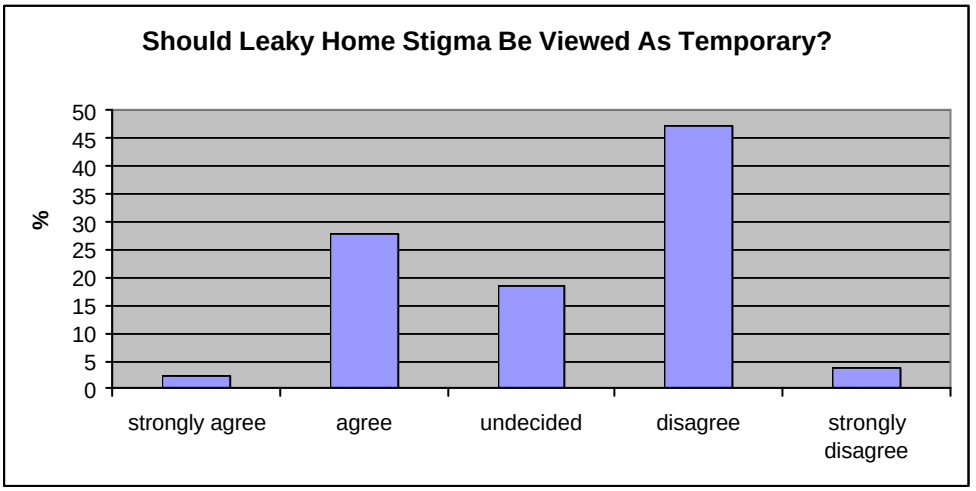
Figure 22: Will Leaky Home Stigma Gradually Diminish Over Time Vs. Respondents' Experience



Q17. Should leaky home stigma be viewed as temporary?

The majority of respondents (51%) indicated that it should not be viewed as temporary. This is in line with the response to question 16, where respondents indicated that it would gradually diminish over time. The results are shown in **Figure 23**.

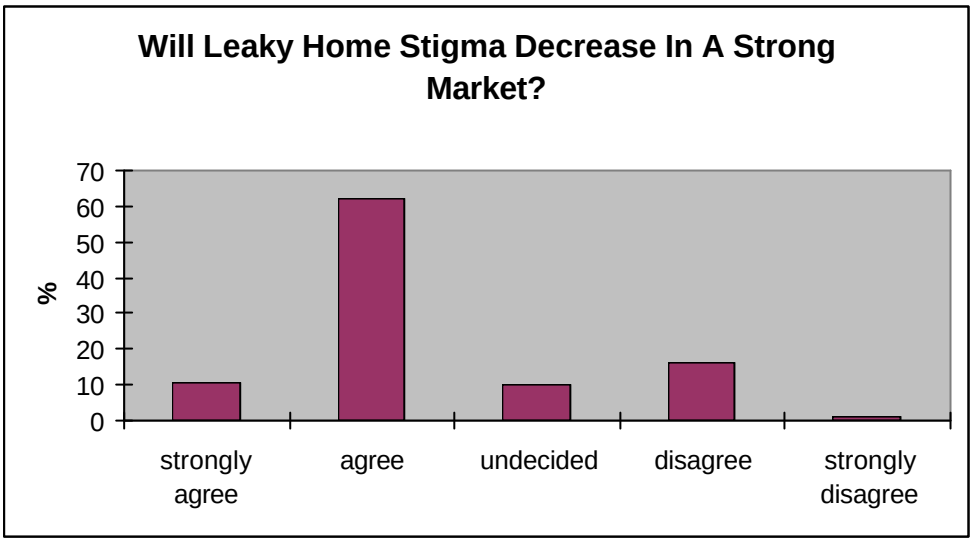
Figure 23: Should Leaky Home Stigma Be Viewed As Temporary?



Q18. Will stigma decrease in a strong market where demand exceeds supply?

The vast majority (73%) chose "strongly agree" and "agree" leaving 10% "undecided", 17% "disagree" and only 1% "strongly disagree". This is shown in **Figure 24**:

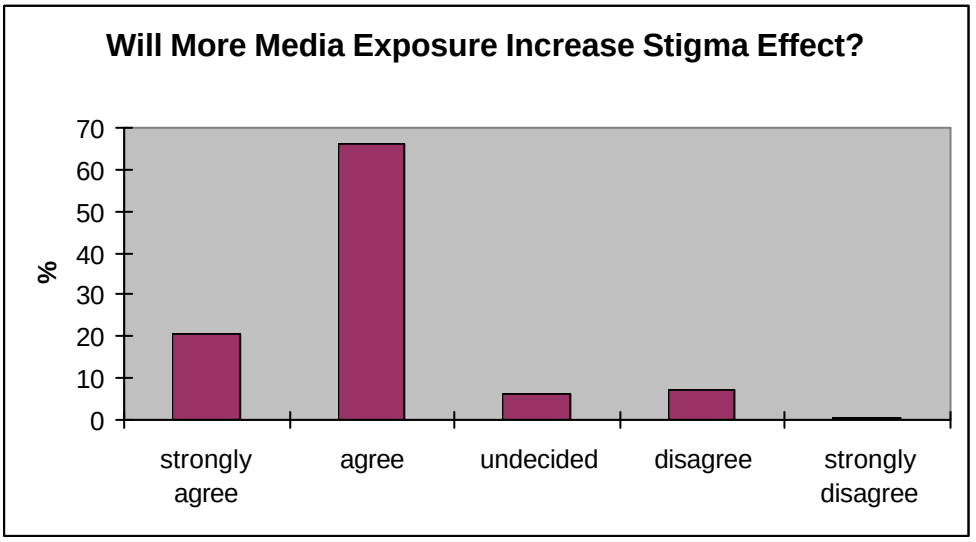
Figure 24: Will Leaky Home Stigma Decrease In A Strong Market?



Q19. Will more media exposure or public awareness increase the percentage of residual loss in value due to leaky home stigma?

The vast majority (87%) chose "strongly agree" and "agree" leaving 13% "undecided" and "disagree". The results are shown in Figure 25.

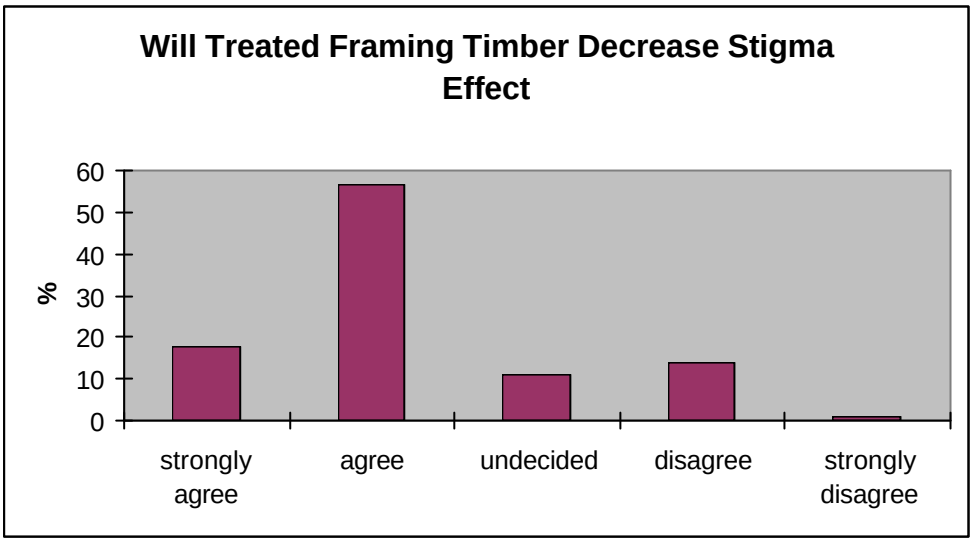
Figure 25: Will More Media Exposure Increase Stigma Effect?



Q20. Will treated framing timber decrease the percentage of residual loss in value due to leaky home stigma as compared to homes framed with untreated radiata pine?

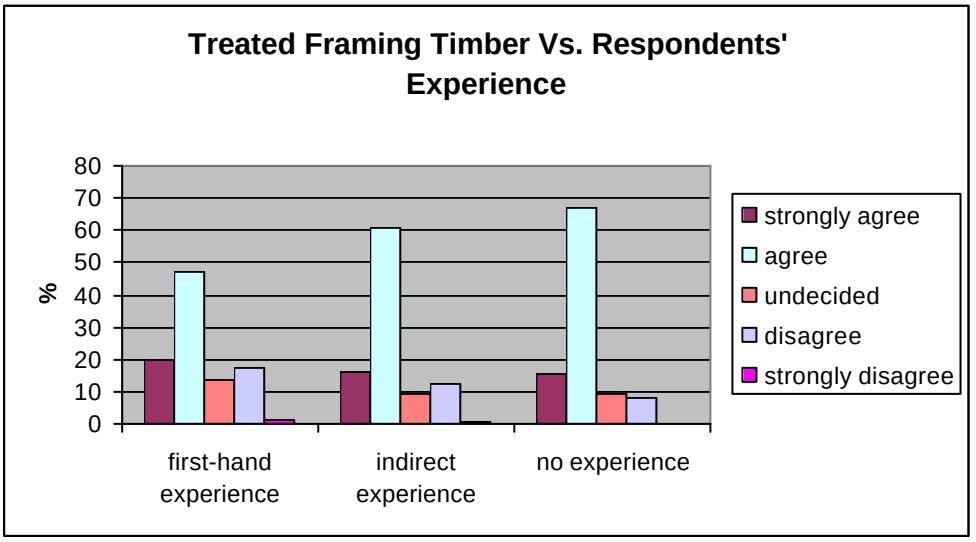
Three quarters of the respondents (75%) in the study chose "strongly agree" and "agree" leaving 11% "undecided" and 14% "disagree". This is shown in **Figure 26**.

Figure 26: Will Treated Framing Timber Decrease Stigma Effect?



It was interesting to note that people with more experience with leaky home stigma were less likely to support this question. Among those who had first-hand experience only 67% supported the agreement, contrasted to 77% of those who had indirect experience and 83% of those with no experience. The results are shown in **Figure 27**.

Figure 27: Treated Framing Timber Vs. Respondents' Experience



5.0 CONCLUSIONS

5.1 Conclusions

The aim of this study was to establish the views of property professionals regarding leaky home stigma impacts on residential property values. As defined in this study, leaky home stigma was described as "**an intangible value loss on remediated leaky homes as compared to homes with no history of leaky home syndrome."**

As expected, the results of this study indicated that across New Zealand there was a perceived value loss due to leaky home stigma in remediated leaky homes as compared to homes with no history of leaky home syndrome.

The reasons for the existence of stigma in remediated leaky homes had been generally identified. The first five overall important factors were future remediation work, followed by willingness of bank lending, then marketing time, compensation claims and sale price discount. It was interesting to note that the study ranked debt servicing costs, weathertightness consultation costs and life span at the bottom, while insurance costs, toxic mould/dampness and due diligence costs were shown to be of moderate importance.

With respect to the scale and extent of leaky home stigma, the majority of respondents recognised that it would occur both before and after the repairs are undertaken. In general monolithic style was the benchmark in identifying residential properties most affected by leaky home stigma, particularly those monolithic style homes built since the mid 1990's. Further analysis showed that valuers tended to choose "monolithic style homes built since the mid 1990's", in contrast with real estate agents who recognised no difference between monolithic style homes built since the mid 1990's and all monolithic style homes. Finally the research indicated that respondents' highest level of education and experience with leaky home stigma had little effect on their choice.

To the question of "what percentage of value is lost", the survey results indicated that on average the value loss was estimated to be 13.60% of the property's undamaged market value. 67% of those sampled believed that the negative impact on values was between

7.85% to 21.45%. Further analysis showed that valuers tended to place an average value loss of 12.85% as compared to real estate agents with an average value loss of 16.22%; while respondents with experience intended to choose an average value loss between 13.2% to 13.54%, in contrast with respondents with no experience choosing an average value loss of 15.46%. No significant location difference to the percentage of value loss had been found in this study, but the new recoded location variable had a statistical significance of 18% in explaining the percentage of value loss from leaky home stigma. In general stigma effects on remediated leaky homes was estimated to be between 12.10% to 14.60% across the whole country,

Finally the survey results indicated that leaky home stigma was a long term issue. It would gradually diminish over time but should not be viewed as temporary. Thus the views of Wilson (1993) and Mundy (1992), that stigma was a perception problem and not easy to reverse, was solidly supported by the results of this study. Moreover the research found that a strong market and the use of treated timber framing could ease the negative effect of leaky home stigma on residential property values. By contrast more media exposure or public awareness would increase its negative effect.

5.2 Limitations

This study was concerned with the perceptions of valuers and real estate agents together with a small number of building consultants with regard to leaky home stigma impacts on residential property values. It should be recognised, however, that these perceptions might vary over time. Previous studies showed that stigma effect on property values often changed over time. This could be expected for leaky home stigma, as it might not fully manifest itself or the experts might not be fully aware of its negative effect at the time of research. Thus the research results might be subject to change over time. However the survey results in this study indicated that leaky home stigma was a long term issue and people's perceptions on leaky home stigma might not be easy to reverse in the short term.

It should also be kept in mind that these results might be location specific. Although the survey samples were collected on a national basis, more than one third of responses were from the Auckland Region, suggesting that the survey results in this study might most likely reflect the situation in this region. However the results in this research indicated that although the location effect on leaky home stigma was statistically significant in explaining the percentage of value loss from leaky home stigma, the location difference on percentage of value loss of remediated leaky homes was minimal, which was estimated to be between 12.10% to 14.60% across the whole country.

Finally the samples selected for the mail survey questionnaire were confined to property professionals, which included all valuers, a sample of real estate salespersons and a small number of specific building consultants, who possibly have more experience/knowledge on leaky home stigma than the general public. Therefore the results might not be indicative of the views of this latter group.

5.3 Future Research

As this study was focused on the professional's opinions of leaky home stigma impacts on residential property values, more research could be carried out on the survey of general public views on similar topic.

Another possible research area was actual sales analysis of leaky home stigma impacts on property values. Then the results could be used as a comparison to the above opinion surveys as testing the hypothesis of "what people say and what they do are unrelated".

6.0 BIBLIOGRAPHY

Arens, S.B. (1997). The valuation of defective properties: a common sense approach. *Appraisal Journal, 65, 2, 143-149.*

Barrett. (1998). The renewal of trust in residential construction – an inquiring into the quality of condominium construction in British Colombia. http://www.qp.gov.bc.ca/condo/terms.htm.

Bell, R. (1997). *The comprehensive real estate handbook. (2nd.)* Melange Media Corporation, Littleton, United State of America.

Bond, S. (1995). The impact of transmission lines on property values. *New Zealand Valuer's Journal, September, 1995.*

BIA, (2003). Weathertightness problems – recent figures. *BIA Weathertightness News No.3 August 2003.*

BRANZ, (2001). On the face of it: getting the best out of monolithic claddings. *BRANZ Seminar Series 2001*.

Callanan, J., & Hargreaves, B. (1995). The effect of transmission lines on property values: a statistical analysis. *New Zealand Valuers Journal, June, 1995*.

Consumer. (2002). Watergate. *Consumer 419, October, 2002*.

HADD. (2000). Homeowners against deficient buildings – website. http://www.hadd.com

Hunn. (2002). Report of the overview group on the weathertightness of buildings to the buildings industrial authority. *August, 2002*.

Hunn. (2003). Report of the government administration committee's inquiry into the weathertightness of buildings in New Zealand. *March, 2003*.

Johnson, K.H., Salter, S.P., Zumpano, L.V., & Anderson, R.I. (2001). Exterior Insulation and Finish Systems: The Effect on Residential Housing Prices and Marketing Time. *Journal of Real Estate Research, 22, 289-311*.

Kiel, K.A., & McClain, K.T. (1996). House price recovery and stigma after a failed siting. *Applied Economics, 28, 1351-1358.*

Kilpatrick, J.A., Brown, D.C., & Rogers, R. C. (1999). The performance of exterior insulation finish systems and property value. *Appraisal Journal, 67, 1, 83-89.*

McCarthy, I. (1997). Pugging of farm land. *New Zealand Valuers' Journal, November, 1997, 27-30.*

Mundy, B. (1992). Stigma and value. *Appraisal Journal, January, 7-13.*

Mundy, B. (1992). The impact of hazardous materials on property value. *Appraisal Journal, April, 158-159.*

Murphy, C. (2000). Auckland House Cladding Survey. *UNITEC Institute of Technology, School of Architecture, December, 2000.*

Patchin, P.J. (1994). Contaminated properties and the sales comparison approach. *Appraisal Journal, July, 402-409.*

Reichert, A.K. (1997). How permanent is stigma? the case of a toxic waste superfund site. *Paper Presented on the American Real Estate Society Conference, Sarasota, Florida, April.*

Ricketts, D. (1999). Leaky condos – why the technology didn't work. *http://www.rdhbe.com/leaky_condo_article.htm*.

Sanders, M.V. (1996). Post-repair diminution in value from geotechnical problems. *Appraisal Journal, 64, 1, 59-67.*

Simons, R., & Throupe, R. (2003). Toxic mold issues and effects on property values. *ARES Conference, Monterrey, CA, April, 2003.*

Syms, P. (1995). Environmental impairment: an approval to valuation. *Paper Presented at the Cutting Edge Conference, Royal Institution of Chartered Surveyors, Aberdeen, Scotland, September.*

Valuation New Zealand. (1984). Overhead electric transmission lines: their effect upon the value of urban property. *Auckland, December, 1984.*

Wilson, A. (1993). Environmental Impairments: a balance sheet presentation. *Real Estate Finance, 10, 2, summer.*

Yates, D. (2003). Weathertightness of buildings in New Zealand: Report of the Government Administration Committee's Inquiry into the Weathertightness of Buildings in New Zealand. *House of Representatives, Forty-seventh Parliament.*

7.0 APPENDICES

Appendix 1 – Questionnaire Covering Letter

Appendix 2 – Questionnaire Reminder

Appendix 3 – Designed Questionnaire

Appendix 4 – SPSS Output