BRANZ

ISSUE 546

BULLETIN

HOUSE CONDITION SURVEY – EXTERNAL ENVELOPE

April 2012

- This report describes findings from the 4th BRANZ House Condition Survey, conducted between July 2010 and February 2011.
- It covers the external condition of 494 New Zealand houses.
- The findings on internal conditions will be reported in a later bulletin.

1.0 INTRODUCTION

1.0.1 This Bulletin reports the preliminary findings from the 4th BRANZ House Condition Survey on the condition of the building envelope of New Zealand houses.

1.0.2 The BRANZ survey is the only systematic survey of this scale of the structure, type and condition of New Zealand dwellings. BRANZ carried out earlier surveys in 1994, 1999 and 2005.

1.0.3 For the first time a nationwide sample was taken, and rental properties are included. 573 houses throughout New Zealand were inspected, 494 of which form the basis for the results.

1.0.4 Details and definitions can be found in Study Report 240, Preliminary BRANZ 2010 House Condition Survey Report. This can be downloaded at no charge from the BRANZ website www.branz.co.nz.

2.0 LOCATION AND AGE OF SAMPLE HOUSES

2.0.1 The sample was derived from an approximate 50:50 split:

- four main centres – Auckland, Hamilton, Wellington, and Dunedin. (Christchurch was removed from the sample because of the September 2010 earthquake, which occurred during surveying.)
- 69 clusters randomly selected across the remainder of the country.

2.0.2 The age distribution of houses in the sample is shown in Figure 1.

3.0 SUMMARY OF FINDINGS

3.0.1 Inspectors made an overall judgement on whether a house was well maintained, reasonably maintained, or poorly maintained. The inspectors considered that just over 40% of the surveyed houses were well maintained (in good or excellent condition).

3.0.2 The most common building envelope defects included:

- poor subfloor ventilation
- inadequate clearance of wall claddings from the ground
- poor or missing subfloor fasteners.

3.0.3 Fifty-five percent of hot water cylinders require replacement, repair or restraint to move out of the poor to serious category.

3.0.4 Houses typically had at least one component in poor or serious condition.

4.0 CONDITION BY TENANCY

4.0.1 The 2010 survey found that New Zealand's rented dwellings have a higher incidence of

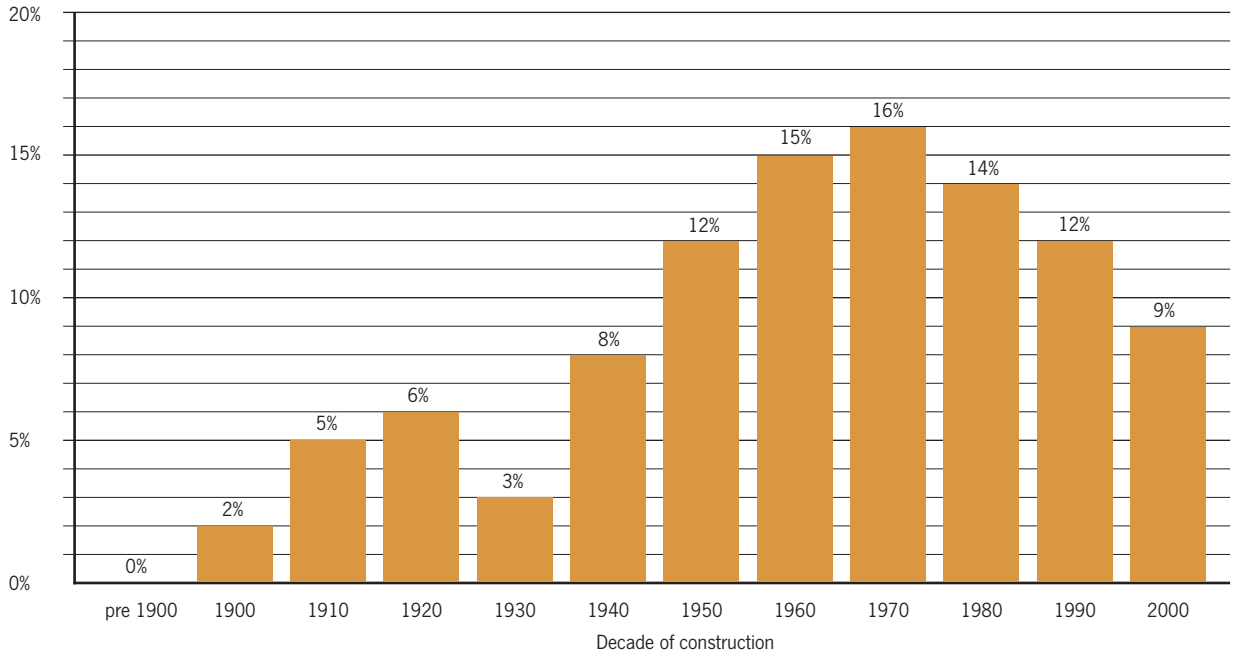

Figure 1: Proportion of sample by age group.

components in poor or serious condition than owner-occupied dwellings.

4.0.2 Nearly half (44%) of rental dwellings are in poor to serious overall condition, compared to a quarter of owner-occupied dwellings. Less than a quarter (22%) are in good to excellent condition, compared to 42% of owner-occupied dwellings.

4.0.3 Nearly three quarters (73%) of the rental properties surveyed have some level of mould, compared to just over half (53%) of owner-occupied dwellings.

4.0.4 Rentals are twice as likely as owner-occupied dwellings to have no ceiling insulation, and nearly twice as likely to have no wall insulation. They are also more likely to have no underfloor insulation.

4.0.5 Between 164,000 and 206,000 rented dwellings are likely to require maintenance and repair work in excess of $10,000 at 2010 prices.

4.0.6 The average cost of repairing only those components in serious or poor condition in rented dwellings is $9698 at 2010 prices.

5.0 AVERAGE CONDITION OF COMPONENTS

5.0.1 Average condition ratings were assessed for components in order of increasing severity (Figure 2).

5.0.2 The average condition of houses across all age groups was 3.7 out of 5.

5.0.3 As expected, newer homes have the highest average component condition (4.3), while houses built in the 1950s have the poorest average condition (3.4). Houses older than this have slightly higher average component ratings, partly reflecting the renovation of bungalows and villas.

6.0 MATERIALS

6.1 WALLS

6.1.1 The most common wall cladding is timber weatherboards, although their presence has fallen, from cladding almost 70% of the houses in 1999 survey to 49% in 2010.

6.1.2 A third of the sample had masonry veneer, which has stayed much the same since 1999. There was an increase in the proportion with fibre-cement plank cladding to 16%, and with stucco cladding to 12%. Only 2% of the sample had EIFS cladding.

6.2 ROOFS

6.2.1 The most common roof cladding (28%) was painted galvanised profiled steel. Coil-coated steel (now 23%) is likely to take over as the most common roof cladding in the next decade. Masonry tiles are the

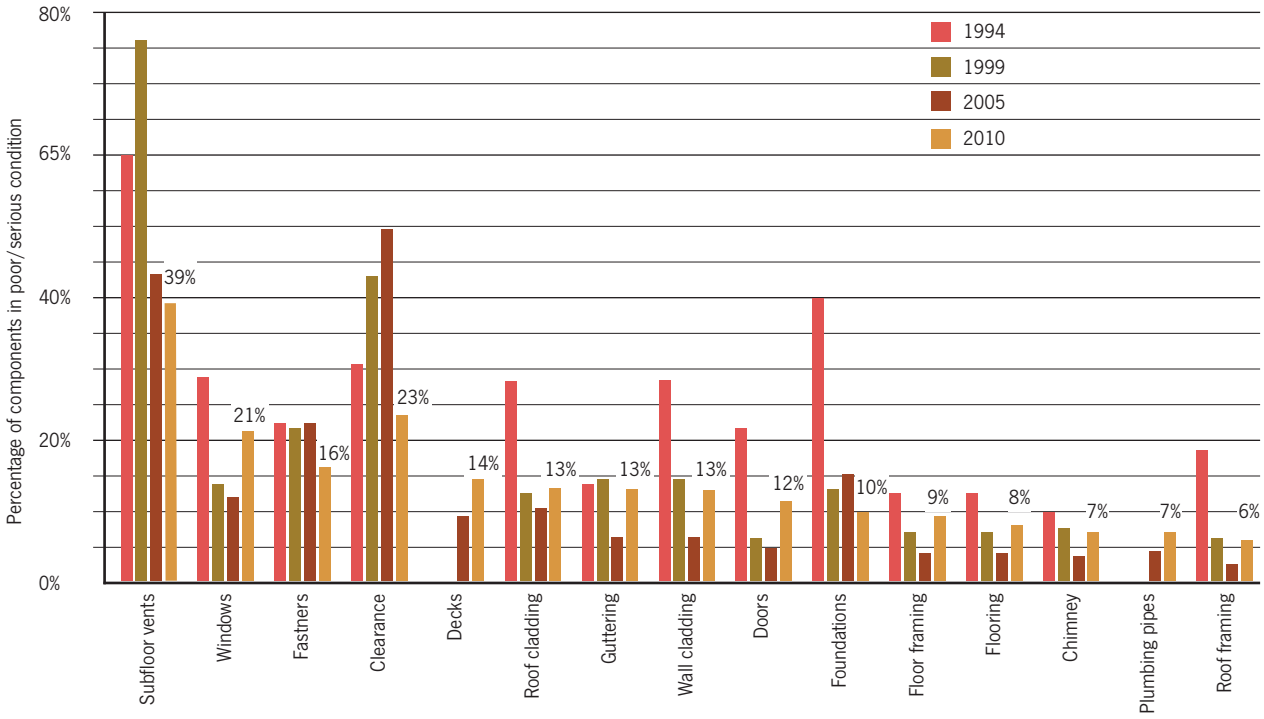

Figure 2. Envelope component condition ratings.

third most common, at 22%, while the proportion of metal tiles has fallen to 11%.

6.2.2 Aluminium windows are now the most common type of window, with powder coated at 38% and anodised at 34%. Timber frames were found in 49% of houses. Nearly one-quarter of houses had both aluminium and timber window frames, reflecting renovations.

6.3 CONDITION BY MATERIAL

6.3.1 The average condition of all common materials is shown in Figures 3–5.

6.3.2 The average ages of houses using the different wall claddings and windows are shown in brackets where the sample size was sufficient, so that average condition ratings can be assessed against the likely age of the materials. Roofs are not considered, as their replacement generally has less to do with their age and more with the conditions they are exposed to.

Timber weatherboards

6.3.3 The most common defects found in timber weatherboards are shown in Figure 6, masonry veneer and concrete block in Figure 7.

6.3.4 The results for monolithic cladding (Figure 8) should be treated with caution, as the survey assesses condition from the cladding's external appearance: establishing the true condition requires destructive testing. The surface appearance may conceal underlying issues.

6.3.5 The defects in other fibre-cement claddings are shown in Figure 9.

6.4 ROOF CLADDING

6.4.1 Profiled steel roofing is the most common roof cladding, present on over half of the houses in the sample. The most frequently observed defects are shown in Figure 10.

6.4.2 The next most common roof cladding types were masonry tiles (29%) and metal roof tiles (14%).

6.4.3 For masonry tiles, the only non-cosmetic defects are cracked or missing pointing (7%) and cracked or dislodged tiles (4%). The most common defects in chip-coated metal tiles are the erosion of the chip coating (41%), dents (43%) and top-coat deterioration (30%).

6.5 WINDOWS

6.5.1 The most frequent defects for timber windows are:
- Paint deterioration (57%)
- Putty cracks (57%)
- Joint cracks (52%)
- Top coat deterioration (45%)
- Dislodged putty (43%).

6.5.2 The most frequent defects for anodised aluminium windows are:

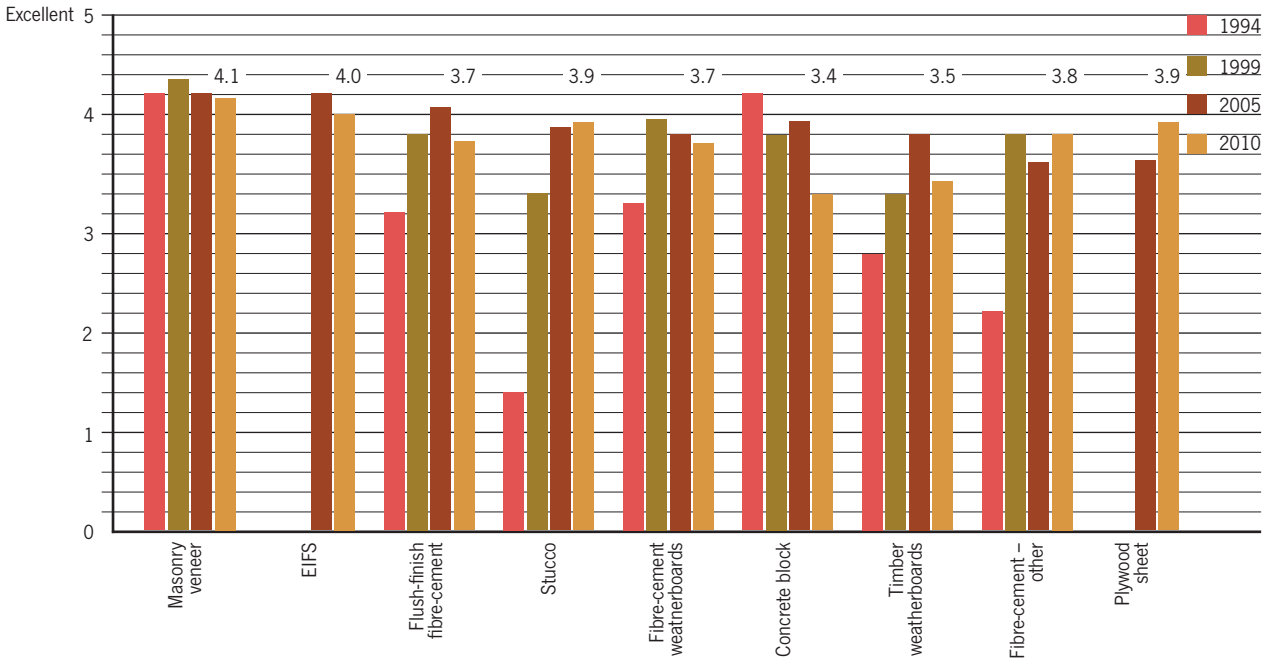

Figure 3. Condition of external materials – wall claddings.

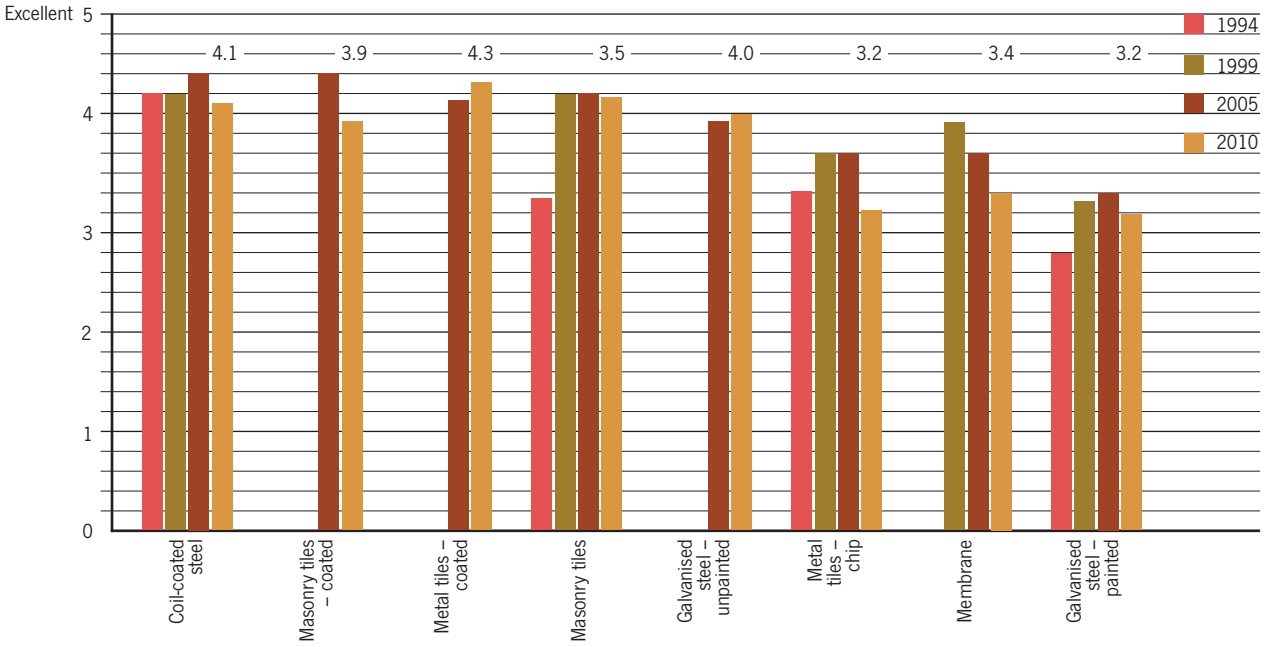

Figure 4. Condition of external materials – roof claddings.

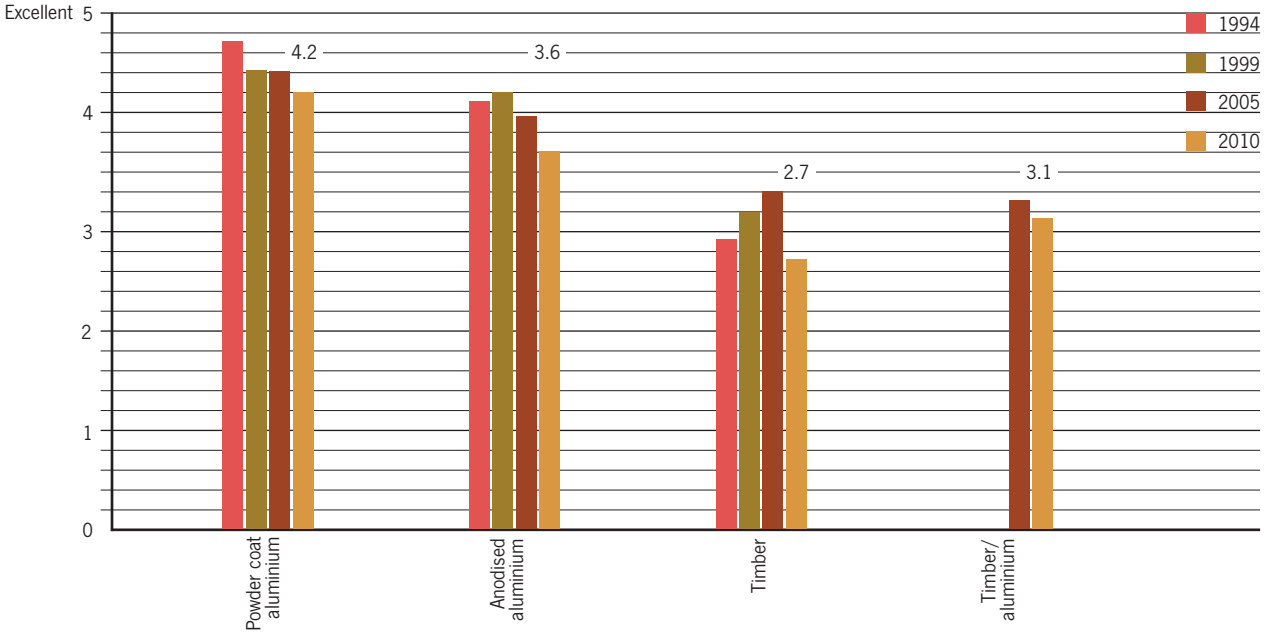

Figure 5. Condition of external materials – windows.

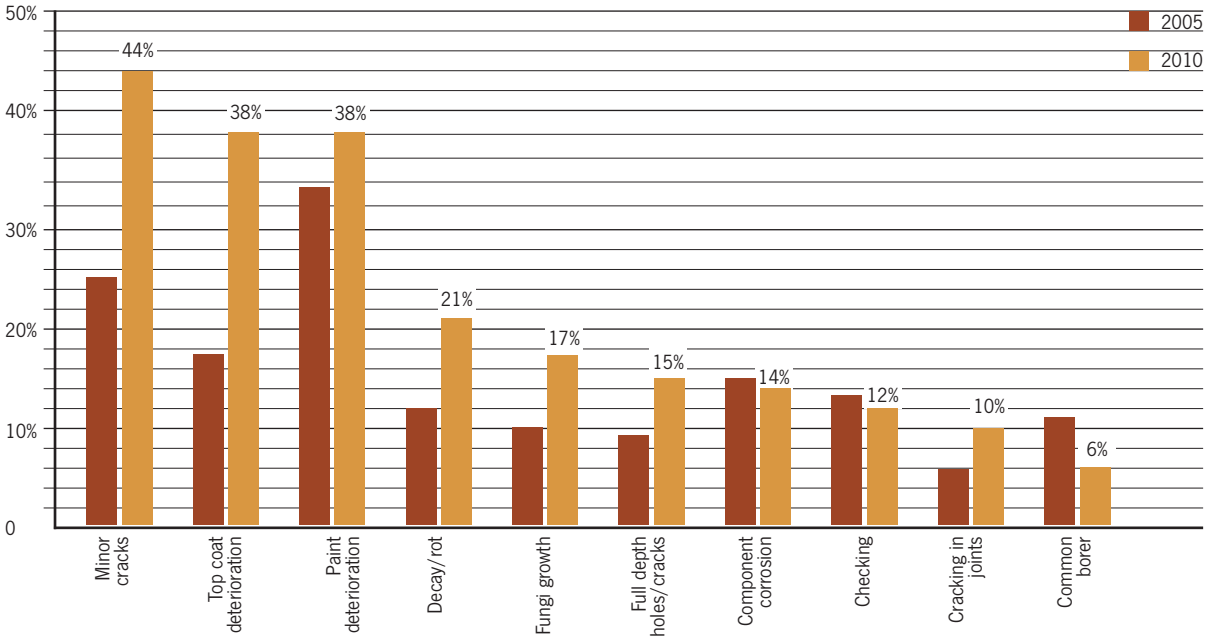

Figure 6. Defects in timber weatherboards.

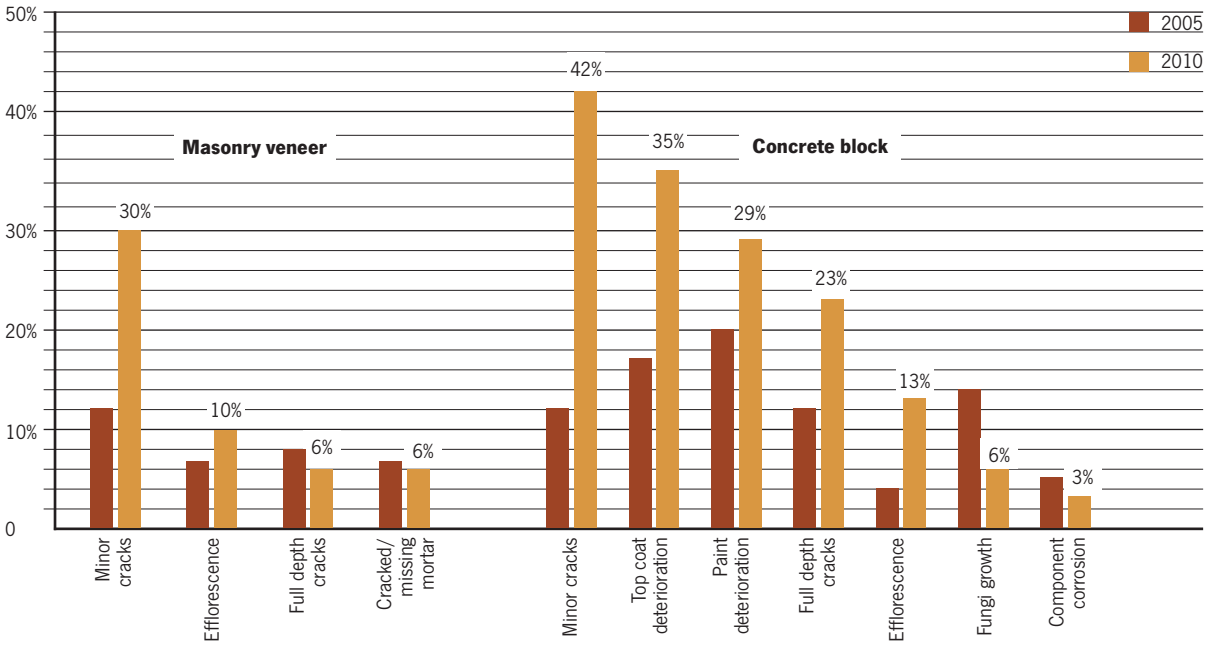

Figure 7. Defects in masonry veneer and concrete block.

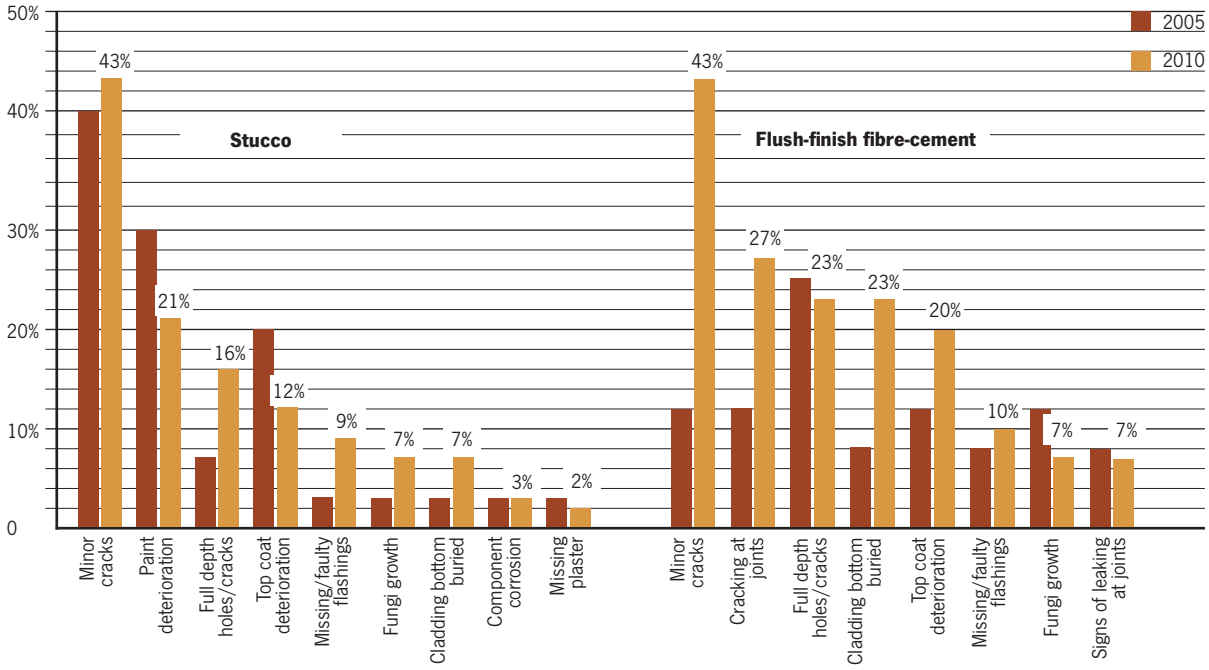

Figure 8. Defects in monolithic claddings.

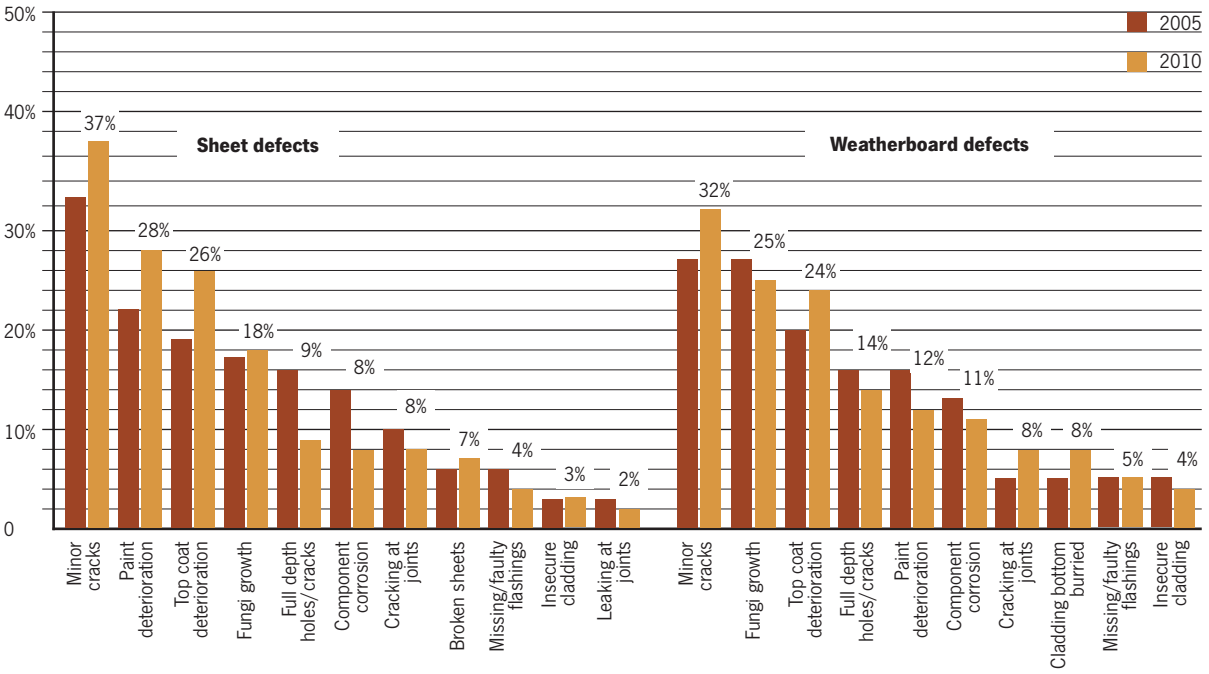

Figure 9. Fibre-cement wall cladding defects – sheet and weatherboard.

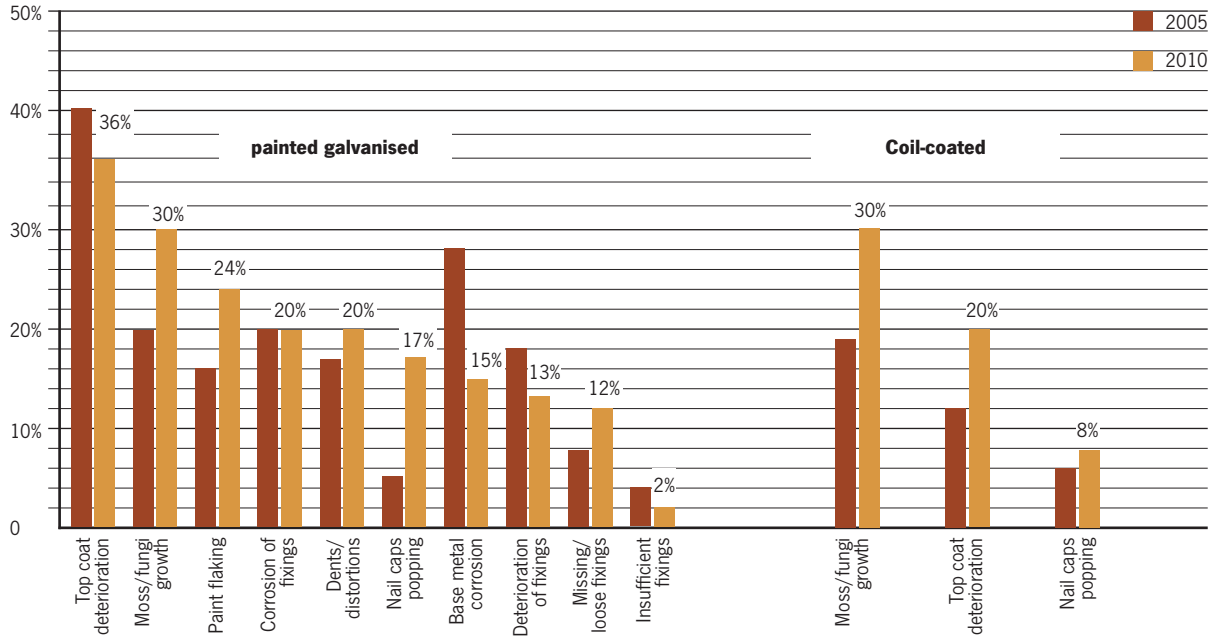

Figure 10. Defects in profiled steel roofing.

- Minor anodising failures (37%)
- Shrinking rubber (31%)
- Corroding hardware (20%)
- Deteriorating hardware (20%).

6.5.3 The most frequent defects for powder-coated aluminium windows are:
- Shrinking rubber (14%)
- Windows sticking (12%).

6.6 SUBFLOOR AREA

6.6.1 Subfloor problems are considered as a separate group of components.

6.6.2 In 8% of houses with subfloors, the moisture content of the subfloor framing was over 20%, placing it at greater risk of decay and other damage (Figure 11).

6.6.3 Non-moisture related defects were common in the sample of houses with accessible subfloors (Figure 12). Any particular subfloor may have more than one defect.

6.6.4 Over 20% of houses had no specialised fasteners between concrete piles and framing timbers. Pre-1940s houses were built before these fasteners were common. Seven percent of the sample falls into this category, and still have no (or inadequate) subfloor fasteners. However, 15% of houses built after 1940 do not have specialised fasteners.

6.6.5 Since the 1999 survey, the percentage of pre-1940 houses without specialised fasteners has fallen from nearly 70% to 34%. This could be the result of retrofitting of these subfloor areas.

7.0 MAIN DEFECTS IN OTHER COMPONENTS

7.0.1 The main defects in other components of the buildings were:
- Carports – lack of bracing (20%).
- Chimneys – unreinforced brick chimneys in older houses (49%). These chimneys are often still in good condition, but they may be unsafe in a major earthquake. The incidence of cracked concrete

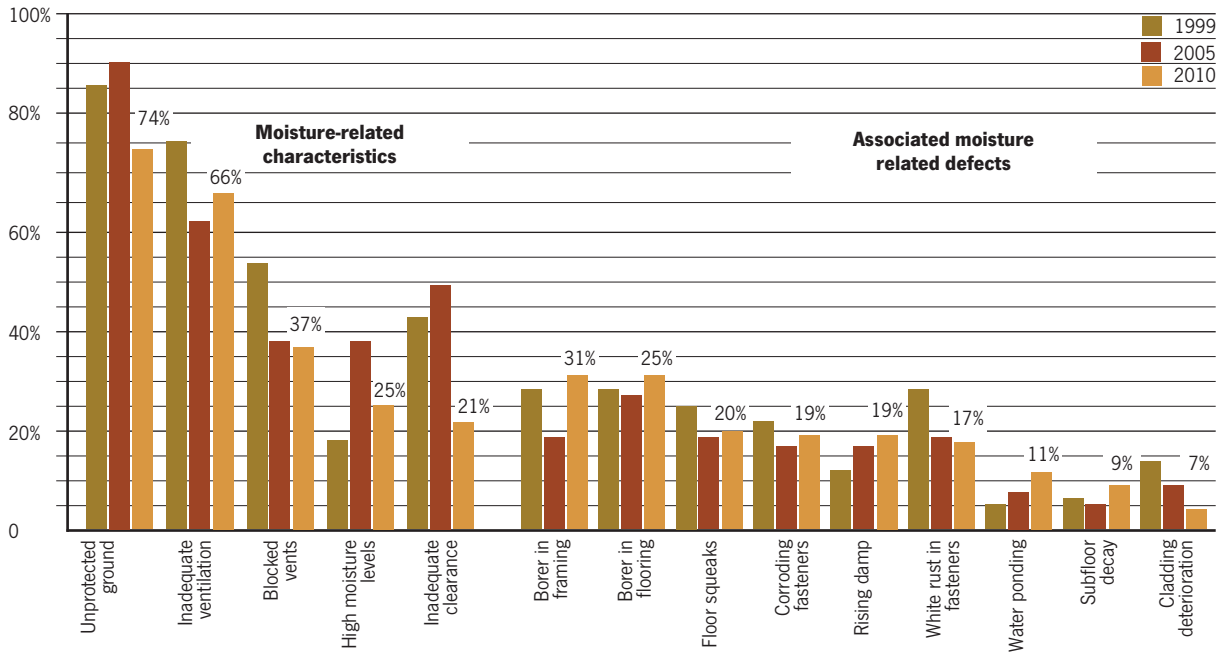

Figure 11. Moisture-related defects in subfloor.

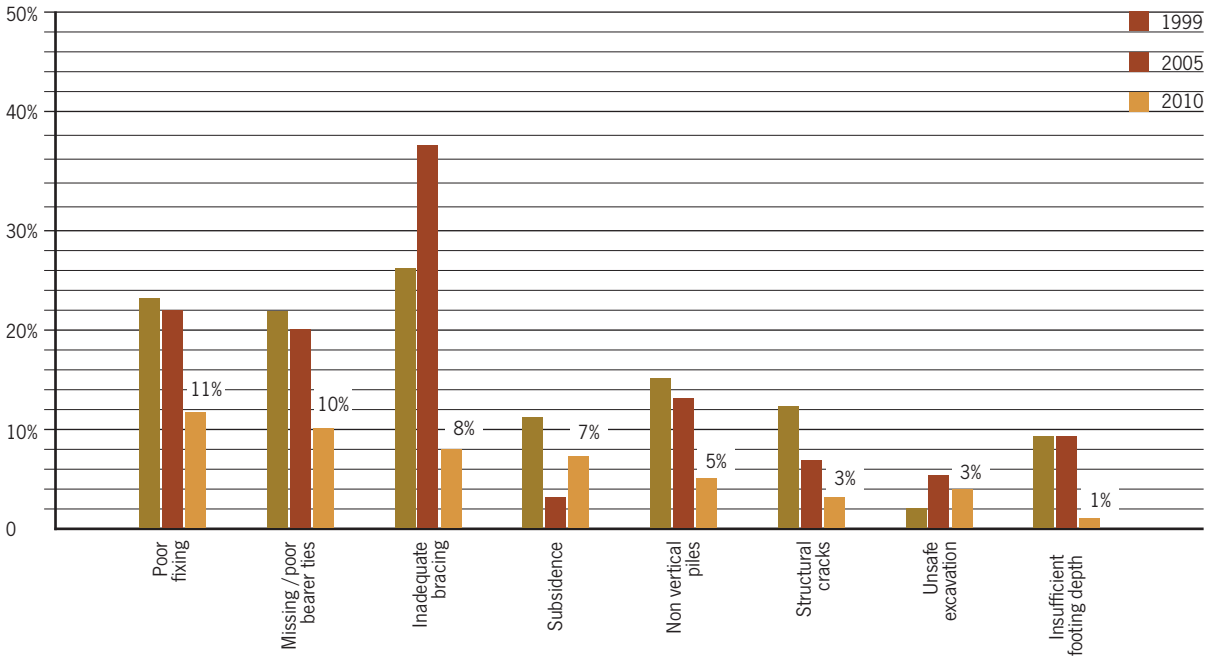

Figure 12. Non-moisture related subfloor defects.

or bricks in newer chimneys with cement-based mortars is also high (at 17%), providing a potential fire hazard if full-depth cracks are within the house envelope.
- Steps and ramps – uneven risers (10%), missing/unsafe balusters (8%), and slipperiness when wet (8%).

8.0 CONCLUSIONS

8.0.1 The average overall condition rating was 3.8 out of 5 (between 'moderate' and 'good') for the approximately 40 components inspected. This was down from 4.0 in the 2005 survey, but up from 3.6 in the 1999 survey. The decline may be due to changes in the 2010 sample, being a national sample and including rental properties.

8.0.2 The condition of houses tended to reduce with age, up until around 60 years old, when conditions began to improve again.

8.0.3 The greatest polarisation of condition was in the pre-1920s houses, where the maximum difference between those in the best and the poorest condition was 2.7. While some houses have been improved, others remain in a deteriorated state. The least polarisation was in 1920s houses. This is likely due to the large amount of renovation of bungalows from this era.

8.0.4 The exterior components with the main problems in order of defect severity were:
- More than 65% of houses with timber-framed floors have inadequate subfloor ventilation (or blocked existing vents).
- 40% of houses had poor or seriously deficient clearance from the bottom of the wall cladding to the ground or paving level. Inadequate clearance from ground to wall cladding is a particular problem in houses built from the 1980s onwards.
- missing or corroding subfloor fasteners
- poor maintenance and deterioration of timber windows.

8.0.5 About 45% of houses have one of these problems, 25% have two, and 15% have three or four.

8.0.6 New Zealand's rented dwellings are in worse condition than owner occupied dwellings, and have a higher incidence of components in poor or serious condition.

9.0 REFERENCES

Buckett NR (Ed), Marston NJ (Ed), Saville-Smith, K, Jowett, J.H., Jones, M.S. 2011. Preliminary BRANZ 2010 House Condition Survey Report. BRANZ Ltd, Judgeford, New Zealand.

Clark SJ, Jones M and Page IC. 2005. New Zealand House Condition Survey 2005'. BRANZ Study Report 142. BRANZ Ltd, Judgeford, New Zealand.

Clark SJ, Page IC, Bennett AF and Bishop S. 2000. 'New Zealand House Condition Survey 1999'. BRANZ Study Report 91. BRANZ Ltd, Judgeford, New Zealand.

Page IC, Sharman WR and Bennett AF. 1995. 'New Zealand House Condition Survey 1994'. BRANZ Study Report 62. BRANZ Ltd, Judgeford, New Zealand.

The survey was jointly funded by the Building Research Levy and the Department of Building and Housing. BRANZ is grateful to the homeowners who allowed access to their houses.

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ISSN 1170-8395