OFFICE OF THE STATE CORONER

FINDINGS OF INQUEST

CITATION:	**Inquest into the death of Annette Lee Spencer**
TITLE OF COURT:	Coroners Court
JURISDICTION:	Brisbane
FILE NO:	2008/164
DELIVERED ON:	28 June 2010
DELIVERED AT:	Brisbane
HEARING DATE(s):	5 - 9, 12 - 13 and 16 October 2009
FINDINGS OF:	Coroner John Lock
CATCHWORDS:	CORONERS: balcony collapse, method of construction, adequacy of building inspections, bearer span width and renovations

REPRESENTATION:

Counsel Assisting:	Ms A Martens, for the Office of the State Coroner
For the family of Mrs Spencer, Mrs C Whitred and Mrs V Whittle:	Mr D Schneidewin instructed by Bennett and Philp and Rodgers Barnes and Green
For Mr and Mrs Biggs:	Mr K Holyoak instructed by Barry Nilsson
For Everlyn Building Certification Pty Ltd and Mr W Everlyn:	Mr C Crawford instructed by McInnes Wilson Lawyers

For Ace Restumping and Mr W McCormack:	Mr S Given
For Brisbane City Council:	Mr D Quayle instructed by Brisbane City Legal Practice
For Australian Building Inspection Services Pty Ltd, Mr P Houston, Mr N Mills and Mr J Toomer:	Mr C Fitzpatrick instructed by Moray & Agnew Solicitors
For Pulse Constructions and Mr S Duignan:	Ms J Rosengren instructed by Jensen McConaghy
For Mr C Howroyd:	Mr Q Lanyon-Owen of Cooper Grace Ward Lawyers
For Neil McKenzie & Associates and Mr J McKenzie:	Ms F Chapman of Thynne & McCartney Lawyers

CORONER'S FINDINGS AND DECISION

These are my findings in relation to the death of Annette Lee Spencer who died on 21 November 2008 from injuries sustained when a balcony collapsed the day before at 57 Upper Lancaster Road, Ascot. These findings seek to explain how the death occurred and consider whether any changes to policies or practices could reduce the likelihood of deaths occurring in similar circumstances in the future. Section 45 of the *Coroners Act 2003* ("the Act") provides that when an inquest is held into a death, the coroner's written findings must be given to the family of the person who died and to each of the persons or organisations granted leave to appear at the inquest. These findings will be distributed in accordance with the requirements of the Act and also placed on the website of the Office of the State Coroner.

The scope of the Coroner's inquiry and findings

A coroner has jurisdiction to inquire into the cause and the circumstances of a reportable death. If possible he/she is required to find:-

(a) whether a death in fact happened;
(b) the identity of the deceased;
(c) when, where and how the death occurred; and
(d) what caused the person to die.

There has been considerable litigation concerning the extent of a coroner's jurisdiction to inquire into the circumstances of a death. The authorities clearly establish that the scope of an inquest goes beyond merely establishing the medical cause of death.

An inquest is not a trial between opposing parties but an inquiry into the death. In a leading English case it was described in this way:- *"It is an inquisitorial process, a process of investigation quite unlike a criminal trial where the prosecutor accuses and the accused defends… The function of an inquest is to seek out and record as many of the facts concerning the death as the public interest requires."* [1]

The focus is on discovering what happened, not on ascribing guilt, attributing blame or apportioning liability. The purpose is to inform the family and the public of how the death occurred with a view to reducing the likelihood of similar deaths. As a result, the Act authorises a coroner to make preventive recommendations concerning public health or safety, the administration of justice or ways to prevent deaths from happening in similar circumstances in future.[2] However, a coroner must not include in the findings or recommendations, statements that a person is or maybe guilty of an offence or is or maybe civilly liable for something.[3]

[1] *R v South London Coroner; ex parte Thompson* (1982) 126 S.J. 625
[2] Section 46 of the Act
[3] Sections 45(5) and 46(3) of the Act

The admissibility of evidence and the standard of proof

A coroner's court is not bound by the rules of evidence because the Act provides that the court "*may inform itself in any way it considers appropriate."*[4] That does not mean that any and every piece of information, however unreliable, will be admitted into evidence and acted upon. However, it does give a coroner greater scope to receive information that may not be admissible in other proceedings and to have regard to its origin or source when determining what weight should be given to the information.

This flexibility has been explained as a consequence of an inquest being a fact-finding exercise rather than a means of apportioning guilt; an inquiry rather than a trial.[5]

A coroner should apply the civil standard of proof, namely the balance of probabilities but the approach referred to as the *Briginshaw* sliding scale is applicable.[6] This means that the more significant the issue to be determined; or the more serious an allegation; or the more inherently unlikely an occurrence; then in those cases the clearer and more persuasive the evidence should be in order for the trier of fact to be sufficiently satisfied that it has been proven to the civil standard.[7]

It is also clear that a coroner is obliged to comply with the rules of natural justice and to act judicially.[8] This means that no findings adverse to the interest of any party may be made without that party first being given a right to be heard in opposition to that finding. As *Annetts v McCann*[9] makes clear, that includes being given an opportunity to make submissions against findings that might be damaging to the reputation of any individual or organisation.

If, from information obtained at an inquest or during the investigation, a coroner reasonably believes that the information may cause a disciplinary body for a person's profession or trade to inquire into, or take steps in relation to, the person's conduct, then the coroner may give that information to that body.[10]

The evidence

It is not necessary to repeat or summarise all of the information contained in the exhibits and from the oral evidence given, but I will refer to what I consider to be the more important parts of the evidence.

After completing the hearing of evidence on 16 October 2009, I indicated that I would be making preliminary recommendations and would later reduce my

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[4] Section 37 of the Act

[5] *R v South London Coroner; ex parte Thompson* per Lord Lane CJ, (1982) 126 S.J. 625

[6] *Anderson v Blashki* [1993] 2 VR 89 at 96 per Gobbo J

[7] *Briginshaw v Briginshaw* (1938) 60 CLR 336 at 361 per Sir Owen Dixon J

[8] *Harmsworth v State Coroner* [1989] VR 989 at 994 and see a useful discussion of the issue in Freckelton I., "Inquest Law" in *The inquest handbook*, Selby H., Federation Press, 1998 at 13

[9] (1990) 65 ALJR 167 at 168

[10] Section 48(4) of the Act

reasons and decision to writing. My preliminary recommendations were delivered 12 November 2009 and are attached to this decision.

Preliminary Comments

Mrs Annette Lee Spencer was 48 years old at the time of her death. She was married to Mr Fraser Spencer and there are two children from the marriage. Mr and Mrs Spencer were architects and worked together in their own business. It was apparent that her death is deeply felt by her family and friends.

A number of people were injured as a result of the balcony collapse, some very seriously. Anecdotally I am aware that the death of Mrs Spencer and the injuries to those present were deeply felt by the wider Anglican Church Grammar School community.

It was also apparent that civil proceedings were anticipated or on foot; hence the number of legal representatives who were granted leave to appear at the inquest. Although this could have imposed some adversarial constraints on how the inquest proceeded, generally this was not the case, due to the credit of the legal representatives.

The property at 57 Upper Lancaster Road

The property at 57 Upper Lancaster Road was a Queenslander style home which was originally constructed in the early 1900's. Records from the Brisbane City Council show plans to the property which are dated 1913. At the time the house was constructed a balcony was also built. The balcony was situated to the front centre of the residence, directly to the left of the front staircase and nearest to the carport (which was erected some time after the original constructions). This balcony was 2.77 metres in width and 6.45 metres in length and also had a small bench seat up against the right wall. It was this balcony that collapsed on 20 November 2008.

It is apparent that the balcony was in its original condition when it collapsed other than the support posts, of which I will discuss further in this decision. The floorboards, joists and bearers were all original timbers. There was evidence heard at the inquest that suggested that timbers utilised at around the early 1900's was of a high quality and grade. Mr Colin McKenzie, who is an expert in timber, inspected the deck and was of the opinion that the timber used in the balcony was equivalent to an F14 grade or better in today's standards (without controversy from the other witnesses). The timbers themselves were relatively protected from the weather and there is no suggestion that any of the timbers were rotting.

In 2001 Mr and Mrs Bridge purchased the property. Prior to the purchase being finalised, they sought a building and pest inspection from Archicentre. The inspection was carried out by Mr Howroyd.

Following the purchase, Mr and Mrs Bridge undertook major renovations to the property. They engaged East Coast Building Design and Drafting to prepare the designs. The final designs included removing and replacing

substandard rooms to create a two storey house, car accommodation and the addition of a new balcony adjacent to the old balcony.

Mr Shaun Duignan was the builder engaged to conduct the renovations. He was appropriately qualified and registered and had previously renovated a number of older style Queenslanders. In addition to the other renovations at the property, he constructed a second balcony which was situated to the front left side of the residence and was 4.85 metres in width and 4.78 metres in length. As part of the building work, Mr Duignan indicated that he replaced the support posts to the old balcony that eventually collapsed however did not otherwise interfere with the balcony bearer or joists.

In order to conduct the renovations, the house was supported with sties for a period of time. This work was carried out by Mr William McCormack and his company Ace Restumping. The renovations were certified by Mr William Everlyn of Everlyn Building.

Several years later, in April 2005, Mr and Mrs Bridge sold the property to Mr and Mrs Biggs. Again, prior to the sale being finalised, Mr and Mrs Biggs commissioned a building and pest inspection report on the property. This was conducted by Mr Peter Houston of Australian Building Inspection Services.

At some stage between August and October 2007, Mr and Mrs Biggs contracted with Mr Carter to paint the entire premises. The underside of both decks was painted white.

Events of 20 November 2008

On 20 November 2008, Mrs Annette Spencer, along with 70 or so other mothers who had sons that attended the Anglican Church Grammar School, attended a function at the home of Mr and Mrs Biggs at 57 Upper Lancaster Road, Ascot, to celebrate their sons' pending graduation from high school.

At a little past 1pm, part of the balcony upon which a number of people (but almost exclusively women) including Mrs Spencer were standing, collapsed from a height of approximately 3.2 metres onto a tiled area on the ground level. This balcony was the balcony that had been constructed at the same time as the original dwelling. The evidence suggests that at the time of the collapse Mrs Spencer had been standing towards the outer edge of the balcony near the railing closest to the road. She is likely to have been one of the first women to have hit the ground, with several other women landing on top of her. When Mrs Spencer was located after the collapse she was unconscious.

The investigating police officer was of the view that 34 people were on the old balcony at the time of collapse as a result of identifying those actual people, however other estimates from witnesses of numbers ranged as low as 20 and as high as 40. For the purposes of the inquest it was assumed that the number of people on the balcony when it collapsed was between 25 and 35.

Immediately following the collapse, emergency services were contacted and in the interim, several of the mothers at the function who had medical training assisted the injured until help arrived. Mrs Spencer received treatment on the scene, firstly from some of those mothers and subsequently from ambulance officers.

Mrs Spencer was taken to the Emergency Department of the Royal Brisbane and Women's Hospital and further treatment was administered. Tests revealed that Mrs Spencer had a subdural haematoma which was evacuated by an emergency left fronto-temporal craniectomy. Despite aggressive treatment, Mrs Spencer's condition did not improve and her brain injury was deemed irreversible. Active treatment was withdrawn during the early hours of 21 November 2008 and Mrs Spencer passed away.

An autopsy was performed by Dr Ong on 22 November 2008. The autopsy revealed complex base of skull fractures with skull fractures to the right occipital region which is towards the back of the head. Dr Ong was of the opinion that the pattern of injury was in keeping with Mrs Spencer's fall resulting in an impact to the back of the head. Dr Ong formed the view that Mrs Spencer's death was as a result of the head injuries she suffered following the collapse of the balcony on 20 November 2008.

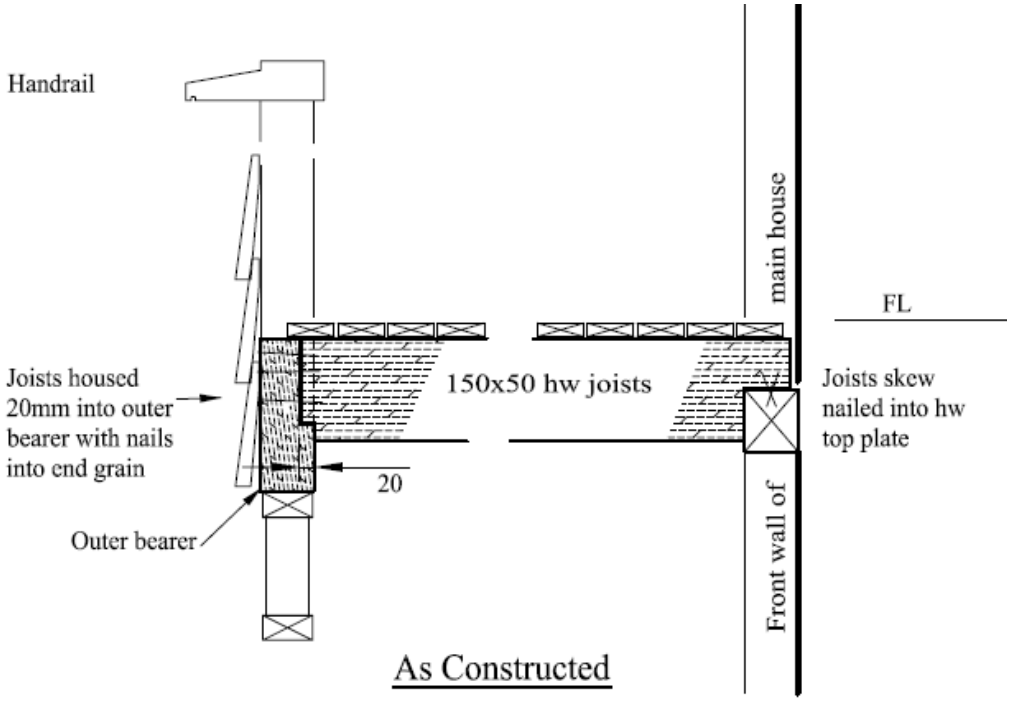
Shortly after the collapse, police officers attended the scene, as did Brisbane City Council employees and a Building Services Authority representative. Officers from Workplace Health and Safety Queensland and a Forensic Crash Unit also arrived.

The investigation was conducted by officers of the Queensland Police Service who were assisted significantly by the Brisbane City Council in relation to the technical aspects of the matter. A comprehensive report was forwarded to the Coroner expeditiously and I wish to place on record my appreciation to those involved in the investigation in attending to the investigation quickly and comprehensively. This enabled my own investigating team to expeditiously prepare the matter for inquest given that it was apparent there may be issues of importance relating to public safety that needed to be addressed.

The cause of the collapse

I have previously detailed a brief description of the balcony which collapsed. The support structure for this balcony consisted of hardwood timber joists supported on a timber top plate running along the front wall of the dwelling and on a hardwood bearer along the front of the balcony. At the time of construction, the joists were housed approximately 20 millimetres ("mm") into the bearer along the front of the balcony secured with only nails into the end grain and skewed nails into the side of the joists. The nails used at the time of construction around 1910 would have been non-galvanised and would corrode over time, although the evidence suggests that galvanised nails are also fallible to corrosion.

A diagram (all diagrams were copied with the kind permission of Mr Peter Wright) of the method of construction is detailed below.

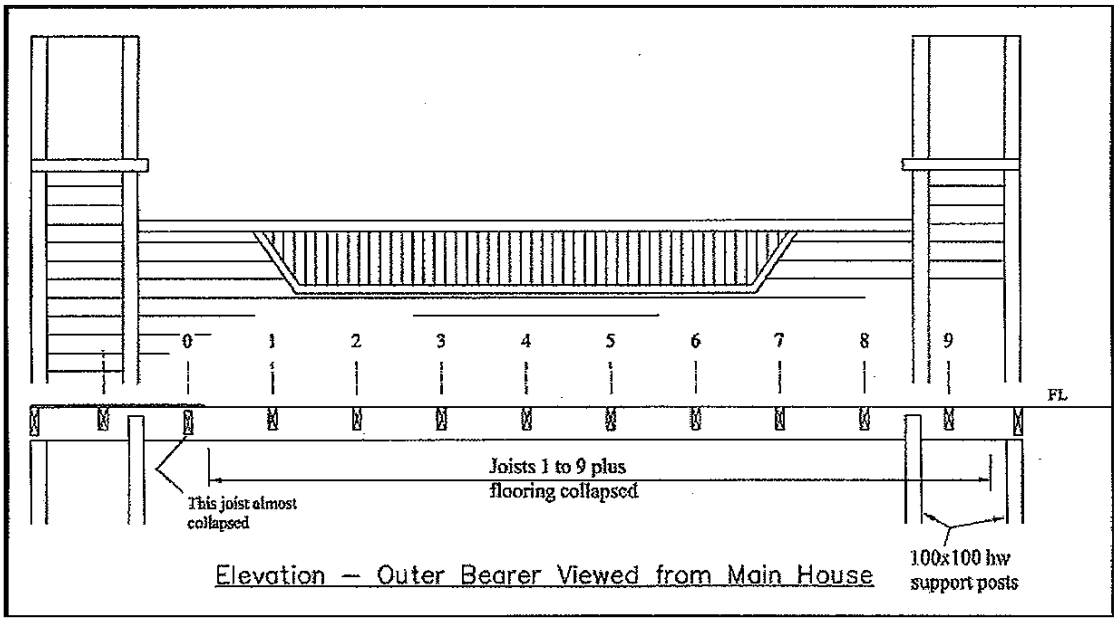


The photograph below illustrates how the joists where cogged into the bearer. Of note insect nests can be clearly seen indicating that the joist was not fully cogged into the bearer.

Following the collapse a number of Brisbane City Council employees (with various trade backgrounds) attended the site to assist the police determine the cause of collapse and to ascertain whether any action needed to be taken by the Brisbane City Council in relation to any defective work. The Resolutions Manager from the Building Services Authority, Mr Gary Stick, also attended to investigate whether any new works had failed. Some days later, the Brisbane City Council engaged Mr Colin McKenzie, a civil engineer

employed by Timber Queensland, to provide a report on the cause of collapse to the Council. Mr Peter Wright, also a civil engineer, was engaged by the insurance company for the property to provide a report on the cause of collapse.

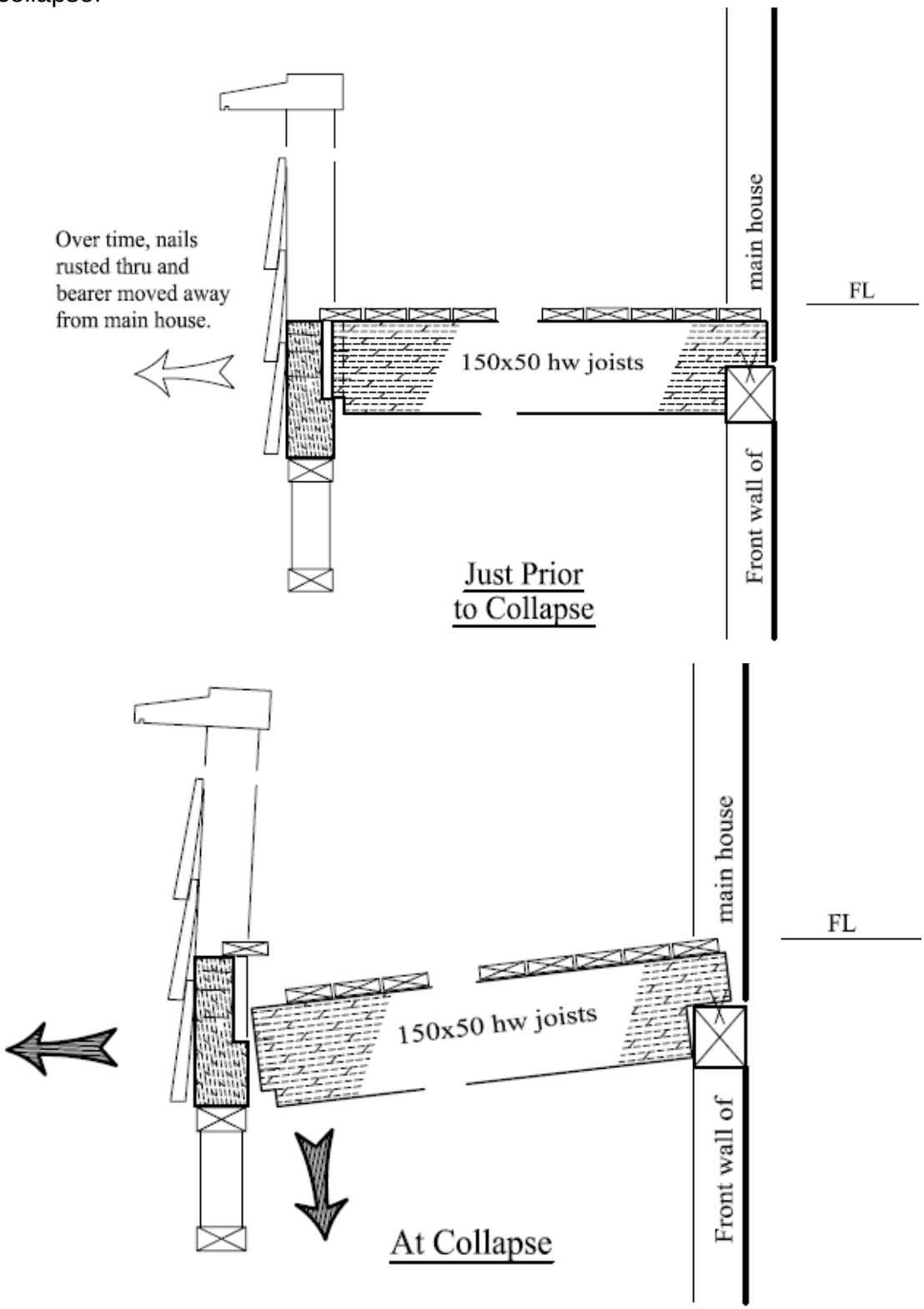
A fair portion of the inquest focused on the movement of particular joists. The diagram below details the numbering system that was attributed to the joists by all of the witnesses. By way of explanation the end of the balcony where joist 9 was located was the end of the balcony that adjoined the new balcony constructed when the property was renovated.



A number of the experts performed various measurements of the balcony. The Brisbane City Council employees measured that the balcony sagged downwards approximately 25mm and deflected outward (bowed) approximately 12mm. Mr McKenzie and Mr Wright measured that the sag was approximately 19mm and the bow was approximately 15mm. The differences in measurements may relate to methodologies of conducting the measurement but in any event are not significantly different.

All of the expert witnesses agreed that the balcony collapsed as a result of little or no bearing of some of the joists into the 20mm pockets in the side of the front supporting bearer on the northern perimeter (the bearer away from the house).

The diagrams below detail the mechanism of the collapse.



Mr McKenzie (with whom the other witnesses agreed) was of the opinion that the joists disengaged from the front bearer due to one or a combination of the following:

- Inadequate bearing of the joist ends onto the bottom of the housing;

- Outward deflection or bowing of this bearer; and/or
- Insufficient restraint provided by nail fixings at the ends of the deck joists due to corrosion of the nails and loss of embedment due to the existing separation of joist ends from the front bearer.

The experts all identified significant corrosion in many of the nails used in the construction of the collapsed balcony. The only items restraining the bearer up against the joists were nail fixings. Once the nails rusted out they were no longer restraining the joist into the bearer and this would not have provided any significant resistance to prevent disengagement of the joists from the front bearer.

The experts all agreed that whenever the underside of the balcony was painted last (evidence suggested that this occurred between August and October 2007), the outer bearer had already moved away from the main house allowing the joists to partly slide out of their housings. Using the paint marks as a guide, the evidence was that the joists had between 2 – 12 mm bearing into the cog of the external bearer as at 2007. Evidence was given by a number of different witnesses that joists 2, 3, 4 and 5 had the least amount of bearing into their respective cogs, with joist 3 having a bearing of approximately 3mm and joist 4 had an even smaller bearing (again at the time the property was painted).

The experts again all agreed that the joists which failed first, causing the collapse, were the joists which had the least amount of bearing (the joists towards the middle of the balcony) into their respective cogs and because the bowing was the most pronounced at the middle of the balcony. The Brisbane City Council employees and Mr Wright were of the view that joists 3, 4 and 5 failed first. Mr Stick was of the view that joists 2, 3, 4 and 5 failed first. Mr McKenzie was of the view that joists 1 and 2 failed first.

Later investigations revealed that joists 8 and 9 were the only joists which broke. There are a number of explanations for this including that they broke upon impact with the ground at the time of the collapse; that the joists broke in situ prior to the collapse or that the joists broke in situ during the collapse. A theory was raised with the experts that joists 8 and 9 failed first causing the balcony collapse. All of the experts discounted this theory for a number of reasons including the fact that these joists had a greater amount (in comparison to the middle joists) of bearing into the cog, there was damage that was evident to the outside of the pockets where the joists were cogged (indicating that they had been ripped out) and if these joists failed first then the experts would not have expected the collapse to extend over the period in which it did.

I find that the joists towards the middle of the balcony failed first, which then caused the entire balcony to collapse. I am not required to make a finding as to how joists 8 and 9 broke as I am satisfied that these joists did not cause the deck to collapse.

I also heard evidence regarding the bowing and sagging that was identified following the collapse. Mr Wright was of the view that the downward sagging would have commenced at the time the deck was first constructed and slowly continued over the next 90 or so years. Mr Stick was of the opinion that the sagging did not contribute to the mode of failure of the deck. All of the experts agreed that the outward bowing of the bearer would have taken a long time to have bowed to the point at which it was measured following the collapse. Mr Wright was of the opinion that the outward bowing would have taken a number of decades, approximately 35 to 40 years to have occurred. Whilst Mr McKenzie agreed with this opinion he also offered the view that it was possible that work done during the renovations could have caused the bearer to bow. Mr Wright gave evidence that the sag and bow on its own would not be concerning, it was only an issue when combined with the method of construction for the balcony.

All experts agreed that the method of construction used for the balcony which collapsed is not a common method of construction used nowadays. Despite this, the experts commented that this method of construction in itself was not problematic or concerning, the concern would only relate to the amount of bearing that the joists were cogged into the outside bearer. Mr Stick commented that he was surprised that this balcony only allowed for a maximum of 20mm of cogging. Mr Beckley (a structural engineer with the Council) commented that 20mm cogging would not be used today and that 25 – 30 mm would be an absolute minimum allowance for cogging.

All experts agreed that if the joists had been fully engaged into the outside bearer then the deck would not have collapsed. Mr Wright provided evidence regarding the live loading of the deck, assuming the joists had been fully engaged. He indicated that the average weight of a female is 67.6 kilograms and on this basis the deck could have withstood 64 women on the deck. He also indicated that if a medium weight of 100 kilograms was applied then 44 people would have been able to be on the deck. Assuming that between 25 and 35 women were on the balcony at the time of the collapse and they weighed between 67 and 100 kilograms, if the joists had been fully engaged then the balcony would have been able to have supported this live load. Mr McKenzie agreed with the evidence provided by Mr Wright.

I find that at the time of the collapse the balcony was not overloaded for what it had been designed for, if the joists had been engaged in the bearer. Of course, the fact that there were a greater number of moving people on the balcony than there would have been previously in the last 10 years was a significant contributing factor for why it collapsed on this particular day.

All experts agreed there was no evidence to suggest the cause of the collapse was as a result of insect damage or significant timber decay.

The balcony collapsed because at some point in time, decades after construction, some of the nails which were fixing the joists to the bearer corroded such that they no longer provided any significant fixing strength. Once the nails corroded, and over more decades, the bearer commenced to

bow outwards, particularly at the centre. Because the joists were only cogged in 20mm the bowing became sufficient enough at some stage, but certainly by 2007, for some of the joists to be barely supported by the bearer. Up until 20 November 2008 this structural support was enough for average everyday use, but with the number of people on the balcony on this particular day it was insufficient.

Could the possibility of the mechanism for the collapse have been identified earlier and/or did the renovations cause the collapse?

It should be noted that much of the evidence given about the following issues was very much dependent on the witnesses telling the court what their usual practice would have been. Some of these events occurred between 4 and 8 years previously. Although many documents were able to be provided to the witnesses which assisted their recollections, it must be said that for many of the witnesses there was nothing particularly remarkable about this project which would have made the events stick in their mind.

Pre-purchase building inspections

Australian Standard 4349.1 1995 applies to the preparation of building inspection reports, and in this case the building inspectors in 2001 and 2005 certainly purported to apply the standard to their business practice.

The standard[11] states that a building report should not be seen as an all-encompassing report dealing with a building from every aspect. Rather it should be seen as a reasonable attempt to identify any significant defects visible at the time of inspection. Whether or not a defect should be regarded as significant, depends to a large extent upon the age and type of building being inspected. The standard provides that if necessary, recommendations for further inspections by suitably accredited specialists such as a structural engineer should be included in the report.

2001 inspection report

Prior to Mr and Mrs Bridge purchasing the property they engaged Mr Howroyd to perform a building and pest inspection. Mr Howroyd is a registered architect who had some 20 years experience as at 2001. He had been conducting building inspections since he started with Archicentre in 2000. He received some formal training in relation to inspections when he commenced employment with Archicentre. His inspection experience mainly related to old Queenslander style homes.

His report[12] noted that the property was generally in good condition for its age and type noting a number of areas which would require attention. There is no reference in the report to structural issues concerning the balcony however Mr Howroyd noted that the balustrade gaps did not conform to current regulations and a timber railing was rotting which may have required attention at some future stage. This was subsequently rectified by Mr and Mrs Bridge. The

[11] clause 3.3
[12] Exhibits M1 to M3

report also noted the balcony was open to weather and there may be a drainage issue with the decking because it did not have open floor gaps and there may have been a concern with the disposal of rainwater. The flooring was not replaced by Mr and Mrs Bridge.

Structural faults were one of the issues that Mr Howroyd would be looking for, and to report upon. He had no independent recollection of his inspection of the balcony area. His procedure was to conduct a visual inspection and if necessary to use a torch and ladder if he required a closer look. His evidence was that he would not have been able to ascertain how far the joists were recessed into the bearer, as the nature of the construction of the housing would have restricted access. To identify this would have required an invasive inspection by pulling up floorboards.

Mr Howroyd was questioned at some length concerning the span of the front bearer and the method of recessing the joists into the bearer in the context of a building inspection report. He was not the only person to say that given the building had existed and functioned for quite some time on this size of bearer, and although it may be greater in today's design world, it was not a matter of concern to him. His visual inspection did not show any evidence of structural defect, otherwise he would have noted it. I accept that this was the case.

I will comment on whether the method of construction and/or the bowing and sagging should have been identified during a building and pest inspection later in this decision.

Issue of the span of the front bearer and support posts

East Coast Building Design was engaged to prepare plans for submission to the Brisbane City Council for the renovation. Benjamin Henning was involved in all client contact and initial design work including initial site investigations. When the design phase was completed another designer prepared the detailed plans for building approval stage. A new verandah which wrapped around the left side of the building was included in the renovations but was regarded to be completely freestanding from the existing balcony. That appears to be evident from the plans.

According to evidence of the Brisbane City Council employees, the renovations were approved with Council and erected according to the plans.

Some significant amount of time was spent at the inquest concerning the replacement posts to the existing balcony and the span of the front bearer insofar as it related to the prepared plans. It is common ground that the span of the front bearer of the existing balcony from the inner support posts was 4900mm. The current Australian standard[13] would suggest that under current building practices the span should not be greater than 4300mm, although it is likely that using a span of 4900mm represented usual building practice when the balcony was constructed.

[13] Table 49 of AS 1684.2 assuming seasoned hardwood with a stress grade of F14 listed as exhibit M5

Much of the questioning concerned aspects of the approved plans with particular reference to drawings 5 of 21 and 6 of 21 of exhibit I2. These related to whether the drawings provided for inner support posts to be placed at a span of 4380mm or were the support posts to be placed to maintain the existing 4900mm span. It was a very valid point raised by the legal representatives for the family of Mrs Spencer.

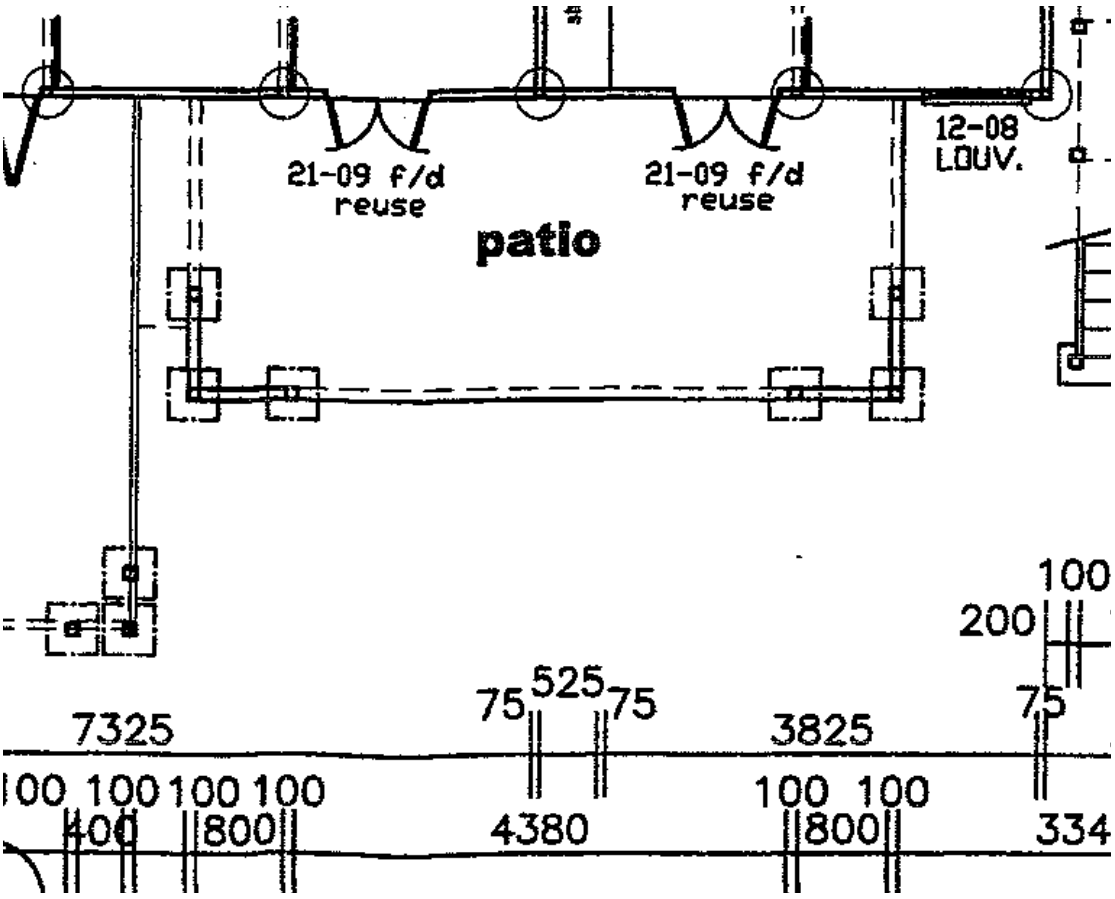
Resolving this issue was not assisted by the somewhat confusing evidence of Mr Henning who seems to have changed his evidence at times relating to this issue. However, for reasons that will be discussed later in this decision, it is unnecessary to resolve the conflict because ultimately I will find that the front bearer and its span were not contributory to the collapse.

Below is a photograph of the property taken prior to the renovations showing the balcony and the trousers facade:

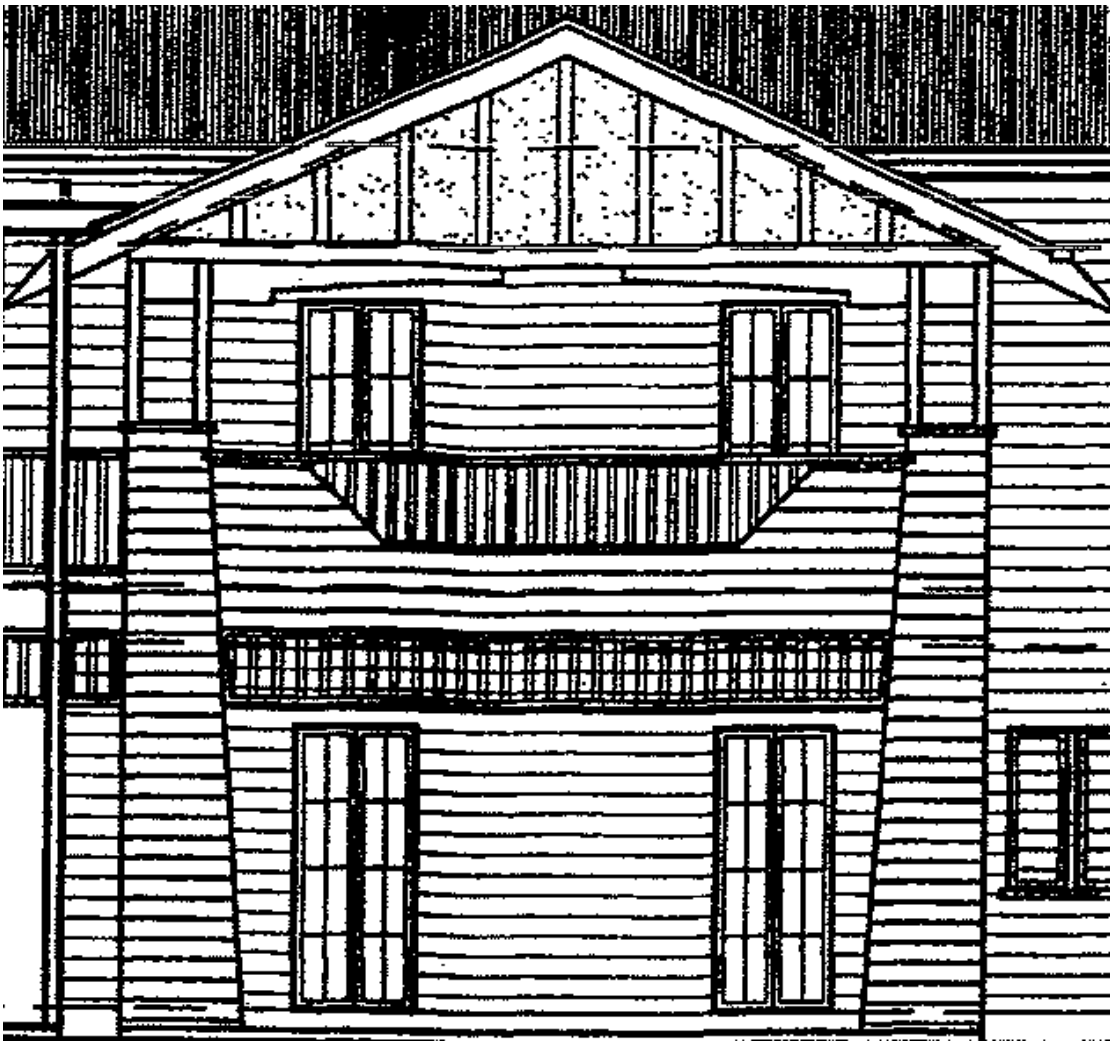
Mr Henning gave evidence that when he was at the property taking measurements, prior to drafting the designs, the width at the top of the "trouser" was 600mm and at the bottom of the trouser was 900mm.

I have included a photograph taken of the property following the renovations for comparison showing the three support posts that were replaced and that ultimately the trousers were not replicated in the renovation:

Below is a portion of drawing 5 from exhibit I2 that provided the measurements for the existing balcony. The plan indicates that the distance between the two inner posts is 800mm with 100mm distance for each post and a span of 4380mm.



Below is an extract of the front on view of the property from drawing 6 of exhibit I2 showing the trousers façade was included in the approved plans:



Essentially the plans would suggest that the bearer span from the inner two posts was 4380mm. The measurement of 4380mm is indicated clearly on the plans and appears to have been taken by Mr Henning from the footing measurement of the existing trousers façade which was built at an angle such that the width at the top was less than the width at the footing. In my view this measurement was simply a mistake on the part of Mr Henning in his drafting of the plan. Some of the confusing evidence from Mr Henning was I think a retrospective attempt to give some explanation as to why that measurement was valid, including references to the use of angled support posts, which although technically possible, did not make a lot of structural engineering sense.

On the issue of the plans and the six new support posts for the old balcony, Mr Duignan's evidence was also confusing. He had made no particular measurements of the bearer or other support structures. He stated that at some point during excavating of the area around the existing balcony he noted the bottom of the trousers were not in good order and they should be

replaced. A decision was then made to not replace the trousers as such but to simply replicate the pattern of the new deck in so far as the posts were concerned and he replaced the support posts in the same position as he found them. This meant the span was 4900mm.

Mr Duignan's recollection was that there were three posts on each corner of the balcony but he could not recall if they were all vertical or were placed at an angle. His interpretation of the plan was that the posts were to be placed at 800mm at the base, but at the top where they connected to the existing bearer they were to be put at an angle so they corresponded with the bearing length on the plan.

I was not particularly convinced about Mr Duignan's evidence on this issue which also may be a retrospective attempt to resolve what I think is simply a wrong measurement on the plan. I suspect it was always intended for the trousers to be removed and for the posts to be vertical and to match the pattern of the old balcony upstairs and of the new deck with its three support posts, notwithstanding what was set out on the plan. There may be other explanations, but whatever may be the true position, the conflict does not need to be resolved because of the evidence I heard from other witnesses.

All of the experts that were asked to comment on this issue were of the opinion it was acceptable building practice to place the new support posts in the same spot as the old support posts notwithstanding that this span was approximately 500mm longer than current Australian standards.

Mr Wright commented he had performed calculations on the bending strength of the bearer and bending stresses under the full design live load (which would be almost double the amount of people on the balcony) and it is still within the strength and capability of the timber. Mr Wright was of the opinion that he does not believe the span contributed to the collapse, and if it did, by only a miniscule amount. Mr Wright was asked whether the collapse would have occurred if the span had been 4380mm (pursuant to the standard). He stated that he does not think this would have had much affect because it would only have reduced the downward deflection (sag) which he did not believe had much contribution to the collapse (as opposed to the outward deflection or bowing which was the significant factor in the cause of collapse).

Mr Colin McKenzie stated he mostly agreed with Mr Wright's evidence on this issue however he commented that the greater the span, the greater the balcony may exhibit greater live load deflection. Mr McKenzie commented that he was unable to confirm whether or not this had occurred in this instance however, if it did, it would have only been a very minor or slight contribution to the collapse.

Other relevant witnesses such as Mr Howroyd and Mr Duignan were asked about this issue and gave similar views to the independent experts concerning the width of the span not being something that would concern them.

I accept the evidence of these witnesses and find that the span of the bearer although set at 4900mm and which would not comply with current Australian Standards of 4300mm, did not contribute to the collapse of the balcony.

Contribution of the renovations to the balcony collapse

William McCormack was the owner and director of Ace Restumping Pty Ltd. He was engaged by the builder to provide support to the residence including beneath the existing balcony. In his statement given prior to the inquest he said he supported the balcony by placing a single steel beam across the joists and then supported that beam on either end with lengths of pine stacked on top of each other (sties). Mr McCormack's evidence before the inquest itself seems to suggest he used two steel beams under the balcony but that either way the balcony was not lifted in any way nor would it have moved during the process of supporting the dwelling. A similar support method was used by him for the whole of the building.

In evidence, Mr McCormack stated that after taking the weight of the house it would be taken up about 5 to 10mms to enable any old stumps and capping to be pulled out. He emphasised many times in his evidence that any movement would only be minor and only vertically and not horizontally to the left or right.

Mr McCormack's evidence was at times confusing but in fairness to him this job was performed almost 10 years previously and his recollection of precisely what was done would have faded with time. There is no evidence that suggests that anything unusual occurred during the process of supporting the house, and on that basis I accept that any movement to the building would have been relatively minor, although there must have been some movement vertically.

Nevell Krogh provided a certified structural inspection of the excavations which effectively stated they provide an adequate bearing capacity to support expected loads and were generally in accordance with the drawings and plans. His inspection involved looking at the post holes and ensuring they generally were in the right spot. His certification did not involve anything above the ground.

In relation to the support sties, Mr Duignan's recollection was there were two sties under each side of the patio and then a steel beam running out supporting the front bearer. He again did not believe there was any possibility the support process would affect the existing bearers and joists.

Mr Everlyn was unable to give evidence so I was unable to determine what process he undertook with reference to the new support structure and whether he gave any consideration to the bearing span and/or the construction method adopted.

Mr McKenzie, Mr Stick and Mr Wright were all asked to consider whether any part of the renovations could have contributed to the cause of the collapse. Mr Wright was of the opinion the process of replacing the support posts

(including the process where the house was supported on sties) was unlikely to have contributed to the bowing and sagging of the bearer because the support posts were placed near joists -1 and 9 and these joists were almost fully housed into the recess of the bearer just prior to the collapse. His view was if anything in the renovation process had affected the outside bearer, you would expect to see the effects at or near joists -1 and 9. Mr Wright also commented that no work was done near the middle of the deck which is where the balcony initially failed.

Mr Stick was of the opinion the support posts were unlikely to have contributed to the principal mode of failure; however it is possible that during the renovation process something may have hit the bearer and dislodged it outwards. Mr McKenzie was of the opinion raising or lowering the house would not have contributed to any significant amount to the potential for the bearer to part from the joists; however he disagreed with Mr Wright's opinion that it was unlikely the renovations caused the collapse. His opinion was that the process of raising or supporting houses and conducting renovations can create stress in a structure and if the structure has inadequate ties or fixings then that may allow various pieces to move slightly. At its highest, Mr McKenzie was of the view this could have potentially happened however there was no way to confirm or deny such a scenario occurred in this instance. Mr McKenzie also commented he would not necessarily expect someone to notice such a change.

The new deck was separate from the old balcony although there was a bearer between the last joist closest to the old balcony. None of the old floorboards were lifted at any stage during the renovations. There is no evidence which suggests that anything unusual occurred during the support or building process.

I find the renovations did not cause a noticeable movement in the bearer or joists which contributed to the collapse. It is possible, indeed probable, the renovations may have caused some minor degree of movement but it is not now possible to be able to ascertain that definitively or the extent of any movement.

2005 inspection report

Mr Houston conducted a property inspection in April 2005 at the time Mr and Mrs Biggs were considering purchasing the property. He was a licensed builder of some 25 years experience. He joined Australian Building Inspection Services in 2003. Company documentation suggests it applied the Australian Standard for the preparation of their reports. He did not have an independent recollection of this particular inspection other than recalling pointing out another issue he identified in the roof space to the current owner. He did not recall how he inspected the balcony. Not surprisingly he stated if he had seen some structural integrity issue including bowing or sagging of structural bearers he would have noted this in his report.

Mr Houston stated a reasonable benchmark for identifying those issues would be to consider what the acceptable standard is currently, particularly if they

were visible and identifiable. He agreed that in relation to balconies the things he would be looking for included the hand rails, decking boards, bearers and joists and the connection between the two, as part of the visual inspection. One of the techniques he would have used was to ascertain the springiness or deflection of a structure whilst walking or jumping on it.

He agreed the method of construction used in this building did have some potential problems, however his visual inspection found no major defects that alarmed him and he did not need to carry out any other inspections or tests.

It has to be noted the Australian Standard as it applied for both building inspections sets out the limitations of such inspections and note they very much rely on visual inspection of accessible areas of the property. Invasive inspections are difficult as this clearly is restricted by virtue that most inspections are commissioned by persons who are planning to purchase a property and not the owners of the property who would be more likely to give permission for a more invasive search.

The method of construction

Plainly one issue for the inquest, and no doubt of interest to other parties, was whether it could be reasonably expected such inspections could identify the potential difficulty in the construction method used, and also whether other persons who had attended the property, such as the building certifier, plan drafter and the builder could reasonably have identified the significant potential flaw in the construction which ultimately resulted in the collapse of the balcony.

The following photograph depicts the view that would have been evident at the time of the inspection with the exception that the underneath of the deck was in its original colour, either a brown stain or unpainted but dark.

Mr Duignan stated he would have been aware during renovations that the construction method that had been used for the old balcony was to engage the joist into the bearer via a cut out in the bearer. There is no controversy that the universal evidence of anyone asked was that this was not a method

of construction that would be generally used today. Nevertheless the method of construction did not concern him.

Mr Duignan stated prior to and during the building work he would no doubt have done a visual inspection of the support and structural members and if he had identified any work that needed to be done to the joists or bearers he would have brought that to the attention of the owners. Mrs Bridge gave evidence about other issues identified by Mr Duignan during the building process which supports this position.

Mr Duignan said if a joist was pulling right out he would have expected to have seen it. The evidence of all witnesses asked was that in this case to tell how far a joist was engaged in the bearer would have involved pulling up part of the flooring deck which would have been relatively invasive and expensive.

The evidence of all witnesses asked was that extra securing for the joists in bearers could have involved a number of processes although the evidence is that most of those would be relatively inexpensive.

I formed the impression that Mr Duignan was a competent professional builder experienced in renovating old Queenslanders. He would expect to come across problems from time to time given the vintage of the construction. I accept that if he had found a problem that required attention he would have fixed it or brought it to the attention of the owners. If he had seen or witnessed a problem with the balcony support he would have sought to do something about it. I accept he had not.

Mr Stick was asked to comment on whether Mr Duignan should have turned his mind to the method of construction. Mr Stick was of the opinion that Mr Duignan was only required to turn his mind to the method of housing if there had been some visual evidence to cause him some concern such as rot, decay or a clear and concerning amount of movement in a number of joists away from the bearer. Given the other expert evidence on this topic, namely, that the method of construction in itself was not concerning but rather the amount of bearing the joists had into the bearer was the issue, and the terms of Mr Duignan's engagement, I do not find that Mr Duignan nor any of the other parties who were involved in the renovations should have turned their minds to the method of construction.

All of the experts commented that if a person was to observe the deck from below it would be impossible to determine how far the joists were engaged into the bearer. Mr Wright commented that one way to determine how far the cogging was would be if the joists had shrunk a little to push a piece of wire in to gauge the depth. If the joists had not shrunk, the only way to determine the depth would be to lift a board from the deck and look at joists from above. This would have been impossible to do during a building and pest inspection.

In particular Mr Colin McKenzie commented that unless "specifically targeted for detailed investigation, this potential mode of failure of the deck would not have been obvious to a member of the general public and that even a trained

building practitioner may not have been immediately alarmed at the potential dangers when viewing the deck from the underside prior to its collapse."[14]

Mr Wright also commented that in the context of a two or three hour inspection he would not have expected this issue to have been identified and he did not think he would have identified this issue in those circumstances. He believed it would only have been identified if a person had spent quite some time looking at the underside of the deck and gave same consideration to the depth of the cogging.

Mr Wright also stated that as the underside of the deck was either unpainted or painted brown at the time of the inspections this issue would have been more difficult to have identified.

The experts were also all of the opinion it is unlikely that the bowing and sagging would have been obvious to those inspecting the property prior to the collapse. They commented that it was only after the collapse (when they were looking for a cause of collapse) and they were underneath the balcony observing it that they identified there was potentially a bow and sag. Mr Wright commented he had attended the property suspecting there may have been a bow in the bearer and it still took him sometime to identify the bow.

Given the totality of this evidence I find the potential mode of failure of the balcony collapse was not one that was reasonably identifiable by the two families who owned the property between 2001 and 2008, those who inspected the property in 2001 and 2005 nor those involved in the renovations to the property.

With the benefit of hindsight it is apparent the method of construction has potential problems particularly after many years. These included the relatively small width of cogging of 20mm and the fact that after 90 odd years it is likely any fixing nails may have corroded. I accept that visually identifying a potential problem was difficult if not impossible without an invasive inspection. It is apparent that until this collapse most witnesses would not have even turned their mind to the method of construction and any potential problems.

It was mentioned by a number of witnesses that the fact that the balcony was standing after many years with no visible defects would seem to have given them some confidence there were no problems with the construction. Accepting that may have been a prevailing view, it is clear that in future that can longer be the case. It is unclear as to the extent the method of construction has been used in similar vintage buildings. At least one witness knew of one other balcony construction using a cogging into the bearer of about 20mm which had also collapsed.[15] There are relatively inexpensive methods to rectify the problem without invasive repairs. For those reasons at the completion of the inquest I had no difficulty in forming preliminary recommendations which are referred to below.

[14] Exhibit G1
[15] Evidence of the engineer who prepared the footing plans, Mr James Neil McKenzie.

Findings required by section 45

I am required to find, as far as is possible, who the deceased was, when and where she died, what caused the death and how she came by her death. As a result of considering all of the material contained in the exhibits and the evidence given by the witnesses, I am able to make the following findings in relation to the Mrs Spencer's death:

(a) The identity of the deceased was Annette Lee Spencer;
(b) The date of death was 21 November 2008;
(c) The place of death was at the Royal Brisbane and Women's Hospital;
(d) The formal cause of death was due to head injuries;
(e) The head injuries were inflicted upon Mrs Spencer on 20 November 2008 as a result of the balcony on which she was standing with a large number of other persons at 57 Upper Lancaster, Ascot, collapsing.

Concerns, comments and recommendations

Section 46 of the Act provides that a coroner may comment on anything connected with a death that relates to public health or safety, the administration of justice or ways to prevent deaths from happening in similar circumstances in the future.

On 12 November 2009 I published preliminary recommendations in relation to the method of construction and action to be taken by various bodies. These remain my formal comments and recommendations.

The general public and the building industry need to be aware of this particular method of construction in older properties, particularly the potential for joists to become disengaged from bearers and collapse in the same manner that occurred in this instance as a result of little or no bearing of the joists into the bearers.

Evidence heard at the inquest indicates that remedial work which would provide support to the structure can be easily attended to and at a limited cost. Suggested remedial work includes the use of joist hangers or Triple Grips; the placing of an added ledge under the joist which is attached to the bearer; and the use of a tie rod fixing the front bearer to the main house. Home occupiers should seek the advice of a builder or engineer as to the necessity for any remedial work and the appropriate method.

I recommend that:

1. house occupiers of all residential dwellings consisting of a wooden deck or balcony, but particularly those built pre World War 2, have those constructions checked for their structural integrity generally, but in particular for the particular construction method identified in this case; and
2. the Building Services Authority, the Brisbane City Council and other Local Government Authorities, and Building Code and Residential Building Associations disseminate these recommendations to their members, stakeholders and the general public to highlight the need for

an inspection of such buildings, to identify any structural concerns and for remedial work to be carried out.

Since the hearing there has been another balcony collapse that occurred at Morayfield where a number of people were injured.[16]

I am aware that since my preliminary recommendations were published, the Brisbane City Council has sent a letter to owners of house properties referring to both collapses and the preliminary recommendations and highlighting the need for property owners to have inspections done on any suspect structures, including decks. Further details and advice are included on the Council's website.

I am also aware that the Building Services Authority has made specific reference to the recommendations on the front home page of its website with a direct link to the recommendations to the website of the Office of the State Coroner. The BSA repeated the recommendations in full in its Summer 2009 edition of Building Links highlighting this case and the other balcony collapse. The BSA is running a number of education sessions for home builders in relation to deck construction.

I thank both organisations for their cooperation during the investigation and the inquest and their assistance in the early dissemination of these recommendations.

My condolences are expressed to Mr Spencer, the family and friends of Ms Spencer and those injured during this tragic accident.

I close this inquest.

John Lock
Brisbane Coroner
28 June 2010

[16] I received a report into that incident with the method of collapse being different to what occurred here but being of equal concern to homeowners.