FORM 37

Rule 60(1)

FINDING INTO DEATH WITH INQUEST

Section 67 of the ***Coroners Act 2008***

Court reference: 3106/04

Inquest into the Death of NATHAN LINDSAY PARK

Place of death:	83 Queens Road, Melbourne[1], Victoria 3182
Hearing Dates:	15 to 18 September 2008 & 10 December 2008 at the Coronial Services Centre, Southbank
Appearances:	Senior Constable (S/C) King Taylor, SCAU[2] - Assisting the Coroner
	Mr Chris Gamble- on behalf of the CFMEU
	Mr Peter Rozen of Counsel - on behalf of Greg Moresi, Anthony Goss, Peter Deneson, Tanya Pearson and Ryan McMahon (Rigby Cooke Lawyers)
	Mr Hallowes of Counsel-on behalf of Mr Aengus O'Donnell (Robert Stary Lawyers)
Findings of:	AUDREY JAMIESON, Coroner
Delivered On:	24 August 2011
Delivered At:	Coroners Court of Victoria Level 11, 222 Exhibition Street, Melbourne 3000

[1] Throughout the investigative material, 83 Queens Road was attributed to as being in both the suburb of St Kilda and Melbourne. For consistency I have opted to attribute 'Melbourne' as the appropriate address.

[2] SCAU = State Coroners Assistants Unit, which in 2010 became the Police Coronial Support Unit (PCSU)

FORM 37

Rule 60(1)

FINDING INTO DEATH WITH INQUEST[3]

Section 67 of the ***Coroners Act 2008***

Court reference: 3106/04

In the Coroners Court of Victoria at Melbourne

I, AUDREY JAMIESON, Coroner

having investigated the death of:

Details of deceased:

Surname: PARK
First name: NATHAN
Address: 6 FLORENCE AVENUE, BERWICK, VICTORIA, 3806

AND having held an inquest in relation to this death on 15 to 18 September 2008 and 10 December 2008, at the Coronial Service Centre, Southbank

find that the identity of the deceased was NATHAN LINDSAY PARK

and the death occurred on 3 September 2004

at 83 Queens Road, Melbourne, Victoria 3182

from:

1a. HEAD INJURIES

In the following summary of circumstances:

1. On 3 September 2004, Nathan Park was working on a high rise building site at 83 Queens Road, Melbourne. The building was being constructed by Melbourne Transit Pty Ltd (Melbourne Transit). Nathan was working on level 7, 'shoring up' holes on the formwork[4] when the formwork he was working under collapsed, intruding into the space where he was working. Nathan Park sustained fatal head injuries and died at his workplace.

[3] The Finding does not purport to refer to all aspects of the evidence obtained in the course of the Investigation. The material relied upon included statements and documents tendered in evidence together with the transcript of proceedings and submissions of legal representatives/Counsel. The absence of reference to any particular aspect of the evidence, either obtained through a witness or tendered in evidence does not infer that it has not been considered.

[4] Formwork systems provide temporary structural support for new floors and other structures during concrete placement.

2. The death of Nathan Park was *reportable*[5] under the *Coroners Act* 1985 (the old Act).

JURISDICTION:

3. At the time of Nathan Park's death, the old Act applied. From 1 November 2009, the **Coroners Act 2008** (the new Act) has applied to the finalisation of investigations into deaths that occurred prior to the commencement of the new Act.[6]

4. In the preamble to the new Act, the role of the coronial system in Victoria is stated to involve the independent investigation of deaths for the purpose of finding the causes of those deaths and to contribute to the reduction of the number of preventable deaths and the promotion of public health and safety and the administration of justice. Reference to preventable deaths and public health and safety are also referred to in other sections of the Act.[7]

5. Section 67 of the new Act describes the ambit of the coroner's findings in relation to a death investigation. A coroner is required to find, if possible, the identity of the deceased, the cause of death and, in some cases, the circumstances in which the death occurred.[8] The 'cause of death' generally relates to the *medical cause of death* and the 'circumstances' relate to the *context* in which the death occurred.

6. A coroner may also comment on any matter connected with the death, including matters relating to public health and safety and the administration of justice.[9] A coroner may also report to the Attorney General and may make recommendations to any Minister, public statutory authority or entity, on any matter connected with a death which the coroner has investigated including recommendations relating to public health and safety or the administration of justice.[10]

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[5] "reportable death" means a death-
(a) where the body is in Victoria; or
(b) that occurred in Victoria; or
(c) the cause of which occurred in Victoria; or
(d) of a person who ordinarily resided in Victoria at the time of death-
being a death-
(e) that appears to have been unexpected, unnatural or violent or to have resulted, directly or indirectly, from accident or injury; or

[6] Section 119 and Schedule 1 - *Coroners Act* 2008

[7] See for example, sections 67(3) & 72 (1) & (2)

[8] Section 67(1)

[9] Section 67(3)

[10] Section 72(1) & (2)

This is in contrast to the old Act which only permitted recommendations to be directed to any Minister or public statutory authority, not an entity. [11]

BACKGROUND CIRCUMSTANCES:

7. Nathan Park[12] was born on 8 January 1981. He was 23 years old at the time of his death. He lived at 6 Florence Avenue, Berwick with his wife Rebecca Park and their 10 month old son, Samuel Nathan.

8. Nathan was a carpenter by trade. He had been employed by the construction company, Melbourne Transit since February 2002.

9. On 11 March 2004, Nathan underwent a site induction at the construction site of a 23 storey apartment building at 83 Queens Road, Melbourne.

SURROUNDING CIRCUMSTANCES:

10. On Friday 3 September 2004, Nathan was working at the construction site at 83 Queens Road, Melbourne. On this day, concrete was being poured to form the 8th floor. The concrete pour commenced at approximately 0805 hours and continued without incident until approximately 1130 hours when work moved to an incomplete section of floor on the south-west corner of the building. This area of the 8th floor was directly over Unit 2 of the 7th floor.

11. At or around 0800 hours Nathan was directed by Mr Greg Moresi, Construction Manager/Supervisor of Melbourne Transit, to enter Unit 2 on the 7th floor and repair or 'shore up' a hole or holes in the formwork of the level 8 floor. 'Shoring up' the holes prevents concrete from seeping through the formwork onto the floor below.

12. At approximately 1145 hours, the concrete pour in the south-west corner, on Level 8 commenced. Nathan was still in Unit 2 on Level 7 working from a ladder, repairing formwork. As the concrete pour proceeded, the formwork and propping failed resulting in the intrusion of concrete and flooring structure into the space where Nathan was working. Several other employees came through the collapsing material and were injured. Mr Anthony Goss, Director of Melbourne Transit and other workers located Nathan within Unit 2 amongst the collapsed material and commenced cardio-pulmonary resuscitation (CPR). Mr Goss instructed other workers to contact Emergency Services.

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[11] Section 21 (2) of the old Act. Whilst not relevant in this case, it is arguable that recommendations can not be directed to an entity, as the Inquest was completed prior to the commencement of the new Act and recommendations directed to an entity were not contemplated at that time.

[12] At the request of the family Mr Nathan Park was referred to as 'Nathan' during the course of the Inquest. For consistency and where possible, I have for the most part attempted to adhere to their request in the Finding.

13. Nathan had however sustained fatal injuries and died at the scene.

14. Police, representatives from WorkSafe Victoria (WorkSafe) and the State Coroner attended the scene of Nathan's death at 83 Queens Road, Melbourne.

INVESTIGATION:

15. The identity of Nathan Lindsay Park and the date and place of his death, were without dispute and required no additional formal coronial investigation.

- **Medical Investigation:**

16. An autopsy was performed by Dr Matthew Lynch, Forensic Pathologist, at the Victorian Institute of Forensic Medicine. Post mortem findings included fractures to the left femur, tibia and fibula and base of skull and parenchymal brain injury. No significant natural disease was identified. Toxicological analysis was negative for drugs and alcohol. Dr Lynch attributed the cause of death to head injuries.

- **Police/WorkSafe Investigation:**

17. Victoria Police and WorkSafe investigated the circumstances surrounding Nathan's death. At the time, the then State Coroner, Graeme Johnson, directed the Police to be the lead agency in relation to this workplace death and that until otherwise determined, the area should be addressed as a crime scene.[13] The crime scene was cleared later that day by Police. WorkSafe then closed and secured the site pending further inspection and investigation. Police made arrangements for a number of the workers to attend St Kilda Police complex to make statements. Thereafter, several other statements were obtained both by Police and WorkSafe investigators.

18. Other companies involved with the construction of the Queens Road complex identified as having relevant connection to the circumstances surrounding Nathan's death included:

- Ultrafloor Pty Ltd - manufactures Ultrafloor concrete beams and supplied Melbourne Transit with the Ultrafloor system (excluding design of formwork and propping design);
- McLeod Consulting - hired by Melbourne Transit as engineers to provide building design detailing (excluding the design of Ultrafloor and the design of erection conditions for formwork);

[13] Exhibit 30 - Statement of Acting Senior Sergeant John Cormack and Transcript of Proceedings @ p277 (Stephen Kelly)

- Mitchcon Pty Ltd - hired by Melbourne Transit to undertake concrete works including the pumping of concrete on 3 September 2004; and
- Worley Infrastructure Group - provides structural engineering and shop drawings for the Ultrafloor system in Victoria.

19. The investigation weighted to an explanation that the incident was attributable to the failure of an 8.6 metre long 150C Ultrafloor concrete beam No. UB89 (UB89) that was manufactured in accordance with Australian Standard 3600-2001. This beam may have failed during the concrete pour as a result of incorrect propping design and location. The beam appeared to have been propped off centre by a 3 metre "Truform" wooden beam. This wooden beam was positioned at 90 degrees (approximately to the concrete UB89 beam). The Truform beam was supported by metal "H" frames from the floor. Specifications required this beam to be propped in the centre.

20. As part of WorkSafe's investigation, they obtained an opinion from Dr Russell Keays, an expert engineer who determined that the wooden Truform beam used was not suitable in terms of strength and stiffness, even if positioned along the centre line of the UB89. Dr Keays suggests that the UB89 should have been propped with a pair of 'Acrow props' (or similar) at mid-span. He stated "*A pair of 'Acrow props' would have been sufficient to safely support Ultrafloor beam UB89*"[14]. He further added "*there were uninstalled 'Acrow props' in the vicinity of the collapse. It is possible that it was intended that these would be installed under UB89.*"[15] However, there is no evidence of the intended use or purpose of these Acrow props. No signs of fissure or other external indications of weakness in the UB89 were identified, although damage caused by the formwork collapse may have destroyed any evidence of weakness in the beam.

21. At some point in construction, the Ultrafloor beam design in the 8th floor was changed over the area of Unit 2, 7th floor from a double beam to a single beam. The reason for this change and the person(s) who authorised the change is unclear from the evidence. Mr Robert Van Senten, a carpenter with Melbourne Transit was shown the Ultrafloor Slab Plan for levels 5 to 23 and commented:

> *I note that this plan shows two Ultrafloor beams 88 and 89. I have seen this plan with the double beams before. I also note that the Ultrafloor on Level 8 at the time of the pour on 3rd September had just the single beam at the time of the pour. I don't know why this was the case.*[16]

[14] Exhibit 24 - Statement of Dr Russell Keays @p10

[15] Ibid

[16] Inquest Brief @ p38 - 40 & Exhibit 9 - Statement of Robert Van Senten dated 21 October 2004

Criminal Proceedings:

22. WorkSafe issued criminal proceedings against Melbourne Transit for breaches of the *Occupational Health and Safety Act* 1985 (old OHS Act). On 17 August 2006, in the County Court of Victoria before Her Honour Judge Gaynor, a conviction was recorded on a plea to one charge of failing to provide a safe work environment contrary to s.21 and s.47 of the old OHS Act. The company was fined $100,000.00. Melbourne Transit was in receivership at the time the fine was imposed. In Her *Reasons For Sentencing,* Her Honour stated:

> *"I regard the defendant company's actions before and after this accident to be reprehensible in the extreme, involving a dismissive and careless approach to the safety of its employees, such that a young life was cut tragically short by what was clearly an easily avoidable accident."*[17]

23. Although I was mindful of the completed criminal proceedings against Melbourne Transit, a review of the investigation material identified a number of matters of public health and safety and in particular, health and safety issues for the building and construction industry and its workers, that warranted further exploration through a public inquiry.

24. I note that no directors or individuals were charged with any offences pursuant to the old OHS Act. I further note at the time of the incident those options were available to the regulator, WorkSafe, and I make no comment as to the reasons why these options were not explored.

25. An Inquest was held pursuant to Section 17(2)[18] of the old Act.

THE INQUEST:

26. Senior Constable (S/C) Taylor, Assisting the Coroner stated at the outset of the Inquest that there were a number of matters identified by the investigation that the Inquest would seek to determine including:

- Who was in charge or supervising the site on 3 September 2004;
- Who was in charge or supervising the concrete pour on Level 8;
- What changes were made to the formwork and propping plans for that floor prior to it being erected;
- Why the changes were made to the plans;

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[17] *R v. Melbourne Transit Pty Ltd* [2007] VCC @ paragraph 11

[18] s.17(2) A coroner who has jurisdiction to investigate a death may hold an inquest if the coroner believes it is desirable.

- Who signed off on the changes;
- Who erected the formwork to hold up the floor under which Nathan was working;
- Who inspected the formwork and signed it off as correct;
- What safety procedures were in place on the day to ensure no person or persons were under the pour when it occurred;
- Who was responsible for the safety of those working on the pour;
- Who was the occupational health and safety representative on this site and/or this pour and their role on site; and
- Why the formwork collapsed.

Viva voce evidence was obtained from the following witnesses:

- Leading S/C Stephen LAKE - Crime Scene Examiner, Victoria Police
- Lyndon PEARCE, Carpenter, Melbourne Transit
- Mark GRIFFITHS, Apprentice Carpenter, Melbourne Transit
- Ryan MCMAHON - Engineer
- Tanya PEARSON - Engineer, Melbourne Transit
- Robert VAN SENTEN, Leading Hand, Melbourne Transit
- Sheldon FREDERICKS - Apprentice Carpenter, Melbourne Transit
- Aengus O'DONNELL - OHS Representative
- Stephen KELLY, WorkSafe Inspector
- Mark O'BRIEN, WorkSafe Inspector
- Andrew SHEILDS, Civil Engineer, Ultrafloor Pty Ltd
- Dr Russell KEAYS, Consulting Engineer, WorkSafe Expert
- Peter COLLINS, WorkSafe Inspector
- Rebecca PARK, Nathan's wife
- Sergeant John CORMACK, Investigating Officer, Victoria Police

27. A number of witnesses sought to be excused from giving evidence on the grounds of self incrimination. These witnesses included Mr Matthew Allen, Mr Greg Moresi, Mr Peter Deneson, Mr Brian Palmer and Mr Anthony Goss.

28. A witness is entitled to invoke this privilege if there are reasonable grounds for the witness' belief that the witness may be in peril of incriminating himself/herself as to the commission of an indictable offence if an answer to a question(s) is given. In *R v The Coroner; Ex parte Alexander*[19] Justice Gray ruled that the privilege against self-incrimination applies in proceedings in a Coroner's Court[20]. A person claiming the privilege should not be denied if the court accepts that it is made *bona fide*.

29. I accepted the applications to be excused from giving evidence on the grounds of self incrimination.

Comment:

30. The effectiveness of any Inquest is in part dependant on the ability of a coroner to hear directly from witnesses to a critical incident and for those witnesses to be subject to cross examination. In the absence of protection from potential criminal or civil proceedings arising from the giving of evidence, a coroner's statutory role to discern the truth of the circumstances is compromised. In the absence of full, frank and public disclosure of the circumstances surrounding the death, the fact finding role of the coronial process is diminished.

31. The investigation into the death of Nathan Park is an example of the unsatisfactory consequences of this lack of statutory protection for witnesses at risk.

32. Prior to the commencement of the new Act, there had been much debate about the invoking of the privilege against self-incrimination in the coroners jurisdiction.[21] Legislative reform had already occurred in most Australian jurisdictions where protection can be provided to a witness from the evidence given to a coroner subsequently being admissible in evidence in criminal proceedings and in some jurisdictions, civil proceedings also. The protection to the witness is usually provided through the issuing of a certificate by the coroner conducting the Inquest.[22]

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[19] [1982] VR 731

[20] Justice Gray followed Madden CJ in *Re O'Callaghan* (1899) 24 VLR 957

[21] See Freckleton I. & Ranson D., *Death Investigation and the Coroner's Inquest,* Oxford University press, 2006 @ pp 578-585 for a summary of the relevant authorities.

[22] In Tasmania and the ACT the certificate is granted under the Evidence Act, not the relevant Coroners Act.

33. The privilege against self-incrimination was considered by the Victorian Parliament Law Reform Committee into the old Act. In the Committee's Final Report[23] a number of recommendations were made for amendments to the old Act including conformity with the *Uniform Evidence Law Report 2005*, and for the provision of a certificate preventing the use of evidence against a person claiming the privilege, in other proceedings. Section 57 of the new Act reflects the recommendations and now allows for the provision of a certificate in certain circumstances if the coroner determines that the objection to giving evidence is reasonable. Unfortunately, this provision was not enacted at the time of the Inquest.

FINDINGS, COMMENTS & RECOMMENDATIONS:

Supervision at the site on 3 September 2004

34. In a statement prepared in September 2006, Mr Anthony Goss, Project Manager and Director of Melbourne Transit, stated that he undertook to be on site for particular significant activities such as big concrete pours. He would take charge when present and would undertake inspections of work being performed during the day. He stated:

> *"These inspections I undertook as a matter of course on all larger concrete pours at Queens Road and in addition to the standard and site specific inspections that were undertaken by the site staff. ....I also check the formwork and the propping on each section that is about to be poured...."*[24]

35. Mr Goss was present on 3 September 2004, as was Mr Brian Palmer, site supervisor and Mr Greg Moresi, builder/supervisor. There is evidence that Mr Moresi instructed Nathan to repair some formwork on Level 7. Mr Matthew Allen was in charge of the pour on Level 8 above the area on Level 7 where Nathan was working.

36. It is unfortunate, that the Inquest did not hear from any of these supervisors.

37. There is no clear and cogent evidence about the identity of the person(s) responsible for supervising the work being performed by Nathan in Unit 2. That responsibility intuitively rests with those in charge/supervising the construction site *per se* and in particular, the person who allocated the work to him, Mr Moresi.

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[23] Printed in September 2006.

[24] Statement of Anthony Goss dated 5 September 2006 - Inquest Brief pp 19-23 @p20

38. Mr Moresi's inability to provide an adequate explanation for Nathan's presence in Unit 2, Level 7, at the time of the concrete pour reflects adversely on his capacity as a supervisor, which in turn reflects adversely on Melbourne Transit *per se*. It reflects a lack of supervision of the workforce and a lack of knowledge of the timing of critical activities on the construction site. In addition to sending Nathan to do the job, Mr Moresi has directed 3 other workers at two different times to do the same work - all of whom left the area without doing or assisting with the job when they saw that Nathan was performing the work they had also been directed to do. In the absence of hearing from Mr Moresi, I can only assume that he had forgotten that he had directed Nathan to do the job in the first instance. In the absence of hearing from Mr Moresi, I was left with the impression that he had no systematic approach to the allocation of work or indeed of any follow up on the progress of the works on that day.

39. It is inexplicable that with three supervisors from Melbourne Transit on site that morning that no one checked Level 7 to ensure it was empty, prior to the concrete pour. Someone in a supervisory capacity needed to take responsibility for ensuring the floor below was clear.

Changes to formwork and propping plans

40. No formwork or propping plans were provided to investigators or the Court. Mr Van Senten said that there were always plans available if you wanted to look at them.[25] He believed the plans were in the possession of the engineers but he had never seen them. In fact, clause 4.7.1 of Australian Standard 3601-1995: Formwork for Concrete, includes requirements for documentation of a formwork system.[26] MacLeods drew up propping plans after Nathan's death.

41. Given the significant structural role played by formwork and the propping, I find it difficult to reconcile an absence of appropriate documentation in the form of plans that were either seen by or would be referred to, by all involved in construction of the formwork.

Erection of the formwork in Unit 2 on Level 7

42. In his statement, Mr Goss acknowledged his responsibilities in general terms however, a number of ambiguities remain and the evidence is equivocal in relation to:

- The identity of the person(s) who erected/set-up the formwork[27] and supports in the area of Unit 2, Level 7;

[25] Transcript of Proceedings @ p148 (Robert Van Senten)

[26] Exhibit 24 - Statement of Dr Russell Keays @p8

[27] Transcript of Proceedings @ 529 (Peter Collins)

- The identity of the person(s) who designed the formwork[28] and propping; and
- The identity of the person(s) who checked and "signed off"[29] on the suitability of formwork and propping prior to commencement of the concrete pour on Level 8, despite there being a number of people at the site that day who were in a position to do so.

43. I accept the submission of Mr Gamble that there was no actual group of cosigned workers who would perform formwork and propping on a regular basis. The delegation of this work came from a pool of workers.[30] Nathan's duties involved erecting formwork and propping. Sheldon Fredericks and Mark Griffiths also performed this type of work on the construction site however, neither could say if they had prepared Unit 2 on Level 7 for the Level 8 pour or similarly, whether Nathan had.

44. Mr Kenneth Clinton in his statement[31] described himself as Leading Hand Carpenter with duties that included erecting formwork at the site. He did not however categorically state that he was responsible for Unit 2 on Level 7 and he was not called to give evidence before the Inquest. Mr Van Senten stated that no one in particular was in charge of setting up the propping but there was always someone *checking and walking around, looking.*[32] The "someone" could be Mr Van Senten himself or another leading hand, Mr Moresi or Mr Deneson as the on site engineer or possibly even an independent engineer that has come onto the construction site. Mr O'Donnell stated that Mr Brian Palmer would also inspect formwork, as would engineers from MacLeod's. However, Mr Ken MacLeod said that was not correct - his engineers did not inspect formwork and propping for Melbourne Transit but inspected reinforcement laid on top of the Ultrafloor beams. Furthermore, none of his engineers were present on site on 3 September 2004.

Why the formwork collapsed

45. At the outset of the investigation *the propping was a major concern.*[33] WorkSafe Inspectors O'Brien and Kelly both suggested that the formwork collapsed because of a lack of propping. Sergeant McCormack reported that Mr Goss said much the same shortly after the fatal incident. Sergeant McCormack stated that on the day of Nathan's death he spoke to Mr Goss on his arrival

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[28] *ibid*

[29] *ibid* @ pp528 & 529 (Peter Collins)

[30] Transcript of proceedings @ p576 (Mr Gamble)

[31] Statement of Kenneth Clinton dated 21 October 2004 - Inquest Brief @ p74

[32] Transcript of Proceedings @ p148 (Robert Van Senten)

[33] Transcript of proceedings @ p 575 (Peter Collins)

at 83 Queens Road. Unit 2 had been taped off and Mr *Goss pointed out a broken timber beam and stated that the beam had broken as it was not properly propped,*[34] that *he thought an H prop was missing from the room* and that *he was responsible.*[35]

46. WorkSafe Inspector Kelly stated that on his arrival at Queens Road, after the formwork collapse, he went to Unit 2 and he described the scene *like a bomb had gone off.* When asked if he was able to make much sense of what he was observing he responded:

> *"Pretty well. It appeared pretty evident initially. It didn't take much to work out that the collapse occurred due to a complete lack of propping.....There just wasn't anywhere near enough in that room".*[36]

47. Inspector Kelly's comments were made in the absence of having seen the propping plans prepared by MacLeod's however, he stood by his opinion which he stated was guided by his *experience in the industry, having been involved in thousands of concrete pours and what I saw in there indicated to me there was a severe...problem.*[37]

48. The presence of an Acrow-prop in Unit 2 and the role it may have played in relation to beam UB89 was raised with Dr Keays.[38] The general lack of documentation/drawings of the setup of the propping or any photographs of propping prior to the 3 September 2004, make any conclusions about the Acrow-prop's role in Unit 2, speculative.

49. The possibility of rust contributing to the failure of the Ultrafloor beam was raised by Mr Moresi in his correspondence/statement but there was little support for this proposition from either Mr Shields or Mr Keays.

50. Similarly, 'boney' concrete[39] was raised as a possible cause of the structure's failure but Dr Keays said you would not be able to see boney concrete at the break because of the explosion and intrusion of concrete into the Unit 2, 7th floor. He also said that there was no reason to suspect

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[34] Exhibit 30 - Statement of John McCormack dated 20 October 2006 @ p2

[35] Exhibit 30 - *ibid* @ p4

[36] Transcript of proceedings @ p 277 (Stephen Kelly)

[37] Transcript of proceedings @ p 301 (Stephen Kelly)

[38] Transcript of Proceedings @ p465 (Mr Rozen to Russell Keays)

[39] 'Boney' concrete refers to a concrete mix that appears to lack sand or cement. It can appear bony in appearance and tends to be difficult to place and compact.

boney concrete as the cause of the failure.[40] The concrete beam was not tested post incident but Inspector Collins stated that it *is not common practice to go and test the concrete*[41] and they saw nothing in their visual inspection of concrete beams in other rooms at the site that made them think *we better get this concrete tested.* WorkSafe Inspector Collins pointed out:

> *That one beam comes part of an 800 metre length, so effectively there's another nearly 100 of those beams cut which would have been used in construction on that site. There was no other indication on any other beam that I viewed .....that the concrete was an issue."*[42]

51. Testing of the concrete beam UB89 could have provided additional information about the overall state of the materials in use in Unit 2. Testing the beam may have directed attention to a manufacturing fault as a cause of the collapse. In the absence of that testing the possibility of a manufacturing fault in the beam cannot be entirely excluded and it logically follows that if there was a deficiency in the beam, it may have contributed to or caused the collapse.[43] According to Dr Keays, if the beam was of inadequate compressive strength it could have failed even with adequate propping.[44]

52. Despite the absence of the testing of the concrete beam UB89 **I find** the evidence of Inspector Collins to be cogent and logically persuasive that there was no evidence to suggest a deficiency in the beam. There was no evidence that other beam(s) on the construction site failed either before or after 3 September 2004, which I find more compelling than the introduction of a speculative theory opportunistically presented some 4 years after the event.

53. Further, **I find** the first impressions about the adequacy of the propping in Unit 2 reported by the WorkSafe Inspectors and Dr Keays, along with the recorded comments made by Mr Goss contemporaneous to the incident, cogent and logically persuasive and **I find** that the propping in Unit 2 was inadequate for its purpose.

Safety responsibilities - working on the level directly under a concrete pour

54. **I find** that Nathan was directed to repair formwork on Level 7 by Mr Moresi. The direction was given on the morning of 3 September 2004, in the knowledge that a concrete pour was to

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[40] Transcript of proceedings @ p 434 (Russell Keays)

[41] Transcript of Proceedings @ p 526 (Peter Collins)

[42] *ibid* @p 527

[43] Submissions of Mr Rozen - Transcript of Proceedings @ p600

[44] Transcript of Proceedings @p 469 (Russell Keays)

occur above the site of the repair work on Level 8 at some undefined time, on the same day. At the time of the direction to Nathan, Mr Moresi was aware that *the concrete pour had just started on the opposite side of the job.*[45] The assigned job to Nathan was estimated to have required 10 minutes to complete according to Mr Moresi[46] and anywhere from 15-40 minutes by Mr Fredericks.[47]

55. I accept that the repair work was required before the pour commenced so as to prevent concrete seeping through into Level 7. Mindful that the pour on Level 8 above Unit 2 was to occur that day, Mr Moresi also directed Sheldon Fredericks, Lyndon Pearce and Mark Griffiths to do the job of placing some infill plywood into the top corner of Unit 2 on Level 7 that is, the same task that Nathan was directed to perform.[48] Mr Fredericks was directed to do the job at sometime prior to[49] Mr Pearce and Mr Griffiths who were to work together. I accept that they were all directed to do this job at sometime after the direction to Nathan.[50] The direction to Mr Pearce and Mr Griffiths occurred sometime after "smoko", *roughly around 10.00 to 10.30.*[51]

56. The exact time of Mr Moresi's direction to Nathan is not known but likely to have been before 1000 hours. The exact times Nathan was seen in Unit 2 on Level 7 by Mr Frederick, Mr Pearce and Mr Griffiths are not known, but by all accounts he was performing the work he was directed to do when he was seen. On the estimations of Mr Moresi and Mr Fredericks, Nathan should have completed the job prior to the time the pour above him commenced. Nathan's presence in Unit 2, Level 7 once the pour commenced on Level 8 remains unexplained to the extent that the job should have been completed given the time frame estimations and according to Mr Moresi, Nathan should have left *the area as soon as he heard the concrete pour above him.*[52] However, it appears no one checked.

57. I accept that there was industry knowledge about the dangers of working under formwork. Darren McCauley, who was employed by Mitchcon Pty Ltd as a concrete hose operator stated

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[45] Statement of Greg Moresi dated 4 August 2006 - Inquest Brief @ p25

[46] Statement of Greg Moresi dated 4 August 2006 - Inquest Brief @ p25

[47] Transcript of Proceedings @ p 207 (Sheldon Fredericks)

[48] Transcript of Proceedings @ pp54-55 (Lyndon Pearce)

[49] Transcript of Proceedings @ p 220 (Sheldon Fredericks)

[50] Transcript of Proceedings @ p 32, 54 (Lyndon Pearce) & 221 (Sheldon Fredericks)

[51] Transcript of Proceedings @ p55 (Lyndon Pearce) & p72 (Mark Griffiths)

[52] Statement of Greg Moresi dated 4 August 2006 - Inquest Brief @ p25

"there was nothing specific said about not working under formwork while pouring concrete. This is a basic state of knowledge issue within the industry that you don't".[53]

Erection of Barricades

58. Mr Moresi is silent on whether he had expected Nathan to report to him at the conclusion of the work and there is no evidence that he had delegated responsibility to another person to inspect Nathan's repair work prior to the pour commencing, as no other person in a supervisory role was aware of Nathan's presence in Unit 2. Mr Moresi also played no role in ensuring that the area was clear prior to the pour, despite having sent 4 workers to Unit 2 in the preceding hours.

59. Further, although Mr Moresi states that the erection of barricades were the responsibility of the Health and Safety Representative, he was not definitive about their presence on the day. Mr Moresi stated that he was *quite sure that barricades were in place for the initial stages of the pour*[54] however, it remains unclear whether he is saying that he was quite sure barricades were present when the pour began on some other level, or on Level 7 when the pour on Level 8 began, or present outside Unit 2 on Level 7 when he sent Nathan to do the repair work. If the latter scenario is what Mr Moresi meant then I must assume he sanctioned Nathan going behind the barricade for the purposes of the repair work.

60. In the course of the investigation Sergeant McCormack interviewed Mr Goss in relation to a possible charge of involuntary manslaughter but apart from agreeing that workers should not be working underneath where concrete is being poured, Mr Goss made a no comment record of interview. In his statement made after the conclusion of the criminal proceedings, Mr Goss stated that he noted barricades across the doorways to prevent entry to the units where a pour was occurring above but could not specifically remember which units.[55]

61. There is however a paucity of evidence about whether there was in fact any barricades erected on Level 7 while the pour was in progress on Level 8. Neither Mr Goss' or Mr Moresi's statement about the barricades instills me with confidence about their presence/use *per se.*

62. Mark Griffiths, apprentice carpenter stated *"there were no barricades or warning signs across this area."*[56]

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[53] Statement of Darren McCauley dated 21 September 2004 - Inquest Brief 2 p62

[54] Statement of Greg Moresi dated 4 August 2006 - Inquest Brief @ p26

[55] Statement of Anthony Goss dated 5 September 2006 - Inquest Brief @ p21

[56] Exhibit 6 - Statement of Mark Griffiths @p11

63. Matthew Allen was in charge of the pour on Level 8. Aengus O'Donnell was in charge/responsible for the safety of the workers in relation to the moving of a heavy concrete precast panel into place in Unit 1, Level 7. The pour on Level 8 was stopped to enable the panel to be moved into place in Unit 1.

Occupational Health and Safety Representatives

64. Aengus O'Donnell indicated that he was the elected safety representative (FEDFA). Mr Goss indicated in his statement[57] that Mr Van Senten was the OH&S appointed Officer and took part in weekly site safety walk throughs with a management representative, CFMEU steward and the FEDFA steward, Aengus O'Donnell. Mr Van Senten indicated he was not an elected safety officer and had been removed from the safety committee sometime before 3 September 2004.

65. No documentation was produced that might have otherwise provided some clarity as to who the OH&S representatives were on this site, whether they were appropriately qualified for the position and what their roles entailed.

Safety Systems

66. Safety at a construction site should occur in a systematic way. Adherence to such systems enhances safe work practices and discourages an *ad hoc* approach that puts workers at risk. I was told that Melbourne Transit was very safety conscious but apart from site inductions I did not get much of a sense of a commitment to safety at this site. I was also told that there was a system for barricading a floor below where a pour was to occur, but that system/practice broke down on 3 September 2004, apparently because there were workers in Unit 1.

67. When work is approached on an *ad hoc* basis - demonstrated in, for example, Mr Moresi's directions to several workers to do the same job and permitting an exception to the use of barricades coupled with an absence of any systematic means of accounting for who was doing what, where and at what time, the extremity of the consequences is clearly demonstrated. Safety was compromised, and a worker, Nathan, died.

68. Tool box meetings and JSAs[58] are intended to have worker's input in identifying risk associated with particular jobs. A collegiate approach to safety I suspect is the intended outcome. Ultimately they are tokenistic if the employer does little to ensure and enforce safe work practices. No one checked Level 7 before the pour commenced on Level 8 to ensure the area was

[57] *ibid* - Inquest Brief @ p 23

[58] JSAs = Job safety analysis

cleared and there was no system in place such as a warning sound to alert the workers on Level 7. It seems that everyone was left to their own devices.

69. Darren McCauley stated: "*at no time during this pour or any other pour on this site were any hazard identifications, risk assessments or JSAs handed out.*" [59]

70. JSAs should be completed by all workers involved in the formwork process so that everyone can buy in and take responsibility for the process.

Prevention of Like Deaths

71. On 25 January 2006, Melbourne Transit went into liquidation. By 17 August 2006, Her Honour Judge Gaynor, described the company as being in receivership and she acknowledged that as a consequence *any fine or penalty imposed by this court will simply not be paid.* In the coronial jurisdiction, one of the intended roles in making recommendations is the prevention of like deaths however, any recommendation directed at Melbourne Transit simply has no meaning as it no longer exists in that guise. The ability of the Directors of Melbourne Transit to continue to operate in the building and construction industry albeit in a new guise, provides little joy to Nathan's family and the CFMEU. It is understandable that they feel a level of injustice because Nathan's employers have mitigated the effects of the sentencing orders by avoiding payment of the penalty and avoided rigorous interrogation of their role on the day. The CFMEU are familiar with such a scenario but for the family, feelings of loss and injustice I suspect are only exacerbated.

72. The prevention of like deaths is the responsibility of all working in the building and construction industry. It is a hazardous and often dangerous industry necessitating constant review of safety measures. A critical observation arising from the investigation into Nathan's death is that his death was preventable. Preventative action that is the responsibility of all on a building construction site - employers and workers alike, is the identification of prohibited areas during phases of concrete pouring and strict enforcement including but not limited to, the use of barriers/barricades to inhibit persons entering an area beneath a concrete pour.

73. The investigation conducted by WorkSafe was reasonable and appropriate in the circumstances and conducted in accordance with a direction in place at the time. Any shortfall in the investigation can be attributed to the uncertainty this caused. Testing of the concrete beam, UB89, should have occurred which in turn may have reduced criticism about the *completeness* of the investigation and provided greater clarity as to the cause of the collapse however, that proposition is perhaps based on a desire that it would provide a definitive explanation for the collapse.

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[59] Statement of Darren McCauley dated 21 September 2004 - Inquest Brief 2 p62

74. The WorkSafe investigation was sufficiently "complete" to obtain a successful prosecution. WorkSafe also took additional action in response to Nathan's death in the issuing of Safety Alerts/ media releases. A Formwork Blitz on construction sites aimed at ensuring formwork for concrete pours was properly constructed[60] had been scheduled prior to Nathan's death and proceeded in the same month. In addition, and prior to Nathan's death, WorkSafe published in 1998, a document entitled "Basic Formwork & Concreting Checklist for Builders and Building Trades Contractors" which addresses the issue of worker access to the area below a pour. The document has been updated on at least 3 occasions prior to the commencement of the Inquest and can still be easily found on WorkSafe's web site.[61]

75. The CFMEU sought and were granted leave to appear at the Inquest as an interested party. I implore the Union to continue to educate and reinforce with its members the importance of adherence to safe work practices and specifically in relation to safe work practices around working with formwork. I acknowledge that in the promotion of public health and safety the CFMEU did release a number of publications about faulty formwork including reference to the collapse at Queens Road in their *Construction Safety Newsletter* in November 2004 and "Faulty Formwork Kills" in their *OH&S Bulletin* in July 2006.[62] I do not doubt that safety of its members is inherently important to the Union.

76. Further, as noted above, my ability to make recommendations in relation to identifiable issues of public health and safety have been diminished by the disappearance of the specific entity/employer,[63]Melbourne Transit. Recommendations for improvement in safe work practices aimed at preventing like deaths[64] can however be directed more generally through the appropriate Minister and relevant statutory authorities with the intended result of capturing all entities, including those that have changed their guise or have many guises, in the building and construction industry. The Building Commission is a statutory authority that oversees the building control system in Victoria and reports to the Minister for Planning. The *Building Act* 1993 established four associated statutory bodies:

- The Building Advisory Council - the peak advisory body to the Minister for Planning;

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60 See **Attachment 1** -WorkSafe Safety Alert/media Release dated 3 September 2004, 24 September 2004 and Formwork Blitz - Site prompt & Report dated September 2004

61 See **Attachment 2** for Version 3 as at 27 April 2007

62 See **Attachment 3** - *Construction Safety Newsletter* Issue 8, November 2004

63 section 72(2) *Coroners Act* 2008

64 See Preamble and section 1(c) *Coroners Act* 2008

- The Building Practitioners Board - responsible for approximately 20,000 registrations of Victorian builders and building professionals, and supervising and monitoring their conduct and ability to practice;
- The Building Appeals Board - determines disputes and appeals arising from the *Building Act* 1993 and *Building Regulations* 2006 and deals with modifications to building legislation; and
- The Building Regulations Advisory Committee - provides advice on building regulatory matters, and accreditation of building products.

77. **I recommend** that The Minister for Planning endorse and oversee a review conducted by the Building Regulations Advisory Committee, Building Commission, of compliance of existing building regulations and industry guidelines along with compliance of industry accepted practises in the specific division of working with formwork.

78. And **I further recommend** that the Building Commission as the statutory authority whose purpose is to ensure the *safety, liveability and sustainability of our built environment*,[65] in consultation with WorkSafe, review the effectiveness of current means of monitoring compliance of the *Building Regulations* 2006, compliance with the *Occupational Health and Safety Regulations* 2007[66] specific to the area of formwork construction and how compliance can be better achieved and/or enforced.

CONCLUDING COMMENTS:

79. The death of Nathan Park has identified the need for enforcement and constant review of safety measures. It is apparent that a generic JSA in relation to the erection of formwork and propping for a number of floors does little to ensure safety and in all probability, creates complacency. I concur with Mr Gamble that compromising safety for productivity in the construction industry, should not be tolerated.

80. Identified preventative measures should include:

- enforcement of the use of barriers/barricades on the floor below during concrete pours;
- delegation of responsibility to someone that is a part of the concrete pour crew to check the floor below before the pour commences;
- the use of barricading at the jump so that no one can inadvertently enter the floor either while a pour is going on or after the floor has been checked and cleared by the concrete pour crew;

65 See the *Building Commission* web site

66 These Regulations were introduced after Nathan's death

- adoption of an alarm/siren system which represents "clear the area/floor" which reinforces and provides additional enforcement that the floor below a pour is a "no go zone"; and
- JSA meetings at the commencement of every floor in multi story complexes.

81. These preventative risk reducing safety measures are the responsibility of all working in the construction and building industry. All have a duty to look out for one's self and to look out for those that might be affected by one's actions or inactions. WorkSafe and the CFMEU play a significant role in educating, reinforcing, policing and enforcement. None of these identified preventative safety measures can be rejected on the basis that they are resource intensive, in fact, workpace safety law requires it.

82. I find that the death of Nathan Park was preventable. I concur with Her Honour Judge Gaynor when she stated that the accident was *foreseeable and obvious and could have been easily averted.*[67] The investigation into Nathan's death has highlighted a less than acceptable standard of supervision and adherence to safe work practices at this construction site. Identification of prohibited areas during phases of concrete pouring and strict enforcement of the widely accepted safety principle of excluding persons in the area below where a concrete pour is to occur, would have prevented this tragic loss of life. **I find** Nathan's presence below the pour at his employer's direction and the failure of the prop are sufficiently and substantially connected to his death that they can be said to have caused his death.

83. I accept and adopt the medical cause of death as identified by Dr Matthew Lynch and **I find** that Nathan Lindsay Park died from head injuries sustained in the course of his employment with Melbourne Transit.

84. In concluding, it is worthy of note, albeit that it was prompted after submissions had concluded, that Mr Rozen stated that his clients accept that no one checked where Nathan was and that they should have done so. I concur.

Pursuant to section 73(1) *Coroners Act* 2008, this Finding will be published on the Internet in accordance with the Rules.

Signature:

AUDREY JAMIESON
CORONER
24 August 2011

[67] *ibid* @ paragraph 12

Distribution of Findings:

- Rebecca Park
- The Honourable Matthew Guy, Minister for Planning
- Ms Jennifer Banks, Building Commission
- Mr Bill Oliver, Secretary, Construction Forestry Mining & Energy Union (CFMEU)
- Rigby Cooke Lawyers
- Manager, Legal Services, WorkSafe Victoria
- Sergeant John Cormack, Investigating Officer, Victoria Police
- Master Builders Association

ATTACHMENT 1

Victorian WorkCover Authority

222 Exhibition Street, Melbourne 3000 : Telephone (03) 9641 1555

Construction site death at Windsor

September 3, 2004

A Windsor building site fatality today is the second Victorian workplace death this week and the sixth in the past month.

WorkSafe is investigating today's incident at an apartment block site in Queens Road, Windsor.

A man aged in his 20s died when he was hit by part of a concrete floor which failed and fell on him during a concrete pour.

WorkSafe's Executive Director, John Merritt, said the death should warn all workplaces that safety must be constantly reviewed.

"Risks and potential solutions need to be identified and the solutions must be put into effect.

"The personal costs of not doing so cannot be calculated. Apart from the deaths, thousands of people suffer permanent injuries every year.

"The short and long term financial cost to the economy is enormous."

"More than 32,000 people made a claim on Victoria's workplace injury insurance system in 2002-03. These were worth nearly
$1.7-Billion dollars."

In this week's other incident, a 61-year-old man died after being injured on a farm at Dixie, south of Terang, in Victoria's south-west.

Mr Merritt said help for employers and workers was available on WorkSafe's website. Small business operators can take advantage of a free, three-hour, independent safety check by contacting WorkSafe on 1800-136-089.

WorkSafe has previously announced a campaign during September aimed at ensuring formwork for concrete pours is properly constructed.

Media enquiries: Michael Birt 0411 256 605 or 9641 1216.

Victorian WorkCover Authority

222 Exhibition Street, Melbourne 3000 : Telephone (03) 9641 1555

WorkSafe Announces Formwork Blitz on Construction Sites

September 24, 2004

Starting next week, WorkSafe will undertake a blitz on construction sites where formwork is used.

Structural collapse, one of the major causes of fatalities within the construction industry, can result from poorly designed or sub-standard formwork.

WorkSafe's Construction & Utilities Director, Geoff Thomas, said that during the blitz, inspectors would focus on the suitability of the erection design, the mechanical condition of formwork components and safe work procedures.

"The consequence of a structural failure can be catastrophic for those workers on or near the formwork and that's why it's so important that formwork is constructed properly.

"Inspectors will also check formwork documentation including engineers' erection designs, inspection reports and Handover Certificates".

Mr. Thomas said WorkSafe would not hesitate to issue notices and, if necessary, prosecute employers for breaches of safety laws.

"Prohibition Notices will be issued where inspectors identify any immediate risk to health and safety that is not rectified during their visit.

"Improvement Notices will be issued where other instances of non-compliance with health and safety laws are identified."

Formwork systems are widely used on all types of construction projects. They provide temporary structural support for new floors and other structures during concrete placement.

Media contact: Michael Birt Ph: 9641 1216

Construction & Utilities Program

FORMWORK BLITZ 2004

SITE PROMPT & REPORT

(For use by Employers, Site Safety Committee, HSR's and others)

Mark the appropriate shaded boxes to indicate compliance.

Yes = ✓ **No = ×** **No information available = O** **Not Applicable = Blank**

Some questions are not Yes/No but are there to assist you in determining if the issues have been addressed.

Formwork Contractor:	
Builder's Name:	
Project:	

TYPE OF PROJECT

Housing		Small/Medium commercial		Major commercial		Civil/Engineering	

Indicate Type of formwork system used:

Formwork systems used	

	FORMWORK DESIGN ISSUES	Indicate:
1	Is there available onsite the erection design drawings and specifications for the formwork system?	
2	Is there available onsite the above design documentation for each type of formwork system used?	
3	Are the design drawings and other documentation legible and adequate?	
4	Is there a specification for a minimum concrete cure time before dismantling?	
5	Is the issue of load limits and is back-propping of lower floors addressed?	
6	Are fall prevention measures to be provided as part of the formwork?	
7	Is suitable access and egress to the formwork work areas provided or planned?	
8	Before the concrete pour commences, is the completed formwork inspected and certified by a structural engineer (**see note**)?	
	FORMWORK COMPONENT ISSUES	**Indicate:**
9	Are the fabricated components in good serviceable condition?	
10	Are the timber support beams in good serviceable condition and of suitable type and grade?	
11	Are the sheets of ply in good serviceable condition and of suitable size and grade?	
12	Is the formwork, supported on firm foundations (condition of soleplates, ground or supporting structure)?	
13	Is the formwork assembly stable, even when exposed to different load combinations?	
14	Have good workmanship techniques been used in erecting the formwork (see attached list)?	
	PRINCIPLE CONTRACTOR ISSUES	**Indicate:**
15	Does the builder have a documented safe system of work for formwork activities?	
16	Does it include a review of subcontractors' JSAs (formwork, steel fixing, concreting, electricians, etc)?	
17	How does the builder ensure the formwork is safe for other trades to access?	
18	Does the builder require the formwork to be inspected and certified before the concrete pour?	
19	How does the builder ensure the formwork's initial and ongoing structural integrity?	
20	Does the builder ensure fall protection is fitted to all voids and exposed edges?	
21	Has the builder supplied adequate access and egress to and from the work areas?	
22	Is other workers access to the formwork area restricted, during concrete pours and strip-outs?	
23	Does the builder ensure the formwork remains in place for the required cure time?	
24	Does the builder have an appropriate level of supervision during formwork activities?	

Note: The structural engineer may be employed directly by principal contractor or the formwork contractor.

	FORMWORK CONTRACTOR ISSUES	Indicate:
25	Does the formwork contractor have safe systems of work for erection and dismantling?	
26	Does the contractor's documentation (JSAs) address manual handling issues?	
27	Does the contractor's documentation (JSAs) address fall prevention issues?	
28	Does the contractor have a process in place to inspect components before erection?	
29	Are the workers erecting the formwork system working safely?	
30	Is the person supervising the formwork erection process familiar with the system and its limitations?	
31	Does the contractor provide adequate supervision to all their onsite workers?	
32	Does the contractor have a process for the inspection of the completed formwork?	
33	Does the contractor provide the builder with a Inspection Certificate?	
	WORKERS ISSUES	**Indicate:**
34	Are formworkers undertaking the erection & dismantling **adequately instructed** (JSA & SSW)?	
35	Are other workers working on or near the formwork **adequately instructed** (JSA & SSW)?	
36	Have all workers onsite, had **safety instruction** (site induction) in relation to formwork?	
37	Are all workers complying with the safe systems of work and their work instructions?	
38	Are all workers in the formwork area, adequately supervised?	
39	Is appropriate **PPE provided** and are **workers wearing** the **PPE**?	

ANY ADDITION COMMENTS

	COMMON FAULTS WITH FORMWORK (POOR WORKMANSHIP TECHNIQUES)	Indicate:
A	U-heads without timber support blocks used at the base instead of proprietary screw jacks	
B	Screw jacks are over adjusted (exceeding the limit set in design and is dependent on load)	
C	Inadequate foundations (condition of soleplates, ground or supporting structure)	
D	Use of damaged or unserviceable components	
E	Inadequate lateral and diagonal bracing	
F	Use of 'prop-on-prop' (unless specifically designed for this application)	
G	Lack of bracing at joints (if required by formwork design)	
H	Out-of-plumb supports (greater than specified in design documentation)	
I	Proprietary locking devices not locked, inoperative, improvised or missing	
J	Failure to comply with recommendations of the formwork components manufacturer	
K	Failure to keep within the limits specified by the formwork designer	
L	Use of sub-standard materials	
M	Improper positioning of supports	
N	Failure to provide adequate support for falsework	
O	Failure to observe the equipment or material stacking limitations	
P	Floor centre on floor centre	
Q	Failure to provide adequate fall prevention systems	
R	Failure to provide adequate access and egress to and from work areas	
S	Failure to ensure form work is not damaged by mobile plant	

ATTACHMENT 2

Basic Formwork & Concreting Checklist for Builders and Building Trades Contractors

- **Document Type:** Tool
  Keycode: web only
  Industry: Construction and Utilities
  Current Version: 3
  Publication Date: 21 October 2005
  Date First Published: 01 October 1998

Version 3 , October 2005

1. Has the formwork system been properly designed?

A competent formwork designer and/or formwork manufacturer/supplier should design the site formwork system. The formwork contractor should have erection design drawings and specifications for the particular formwork system to be constructed. Ensure a copy of the design drawings and loading calculations are available on site. Make sure the building's design engineer specifies when the formwork can be dismantled (concrete cure requirement).

2. Has the formwork been properly constructed?

All modular or framed formwork components, support timbers and structural ply, need to be in a serviceable condition. Check that the constructed formwork is on firm foundations (suitable soleplates, hardness of ground or adequacy of support structure). Make sure the formwork system is the same type and capacity as specified in the design drawing and is erected in accordance with the design. Ensure any adjustable building props are tied to each other or to the shoring frames so they cannot collapse when released.

3. Is the formwork deck being laid safely?

The work method used to lay out and secure form ply must protect the workers from falling. When required to work from the formwork itself, make sure they have a full deck of scaffold planks and safe access. When laying additional sheets from the formwork deck, workers should stay clear of the leading edge, pushing out the sheets as they go. Perimeter edge protection (temporary guardrails or scaffolding) needs to be provided. Ensure workers have safe and secure access and egress to and from all the formwork areas, including deck

4. Is steel fixing being done safely?

Make sure plastic protective caps are always placed on the ends of starter bars to safeguard workers. When fixing steel for concrete walls and columns, steel fixers will need properly constructed scaffolds. Steel fixers need protective glasses when using bolt cutters to stop steel fragments from wounding their eyes.

5. Is the formwork structurally adequate?

Before pouring concrete, use an experienced structural engineer to inspect the erected formwork system. This inspection should also include any supporting structure the formwork is constructed upon; for adequacy and the ability to take the loads of the new suspended concrete floor or beam. The engineer should supply an inspection certificate to verify the structural integrity of the support structure and formwork system

6. Are wall and column shutters safely lifted and properly secured?

Formwork shutters need to be securely slung and controlled with a tagline when they are being crane-lifted. Do not allow large shutters to be lifted in strong winds. Where possible, push-pull angled props should be fixed to cast-in anchors. Workers installing she-bolts need to work from properly constructed scaffolds or other safe temporary work platforms

7. Are workers prevented from accessing the area underneath the concrete pour?

Ensure that no worker is allowed to access the immediate area beneath the section of formwork where the concrete is being poured. If an observer is to be positioned at a lower level during the pouring operation, they must be located in a position that will safe guard them from injury if the formwork fails during concrete placement. Generally, neither the observer nor any other worker should be permitted to access the area below the pour once concrete placement has commenced, even to rectify problems.

8. Are concrete pumps being used safely?

Concrete pumps must be well maintained, fully serviceable and should comply with the requirements of the Industry Standard for Concrete Pumping. The operator of a truck mounted concrete placing boom must hold a WorkSafe certificate of competency (Class PB). Ensure mobile boom-type units are set up correctly and fully comply with the NO-GO-ZONE rules for overhead power lines. Concrete pumping lines need cleaning out after each use.

9. Are kibbles being used safely?

Crane-lifted concrete kibbles normally require a person with a WorkSafe dogging or rigging certificate to operate them and direct their movement. Make sure the dogman understands the need to release the concrete gradually from the kibble so as not to overload the formwork and risk structural failure. The sudden release of concrete from the kibble can also make the crane boom whip upwards, causing the kibble to bounce dangerously. Never allow workers to "ride the load" by standing on a kibble while it is being lifted.

10. Are concrete vibrators being used safely?

Check that vibrators are well maintained and fully serviceable. Residual Current Devices (RCDs) must be fitted for the protection of all electrical power leads and electric vibrators. Do not use petrol-driven vibrators in cellars or other poorly ventilated areas

11. Are the concreters working safely?

Make sure there are no open sides or penetrations where a worker could fall. Where required, provide temporary guardrails or a heavy duty perimeter scaffold

12. Is formwork being dismantled safely?

Do not allow formwork to be removed prior to the concrete reaching its required strength. When stripping the underside of a suspended floor slab, barricade the area off from other workers. Make sure people dismantling the formwork are working from properly constructed scaffolds or properly planked shoring frames. Never allow "drop stripping" of form ply and falsework.

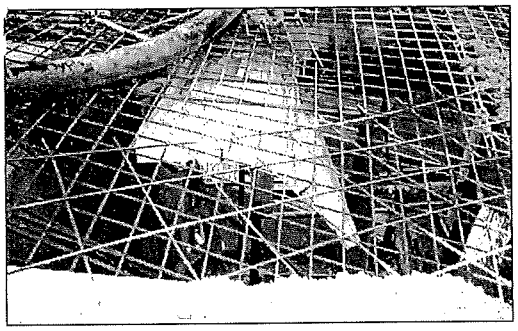
ATTACHMENT 3

Ultrafloor system collapses prompt national union action

The tragic death of a Victorian worker and a spate of formwork collapses during concrete pours have set alarm bells ringing for the CFMEU's National Safety Committe.

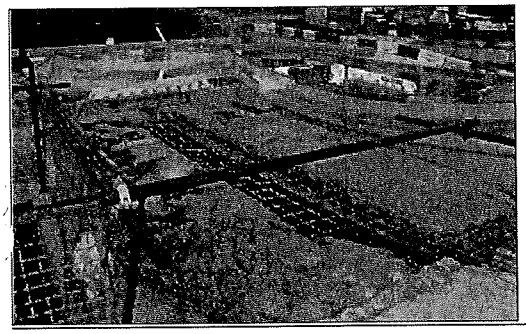
Twenty-three year old Nathan Park was killed when a beam smashed down on him, after a concrete pour caved in at a Queen's Road job in Windsor on September 30.

Two others working with Nathan narrowly escaped injury, and three others rode the slab down.



Above: The Windsor incident where Nathan Park was killed.

Below: the collapse of the Ultrafloor system at Glebe, Sydney during a cement pour.



An Ultrafloor band beam system was being used at the time.

"Nathan's death and a number of other incidents where Ultrafloor systems and formwork has collapsed during cement pours, have sparked deep concerns in the Union nationally," said Victorian Environmental & Safety Manager, Pat Preston.

NSW Safety Co-ordinator Dick Whitehead knows of at least four recent incidents of similar formwork collapses.

Experts condemn overloading

Engineering analyses of two of these NSW collapses have criticised overloading of the system and the lack of internal bracing.

Murdocca & Associates said of a collapse at the NSW Fire Fighting Facility at Lidcombe in April: "The collapse of the [two-legged scaffold] tower was due to overloading and the fact that no internal bracing was provided to it. The load on the two-legged scaffold tower was very high due to the concentration of the Ultrafloor beams in the area of the collapse (probably the highest concentration of beams on the entire floor)."

After another incident at Glebe in September, in which a section of the Ultrafloor installation (pictured left) collapsed, T.O.P Consulting said: "Each of the checked above Ultrafloor members has been grossly underdesigned and could be reasonably expected to fail under the construction loads".

They also concluded: "It is our view that, at the very least, appropriate centre line propping had to be adopted for all of the subject Ultrafloor members for the duration of the construction sequence".

Moves to address formwork problems

Ultrafloor's band beam system is designed to reduce formwork and conventional propping. But these incidents are raising questions whether the system, suited for low-rise residential building, is appropriate for bigger commercial jobs.

The CFMEU and Ultrafloor have a memorandum of understanding that includes a work method statement. Safety delegates who are concerned about the way the product is being used or the extent of propping during cement pours, should contact your organiser or Branch OHS officer.

The national formwork campaign will look at the full range of issues regarding formwork, besides Ultrafloor.

The National Committee is developing guidelines for Safety Delegates, shop stewards and organisers for inspecting formwork and other material to help alert members to potential hazards.

Check out future issues of **make it safe** for more details of this campaign. ❐

New Memorial Park at West Gate

A new memorial park was opened at West Gate Bridge in Melbourne in October on the 34th anniversary of Australia's worst workplace catastrophe.

The West Gate Bridge Memorial Committee and WorkSafe Victoria have produced an excellent leaflet on the commemoration. It includes photos from the opening of the new park.

A copy is posted on the CFMEU Construction Website: www.cfmeu.asn.au/construction/history/

See also: The West Gate Bridge Memorial Committee's website: http://www.westgatebridge.org/index.html ❐

Poor OHS costs over $34 billion each year—NOHSC

continued from p.1

"Tragically, our **young workers** will be particularly exposed, with **50 suffering compensable work-related injuries every day**—five of those resulting in permanent incapacity," Mr Ellis said.

"In any other field, the current level of death and injury would not be tolerated."

The NOHSC Chair wants employers to commit to improving Australia's safety performance.

"This process should be led from the top, including regular consideration of performance and strategies for improving performance at board meetings and accountability through reporting on OHS performance in annual reports."

Poor OHS costs the economy over $34billion each year and is of concern to everyone, but the challenge is to eliminate the incalculable human pain and suffering.

SAFETY CIRCULAR ON FORMWORK/TABLEFORM

MINISTRY OF MANPOWER

By Occupational Safety & Health Specialist Department
Occupational Safety & Health Division
Ministry of Manpower

INTRODUCTION

Formwork is a temporary structure erected for the purpose of allowing the wet concrete to be retained and shape into desired shape and form.

Formwork structure consists of formwork, shores and any other supports that are necessary to ensure that the formwork structure is stable and rigid. It must also be safe for any worker working on or near the formwork)

In order to ensure stability & rigidity of the formwork, it is important that sufficient longitudinal, transverse and diagonal bracings are provided. In addition, continuity of the structure, vertical supports and the physical and structural conditions of the members are also the key areas that must look at when designing and erecting of formwork.

Incidents Involving Formwork Structures

There have been few cases of formwork collapse in the last few years. Here are some examples.

Accident # 1 – 23 April 2001

Findings

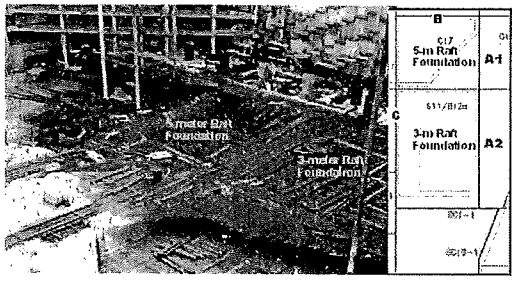
The accident occurred at a 6 storey industrial building with a vehicular ramp. Prior to the accident, level 1 to level 4 of the vehicle ramp had been constructed.
The design of the ramp was such that half of the ramp was level while the other half was at a slope of 4.5 degree from horizontal plane. The ramp that collapsed was on the sloped portion.

The formwork structure was erected on the 5th level ramp. The ramp was supported by falsework comprising conventional steel frame scaffolds. The falsework immediately below the formwork were made up of forkheads, steel frames scaffolds and base plates.

Investigation revealed that the lack of diagonal bracings, inclined support, discontinuity in the structure and use of defective, corroded and deformed members used had reduced the loading capacity, stability and rigidity of the formwork structure. This resulted in its failure.

Accident # 2 – 29 April 2004

Diagram 2:
General snapshot of the collapsed region and location in the plan



Findings

On the day of the accident, workers were installing re-inforcement bars for the foundation at the basement. The re-inforcement bars were supported by U-shape bar chairs. Halfway through the erection, the bar-chair support system collapsed.

Investigation revealed that the bar chairs had "toppled over". The system wide collapse was triggered by a localized failure of the bar chairs at a particular area.
Investigation also revealed that the design of the bar chairs did not provide for any bracing or anchoring to serve as restraint against any horizontal force that could be exerted onto the bar chairs.

Accident # 3 – 15 May 2005

This accident occurred while workers were transporting table forms from one location to another.

On the day of accident, workers were instructed to shift tableform structures from 15th floor to the 18th floor of a building under construction. Two trolleys were used to shift the tableform structures to the material platforms on the 15th floor for subsequent hoisting to the 18th floor by a tower crane.

As the passage to the material platform on the 15th floor was obstructed by an overhead beam structure, the workers separated the tableform structures into two parts, i.e. the upper and lower tiers, in order to clear the beam. While the workers were shifting the upper tier (weighing about 900 kg) using the trolleys, the wheel of the front trolley hit a formwork plank lying on the floor and caused the front trolley to topple and fall onto a worker. He died on the spot.

Investigation revealed that the accident occurred as a result of the separation of the tableform structure into its upper and lower tiers. The separation of table form structure was a deviation from the safe work procedure which required the tableform structure to be shifted as a single item as the lower tier provides stability to the structure.

Legal Requirements

The Factories (Buildings Operations and Works of Engineering · Construction) Regulations stipulates general requirements for formwork structures. In addition, CP 23: Code of Practice for Formwork also spells out the design, fabrication, erection and stripping of formwork.

Going Forward

Formwork and formwork structures can cause serious accidents if the hazards associated with it are not properly managed. In order to manage these hazards, the following measures are necessary:

- **The formwork must be designed by a competent person**. The following classes of formwork requires a professional engineer's design:
  a. The floor to ceiling height exceeds 9.14metres.
  b. The formwork deck is supported by shores constructed in 2 or more tiers.
  c. The dead, live and impact loads on the formwork exceed 732.3kgf per square metre.
- **Conduct Risk Assessment for the activity.**

Steps to Risk Assessment

1 Hazard Identification:

- Identify hazards & type of potential accidents/incidents.

2 Risk evaluation:

- Identify existing control measures

- Assess potential severity

- Determine likelihood of accident

- Assess risk level

3 Risk control:

- Determine additional control measures to reduce risk.

- Implement control measures & review assessment.

- **Establishment and Implement of Safe Work Procedures.**

Safe Work Procedures shall provide the following contents:

1. Step-by-step sequence of action to carry out the work.
2. The provision of suitable personal protective equipment.
3. The safety precautions to be taken in the course of work.

- **Ensure personnel are properly trained**. A qualified formwork supervisor must be employed to supervise the erection, alteration, and dismantling of the formwork. The workers doing the work must be given in-house training and adequately supervise by someone who has good knowledge and experience on the work.
- **Have a detailed shop-floor drawing to help erectors construct the formwork**. Formwork design drawings should be reduced to shop-floor drawings so that supervisors and workers can understand these, and erect the formwork accordingly.

The Ministry hopes that by mitigating the potential hazards, we can reduce the number of accidents at worksite. The Ministry will not hesitate to take strict enforcement actions against offenders.