QUEENSLAND COURTS

CORONERS COURT OF QUEENSLAND

FINDINGS OF INQUEST

CITATION:	**Inquest into the death of Christopher Ian Powell**
TITLE OF COURT:	Coroners Court
JURISDICTION:	BRISBANE
FILE NO(s):	2015/4941
DELIVERED ON:	8 March, 2022
DELIVERED AT:	Brisbane
HEARING DATE(s):	27 and 28 July 2021
FINDINGS OF:	Donald MacKenzie, Coroner
CATCHWORDS:	Coroners: Inquest, Elevated Work Platform, Outrigger Collapse, Unstable Ground, Mobile Crane Code of Practice 2006, Geotechnic Report, Safe Support Mobile Plant Guide, Photography.

REPRESENTATION:

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For Mr Ian Powell:	Ms S Seefeld (Counsel) Instructed by Caxton Legal Inc
For OIR:	Ms J Franco (Counsel) Office of Industrial Relations
For Binyan Studios:	Mr A Harding (Counsel) Instructed by HBM Lawyers
For Lincon Logistics: Pty Ltd	Mr B Charrington (Counsel) Instructed by Moray & Agnew
For Tom Dooley: Developments Pty Ltd (“TDD”)	Mr M Hickey (Counsel) Instructed by DLA Piper
For EWPA:	Mr E Burke (Solicitor) Instructed by the Elevating Work Platform Association of Australia

Executive summary

On Monday, 14 December 2015, at sunset (18.48 hours), in order to capture an image to the west of the sun setting just above the Story Bridge, the deceased, Christopher Powell, a highly regarded professional photographer, was hoisted approximately 50 metres above the ground. He was in a crew basket raised from a “crane truck” or “elevated work platform” (“EWP”). The photographs were to be used in marketing material replicating the view from the top floor of a yet to be constructed unit block at 70 Longland Street, Newstead (adjacent to the old gasworks site). Sharing the crew basket was the deceased’s son, Brendan, who was assisting with the photography. They were both wearing safety clips.

The 70 Longland Street site was a cleared vacant lot. There had been recent excavation, demolition and rain. EWPs had been used on the site twice in recent days for photography but not in the exact area where this particular EWP was set up. It was a 33-tonne body truck fitted with a 70-metre telescopic boom on a turntable with four outrigger legs, each with stabilizing pads. It had a sophisticated computer system to detect instability and to adjust pads. This system could only correct minor destabilization.

After being aloft for about 20 minutes, at 19:15 hours, the rear passenger side outrigger leg suddenly sank 1.7 metres into the ground. The driver’s side outrigger legs lifted off the ground and the EWP rotated 46 degrees in an anticlockwise direction overturning on to the passenger’s side. The boom crashed through the boundary fence and on to Longland Street. The deceased was still in the basket, but Brendan had been thrown out and had landed a few metres away. Both had suffered serious injuries including multiple fractures, chest pelvic and abdominal injuries. The deceased succumbed to his injuries some minutes later. Incredibly, Brendan survived and after years of rehabilitation has resumed a hybrid normality to his life.

This Inquest concentrated on the cause of this tragic incident, not to establish blame, as it was clear what had occurred, but rather, to investigate preventative measures so this tragedy might not be repeated.

This investigation discovered a hiatus in the regulatory framework around Elevated Work Platforms resulting in these appliances being set up on ground that the operator has a “gut feeling” is sure.

I have made a number of recommendations to government. Primarily, they revolve around the mandatory requirement that an engineering report certifying ground is safe for a top end EWP to operate. Obviously, EWPs come in a variety of vehicular platforms, hoisting mechanisms and sizes. The requirement for such a certificate would only apply where the ground surety is unknown, high risk work is being undertaken and to EWPs working with a boom in excess of 11 metres. There will be a cost to developers but in my view this is a necessary reform to ensure workplace safety.

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Introduction

On 15 December 2015 the death of Christopher Ian Powell ('the deceased") at 70 Longland Street, Newstead, was reported to this Court as a violent and unnatural death. My predecessor, Coroner Hutton, ordered a full investigation. The Office of Industrial Relations (Work Health and Safety Queensland) and the Queensland Police Service carried out investigations which were thorough and assiduous.

A preliminary report was completed in 2018 but follow-up enquiries did not allow for completion of this report until 2019. An Inquest was set for early 2020 but the onset of COVID-19 considerations did not allow for its completion until December, 2021. There were many parties, a zest for detail and many levels of complexity. I make no criticism of any party for these delays.

In short, this death involved the deceased and his son, Brendan Powell, takingphotographs from a crew basket of a Palfinger Wumag WT700, Elevated Work Platform ("EWP"). On this day, the EWP was operated by Bradley Sugden. It was sunset and the photographs were to be used in marketing material replicating the view from the top floor of a yet to be constructed unit block at 70 Longland Street, Newstead (adjacent to the old gasworks site).

An EWP is a mobile machine designed to lift or lower people and equipment by a telescopic, hinged or articulated device, or combination of these, from a base support that is moved on to a site. There are various types of EWPs, including but not limited to, scissor lifts, trailer or vehicle mounted lifts, telehandlers, self-propelled boom lifts with an elevating work platform attachment, referred to as a crew basket. Some are mobile some are not. Fruit picking two metres off the ground requires a completely different safety regime from a photographer working 50 meters in the air. Because of this variety, it is impossible to precisely "define" an EWP and provide an all-encompassing code. Consequently,

EWP operators have largely avoided the strict regulations governing the use of cranes.

Figure 6 – Examples of mobile elevated Work platforms and the great variety of sizes and uses. The top two EWP's only extend to a working height of five metres and weigh less than one tonne. The bottom two EWP's extend to a working height over 11 metres and weight over five tonnes.

On Monday, 14 December 2015, at about 19:15 hours, an EWP operating a crew basket, containing the deceased and his son, was over 40 metres in the air when the ground beneath the rear left outrigger leg gave way. The passenger's side rear outrigger foot and pad had punched through the ground, resulting in the EWP twisting and overturning causing the boom to collapse. The crew basket crashed into the roadway at the intersection of Longland and Doggett Street, Newstead. The deceased sustained catastrophic injuries causing his death almost immediately. His son, Brendan, was seriously injured.

The Queensland Ambulance Service ('QAS') was advised of the incident at 19:17 hours and an ambulance was dispatched at 19:19 hours, arriving at 70 Longland Street, Newstead three minutes later. QAS officers commenced treatment of the deceased but he was asystole (no shockable heart rhythm). He was pronounced deceased at 19:30 hours. Brendan Powell was transported to hospital with multiple injuries.

On 16 December 2015 an experienced Forensic Pathologist, Dr Christopher Day, conducted an autopsy consisting of a full internal examination of the body, toxicology, and a full body CT scan. The internal examination showed multiple injuries to the chest, abdomen and pelvic cavities. There was some natural disease in the form of moderate degenerative narrowing of the coronary arteries (coronary atherosclerosis). Given the mechanism of the injuries and their severity, this coronary atherosclerosis was not considered to have contributed to the death. The cause of death was, unremarkably, determined to be:

1(a). Multiple injuries, *due to, or as a consequence of;*

1(b). Crane rollover (bucket passenger).

Figure 1 - EWP being set up in position before the collapse on 14 December, 2015.

Figure 2 - Example of a similar Wumag-Palfinger WT 700 EWP in operation: note only the front outrigger legs and pads and crew bucket on this vehicle

Figure 3 - Aerial view of the EWP the next morning (15 December, 2015)

Figure 4 - Final position of the EWP basket on Longland Street. The front of the basket has been cut away by emergency services.

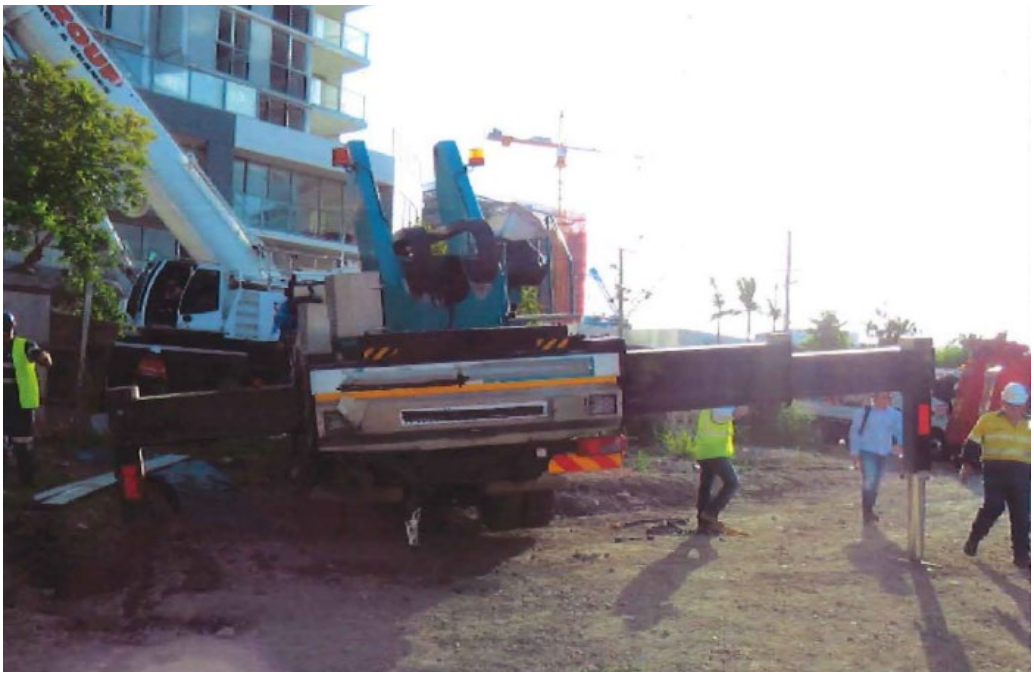

Figure 5 – The subject EWP after being recovered and "uprighted" but not returned to its original position. Note the rear outrigger "arm" on the passenger's side is not fully deployed to 3 metres unlike the driver's side leg. It was half deployed at 1.4 metres which reduced the "spread" of the load.

Figure 6 – Note the EWP in situ before being "uprighted" and buried passenger's side outrigger leg. The hard gravel crust can be seen but not the soft clay underneath.

Figure 7: View of the recovered stabiliser pad upon which the rear passenger's side outrigger leg was placed. Note the soft underground of clay below the hard gravel crust.

The Coronial Jurisdiction

Before turning to the evidence, I will say something about the nature of the coronial jurisdiction. The basis of this jurisdiction arises because the police officer who attended this crash scene considered the death to be "a violent or unnatural death" within the terms of s7(1)(a)(i) of the Act, which he was obliged by s7(4) to report it to a Coroner. Section 11(2) confers jurisdiction on a Coroner to investigate such a death and s28(1) authorises the holding of an inquest into it.

Section 45(2) of the Coroners Act (Qld) provides:

(2) A coroner who is investigating a death or suspected death must, if possible, find—

(a) who the deceased person is; and

(b) how the person died; and

(c) when the person died; and

(d) where the person died, and in particular whether the person died in Queensland; and

(e) what caused the person to die.

After considering all of the evidence presented at the inquest, findings must be given in relation to each of those matters to the extent that they are able to be proved. An inquest is not a trial between opposing parties but an inquiry into the death. Lord Lane CJ in *R v South London Coroner; ex parte Thompson* (1982) 126 S.J. 625 described a coronial inquest in this way:-

> *… an inquest is a fact finding exercise and not a method of apportioning guilt. The procedure and rules of evidence which are suitable for one are unsuitable for the other. In an inquest it should never be forgotten that there are no parties, there is no indictment, there is no prosecution, there is no defence, there is no trial, simply an attempt to establish facts. It is an inquisitorial process, a process of investigation quite unlike a criminal trial where the prosecutor accuses and the accused defends," … (and) … "the function of an inquest is to seek out and record as many of the facts concerning the death as [the] public interest requires.*

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 (s46) but prohibits findings being framed in a way that appears to determine questions of civil liability or suggests a person is guilty of any criminal offence (s45(5)).

Proceedings in a coroner's court are not bound by the rules of evidence because s37 of the Act provides that "*the Coroners Court is not bound by the rules of evidence but may inform itself in any way it considers appropriate"*. 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. However, the rules of evidence and the cornerstone of relevance should not be disregarded and in all cases the evidence relied upon must be logically or rationally probative of the fact to be determined.[1]

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.[2] This means that the more significant the issue to be determined, the more serious an allegation or the more inherently unlikely an occurrence, the clearer and more persuasive the evidence needed for the trier of fact to be sufficiently satisfied that it has been proven to the civil standard.[3] It is also clear that a Coroner is obliged to comply with the rules of natural justice and to act judicially.[4] 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 the High

[1] See Evatt, J in *R v War Pensions Entitlement Appeal Tribunal; Ex parte Bott* (1933) 50 CLR 228 at 256; Lockhart J in *Pearce v Button* (1986) 65 ALR 83, at 97; *Lillywhite v Chief Executive Liquor Licensing Division* [2008] QCA 88 at [34]; Priest v West [2012] VSCA 327at [14] (Coroners Court matter) and *Epeabaka v MIMA* (1997) 150 ALR 397 at 400.
[2] *Anderson v Blashki* [1993] 2 VR 89 at 96 (per Gobbo J)
[3] *Briginshaw v Briginshaw* (1938) 60 CLR 336 at 361 per Sir Owen Dixon J
[4] *Harmsworth v State Coroner* [1989] VR 989 at 994; Freckelton I., "Inquest Law" in The Inquest Handbook, Selby H., Federation Press, 1998 at p13

Court made clear in *Annetts v McCann* (1990) 65 ALJR 167 at 168 this includes being given an opportunity to make submissions against findings that might be damaging to the reputation of any individual or organisation.

Further, by s. 46(1) of the Act a Coroner may whenever appropriate comment on anything connected with a death investigated at an inquest that relates to:

(i) public health or safety; or
(ii) the administration of justice; or
(iii) ways to prevent deaths from happening in similar circumstances in the future.

For the purposes of s. 46(1) of the Act, issues to be dealt with at this Inquest were:

1. *Whether the industry best practice guides for EWPs, in particular:*
   (i) the Safe Support of Mobile Plant Guide (2018) of the Office of Industrial Relations Workplace Health and Safety Queensland (WH&S);
   (ii) the EWPA Good Practice Guide of the Elevated Work Platform Association (v.1.2) (2020); and
   (iii) the Guide to Managing the Managing the Risks of Elevating Work Platforms of Safe Work Australia dated June 2021;

   should be amended as a guide to the operator of an EWP in the assessments of ground types and conditions;

2. *How the operator of an EWP can find information about a site in order to assess the ground conditions;*

3. *How to facilitate:*
   3.1 an operator of an EWP to make inquiries of a person possibly possessing relevant information about a site, and/or;

3.2 information being provided to an EWP operator before an EWP is brought on to a site.

This Inquest concentrated on the cause of this tragic incident, not to establish blame. It was clear what had occurred. Rather, I wanted to investigate preventative measures so this tragedy might not be repeated. I ruled that the Inquest should not devolve into who was responsible for the state of the ground that failed despite one party, Ian Powell (the deceased's father) agitating for that matter to be traversed.

My reasoning, supported by other parties, was that Work Health and Safety and Queensland Police Service investigators had determined that any knowledge of hazardous soil conditions and/or past history illegal was outside the scope of their investigation. I should add that there was no evidence of any such knowledge before the court. Critically, the ground failed. The issue for this Inquest is: "*Why was this EWP set up on unstable ground?"* It is not how the ground came to be unstable.

The background and circumstances leading to this fatal EWP crash

The Office of Industrial Relations (Work Health and Safety Queensland) and the Queensland Police Service carried out investigations which were completed in early 2018. The brief of evidence provided amounts to over 5000 pages of witness statements, transcripts of recorded interviews, diagrams, photographs, expert reports and detailed summaries. That brief of evidence formed the substantial part of the evidence at inquest. The following is an undisputed collated summary of that evidence referenced by footnotes to this brief of evidence.

History of the site

Admirably and helpfully, Counsel Assisting provided this Court with a general history of the 70 Longlands Street, Newstead site. It is included

in these findings as general background and has a very limited relevance to the issues and this history did not form part of the coronial investigation.

According to the Brisbane City Council, the Turrbal and Jagera/Yuggera people are the traditional custodians of the Newstead area. In 1883, with an increasing demand for gas for street lighting, industrial and residential use, the Brisbane Gas Company decided to expand its business by acquiring 22 acres (8.9 ha) of land at Newstead, next to Longland Street, and in 1885 it purchased further adjoining land, to set up a new gasworks.[5] This parcel of land included the subject 70 Longland Street, Newstead address.

Newstead is located in the meandering corridor of the Brisbane River floodplain, which contains stream sediments with a profile of silty clay and other alluvial deposits.[6] As the area is close to the Brisbane River, it lies in a flood zone, and parts of it are below sea level.[7] Further, Newstead was an overland drainage area for water flowing into the Brisbane River from the higher land of what is now Victoria Park and the Royal National & Industrial Association of Queensland Show Grounds.[8]

The Newstead land that was acquired by the Brisbane Gas Company was swampy, so it was filled in with dry materials, including coal ash from the original Petrie Bight gasworks.[9] In 1887 the Brisbane Gas Company built

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5 *https://environment.ehp.qld.gov.au/heritage-register/detail/?id=601594*; Newstead Gasworks No.2 gasholder (remnants) and guide framing

6 SKM, Aurecon. *Cross River Rail Study*, Chapter 7, Topography, Geology, Geomorphology and Soils, July 2011: https://eisdocs.dsdip.qld.gov.au/Completed%20Projects/Cross%20River%20Rail/EIS/EIS%2030%20Aug%202011/01%20Volume%201/07%20Soils%20Topography%20and%20Geomorphology.pdf

7 The incident the subject of the inquest may have been affected by tidal influences because it occurred 1 and ½ hours after low tide which may have prevented the ground from adequately drying out and possibly resulting in the softer clay below the dry crust: Ex C 2.1, page 18 and 20

8 par 6.1.1 at page 6-1 of Airport Link EIS, *Airport Link, Phase 2 – Detailed Feasibility Study*, Chapter 6, Topography, Geology, Geomorphology & Soils: https://eisdocs.dsdip.qld.gov.au/Completed%20Projects/Cross%20River%20Rail/EIS/EIS%2030%20Aug%202011/01%20Volume%201/07%20Soils%20Topography%20and%20Geomorphology.pdf

9 *https://newfarmhistorical.org.au/gasworks-part-of-newsteads-identity/*

a gas generating plant on the Newstead land, which baked coal in ovens, to produce gas which was stored in a large holding tank known as the Gasometer.[10]

Over the next 100 years, the gas generated at Newstead was the main source of power for Brisbane's street lighting, public buildings, factories and homes. With the addition of coal yards, rail lines, wharves and warehouses, the Newstead gas works grew considerably in size. In 1954 a new carbonising facility at the site gave Brisbane "the most modern gas producing plant in Australia."[11] In the early 1980s, with the advent of natural gas, the Newstead Gasworks was rapidly becoming redundant. In 1996 the Newstead Gasworks was shut down and permanently closed.

After closure, all of the main structures of the Newstead Gasworks were demolished, except for the almost totemic frame of the Gasometer. Because of its historic significance, the Brisbane City Council required it to be retained in situ. The demolished area was secured behind a wire security fence and for more than a decade it languished as a derelict, overgrown, vacant and unused wasteland.[12] After a century of gas production and industrial use, the land and groundwater at Newstead was heavily contaminated with pollutants. As a result, the area of the defunct gasworks was listed as contaminated land on the Environmental Management Register under the *Environmental Protection Act* 1994 (Qld).[13]

As part of the *Commonwealth Better Cities Program Initiative*, the Brisbane City Council formed the *Urban Renewal Task Force* which began focussing on the regeneration of the redundant industrial site in the Newstead area. Under the *Brisbane City Council Plan 2000*, the old gas works area was marked for transformation from a barren and desolate

[10] also known as the Newstead Gasworks No.2 Gasholder
[11] Ibid
[12] https://newfarmhistorical.org.au/gasworks-part-of-newsteads-identity/
[13] *Thiess Services Pty Ltd v Mirvac Q P/L* [2005] QSC 364 at [5]

area into a new urban community of medium to high density residential and commercial use with the restored Gasometer frame at its epicentre.[14]

In order for the area to be transformed from a post-industrial wasteland into a living contemporary and commercial precinct, remediation of 17ha of heavily contaminated land at Newstead was required.[15] Accordingly, numerous truckloads of contaminated earth were carted away and the area was replaced with fresh fill.[16] In mid-2007 the *Newstead Gasworks Redevelopment* commenced as a $1.1 billion urban renewal development project, comprised of seven mixed-use buildings featuring a total of 17,000m² of retail usage, 103,500m² of commercial premises and about 750 residential apartments.

The Gasometer, as the hub of the *Newstead Gasworks Redevelopment*, is now the Gasometer Ring Public Plaza, which is an open community integrated multi-use space designed for public use including for the hosting of public events, festivals, live music, and theatrical performances.[17]

The Site

FKP Commercial Developments Pty Ltd (ABN 19 010 750 964) (FKP), now known as "AVEO", is a property and investment company which had a very significant role in the *Newstead Gasworks Redevelopment*. In 2015, FKP was the owner of a vacant lot of 5,153m² of freehold land at 70 Longlands Street, Newstead (the site).[18]

The site is located between the Gasometer Ring Public Plaza and Longland Street, opposite the intersections of Longland Street and

[14] *WAW Developments Pty Ltd v. Brisbane City Council* [2015] QPEC 38, at [11] and fn 4
[15] *Thiess Services P/L v Mirvac Queensland P/L* [2006] QCA 50
[16] https://eprints.qut.edu.au/13833/1/13833a.pdf
[17] https://www.planning.org.au/documents/item/7194
[18] Ex 20.11, page 27; Ex 20.11, page 27, having a real property description of Lot 800 on SP257552, Title Reference 50940542

Kyabra and Doggett Streets, and next to the Bank of Queensland building. Nothing had been built on the site, certainly since 1936, possibly because of the underlying Brisbane River mud and water levels.[19] The land was flat with a very slight incline of approximately 2° with a 0.4 metre bank that ran parallel to Longland Street.[20]

There was a pond of water in the north-east corner of the site[21] which covered about a tenth of the area of site.[22] In the western portion there was an existing basement overlain by a landscaped area.

The ground was covered in gravel, crushed rock, cobble stones and grass. Parts of the site had been excavated and other areas had been filled.[23] Further, it was evident that vehicular traffic had traversed the site from the Longland Street gate entrance across the site to the Gasometer Ring Public Plaza having left a well-worn path of vehicular tracks. The empty allotment was surrounded by a two-metre-high fence, covered in vinyl advertising cladding, and had a gate which was secured by a double lock.[24]

Previous geotechnical studies of the site for TDD

In Queensland, there are planning and development controls to minimise the environmental and construction risks associated with the disturbance of naturally occurring acid sulphate soils.[25] In late 2010 and 2011, Butler

[19] Transcript page 1-44, Queensland Government QImagery: https://qimagery.information.qld.gov.au
[20] Ex C2.1, page 7
[21] Ex 2.11, page 4 and 5
[22] Ex B1 at page 3
[23] Ex C2.1, page 7
[24] Ex B1 at page 2; 30; Ex G20:11 page 1 and Ex G20:10 page 1
[25] https://www.qld.gov.au/environment/land/management/soil/acid-sulfate/legislation-police; "Acid sulphate soils are safe and harmless when not disturbed. If acid sulphate soils are dug up or drained they come into contact with oxygen. The pyrite in the soil reacts with the oxygen and oxidises. This process turns pyrite into sulfuric acid, which can cause damage to the environment and to buildings, roads and other structures. The acid also attacks soil minerals, releasing metals like aluminium and iron. Rainfall can then wash the acid and metals from the disturbed soil into the surrounding environment. When acid sulphate soils are undisturbed, they are dark blue-grey (sometimes black) and wet, with no structure. They are often high in clay but can be sands or sometimes even gravels.": see *Acid Sulphate Soils Explained: Queensland Government*: https://www.qld.gov.au/environment/land/management/soil/acid-sulfate/explained.

Brothers Engineers conducted a broad scale acid sulphate soil investigation of the *Newstead Gasworks Redevelopment* area.[26]

The geotechnical survey included the drilling of investigative boreholes, two of which were drilled on the site, adjacent to its southern boundary, referred to as BH105 and BH106. [27] The log sheets for borehole BH105 and BH106 revealed that the site has been filled with gravel to a thickness of 1 metre to 1.5 metres from the middle of the site to its southern boundary.[28] Below the gravel fill was very soft silty clay of high plasticity which extended to a depth of 7.2 metres to 9.3 metres. Below this layer of soft clay was stiff, silty and sandy clay, also of high plasticity, extending to depths ranging from 8.4 m to 11.3 m. Further below this, to a depth of 8 metres to 16 metres, was extremely weathered argillite rock.[29]

The essential feature of this geotechnical investigation, relevant for the purposes of the inquest, is this Butler Brothers investigation revealed that the site had been filled for about a metre with a cobble and crushed concrete gravel mix, below which was soft marine clay of high plasticity to a depth of 7 to 10 metres.[30] In October 2015, a month or so before the incident, a further geotechnical investigation was conducted on the site by Morrison Geotechnic for a proposed basement construction to be carried out for Tom Dooley Developments Pty Ltd ("TDD").[31]

TDD proposed to construct a 16-story high rise building of mixed use with a four-level basement car park on the site. The development required the ground to be excavated to a depth of 13 metres below ground level to accommodate the car park,[32] so the proponent developer required information about the condition of the subsurface ground on the site.[33]

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[26] Ex 20.11, page 6; 21
[27] Ex 20.11, page 5;
[28] Ex 20.11, page 5
[29] Ex C20.11, page 5
[30] Ex C20.11, page 6; 21
[31] Ex C23.1, page 1
[32] Ex C20.11, page 8
[33] Transcript day 2, page 6, ln 31-38.

By a report dated 13 November 2015, Morrison Geotechnic advised it had drilled four boreholes on the site to a depth between 18.8 metre and 24.4 metres[34], which confirmed the previous Butler Brother results, concluding that:

> *Beneath the fill, natural soils comprising silty clay (marine clay) of high plasticity were encountered. The silty clay soils were moist to wet and wet, very soft firm, and extended to depths ranging between 7.4 metres and 10.7 metres.*[35]

Morrison Geotechnic further observed that:

> *Due to the presence of soft marine clay soils below a depth of approximately 1 metre, the excavation procedure will have to be carefully planned to reduce the issues associated with tracking plant on these materials.*[36]

Relevantly, the fill materials on site decreased in strength with depth, with undrained sheer strengths reducing from 150 kPa in the upper layer to about 40 kPa below a depth of 1 metre.[37]

Importantly, the Butler Brothers and the Morrison Geotechnic reports were not for the purpose of determining ground stability for the positioning of an EWP or other heavy machinery on the site.[38] The results of these geotechnical surveys on site were not known to any of the individuals involved in the incident nor were they otherwise publicly available to an EWP operator. This is not a report that would be regarded as suitable for an EWP operator to interpret.

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[34] Ex C20.12, page 7
[35] Ex C20.11, page 6
[36] Ex C20.11, page 4
[37] Ex C1, page 11
[38] Transcript day 2, page 6, ln 31-38.

Denis Riley of Morrison Geotechnic was a Senior Engineer at Morrison Geotechnic Pty Ltd. By a report dated February 2016, Mr Riley, as a starting point, observed out that there had been geotechnical investigation reports on the site that predated the incident: *…which ideally should have been passed on to the company providing the photo shoot or sought by that company, who possibly then could have obtained advice from a geotechnical engineer on out rigour support requirements or passed on the information to Lincon.*[39]

It is a moot question whether or not the EWP operator on the day of the incident, Mr Sugden, would have understood such a technical report with his limited training. Although prepared for acid sulphate and construction purposes, the results of these two studies could undoubtedly have alerted an engineer or soils expert that there were very real hazards on the site because they revealed that:

(i) there was indiscriminate or uncontrolled fill;
(ii) the removal of any stiff competent surface had resulted in the firm clay materials being closer to the surface; and
(iii) there were wet and soft soils below the surface.[40]

Counsel Assisting this Inquest submitted that, had this information been known to an EWP operator, this information would have put the EWP operator on alert as to the possibility of ground bearing failures that may cause loss of stability overturning an EWP set up on the site, resulting in personal injury or death.[41]

Counsel for the developer TDD quite correctly pointed out that these reports were generalised to provide advice for the design and construction of the proposed development. They did not specifically address the surety of the ground for an EWP. With respect to all parties,

[39] Ex C2.2 pages 11, par 5.2
[40] Ex C2.2, page 7
[41] Ex C2.2, page 8

at best, the geotechnical report might have brought Mr Sugden's mind to bear on the issue of ground surety. However, the failure to produce it, ask for it or peruse it for that purpose is only clear evidence that ground surety was not front and centre of anyone's mind.

Photography project to obtain views from the proposed building

The owner of the site, FKP entered into Put and Call Option Deed[42] with TDD Gasworks Pty Ltd (ACN 20 607 536 27) (TDD) whereby FKP granted to TDD an option to purchase the site for $16 million, with a date of completion of the contract by 30 October 2016. The put and call contract allowed TDD to enter upon the site to conduct investigations, building work assessment and other related purposes for the proposed construction of the high-rise building.[43]

TDD required architectural visualisation of the future views from the proposed building, 3D rendering of the structure, and graphics for advertising, marketing and forward sales purposes. To this end, TDD contracted with Binyan Studios to take photographs from a range of heights correlating with the specific floors of the proposed building and in specific directions to show the future views that would be seen from the completed building.[44] Binyan Studios is an architectural visualisation company that produces photorealistic 3D stills and animations for architects, interior designers, property developers and real estate agents. A graphic designer employed by Binyan Studios at the time was Mr Dave Spittle, who specialised in 3D rendering and was assigned to prepare the graphics for TDD. Mr Spittle engaged Jumbo Aerial Photography to take the required photographs from the site.

[42] A put and call option agreement is a contract where one party agrees to sell one or more properties if requested by the buyer (a call option) and the other party agrees to buy the same property if requested by the seller (a put option): see *Vale 1 P/L as Trustee for the Vale 1 Trust v. Delorain P/L as Trustee for the Delorain Trust* [2010] QCA 259
[43] Ibid, page 17, ln 33-42.
[44] Ex B1, page 5

The deceased was a photographer and director of Advanced Thermal Surveys Pty Ltd ACN 147 292 171 which was trading as Jumbo Aerial Photography. He was an innovative, very experienced and a highly accomplished aerial photographer with a reputation for excellence in his field. Jumbo Aerial Photography specialised in commercial high quality aerial photography utilising balloons, helicopters, drones and EWPs.
Jumbo Aerial Photography provided a quote to Binyan Studios for the photographs to be taken from the site using a helicopter, a drone or an EWP. Binyan Studios agreed to engage Jumbo Aerial Photography and chose to the photographs taken by using an EWP.

For a professional photographer to take the best advantage of natural light, the optimum time to take such photographs is shortly after sunrise and shortly before sunset, which is the twilight period, referred to by professional photographers as, “the golden hour”. At these times, the ambient light changes quickly, which requires a photographer to be in position and to be ready to capture the right moments within a very limited time frame.

Accordingly, it was proposed to take the photographs, on 11 December 2015 at day break shortly after sunrise, and on 14 December 2015, around sunset time and before night fall. In order to take the photographs of the views from the proposed 16 story building, an EWP with a 70-metre boom was required. Jumbo Aerial Photography contacted Performance Tower Hire, a company which provides EWPs for this purpose. However, Performance Tower Hire was unable to provide a 70 metre EWP on the dates nominated. Performance Tower Hire then sub-contracted the task to:

(a) Summit Tower Hire to provide an EWP on 11 December 2015; and
(b) Lincon Logistics Pty Ltd to provide an EWP on 14 December 2015.

Photography reconnaissance – the first EWP on site on or about 1 December, 2015

About a fortnight prior to 11 December 2015 (the exact date is unclear from the evidence but the issue irrelevant), Chris Neilson, an employee of TDD, arranged for an EWP to be brought on to the site for a photographic reconnaissance by the deceased and Tom Dooley of TDD to confirm positions and heights from which the required photographs would be taken. This was the first EWP set up on the site. For this purpose, Boom Logistics provided an EWP to be operated by Darryl Schwass, who had 22 years of experience using EWPs.

Mr Schwass met with the deceased and Mr Dooley outside the site where the mobile EWP was parked on Longland Street. After the gate to the site was unlocked they entered and discussed the positioning of the EWP. Mr Schwass observed that this was a "site where… demolition… had been happening or excavation had definitely been happening". He examined the ground carefully and concluded there were areas which looked, as he expressed it, "dodgy". He noted the loose gravel and saw an area where it looked as though a bobcat earth moving machine had pushed rubbish about. He looked for indicators of water and possible moisture and noticed there was small pond of water at the back of the land. Mr Schwass said that he "*had no knowledge of what was under there… nothing was told to me about any works that may have been done there, so I made…. my own inspection, I made the ca*ll".

Mr Schwass' practice was to use a piece of timber to *"bang it on the ground"* to see what can be heard underneath. If he had any concerns about the stability of a setup, he would not hesitate to speak to the client in order to obtain ground checks or check with his office. He would refuse to set up an EWP on an area which he considered was unstable.

On this occasion, he declined to set up the EWP at the first place under consideration. Instead, he chose another area on site which was flat, appeared to be solid, and was far enough away from the back of the property.

Under each of the four stabiliser pads of the EWP, he placed a bed of timbers as dunnage or "pig boards" which were plywood pads 1.2m x 1.2m in dimension.[45] Mr SCHWASS used these timbers as an extra measure of safety because of the lack of information about what was below the ground surface. Once set up, the deceased and Mr Dooley went up in the basket of the EWP and the boom was extended to a height of 50 metres, where views were determined for the taking of the photographs.

The photograph reconnaissance exercise was successfully completed without incident.

The dawn photography session – the second EWP on site 11 December, 2015

On 11 December 2015 at Brisbane, sun rise commenced at 04:46 hours. For the photographs to be taken this day, Summit Tower Hire provided an EWP which was operated by Kevin Staff, who had 21 years of experience as an EWP operator. This was the second set up of an EWP on the site.

Early in the morning Mr Staff arrived at the site with an EWP and was greeted by the deceased and Mr Spittle. After the gate was unlocked, the three men walked on to the site with the building plans and discussed where to set up the EWP on site. As the operator, Mr Staff regarded himself as being solely responsible for the safe set up of an EWP. Mr Staff assessed the suitability of the ground, looking for hard packed untouched soil surface areas, signs of previous excavations, and the presence of

[45] Ex C4.11, page 204

water. He saw that the pond of water and another area where the ground appeared softer and "*marshy*".

When asked how he assessed the ground conditions of various sites, Mr Staff explained:

> "*Basically, just check for the type of soil it is. Look for compact soil, or road base, or anything like that that looks like it has been there for a long time. If it's otherwise not, then I generally don't – I'll assess further, have a look, walk over. If it looks like it's been cut or disturbed then I tend to not set up there."*

Mr Staff reiterated that he had no specific training in soil structures, strength or stability, and relied on his own observations, inspections, and common sense. [46] Mindful of avoiding setting up near the proximity of retaining walls, he looked for available space to place the EWP footprint with stabilisers and ground pads.[47] Mr Staff stated that EWP operators typically stayed away from the edges of retaining walls because they do not know how the rocks have formed or been packed.

Mr Staff had been asked by the deceased to set up the EWP at a different position towards to the back of the site parallel to Longland Street, but he declined to do so because he "*did not like the look of*" the ground, noting it was darker in appearance.[48] This area looked freshly excavated, was near a contour bank with darker soil, and there were concrete walls on two sides which were approximately 2 metres in height.

Mr Staff was concerned about the cut soil surface and the apparent distribution of the soil at this position. This area was nearer to where the third EWP would set up and overturn.[49] In Mr Staff's opinion, there only

[46] Ibid, page 26, ln 32 – 35.
[47] Ex C4.1 at page 193
[48] Ex B1, page 30
[49] Ex B1, page 5

one area that was appropriate for the EWP to be set up, which was directly inside the entrance gate, where the ground was a hard stand area, which he described as akin to a road base. This was where there were tracks and surface wear of vehicles that had used the area to traverse the site from the gate to the Gasometer location.

Only the short legs could fit within the five and two metre radius that was chosen, which meant that the work platform would not have a large horizontal radius when suspended. As a consequence, Mr Staff explained to the deceased that he would only move the crew basket vertically up and down. It was agreed to set up the EWP in this position.

Large 90 cm x 90 cm ground pads with full timber dunnage were placed under each outrigger which had a bearing area of 0.81m². Mr Staff explained that he used the timber dunnage because he was trained to do so and it was the safest thing to do.[50] Mr Staff acknowledged that, while the timber dunnage would reduce risk, it was not necessarily a complete failsafe.[51] He added that setting up the dunnage took little extra time in an overall EWP set up.[52]

Mr Staff stated that in his 21 years of experience he had never been provided with a geotechnical report about a site before setting up an EWP at the site.[53] He agreed that geotechnical data about the nature of the sub-soil on a site prior to setting up an EWP, would be of assistance.[54]

On that morning, the deceased went up in the basket of the EWP and took the photographs, again without incident.

[50] Ibid, page 27, ln 45-46.
[51] Ibid, page 29, ln 46.
[52] Ibid, page 29, ln 30.
[53] Transcript day 1, page 28, ln 6-7.
[54] Ibid, ln 14-16.

The fatal dusk photography session – the third EWP on site: 14 December, 2015

For three days prior to 14 December, 2015 (the fatal incident date), it had been raining in Brisbane.[55] On 13 December 2015 it was recorded by the Bureau of Meteorology that there had been 9.88mm of rain. On 14 December 2015 there was 8.8mm of rain.[56] Owing to the proximity of the site to the Brisbane River, the tide could also have an influenced water drainage from the site.[57] On 14 December 2015, high tide was at 11:24 am and a low tide of 0.52 metres occurred at 6:03 pm. Although the incident occurred approximately 1 to 1 ½ hours after low tide, the tides could have been a contributing factor. Even a slow ebbing tide can inhibit any drying out of ground resulting in softer clay below the dry crust surface at the site at the time.[58]

On 14 December 2015, sunset at Brisbane commenced at 6:38 pm, with twilight extending through to nightfall at 20:11 hours.[59] The weather was clear and dry without any wind or breeze.[60] Photographs were to be taken from several different advantage points which required an EWP boom reach of at least 56 metres. Accordingly, the deceased requested an EWP with a 70-metre boom. This was considered more economical than using a smaller EWP that would otherwise be required to be moved to different positions on the site.[61]

Lincon Logistics provided the EWP, to be operated by an employee, Bradley Sugden. Mr Sugden held a license from Workplace Health and Safety Queensland to perform High Risk Work with an EWP that had an

[55] Ex B1, page 28
[56] Ex C2.1, page 17; wind speed was considered insignificant, but it was observed that the rain fall may have been a factor in ground properties.
[57] Ex C2.1 page 18
[58] Ex C2.1 page 18 referring to the *Queensland Tide Tables Standard Port Tide Times by the Maritime Safety Queensland* of the Department of Transport and Main Roads 2015 at the Brisbane Bar
[59] https://www.timeanddate.com/sun/australia/brisbane
[60] Ex B1, page 28; Ex C2.1, page 17
[61] Ex B1 page 29

11 metre or more plus boom.[62] To obtain his licence Mr Sugden had attended a classroom and practical training course conducted by a registered training organisation in accordance with the requirements of the Commonwealth of Australia Assessment Instrument Licence to operate a boom-type elevating work platform with boom length of 11 metres of more.[63] Mr Sugden told investigators that he had received limited training about assessing sub-surface ground conditions and most instructions he received where about assessing ground levels on a surface.[64] He had three and a half years of experience operating EWPs.[65]

At approximately 17:00 hours, Mr Sugden arrived at the Longland Street site with a Palfinger Wumag WT700 EWP. The EWP was mounted on a 33 tonne Mann truck chassis which has four axles and eight wheels[66] owned by and registered to Lincon Recruitments Pty Ltd.[67] The EWP was manufactured in 2012, and by 7 December 2015 had 5010 hours of operation.[68] It had a 70-metre telescopic boom, consisting of five sections mounted on a turntable. There was a further two-section telescopic fly boom with an attached crew basket which was the work platform from which the deceased took his photographs. The maximum permissible load in the crew basket was 600 kg. The maximum working height of the EWP was 70 metres with a maximum radius of 35 metres.

This EWP was fitted with a sophisticated computer system, that automatically manages its stability. When operating the boom, it was

[62] Ex C1, page 9; by s. 81 of the *Work Health and Safety Regulations 2011* (Q) a person must not carry out a class of high-risk work unless the person holds a high-risk work licence for that class of high-risk work; Item 21 in Table 3.1 of Schedule 3; High Risk Work licence "Boom-type elevating work platform" for "Use of a boom-type elevating work platform where the length of the boom is 11m or more"
[63] C4.4, page 6
[64] Evidence from a EWP operators and trainers provided in the investigation included: Mr Curtis Morley from Performance Tower Hire (Ex C4.1, page 136); Mr Adam Colldunberg from Lincon Logistics (Ex C4.1, page 145); Mr Jeremey Wales (Ex C4.1 ay page 161); Mr Staff from Sherrin Hire EWP (Ex C4.1 at page 193); Mr Schwass from Boom Logistics (ExC4.2 at page 204)
[65] Ex C4.8
[66] bearing registration number 455-SBU
[67] Ex C20.22; Ex B1 page 4 and 17; registered serial number 1170 0151
[68] Ex C2.1, page 2

supported by four variable extended outriggers.[69] Each outrigger had multiple sensors that measure the horizontal and vertical deployment distances for the purposes of maintaining safe stability of the EWP.
The computer takes into account the outrigger configuration, position and the weight in the basket. Should an operator attempt to move the crew basket to a position that would make the platform unstable, the computer will prevent such movement.[70] However, these sophisticated computer safeguards are not able to rectify a sudden subsidence in the ground that might occur under a collapsing outrigger.

On the way to the site, the EWP had a slight collision with parked car which damaged the passenger side of the EWP, leaving some superficial markings on the plastic trim casing of the panel box that contained the controls for the hydraulic legs. Mr Sugden advised the Lincon Logistics service manager and an officer of Workplace Health and Safety (WH&S) about the scraping of the plastic box panel, but after testing the manual control systems, the EWP was cleared for operation.

One of tyres on the driver's side was deflated. Mr Sugden decided to change the tyre on site, rather than out on the road.

When the deceased arrived for the photo shoot, he discussed the EWP set up with Mr Sugden while they waited for Mr Spittle to arrive to unlock the gate. They discussed the ground suitability of the site and the positioning of the EWP. The deceased remarked that there were "dodgy areas" on the site. The deceased said that photographs were required from the three points on the site. He asked if all three points could be photographed without needing to reposition the EWP and suggested setting up the EWP in a position between the three points. Mr Sugden agreed that the one position of the EWP should be sufficient for all three photograph sets.

[69] Ex C2.1, page 3
[70] Ex B1, page 16

Mr Sugden considered that as the operator, it was for him to decide where to set up an EWP, and this was only in a safe area, despite what a customer may want. He and the deceased walked to the EWP, then parked on Longland Street, and examined the 'safe working load' chart. Mr Sugden explained the maximum reach at certain heights and weights.

Mr Spittle arrived and unlocked the gate to the site. Shortly afterwards, Mr Dooley arrived then both he and Mr Spittle left the site. Mr Sugden drove the EWP through the gated entrance onto the site for set-up.

Mr Sugden noticed the weight of the EWP driven onto the site did not leave any indentation in the ground and there were no other indicators of ground softness. He observed that it appeared that heavy vehicles, such as trucks, had used the central area of the site apparently as a roadway during the construction of the nearby gasworks Plaza. The ground appeared to have been compressed by the weight of the vehicles.

Mr Sugden considered that he had "*done a fair sort of a survey of the ground, it all looked solid*".[71] The EWP was set up parallel to Longland Street.[72] Mr Sugden said this position was "*in clear space… an area of compacted dirt that had been cut in to level it off*", with a slight slope upwards towards Langland Street, where there was some grass.

He extended the two front outriggers and the rear driver's side outrigger to their full extent, on what he considered to be a hard ground surface area. [73] He extended the rear passenger side outrigger to about half of its full length "(short- legging)" to avoid the ground slope near the fence line. [74] The land there did not appear to have been previously driven over nor was it compressed by other means.

[71] Ex B1, page 34-38
[72] Ex C2.1, page 7
[73] Ex C2.1, page 8
[74] Ex B1, page 34-38

Mr Sugden did not consider there was any problem short legging the rear passenger side outrigger because the photographs were to be taken in the crew basket from positions, either in front of the EWP, or behind on the driver's side of the EWP. Further, Mr Sugden thought that any crew basket reach towards the passenger side of the EWP would be restricted by the on-board computer, which would automatically limit the crew basket reach at the first sign of any instability, considering the short legged rear passenger side outrigger.

Mr Sugden placed standard EWP stabiliser pads underneath each leg,[75] which were made of a dense plastic material measuring approximately 78cm x 60cm, with a bearing area of 0.7m². The Manual for the EWP advised that the standard EWP stabiliser pads provided were sufficient for roadways or compressed surfaces.[76] Mr Sugden used the plastic pads without any additional load spreading timbers, although he had timber for this purpose in the back of the truck.

After the EWP was set up, Mr Sugden let the EWP sit and settle for a while. He kicked each pad to ensure they were secure. It all appeared to be in good working order and Mr Sugden saw no reason to suspect the ground where he placed the outriggers was soft and/or unstable. He was satisfied that he had placed the EWP in a safe position on solid ground.[77] Mr Sugden checked to see if the controls of the EWP were working properly. The ground and crew basket control displays were working, but the control display in the turret was not working.

Mr Sugden telephoned the service manager of Lincon Logistics and was advised that as long as ground level and crew basket control displays were working, the operation of the EWP could proceed. Then Mr Sugden conducted standard pre-start tests, which included extending the boom,

[75] The EWP Manual refers to the stabiliser pads as underlay plates
[76] Ex B1, page 28
[77] Ex B1, page 34-38

moving it from side to side, lifting the crew basket and testing the emergency controls, all of which he found were working satisfactorily.

The deceased told Mr Sugden that previously a 55 metre EWP from Summit Tower Hire, when set up on “the driveway”, lifted a leg from the ground. He told Mr Sugden that the emergency controls had to be used to get him down. Mr Sugden explained that Summit Tower used a different type of EWP that stops the controls when an EWP “loses a leg” and this particular EWP could still operate when a leg lifts off the ground.

Before commencing, Mr Sugden asked the deceased if he had an EWP licence, and Mr Powell replied that he did. Mr Sugden confirmed with the deceased that he knew how to operate the radio in the crew basket to maintain communication between them. Then Mr Sugden asked the deceased if he had operated this type of EWP before and Mr Powell replied that he had not. The deceased asked Mr Sugden if he would like to operate the controls of the EWP in the crew basket with him. Mr Sugden replied that he would prefer to be on the ground, given the deceased’s advice about the previous EWP leg lifting.

When Mr Sugden was explaining to the deceased the operation of the EWP to Mr Powell, his son, Brendan Powell, arrived on site to help his father. When ready, the deceased and his son were harnessed with two metre safety lanyards in the crew basket and were given a two-way radio to communicate with Mr Sugden. They went up in the crew basket with the deceased located on the control side of the crew basket.

Mr Sugden had just commenced replacing the flat tyre, when the deceased radioed to advise that he was having difficulty operating the EWP and was unable to reach the first photograph position. The deceased had not extended both parts of the boom, causing the EWP’s computer system to automatically restrict the reach. Mr Sugden took over the controls of the EWP and the crew basket was positioned in the first photograph position.

At 18.48 hours, the deceased and his son took photographs in the first position for about 10 to 15 minutes.[78] During this time, Mr Sugden walked around and inspected the EWP outriggers checking on stability. All appeared to be in order. The deceased radioed Mr Sugden to advise that he was ready to take the next set of photographs in the second position. Mr Sugden retracted the boom and moved the crew basket towards the driver's side behind the EWP into the second position.

The deceased and his son took photographs in the second position for about 10 to 15 minutes. Mr Sugden walked around the EWP to check that all was in order and did not observe any movement or sinking of the outriggers.

The deceased radioed Mr Sugden to advise that he was ready to take the third set of photographs. Mr Sugden moved the crew basket to the third position where photographs were taken for about 10 to 15 minutes. He again walked around the EWP checking on its stability. At 19:10 hours, the last photographs were taken by the deceased of views looking east and panning around to the south and then to the north.[79]

The Palfinger EWP overturns

When the third lot of photographs were completed, the deceased radioed Mr Sugden and asked to be brought down to the ground. As Mr Sugden began retracting the boom, the deceased radioed to say he would like to take one more set of photographs, positioned at the same extended distance, but in a lower position. Mr Sugden moved the basket to the lower position which was approximately 50 metres above the ground. This placed greater force on the rear passenger side outrigger leg.

[78] Ex B1, page 6
[79] Ex B 1, page 7

At 19:13 hours, after one or two minutes positioned in this lower position, Mr Sugden heard a noise. He looked around and saw that the ground directly underneath the rear passenger side short legged outrigger was still there, but a hollow was forming around the base of the stabiliser pad. He could see the ground giving way under the stabiliser pad of the rear passenger side short-legged outrigger which had commenced to slowly sink beneath the surface and into the ground. Mr Sugden immediately radioed the deceased and told him they had lost a leg on the EWP and he needed to immediately bring them down safely.

Brendan recalled Mr Sugden telling them on the radio: "*I have to get you down. I have to get you down."*[80] The deceased replied: "*Do whatever you can, mate*". As Mr Sugden retracted the boom, the rear left-hand side short-legged outrigger sank further into the ground. When it had sunk 1.7 metres into the ground, the whole of the EWP began to pivot on the rear passenger's side sunken outrigger leg.[81]

The outriggers on driver's right side then lifted off the ground and the entire truck mounted EWP rotated 46° in an anticlockwise direction, causing it to capsize on to its passenger side. At 19:15 hours the extended boom smashed over the fence of the site and protruded onto Longland Street for about 30 metres,[82] bringing the deceased and his son in the crew basket crashing down from a height of over 40 metres on to the roadway at the intersection of Longland Street and Doggett Street with both men suffering extensive bodily injuries.

The deceased was found still inside the basket with his legs tangled in the safety rails. His son was thrown a few metres away from the basket.

[80] Ex B 1, page 30
[81] Ex C2.1, page 8
[82] The total length of the boom including the work platform was 49 metres: Ex C2.1, page 4

Both men were still harnessed to the basket with lanyards, the energy absorbing sections of which remain undamaged, indicating that the lanyards were not put under excessive stress.

Many people in the nearby busy commercial area along Longland Street witnessed this capsizing of the EWP. Within seconds of the crew basket striking the ground, people from restaurants across the street and passers-by rushed forward to assist the two men. Cardiopulmonary resuscitation was performed by bystanders on the deceased, who was not responsive. Brendan, who was severely injured, lay a few metres away still conscious and speaking. At 7:17pm Queensland Ambulance Service ("QAS") were advised of the incident and within two minutes an ambulance was dispatched. At 19:22 hours the QAS ambulance arrived on the scene and QAS officers commenced treating the deceased, however there were no signs of life. At 19:30 hours the deceased was pronounced dead.

Brendan was transported to hospital with multiple injuries including crushing injuries to his feet and ankles, and fractures to his spine, femur, arms, ribs, jaw and nose.

Mr Sugden told investigators that the last thing he remembered was attempting to retract the boom as the EWP lifted off the ground and collapsed. He did and does not remember how he got away from the falling EWP, but he recalls rushing towards the gate, running towards the crew basket and trying to call for help on his mobile telephone.

The Investigation

Officers of the Queensland Police Service (QPS) and officers of Workplace Health and Safety (WH&S) of the Queensland Government Department of Industrial Relations attended at the scene soon afterwards and commenced their investigations, interviewing witnesses, securing

and inspecting the site, taking photographs and measurements. The QPS produced a detailed report to the Coroner which analysed the material facts and circumstances of this tragedy, setting out how the death occurred in a report to the Coroner which was of considerable assistance in the inquest.[83] The report of the WH&S investigation delivered in 2018 and supplemented in 2019 made up a large portion of the very helpful expert and analytical material provided to the Coroner.

The QPS summary of the investigation this tragedy is informative:

1. This incident occurred at about 7.15 pm on Monday 14 December, 2015 on Longland street, Newstead. This is a busy commercial area.

2. It was night-time when the incident occurred. The weather was fine and dry and there was good visibility.

3. The deceased was Christopher Ian Powell who died at the scene prior to the arrival of the QAS.

4. The deceased was performing work as a professional photographer and was assisted by his son at the time of the incident.

5. There is no evidence that the deceased or his son performed any actions that caused or contributed to the incident.

6. There is no evidence of any mechanical failure by the EWP that caused or contributed to this incident.

7. The outrigger stabiliser leg that sunk into the ground was the only one that had been partially deployed ("short-legged").

8. The outriggers were placed on standard Palfinger stabiliser pads without any additional load spreading timbers or steel rafts. Timbers for this purpose were carried on the truck but were not used.

9. The operator's manual for the WT 700 shows that the standard pads would only be sufficient for compressed surfaces or roadways.

[83] Ex B1, report and Ex B1.1

10. The soil under the area where the outrigger sank appears to be fill that consists of a water retaining blackish soft clay.

11. Trucks used in the central area of the site as a roadway during the construction of Gasworks Plaza thereby compressing the ground the driver's side outriggers sat on.

12. In the area where the passenger side outriggers were located, the ground appears to have been filled. Additionally, its raised level and proximity to the fence meant that it was not driven on or subsequently compressed by other means.

13. Short-legging greatly increases the force on the short-legged outrigger. In this case, it appears that the outrigger subject to the greatest force was situated on the least supportive area of ground.

I accept each of these short point conclusions and I so find.

Report of Denis Riley of Morrison Geotechnic

As stated above, for the WH&S investigation, a geotechnical report was prepared by Denis Riley of Morrison Geotechnic, a Senior Engineer at Morrison Geotechnic Pty Ltd dated February 2016. In summary, Mr Riley reported:

(a) The ground conditions at the site were variable.
(b) Although the surface comprised of a layer of loose to medium dense crushed concrete and very stiff gravelly clay, it had a relatively stiff depth of about 0.5 metres.
(c) The subsurface soil close to a metre below the surface at most locations consisted of significantly firm silty clay.
(d) The soil sheer strength for the surface layer was about 165kPa.
(e) The sheer strength from about 1 metre below the surface was about 40kPa (i.e. less than ¼ of the surface layer sheer strength).

(f) Under Bearing Capacity Theory[84], the ultimate bearing pressure for the geotechnical conditions was assessed at having been about 50t/m².

(g) For the permissible ground pressure range of 10t/m² to 20t/m², the loading required pad areas of 2m² and 1m² respectively, which was at least 2.2 times bigger than the actual pads that were used beneath the outriggers.

(h) Under the *Mobile Crane Code of Practice 2006* (Qld)[85] the maximum permissible ground pressure values for "Stiff Clay- dry" and "Soft Clay-dry" are about 20t/m² and 10t/m².

(i) Using the *Mobile Crane Code of Practice 2006* (Qld) values for maximum permissible ground pressure of the generic soil types present at the site, the ground pads beneath the EWP outrigger feet at the time of the incident should have been at least 3.1 times larger than that those actually used.

(j) Using site-specific geotechnical test information, it was determined that the pads should have been at least 2.6 times larger.

(k) The crane industry relies heavily on geotechnical engineering input when assessing what should be carried out to eliminate or minimise so far as is reasonably practical the risk of outrigger or track bearing capacity failures due to soft ground conditions on construction sites.[86]

Mr Riley's report concluded that at the time of the incident, it was obvious that some of the surface fill had recently been removed from the area

[84] In geotechnical engineering, bearing capacity is the capacity of soil to support the loads applied to the ground, which is the maximum average contact pressure between the foundation and the soil which should not produce shear failure in the soil: see Professor Karl von Terzaghi (the "father of soil mechanics and geotechnical engineering") in Terzaghi, K., Peck, R. B. and Mesri, G., *Soil Mechanics in Engineering Practice, 3rd Ed.* Wiley-Interscience (1996); Terzaghi, K (1943). Theoretical Soil Mechanics, John Wiley and Sons, 1967; Terzaghi. K & Peck, R B. (1967), Soil Mechanics in Engineering Practice, Second Edition, John Wiley and Sons, 1967.

[85] Ex C20.87

[86] Ex C2.2 pages 1 to 43

where the EWP was set up, thereby reducing the cover over the weaker firm clay materials and importantly, reducing the ultimate bearing pressure for loading at the surface.[87]

Plainly, the bearing capacity of the ground must be greater than the load applied by the EWP outriggers, if it is to adequately support the EWP and prevent it from becoming unstable.[88] Mr Riley explained the engineering mechanics of what happened in simple terms: The tipping point of an EWP is proportional to the operating radius and the load in the platform. The force applied to an outrigger is greater for a large operating radius. Hence by shortening the passenger's side outrigger leg and by increasing the operating radius the load pressure imposed on the supporting ground becomes greater.[89]

In Mr Riley's opinion:

(a) The most likely cause of the instability of the EWP was "bearing capacity failure under the rear left outrigger pad which was not fully extended".
(b) A secondary component may have been the reduction in ultimate bearing pressure of the foundation as water pressures dissipated towards fully drained conditions.
(c) The failure occurred because the area of the plastic pad beneath the outrigger was inadequate for the prevailing ground condition and applied loads.
(d) Geotechnical assessment indicated that the pad size should have been at least 2.6 times larger than was actually used beneath the outriggers, and possibly larger if the outrigger load was greater than 19.9t as shown on the Lincon Logistics load tables.
(e) Using the plastic pads with an area of only 0.46m², necessitated permissible ground bearing pressures of 40t/m² to 50t/m² for the

[87] Ex C2.2 pages 3, par 2.2.1
[88] Ex C2.1, page 9
[89] Ex C2.1, page 8

likely outrigger loads. This was grossly unrealistic for the ground conditions which were evident at the time of the photography and could have been confirmed by the original geotechnical report held by TDD, and consultations with another geotechnical engineer. This would have indicated permissible ground pressures of about 20t/m² for the pad area of 0.46m².

(f) The Factor for Safety[90] was calculated as 1.03.

(g) Factors for safety for the plastic pads beneath the outriggers could be assessed as being as low as 1.0 to 1.2, which is grossly inadequate when compared to industry norms of 2.5 to 3.0, and this essentially foreshadowed failure.

Mr Riley observed referring to the *Mobile Crane Code of Practice 2006* (Qld), the crane industry relies on geotechnical engineering assessment of ground conditions to ensure the risks of machine instability are appropriately managed. His report noted that the *Mobile Crane Code of Practice 2006* (Qld) addresses industry standards for assessing geotechnical risks for the crane industry which relies heavily on a geotechnical engineering input when assessing what should be carried out to eliminate or minimise so far as is reasonably practicable the risk of outrigger or track bearing capacity failures due to soft ground conditions on construction sites.[91]

Relevantly, Mr Riley pointed out:

> *… our understanding is that the mobile crane code does not specifically include use of MEWPs [Mobile Elevated Work Platforms]. However, the mechanics and principles of machine stability including the issues*

[90] "Factor of Safety" refers to the actual load-bearing capacity of a structure or component or the required margin of safety for a structure or component according to code, law, or design requirements where the ratio of a structure's absolute strength (structural capability) to actual applied load as the measure of the reliability of a particular design. Beer, F and Johnson, R: *Mechanics of Materials*, second edition. McGraw-Hill,1992; Buchanan, G: *Mechanics of Materials*, Page 55. Holt, Reinhart, and Watson,1988; Timoshenko, S: *Strength of Materials*, Volume 1. Krieger, 1958.
[91] Ex C2.2 pages 11, par 5.1

associated with out rigours support and sizes applies equally to MEWPs and therefore the Code is considered to be a useful reference for MEWP operators.[92]

Work Health & Safety Investigation - Mr Barry Willett

The second expert who assisted the WH&S investigation was Barry Willett. Since 1985 he has been an accredited Crane Instructor and Assessor approved by WH&S. He is a trainer for EWP High Risk Licencing in Queensland and has over 1000 hours of experience using EWP's. In Mr Willett's opinion:

(a) Lincon Logistics did provide adequate training instruction to Mr Sugden in the use of operation of the different models of EWP's.
(b) Mr Sugden followed industry practice by taking the Palfinger EWP through the range of movements to test ground indentation.
(c) Mr Sugden had carried out his duties as per instructions and training and had followed industry practice.
(d)There was no indication of bad ground conditions, problems with the site, no warning of ground failure, no sinking of outriggers and no cracks appearing.
(e) Ground failures in cranes are usually revealed after the outriggers are down and the packing is laid and the crane is put through its full range of movements.
(f) The alarms on the EWP were not triggered, which indicates that the collapse was so catastrophic and sudden, the warning devices did not have time to be alert to any problems.
(g) Mr Sugden had used timber packing on 5% of his set ups where there were no previous incidents or reports of problems with the ground conditions.
(h) Mr Sugden performed his duties as trained by his employer and PCBUs training, and his only failure was permitting the deceased

[92] Ex C2.2 pages 11, par 5.2

to operate the EWP without being shown evidence of his licence and allowing the deceased to carry a passenger. [93]

Mr Willet advised that it was not standard industry practice to obtain a geotechnical report before using an EWP. He said it is *"not the norm for either the operator or person in control of a site to ask for a geotechnical report when setting up and operating [an EWP] on site*". Mr Willet had never asked for nor has he ever been provided with a geotechnical report in relation to the set-up of an EWP.

Mr Willet agreed that the Morrison Geotechnical Report dated November 2015, which revealed the existence of soft, silty clay on the site, would have been of considerable assistance to Lincon Logistics and Mr Sugden for the safe set up of the EWP. However, he did not give an opinion regarding Mr Sugden's ability to understand that report.

Mr Willett's concluding opinion was that the Palfinger Wumag WT700 EWP should be classified as a class of crane and the *Mobile Crane Code of Practice 2006* (Qld) would provide a higher level of safety for set up and use of an EWP.

Hence Mr Willett recommended that:

(a) EWP instructions should be expressed in mandatory terms, such as requiring, rather than advising on the use underlay plates and timber dunnage.
(b) Specific types of EWP's should come within the crane category of design under the *Mobile Crane Code of Practice 2006* (Qld) in Queensland and throughout Australia.
(c) The *Mobile Crane Code of Practice 2006* (Qld) calculation methodology should be included in all training material provided for

[93] Ex C3.5

EWP's to ensure better training outcomes and safer operation of this type of equipment.

Work, Health &Safety Investigation - Mr David Flatman

The third expert was David Flatman, engaged by WH&S investigators. He is a very experienced engineer and is a Principal WH&S Advisor (Mechanical). After a careful analysis of all relevant issues, Mr Flatman reported that there was no evidence of mechanical or electrical failure that contributed to the incident.

The incident, he said had occurred as a result of insufficient bearing capacity of the ground to support the load applied by the EWP outriggers. Mr Flatman observed that generally speaking, ground properties at any particular place can vary significantly and can change over time, for example, as the water content changes.[94]

He referred to the geotechnical report that the ground bearing capacity of the incident side was approximately 50 tons per m²,[95] where the maximum load applied by the outrigger with the pads used was 51.3 tons per m², which corresponded to a safety factor of 51.3/50 = 1.03. A safety factor of one corresponds to the bearing capacity failure.[96]

Mr Flatman estimated that the maximum outrigger load applied by the EWP when using the outrigger pads was greater than three times this load.[97] He referred to the *Mobile Crane Code of Practice 2006* (Qld), which provides guidance for operators of mobile cranes and deals with the risks associated with mobile crane operations including the risks of a mobile crane overturning: s. 5. He noted that the *Mobile Crane Code of Practice 2006* (Qld), which indicates that the maximum load for stiff dry

[94] Ex C2.1, page 9
[95] Ex C2.1, page 9, referring to appendix F, page 11, paragraph 6.4
[96] Ex C2.1, page 9, referring to appendix F, page 9, paragraph 4.2.4 and page 11, paragraph 6.4
[97] Ex C2.1, page 9, paragraph 28

clay is 20 tons per m², the load applied by the rear passenger short legged outrigger of the EWP in this incident was 2.5 times larger than it should have been.[98]

Essentially, Mr Flatman concluded that timber dunnage or bog mats should have been used under the outrigger feet on the site.[99] Mr Flatman considered that *Mobile Crane Code of Practice 2006* (Qld) could be applied to EWPs for the calculation of ground capacity and concluded that if the calculations given in the *Mobile Crane Code of Practice 2006* (Qld) were used prior to the incident, the need for larger outrigger pads could most likely have been identified and the incident avoided.[100]

Both Mr Reilly and Mr Flatman regarded the insufficiency of the stabiliser padding or wooden dunnage as a significant contributor to this crash.

Work Health &Safety - Decision not to Prosecute

On 10 February 2017, WH&S finalised its report on the investigation into the incident. The investigation eliminated, as causing or contributing to the EWP collapse: any effect of breeze; the small slope on site; failure of the EWP control systems; any electrical or mechanical faults; any lack of maintenance or repairs; or any conduct by the deceased and/or his son.[101]

The WH&S investigation considered the relevant provisions of the *Work Health and Safety Act 2011* (Qld)[102] and the *Work Health and Safety*

[98] Ex C2.1, page 21, paragraph 91
[99] Ex C2.1, page 12, paragraph 51
[100] Ex C2.1, page 10 to 11, paragraphs 34 to 40.
[101] Ex C2.1 page 21
[102] Duty to eliminate risks to health and safety so far as is reasonably practicable, and if it is not reasonably practicable to eliminate the risks to minimise those risks so far as is reasonably practicable: s. 17; Maintenance of a work environment without risk to health and safety: s. 19(3); Provision and maintenance of safe system of work: s. 19(3)(f); Duties involving management or control of plant at workplaces: s. 21; Supply of plant: s. 25; Set up and operation of plant: s. 28. Under the *Work Health and Safety Regulation 2011* (Qld) the site was not a construction site since no construction work was being carried out at the time the EWP entered on the day of the death: s. 289, 290.

Regulations 2011 (Qld).[103]Persons conducting a business or undertaking and with the management or control of plant are required by s. 19 of the *Work Health and Safety Act 2011* (Q) to ensure, so far as is reasonably practicable that:

(i) operators receive adequate information, training, instruction and supervision;
(j) operators are competent; and
(k) appropriately use equipment to minimise any risks to health and safety.[104]

Under s. 81 of the *Work Health and Safety Regulations 2011* (Q), person must not carry out a class of high-risk work unless the person holds a high risk work license for that type of work. Schedule 3 of the *Work Health and Safety Regulations 2011* (Q) sets out the high-risk licenses and classes of high-risk work that are within the scope of each license. Item 21 in Table 3.1 of Schedule 3 details the requirements for a boom-type high risk work license where a person uses a boom-type EWP with a length of the boom is 11 metres or more.

Accordingly, Operators of EWPs with a boom length of 11 metre or more are required to hold a High-Risk Work license in the class of a boom type EWP. High risk work licences are issued based on the completion of a vocational training unit of competency and must be renewed every five years. Mr Sugden had such an operating licence.

Brett Heath, an Investigation Manager from WH&S noted that the owner of the site at the time, “AVEO”, was not a relevant duty holder and had no involvement regarding the work undertaken on the day.[105] Similarly, the

[103] Mobile plants: s 214; Part 3.12.
[104] see *Work Health Authority v Outback Ballooning Pty Ltd* [2019] HCA 2, Kiefel CJ, Bell, Keane, Nettle and Gordon JJ. at par [2] refer the statutory scheme that requires that a person conducting a business or undertaking must ensure, so far as is reasonably practicable, that the health and safety of persons "is not put at risk from work carried out as part of the conduct of the business or undertaking" and a number of things which are directed to the protection of all persons from risks to their health and safety from work carried out as part of the conduct of the business or undertaking.
[105] Ex C4, page 2

proposed purchaser, under the put and call contract, TDD, exercising its investigation rights over the site and engaging Binyan Studios, was not a duty holder. Importantly, this was not yet a “construction site” which would have attracted more stringent regulatory controls such as a safety management plan for all equipment.

The Workplace Health and Safety investigation found, while Mr Sugden had acted in accordance with his training, he had not correctly assessed the ground type and did not use the appropriate stabilising pads. Mr Sugden was aware of the hazards and risks posed by soft grounds and had followed his instructions in relation to the testing of ground conditions. However, he did not have the experience to identify the hazard of the soft clay below the hard ground crust of the surface of the ground. This was a training deficit but an extraordinary situation not usually contemplated given the complexity of the site. When alerted to the sudden subsidence of the short-legged outrigger, Mr Sugden did everything in accordance with his training to reduce the boom length and to try to minimise the harm to the deceased and his son in the crew basket.

Workplace Health and Safety investigator concluded that there was to be no prosecution of any person in relation to this tragedy and I do note that Mr Sugden suffered a significant psychological injury as a result of this tragedy. A review of the Workplace Health and Safety investigation is not an issue for this Inquest and this precis of it is only included for completeness.

The Inquest

The Inquest Hearing into this death took place over two days on 27 and 28 July, 2021. It was scheduled originally to take place in 2020 but COVID-19 considerations intervened. There were originally many witnesses to be called but interstate closures and the unavailability of experts caused frustrating delays. Eventually, with the excellent co-

operation of Counsel, the witness list was “culled” and eventually the court proceedings and evidence were able to take place by mostly digital video-link. By agreement, admirably, an exchange of questions and submissions took place through to December, 2021 between the parties and this Court in lieu of further court time. I thank the parties for this co-operation and collaboration.

The witnesses called at the Inquest were:

1. Inspector Deborah Dargan, Work Health and Safety Office of Industrial Relations - the senior WHS Investigator of this death;

2. David Spittle (He did not add to the evidence discussed above);

3. Kelvin Staff – EWP operator on 11 December, 2015;

4. Paul Carnavas – Expert Forensic Engineering consultant;

5. Tom Dooley – Director TDD - the potential developer for the site;

6. Andrew Delahunt – mechanical engineer safety specialist and representative of the Elevated Work platform Association of Australia; and

7. Jodie Deakes – Executive Director Work, Health, Safety, Engagement and Policy Services in the Office of Industrial Relations.

I propose to review the evidence of these witnesses considering both their statements in the brief of evidence and viva voce at the Inquest Hearing.

Inspector Deborah Dargan

Inspector Dargan was amongst the first investigators to arrive at the 70 Longland Street, Newstead after receiving a telephone call at 19:45 hours on Monday, 14 of December, 2015. From her report and evidence at the Inquest[106] the following salient bodies of evidence emerged:

- This type of ground stability failure crash is not uncommon particularly with concrete pumps in wet areas on construction sites.

- This case was very unusual because from an initial visual inspection, the ground upon which this EWP failed did look very stable. The ground had been used uneventfully in the weeks before by trucks and EWP's. It was a "pie crust" situation. There were some factors raising concern: the recent rain and previous apparent non-use of similar heavy machinery.

- Sufficient dunnage or "pig-boarding" was available on the EWP but it could not be definitively concluded that the use of dunnage would have prevented this crash. More substantial metal stabiliser pads are commercially available and it would have been more prudent, in hindsight for Mr SUGDEN to have used dunnage or stabiliser pads.

- Had 70 Longland Street, Newstead been a construction site on 14 December, 2015, the EWP would have been subject to much tighter regulations under the supervision of a site safety inspector, safety management plan, all managed by the principal contractor. A "construction site" is defined in various regulations as a place where construction work takes place.

[106] See Inquest Day 1 pages 6-20 and Brief of Evidence

- Had the EWP been a mobile crane, there would be a different, more stringent set of rules about the use of a mobile crane. There is a specific code of practice for cranes which has directions and tables in relation to assessment of ground soil and testing, the use and size of the dunnage and placement of the crane as minimum standards. Practically, anywhere a crane sets up becomes a construction site really by the nature of there being a crane there. A crane is usually then subject to a site safety management plan. Notably cranes are less dangerous than EWPs in that EWP's usually carry workers to heights.

- The following conclusion was made in relation to the competency of Mr Sugden as an EWP operator: *"The evidence gleaned during the course of the investigation indicated that the operator from Lincon Logistics was licensed and adequately trained with three and a half years' experience in the operation of EWP. The operator had received training both externally when he obtained his licence, and internally through his employer, Lincon. It appears the training received by Mr Sugden was in accordance with industry standards."*

- A review of units of competency for an EWP licence to ensure operators have greater undertaking of geotechnical hazards during the setup and the operation of elevated work platforms is necessary.

- It would be a practical impossibility for an EWP operator to be trained to determine the stability of a site or to obtain this sort of technical information without a specific engineering report: "*It's not like a Dial Before You Dig, no*."

- Mandating a geotechnical report regarding ground stability for the operation of an EWP in all cases would be cost-prohibitive for the industry. However, where the EWP was deployed on questionable

ground (not for example a concrete slab or engineer certified ground) and the EWP was heavy machinery elevating workers working at dangerous heights, it should be so mandated.

- Practically, the owner or proponent developer of a site should be responsible for such a geotechnical report regarding ground stability.

- There is an absence of Codes of Practice, Industry Guidelines and Industry Standard regulating EWP use and prosecutions for breaches of duties of care are accordingly difficult.

Kelvin Staff

Mr Staff was the EWP operator on 11 December, 2015. His evidence comprised statements to investigators and viva voce answers during the Inquest.[107] As noted earlier, he was the EWP operator who attended the 70 Longland Street, Newstead site on 11 December, 2015 (the early morning photography shoot). He had some 21 years' experience as an EWP operator. Critically, he was questioned about his decision not to set up near to where the EWP involved in the fatal crash on 14 December, 2015 had set up. He gave this evidence:

> *"All right. Did the deceased want you to set the EWP up further to the east, nearer to where the fatal incident occurred?---Not on that setup, no. That was the first setup, so the area you're talking about was my second setup.*
>
> *All right. And what did you say about that request?---I told him no.*
>
> *And why did you say no?---There was an – it looked like an excavation that had been on site, so if I looked to my left, not sure what direction that is, but when I looked to my left there was, like, a cut bank and that soil had been brought across to about where my truck was – to the edge of where my truck was set up, so I wasn't comfortable moving to the left because that would have put my left rear outrigger into unknown soil.*

[107] See Inquest Day 1 1-25 to 1-30

All right. Now, when you did ultimately set up, did you use additional timbers under the stabiliser pads?---I did on the left rear on the first setup. So left rear I had additional timbers. The other three legs were set up on my ground pads, which on road base I typically assess to be ground structural enough to take that weight. On the second setup I used timbers all around the truck.

And why was that?---Because, one, I wanted to make sure that the truck was set up properly. The ground, I had been informed, was a pad designed for a 200 ton crawler; however, they couldn't tell me whether it was a hydraulic or a crawler crane so I just went with straight to precaution and set up my full timbers. I also short-legged as well so that I remained two metres off the wall and five metres off the edge towards where the pool of water was.

All right. And making these decisions, again, is that based, not only on your training, but more particularly your experience?---Yes."[108]

The ground stabiliser pads used by Mr Staff were much larger (900 x 900mm) than those used by Mr Sugden. This evidence demonstrates the advantage to the deceased of Mr Staff's vast experience to avoid a ground stability failure.

Dr Paul Carnavas

Dr Carnavas is a forensic engineering consultant and was asked to provide an expert engineering report to the Coroner's Court on the death. Dr Carnavas was asked to advise on the adequacy of:

(i) the current regulations;
(ii) guidelines for EWPs in Queensland;
(iii) training of the EWP operators in relation to:
- hazards;
- ground types;
- use of stabilising pads/damage; and

(iv) to make recommendations to the EWP industry that may prevent similar deaths from occurring in the future.

[108] Inquest p1-27

Dr Carnavas concluded quite simply that: "*The death of the deceased occurred because the bearing area of the ground pad installed beneath one of the EWP stabilises was undersized."* He considered that the processes required to safely position an EWP and to correctly size the ground pads for a safe loading consisted of four steps as follows:

1. Identification and avoidance of ground hazards which could lead an EWP to be unstable;
2. Determination of maximum stabiliser forces transferred to the ground for the EWP configuration;
3. Ground type assessment beneath each stabiliser and the estimate of the permissible ground pressure;
4. Ground pad/dunnage bearing area calculation to confirm stabiliser ground pressure is less than the permissible ground pressure.

Dr Carnavas said that the site had a "*fairly complex ground condition and obviously one that may not be apparent to people investigating just the surface characteristics*"[109]. He noted that: "*Complex conditions can be particularly fraught because particularly when there's an underground contribution or weakness particularly you can set up something and not be aware that there is an issue"*[110] Given the complexity of the site, some areas would be more stable than others, where ground stability varies with mixed soils, excavations and other hazards.[111]

Dr Carnavas advised that operator training for the identification of ground hazards appeared to have been adequate, having regard to the easy guide training documents[112] and the evidence of operator trainer.[113] However, he noted that the Commonwealth of Australia Assessment Instrument Licence to operate a boom-type elevating work platform

[109] Transcript, page 39, ln 14 – 16.
[110] Transcript, ln 16-18.
[111] Transcript, ln 32-33.
[112] Ex C4.4, pages 54, 203, 206, 216, 377, 412 and 426 in the EWP Manual (Exhibit C4 .2 page 409)
[113] Ex C4.1, pages 164, 165, 197, 208–210

(boom length 11 metres of more)[114] training curriculum does not provide any information on specific types of hazards and does not provide specific information to help an operator determine the necessary ground pad bearing areas.

Dr Carnavas noted that Mr Sugden said that he considered that the Palfinger Wumag WT700 EWP would safely operate using only the manufacture supplied ground plates and the stabiliser feet where the ground type was equivalent to a “road base”. Mr Sugden said he did not need to use any calculations of ground bearing capacity but had to judge the ground type where the EWP was to be located.[115] Mr Staff and Mr Schwass had a similar approach, however, possibly because of their more significant experience, they may have been able to select more stable locations on the site and utilised larger pad areas.

Dr Carnavas observed that all of the three EPW operators that went onto this site assessed ground conditions by comparing it to other ground types they had previously encountered to make the judgement about the ground pad size without engaging in any calculations. Noting that in this incident the methods to assess ground conditions used by the individual EWP operators varied, they relied on judgment derived from their personal experience rather than derived from formalised training.[116]

He observed that the risks increase where the ground type is unfamiliar to the operator or where there are complex ground types (e.g. mixed soils, excavations, hazards etc). In his view, the “rule of thumb” type assessments had very serious limitations. He also considered that the lack of ground disturbance by truck tyres was not a useful indication of ground type, because of the difference between tyres and ground pair pressure bearings, particularly where the ground type is variable, complex

[114] C4.4, page 6
[115] Ex A, page 11
[116] Ex A, page 12,

or located away from the path of the truck.[117] Plainly, the "digging in of a heel" method is not a sufficiently accurate test.[118]

All three EWP operators operated on a high-risk underlying assumption that ground conditions could be determined from surface appearance alone. Moreover, they had not sought local knowledge or geotechnical information from the client or the site owner, suggesting that seeking such advice or other outside assistance about ground conditions was atypical.[119]

Dr Carnavas said, in the absence of relevant local knowledge on site, or geotechnical information about a set up site, there will always be some risk that the operator's assessment may be inaccurate in determining the maximum stabiliser forces and the ground type assessment before setting up an EWP.[120] Dr Carnavas was of the opinion that geotechnical reports and testing should be undertaken to ascertain the types of soil underneath.[121]

He noted the comments by Mr Willett[122] that, based on industry experience, it was not the norm for an operator or the person in control of the site to commission a geotechnical report before setting up an EWP[123], whereas that the crane industry relies heavily on geotechnical engineering input[124], highlighting the difference between crane and EWP operator behaviour.

Dr Carnavas was asked to comment on the 78-page *EWPA Good Practice Guide Mobile Elevating Work Platforms* v1.02 published by the Elevated Work Platform Association.[125] The *EWPA Good Practice Guide*:

[117] Ex A, page 12, referring to Ex C4.1, page 154
[118] Ex A, page 12, referring to Ex C4.1, page 184
[119] Ex A, page 11
[120] Ex A, page 11
[121] Transcript, page 66, ln 11-16.
[122] Ex C3.5
[123] Ex A, page 11
[124] Ex C 4.11, page 255
[125] Ex C26

(i) Identifies the overturning hazard of an EWP on uneven or soft surface terrain.[126]

(ii) Provides checklist for physical inspection to identify and manage the hazards.[127]

(iii) Advises for best practice guidance for ground conditions include using the EWP on firm and level ground where possible[128] and

(iv) Provides a table that gives the maximum pressure that can be applied to various ground types including determining the minimum required area under a wheel or outrigger foot.[129]

Dr Carnavas observed that some of the *EWPA Good Practice Guide* appears to have been "taken heavily" from the *Mobile Crane Code of Practice 2006*. [130] He considered that the section on "Identifying Hazards"[131] provided some useful guidance for an operator working independently, but the guide could be significantly improved by requiring operators to seek site information from relevant persons such as the client, site manager, or owner to assess potential ground hazards.

As to "Ground Conditions"[132] in the *EWPA Good Practice Guide*, Dr Carnavas recommended seeking local knowledge from the client, site manager and/or property owner regarding geotechnical information and potential hazards of a site before setting up. Dr Carnavas considered that the maximum permissible ground pressure calculation was limited because of underlying assumptions that the operator will be able to accurately identify the ground soil types on site by training but there does not appear to be any formal EWP operate instruction that would provide the operator with these skills.[133] There was an assumption that the soil

[126] Ex C26 page 12
[127] Ex C26 page 13
[128] Ex C26 page 15
[129] Ex C26 page 16
[130] Transcript, page 48, ln 26-27.
[131] Section 2.2 of Ex 26
[132] Section 2.5.2 of Ex 26
[133] Ex A4, page 13

type on the site is simple and uniform but the ground consisted of mixed complex all types, where there is no guidance for assessing the situation.[134]

Dr Carnavas did not think the *EWPA Good Practice Guide* went far enough and should be expanded to "require the operator to consider what's going on underneath the surface to make the operator consider all of the parts that are going to affect the stability of the crane, rather than just relying on the appearance of the surface."[135] Dr Carnavas considered that the *EWPA Good Practice Guide* does neither provide any operator guidance for EWP use on soft ground;[136] nor adequate guidance for an EWP operator on complex ground types.[137]

Dr Carnavas considered there needs to be more detail provided in the training documents for an operator.[138] He stated that there had to be an acceptance from operators that "*what they see is not what they get*". He added:

> *"They have to be aware that there are hidden dangers that they cannot assess based on the surface appearance and that the only way that they can get that information initially is probably to ask for it, and if they can't get it by asking for it then they should probably – they should probably take measures to reduce the risk that's involved with the unknown. Now, one possibility for that is if they don't know what's underneath then they go to a maximum danger area and they go straight to a two-square metre type dunnage size."*[139]

Dr Carnavas reviewed the Queensland Government WH&S *Mobile Crane Code of Practice 2006* (Qld) which addresses complex ground types in

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[134] Ibid
[135] Transcript, page 48 ln 33-36.
[136] Ex A4, page 13
[137] Ex A4, page 14
[138] Transcript, page 45, ln 40-41.
[139] Transcript, page 49, ln 28 – 35.

section 10.2. In this regard, Dr Carnavas concluded that a regulation that included Ground Condition information in similar detail to the Code would be beneficial to EWP operators should be implemented.

Of note, there is a requirement in this Code of Prctice for a crane operator or principal contractor to obtain ground bearing pressure information from a geotechnical engineer prior to performing critical lift types (section 10.5.3). Dr Caravas added that it could be argued " … *because EWPs of the type involved in this incident carry passengers to significant heights, there is a higher direct risk of injury or death when compared to a crane lift. The application of the advice in the code to relevant aspects of EWP operation would improve safety and should be considered."*

Dr Carnavas was questioned about requirements in the *Mobile Crane Code of Practice 2006* (Qld) for crane operators or principal contractors to obtain ground bearing pressure information for a geotechnical engineer prior to performing "critical lift types"[140].

At the hearing, Dr Carnavas said there was a difference between EWPs and mobile crane which lift bridge beams, tilt-up panels and other heavy lifts where the load is 50 tonnes or more. He also agreed that, in recommending geotechnical engineering reports for EWP operators, there should be a distinction for certain types of work such as in the case of critical type lifts.[141]

He went on to qualify that his recommendation to obtain geotechnical reports be used for high lift EWP's[142], and more broadly, "high risk activity"[143]. He did not know if EWP operators were familiar with these guides and standards.[144] When asked about a requirement for geotechnical reports before EWP use, Dr Carnavas stated that "*obviously*

[140] Transcript, page 56, ln 15 – 40.
[141] Transcript, page 57, ln 2-13.
[142] Transcript. page 58, ln 9-11.
[143] Transcript, page 58, ln 36.
[144] Transcript, page 29, ln15-15.

that's going to give you the best information that you can get your hands on, but clearly there are limitations"[145], noting that borehole drilling may take "*considerable amount of time*"[146] and the cost may be an issue.[147] He considered that training would need to be extended to enable an operator to understand the terminology used and the content of a geotechnical report.[148]

The *Mobile Crane Code of Practice 2006* had greater detail regarding the assessment of ground conditions than the EWP documentation.[149] Relevantly, Dr Carnavas noted that mobile cranes are not permitted to lift humans in that regard with "*the same risk of directly causing an injury or a fatality that a high lift EWP carrying persons"[150].*

Dr Carnavas drew the Court's attention to *The Australian Standards Amusement Ride and Devices Part 2 – Operations and Maintenance* and its table for ground bearing capacities noting its usefulness.[151] This provides a basic criterion for a simple on-site test to ensure *"there is no hard crust over lose fill*", the need to obtain "*any historical knowledge*", and warning that "standing water over clay and sealed based soils should be viewed with suspicion".[152]

In summary, Dr Carnavas made recommendations as follows:

- The prevention of similar incidents requires more accurate ground type assessments prior to commencing the EWP operation.
- Prior to EWP use, there should be consultation by the operator with the client, site manager, property owner or other relevant person

[145] Transcript, page 50, ln 6-8.
[146] Transcript, ln 10-11.
[147] Transcript, ln 13.
[148] Transcript, page 53; 39 – 42.
[149] Transcript, page 41, ln 16.
[150] Transcript, ln 28-29.
[151] Transcript, ln 30-33.
[152] Ex D6, page 64; Dr Carnavas also referred the Court to *Ground Conditions For Construction Plant Critique Forum For Construction Good Guide Practice 2014* which provides a very useful appendix categorising soil types and characteristics together with an investigation methodology and setting out the bearing values: Ex D7.

regarding the availability of geotechnical or other information which may assist in confirming site grounds debility and/or the presence of hazards.

- Consideration should be given to a mandatory requirement to obtain ground bearing pressure information from a geo-technical engineer prior to operation given the direct risk of injury or death to a high lift EWP passenger.
- Where ground pressure information from a geo-technical engineer is unavailable, consideration should be given to imposing a minimum and ground pad/dunnage bearing area regardless of the existing ground type such that the minimum bearing area was sufficient for all soil types that could reasonably be in counted.
- There should be industry consultation to determine if this requirement should be limited only to specific types of sites and, if so, what site criteria would be practicable.
- Consideration should be given to formally documenting the ground type assessment, the calculation of ground pad forward/damage area and the corresponding boom movement limits for each EWP set up, incorporating a job sheet/operations diary.
- Training for an EWP operator should be extended to include:

  (i) ground type assessment for simple and mix soil types;
  (ii) the explicit calculations of ground pad/dunnage bearing areas;
  (iii) risk mitigation strategies for safe operation in locations of complex and soft ground types;
  (iv) assessment if ground pad bearing areas allowing for uncertainties;
  (v) basic theory of EWP stability including typical ground pressure distribution between stabilises, the effect of boom movements on ground pressure distribution, the influence of weak subsoil layers, water and evacuations and other hazards

- Documented EWP operator guidance for ground type assessments and ground pad/dunnage bearing area calculations should clearly state any associated limitations or assumptions associated with that guidance.
- The use of “rule of thumb” type assessment should be discouraged.

- Consideration should be given to applying the relevant mobile crane training and regulations to the operation of high reach EWPs, given the similarity in the out-rigger type stabilisation methods between EWPs and mobile cranes.
- An EWP regulation that includes ground condition and information in similar detail to the *Mobile Crane Code of Practice 2006* (Qld) would be beneficial to each EWP operators and should be implemented.[153]

Tom DOOLEY – potential developer TDD

Mr DOOLEY was a Director of Tom Dooley Developments ("TDD") and potential developer for the site. In particular, he was asked about the feasibility of obtaining a specific geotechnical report on ground stability at a site before the setting up of an EWP. The previous acid sulphate soil investigation by Butler Brothers and the basement construction soil investigation by Morris Geotechnic on the site were not a geotechnical report for the purpose of setting up heavy machinery or an EWP on the site.[154] Mr Sugden could not have readily understood them.

Helpfully, Mr Dooley provided the Court with examples of geotechnical reports created for the purpose of machinery brought on site. Such geotechnical reports about subsoil conditions could be undertaken in "*days to weeks*"[155] at a cost estimated to be between $2,000 - $3,000 for small setups and $8,000 - $10,000 for a big set-up (e.g. crane tower).[156]

Mr Dooley spoke of the cost to industry of a mandated requirement for a geotechnical report certifying the stability of ground upon which an EWP might operate. Quite responsibly, he indicated that his company would comply with any safety regulations in relation to EWP operations.

[153] Ex A4, page 14-15
[154] Transcript day 2, page 6, ln 31-38.
[155] Ibid, page 11, ln 16-17.
[156] Ibid, page 10, ln 37-41.

Andrew DELAHUNT - Elevated Work Platform Association

Mr Delahunt, an engineering expert, gave evidence in his capacity as a representative of the Elevated Work Platform Association (EWPA) which has over 450 members including rental companies, manufacturers, suppliers, specialised support and service companies using EWPs.

Mr Delahunt stated that the *EWPA Good Practice Guide* was developed as "*an opportunity to provide guidance to operators, supervisors, site management, and owners of EWPs on how to safely use the machine*"[157]. The *EWPA Good Practice Guide* was not in substitutions for the EWP operator training and was for guidance only.[158] In all cases, the operator should be trained, [159] and the *EWPA Good Practice Guide* "*was not training"[160].*

Operators he said had to refer back to their training for the High-Risk Work licence for ground assessments and to ensure they have appropriate size pads and dunnage.[161] It was noted that it would be *"quite impractical and probably impossible*"[162] to provide a clear statement of individual responsibility and cover all of the applications in which an EWP could be deployed.

He noted that soil conditions are dealt with in the *EWPA Good Practice Guide* under "checklist 10", "table 1", for "Environmental Hazards" and "Mechanical Hazards". He agreed that in parts the *EWPA Good Practice Guide* could be regarded as vague. Again, this was probably because it was written to cover the range of all different types of EWP's. In his view, there was a need to define what is a critical lift, the type of equipment and the ground conditions for the risk.[163]

[157] Ibid, page 27, ln 47 – page 28, ln 2.
[158] Ibid, page 32, ln 25 – 30.
[159] Ibid, ln 42 – page 37, ln 4.
[160] Ibid, ln 31.
[161] Ibid, ln 31 – 34.
[162] Ibid, page 33, ln 4.
[163] Ibid, page 37, ln 13 – 19.

Mr Delahunt emphasised the great variety of EWPs in use.[164] In assessing the associated risks of EWPs, he made a distinction between the high-risk work with the boom for 11 metres or higher the smaller EWPs such as scissor lifts, vertical mast type EWPS used for routine high-volume tasks.

Mr Delahunt advised that the EWPA was currently drafting a specific guide for truck-mounted EWP's.[165] He agreed with the recommendation of Dr Carnavas that the *Mobile Crane Code of Practice 2006* could be transposed into the *EWPA Good Practice Guide*, Mr Delahunt agreed that it should revised for ground condition safety for EWPs[166]. He saw a benefit in providing more information for complex ground types and their influence on stability but were not required for every EPW and in every case, for example, for stock-pickers and working on concrete surfaces.[167]

He agreed with a recommendation that an EWP with boom greater than 11 metres going onto an unknown site should having the same requirements as a mobile crane[168], depending on the description of the work activity the type of EWP, and sufficient ground assessment.[169] As to geotechnical reports, he considered that they would have to be comprehensible for the operator.[170]

Ms Jodie Deakes – Office of Industrial Relations

Ms Deakes is the Executive Director from Work Health Safety Engagement and Policy Services in the Office of Industrial Relations. She helpfully set out the legislative scheme in the *Work Health and Safety Act 2011* (Q) and regulations *Work Health and Safety Regulations 2011* (Q)

[164] Transcript, day 2, page 36, ln 28 – 40.
[165] Ibid, page 29, ln 20 – 37.
[166] Transcript day 2, page 31, ln 6-19.
[167] Ibid, ln 33-41.
[168] Ibid, page 32, ln 5.
[169] Ibid, ln 5-16.
[170] Transcript day 2, page 34, ln 41 – page 35, ln 3.

listing the range of duties on persons associated with work, including specific duties relevant to the design, provision and maintenance of plant, which includes EWPs.

Ms Deakes explained that the High-Risk Work Licence training is delivered by an accredited assessor to meet the legislative requirements and the requirements of Australian Skills Quality Assurance (ASQA).[171] There is no renewal for a licence, but a licence holder must make a five yearly self-declaration that they have maintained their competence.[172]

Ms Deakes said that training include a unit of competency to ensure a person who obtains a High-Risk Work Licence understands the risk and methods of assessing and controlling ground conditions.[173] Ms Deakes attached to her statement the WH&S publication, *Safe Support of Mobile Plant Guide* (2018), for "Mobile Plant" defined as including:

(i) elevating work platforms (EWPs);
(ii) mobile cranes:
(iii) hydraulic slewing cranes;
(iv) lattice boom cranes;
(v) hydraulic pick-and-carry cranes;
(vi) vehicle loading cranes
(vii) mobile concrete placing booms;
(viii) piling rigs;
(ix) any other mobile plant where the risk of overturning may be high.

The Safe Support of Mobile Plant Guide (2018):

> *"provides industry with methods to ensure that ground conditions have been suitably assessed and that risks associated with plant overturning have been managed when operating mobile plant.*

[171] Ibid, page 40, ln 34-35.
[172] Ibid, ln 36-37.
[173] Ibid, page 50, ln 16-19.

Assessment should include management of ground conditions prior to the start of operations and ensuring outriggers are set up correctly".

It was developed in response to a number of incidents, including the death of the deceased noting: "In 2015, a photographer was killed after the EWP he was working from collapsed when one of the outrigger legs sunk into the ground." The *Safe Support of Mobile Plant Guide* (2018) has the aim of providing industry with practical measures to ensure that the ground conditions have been suitably assessed and the risks associated with plant overturning have been managed when operating mobile plants such as EWPs.

Under the heading of "Hazards and associated risks" discussing "ground conditions", the *Safe Support of Mobile Plant Guide* (2018) warns:

(a) Ground conditions can vary dramatically from one workplace to another and from one part of the workplace to another.
(b) Failure to address poor ground conditions to ensure mobile plant stability can lead to the plant overturning, with serious injury or death to the plant operator and others nearby.
(c) Factors that affect the ability of the ground to provide adequate support include:
    - Presence of water, including when it is mixed with the soil as mud and when it is under the surface;
    - the type of ground for (e.g. clay, sand rock or a mixture of these);
    - backfilled ground that was previously an excavation or trench;
    - cavities or penetrations in the ground that have been covered but still exist
    - rain, prior to and during operation of mobile plant including run-offs that could undermine damage, out we get pads or bog mats.

(d) When mobile plant is being set up, the plant operator can only make a decision based on the site information available;
(e) Additional risks must be managed when out riggers are positioned close to an excavation.

Relevantly the *Safe Support of Mobile Plant Guide* (2018) provides:

> *Care must also be taken with ground that has a crust on its surface. The surface of this type of ground is usually harder than the ground underneath (see photographs 1 and 2). The harder surface may give the perception that the ground is more stable than it actually is.*
>
> *….*
>
> *Be cautious when the ground is made up of fill. Indicators that the ground contains fill include the presence of rubble (i.e. broken concrete, bricks, metal, and timber) and that the ground doesn't appear to be natural. Do not assume that because there are no obvious signs that the ground is soft that it can safely support the plant.*

A photograph in the Guide shows an out rigger pushed deep into soft ground, after breaking through a crust, similar to what occurred in this incident. The *Safe Support of Mobile Plant Guide* (2018) expressly warns: *"Mobile plant may overturn when the boom or counterweight are positioned towards the short-legged outrigger or stabilisers."*

Among the items for "Planning" the *Safe Support of Mobile Plant Guide* (2018) states:

> *Risk of plant overturning becomes greater as the size of the plant increases and/or the ground condition is poor. The best outcome is that a geotechnical engineer assesses the ground condition before the mobile plant is set up or travels over the ground. Sometimes a geotechnical engineer is required as part of the building process to assess the ground. If this is the case, the geotechnical engineer should be engaged to make an assessment of the ground in the location*

where the mobile plant is to be set up and the bearing capacity of the ground is to be provided to both the supplier of the mobile plant and the plant operator. Even if the geotechnical engineer assessment is not required as part of the building activity it is advisable to engage a geotechnical engineer wherever the bearing capacity of the ground is unsure. Further guidance on this topic is provided in the Mobile Crane Code of Practice 2006.

The Guide expressly warns that: "Mobile plant may overturn when the boom or counterweight are positioned towards the short-legged outrigger or stabilisers." For "pre-start works", the Guide advises that operators should "ensure that outriggers are set up in accordance with the plant manufacturer's instructions" and states that "timbers or other means of distributing the load should always be placed under the outriggers irrespective of ground conditions."

There is also a checklist of questions that accompanies the *Safe Support of Mobile Plant Guide* (2018) such as:

- A list for consideration of ground conditions setting out factors that affect the ability of the ground to provide adequate support, such as the type of ground (e.g. clay, sand, rock or mixture), whether the ground has been backfilled, the presence of water, the location of excavations, and maintenance or underground services: Item 21.
- Is certification available from a competent person (e.g. geotechnical engineer for support on ground, structure engineer for structures, and marine surveyor for vessels?
- Factors adequate bearing capacity and/or stability to support the EWP are proximity to excavation or embankment, "where the bearing capacity of the ground is not known and there are indications that the ground may be made up of fill (e.g. presence of rubble)".

- Item 23 asks are timbers or pads placed under the out rigours of the EWP to help distribute the load over a bigger area?
- Item 24 asks if operating an EWP with partially extended outriggers, do the manufacturers specification allow for short legging?

Ms Deakes observed that although the Guide does not have the statutory standing as a code of practice, but it may be a test of what ought to be done and what is reasonable, particularly for regulators[174] The *Safe Support of Mobile Plant Guide* (2018) was "there to have some guard rails".[175]

Similarly, there are also Australian standards that provide guidance to industry on safety dealing with cranes, hoist and winches and mobile cranes.

Further Ms Deakes exhibited to her statement the *Guide to Managing the Managing the Risks of Elevating Work Platforms* of Safe Work Australia (dated June 2021) [176] which provides practical guidance to assist duty holders, primarily persons conducting a business or undertaking that involves an EWP recognising "they can pose a number of work health and safety (WHS) risks."

Relevantly, the Safe Work Australia Guide:

- Identifies the hazards of overturning or collapse and outriggers posed by terrain and operating surfaces of the EWP, which can pose serious risks if the ground is uneven or unstable and advises operators "to ensure the ground can bear the weight of the machine and any loads it is required to carry": s. 3.2.1;
- Sets out in its pre-use safety checks "the risk of the EWP overturning or collapsing due to the foundations or supporting

[174] Ibid, ln 27-38.
[175] Ibid, page 42, ln 22.
[176] Ex D3, page 6

structure giving away, overloading the machine, heavy winds and uneven ground": s. 4.4;

- Advises:

  (i) To minimise the risk of overturn which can be achieved by ensuring the ground is stable, flat and appropriate supports are to be used if needed.

  (ii) To ensure the weight of the EWP does not exceed ground bearing capacity.

  (iii) Ground conditions should be stable when using that machine, as movement of earth can cause the machine to destabilise.

  (iv) If out riggers are used, ensure they are clear of excavations, soft or filled ground, or other obstacles.

  (v) Out riggers should be regularly check for stability: s 5.3.

The pre-operational checklist of the *Safe Work Australia Guide* in Appendix A does not include any geotechnical advice about unknown terrain.

The Queensland Department of Industrial Relations has provided detailed feedback to *Safe Work Australia* on the *Guide to Managing the Managing the Risks of Elevating Work Platforms of Safe Work Australia* [177] and feedback on the *EWPA Good Practice Guide*[178] by reference to the Queensland *Safe Support of Mobile Plant Guide* (2018) dealing with overturning, ground conditions, technical standards on ground bearing capacities, dunnage/packing.

Ms Deakes acknowledged there is no code encompassing EWP operations in the same way there is for mobile cranes under the *Mobile Crane Code of Practice 2006* (Qld). Ms Deakes agreed that there is more information in the *Mobile Crane Code of Practice 2006* (Qld) that could be used for an EWP. [179] As to whether a geotechnical report should be

[177] Ex D4
[178] Ex D4.1
[179] Transcript day 2, page 49, ln 2-28.

mandated for EWP use, Ms Deakes considered that such a requirement depended on the environments and the cost,[180] but observed that one cannot put a price on a life.[181]

During the Inquest, I had this exchange with Ms Deakes which I think was enlightening:

CORONER: … *nobody realised that this was a piecrust surface. To all intents and purposes, everybody thought that it was a solid piece of ground, not unreasonably, and we've lost a life. And we're putting lives in danger every day when there's an assumption that ground is solid when it is not. Now, obviously, this doesn't happen all the time, but I'm just concerned about the absence of a mandatory provision, like a code of practice, and why there isn't one for elevated work platforms working at – and, obviously, we're not talking about people picking mangoes. I'm talking about – we're talking about people working at considerable height where there's a real risk to – for fall injury on failure of the plant?---*

Ms DEAKES: *There are a number of [indistinct] that don't have dedicated codes of practice specifically for those, because they are picked up and captured by other codes of practice, just like the elevated work platform. I think what the incidents have – over the last years, have highlighted is exactly what you've raised around the ground surface, and that has been picked up now in guides and also the referencing to the calculations that are in the Mobile Crane Code of Practice. And so as part of the assessment, that information is now there for operators and/or PCBUs in terms of their use of – in determining the risks. And there is a code of practice that covers the risks.*

So, yes, you're right, there isn't a dedicated EWP code of practice and there is not a dedicated code of practice for all plant under the health and safety legislation, but there are still requirements and duties associated that cover EWP operation. However, saying that, I think – relating to the training and given that the operators need to understand that more in detail about the risks you've highlighted that – and looking at the training, I do believe that there's an opportunity there for that to be further explored as part of that unit of competency to ensure that everyone who gets one of those licences understands that risk and the methods of assessing and controlling."

[180] Transcript day 2, page 44, ln 22-40.
[181] Ibid, page 47, ln 15-19.

Investigation findings

Findings required by s. 45

(a) Identity of the deceased – Christopher Ian Powell

(b) How he died – EWP rollover caused by unstable ground leading to a fall from height (over 40 metres)

(c) Place of death – 70 Longlands Street TENERIFFE QLD

(d) Date of death – 14 December, 2015

(e) Cause of Death - 1(a) Multiple injuries due to; or as a consequence of: 1(b) Crane rollover (bucket passenger)

It is unnecessary to make any substantial factual findings because the circumstances of this death are not in dispute. However, additionally, I draw the inference from all of the evidence that those present on at around 19:00 hours on 14 December, 2015 at the 70 Longland Street, Newstead were anxious to have this photography task completed in the brief window of opportunity afforded with a setting sun. I am not suggesting short-cuts were taken but perhaps with fewer time constraints the deceased, Mr Sugden and all concerned might have undertaken a deeper consideration of the ground stability. It cannot be said impatience was a cause of this death.

Comments

Comment on the prevention of deaths from happening in similar circumstances in the future under s. the *Coroners Act 2003* (Qld)

For the purposes of s. 46(1) of the Act, issues to be dealt with at this Inquest were:

1. *Whether the industry best practice guides for EWPs, in particular:*
   (i) the Safe Support of Mobile Plant Guide (2018) of the Office of Industrial Relations Workplace Health and Safety Queensland (WH&S);

(ii) the EWPA Good Practice Guide of the Elevated Work Platform Association (v.1.2) (2020); and

(iii) the Guide to Managing the Managing the Risks of Elevating Work Platforms of Safe Work Australia dated June 2021;

should be amended as a guide to the operator of an EWP in the assessments of ground types and conditions;

2. *How the operator of an EWP can find information about a site in order to assess the ground conditions;*

3. *How to facilitate:*
   - *3.1 an operator of an EWP to make inquiries of a person possibly possessing relevant information about a site, and/or;*
   - *3.2 information being provided to an EWP operator before an EWP is brought on to a site.*

Practically, each of these issues can be addressed together. Ultimately, I will be recommending that the *Mobile Crane Code of Practice 2006* (Qld) be used as a module to amend the three guides above and in that course address issues 2 and 3.

***Mobile Crane Code of Practice 2006* (Qld)**

In the analysis of the incident, reference has been made thoughout to *Mobile Crane Code of Practice 2006* (Qld) for the making of recommendations on "ways to prevent deaths from happening in similar circumstances in the future" for the purposes of s. 46(1)(a) of the Act.
In common parlance, a code of practice is a set of rules which details how people in a certain industry should behave,[182] or is a practical guide on how to comply with the legal duties under the *Work Health and Safety Act*

[182] https://ablis.business.gov.au/service/qld/mobile-crane-code-of-practice-2006/42503

2011 (Qld) and the *Work Health and Safety Regulations 2011* (Qld).[183] Codes of practice are approved by the Minister for Industrial Relations under s. 273 of the *Work Health and Safety Act 2011* (Q) which are notified in the *Work Health and Safety (Codes of Practice) Notice 2011* (Q).

Accordingly, The *Mobile Crane Code of Practice 2006* (Qld) is a code of practice under s. 284 of the *Work Health and Safety Act 2011* (Q).[184]
By s. 274 of the *Work Health and Safety Act 2011* (Q) the Minister may approve a code of practice for the purposes of the Act and may vary or revoke an approved code of practice. A Code of Practice is relevant to:

(a) the duty imposed on a person to ensure health and safety which requires a person to eliminate risks to health and safety, so far as is reasonably practicable[185] and
(b) where it is not reasonably practicable to eliminate risks to health and safety, then to minimise those risks so far as is reasonably practicable: s. 17.

By s. 274 of the *Work Health and Safety Act 2011* (Q) a court may: (i) have regard to a code of practice as evidence of what is known about a hazard or risk, risk assessment or risk control to which the code relates; and (ii) rely on the code in determining what is reasonably practicable in the circumstances to which the code relates.

[183] https://www.safeworkaustralia.gov.au/system/files/documents/1702/cop-and-guidance-fact-sheet.pdf
[184] see *Work Health and Safety (Codes of Practice) Notice 2011* commencing on 1 July 2006: Schedule 1.
[185] In *Deal v Father Pius Kodakkathanath* [2016] HCA 31 (French CJ, Kiefel, Bell, and Nettle JJ jointly; Gageler J concurring separately) the High Court re-asserted the liberal interpretation Courts are willing to give to occupational health and safety legislation demonstrating the high level of specificity for detailed methods and instructions that employers may be expected to prescribe their employees prior to performing work tasks in order for employers to prevent breaches of their statutory duties.

The *Mobile Crane Code of Practice 2006* (Qld) gives "practical advice about how to manage risks associated with mobile cranes, vehicle-loading cranes and other mobile plant used as a mobile crane to raise or lower a freely suspended load." By definition it is limited to a mobile crane which relevantly "means a machine that is used primarily for raising or lowering a freely suspended load" and "relies only on gravity for stability, with no vertical restraining connection between itself and the supporting surface, and no horizontal restraining connection (other than frictional forces at supporting-surface level) that may act as an aid to stability."

Relevant to the facts of this incident the *Mobile Crane Code of Practice 2006* (Qld) in Chapter 5 recognises that a:

> *mobile crane is likely to overturn if the crane has been overloaded in the stability area of its load chart. This may be influenced by a number of factors including:(a) poor ground conditions such as unstable ground (b) failure to use or fully extend outriggers or stabilisers.*

Section 9, "Planning and coordinating mobile crane operations" sets out some of the issues to be considered when planning for mobile crane operations to include "ensuring that the ground conditions are adequate to support the mobile crane".
Relevantly, Section 10 of the *Mobile Crane Code of Practice 2006* (Qld) entitled "Crane Stability" states that:

> *Stability is one of the most important safety issues relating to mobile cranes. Failure to maintain stability is one of the key factors associated with serious crane incidents.*

The main issues include "the ground conditions and means of supporting the outrigger pads or the crane tyres." Under the sub-heading: "10.2 Ground conditions and crane support", the Code provides:

Ground conditions can vary dramatically from one workplace to another, and even within the one workplace. Failure to address poor ground conditions to ensure crane stability may cause the crane to overturn resulting in serious injury to the crane operator and other people in the vicinity of the crane.

Under s. 10.2.1 the Code sets out the ground factors that will affect the ability of the ground to provide adequate support include the following:

(a) the presence of water, including when it is mixed with the soil as mud, and where it is present under the surface (e.g. underground springs or streams);
(b) the type of ground (e.g. clay, sand, rock or a mixture of these);
(c) backfilled ground that was previously an excavation or trench;
(d) cavities or penetrations in the ground that have been covered but still exist; and
(e) continued operation of the crane in one location.

Relevantly, the *Mobile Crane Code of Practice 2006* (Qld) in s. 10.2.1 states that:

"When a mobile crane is being set up, the crane operator can only make a decision based on the surface of the ground. Generally, rock provides the most stable supporting surface for a mobile crane. However, although rock may be present on the surface, it may not extend far below the surface. One way to establish how far rock may extend below the surface is to examine nearby excavations or trenches at the workplace. Rock that extends far below the surface provides a good indication of the ground's integrity. However, this will only provide a reasonable indication of the ground's strength when the excavation is not too far from the crane. Additional risks must be managed when outriggers are positioned too close to an excavation. See section 10.2.2 of this

code for further information.

Care also needs to be taken with ground that has a 'crust' on its surface. The surface of this type of ground is usually firmer than the ground underneath. The firm surface may give the perception that the ground is more stable than it actually is. If the ground is punctured by an outrigger, or the end of a crawler track, the softer ground will be exposed, which may cause the crane to overturn.

Where a mobile crane is continuously operated in one location, the ground underneath the outriggers will compact. Additional care needs to be taken to ensure that the crane has not compacted the ground to the extent that the minimum overturning moment of the crane is reduced (i.e. the crane is more likely to overturn)."[186]

At s. 10.2.3 the Code deals with "Timber, pads and bog mats" which provides:

"Timbers, pads and bog mats should be of dimensions and materials as specified by the crane manufacturer. If the manufacturer has not provided this information, a competent person should specify the minimum size of the material to be used. Generally, the following principles should be applied to timbers, pads, steel plates and bog mats:

(a) Timbers should have a minimum width of 200mm and minimum thickness of 75mm.

(b) Timbers should be laid together so that the width of the timber pad is wider than the outrigger foot with no gaps between timbers.

(c) Pads should have a minimum thickness of 75mm.

(d) The dimensions of steel plates and bog mats should be determined by a competent person, based on the type of mobile crane."[187]

[186] Ex C20.87, page 21
[187] Ex C20.87, page 21

At s. 10.2.4 dealing with heavy lifts the Code provides:

> *The bearing capacity of the ground is usually estimated by the crane operator when lifting smaller loads. However, certification of the ground bearing capacity must be obtained from a geo-technical engineer before performing a heavy lift. The crane owner should compare the ground bearing capacity with the maximum pressure the crane will apply to the ground for the lift. The maximum pressure applied by a crane is a function of the crane mass, crane configuration (i.e. boom length and centre of gravity) and the mass of load on the hook. The ground bearing capacity must be greater than the maximum pressure applied by the crane to the ground to ensure adequate crane support. If not, then appropriate control measures, such as the use of bog mats, must be in place to increase the ground bearing capacity before the lift is performed.*

Noting that "*the use of outriggers on mobile cranes helps to provide greater stability to the crane when lifting loads*", the Code states that *"irrespective of the ground conditions, timbers or other means of distributing the load should always be placed under the outriggers.*":
s. 10.2.5.

It recommends that "*outriggers should be set according to the manufacturer's operating instructions for the specific type of mobile crane."*: s. 10.2.5.

Notably, the Code warns that if one or more outriggers are not fully extended, the crane may become unstable during lifting operations. Where it may not be possible to fully extend all outriggers, only cranes that have the manufacturer's approval to lift with partially extended outriggers should be allowed: s. 10.2.5. The Code is also quite explicit that if a lift is to be undertaken with partially extended outriggers, the correct outrigger configuration, according to the appropriate load chart,

must be used in the method for calculating the pressure applied to outriggers without a detailed load chart: 10.2.5.

In calculating the pressure to be applied to outriggers, the Code notes that some crane manufacturers provide information on the maximum ground pressure that is applied when the crane is at maximum capacity, in the stability range of the load chart and advises:

> *Different ground types will have different ground bearing capacities. Generally, harder ground, such as rock, is capable of withstanding higher ground pressures than softer ground, such as dry sand. Where the ground consists of a combination of ground types, the poorer ground type should be used for determining the maximum ground pressure that can be applied to the ground when the crane is set up on outriggers.*

Table 1 of the Code sets out the maximum permissible ground pressures for various ground conditions mathematically.

Relevantly, for the facts of this incident, Table 1 advises the Maximum permissible ground pressure, P_{max} (tonnes per m²) for ground type:

(i) stiff dry clay: 20 tonnes per m²;
(ii) soft clay: 10 tonnes per m²;
(iii) wet clay: less than 10 tonnes per m².

Further the Code points out that the greatest force applied by any outrigger to the ground will be "at the point of tipping, just as the crane is about to overturn or when the crane boom is located directly above an outrigger foot: 10.2.6."

The subject Palfinger Wumag WT700 EWP, with a 70-metre extended boom, mounted on a 33 tonne Mann truck chassis, with four axles and eight wheels, together with its weight, size and dimensions, is an analogous species of machinery to a mobile crane. The critical feature of

an EWP that distinguishes it from a mobile crane is that a person is lifted and held aloft above the ground in an EWP crew basket, something which is not permitted in a crane, mobile or otherwise (except in exceptional circumstances such as a medical emergency).

The purpose of the *Mobile Crane Code of Practice 2006* (Qld) is to give practical advice about how to manage risks associated with mobile cranes, vehicle-loading cranes and other mobile plant used as a mobile crane to raise or lower a freely suspended load.

The *Mobile Crane Code of Practice 2006* (Qld) only applies to registered cranes[188] and does not apply to an EWP. However, by the definition in the *Mobile Crane Code of Practice 2006* (Qld), an EWP is also "mobile plant" used to "raise or lower a ….load and does rely "on gravity for stability". The critical difference is that an EWP, while not registered as a mobile crane, the EWP raises and lowers a person in a crew basket, which a mobile crane does not.

Expert Opinion: EWP's and the *Mobile Crane Code of Practice 2006*

In Mr Willet's opinion, relying on his long experience, as an accredited crane instructor and assessor approved by WH&S, the Palfinger Wumag WT700 EWP should be classified as a class of crane to provide for higher level of safety for set up and use of the EWP as if it were a mobile crane under the *Mobile Crane Code of Practice 2006* (Qld).

Mr Flatman, the WH&S engineer considered that the *Mobile Crane Code of Practice 2006* (Qld) should apply to EWPs for the calculation of ground being capacity and safe set up.

Dr Carnavas, the forensics engineering consultant, considered that the *Mobile Crane Code of Practice 2006* (Qld) provides a greater level of

[188] see *Mobile Crane Code of Practice 2006* (Qld), part 4.1

safety assessment of ground conditions which should also be required for EWPs. Dr Carnavas drew a distinction between difference in weight and dimensions of heavy crane lifts and EWPs, but recommended for critical high lift and high-risk work EWPs:

(e) the *Mobile Crane Code of Practice 2006* (Qld) should apply; and
(f) geotechnical reports should be obtained before an EWP operator sets up on unfamiliar, unknown and complex ground.

As Mr Delahunt, an engineer from the EWPA, argued small scale routine scissor lifts, such as scissor lifts, trailer or vehicle mounted lifts and telehandlers that perform routine and light weight work such as in orchards and for roadside hording replacement, that the requirements of the *Mobile Crane Code of Practice 2006* (Qld) would be unnecessary. However, Mr Delahunt, agreed that as a piece of heavy machinery, an EWP, with a boom greater than 11 metres should have the same requirements as the *Mobile Crane Code of Practice 2006* (Qld). Accordingly, on unknown ground, the *Mobile Crane Code of Practice 2006* (Qld) would be a potential failsafe[189].

Ms Deakes, from the Office of Industrial Relations acknowledged there is no code encompassing EWP operations in the same way there is for mobile cranes under the *Mobile Crane Code of Practice 2006* (Qld). Ms Deakes agreed that there is more information in the *Mobile Crane Code of Practice 2006* (Qld) that could be used for an EWP. [190] As to whether a geotechnical report should be mandated for EWP use, Ms Deakes considered that such a requirement depended on the environments and the cost,[191] but observed that one cannot put a price on a life.[192]

[189] My word – not Mr Delahunt's
[190] Transcript day 2, page 49, ln 2-28.
[191] Transcript day 2, page 44, ln 22-40.
[192] Ibid, page 47, ln 15-19.

Submissions from the Parties

On behalf of the deceased's father, Caxton Legal Service submitted in support generally of Counsel Assisting's submission that EWP operations should be regulated in the same way as mobile cranes under the *Mobile Crane Code of Practice 2006* (Qld). The legal service also made detailed submissions on behalf of Mr Powell regarding the ground conditions and the history of the site. As I ruled during the Inquest, how the ground came to be dangerous was not an issue.

Ms Franco on behalf of the Office of Industrial Relations urged me to not review the history of the instability of the ground at 70 Longland street, Newstead and the Work Health and Safety prosecutorial discretion. Neither were issues settled before the Inquest and I have not done so. She submitted that if the Court was considering making a recommendation aimed at EWPs, it should be aimed at updating regulatory material and training rather than amending or creating a Code of Practice. Ms Deakes outlined at the Inquest[193] the existing regulatory coverage for this type of hazard to enable enforcement of non-compliance. There was also detailed guidance material.

Ms Franco also pointed out that If a recommendation was made in relation to the amendment or creation of a new Code of Practice, at the approval of the Minister, the process will involve significant levels of resource and a potential timeframe of 12-18 months development. The process includes significant policy design and drafting, consultation with industry and technical research and guidance. It will require examination by the Office of Best Practice Regulation and depending on their assessment of the potential costs associated with the proposed new provisions, it may also involve a regulatory impact statement. Guidance material can be developed more quickly and be more accessible to the industry and workers.

[193] Transcript day 2, page 42

Whilst I accept a change of a Code of Practice will take some time, Counsel Assisting's submission was really to adopt the Mobile Crane Code of Practice for EWP's. In my view, this tragedy occurred because a 33-tonne piece of machinery holding two men almost 50 metres in the air was allowed to operate when no one had any idea of the ground quality. This was a serious short-fall in the current regulatory scheme.

Mr Charrington, for LinCon Logistics Pty Ltd, supported Counsel Assisting's recommendation that the *Mobile Crane Code of Practice 2006* (Qld) should be adopted and applied to EWP's in high-risk applications. He submitted that the owner or developer should be required to meet the cost of any geothermic report. My preference is to require the operator of an EWP to possess one before EWP work is commenced. As to who should bear the cost is a commercial matter.

Mr Hickey for TDD criticised Counsel Assisting's contention that had Mr Sugden received the geothermic reports prepared for the construction at 70 Longland Street, Newstead, he would have "undoubtedly" realised the danger of operating the EWP where he did. I have already accepted that such an inference cannot be drawn given Mr Sugden's lack of experience and inability to accept such a complex technical document designed for another purpose.

Unsurprisingly, Mr Burke for The Elevating Work Platform Association of Australia Incorporated (EWPA) was concerned about Counsel Assisting's recommendations.

He argued that in general terms we note that the characteristics of EWPs and the use of EWPs are significantly different to those of Mobile Cranes in a number of ways including:

(i) The rated capacity of an EWP is significantly less (usually 250kg-500kg) and will usually be constant throughout the working range. Conversely Mobile Cranes have variable rated capacities, often up to 50 tonnes, and are designed to achieve the optimum lifting capacity at various reaches as may be

governed by stability and/or strength limits.

(i) The loads imposed on the ground by an EWP are generally less than those for a mobile crane.

(ii) There is significantly more variation in the types of EWPs in use in Australia, ranging from self-propelled machines on an integral chassis, to machines mounted on a commercial truck chassis.

(iii) There are significantly more EWPs in use in Australia than there are mobile cranes.

(iv) EWPs may be relocated numerous times in any given day, mobile cranes are more likely to remain at the one site for an extended period and be utilised on an infrequent basis during that time.

Collaboratively, Mr Burke agreed that detailed ground stability planning and set up would be reasonable if limited only to complex sites and undertaking High Risk Work. Less onerous requirements should be adopted for the majority of circumstances where EWPs are employed. I accept that submission.

Mr Burke also pointed out that having concurrent Codes of Practice for similar sized cranes and EWP's could lead to confusion in the industry. That is accepted also. However, the regulators who might design the code of practice for EWP's will surely be intelligent enough to draft without verisimilitude. He further submitted that if these recommendations are implemented it will be important to specifically define what a complex site is, and to ensure that the recommendation in practice does not default to requiring all EWPS with boom lengths greater that 11m to comply with the above recommendation. I accept that observation. The recommendation is that it only apply where a high-risk licence is required by the operator.

He also pointed out that while the EWPA Good Practice Guide does contain information regarding setting up on unstable ground and does incorporate calculations for establishing the ground pressure, it does not include the calculation of the maximum outrigger load. The reason for this is that EWPs are designed and manufactured in accordance with

AS/NZS1418.10, and this as well as other prominent international standards (European, American and Canadian) all of which require that the maximum outrigger load be displayed on the EWP.

He informed this Court that the EWPA will undertake to review the Mobile Crane Code and adopt any relevant provisions from the code. Such a positive contribution from an industry organisation which is likely to incur addition costs as a result of my recommendations in the interests of safety is uplifting.

Recommendations

Considering the evidence before this Inquest, I make the following recommendations:

Recommendation One:
Elevated Work Platforms, in excess of 5 tonnes, performing work on complex ground that requires the operator to have a high risk work licence and with a boom of 11 metres or more are recommended to:

(i) be incorporated into the definition of a mobile crane so that the relevant provisions in *Mobile Crane Code of Practice 2006* (Qld) apply to an EWP.
(ii) have their own EWP Code of Practice which incorporates the set up and the maximum permissible ground bearing pressure values and ground capacity calculations as set out in the *Mobile Crane Code of Practice 2006* (Qld).

Specifically, this must be a Code of Practice not just a set of industry guidelines. It should mandate that an EWP in excess of five tonnes, performing high risk work with a boom of 11 metres or more, before setting up on a complex ground site must obtain a geotechnical report specific for the purpose of the EWP machinery being brought on site.

Recommendation Two:

The relevant provisions of the *Mobile Crane Code of Practice 2006* (Qld) should be incorporated into the Queensland *Safe Support of Mobile Plant Guide* (2018), Safe Work Australia *Guide to Managing the Managing the Risks of Elevating Work Platforms* and the *EWPA Good Practice Guide* dealing with:

1. The risks associated with mobile crane operations overturning because of unstable ground and failure to use or fully extend outriggers or stabilisers: s. 5.
2. Lifting capacity of a crane limited by structural strength when the working radius is small and stability when the working radius is greater: s. 8.1.
3. Planning and coordinating operations to include ensuring that the ground conditions have adequate support: s. 9(e).
4. Failure to maintain stability is a key factor associated with serious incidents concerning the ground conditions and means of supporting the outrigger pads against overturning: s. 10(c).
5. Stability function of load charts when “short-legging”: s. 10.1.1.
6. Ground conditions varying dramatically from one workplace to another, and within the one workplace where there is a failure to address poor ground conditions and to ensure crane stability causing overturning, resulting in serious injury to the crane operator and other people in the vicinity: s. 10.2.
7. The type of ground (e.g. clay, sand, rock or a mixture of these) and backfilled ground that was previously an excavation or trench: s. 10.1.2.
8. Risks that increase with softer ground such as the presence of groundwater: s. 10.2.2.
9. The use of Dunnage and Stabiliser Pads and the use of outriggers set according to the manufacturer’s operating instructions for the specific type: s. 10.2.5.
10. Certification of the ground bearing capacity by a geo-technical engineer before performing high risk lifting: s. 10.2.4.
11. More generally, the:

- roles and responsibilities regarding crane stability: s. 10.5.
- roles and responsibilities: s. 13.
- load Chart: s. 15.2.
- lifting points: s. 15.3.
- training: s. 17.

Recommendation Three:

EPW licenced operators and applicants for an EWP operator's licence should receive additional training by geotechnical experts regarding the identification of hazardous and unsure ground conditions for operating any EWPs and how to interpret geothermic reports. There should be a 'Review of Units of Competency' to ensure operators have a continued understanding of the geotechnical hazards during the set up and operation of EWP's.

Recommendation Four:

Queensland Government, industry groups and regulators consult with each other and Commonwealth and interstate and territory Work health and safety Regulators about these proposed amendments in context with National Model Work Health and Safety laws.

Conclusion

Ironically, the deceased was an industry leader in the introduction of drone use for such photography shoots from height involved in this tragedy. Since 2015, drone technology has advanced significantly and might today have been used in lieu of an EWP. Further, devices such as the Bronto Loadman which is a hand-help pipe that records percussion signals for measuring the bearing capacity of any kind of ground have now become commercially available.[194] However, industry will always have a need to raise workers to considerable heights for many different

[194] ***https://brontoskylift.com/wp-content/uploads/2019/04/Bronto_Loadman_2s_EN.pdf; https://www.lkwlift.com/archivos/pdf/loadman.pdf*** *This new device might be a cost-effective alternative to a geometric report but I have no evidence of its industry standardisation.*

applications. So the safety of EWP operation in terms of sound ground stability will be ever-present.

Tragically, the deceased's family have lost him, their business and have had to work tirelessly with Brendan to facilitate his recovery. Queensland cannot afford to lose lives on workplaces and to lose high achievers like the deceased is a double tragedy. This incident is an industrial relations issue as well. Workers need to be sure that appropriate regulations are in place to protect them at heights and others from the associated trauma with a serious crash.

My recommendations will cause expenditure but I urge the relevant government, industry and regulatory bodies to closely consider these recommendations.

"*Safety isn't expensive, it's priceless*." – Anon.

I close the inquest.

Donald MacKenzie
Coroner
BRISBANE