QUEENSLAND COURTS

CORONERS COURT OF QUEENSLAND

FINDINGS OF INQUEST

CITATION:	**Inquest into the death of Daniel Geoffrey Springer**
TITLE OF COURT:	Coroners Court of Queensland
JURISDICTION:	NORTHERN
FILE NO(s):	2017/3427
DELIVERED ON:	23 February 2021
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FINDINGS OF:	Nerida Wilson, Northern Coroner
CATCHWORDS:	Coroners: inquest, mining accident; BHP Billiton Mitsubishi Alliance Coal Operations; Goonyella Mine; excavator bucket; external steel vertical wear plate package; indentions; build up of stored energy; air carbon arc gouging; 1.150 metre spring-back event; fatal injuries to head due to industrial accident; death of qualified boilermaker; no prior industry knowledge regarding magnitude of spring-back.

REPRESENTATION

Counsel Assisting the Coroner:	Ms M. Zerner of Counsel
Counsel for Department of Natural Resources and Mines [now Resources Safety and Health Qld]	Ms D. Holliday Q.C. and Ms R. Taylor
BHP Billiton Mitsubishi Alliance Coal Operations Pty Ltd (BMA)	Mr P. Roney Q.C. i/b Allens
Independent Mining Services (IMS)	Mr B. McMillan of Counsel i/b Lander and Rogers Lawyers
ESCO Australia Holdings Pty Ltd, Mr D Popadynec and Mr M Borowicz	Mr J. Bremhorst of Counsel i/b McCullough Robertson Law
BAE Engineering	Ms A. Morton, Fisher Dore

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Publication

Section 45 of the *Coroners Act 2003* ('the Act') provides that when an inquest is held, the Coroner's written findings must be given to the family of the person in relation to whom the inquest has been held, each of the persons or organisations granted leave to appear at the inquest, and to officials with responsibility over any areas the subject of recommendations. These are my 32 page findings in relation to Daniel Geoffrey Springer. They will be distributed in accordance with the requirements of the Act and published on the website of the Coroners Court of Queensland.

The inquest

1. The following issues were set for Inquest:

    a) The information required by s45(2) of the Coroners Act 2003 ('the Act'), namely when, where and how Daniel Geoffrey Springer died, and what caused his death.

    b) The circumstances surrounding the death of Daniel Geoffrey Springer, including the work he was carrying out immediately prior to his death, and why the external wear plate on the excavator bucket he was working on sprung forward.

    c) To determine when, why and the process that led to the excavator bucket having the external wear plate Daniel Geoffrey Springer was working on were in place, and why it was required to be removed.

    d) To determine whether Daniel Geoffrey Springer was appropriately qualified for the work he was carrying out.

    e) To determine whether the work method adopted by Daniel Geoffrey Springer was appropriate with respect to attempting to remove the external wear plate on the excavator bucket, and whether the work method was approved by his supervisor (or another appropriate person) or should have been approved prior to commencing the removal of the external wear plate.

    f) To determine what safety measures, including relevant policies and procedures were in place with respect to the original installation of the external wear plate to the excavator bucket Daniel Geoffrey Springer was attempting to remove and whether they were adequate.

    g) To determine what safety measures, including relevant policies and procedures were in place with respect to the attempted removal by Daniel Geoffrey Springer of the external wear plate from the excavator bucket and whether they were adequate.

    h) In accordance with s46 of *the Act*, are there any comments

the Coroner could make which may prevent deaths from happening in similar circumstances in the future.

2. The first week of the Inquest was conducted in Mackay. A final day of evidence was conducted via video-conferencing facilitated from the Cairns Court. Seventeen witnesses were identified to provide oral evidence at Inquest including as follows:

    1. Mr Jack Alexander
    2. Mr Jesse Abbott
    3. Mr Ashley Corrie
    4. Mr James Munns
    5. Mr Ryan McGoven
    6. Mr Paul Thompson
    7. Mr David Popadynec
    8. Mr Lane Richardson
    9. Mr Kevin Caesar
    10. Mr Ian Trowell
    11. Mr Martin Borowicz
    12. Mr Kevin McDonald
    13. Mr Matthew Currie
    14. Mr Geoff Collins
    15. Mr Don Wood
    16. Mr Duane Madam
    17. Mr Lenny McInnes

The Relevant Legislation

3. Pursuant to s.45(2) of the Coroners Act 2003 I must, if possible, make findings as to:

    a) Who the deceased person is;

    b) How the person died;

    c) When the person died;

    d) Where the person died; and

    e) What caused the person to die

4. I am specifically precluded in my findings from making any statement or comment that a person is or may be guilty of an offence, or from determining civil or criminal liability by virtue of section 45(5) *Coroners Act* 2003.

Standard of Proof

5. The particulars a Coroner must if possible, find under section 45 *Coroners Act* 2003 need only be made to the civil standard but on the sliding Briginshaw scale. That may well result in different standards being necessary for the various matters a Coroner is required to find. For example, the exact time and place of death may have little significance and could be made on the balance of probabilities. However, the gravity of a finding that the death was caused by the actions of a nominated person would mean that a standard approaching the criminal standard should be applied because even though no criminal charge or sanction necessarily flows from such a finding, the seriousness of it and the potential harm to the reputation of that person requires a greater degree of satisfaction before it can be safely made.

   The paragraph above was specifically contemplated by the Court of Appeal with apparent approval. The Court went on to state:

> *Two things must be kept in mind here. First, as Lord Lane CJ said in R v South London Coroner; ex parte Thompson, in a passage referred to with evident approval by Toohey J in Annetts v McCann: …an inquest is a fact finding exercise and not a method of apportioning guilt … 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 trial where the prosecutor accuses and the accused defends, the judge holding the balance or the ring, whichever metaphor one chooses to use. Secondly, the application of the sliding scale of satisfaction test explained in Briginshaw v Briginshaw does not require a tribunal of fact to treat hypotheses that are reasonably available on the evidence as precluding it from reaching the conclusion that a particular fact is more probable than not.".*

The material and evidence

6. The material and evidence compiled for this coronial investigation is extensive and encompasses the coronial file; a coronial brief of evidence; the oral evidence of witnesses; comprehensive written submissions and the inquest transcript. For example, the closing submissions of Counsel Assisting the Inquest number some 103 pages (referred to by the collective Bar Table as 'very detailed and helpful').

Similarly, I received comprehensive submissions on behalf of BHP BM Alliance, ESCO and IMS and DNRM. In these findings I do not refer to all the available material and evidence. I refer only to the material and evidence relevant to, and supporting my findings and reasons and deal only with those matters that touch on the agreed issues for inquest, which include my statutory obligations to find what caused the Daniels death and to consider if there are ways to prevent similar deaths from happening in the future. I do not traverse the very wide ambit of issues that were raised at Inquest. Instead I deal with the much narrower Inquiry with which I am tasked.

Background

7. Mr Daniel Geoffrey Springer (hereinafter referred to as Daniel) was born on 12 September 1986. He was aged 30 years at the time of his death.

8. Daniel is survived by his wife Carmela, his son Wolf, his mother Kerry, his father Reon, and siblings Cristi, Michael, Benjamin and Emma. Daniel resided in Mackay with his wife and son.

9. At approximately 12:56AM on Saturday 5 August 2017 Daniel was performing lawful duties as a boilermaker in the course of his work as an employee of Independent Mining Services (IMS) at Goonyella Riverside Mine. The mine is located approximately 220 kilometres south west of Mackay and is operated by BM Alliance Coal Operations Pty Ltd (BMA). The tenure holder is BHP Coal Pty Ltd.

10. Daniel was a qualified, experienced, and highly regarded boilermaker. He held a trade certificate for 'Engineering Fabrication Trade (Heavy Fabrication Boilermaking)'. He was experienced in working with rolled and pressed plates.

11. He had not been assessed or trained in the Mines' GRM-SOP-290.01 Hot Work at Goonyella Mine (although he had achieved that certification in other workplaces). If the contract management system had been utilised properly, this oversight would have been detected and Daniel would have been prevented from commencing work (until he had undertaking the mine specific Hot Work training). The DNRM join with Counsel Assisting and BMA and submit that this issue as largely immaterial as he had in fact completed training in three other BHP SOP's. I accept that Daniel was sufficiently qualified to perform the work. I am however critical of the failure to ensure compliance with the contract management system.

12. At the relevant time, Daniel was working in the maintenance bucket shop removing an external wear plate from a Terex RH340 Excavator bucket using an air carbon arc gouger. He was tasked with removing welds holding a large middle section vertical plate to the basket structure. He was cutting the large plate into smaller pieces of approximately 800mm x 800mm for ease of handling.

13. Daniel was working from a scaffolding platform approximately 1.7 metres from the top of the bucket when his co-worker Mr Jesse Abbott heard 'popping' (indicative of 'spring-back') and checked on him. Daniel continued gouging and Mr Abbott soon after heard the sound of a loud 'pop' and called out to check on Daniel and did not receive a response. Upon inspection Mr Abbott found Daniel seriously injured, slumped, laying out cold, and making snoring like sounds. He rendered first aid and called on-site emergency via a nearby radio. Site paramedics responded within 2 minutes of the call.

14. The force and speed of the strike to Daniels head rendered him immediately unconscious. [Mr McInnes an expert in metallurgy later referred to the mechanism of the strike as 'biaxial spring-back occurring in both forward and lateral direction'].

15. Daniel was airlifted to the Mackay Base Hospital and then to the Townsville Hospital and despite emergency surgery and all life saving efforts at Townsville Hospital, he succumbed to his fatal injuries on 7 August 2017.

Post -mortem examination

16. A Consultant Forensic Pathologist conducted a post-mortem examination and concluded that the medical cause of death was the result of 'head injury, due to, or as a consequence of industrial accident'. Toxicology testing revealed only prescribed medications administered during resuscitation and treatment attempts.

17. I accept and adopt the cause of death for the purpose of these findings.

Employment Relationships

18. BHP Billiton Mitsubishi Alliance (BMA) owns the Goonyella Riverside Mine.

19. Independent Mining Services (IMS) provides mining and engineering services to Goonyella Riverside Mine. On 21 July 2017 IMS commenced work at Goonyella Riverside Mine to carry out boilermaker work as part of maintenance activities.

Provenance of external wear package

20. Austin engineering (Austin) designed and manufactured the bucket as the original equipment manufacturer (OEM).

21. An anomaly over the serial number on the wear package resolved when Austin confirmed it "*has every reason to believe that this bucket referred*

to as 9213.09 and the bucket 9231.08 is one and the same item, which is the subject of the inquest…".

22. An external wear package provides wear protection to the underside of the excavator bucket it is attached to. Wear plates are consumable items that need to be replaced from time to time. Austin did not endorse the application of the large external wear plate configuration affixed to the bucket at the time of Daniel's death and maintain it was not an appropriate external wear plate configuration for the bucket as manufactured by them (Austin).

23. Austin confirmed it does not (and did not) provide any guidelines or information concerning the replacement of the external wear packages to the external basket of its buckets.

24. In late 2014 BMA Goonyella Riverside requested ESCO Engineering Pty Ltd (ESCO) who were not the OEM to refurbish the external floor wear plates on a number of excavator buckets by removing thin horizontal external wear strips and replacing them with five pieces of steel wear plates including two large middle vertical external wear plates on each bucket (the wear package). BMA's decision to modify the wear package was to decrease maintenance, downtime, and costs.

25. BMA had previously utilised another company, BAE Engineering, to replace the smaller horizontal strip wear package with the larger vertical plate design (not identical to that applied by ESCO). BAE were engaged to install the large wear plate configuration onto four BMA buckets, including two RH340 buckets prior to ESCO completing work on the subject bucket in April 2015.

26. I do not accept the assertion by BMA that they were not aware of the design change by ESCO, and that ESCO was unilaterally responsible for the change from small vertical strip plates to large vertical wear plates. BMA, and not the contractor/s, (ESCO) were responsible for the written work instruction, the scope of works, the purchase order for the refurbishment, payment for the works undertaken, and the receiving the refurbished bucket back to the mine site for an inspection cross referenced to the Scope of Works. I would accept that ESCO had significant design input within parameters requested by BMA. I also accept that ESCO was wholly responsible for the installation of the new design.

27. In this case the BMA Maintenance Planner responsible for authorizing the works deposed he did not personally oversee the return of the bucket to site. The Maintenance Manager however contradicted the evidence and deposed that a visual check would have occurred when receiving the plant to site and that cranage was necessary to uplift the bucket from the float.

28. Authorised representatives of BMA were solely responsible for signing off on the refurbished bucket bearing the updated large vertical wear plates. The package was so significantly and obviously different, and of

such immense proportions that had the work not been commissioned by BMA it would, (or should), have been detected immediately. By then a number of buckets bearing similar large (although not identical) configurations were in production at the same mine site, this design could not therefore have been unintended by BHP.

29. I find that ESCO fulfilled the Scope of Works on the subject RH340 as required and approved by BMA and that the works undertaken by ESCO were fit for purpose. I find that ESCO did not further undertake maintenance or repairs on the subject wear package thereafter.

30. ESCO disputed that the subject wear plate package as at the time of this incident was one and the same as applied by them in 2014. I accept that repairs were carried out in the field after installation by Bryan Industries however I do not accept that the wear package was materially altered of changed, removed or replaced by Bryan Industries.

31. ESCO assert that the chemical composition of the subject wear plate was materially different to the composition of the wear plate install by them during refurbishment. The chemical analysis indicated the presence of Copper, Vanadium, Titanium and Aluminium within the subject wear plate. ESCO maintain that the Abrex 400 steel supplied by them does not contain those constituents. Mr McInnes an expert metallurgist opined that is was 'possible' the steel applied to the incident bucket was not Abrex 400.

32. The modelling undertaking by UQMP to form the basis of the opinions within the report commissioned by the DNRM, was primarily based on Billasoy 500 steel. I am of the view that in the absence of specific testing and calculations on Abrex 400 I am unable to conclude to the requisite standard that the incident plate was not an ESCO plate. The 'possibility' of an alternate steel as opined by Mr McInnes who did not have the opportunity to perform testing on Abrex 400 and had not 'come across' Abrex 400 prior to the Inquest, is therefore equivocal. The submission of ESCO is speculative and a conclusion cannot be drawn from the technical evidence alone, and as it currently stands.

33. I also weigh the substantial lack of evidence that the wear plate was replaced at any time between 2014 and the time of this event. I have accepted that ESCO performed no further work on the subject bucket from time of refurbishment, therefore evidence of replacement by other than ESCO, would be required for me to accept the plate had been replaced.

34. The concern raised by ESCO that the metal in the subject wear package was a different thickness to that applied during the 2014 refurbishment is discounted by me with reference to the UQMP report and purchase orders indicating the wear package bore plates of both 20mm and 25 mm thick.

35. A perceived anomaly regarding the number of plug welds was also claimed by ESCO to support their assertion. Such is explained by the

fact that a number of plug welds were visible and some not visible. Upon a reckoning of the evidence I am satisfied that 8 plug welds exist on the subject plates and consistent with the 2014 ESCO refurbishment and plug weld design.

36. I am comfortably satisfied that the subject bucket was not 'off excavator' for a period of time sufficient to undertake a rebuild or replacement of the wear plate between 2014 and the time of these events. Whilst spreadsheet records in relation to the movement of buckets on site for maintenance scheduling purposes were somewhat rudimentary, the records of themselves were not demonstrated to be inaccurate, and nor were they to be read in isolation from other documents such as purchase orders and those used to record the maintenance undertaken on plant and equipment.

37. The application of a new wear plate by another person or entity to the subject excavator bucket without any trace of record (or recollection) for the numerous processes involved in such an undertaking, is improbable.

38. I am satisfied the records held by BMA would have evidenced procurement of a replacement wear plate on the subject bucket between the 2014 refurbishment and the date of the incident, had it occurred.

39. The plate itself would have been uniquely fabricated off site, conveyed to Goonyella Mine and then affixed to the bucket in the field. Alternately the bucket would have been removed from the excavator and conveyed to a third party supplier off site. Either way the BMA audit of all records are devoid of such undertakings.

40. Counsel Assisting, DNRM and BMA all submit that the plate installed by ESCO in 2014 was one and the same as the incident plate. I also take into account the significant investigations undertaken by DNRM and BHP did not suggest otherwise.

41. I am satisfied on the material before me that the wear plates and package affixed to the relevant bucket at the relevant time was affixed by ESCO Engineering Pty Ltd. (That is the plates had not been replaced or rebuilt from time of refurbishment / replacement in late 2014 until the time of Daniel's death). No other logical inference can be drawn.

42. It is of note that as at April 2014 structural changes within BMA resulted in the dissolution of the Off-site Mechanical Rebuild Coordinator roles, thereafter, necessitating future re-build processes and technical queries to be 'run through site'. I have considered (in retrospect) the transition of these roles may have influenced the continuity of processes impacting on the issues referred to above.

43. I accept that ESCO wholly complied with the BMA Offsite Rebuild Change Procedures.

44. There was conjecture as to whether the change management process (MOC) within BMA applicable to modification of Plant and Equipment was applicable to the change from 'standard 'wear plate design to 'non

standard or uncommon' design. A BHP ICAM review recommended the MOC process include a mandatory trigger for such changes. I am of the view that capturing such changes through the MOC process provides another layer of risk assessment through analysis and engineering assessment, specifically applicable when undertaking a change from the OEM design.

Terex RH340 and external wear plates

45. The original (OEM) wear package was replaced with five pieces of steel, the middle vertical plates measured 2 metres wide x 3.4 metres long and approximately 20 millimetres thick (Photographs annexed to these findings clearly depict the wear package in situ).

46. The 2 x 3.4 sized wear plate design was not commonly used in the coal mining industry. There was no evidence before me of any previous occasion a vertical wear plate package of this size, had been removed from the exterior of an excavator bucket. The removal of this particular wear package was likely to be a first time event and no prior experience or knowledge could be relied upon.

47. The excavators to which the buckets are affixed weigh approximately 550 tonnes and are used to dig and load coal into dump trucks. To provide some idea the excavator itself is bigger than an average size house and the bucket is as big as an average size room. The bucket of the Terex RH340 weighs 32 tonnes and is designed to hold approximately 34 cubic metres of ground material.

48. Significant maintenance work carried out on buckets and wear plates occurs in the bucket workshop at the mine, before which, the bucket is removed from the excavator. The workshop facility at Goonyella Mine was equipped with the resources, including scaffolding, to undertake the required work.

49. Annexed to these findings is a photograph of the bucket Daniel was working on at the relevant time and gives a sense of the:

    - size of the plant;
    - the scaffolding platform used to reach the wear plates;
    - and the wear plate in its resting position after the spring back event.

50. It was established as a general proposition that wear plates usually require replacing at approximately every nine to twelve months, which equates to approximately 6000 hours in operation. The bucket subject of these proceedings completed 9528.60 hours production prior to removal from the excavator for repair and maintenance. The life span of a wear package depends on the variability of conditions which can significantly alter the wear rate.

51. Mr McInnes an expert in the field of abrasion resistant materials and processes would not be drawn on an opinion as to the appropriateness of a maintenance cycle for a machine logged with those operation hours. His evidence on this issue at Inquest:

> *"the life experienced by any abrasion resistant material is very strongly dependent on the abrasive conditions, and how severe the abrasive conditions are, depend on a number of factors, one of which is the type of material causing the abrasion, the rock or dirt or soil or sand; also, the size of the particles, be they very small, like dirt or sand, or very large, like larger rocks. these variables, these factors, can make an enormous difference in the actual wear rate's experience. so I can provide some input from my experience as a wear researcher, but not from utilisation of this machine or this mine because I'm unfamiliar with the conditions, even what this machine was used for, whether it was for loading coal or for simply clearing overburden, what the mineral types were, the rock types. So there's lots of variables to go in that equation"*

52. Evidence before the inquest bore out a 'rudimentary' (to use Counsel Assisting's phrase) system utilised at Goonyella Mine for tracking buckets and therefore difficulty maintaining accurate tracking records to inform the 'duty cycle' and calculations for maintenance scheduling. The spreadsheet system maintained for such purposes was limited in it's effectiveness, although was created in the absence of other tracking systems and was not discounted as being inaccurate.

53. I am satisfied that the relevant wear package was damaged beyond its limits and was not fit for purpose at time of these events. The evidence clearly demonstrates that the welds had failed by the time Daniel came to work on the bucket.

54. As a result of regular heavy use the external wear plate covering the outside of the bucket became indented, creating a build up of stored energy or tension, and when released through the air carbon arc gouging process, the plate sprang back or out approximately 1.150 metres striking Daniel to the head. At rest, the protruding metal after the spring back event, measured 600-650mm (depicted in the attached photographs).

55. The dimension of the spring back in this case was unprecedented. The inquest did not locate any person called to give evidence familiar with the mining industry or boilermaking generally, whether designers or users of the packages, boilermakers, or experts in metallurgy who had encountered a spring-back event of such magnitude. At most spring-back was described as 'popping' or 'releasing' in the range of between '100mm- 150'mm (drawing on the evidence of those asked at Inquest).

The ‘spring-back’ phenomenon

56. Spring-back within the metal fabrication industry is a term used to describe the conduct of metal as it tries to return to its original shape after being bent.

57. At Inquest I found a complete lack of industry knowledge within the mining and welding sectors regarding spring-back to the degree described in this event.

58. The maximum displacement achieved during the event that caused Daniel’s fatal injury was calculated by The University of Queensland Material Performance expert metallurgists as 1150 millimetres from the start location, that is twice the static (at rest) spring-back position. Therefore, any object within 1.15 metres of the tip plate in the direction of motion during release would be impacted.

59. It is unlikely that the risk of spring-back effect of a 1.15metres displacement could have been known or predicted by any person prior to these events.

60. Daniel’s death occurred when a series of specific factors coalesced creating the environment for this elastic springback effect.

61. Daniel himself did not have, and could not have, an appreciation of the risk or potential for a spring-back event to 1.15 metres because he had no understanding of the prevailing factors and how those factors would impact the behaviour of the metal he was working with.

62. Daniel had no time to react so as to avoid the risk of injury.

63. I am left in no doubt that had Daniel known and understood the risks he would not have proceeded as he did.

Nature and Cause Investigation Report for Chief Inspector of Coal Mines

64. The Mines Inspectorate (Coal) through the Department of Natural Resources and Mines Qld (DNRM) were tasked with investigating Daniel’s death.

65. A ‘*Nature and Cause Investigation Report for Chief Inspector of Coal Mines*’ prepared by Lead Investigator Mr Creswick Bulger, Inspector of Mines on 18 June 2018, and approved by the then Chief Inspector of Coal Mines Mr RJ Albury on 29 June 2018, was exhibited to the coronial brief.

66. On 1 July 2020 the *Resources Safety and Health Queensland Act* was proclaimed. The RSHQ is established as a separate statutory body. Prior to the Inquest, the Mines Inspectorate was a division of the Department of Natural Resources, Mines and Energy (DNRME). I refer herein to the

DNRME as it was then (although noting the relevant body is now the RSHQ).

67. At the conclusion of the five days of oral evidence, those with leave to appear negotiated redactions to the Nature and Cause report. The redacted report was exhibited to the coronial brief of evidence. BMA and IMS both agreed they would address their respective client's outstanding issues with the Mines report through written closing submissions. Mr Bulger was not required to provide oral evidence to the inquest.

68. As submitted by IMS I accept the conclusions and findings within the DNRM report should be viewed through the lens of the greater volume and quality of evidence available with the benefit of the coronial investigation and Inquest.

69. I also accept the submission on behalf of BMA that matters of housekeeping and perceived non-compliances specific to BMA (as traversed within the DNRM report), and not causative to the circumstances surrounding Mr Springer's death, are beyond the ambit of the coronial inquiry.

70. I refer where relevant, agreed aspects of that report (in italics) below:

> *During the period between October and December 2014, excavator bucket #1 (SN-921309) was rebuilt in Mackay by ESCO at their industrial workshop in the suburb of Paget. During this maintenance rebuild of the bucket the external floor wear plates were changed from the original OEM's thin horizontal wear plates to two large wear plates. The rebuilt bucket was returned to Goonyella Riverside mine in December 2014. The bucket was then used on a Terex RH340 Excavator in mining operations for an unknown period of time between December 2014 and July 2017.*
>
> *On 20 July 2017 ALS provided to Goonyella Riverside mine a condition monitoring report on the excavator bucket #1. This report showed the cracking that had been identified by non-destructive testing, and the measurements of thickness tests conducted on the bucket.*
>
> *On 21 July 2017 IMS commenced work at Goonyella Riverside mine, and this was carrying out boilermaker work mostly in the mine's maintenance bucket shop. On 2 August 2017 Mr Springer and Mr Abbott commenced work with IMS at Goonyella Riverside mine. After completing an area familiarisation at the mine they commenced work in the maintenance bucket shop. They both worked day shift on 2 & 3 August 2017.*
>
> *On 4 August 2017 Mr Springer and Mr Abbott arrived at Goonyella Riverside mine at approximately 05:50 pm to work night shift. Mr Springer and Mr Abbott then did a shift handover with the off going day*

shift IMS boilermakers, Mr Ashley Corrie and Mr James Munns. Around this time Mr Springer signed the Hot Works Permit and JSA. At approximately 06:15 pm Mr Springer and Mr Abbott attended a shift pre-start meeting which was held in a meeting room over at the main maintenance workshop. At the time there were three excavator buckets in the maintenance bucket shop, and in this report these buckets are referred to as buckets #1, #2 and #3. Bucket #1 was located at the southern end of the bucket shop, bucket #2 was in the middle of the bucket shop, and bucket #3 was at the northern end of the bucket shop. Following the conclusion of the shift pre-start meeting Mr Springer and Mr Abbott returned to the maintenance bucket shop to commence their boilermaker activities for the shift. Mr Abbott's assigned work was to gouge out identified cracks on the inside of the excavator bucket, and then re-weld these areas. *Mr Springer's assigned work for the shift was to remove one remaining heel shoe from the outside of the excavator bucket #1, and then remove the two large external floor wear plates. Mr Springer completed his BMA Safe at around 07:00 pm on the tasks that he had planned for this shift.*

Mr Springer removed the one remaining heel shoe from the excavator bucket, and then commenced removing the large floor external wear plates. Using an air carbon arc gouger it appears that he firstly made a horizontal cut across the bottom of both large wear plates, and that this cut was made prior to a work platform being put in place against the bucket. After placing a work platform adjacent to the bucket Mr Springer then removed two smaller sections from the left hand lower side of the left wear plate, and these two plates were placed on the workshop floor. It is common for boilermakers to cut large plates into smaller sections when removing them, as this makes them easier to manually handle due to the lighter weight. Whilst these two smaller sections were being cut out Mr Abbott stated that he heard three or four popping noises signalling kickback (springing out) of the wear plate as it was being cut, and each time Mr Abbott heard one of these noises he'd call out and ask Mr Springer if he was okay. On each occasion Mr Springer would answer stating that he was okay. At the time Mr Abbott was working underneath and inside the excavator bucket, and Mr Springer was working outside the bucket and up on a work platform, so they couldn't see each other but were able speak to each other.

At some stage during the above activities Mr Springer and Mr Abbott stopped for a 30 minute crib break, likely at around 11:00 pm.

There was evidence that Mr Springer then used an electric angle grinder to clean the cutting slag and weld away from the left side of where he had removed the two smaller sections of wear plate. Mr Abbott stated that during the shift he and Mr Springer had discussed the potential of the wear plate springing out when cutting it, and Mr Springer had commented that he was aware of it and knew to keep out

of the way when it was likely to happen. Mr Abbott stated that they had only expected the wear plate to spring out a short distance, and nothing like to the extent that the wear plate later sprang out.

Mr Springer then made a horizontal cut across the right hand side of the left wear plate, when the plate has suddenly sprung up. Mr Springer was struck in the upper forehead area by the steel wear plate. Evidence suggests that Mr Springer had just completed air carbon arc gouging the wear plate, and had lifted his welding face shield and hung the air carbon arc gouger handpiece over the adjacent handrail on the work platform that he was working upon. Given the position of the injury on his forehead it would appear that Mr Springer was looking back at the steel wear plate when it has suddenly released and sprang up 600 to 650 mm.

71. Mr Lenny McInnes in fact deposed that the amplitude of the spring back (or spring up as described above) at the time of release, measured 1.15metres and came to rest at 600-650mm.

72. The DNRM investigation concluded that:

73. The mine did not identify any potential risks associated with modifying the external floor wear plates on the excavator buckets by changing from the thin horizontal wear plates to the two large wear plates, and this likely due to the following:

- The mine had an insufficient knowledge or awareness of what could cause a buildup of tension in the large external floor wear plates on excavator buckets
- Across the coal industry as a whole there is also generally an insufficient knowledge or awareness of what can cause a build-up of tension in the large external wear plates on excavator buckets
- The mine did not formally assess the risk associated with modifying the wear plates
- The mine did not involve any technical expertise in assessing the risk associated with modifying the wear plates
- Goonyella Riverside mine made a decision to modify the external floor wear plates on a number of excavator buckets in 2014.
- Goonyella Riverside mine didn't apply the processes required within GRM-HSEPRO-0028Change Management Procedure when modifying the external floor wear plates on a number of excavator buckets in 2014.
- The mine had insufficient knowledge of what could cause a build-up of stored tension in the large external floor wear plates, so therefore no one recognised the potential for the wear plate to

spring so far.

- Across the coal mining industry as a whole there is generally an insufficient knowledge of what can cause a build-up of tension in steel plates such as these surface wear plates.
- Indentations in the wear plate were the major reason for the build-up of stored tension which caused the wear plate to violently spring out.
- The Maintenance Manager at Goonyella did not ensure a risk assessment was conducted before the modification to the bucket's wear plates were carried out in 2014.
- The requirements of the change management procedure were not followed before the modifications to the bucket's wear plates were made in 2014.

57. On 7 August 2017 the DNRM issued a safety news flash to all Site Senior Executives of open cut coal mines in Queensland, followed by a Directive to all operational open cut coal mines in Queensland. The Directive required that all coal mines in Queensland take steps to immediately review elements of their Safety and Health Management System (SHMS) relating to the removal and replacement of wear and liner plates on earthmoving equipment, to ensure that risk was at an acceptable level. The mines were required to document evidence of this review.

74. The DNRM published relevant safety alerts via its website and contacted the Australian Industry and Skills Committee requesting learnings from this incident be incorporated into boiler-making training.

75. The DNRM made a number of recommendations as follows.

Recommendation 1

76. Excavator buckets: Smaller wear plates are being used in an alternative wear package. This design is safer because the elastic spring-back potential is much lower than for the large wear plate design used in the incident bucket.

Recommendation 2

77. Other equipment: The hazard of elastic springback is not limited to excavator buckets.

78. Since the incident, anecdotal- and other evidence found from similar operations highlighted the hazards associated with plate structures that had been indented. A range of equipment types were involved. The common factor for all was that plate material had been plastically and elastically deformed during operations, resulting in residual stresses that later released violently.

79. Incidents included:

- In two similar but separate incidents, workers were struck whilst removing indented sections near the rim of rear dump truck trays. Injuries occurred.
- Violent elastic springback was observed during the removal of an under-tub wear plate from a dragline. The plate had probably been indented when the dragline was walked over an uneven surface.
- A worker was struck on the head when a wear strip on an excavator bucket sprung out whilst he was gouging a weld that attached it to the bucket.
- A worker was hit whilst he was removing a wear liner (push pad) from a dozer blade.

80. It is recommended that the above be considered before indented plate sections from any equipment are cut for removal.

Recommendation 3

81. All mines to ensure that they have a procedure within their SHMS that requires an effective risk management process to be carried out on any modification being made to plant and equipment prior to the modification being carried out.

Recommendation 4

82. If a modification to plant and equipment is changing the OEM's design the above procedure must require the mine to consult with the OEM and / or an appropriate technical expert prior to the modification being carried out.

Recommendation 5

83. The Qld mines inspectorate to issue a Safety Bulletin to all mines informing them of the various elements that can cause a build-up of stored tension in steel plates.

DNRM decision not to prosecute

84. DNRME advised at the conclusion of the investigation they would not proceed with a Prosecution in relation to the incident and requested an Inquest be conducted in the public interest.

University of Queensland Material Performance Report (UQMP)

85. Mr Lenny McInnes and Mr Richard Dobeson (University of Queensland) were retained by the Inspector of Mines to investigate the metallurgical and weld cracking related to the external wear plates and the nature and effect of the stored residual stress. He provided a report that was exhibited to the coronial brief and gave oral evidence at Inquest.

86. Mr McInnes confirmed in evidence:

a) The fitment of the external vertical plate package, the metal used in those plates, and the welds made or created to affix the plates to the bucket, were all fit for purpose and appropriate;

b) damage to the vertical wear package on the relevant bucket including that all vertical welds were cracked;

c) the weld plates were not sitting hard against the bucket due to the build up (ingress) of dirt substrate through use, which created the environment for indentations (deformation including 'rippling') to the external plates;

d) some plug welds (described as P1 to 8) were completely detached from the bucket structure (such that they would not sufficiently hold the wear plates to the surface of the bucket);

e) Plug welds described as P4 and P6 were also cracked; there was evidence of extensive fatigue cracking on the external plates;

f) Large or significant fatigue cracking (as was in this case) can be identified by visual observation;

g) Smaller fatigue cracking can be identified by non destructive testing such as ultrasonic inspection or magnetic particle inspection or dye penetration;

h) Repair and maintenance of fatigue cracking requires condition based monitoring, and if wear plates or welds are observed to be no longer suitable they should be repaired or replaced;

i) When indents are created on the plate, they attempt to and tend to, deform the plate in the direction of the indent which is opposing the direction of the overall curvature of the plate and this is the primary mechanism that has forced the plate into its final position after the incident and of course because it still remains attached and welded by the horizonal welds at the top and the bottom, the plate cannot take that final position or its desired position from those indents until those welds are released.

j) Even though there's only the horizontal welds remaining, those welds

are still large and very, very strong and easily capable of holding the plate in position despite the plate's desire or the internal stress on the plate attempting to flatten it and make it take a new shape. And the new shape, being defined by the amount and the severity of the indentations present on the plate;

k) The majority of cracking seen was progressive in nature, consistent with fatigue cracking. The weld design was shown to be inadequate to bear the applied or developed shear stresses. However, the Incident is judged to be primarily related to the factors, which led to accumulation of large residual stresses, more so than the inability of the welds to withstand these stresses. The weld cracking was found to be consequent on, more than causative.

l) The presence of dirt being between the plates and that the presence of the dirt provides a more compliant base underneath the wear plate which allows it to bend more and makes it easier for it for indents to form on the plate. The presence of the indents are the mechanism by which the plate retains this residual stress that makes it want to spring off;

m) The indentation of the plate was the motivator for spring-back;

n) Continued damage to a wear plate increases the stored energy and also how a perforation to the perimeter welds allow dirt ingress and that dirt ingress provides a compliant counter-face which increases the probability of severe indentation, further increasing the likelihood of stored energy.;

o) Cracks and damage or perforations allow dirt ingress between the plates then increases the probability of building up stored energy elastic energy in the plates;

p) Welding the perimeter of small plates gives effectively more constraint more weld to plate ratio, important for making the plates stable and getting them attached well. With the smaller plates, there's no need to do plug welds. The presence of these plug welds is a method to increase the amount of welding the amount of joins to help restrain and constrain the large plate to the bucket structure. The plug welds through the middle of the large wear plate has significantly less – four times – 4.4 times less welding per unit than the small plate (observed from the neighbouring bucket).

q) The primary purpose of the welds is to hold the wear plates to the bucket for the life of the wear plate. Cracks and damage or perforations allow dirt ingress in between plates, that then increases the probability of building up stored energy – elastic energy in the plates. The comparatively less welding on the very large wear plate in comparison to the smaller wear plates makes them more

susceptible to generating or storing up elastic energy – elastic stress, and therefore makes it less applicable.

r) Examining wear plates prior to removal can identify the potential for spring-back of a plate. Observable features such as indentations, cracked welds, and/or dirt between the plates, are clear signs of a potential for spring-back. Large plates should be treated with particular care, since the length of the wear plate magnifies spring-back amplitude.

s) The length of the lever, being 1.7 metres from the attachment point posed inherent danger.

t) Spring-back occurs faster than any human can react, therefore 'getting out of the way' is not possible. Workers have to be outside the danger zone, or the residual stress must be released in a controlled manner (such as by pre-cutting while restraining the plate).

u) Another (possible superior) method of preventing dangerous spring-back events would be to design wear packages that do not tend to accumulate significant residual stresses. This could be achieved by using many small discrete plates instead of large continuous plates.

87. I was greatly assisted by the oral evidence of Mr McInnes and I accept the findings within the UQMP report, and his evidence at Inquest.

BHP Investigation

88. BHP undertook a systematic safety investigation analysis and established an independent team of 11 persons to investigate the Incident and the circumstances around it. The methodology used was the Incident Cause Analysis Methodology ('ICAM'). The ICAM is a structured methodology for identifying causes and contributing factors to safety incidents. The investigation lead was Mr Matt Currie, Vice-President Health, Safety & Environment, Mineral America.

89. Following the investigation, a report was prepared by the Mine Site Senior Executive ('SSE'), Robert Craike, for the purpose of section 201 of the *Coal Mine Safety and Health Act 1999*.

90. The Key Findings from the investigation included:

a) The risk management process at the Mine did not identify the hazard (that is, the hazard of the stored energy in the wear plate);

b) Excavator buckets do not have an effective 1SAP-supported

maintenance strategy, which manages and tracks them throughout their life cycle as separate repairable items (contributed to a reactive and ad-hoc maintenance strategy);

c) The contract management process resulted in an ambiguity about onboarding and supervision of the contractor personnel;
d) The Management of Change ('MOC') process at the Mine did not provide adequate triggers to ensure the impact of changes to standard plant and equipment design was fully assessed; and
e) The approach to risk and change management has not yet developed a mature culture of 'chronic unease' (this is a culture which the norm is prioritising and constantly (but sensibly) testing and reviewing risk in all decisions and actions, at all levels – not just when required by formal risk processes).

91. The key organisational lessons from the investigation were:

a) Leadership must constantly emphasise a 'chronic unease' about risk across all levels of the organisation. The question of "what can go wrong?" must be asked at all times and specific controls must be in place for risks identified. Field leadership provides a good opportunity for leaders to encourage this culture.
b) Some hazards are difficult to identify. Different types and sources of energy need to be explored. Leaders should draw on a broad range of experience and information sources (both internal and external) when undertaking risk assessments.
c) Contractor management processes must enable the business to ensure the effective management of risks associated with contractor's activities. Leaders and other personnel involved in management of contractors need to be trained and skilled to apply this process.
d) The MOC process must allow leaders to manage change in an effective manner and must prevent changes that have the potential to introduce fatal risks from being executed without proper MOC. Leaders and other personnel involved in change activities need to be trained and skilled to apply this process.
e) In an environment with a strong focus on cost and productivity, leaders must constantly reinforce the message that safety is our highest priority, and make sure their behaviours and actions are aligned with this.

92. A number of actions and recommendations came out of the investigation including:

<u>Actions to address absent/ failed defences</u>

a) Do not use the 'large external wear sheet' design on future excavator buckets; use standard smaller horizontal wear strips (or none at all). This should be noted in maintenance strategies for

buckets. (Consider application in the context of other equipment which requires large plates or sheets).

b) Review relevant procedures and risk assessments (including for hot works), to ensure the hazard of stored energy in steel plates/ sheets/ rails/ pipes is identified and addressed with appropriate controls.
c) Review existing buckets at all operations to identify any with the 'large external wear sheet' design; and either dispose of the buckets or develop procedures for the removal of the wear sheets using – Guidance for Managing Stored Energy When Cutting Steel.

Recommendations to address organisational factors

Leadership and culture

a) Leadership to take action to verify current standards of 'chronic unease' and reinforce the principle through leadership routines, integrating concepts around:
    - Risk management.
    - Contractor management.
    - Management of change.
    - Quality of ICAMs/ significant event investigations and action closeout.
    - Lessons from other significant events (in particular fatalities).

Risk Management

a) Delivering/ completing risk system improvements already underway:
    - "Project arrow" – coordination and standardisation of an identified set of SOP risk assessments across multiple BMA Mines, to draw on a more extensive pool of experience and maximise change of identifying low frequency risks, and achieve highest, denominated quality SOPs. Consider sharing those risk assessments and SOPs with other parts of the company.
    - Combine and create searchable databases of safety alerts and ICAMs from across BHP, which will be available as a resource to teams performing risk assessments.
b) Engage with relevant authorities (both directly and through industry associations/ professional bodies) to seek to have the hazards of stored energy steel plates or sheets adequately identified in relevant Government guidelines, Australian Standards, and training qualifications/ competencies for boilermakers.
c) Establish specific guidance to improve the quality of risk assessments, to ensure hazard identification through a systemised and robust process that draws on a broad range of

experience and information sources (both internal and external) where possible.

Contractor Management

a) BHP Minerals Australia to complete the contract of management framework project which is being implemented in response to the fatality at Escondida. Ensure that its scope also addresses the issues with contract and contractor management identified in this ICAM and includes inputs on operational implementation from and training for relevant personnel.

Management of Change

a) Review the MOC process to include a mandatory MOC trigger for where changing, or standard equipment design between non-standard or uncommon design (not a “like for like” replacement) and ensure relevant personnel have training in the MOC process.

One SAP and Maintenance Planning

a) Key repairable components in major plant and equipment should be given unique 1SAP identifiers (equipment) and be included in formal maintenance planning.
b) Consider whether standardised technical design specifications should be adopted for key equipment and components, to ensure consistency in management and maintenance, with any departures requiring a MOC process.

93. Since providing the ICAM report, BHP has provided further evidence in relation to improvements they have made since the Incident. Mr Benjamin Clark is the head of safety analysis and improvement for Minerals Australia (a division of the BHP group that includes operations focused on iron ore, copper, coal and nickel operating across Western Australia, Queensland, New South Wales and South Australia). The Minerals Australia division includes BMA. Mr Clark confirmed that once the ICAM report is completed the actions are endorsed by the vice president of HSE Minerals Australia and the Minerals Australia leadership team. They are then loaded into 1SAP.

94. The actions are given a unique identification number and refer to a ‘Notification’. Each Notification is assigned to an individual from the Mine or function as appropriate. Once the action has been completed by the individual, evidence is attached to the Notification to demonstrate completion. The information is permanently recorded.

95. Once completed, the Notification is reviewed. When the reviewer is

satisfied, they mark the Notification as review complete. If not satisfied they will talk to the responsible action owner and if necessary, further actions will be undertaken. A summary report detailing the status of the actions is distributed via monthly report to all senior HSE leaders within Minerals Australia. The report allows this team to follow up any actions that are not on track with the onsite leaders.

96. Mr Clark has advised as at 20 September 2019, there were 339 Notifications created across BHP Minerals Australia sites and functions for the Incident. Of these 326 have a summary status of complete; one Notification has a summary status of approved; and 12 Notifications have a summary status 'overdue'. Mr Clark has provided an extract of the report which shows only Notifications relevant to the Incident.

97. In addition to that process there is auditing of Notification completion which is undertaken. This was completed in January 2019 in relation to the Incident. Of those actions reviewed 79 were completed adequately; 12% had not been assigned via 1SAP; and 9% of actions were either still outstanding or did not meet the intent of the original action.

98. Mr Clark confirmed a review of South Walker Creek Mines, Poitrel Mines and all BMA sites, 'prohibited and restricted items register', has confirmed that they list large sheet steel wear plates on large excavator buckets as a prohibited item. Further, the BMA wear plate procedure has been implemented at 10 BMA sites in addition to the Mine.

99. Mr Clark has set out the actions that have been undertaken by BMA in response to the Incident. Some of the actions are general improvements and, by themselves, would not necessarily have prevented a similar Incident.

Conclusions and Findings

100. I endorse the recommendations contained within the Nature and Cause Investigation Report prepared for the Chief Inspector of Mines.

101. I acknowledge and endorse the ICAMS analysis commissioned by BHP and the findings, recommendations and implemented improvements arising therefrom.

102. The scope of work to be undertaken by Daniel was ill defined when assessed against the risk. Individual boilermakers were required to exercise independent judgement as to how best remove a 'novel' wear plate package, presenting with significant damage and consequent stored damage. Daniel drew on his significant experience and utilised his knowledge and training. He was not aware the deterioration and damage to the plates accumulated stored energy such that upon release the metal would spring-back in excess of 1.15 metres.

103. I accept that only in hindsight can it be understood that when confronted with these circumstances a usual approach could not be adopted to the methodology for removal.

104. Daniels risk of injury was not within an acceptable level. A lack of knowledge regarding the behaviour of the metal plates under such conditions does not, and did not, negate the obligation to ensure the risk was acceptable and to keep him safe in the workplace. He was fatally wounded through no error on his part.

105. The question which is almost unanswerable is whether knowledge of a spring-back event to of this magnitude under these conditions could have been acquired earlier. I take into account that there were no previous near misses of this type; no fatality arising in the same circumstances; no issue of inadequate or deficient training.

106. I accept the ultimate submission of BMA that the lack of knowledge meant that BHP, ESCO, DNRM did not and could not have recognised the potential for the wear plates to dislocate to the magnitude as occurred in this Incident. This lack of knowledge applied across the coal mining industry, including within the Queensland Mines Inspectorate. This absence of knowledge also afflicted the boiler-making and steel fabrication industry and the engineering and academic community. BHP now classify large wear plates of this type as a prohibited item.

107. Daniel's death is a tragic accident. Without knowing the inherent risk no control measure could have mitigated against the unprecedented magnitude of the spring-back in this instance.

108. The learnings from this coronial investigation will not restore Daniel to his family. The decommissioning of wear packages of this type will however mitigate against further fatalities.

Recommendations

109. I recommend that the DNRM (or Resources Safety and Health Qld as it is now) follow up on all recommendations made in the Nature and Cause Investigation Report prepared for the Chief Inspector of Mines and to undertake an industry wide audit ensuring compliance with all recommendations within that report, ensuring the decommissioning of large sheet steel wear plate packages of this type on excavator buckets.

110. I recommend that DNRM issue a further Safety Alert or Bulletin alerting industry that the hazard of spring-back is not limited to excavator buckets and applies to a range of equipment deformed or damaged by wear increasing the potential for violent release of metal during removal processes.

111. Further I recommend that the DNRM provide these Inquest findings to relevant industry training providers to ensure the learnings are incorporated in training content.

Key Learnings

112. A significant key learning arising from the Inquest is that cumulative damage caused by weld cracking, perforation, wear and dirt ingress between the curved steel wear plates, increases the likelihood of stored energy or tension, which in turn increases the risk of hazard including significant spring-back and displacement of metal under certain conditions.

113. A change of shape of large wear plates, which may include rippling and / or indentations, is indicative of the potential for an increase of stored energy and therefore, hazard.

114. The length of the plate correlates to the potential length of the metal lever when released and therefore indicative of the size of the hazard.

115. In this case the plate size was 2 x 3.4 metres and the offending lever was 1.7 metres from its attachment point to tip. The incident plate came to spring-back approximately 1.2 metres when released (at the point it struck Mr Springer) and came to rest in a static position of 600-650mm.

Referrals (s.48 *Coroners Act*)

116. I accept the submissions of Counsel Assisting, the DNRM, BMA, ESCO and IMS and I make no formal referrals.

Acknowledgements

117. I acknowledge Counsel Assisting the Inquest Ms Zerner for her comprehensive presentation of the evidence at Inquest and her thorough written submissions. I thank all Counsel and instructors for the collegiality and professionalism demonstrated during the Inquest, and for the quality of written submissions provided.

Condolences

118. On behalf of the Coroners Court of Queensland I offer my sincerest condolences to Mrs Carmela Springer and to their only child, Wolf, and to Daniel's parents Kerry, and Reon, and siblings Cristi, Michael, Benjamin and Emma of their tragic loss. I wish them well in their healing.

Findings required by s. 45 Coroners Act 2003

Identity of the deceased – Daniel Geoffrey Springer

How he died – Daniel Geoffrey Springer a qualified and experienced boilermaker whilst performing lawful duties as an employee of Independent Mining Services at Goonyella Riverside Mine sustained a fatal head injury whilst removing metal welds holding a large middle section vertical wear plate to an excavator bucket using an air carbon arc gouger. The section of metal plate released violently creating a spring-back effect of 1.150metres striking Daniel in the head. The cause of the spring-back event was due to the build up of stored energy through the cumulative heavy use of the excavator bucket resulting in weld cracking, perforation, wear and dirt ingress and significant indentation to the external wear plates. The magnitude of the spring-back event was unprecedented. At the time of Daniel Springer's death there was limited, if any, coal mining industry knowledge regarding the propensity for large indentations on large external wear plates to increase stored energy so as to create the conditions for a spring-back event to the extent of 1.150metres.

Place of death – Townsville Hospital
TOWNSVILLE QLD 4810
AUSTRALIA

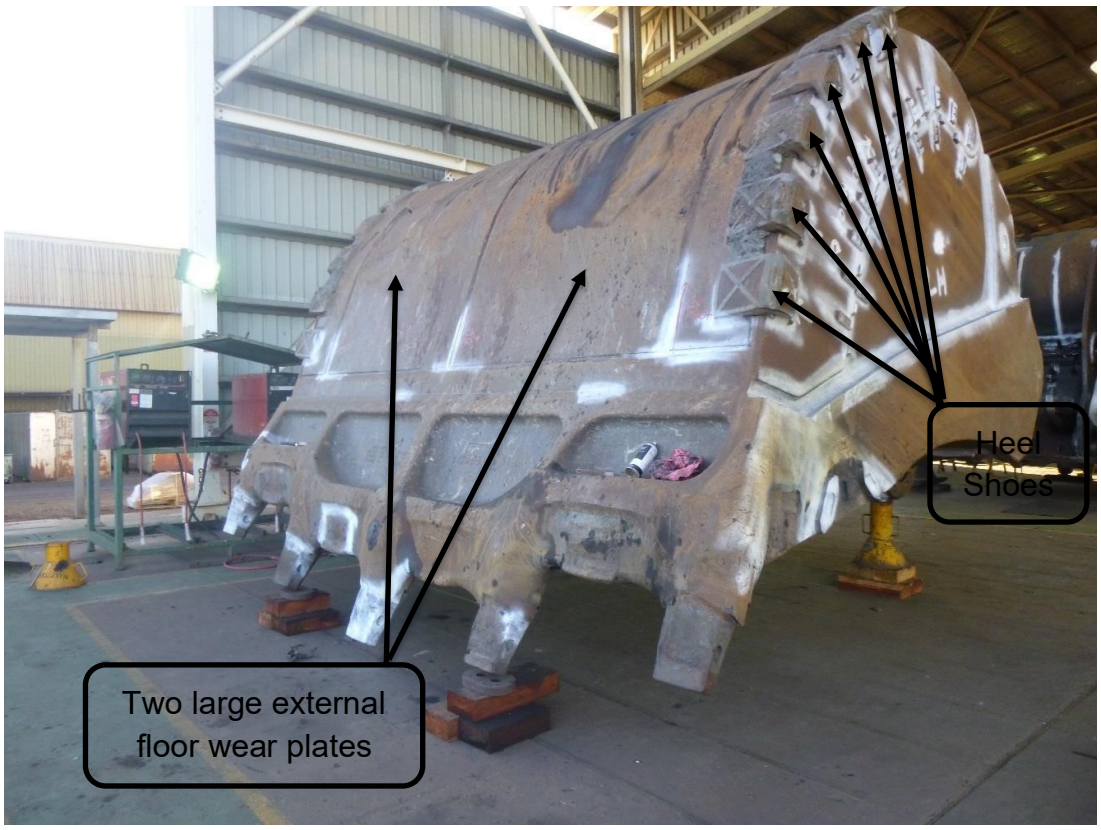
Date of death– 6 August 2017

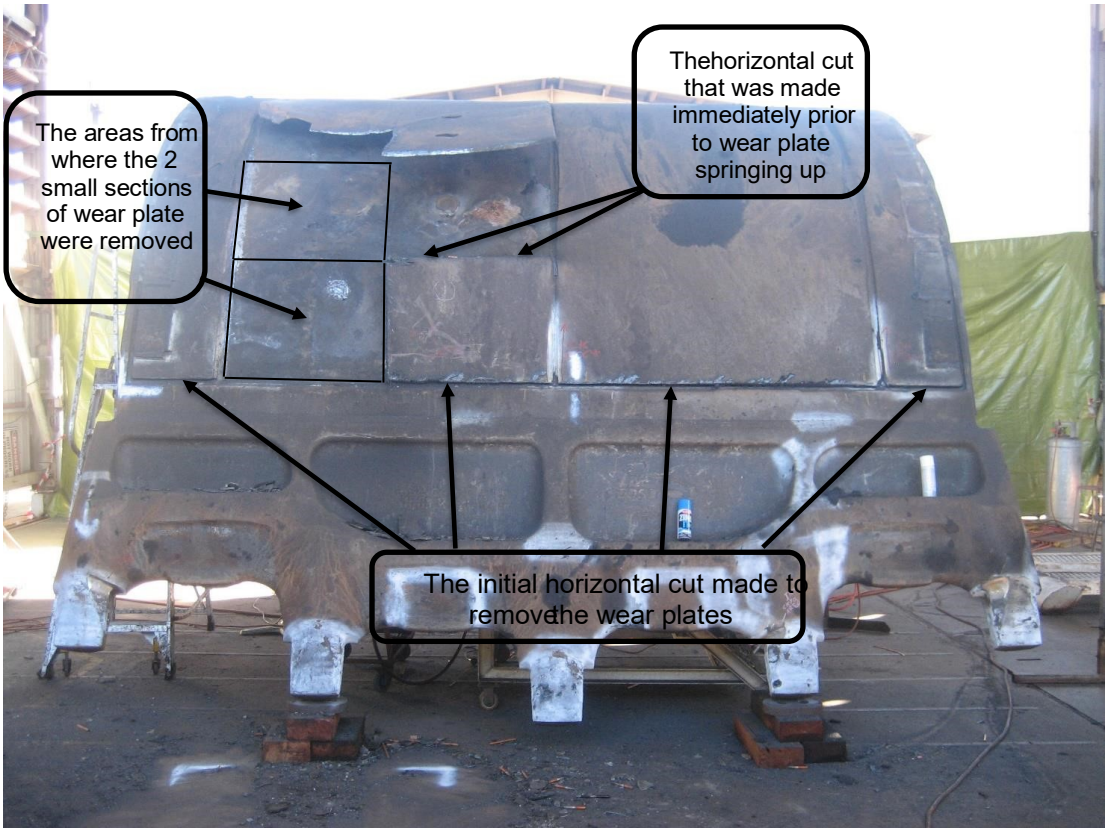
Cause of death – 1(a) Head injury
1(b) Industrial accident

I now close the coronial investigation.

Nerida Wilson
Northern Coroner
CAIRNS

[OEM] Original wear package – smaller horizontal plates





Excavator bucket post incident – depicts the work performed immediately prior to the spring back event

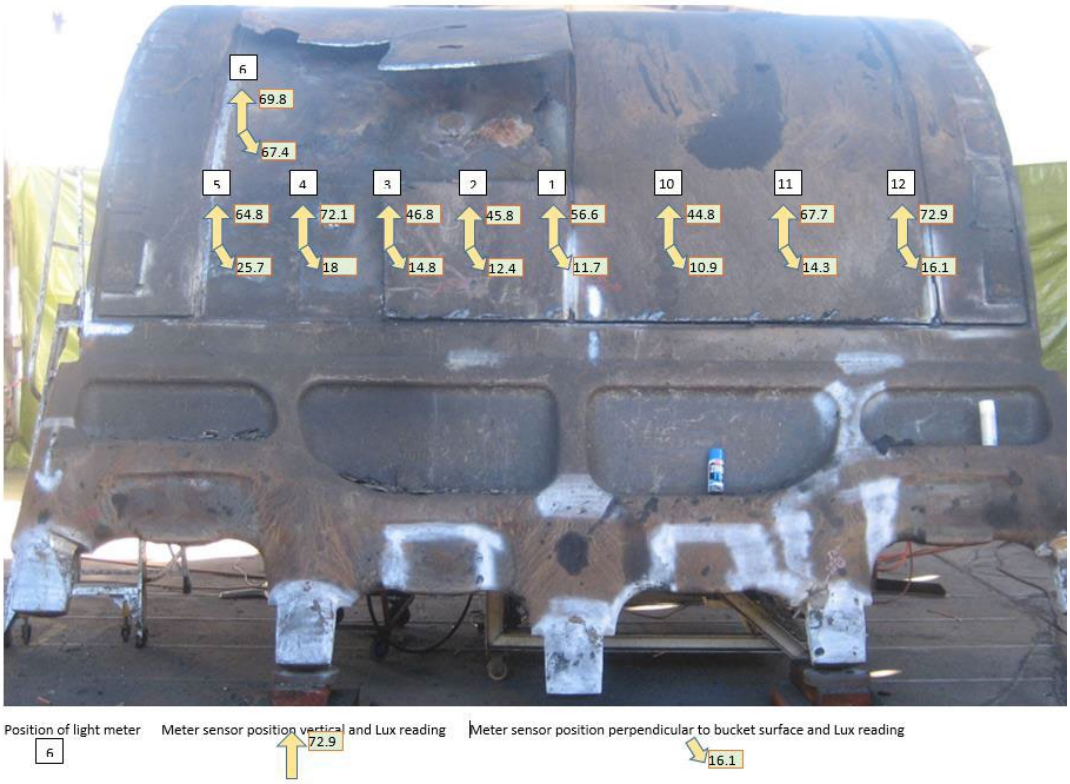


Photo of work platform in situ from which Mr Springer was working on bucket #1 at the time of the spring back event.