



SAFETY WISE

INCIDENT INVESTIGATION REPORT into A NEAR MISS BETWEEN A GRADER AND WORK GROUP ON THE COASTAL BYPASS CONSTRUCTION PROJECT

**Prepared by
Safety Wise Solutions Pty Ltd**

SWS 03 Ver 2 (Final) 30 July 2010

Prepared for the sole purpose for advancing safety.
Confidential and subject to limited distribution.



CONTENTS OF REPORT

1.0	Investigation Team	3
2.0	Incident Description	3
2.1	Incident	3
2.2	Events Leading up to the Incident	4
2.3	Incident Description	5
2.4	Events Post Incident	6
2.5	Photographs	6
2.6	Time Line	8
3.0	Data Collection	9
3.1	People	9
3.2	Environment	11
3.3	Equipment	12
3.4	Procedures	12
3.5	Organisation	13
4.0	Key Findings	15
4.1	Basic Cause	15
4.2	Contributing Factors	16
4.2.1	Absent or Failed Defences	16
4.2.2	Individual or Team Actions	16
4.2.3	Task or Environmental Condition	17
4.2.4	Organisational Factors	17
5.0	Recommendations	18
5.1	Communication via Safety Alert (Administration)	18
5.2	Risk Management and Training (Administration)	18
5.3	Procedures (Administration)	18
5.4	Responsibilities (Administration)	19
5.5	Inspections (Administration)	19
5.6	Contractor Management - Monitor and Review (Administration)	19
5.7	Learning from Previous Incidents (Administration)	19
5.8	Fair and Just Culture (Administration)	19
6.0	Management Review of the Investigation Report	20
6.1	Management Review	20
6.1.1	Distribution	20
6.1.2	Implementation of Corrective Actions	20
6.1.3	Implementation Monitoring	20
6.1.4	Analyse Effectiveness	20
6.1.5	Document Archival	20

7.0	Significant Learnings	20
7.1	Mobile Plant Risk Management	20
7.2	Contractor Management - Monitor and Review	21
7.3	Operational Discipline with Risk Management	21
7.4	Responsibilities for Supervision of Work Groups	21
8.0	Appendices	22
8.1	ICAM Analysis	22
8.2	Corrective Action Plan	23
9.0	Report Sign-off	24

Sample Report

1.0 Investigation Team

Name	Position	Company
[Name]	ICAM Lead Facilitator (independent)	Safety Wise Solutions
[Name]	Construction Superintendent	Road and Civil Constructions (R&C)
[Name]	Safety Advisor	Road and Civil Constructions (R&C)

2.0 Incident Description

2.1 Incident

Brief Description: A grader operator was levelling the road surface on the Coastal Bypass Construction Project at Hawks Bay in Victoria when the grader operator reversed the grader into the close proximity of two other workers preparing geotextile fabric on the road surface.	
Location: Coastal Bypass, Hawks Bay, Victoria	Area: Northern Cut 4, southbound carriageway
Incident Date: Monday, 19 July 2010	Time: 1630 hrs
Reported Date: Monday, 19 July 2010	Time: 1645 hrs (approx.)
Road and Civil Constructions Reference - Incident Number: 046	
Incident Type: Near Miss - interaction between mobile plant and workers on foot	

Details of Entities Involved

Principal Contractor: Road and Civil Constructions
Contractor: ACME Plant Hire
Labour Hire: Multitask Labour Hire

Details of Person/s Involved

Employer: ACME Plant Hire	
Name: [Name]	Role: Grader Operator
Employer: Road and Civil Constructions	
Name: [Name]	Role: Roller Operator / Labourer (Labourer #2)
Employer: Multitask Labour Hire	
Name: [Name]	Role: Labourer (Labourer #1)

Injuries Sustained:

Nil

Details of Equipment and Damage

Equipment:	Grader, John Deere C68980
Owner of Equipment:	ACME Plant Hire
Damage to Equipment:	Nil

Environmental Impact:

Nil

Risk Rating

Actual Consequence Level:	Low
Potential Consequence Level:	Extreme (Class 1 - potential multiple fatalities)

The risk rating was assessed using the Australian Standard AS/NZS ISO 31000:2009 and based upon Road and Civil Constructions' Risk Matrix Classifications from Procedure "Risk Management" Doc. No. RC-HS-PRO-01.

2.2 Events Leading up to the Incident

- a) Road and Civil Constructions (**R&C**) is the Principal Contractor for the new road construction of the Coastal Bypass Construction Project (**the Project**) at Hawks Bay, Victoria. R&C commenced construction on this Project in October 2009 with construction activities being conducted for approximately nine months.
- b) On the day of the incident, several work teams were working on areas of the road construction around Cut 4 to smooth and level the carriageway in preparation to lay the tarmac. A 25-metre section of road remained unprepared due to drainage works still in progress.
- c) A gravel ramp had been constructed on this 25-metre section of road to allow vehicle access to the drainage works to prevent damage to the rock fill and geotextile fabric (**Fabric**) which had been previously laid.
- d) One of several tasks for that day was to remove the gravel ramp and prepare the carriageway surface for completion. It was during this task that the incident occurred.
- e) On Monday, 19 July 2010, at 0630 hrs, the people involved in the incident (Grader Operator, Roller Operator/Labourer and Labourer) attended the Daily Pre-start Meeting delivered by the Area Supervisor and Leading Hand.
- f) The task and specific activities for the day were assigned by the Area Supervisor to the relevant personnel.
- g) The Roller Operator/Labourer, employed by R & C Constructions, (**Labourer #2**) was assigned work operating the roller at Fill 3 to continue compacting rock fill and gravel.

- h) The Grader Operator, employed by ACME Plant Hire, (**Grader Operator**) commenced his assigned work to complete spreading gravel on the southbound carriageway surface by operating a John Deere C68980 Grader. Refer to Figure 1 showing the grader being operated.
- i) The Labourer from Multitask Labour Hire (**Labourer #1**) was given the task to assist, and act as a spotter for the Grader Operator.
- j) Around 1030 hrs, the Area Supervisor instructed the Grader Operator and Labourer #1 to cease their current task and commence removing the gravel ramp on the unprepared 25-metre section on the southbound carriageway.
- k) They both went to the ramp area and Labourer #1 continued being his spotter. Both the Grader Operator and Labourer #1 did not complete or sign on to a risk assessment for this new task.
- l) During the removal of the gravel ramp the Fabric underlay was damaged caused by operation of the grader.
- m) At 1430 hrs a Backhoe Operator was instructed to remove the damaged Fabric and deliver new Fabric to the area for preparation and installation.
- n) At 1600 hrs the removal of the ramp and Fabric was completed including trimming of the rock layer for surface preparation.
- o) Labourer #1 then left the Grader Operator and started preparations for laying the new Fabric as he assumed the grader work was complete. Preparations included creating an overlap to join on to the existing Fabric.
- p) Also, at approximately 1600 hrs Labourer #2 was instructed by the Leading Hand to assist Labourer #1 to prepare and install the new Fabric.
- q) At this time, the Grader Operator continued to level any remaining rock/gravel on the carriageway. He operated the grader without a spotter.
- r) Both Labourer #1 and Labourer #2 were preparing the existing Fabric for a 300mm to 500mm overlap with the new Fabric. No risk assessment was completed for this task.
- s) Labourer #1 placed his 2-way radio (used to communicate with the Grader Operator as part of spotter responsibilities) on the edge of the carriageway, and away from the work of preparing the Fabric edge, because he thought his spotting duties were finished and that the radio was an obstruction to the work and may be potentially damaged.

2.3 Incident Description

- a) At 1630 hrs both Labourers were working on the Fabric edge preparation facing south with their backs to the grader operating on the carriageway. Labourer #2 spotted the grader “out of the corner of his eye” reversing in their direction. Refer to Figures 2, 3 and 4 showing the location of the labourers in relation to the reversing grader.
- b) Labourer #2 alerted Labourer #1 and they both quickly moved to ensure they were each clear of the grader travel. The Labourers were not in the direct path of the grader; however, were in close proximity; being one to two metres away.

2.4 Events Post Incident

- a) Labourer #1 went immediately to get his 2-way radio to communicate to the Grader Operator to stop operating.
- b) The Grader Operator immediately stopped the grader and dismounted from the cabin.
- c) The Area Supervisor who was standing approximately 150 metres away witnessed the event and immediately approached the workers and ceased operation in the area.
- d) The Area Supervisor reported the incident at 1645 hrs to the Project Manager.
- e) He then went and advised the Leading Hand of the incident who was working with another work team.

2.5 Photographs



Fig. 1: Grader – John Deere C68980



Fig. 2: Aerial view showing direction of travel of the grader and position of the labourers preparing the geotextile fabric on the carriageway.



Fig. 3: View from inside the grader showing location of both Labourers.



Fig. 4: Location of the grader and Labourers at the time when the Labourers observed the grader reversing in the close proximity to them.

2.6 Time Line

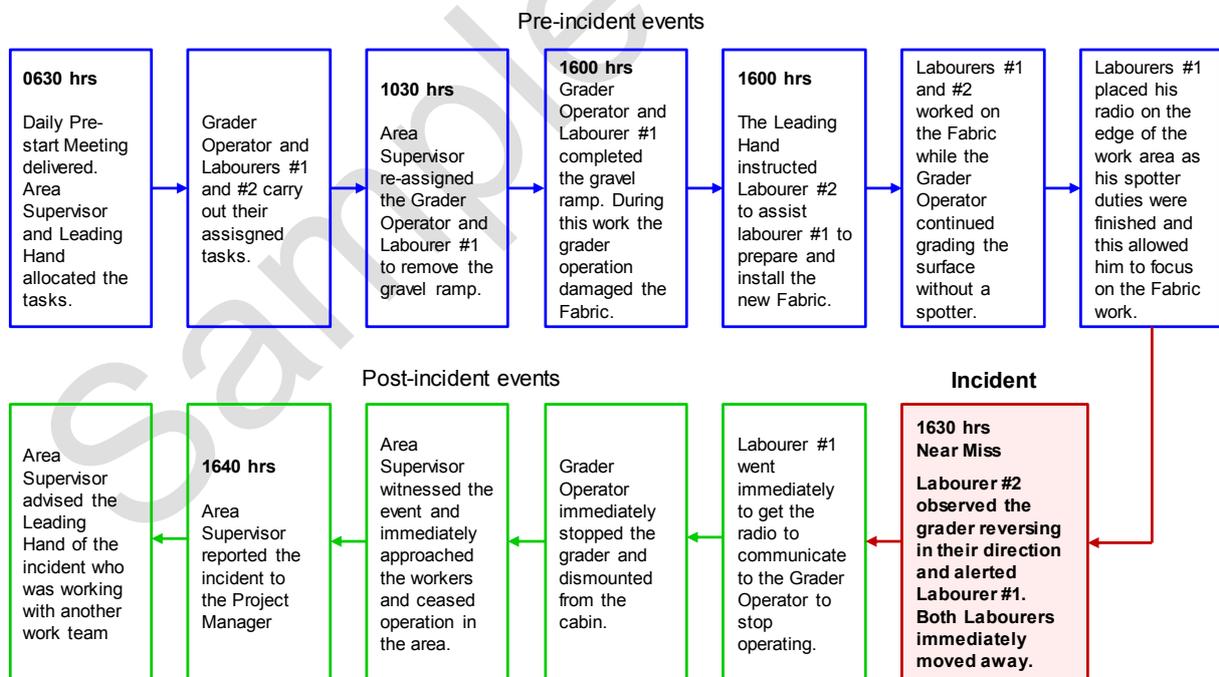


Fig. 5: Time line summary of events

3.0 Data Collection

Data was gathered to identify the relevant facts surrounding the incident using the principles, techniques, and methodology of the ICAM Data Collection process focusing on the five data categories known as the “PEEPO” process. These five data categories are:

- People;
- Environment;
- Equipment;
- Procedures; and
- Organisation

The basis of the data collection is to establish details of the incident and determine the contributing and non-contributing factors to the incident.

3.1 People

The personnel associated with the incident and/or activities and process impacting on the incident occurring on 19 July 2010 were interviewed providing statements and/or were subject to discussions. These personnel are detailed in Table 3.1.

Name	Position	Company
[Name]	Roller Operator / Labourer	Road and Civil Constructions
[Name]	Area Supervisor	Road and Civil Constructions
[Name]	Leading Hand	Road and Civil Constructions
[Name]	Backhoe Operator	Road and Civil Constructions
[Name]	Safety Advisor	Road and Civil Constructions
[Name]	Contracts Administrator	Road and Civil Constructions
[Name]	Grader Operator	ACME Plant Hire
[Name]	Plant Hire Superintendent	ACME Plant Hire
[Name]	Labourer	Multitask Labour Hire
[Name]	Safety Manager	Multitask Labour Hire

Table 3.1 - Personnel interviewed and/or subject to discussions

Supervision and Work Instructions

- On the day of the incident, the Area Supervisor assigned duties at the Daily Pre-start Meeting. Potential hazards and the approved control measures were discussed at the meeting including moving plant, reversing plant, use of spotters and safe work method statements (**SWMS**). All persons involved in the incident attended the Daily Pre-start Meeting and signed onto the Daily Pre-start Meeting Form.
- The Grader Operator, Labourer #1, and the Roller Operator / Labourer (Labourer #2) were assigned specific tasks at the commencement of the day, and later during the day, the Area

Supervisor and Leading Hand re-assigned them the task of removing the gravel ramp and preparing the carriageway surface for completion.

- Minimal instructions were given for this task as indicated below by the following description:
 - The Area Supervisor requested the Grader Operator “to remove the gravel ramp on the southbound carriageway at Cut 4.”
 - The Leading Hand requested Labourer #2 “to go to Cut 4 and help Labourer#1 with the installation of the Fabric.”
- No risk assessment was completed prior to the start of this newly allocated work. Reliance was upon the workers knowing what SWMS’s were available, and the specific risk controls that were discussed at the Daily Pre-start Meeting.
- The Area Supervisor and Leading Hand both had roving responsibilities for several tasks and work teams on the Project. At the time of the incident both the Area Supervisor and Leading Hand were attending to other work.

Training and Experience

The Grader Operator is:

- engaged as a contractor by R & C and employed by ACME Plant Hire. He has been working on site for ten days;
- trained and competent on operating the John Deere grader. He had three weeks experience on this grader plus five years of experience on Cat graders;
- inducted onto the site - completing the induction on 11 March 2010;
- completed awareness training covering the R & C SWMS “General Earthworks Safety” Doc. No 009; and
- trained in the ACME Plant Operation risk assessment - “when reversing plant, a spotter must be used and if the spotter goes out of sight immediately stop operating.”

The Roller Operator / Labourer (Labourer #2) is:

- employed by R & C and was inducted on 11 June 2008;
- trained and competent on operating rollers with ten years of experience; and
- completed awareness training covering the R & C SWMS “General Earthworks Safety” Doc No. HS-SWMS-009 and “Spotting for Heavy Plant” Doc. No. HS-SWMS-078.

The Labourer (Labourer #1) is:

- engaged by R & C and employed by Multitask Labour Hire and has been on site for ten weeks;
- inducted onto the site completing the induction on 10 April 2010; and
- completed awareness training covering the R & C SWMS “General Earthworks Safety” Doc. No 009 and “Spotting for Heavy Plant” Doc. No.078.

Other Factors

- No fatigue or other fitness for duty issues were identified of those persons directly involved.
- The Area Supervisor and Leading Hand were not aware the Grader Operator was operating without a spotter for the task.
- Labourer #2 was wearing earplugs and did not hear the grader's reversing beeper.
- Labourer #1 had removed his 2-way radio and left it on the edge of the carriageway to carry out the task of preparing the Fabric and therefore had no direct communication with the Grader Operator.
- A communication system was developed previously by the team using both hand signals and the 2-way radio. This process was unapproved and ad-hoc.
- No time or other pressures were evident to complete the task.

Conclusions

- There was ineffective and inadequate supervision with respect to the practical application of the work being undertaken because of limited instruction and lack of adequate control measures provided by the Area Supervisor and Leading Hand. There was poor coordination of work that involved two different tasks, which did not account for clear separation of personnel working on foot in the vicinity of reversing mobile plant.
- No risk assessment was conducted for this task, which is a mandatory procedural requirement detailed in Section 3.4 of this report.
- There was no form of direct communication (radio or hand signals) between the Grader Operator and the two Labourers.
- The Grader Operator was operating the grader without a spotter, despite this being a mandatory procedural requirement.

3.2 Environment

The conditions in the vicinity, and on the day of the incident are summarised as follows:

- Weather was fine and dry with clear visibility.
- The sun was low in the sky with sunset at 1705 hrs; however, this did not impede visibility.
- The surface of the work area was a layer of rock fill nominally 125mm diameter in size.
- The two Labourers who were working on preparing the Fabric at the time of the incident were standing on a gravel surface facing south, and with their backs to the reversing grader.
- Time pressure was not identified as a factor, although workers were due to be off site by 1700 hrs.
- The two Labourers were working behind the grader, approximately one to two metres, outside its line of travel.

Conclusions

The environmental issue was the unsafe proximity of the two Labourers, only being one to two metres away from the reversing grader operation on the road, without adequate protection and no knowledge of the grader work being performed at the time of the incident.

3.3 Equipment

The following equipment was in use, or available on site at the time of the incident:

- John Deere grader C68980:
 - identified as in good operational condition.
 - equipped with clean and clear glass and installed side mirrors providing good visibility.
 - found to have fully operational reversing alarm and lights.
- Hand held 2-way radio:
 - not carried and used by the Labourer at the time of the incident.
 - used to ensure verbal communication between the spotter and mobile plant operator.
- Physical barriers:
 - there were no physical barriers to define and mark movements of the grader when working near people and thereby provide appropriate separation and/or exclusion zones.
- PPE:
 - standard personal safety equipment including hi-visibility vests and ear plugs were worn.

Conclusions

- The work area was inadequately prepared to provide clear separation between the grader and any workers on foot, given that multiple tasks were being carried out in close proximity to each other.
- There was no positive communication in place in the form of either a 2-way radio, agreed hand signals, and/or a clear line of sight between the Grader Operator and a designated spotter.

3.4 Procedures

Road and Civil Constructions' processes and procedures were reviewed to establish any aspects that may have contributed to the incident. The following information was obtained:

- The Daily Pre-start Meeting, conducted on the 19 July 2010 by the Area Supervisor and Leading Hand for R & C, identified potential hazards such as "moving plant" and "hit by mobile plant." The control measures documented and discussed were the use of a "spotter, 2-way radio communication, SWMS's and delineation." All persons involved in the incident that day signed onto the Daily Pre-start Form; however, the control measures were not adequately applied during the task of reinstalling the Fabric and grading the road surface.
- Neither the Take 5 nor Job Safety Environmental Analysis (**JSEA**) risk assessments were conducted prior to commencing the work by both the Grader Operator and Labourer #2 when

each person was assigned their new tasks (remove gravel ramp and install Fabric on road surface) later in the day. This is a mandatory requirement under the Risk Management Procedure, Doc. No. RC-HS-PRO-01. If a specific SWMS's is not available, a JSEA must be completed for the task.

Additionally, Labourer #1 also did not complete a "Take 5" when his scope of work changed to replacing the Fabric.

- The R & C Project Risk Register identified the hazard "personnel struck by mobile plant" and stated the control measures to be implemented such as a spotter, 2-way radio communication, delineation of works by use of barriers, and exclusion zones. These control measures are detailed in the relevant SWMS's for this work.
- The SWMS's applicable for the work being conducted at the time of the incident were:
 - R & C General Earthworks Safety, Doc No. HS-SWMS-009; and
 - R & C Spotting for Heavy Plant, Doc. No. HS-SWMS-078.

Both documents identify the appropriate control measures to be implemented for the tasks.

- The ACME Plant Risk Assessment for operation of the grader states; "when reversing plant, a spotter must be used and if the spotter goes out of sight immediately stop operating."
- The R & C Project Safety Management Plan, Doc. No. HS-SMP-001 was reviewed specific to responsibilities and application of risk management, applicable SWMS's and safety when working around mobile plant. This document aligns to the Project Risk Register and relevant SWMS's.

Conclusions

The documentation for the assigned work at the time of the incident was up to date and is available. All persons involved in the incident had been trained in the relevant procedures and were familiar with the documentation. There was inadequate operational discipline in following and applying the formal documented processes such as completing a risk assessment and application of the SWMS's.

3.5 Organisation

R & C systems and processes impacting on the task being carried out at the time of the incident included:

Procedures

- Procedures and SWMS's were available and implemented as detailed in Section 3.4 of this report; however, these were not followed to the standard required which resulted in hazards remaining unaddressed.
- Previously completed Task Observations and Workplace Inspections during the Project have identified issues such as behavioural non-conformance to documented process, and hazards addressed. Some specific areas identified have included the inconsistent use of risk assessments, where there has been a change to the scope of work, and the application of SWMS's; in particular, the use of documented control measures around working around mobile

plant. There is limited evidence of corrective actions being implemented to address the issues raised from the Task Observations and Workplace Inspections.

Risk Management

- Where different tasks were assigned throughout the day, no risk assessment/s were carried out to identify potential hazards for the new scope of work. Management of change processes applied for the scope of work were ineffective with hazards and risks not identified and/or not addressed.
- Past practices for this Project have indicated the Daily Pre-start Meeting held at the start of the shift is when a formal risk assessment is completed, if no SWMS's are available. The Take 5 required at the start of each further assigned task throughout the day is not always completed. There was no Take 5 or JSEA completed for the newly assigned task, where the incident occurred.

Training and Communication

- Training on risk assessments and the relevant SWMS's for the task was provided and completed by the persons involved. There is no indication of follow up on site to determine conformance to process.
- Training includes site induction, risk assessments, and SWMS's.
- Communication is generally via (i) Daily Pre-start Meetings covering work activities, associated hazards and risks; and (ii) Toolbox Meetings covering previous incidents and learning across the Project and organisation.

Roles and Responsibilities

- Inadequate application of responsibilities with respect to work planning, supervision, work instruction, communication, and application to process.
- Ineffective work planning and coordination between the Area Supervisor and Leading Hand.
- There exists an organisational tolerance to allow non-conforming practices to that of documented process to go unaddressed. This is evident by (i) inaction to address issues identified from inspection processes, such as the Task Observation and Workplace Inspection; and (ii) inconsistent application of SWMS's, such as spotter duties, by different work teams across the Project.
- Contractor management between all parties from the Principal Contractor to subcontractors indicate unclear responsibilities and accountabilities with less than adequate communication and operational discipline to documented process.

Previous Incidents

- A previous similar near miss incident on this Project, occurred approximately six weeks prior, on 1 June 2010, in which a backhoe operator was reversing in the close proximity to workers. The recommendation from this incident was to "ensure spotters are used." There is no evidence of any follow up monitoring or review of this recommendation.

- Additionally, at a Toolbox Meeting held on the 9 July 2010, three separate incidents resulting in property damage caused by reversing vehicles were communicated. Again, all personnel were reminded of the importance of using a trained spotter.

Conclusions

The planning and application of the work where the incident occurred, demonstrated ineffective working arrangements between the work group due to:

- ineffective supervision through inadequate lines of communication between the Area Supervisor, Leading Hand, Grader Operator, and Labourers, with both the initial work instruction and follow up of the work;
- work was allowed to proceed without a risk assessment being completed that should have identified the hazards and addressed the associated risks;
- the scope of work was unclear between the Grader Operator and Labourers working on the Fabric; and
- the safe working practices around working with mobile plant were ignored by the workers and went unchecked by the Leading Hand and Area Supervisor.

While the investigation did identify that errors were committed by directly involved persons carrying out their work; they are considered “system induced errors” whereby they were assigned the duties without adequate instruction and supervision. This investigation found that there exists a tolerance across the Project, allowing non-conformance to procedures to become repeated behaviours.

The organisation has systems and processes in place; however, the application of process is inadequate and ineffective. This is supported by:

- inadequate management of previous incidents with minimal corrective action follow-up resulting in deficiencies remaining in the safe systems of work;
- Task Observations and Workplace Inspections not identifying diminishing operational discipline and not addressing all identified hazards in the workplace;
- inadequate supervision tolerating non-compliance behaviour; and
- a largely ad-hoc and informal process of system review, which is focused on a surface level (quantity) approach rather than a detailed examination (quality).

4.0 Key Findings

The key findings outline why the incident occurred and the contributing factors identified from the investigation have been categorised using the Incident Cause Analysis Method (**ICAM**). The ICAM analysis chart is shown as an Appendix in Section 8.1 of this report.

4.1 Basic Cause

The basic cause of the incident was the failure to ensure adequate separation between the workers installing the Fabric on the carriageway surface and the reversing grader.

This basic cause combining with the following contributing factors led to the incident.

4.2 Contributing Factors

Based on the evidence to hand, the Investigation Team consider the following were the main contributing factors to the incident:

Note: All codes assigned to the contributing factors are detailed in the Safety Wise Solutions Pocket Investigation Guide; pages 70 to 74.

4.2.1 Absent or Failed Defences

- **DF1** Awareness - Hazard identification: No risk assessment (Take 5 or JSEA) was conducted prior to the task being performed, resulting in hazards and hazard mitigation strategies not identified.
- **DF5** Awareness - Work instruction/procedures: There was ineffective application of SWMS's specific to separation between mobile plant and workers.
- **DF1** Awareness - Hazard identification: There was no designated spotter to monitor the proximity of the grader operation to the workers on foot.
- **DF4** Awareness - Supervision: There was inadequate supervision in place to ensure the relevant work instructions and risk assessment for the task was applied to an acceptable standard.
- **DF2** Awareness - Communication: There was no positive or effective communication in place between the Grader Operator and Labourers including visual, verbal, hand signaling or radio communication.
- **DF17** Protection and Containment - Barricading/exclusion zones: There was no delineation of work zones including the use of a physical barrier.

4.2.2 Individual or Team Actions

- **IT7** - Change management error: The Labourers did not complete a risk assessment, Take 5 or JSEA for the new work. (Routine Violation¹)
- **IT11** - Hazard management error or violation: Labourer #1 did not act as a spotter as he assumed this was not required. (Rule Based Mistake²)
- **IT10** - Hazard recognition/perception: Labourer #1 placed the radio out of the direct work area on the edge of the carriageway and did not communicate with the Grader Operator. (Rule Based Mistake)
- **IT1** - Supervisory error or violation: Both the Area Supervisor and Leading Hand allocated the work without adequate instruction and allowed the work to commence without a risk assessment being conducted. (Routine Violation)
- **IT7** - Change management error: The Grader Operator did not complete a risk assessment, Take 5 or JSEA for the new work. (Routine Violation)

¹ Safety Wise Solutions Pocket Investigation Guide
s05 - Routine violation - habitual corner cutting / implicitly accepted.

² Safety Wise Solutions Pocket Investigation Guide
s05 - Rule based mistake - incorrectly applying a rule or having a poor plan.

- **IT12** - Work method error or violation: The Grader Operator reversed the grader without a designated spotter in place. (Personal Optimising Violation³)
- **IT10** - Hazard recognition/perception: The Grader Operator reversed the grader in the close proximity to workers. (Rule Based Mistake)

4.2.3 Task or Environmental Condition

- **HF5** - Situational awareness: The Grader Operator was not aware he was reversing in close proximity to the Labourers. The Labourers were standing with their backs to the grader.
- **TE12** - Routine / non-routine task: The damage to the Fabric from removing the gravel ramp was unforeseen resulting in the unexpected work to replace of Fabric.
- **HF22** - Passive tolerance of violations: After the Daily Pre-start Meeting at the start of shift; it is common practice to not do additional risk assessments or re-visit the SWMS's during the day.
- **TE1** - Task planning/preparation/manning: The Grader Operator and Labourers were working on separate tasks in the same area.
- **HF1** - Complacency/motivation/desensitization to hazard: The Labourers did not hear the reversing beeper on the grader due to ear plugs they were each wearing.
- **TE1** - Task planning/preparation/manning: Workers were left to perform their tasks unsupervised, with both the Leading Hand and Area Supervisor leaving to attend to other work.

4.2.4 Organisational Factors

- **RM** - Risk Management: There was no risk assessment conducted prior to the allocation of new work and the unplanned task to replace the damaged Fabric, resulting in ineffective risk management.
- **OR** - Organisation: There was ineffective work planning, co-ordination and lines of communication for the task due to unclear responsibilities and ineffective attention paid to active supervision.
- **PR** - Procedure: There was ineffective application of the SWMS's specific to the task and limited risk mitigation controls identified and implemented.
- **MC** - Management of Change: There was an ineffective process applied to manage the change in the scope of work for the Labourers and Grader Operator.
- **OC** - Organisational Culture: Previous incident history indicated a degree of management tolerance to accept repeated non-conformance to operating procedures and the inconsistent use of the risk assessments (Take 5 and JSEA).

³ Safety Wise Solutions Pocket Investigation Guide
s05 - Personal optimising violation - Personal convenience, suits self.

- **OL** - Organisational Learnings: Lessons from similar previous incidents have not been applied, resulting in hazards remaining unaddressed.
- **RM** - Risk Management: There was ineffective monitoring and oversight processes in place, such as Task Observations and Workplace Inspections, to identify and resolve the incidence of poor operational discipline and procedural non-compliance.
- **CM** - Contractor Management: There was ineffective monitoring of contractor application to required practices specific to the grader operations.

5.0 Recommendations

The following recommended corrective actions are proposed for consideration. The recommendations address the **Absent or Failed Defences** and **Organisational Factors** identified as key findings of the investigation. These recommendations are applicable to Business Group or site and could benefit other Company group operations.

5.1 Communication via Safety Alert (Administration)

Issue and communicate a Safety Alert (or other suitable communication method) to all personnel including contractors explaining what occurred, the basic cause, and the actions that have been taken as well as those that are to be taken.

Emphasise the importance of (i) conducting risk assessments (ii) understanding the risks around mobile plant and separation from workers and applying the appropriate documented control measures; (iii) having good operational discipline to follow documented process (iv) knowing your responsibilities (e.g. supervision and accountability to follow process); (v) situational awareness and interaction with other work groups; and (vi) a good monitoring and review program across all operations including contractors to maintain the integrity of the safe system of work.

5.2 Risk Management and Training (Administration)

Introduce a refresher training program to address deficiencies in the application of both the Take 5 and JSEA risk assessments including identification of hazards and associated risks, risk mitigation and application. The focus of the refresher training should include the specific triggers (change, etc) for when a risk assessment should be updated or refreshed. Introduce a monitoring program to ensure application and quality of the risk assessments is maintained to a high standard.

5.3 Procedures (Administration)

Review existing SWMS's, i.e. documents HS-SWMS-009 and HS-SWMS-078, and update to ensure specific tasks are detailed with the appropriate control measures relating to separation of mobile plant from workers and ensure these are relevant and consistent to the task. This information must cascade through the Document Hierarchy where relevant; i.e. Safety Management Plan, Risk Register, SWMS, JSEA, Take 5, and other relevant documents.

5.4 Responsibilities (Administration)

Review and modify Supervisor and Leading Hand position descriptions regarding responsibilities and accountabilities, specific to work planning and communication, such as provision of work instructions and ensuring the instructions are understood and applied accordingly, and participation in risk assessments and sign off.

Ensure responsibilities are clearly defined and provide support with targeted coaching / training in these areas.

5.5 Inspections (Administration)

Review and update the program for Task Observations and Workplace Inspections specific to working around mobile plant and separation requirements. The areas to improve include frequency of inspections, who must complete them and quality of findings and actions.

Introduce a monitoring program to measure improvements with quantity and quality of the data collected and actions taken.

5.6 Contractor Management - Monitor and Review (Administration)

To ensure the application of the safe system of work, as per requirements of the Project's Safety Management Plan, a comprehensive monitoring and review program must be formalised and applied to contractors. An inspection program be developed to measure compliance to mobile plant operations at a defined frequency across the Project.

5.7 Learning from Previous Incidents (Administration)

Develop a program of quality assurance following incident investigations and subsequent corrective actions. The program to include close out of actions and dissemination of information across the Project and/or organisation.

5.8 Fair and Just Culture (Administration)

Review and modify fair and just culture behavioural markers to ensure that employees and contractors are fully aware of the safe behavioural requirements of R & C.

Additionally, all employees and contractors must be fully aware of their responsibilities and accountabilities in their role to meet the organisation's management protocols and standards. These protocols and standards include:

- clearly defined expectations of behaviour
- effective communication of safety related information
- guidance on risk assessment and acceptance
- the right and duty to intervene on unsafe acts and conditions
- personal accountability for safe behaviours
- process to develop, encourage and sustain safe behaviours

6.0 Management Review of the Investigation Report

6.1 Management Review

The management of Business Group, site and Project should formally review the investigation report for completeness, quality of the investigation and to endorse the recommendations with aligned corrective actions. It is recommended that the following action plan is implemented:

6.1.1 Distribution

To maximise the preventative potential of the investigation report, the findings and conclusions of the report should be distributed as widely as practicable internally within Company Business Groups and externally to industry bodies.

6.1.2 Implementation of Corrective Actions

Corrective actions addressing the recommendations shall be formally presented to the Responsible Line Manager for implementation. An action plan and timeframe shall be agreed and endorsed by the appropriate level of management. An action plan is attached in section 7.2 of this report.

6.1.3 Implementation Monitoring

The completion of corrective actions must be documented and communicated by the Responsible Line Manager to the Site Senior Executive, and in turn to the Safety Manager. Where corrective actions have not been fully implemented, ongoing monitoring should be maintained until implementation is complete.

6.1.4 Analyse Effectiveness

The effectiveness of the corrective actions should be evaluated by a review of safety performance and through an audit within the next 6 months whereby a report will be prepared for management to detail compliance and progress achieved.

6.1.5 Document Archival

Investigative data and reports shall be archived in accordance with site and regulatory guidelines.

7.0 Significant Learnings

The investigation has raised several key learnings which are covered in the body of the report. The significant learnings for the Company are:

7.1 Mobile Plant Risk Management

All operations involving mobile plant need to be subject to hazard assessment and risk control processes. Separation of mobile plant and pedestrians must be considered and treated as a critical risk to operations.

7.2 Contractor Management - Monitor and Review

The chain of responsibility across contractors must be understood and applied through effective monitoring and review processes. Contractors must comply with Road and Civil Constructions Safety Management Plan and associated documents for the duration of the Project. A robust monitoring system must be scheduled and applied to maintain integrity of process and application across all contractors.

7.3 Operational Discipline with Risk Management

Although the organisation has systems and processes in place and applicable to tasks, these must be supported with high level operational discipline across all personnel at all levels of the organisation to ensure the integrity and application to a safe and efficient workplace.

7.4 Responsibilities for Supervision of Work Groups

Direct and visual supervision with good communication and instruction effectively combines to ensure conformance to process, quality application and outcome of the task.

8.0 Appendices

8.1 ICAM Analysis

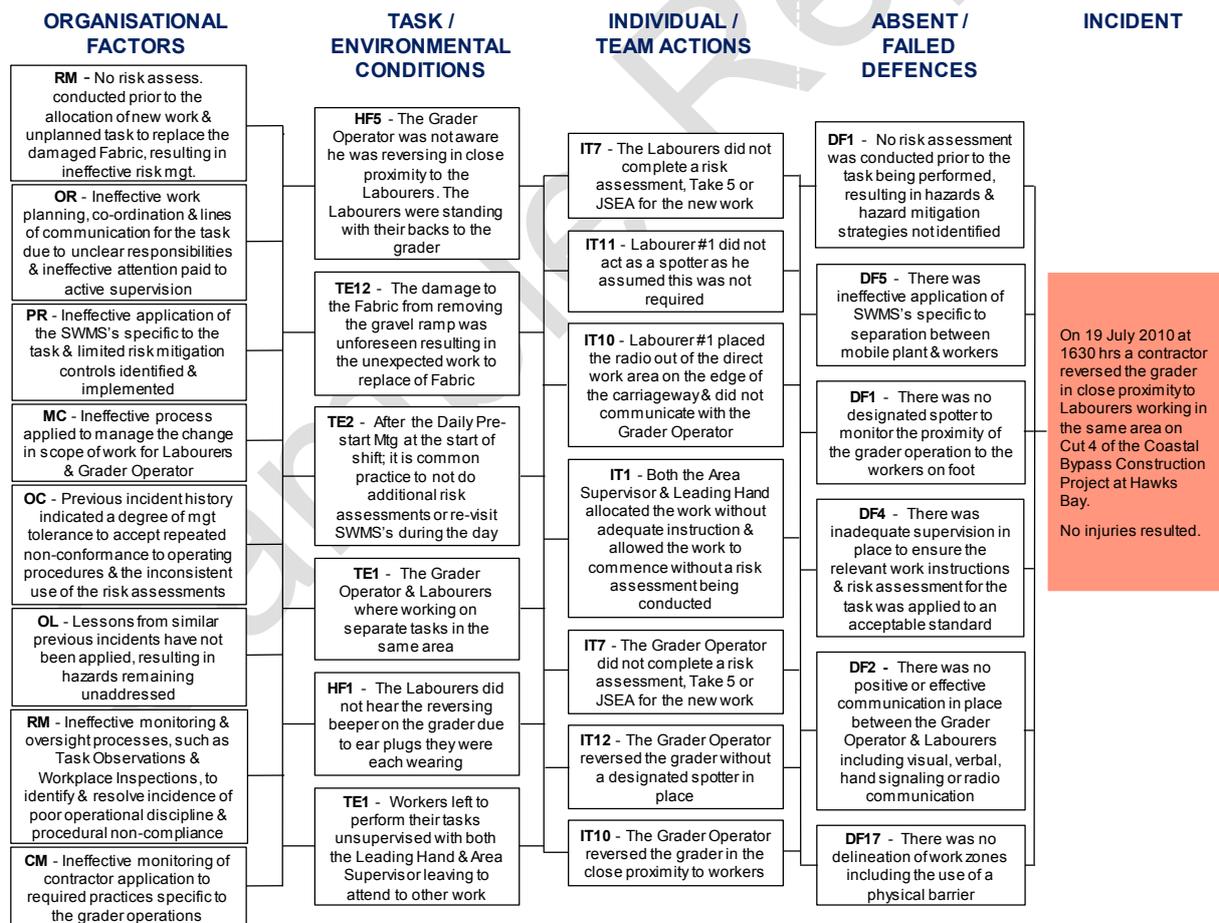
The features of the ICAM chart for the purposes of this Report are:

- It provides a graphical representation of all the key circumstances and factors relating to the incident; and
- It outlines the relationship of the various elements considered throughout this report.

In addition, ICAM is designed to:

- Provide a framework to organise the data collected;
- Assist in assuring the investigation follows a logical path;
- Aid in the resolution of conflicting information and the identification of missing data; and
- Provide a diagrammatical display of the investigative process for management briefing.

Accordingly, this ICAM table should not be considered in isolation and needs to be considered in the context of all the comments in this report and the additional matters that will be addressed in the final report.



Note: Refer to Section 4 of this Report for the description of the codes assigned to the contributing factors.

8.2 Corrective Action Plan

To be completed in consultation with Road and Civil Constructions line management and approved by management.

Item Ref	Recommendation	Responsible Department	Responsible Person	Completion Date	Sign off
5.1	Communication via Safety Alert				
5.2	Risk Management and Training				
5.3	Procedures				
5.4	Responsibilities				
5.5	Inspections				
5.6	Contractor Management - Monitor and Review				
5.7	Learning from Previous incidents				
5.8	Fair and Just Culture				
General Manager's Close out of Incident - All corrective actions have been completed, where corrective actions have not been fully implemented, the following measures have been put in place to ensure ongoing monitoring until implementation is complete.					
Name:		Signature:		Date:	

9.0 Report Sign-off

To maximise the preventative potential of the investigation report, the findings and conclusions of the report should be distributed to the various people involved in the incident and as widely as practicable.

The completion of corrective actions must be documented and communicated by the Responsible Line Manager to the Site Senior Executive, and in turn to the Safety Manager. Where corrective actions have not been fully implemented, ongoing monitoring should be maintained until implementation is complete.

Feedback to the Involved Person(s) and comments:		
Name:	Signature:	Date:
Feedback to the Involved Person(s) Supervisor(s) and comments:		
Name:	Signature:	Date:
Department Manager's acceptance of findings and comments:		
Name:	Signature:	Date:
Safety Manager's acceptance of findings and comments:		
Name:	Signature:	Date:
Site Senior Executive's acceptance of findings and comments:		
Name:	Signature:	Date: