

Working together to reduce land transport safety risk in the CSG sector: can we ever do enough?

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Abstract. Queensland coal seam gas (CSG) company, Arrow Energy (Arrow), has been implementing a strategy to improve land transport safety across its business. The present paper examines the strategy Arrow has taken to better understand and mitigate the risks associated with land transport. It looks at current transport risk, specific examples of existing good practice adopted by Arrow and future opportunities.

Land transport-related incidents have historically been the main cause of fatalities in this sector. To address this risk, Arrow has developed a seven-pillar strategy, comprising safe vehicles, safe drivers, safe speeds, safe roads, Arrow assurance program, industry collaboration and contracting strategy. The strategy applies equally to light and heavy vehicles and both professional and non-professional drivers. The unique approach focuses on changing driver behaviours, having a robust assurance and controls program, appointing a third party logistics (3PL) specialist transport provider and developing key relationships with contractors and internal stakeholders.

A continuous improvement approach to safety culture, positive driving behaviours, transport safety education, industry focus group participation (Safer Together), better vehicle technical standards, and having supplier relationships to drive outcomes will further ensure that land transport safety is a key priority across the business. Arrow believes this integrated approach yields the best results, but that it is an ongoing journey, as long as the industry has vehicles and is driving.

Keywords: assurance, coal seam gas, driving behaviours, fatalities, safe drivers, safe roads, safe speeds, safety, supplier relationships, technology, training.

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Introduction

The purpose of the present paper is to examine transport risk and the strategies adopted to ensure that the risk is as low as reasonably practicable. The paper explores the strategies that Arrow has adopted for best results in working with contractors to improve safety performance. It also includes specific examples of good practices adopted by Arrow and the positive results observed from them. The paper also looks at opportunities for future improvement, to drive safety risk to an even lower level.

The present paper features Arrow Energy (Arrow), an Operator company active in the Queensland coal seam gas (CSG) sector, and examines how the company is applying a strategy to reduce land transport safety risk. Land transport-related incidents are historically the main cause of fatalities in the sector. Arrow has implemented several strategies, with a significant improvement to the number of vehicle incidents since 2011. However, it does not believe that it has solved the problem; rather, that it is on a journey to improvement.

Statistically, transport-related deaths have been the highest among work-related deaths in 2016 and 2017 (Australian Government Department of Infrastructure, Regional Development and Cities 2017a). According to Safe Work Australia (2018), in 2015, almost half (47%) of worker fatalities occurred within the transport, postal and warehousing, and agriculture, forestry and fishing industry. Figures 1 and 2 highlight the road deaths and industry types with the highest proportion of deaths.

Arrow utilises a large number of heavy vehicles as part of its transport operations both for warehouse freight movements and rig operations. In the 12 months to the end of September 2017, 216 people died in Australia from 197 fatal crashes that involved heavy trucks or buses (Australian Government Department of Infrastructure, Regional Development and Cities 2017b). Figure 3 tracks the counts of fatal crashes that involved heavy vehicles.

Given the significant amount of reliance on inland freight movements, land transport-related incidents are the single largest

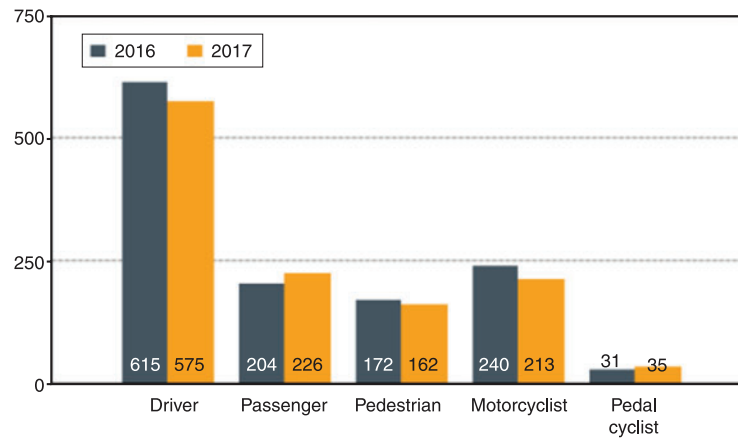


Fig. 1. Road safety statistics. Road deaths by road-user group: 12 months to October 2017. Source: Australian Government Department of Infrastructure, Regional Development and Cities (2017a).

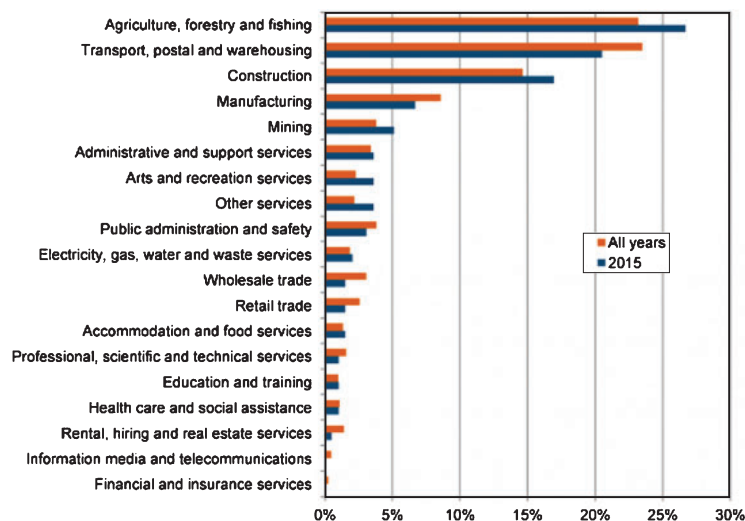


Fig. 2. Worker fatalities: proportion by industry of employer, all years (2003–2015 combined). Source: Safe Work Australia 2018, fig. 2.

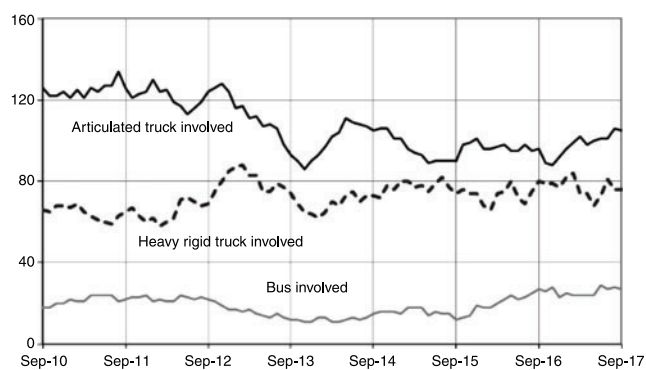





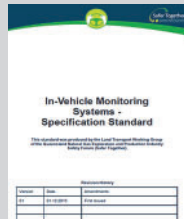



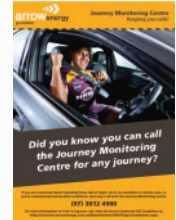
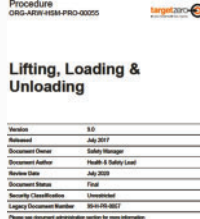

Fig. 3. Fatal heavy-vehicle crashes Australia: quarterly bulletins. Source: Australian Government Department of Infrastructure, Regional Development and Cities (2017b).

cause of fatalities in CSG company operations. It is an industry expectation that all companies operating land transport vehicles, or providing services involving land transport, have in place a management system for these operations and that this is based on a full assessment of the risks and measures to address such risks.

To address risk, Arrow has developed a multi-pronged strategy that relies on key parts of the organisation working together, notably Contracts and Procurement, Transport and Logistics and HSE. The other key aspect has been the Arrow internal contract holders and the contractors themselves that have been actively working hard to improve driver safety through regular meetings and tool box sessions. The seven pillars of Arrow's strategy are detailed in Table 1. This strategy applies equally to light and heavy vehicles and professional and non-professional drivers.





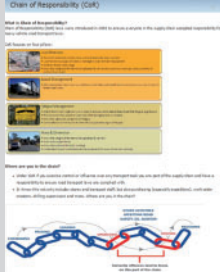

There are multiple aspects to consider in managing land-transport risks. Unfortunately, there is no perfect solution where a single control will result in elimination of a land-transport risk for the resource/CSG industry.

Table 1. Arrow Energy seven-pillar strategy
Source: Arrow Energy (2017a)

Pillar	Risk controls	Future improvements
Pillar 1  Safe Vehicles	<ul style="list-style-type: none"> Arrow vehicle specifications follow industry Safer Together standard.   <ul style="list-style-type: none"> Arrow in-vehicle monitoring system (IVMS) specifications follow Safer Together standard.   <ul style="list-style-type: none"> Arrow bus. 	<ul style="list-style-type: none"> Detailed road base map may eventually allow electronic driverless cars.
Pillar 2  Safe Drivers	<ul style="list-style-type: none"> Driver competency training.  <ul style="list-style-type: none"> Journey Monitoring Centre.  <ul style="list-style-type: none"> Loading and unloading training.  <ul style="list-style-type: none"> Driving to Conditions Conversation Program.  <ul style="list-style-type: none"> Focusing on staff and contractor fitness to work (e.g. regular health checks and Heart of Australia participation). 	<ul style="list-style-type: none"> Voice technology to prompt drivers on upcoming road hazards and speed-limit changes Improve driver competency training. Safety behaviour.





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Table 1. (continued)

Pillar	Risk controls	Future improvements
Pillar 3 	<ul style="list-style-type: none"> Geographical set speed limits. 	<ul style="list-style-type: none"> Voice technology to prompt drivers on upcoming road hazards and speed-limit changes.
Pillar 4 	<ul style="list-style-type: none"> Arrow-owned road maintenance program Arrow route hazard assessments (example right) 	<ul style="list-style-type: none"> GIS road map with geographically linked road hazards. Engineering design of production infrastructure to require less regular maintenance.
Pillar 5 	<p>Arrow has a targeted land-transport safety-assurance plan that includes Arrow-led audits of contractors and how they manage their transport subcontractors, as well as a rolling schedule of National Logistics Safety Code (NLSC) independent audits. An effectively implemented management system with due focus on land transport yields many benefits, including improved driving-safety performance, with a consequential reduction in the number and severity of incidents, leading to a reduction in injuries and fatalities.</p> <ul style="list-style-type: none"> Third-party logistics (3PL) assurance National Logistics Safety Code (NLSC) structured audits plan Chain of responsibility (COR) training (example below) 	<ul style="list-style-type: none"> National Logistics Safety Code (NLSC) structured audit framework applied across industry.
	<ul style="list-style-type: none"> LSR Panel – A Life Saving Rule (LSR) Panel was established, comprising senior line management general managers, to look at every potential LSR breach. This led to a progressive change of the Arrow driving-safety culture. Arrow implemented a Driver Conversation Program aimed at getting drivers and supervisors to recognise what is ‘driving to conditions’ for them. 	
	<ul style="list-style-type: none"> Tender board land-transport risk assessment 	

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Table 1. (continued)

Pillar	Risk controls	Future improvements
Pillar 6  Industry Collaboration	<ul style="list-style-type: none"> • Industry standard speed limits: sealed and unsealed roads. • Industry standard specifications for light and heavy vehicles and IVMS.  <ul style="list-style-type: none"> • Safer Together  <ul style="list-style-type: none"> • Learning from incidents – detailed review of industry fatal events for Arrow learnings and tracked improvements. 	<ul style="list-style-type: none"> • Industry road base map of speed limits and hazards. • Industry model for driver training and competence. • More effective sharing of learnings.
Pillar 7  Contracting Strategy	<ul style="list-style-type: none"> • Appointment of a 3PL transport specialist contractor, which applies a robust assurance process to transport and logistics subcontractors. They are also the specialist in transport safety. • Arrow has clear contractual requirements; the specifications for light and heavy vehicles and IVMS have been a cornerstone. • The main thrust to get real improvement must be Arrow and the contractors working together. This has been greatly facilitated by the Safer Together Land Transport Working Group. This involves putting together a comprehensive approach of services to reduce or improve safety outcomes. Taking a collaborative and integrated approach with our contractors, working together with internal business departments (e.g. HSE, Contracts and Procurement and Operations). 	

Improvements to date and looking forward

In-vehicle monitoring system (IVMS) has helped make a dramatic change in driver behaviour, but the improvement is largely due to driver compliance. This does not take into account external factors such as road hazards, vehicle load, weather conditions, night time or personal factors such as fatigue. As such, Arrow has commenced a Driving to Conditions Conversation Program, specifically to address these factors. This program sees managers conducting one-on-one conversations with staff who have work-related driving as part of their role. The manager is prompted to consider how to help staff deal more effectively with the road and driving conditions. The aim of the program is for Arrow drivers to consciously consider driving to conditions every time they drive. This would change driver behaviour and improve their road awareness, thereby reducing transport incidents. Figure 4 shows an extract of a completed template from the Driving to Conditions Conversation Program. This tool provides a process for discussing recent driving in general, then discussing specific

driving-to-conditions issues, and then discussing potential learning and/or actions.

Figure 5 summarises Arrow's driving-related IVMS breaches since 2011. These data allow Arrow to determine any trends that may be of concern at an early stage and put in place controls to prevent them from escalating to a more serious issue.

Looking to the future, Arrow believes that driving to conditions is critical to protect the safety of its drivers and other road users. Further development of initiatives to promote awareness of driving to conditions will include using technology to assist drivers. For example, development of a GIS road map with geographically linked speed zone changes and road hazards, then linked to voice technology for advance notifications, is under development to further improve driver safety. Imagine a driving experience where voice technology informs the driver well in advance of approaching speed limit changes, and associated road hazards such as narrow bridges, tight corners, river crossings, loose gravel or busy crossroads. Voice technology would inform the driver of the speed zone changes and would remove the punitive nature of the IVMS

Driver Conversation Tool

PART A: About Recent Driving

Part A of the conversation is designed to get an idea of the typical driving the person does. This is simply a learning process. Part A can be used with contractors as well as Arrow employees.

What does a typical week of driving look like for you?
Use the sections below to guide the conversation.

Distances	Duration	Times of day	Remote/urban	Lone work?
2651km	Month	7am-5pm	mainly Hway + other road	50%

Driving to Conditions

This part of the tool is designed to help identify what the main driving to conditions issues are for the driver. Managers may choose to mark up this model by circling key areas, or making notes next to relevant factors. Prompts have been provided to help structure the conversation.

Which driving to conditions factors have the strongest influence on your driving safety?

3 Environment

2 Organisation

1 Vehicle

1 Policies

1 Driver

What are some specific examples for those identified?
(refer to the instruction page for further information if needed)

3 issues noted that mainly the Driver is in full control.

Strategies

This section provides an opportunity to discuss the strategies used for driving safely.

What are your top three strategies for driving safely?

1. Road worthy vehicle
2. Vehicle suits work application
3. patience while driving on road. Drive defensively beware of others.

What can I (as a manager) do to support your driving safety?

Don't enforce dead lines or time travel to get to sites.
Push management to get better purpose vehicles.
Don't encourage driving during bad weather events.

Details

This conversation was between: On: 11/7/17

Fig. 4. Driver conversation sample completed document. Source: Arrow Energy 2017b.

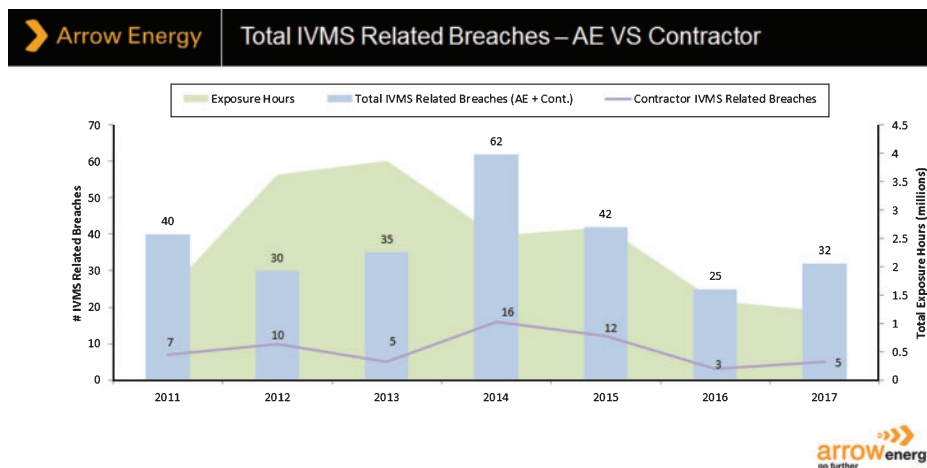


Fig. 5. Summary of in-vehicle monitoring system (IVMS) breaches (trend analysis). Source: Arrow Energy and Contractor (2017).

arrangements. This allows drivers to better focus on driving and reduce any unnecessary distractions.

Conclusions

In conclusion, land transport safety is an ongoing and evolving challenge for Arrow and the CSG industry. The present paper has highlighted the importance of having an overall land transport strategy, provided examples of good practices that have worked for Arrow and looked at further improvements. Opportunities for better outcomes exist with targeting safety culture and driving behaviour through transport safety education, industry focus group participation (Safer Together), better

vehicle technical standards and having supplier relationships to drive outcomes.

The area that offers significant opportunity for safety improvement is encouraging drivers to consciously consider driving to conditions every time they drive. Arrow has embarked on this journey with the Driving to Conditions Conversation Program. In the near future, the company will use technology to further enhance driver safety.

Arrow, and the Queensland CSG industry, must continue to strive to make the land transport risk component of our operations as low as reasonably practicable, so as to ensure the safety of staff and other road users.

Arrow believes that all staff and contractors play an important role in reducing safety incidents by sharing and learning from our collective experiences.

Conflicts of interest

None.

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Brandon Yeong is responsible for warehousing, inventory and contracting at Arrow Energy. He is an experienced supply chain practitioner with particular expertise in the oil and gas sector. Prior to joining Arrow Energy, Brandon has over 10 years of consulting and commercial experience in industries covering mining, oil and gas, aviation, FMCG, manufacturing, utilities, construction, government and telecommunications. Brandon's consulting experience includes working at leading firms such as Accenture, KPMG and Ernst and Young. Brandon has led a wide range of projects across the Asia Pacific, focusing on strategy development, operational and process improvement and technology implementation. Brandon also has significant experience in planning and integrating large-scale transformation projects and business consulting at senior and executive levels. Brandon holds a Bachelor of Finance and Masters of Business Administration from the University of Queensland.