

# SAFETY BULLETIN

DATE: SEPTEMBER 2021

## Human factors – water carts and cabin interfaces

This safety bulletin provides safety advice for the NSW mining industry.

### Issue

The NSW Resources Regulator has recently received two notifications of dangerous incidents involving water carts. In each case, the operator has identified that they were distracted at the time of the incident. In one incident, the operator was distracted by alarms and drove into the path of a haul truck. In the other incident, the operator was using the touch screen interface for the operation of pumps and sprays and failed to negotiate a bend in the haul road, struck a windrow and rolled.

Figure 1. Water cart (incident 1)

Figure 2. Water cart (incident 2)



## Human factors in design considerations

Operation of water carts in open cut mines is a high-workload, complex task. The water cart operator regularly has to manage several competing activities. The operator needs to manage:

- operation of a heavy vehicle within the mine environment
- machine and computer interfaces, including dispatch and alarms
- control and monitoring of water pump and spray systems (e.g. spot spraying, avoiding overwatering, not spraying intersections)
- multiple complex in-cab-console and operation controls, including joy sticks and gear levers.

Undertaking multiple tasks and needing to interpret competing information, can lead to a worker being overloaded and unable to deal with unexpected events.

Finding solutions to manage the complexity of the operating environment is a challenge, and over time, many water carts have been retrospectively fitted with equipment to meet the site's requirements.

Figure 3. Cabin of water cart (incident 1)



Figure 4. Cabin of water cart (incident 2)



## Recommendations

Mines operators should review the following recommendations with respect to water carts:

- when undertaking a risk assessment for new plant, human factors in design concepts are utilised to identify appropriate system interface and end user interactions, this should include considering variations in units and their information screens and controls for managing human error

- design and procurement criteria for equipment should include human factors concepts and key ergonomic standards
- when installing additional systems and the system interface for operators, include operators, maintenance and systems support personnel in consultation
- when installing system interface screens and controls, impacts on operator visibility are considered
- review information sources (such as alarms, dispatch screens and radios) to managed information within an optimal workload for operators
- Review the criticality of alarms and the responses required by operators to prevent overload and distraction of operators and normalisation of alarms
- where feasible, create profiles or include automation for control of water spray systems to reduce operator input (such as intermittent spray patterns)
- review how dispatch information is relayed to the water cart operator, including the quality and quantity of information and the prioritisation of tasks
- operator training should include all operational controls, emergency stops and access systems.

## Additional information

For further information on [human factors in design](#) visit the UK health and safety executive website.

**NOTE:** Please ensure all relevant people in your organisation receive a copy of this safety bulletin and are informed of its content and recommendations. This safety bulletin should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's common area, such as your notice board where appropriate.

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