

# Machine Safety

## Case Study: Unplanned movement of a machine

**Client:** A coal preparation plant operator

### Project Summary

Our client saw the need to respond to a safety alert published by the mining regulator, the NSW Department of Primary Industries. The alert described an unplanned machine movement event that the operator believed could also occur at its coal plant. As the regulator is keen to foster a functional safety approach in the industry, it suggested that operators review their electrical and mechanical engineering control systems to ensure a safety integrity level (SIL) or safety category suitable for the level of risk.

### The Problem

The relevant standards for machine safety are daunting. The three most often quoted standards (AS 61508, AS 62061 and AS 4024) together account for about 1,000 pages, creating a difficult and costly task for the operator. In addition, the language is not simple - particularly in the standards dealing with functional safety.

### The Solution

Advitech assisted the operator through the issues, looking for opportunities to meet the full intent of the standards yet avoiding unnecessary complication.

As it happened, the operator was using a standard Programmable Logic Controller (PLC) to perform critical safety functions as well as control functions. In theory, a functional safety approach would require this PLC to be designated as a safety PLC, certified by a third party as to its dangerous random hardware failure rates, including a statement that its software was properly designed to minimise systematic failures.

Advitech proposed a simpler approach - the existing PLC was confined to non safety critical functions, and hard wiring or modular safety relays were suggested for safety functions. This way, the required fault tolerance for a SIL 2 system was achieved, without the complications of software and its ongoing management. A Failure Modes and Effects Analysis (FMEA) was conducted on the various subsystems providing the safety functions, looking for areas where single points of failure (zero fault tolerance) could cause dangerous situations.

### Project Outcome

Advitech provided a fast and simple response to the issues involved, using an easily understood logical process. We provided the operator with a simple description of the requirements for circuits and mechanical devices performing safety functions. The actions required by the operator were understandable and free from much of the complicated terminology used in the standards. This enable quick implementation of improvements.



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