

# Safety Integrity Level (SIL)

**Case Study:** Risk of gas explosion in a coal mine

**Client:** A coal mine operator

## Project Summary

A coal mine, operating in care and maintenance, is unattended for periods, particularly nights and weekends. Although ventilation air would be circulating, any failures in this system could result in methane build-up and possible gas explosion if ignition sources are present. The mine operator was concerned about the risks posed to a crew that would need to re-enter the mine and check for damage, more so than the risks of the original incident because no persons would be present at that time. The operator was concerned about the reliability of their existing safety systems.

## The Problem

How reliable do the safety systems need to be, in order to avoid the ignition? In many cases, mine operators believe that they are required to meet a target Safety Integrity Level (SIL) for certain applications, yet are not sure whether this is an appropriate specification in the first place.

## The Solution

Rather than relying on various opinions about a target SIL, Advitech combined NSW Department of Primary Industries published fatality data with the professional judgment of the mine operator, to estimate just how likely such a serious event would be at the mine site.

Advitech helped the mine operator determine the extent of risk reduction necessary to bring the frequency of serious undesired events to tolerable levels. This is the first step in specifying a SIL for any safety system proposed for such reduction.

This still left the question of what is tolerable. Advitech used published guidelines from the NSW Department of Planning, and from the UK Health and Safety Executive, to help the mine operator establish a benchmark. In this way, the required amount of risk reduction was estimated, thus providing a rational basis for a SIL specification.

As it happened, this turned out to be a lower amount of risk reduction than first thought, and thus avoided unnecessary expense

## Project Features

The project used logical decisions based on available data rather than just opinions.

## Project Outcome

The mine operator avoided unnecessary spending on safety systems that were now shown to be adequate for their intended purpose.



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