

# ARC FLASH RISK ASSESSMENT AND SUBSTATION PRESSURE RISE CALCULATIONS



## OVERVIEW

Failure of high-voltage electrical switchgear during operation can result in an explosion and associated blast pressure wave. These hazards pose serious risk to operators and of building collapse.

Threepwood help switchgear owners to assess and mitigate these risks to keep people and switchrooms safe.

## CASE STUDY

A network operator was concerned about the risks of arc flash in its electrical switchrooms and the ability of the containing building to withstand the pressure rise in such an event. Threepwood Consulting conducted an arc flash hazard assessment of the high-voltage switchboard and pressure rise calculations to determine the risks

## OBJECTIVES



Establish all relevant facts surrounding the equipment failure



Determine the maximum pressure rise in the switchrooms and whether this exceeded the structural strength of the building



Identify practical steps to mitigate the risk of injury and building damage of an arc flash event



### PROJECT AIM

To demonstrate how the client can best manage legacy oil switchgear in terms of operation and maintenance to minimise the arc flash risk and associated safety impacts taking into consideration blast mitigation



### PROJECT CHALLENGES

- Quantifying the unpredictable behaviour of oil-filled switchgear in an arc flash situation
- Determining the structural integrity of older switchroom designs with limited construction detail
- Applying a suitable model to determine how the pressure wave propagates through the switchroom
- Evaluating wider risks to others working in the close vicinity of high-voltage switchrooms



### PROJECT SOLUTION

Threeepwood Consulting successfully delivered a comprehensive report with key findings and recommendations addressing:

- Evaluation of on-site factors including operating context and operational practices
- Qualitative risk assessment identifying key risks and exposures
- Results from pressure rise calculations
- Changes to maintenance practices
- Necessary building works to withstand pressure rise

## KEY RESULTS

Quantified arc  
flash risk

Predicted blast  
wave and  
pressure rise  
values

Identified  
practical risk  
mitigations to  
keep people safe

Assessed ability  
of switchrooms  
to withstand  
pressure rise



*'The client appreciated how Threeepwood Consulting provided a clear and technical assessment of the risks and identified practical solutions to mitigate the risk of an arc flash to operators and from building damage.'*