The safety case regime in Singapore requires a detailed demonstration that all major accident hazards have been identified and that appropriate controls have been implemented to reduce risks to As Low As Reasonably Practicable (ALARP).

Under the changes to the Major Hazard Installations (MHIs) regulatory framework, companies operating plants in Singapore have a requirement to prepare safety cases to demonstrate that ‘all measures necessary’ have been taken to reduce the risk of Major Accidents to ALARP, approved by the newly formed National MHI Regulatory Office (NMRO), led by MOM.

Technical guidance for the preparation of safety cases is available and an assessment manual with further guidance on the contents of a safety case is due to be published. Operating companies are required to prepare documents that are suitable and sufficient and proportionate to the risks in order to make the required demonstration to the authorities that they have managed their SHE risks to as low as reasonably practicable.

The minimum descriptions in a safety case include the following:
- Major Accident Prevention Policy (MAPP)
- Safety and Health Management System (SHMS)
- Description of installation and its vicinity
- Major accident identification, risk assessment, and risk control methods
- Measures to limit the consequences, Emergency Response Plan (ERP)

Companies are likely to have a significant amount of process safety information on their plants, but the challenge with a safety case is providing an appropriate amount of information in a suitable format to comply with the MHI regulatory framework. Consultancies providing safety case support require a deep understanding of complying with safety case regulations in a pragmatic and efficient manner, whilst offering a flexible approach that allows effective knowledge transfer between both parties.

What we offer
ABB Consulting provides a range of support services for companies with a requirement to prepare a safety case, as outlined below:

Level 1: safety case gap analysis
ABB provides a gap analysis of current information against the safety case requirements as detailed in the technical guidance and assessment manual. This includes a visit to the MHI to discuss requirements and gather relevant Process Safety Information followed by a gap analysis against the ABB safety case format based on the assessment manual guidance. The output is a report with clear actions, resource requirements and timescales to address the gaps. These actions can readily be assigned to the most suitable internal departments or external consultants.
**Level 2: Major accident scenario risk assessment**

ABB carries out part or all of the risk assessment and ALARP demonstration aspects for the safety case as shown on the flowchart below.

- Review all relevant process safety incidents
- Identify all Major Accident Hazards (MAH)
- Select ‘representative set’ of scenarios
- Identify measures using HAZID approach
- Consequence modelling for extent / severity
- Event frequency using LOPA / QRA
- Select safety critical events from risk level
- ALARP demonstration for all SCEs

The results of the risk assessment are used to prepare the predictive aspects section of the safety case, providing a detailed description and justification of the methodology used and the results of the risk assessment.

**Level 3: Full safety case preparation**

ABB takes responsibility for preparing the full safety case for submission to the NMRO, utilising a small team of experienced ABB engineers and consultants, working in close collaboration with the client. This is based on the ABB safety case format and the agreed action plan from the gap analysis, detailing sections to be completed using in-house resources or by an external consultancy.

**Benefits**

The ABB approach offers the following benefits:

- Support from ABB allows the safety case requirements to be met in an efficient manner reducing the load on busy operations based technical and engineering staff
- Clear focus on the ‘representative set’ of scenarios and safety critical events reduces the amount of detail required in the safety case
- Working in collaboration allows clients to retain control over the safety case contents and ownership of the demonstrations and improvement plan
- Providing demonstrations in a clear format based on the assessment manual reduces NMRO assessment time and improves the chance of gaining approval
- Overall risk assessment and ALARP demonstration process drives continuous improvement in process safety reducing the risk of a costly major accident

**Why ABB?**

ABB Consulting has been heavily involved supporting companies since 1999 in complying with the UK COMAH regulations, which are the basis for the Singapore safety case regime. ABB has supported the development of the safety case regime in Singapore, including sponsoring conferences organised by MoM / IChemE since 2014, where ABB delivered papers and facilitated workshops. ABB tutored a 2-day course on writing safety cases in July 2016 that was attended by a number of Singapore operating companies.

ABB has a wide experience of making the demonstrations required for a safety case across all aspects including the Safety & Health Management System (SHMS), Emergency Response Plan (ERP) and technical measures. A wide range of engineering know-how within ABB can be deployed to ensure that these aspects are covered to the required level of detail, avoiding the safety case becoming an excessively large document that requires more time and cost both to prepare and for the NMRO to assess.

ABB is a proven leader in process safety, offering a wide range of consultancy and training services, which address the way in which people, plant and systems inter-relate to ensure effective PSM.