The foundation of effective process safety and integrity management is a full identification and assessment of potential hazards.

Hazard studies

Hazards on process plants must be identified, eliminated where possible or otherwise controlled in order to improve safety, reduce operating costs, comply with legal requirements and benefit from increased efficiency and profitability.

What we offer

ABB Consulting can facilitate a series of hazard identification and assessment studies throughout a project lifecycle, from the early R&D phase through to ongoing operation. Every project gives unique challenges and we can help you select the right approach. ABB’s Hazard Study (HS) methodology has been developed and refined over many years, building on an ICI heritage (ICI invented HAZOP studies). Up to eight studies can be utilised at various stages of a plant lifecycle, mostly covering the design stages of a project or modification.

HS 0 - Concept stage: Inherent safety workshop

Here, development chemists and engineers work to reduce or eliminate the hazard potential of a process, and reduce the need for extra safety measures and waste treatment facilities. The methodology provides demonstration of a structured hierarchical approach, as required in the UK under the COMAH regulations. The aim is to increase the inherent safety of the design.

HS 1 - Feasibility stage: Process safety information

This checklist-based study ensures personnel have an adequate understanding of the project, processes and materials to address safety, health and environmental issues effectively. Consideration is given to what other studies are needed, and the need for contact with regulatory bodies who may place restrictions on the project to avoid any expensive delays at a later date.

HS 2 - FEED stage: HAZID study

This is a hazardous event based study of the preliminary process flow diagrams which aims to identify and eliminate major accident hazards wherever possible. If this cannot be achieved, the team will specify what safety measures are needed and further quantify risk assessments to ensure that the risk is reduced to an acceptable level.

HS 3 - Detailed process design stage: HAZOP study

This is a detailed and systematic study of process design and outline operating procedures. Using deviation analysis, the team will identify any outstanding hazards or operability problems and make recommendations based on the application of ‘relevant good practice’ to allow the process design to be finalised. HAZOP studies utilise a multi-functional team of project and operations staff and require a flexible approach depending on the nature of the process being assessed.

HS 4 and 5 - Pre-start up safety review

These checklist-based studies take place prior to construction hand-over and prior to start up. This will ensure the plant has been installed and pre-commissioned as designed and has incorporated key safety features from earlier studies, focusing on process safety hazards. Staff responsible for the operation of the plant also have the opportunity to review the facilities for personal health and safety issues, and measures needed for environmental protection.

HS 6 - Early operational stage

Using this checklist-based study, the team will review early operation and ensure the level of safety developed during the plant design stage is reflected by actual experience during the first months of operation. The findings from the study can also provide feedback to the design team to promote continuous improvement in process design.
HS 7 - Operational stage re-validation: PHR / HAZOP

Many companies are required to carry out periodic revalidation of their safety reviews, typically every 5 years, as part of their process safety management systems and to meet legal obligations. ABB developed the time efficient Process Hazard Review (PHR) method focussing on loss of containment and release of energy events. PHR allows an experienced team to assess the adequacy of existing protective measures, using the learning from operations, assessing plant changes and ensuring compliance with relevant standards. For companies requiring a more thorough assurance, ABB offers retrospective HAZOP studies using a ‘line-by-line’ deviation analysis approach developed from design stage studies.

Action close-out
In addition to facilitating Hazard Studies, ABB can help manage closure of the actions identified during each stage of the project. This ensures rapid efficient and appropriate closure, allowing the project to continue without delay.

Training and procedures
ABB also offers training in Hazard Study methods and can provide a licence for the detailed guidance documents.

Benefits
− Compliance with the legal requirement for risk assessment
− Inherently safer processes with reduced capital and operating costs
− Early identification of hazards and contact with regulatory bodies avoiding expensive delays in the project
− Minimisation of problems during commissioning and early operation
− Time efficient assurance of suitability of existing assets for ongoing operation
− Opportunity for shared decision making and learning across engineering functions

Hazard Study process and project process

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ABB Consulting provides technical and engineering services to improve performance in the areas of compliance, operations and engineering to customers in the chemical, petrochemical, oil & gas, power, pharmaceuticals, metals and consumer industries worldwide.

Why ABB
ABB has extensive experience of hazard identification and risk assessment, based on our ICI heritage. Our Hazard Study leaders have extensive experience across a wide range of industry sectors, and come from an operational background. They use their experience to make pragmatic technical judgements and lead the team to extract and share all their experience.

ABB are leaders in process safety, offering a wide range of services, including SIL determination and LOPA, which address the way in which people, plant and systems interrelate to ensure good safety management. We can provide support throughout the risk assessment process, from identifying the risks, developing solutions, right through to implementation in order to gain the risk benefits sought by our clients.

<table>
<thead>
<tr>
<th>Study</th>
<th>Description</th>
<th>Timing</th>
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<tbody>
<tr>
<td>0</td>
<td>Inherent safety workshop: Eliminate or minimise hazards at source</td>
<td>R&amp;D</td>
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<tr>
<td>1</td>
<td>Ensure information available on basic hazards</td>
<td>Concept</td>
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<tr>
<td>2</td>
<td>HAZID: Identify major accident hazards and agree basis of safety</td>
<td>FEED</td>
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<tr>
<td>3</td>
<td>HAZOP: Identify deviations from design intent, ensure all safeguards are in design</td>
<td>Detail design</td>
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<tr>
<td>4 &amp; 5</td>
<td>Pre start-up safety review: Plant as built meets process safety and SHE requirements</td>
<td>Commissioning</td>
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<tr>
<td>6</td>
<td>Process safety audit: Review of early stages of operation to identify key concerns</td>
<td>Early operation</td>
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<tr>
<td>7</td>
<td>Revalidation: Review ongoing operation and experience, ensure safeguards are effective</td>
<td>Every 5 years</td>
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