

Functional Safety Engineering

At Lagoni, we appreciate our clients are faced with increasingly complex challenges including striking the balance between desired functionality, operability, safety and financial justification, as well as the trade-off between application of proven, tested solutions vs. latest technological advancements.

Driven by innovation and employing a combination of complex tools and value engineering, Lagoni delivers bespoke support, guidance and solutions to help our clients in devising robust strategies to address these challenges. With stakeholder management at heart, we strive for continuous improvement in results through a deeper appreciation of our client needs.

LAGONI 
INNOVATIVE ENGINEERING SOLUTIONS

a **Belcan** company

Lagoni's Capabilities

Our industry certified Functional Safety Consultants have decades of experience in delivering the complete suite of studies to provide full compliance with BS EN/IEC 61508, 61511 and 26262 frameworks. Our expertise includes (but is not limited to):

- Functional Safety Management Plans
- Hazard identification and Risk Assessments
- HAZID/HAZOP
- Fault Tree Analysis (FTA)
- Event Tree Analysis (ETA)
- Human Reliability Analysis (HRA)
- Reliability Block Diagrams (RBD)
- Failure Mode and Effects Analysis (FMEA)
- Layers of Protection Analysis (LOPA)
- SIL Determination and Verification
- Safety Requirement Specification (SRS)
- Functional Safety Assessment (FSAs)/Audits
- Functional Safety Gap Analysis
- Proof Testing Procedures

Combining the FS expertise with core Process & Technical Safety Engineering capabilities such as QRAs, Consequence Modelling, FERA/FRA, EERA, ESSA, AP521 Engineering & Compliance, SCE Identification and Performance Standards, Fire & Gas Mapping, COMAH Reports, Safety Cases and Cost Benefit Analysis (CBA), we provide End User/Operators with the appropriate confidence to optimise risk reduction and demonstrate ALARP.

Our experience of physically implementing the recommendations we make sets us apart from a lot of companies who only carry out the theoretical modelling and studies. Our application of the advice we provide makes the studies we deliver relevant, as we “practice what we preach”.

UK National Grid LNG Terminal Case Study



Lagoni was contracted to perform a suite of safety studies to enable Grain LNG to create a roadmap to achieve adequate risk reduction and the necessary regulatory compliance at the Terminal. Using a combination of safety engineering tools such as HAZOP, HRA, FTA and ETA, the desired reliability and integrity requirements were analysed

for the protection layers (including Safety Instrumented Functions –SIFs). These were followed by a variety of sensitivity analysis and verification activities until an optimal design solution was achieved for which ALARP was demonstrated successfully using CBA. The project was successfully delivered with the final solutions devised within the operational and financial constraints typically prevalent for a brownfield modification.

The onus of being able to demonstrate conformance with evolving International Standards and Regulations relating to Safety Instrumented Systems is on designers and operators alike. Utilisation of expert knowledge at early stages of the safety lifecycle will not only facilitate conformance but will enable operators and duty holders to achieve ALARP while potentially optimising CAPEX and timeliness.

Additionally, only by applying appropriate consideration during these early stages can the operators and duty holders prevent or mitigate vulnerability to unacceptable risk to People, Assets and Environment.

