Explosion of Gas and Additional Dangers in LNG Facilities

Recognising the Fundamentals of the Various Fire and Explosion Hazards

Introduction

The risks associated with gas explosions and other LNG facility dangers are covered in this Course N Carry training course. It covers every facet of the risks connected to vapour cloud explosions (VCEs), including blast load, explosion mechanisms, release and dispersion, ignition processes, and modelling of these factors.

To understand how fires start, spread, and how explosions happen, professionals working in fire safety and risk management must grasp the fundamentals of fires and explosions. A thorough understanding of the classification of hazardous areas is also essential for the safe selection and installation of equipment in hazardous LNG environments.

You will gain thorough understanding of the origins and characteristics of explosions in this 5-day Explosion of Gas and Additional Dangers in LNG Facilities training course, with an emphasis on those involving gases.

This Course N Carry training programme will enable you to:

- Recognise the characteristics of explosive and flammable substances as well as how they ignite.
- Learn how catastrophic mishaps are caused by malfunctioning systems and mechanical components.
- Study up on typical fire detectors, alarm systems, and protocols.
- Recognise why materials, temperatures, and dangerous situations are categorised.
- Recognise equipment protection schemes.
- Recognise the release and dispersion of LNG.
- Recognise safety rules for LNG and comprehend explosion modelling
- Recognise mitigation
- Recognise preventive actions
- Recognise consequence models and the QRA technique.
- Recognise the structure of the oil and gas sector
- Recognise the LNG project lifecycle.
- This training session on Course N Carry will address:
- Current problems and business patterns
- Technical issues of developing and producing oil and gas
- Knowledge of the process of gas liquefaction
- How to load, store, and transport LNG
- Examining LNG receiving terminal architecture

- Understanding of the risks associated with LNG and safety concerns
- Knowledge of the fundamentals and significant variables influencing the release and dispersion of LNG
- Knowledge of LNG leaks, accident data, and a few significant LNG mishaps
- Knowledge of the fundamentals and significant variables influencing Vapour Cloud Explosions (VCEs)
- Knowledge of the key factors influencing the release and dispersion of LNG as well as the sequence of events leading up to the accident
- Knowledge of different safety precautions to lessen the likelihood of accidents as well as different mitigation and control strategies to lessen the effects of explosions Recognising the Features and Risks of LNG
- LNG Specialist Equipment's Physical Reaction, Including PPE
- Hazardous behaviours and distances that exclude people
- Large-scale events, such as BLEVE
- Implications and repercussions on the environment of response
- During tabletop or practical scenario talks, coaching and mentoring are provided.
- Understanding the various techniques for gas explosion analysis and when to use them
- Knowing how to integrate the responses of structures with gas explosion loads

Objectives

The purpose of this Course N Carry training programme is to give participants the information and abilities they need to comprehend the different risks associated with LNG facilities and to mitigate or initiate emergency reaction to events.

- Delegates should have attained the following primary learning objectives by the end of the GLOMACS training programme:
- Recognise the fundamentals and crucial elements influencing known hazards such as vapour cloud explosions (VCEs).
- Understand release and accident statistics, as well as some significant offshore incidents that have happened.
- Recognise the sequence of events leading up to the disaster
- Recognise several mitigation and control strategies to lessen the effects of gas
- Explosions as well as different preventive methods to lessen the likelihood of mishaps.
- Discover the several explosion modelling methods that can be used and the significance of employing sophisticated 3D modelling for gas analysis.
- Discover the many techniques for gas explosion analysis and when to use them.
- Recognise how gas explosion loads can be combined with structural reactions.

Training Methodology

In this Course N Carry Explosion of Gas and Additional Dangers in LNG Facilities training course, participants will engage in interactive conversations centred around their personal interests, facilitated by the teacher, alongside presentations. The formal lecture sessions will be supplemented by practical exercises, video content, and case studies designed to encourage these debates and maximise the benefit to the

participants. Above all, a lot of case studies and examples of difficulties that the course instructor has personally been involved with will be used.

Organizational impacts

The company should be able to allocate resources to personnel professional development in addition to proving that process risks are appropriately managed.

- Comprehensive instructions on excellent practices
- Possibility of assessing top practices and good practices through workshops
- Recognise the constraints regulating the release and dispersion of LNG.
- Recognise LNG release and accident data
- Recognise the rules regulating other risks as well as vapour cloud explosions (VCEs).
- Recognise the sequence of events leading up to the disaster

Personal Imapct

Participants will be able to prioritise decisions for controlling key risks and identify the causes of those hazards by using the practical skills they have learned from this programme.

- Recognise the constraints regulating the release and dispersion of LNG.
- Recognise LNG release and accident data
- Recognise the conditions that control vapour cloud explosions (VCEs).
- Recognise the sequence of events leading up to the disaster
- Recognise many ways to prevent mishaps from happening and different ways to mitigate and control the effects of explosions.
- Discover the several explosion modelling approaches that can be used and the significance of employing sophisticated 3D models for LNG explosion assessments.

Useful case studies and an illustration of how 3D modelling is applied to LNG explosion safety

Who should attend?

A wide range of professionals involved in controlling risks and hazards on LNG facilities will benefit from this Course N Carry training course, including:

- Managers, safety engineers, and other staff members engaged in the planning, execution, or alteration of an offshore oil and gas facility (platforms, FPSOs, etc.)
- Investigators of accidents

- Governmental or public representatives involved in the creation of offshore safety standards Anyone interested in learning more about the risks related to LNG facilities

Course Outline

Day 1

Setting Course Objectives and Providing an Overview of LNG Gas Explosions

- Overview of the Basics of LNG Historical Explosions involving LNG
- Cleveland Explosion, Skikda LNG liquefaction facility explosion, and several smaller instances
- Basics of gas explosion
- Models of the implications of the LNG accident
- Avoidance and reduction of
- Protection measures for cryogenic spills

Day 2

Risks: Gas explosion Risks: Explosion risk evaluations

- Fundamental techniques for identifying hazards include HAZID, release scenarios, and explosion potential.
- Dispersion models: momentum jet, heavy gas, passive/lighter-than-air, and CFD methods
- Knowing how to use FMEA and other risk assessment techniques
- LNG Risk and Hazard Evaluation
- Group tabletop exercise: Risk analysis and safety implications of a large-scale LNG spill over water

Day 3

Evaluation and Interpretation

- EN 1473 and NFPA 59A safety requirements for LNG
- Approaches for assessing hazards: deterministic versus probabilistic
- Onshore liquefaction through deterministic analysis (truck-loading and export facilities)
- Statistical evaluations – onshore liquefaction
- Floating LNG: Probabilistic assessments (safety gaps, grated decks, layout examples)
- Exercise at the Table Top in group

Day 4

Statistics and instances related to mitigation of explosion incidents (class activity) An investigation of the rough 47/3B platform explosion

- Dispersion and release in offshore facilities
- Sources of ignition
- Preventive actions
- Control and mitigation
- Fires, such as: How do they start?
- Features of pool and jet fires
- How damage is caused by fires and how damage potential is determined
- Reduction of
- Dispersion, encompassing:
- Features of the dispersion of vapour after a spill of liquid
- Possible consequences of a delayed ignition
- Buildup of gas in enclosed spaces
- Releases from pipelines and from onshore and offshore facilities distributed
- Explosions, such as:
- Pressure-generating mechanism in crowded process areas
- Impact of crowding and confinement on explosions
- Transition from deflagration to detonation
- Techniques for calculating the loading and mitigation of explosions

Day 5

Modelling Explosions

- Explosion modelling: dust explosions, vessel bursts, contained, semi-confined, and VCE explosions
- Fire modelling: assumptions, fireballs, jets, and pools
- Application of findings: they are used as inputs for risk assessments, escape and evacuation plans, QRA, LOPA, and other procedures.
- Explosion Risk Management: Purpose and Driving Force
- Straightforward method
- Sophisticated methodology
- A few examples of analysis I
- Examples of selected analysis II
- Structural reaction and explosion loading