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Nota di contenuto	LNG RISK BASED SAFETY; CONTENTS; Preface; 1 LNG Properties and Overview of Hazards; 1.1 LNG Properties; 1.2 Hazards of LNG with Respect to Public Risk; 1.2.1 Flash Fire, Pool Fire, or Jet Fire; 1.2.2 Outdoor Vapor Cloud Explosions; 1.2.3 Enclosed Vapor Cloud Explosions; 1.2.4 Asphyxiation; 1.2.5 Freeze Burns; 1.2.6 RPT Explosions; 1.2.7 Roll Over; 1.3 Risk Analysis Requires Adequate Modeling; 1.4 Flammability; 1.5 Regulations in Siting Onshore LNG Import Terminals; 1.5.1 U.S. Marine LNG Risk and Security Regulation; 1.5.2 U.S. Land-Based LNG Risk and Security Regulation 1.5.3 European and International Regulations1.6 Regulation for Siting Offshore LNG Import Terminals; 1.7 Controversial Claims of LNG Opponents; 2 LNG Incidents and Marine History; 2.1 LNG Ship Design History; 2.1.1 Initial Design Attempts; 2.1.2 Tank Materials; 2.1.3 Insulation Materials; 2.1.4 Tank Design; 2.2 Designs and Issues-First

Commercial LNG Ships; 2.2.1 Membrane Technology; 2.2.2 Gaztransport Solution; 2.2.3 Spheres; 2.2.4 LNG Carriers for the Asian Trade; 2.2.5 Current State of LNG Tankers; 2.3 LNG Trade History; 2.3.1 European Trade; 2.3.2 Asian Trade; 2.3.3 Temporary Setbacks
2.3.4 Revival of LNG with Worldwide Supply-Demand Pinch of Petroleum2.3.5 Supply History; 2.3.6 Some Economic Factors; 2.4 LNG Accident History; 2.5 Summary of LNG History and Relevant Technical Developments; 3 Current LNG Carriers; 3.1 Design Requirements; 3.2 Membrane Tanks; 3.2.1 Tank Design and Insulation; 3.2.2 Dimensions and Capacity; 3.2.3 Tank Materials and Insulation; 3.2.4 Pressure and Vacuum Relief; 3.2.5 Design Issues; 3.3 Moss Spheres; 3.3.1 Typical Dimensions and Capacity; 3.3.2 Insulation and Tank Materials; 3.3.3 Pressure and Vacuum Relief; 3.3.4 Design Issues
4 Risk Analysis and Risk Reduction4.1 Background; 4.2 Risk Analysis Process; 4.2.1 Hazard Identification; 4.3 Frequency: Data Sources and Analysis; 4.3.1 Generic Data Approach; 4.4 Frequency: Predictive Methods; 4.4.1 FTA; 4.4.2 Event Tree Analysis; 4.5 Consequence Modeling; 4.6 Ignition Probability; 4.7 Risk Results; 4.7.1 Risk Presentation; 4.7.2 Risk Decision Making; 4.8 Special Issues-Terrorism; 4.9 Risk Reduction and Mitigation Measures for LNG; 5 LNG Discharge on Water; 5.1 Type 1-Above Water Breaches at Sea; 5.1.1 Ship-to-Ship Collisions; 5.1.2 Weapons Attack
5.2 Type 2-At Waterline Breaches at Sea5.2.1 Grounding or Collision; 5.2.2 Explosive-Laden Boat Attack; 5.3 Type 3-Below Waterline Breaches at Sea; 5.4 Discharges from Ship's Pipework; 5.5 Cascading Failures at Sea; 5.5.1 Sloshing Forces; 5.5.2 Explosion in Hull Chambers; 5.5.3 RPT in Hull Chambers; 5.5.4 Cryogenic Temperature Stresses on Decks and Hull; 5.5.5 Cascading Events Caused by Fire; 5.6 Initial Discharge Rate; 5.7 Time-Dependent Discharge (Blowdown); 5.7.1 Blowdown for Type 2 Breach (at Waterline); 5.7.2 Blowdown for Type 1 Breach (above Waterline)
5.7.3 Blowdown of Type 3 Breach (Underwater Level)

Sommario/riassunto

Liquefied Natural Gas (LNG) is the only viable way to extract and transport natural gas from areas not serviceable by a pipeline, but it also poses safety risks. This book examines the safety concerns regarding LNG, and examines the debate between its advocates and its opponents. The text considers risks on the extraction, transportation, and maintenance of LNG; includes discussion of case studies and LNG-related accidents over the past half-century; and summerizes the findings of the Governmental Accountability Office's (GAO) survey of nineteen LNG experts from across North America and Europe