

**Catastrophic losses result from interrupted operations at LNG facilities during earthquakes. Accurate assessment of structural impact, and informative alerts are critical to safe and efficient operation of these facilities during an emergency.**

Reliable observation of structural behavior during an earthquake is required to fully assess impact, deliver OBE and SSE alerts, and guide response actions at LNG facilities. Decisions must be made quickly and responsibly to maintain operational continuity.

**KMI-LNG puts a complete LNG Earthquake Response Platform under your control.**



# KMI-LNG

## Kinematics Management Infrastructure for LNG Facilities

[www.kinematics.com](http://www.kinematics.com)

Manage your LNG facilities with a combination of smart sensing technology, real-time processing, and predictive computations. Automated information tools and alarms deliver a solution tailored to your unique needs to ensure safe and compliant operational continuity.

- Immediately understand the impact of seismic events on your structures to eliminate guesswork and enable better informed decision making
- Receive Operating Basis Earthquake (OBE) and Safe Shutdown Earthquake (SSE) alerts to guide your emergency response
- Perform emergency response procedures with confidence based upon actionable information
- Achieve and maintain compliance with local regulations

# Understand the Status of Your Structures

**KMI-LNG was designed to provide a complete platform to improve your understanding of the many elements that impact your decision-making during earthquakes.**

## **MANAGING EMERGENCY RESPONSE MORE EFFECTIVELY**

Decisions during an emergency are too important to make without the right information. Targeting response to the correct actions can be difficult, especially when time and accuracy are critical. In these situations, real-time information on potentially damaging ground motion is crucial to initiating the proper emergency response procedures.

## **EARTHQUAKE IMPACT ALERTS (EIA)**

During a seismic event, KMI-LNG EIA detects on-site shaking and automatically provides alerts on the exceedance of design performance criteria, delivering an immediate understanding of the possible impact on your structures and facilities. Information from sensors and real-time calculations provide actionable information on the level of impact, and the required response steps.

The longer it takes to respond to an emergency, the more costly the impact. KMI-LNG delivers increased situational awareness you can trust to help deliver a quicker and more appropriate emergency response.



## **BECOME BETTER PREPARED**

Unnecessary shutdown or evacuation of LNG facilities during an earthquake can result in massive financial losses and a loss of confidence in the operation of the site. It is critical to determine the actual impact to structures, and correlate it to proper emergency response procedures.

Integration of design performance criteria with the definition of meaningful alert levels ensures that operators and emergency responders have the information they require.

## **ALERT LEVELS AND ALARMS**

During an earthquake or other ground motion, KMI-LNG performs real-time analysis of measured response spectra to determine OBE or SSE exceedance that would allow either continued operations or start emergency protocols, such as emptying tanks for inspection. Reliable hardware alarms indicate the level of impact.

This detailed understanding of the actual level of impact to facilities minimizes the likelihood of overreaction in moderate events. It also provides the confidence required by personnel to stop hazardous processes, preventing post-event fires and other disasters during severe events.



# The Only Complete LNG Earthquake Management Platform



## IMPROVING OPERATIONS

Managing LNG facilities is multi-faceted, and involves many kinds of information and systems. These operations can be difficult and expensive without the proper tools in place.

## MULTI-ASSET COMMAND AND CONTROL SYSTEM (CCS)

KMI-LNG CCS provides a high-end data center that houses tools for monitoring the state-of-health of all deployed hardware, real-time data acquisition, and processing systems with automated reporting and dissemination functions.

Deployed in dozens of energy facilities worldwide, KMI-LNG delivers the information you need to meet the needs of all your stakeholders. Having all relevant information at your fingertips provides increased confidence in your operational procedures, the safety of your facilities, and your real-time emergency management decisions.

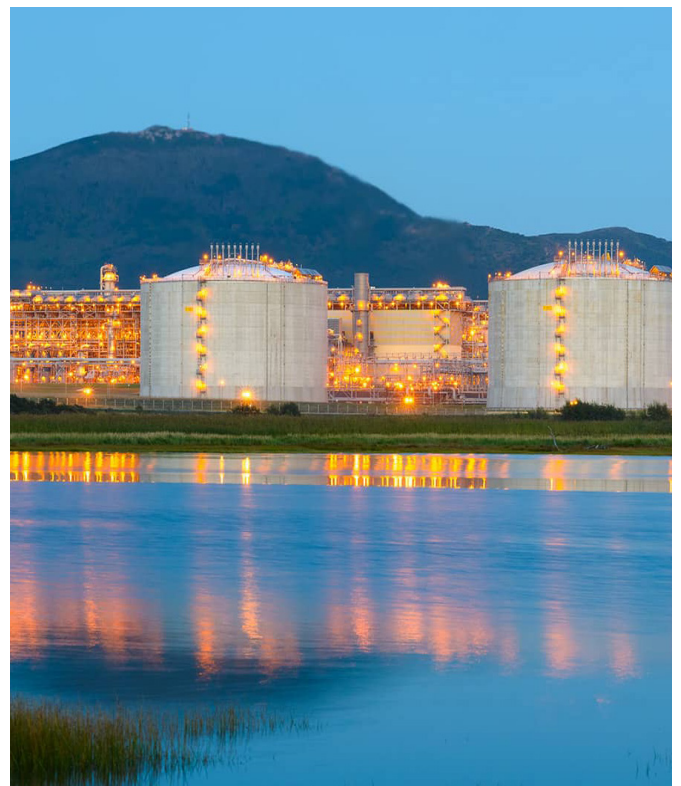
## DESIGNING AN INTERGRATED SOLUTION

Understanding the unique needs of your LNG facilities and stakeholders is fundamental to delivering the proper earthquake monitoring and response system. Facility design, emergency response procedures, and existing systems all play a role in deploying a simple, effective solution.

## A RELIABLE PLATFORM FOR THE LNG SECTOR

The KMI-LNG platform was designed specifically to meet the needs of the LNG sector. We review your facility needs and compliance requirements to ensure that you have the documentation you need to address internal procedures and external regulations.

In addition, KMI-LNG can be integrated with existing distributed control systems via standard communications protocols. This minimizes the time and effort required to implement and commission KMI-LNG within your facilities.



# A Trusted Partner

1

## **A Partner and Solution You Can Trust Today and in the Future:**

Kinematics can enhance the KMI-LNG solution by coordinating related engineering services including geotechnical, structural engineering assessments, and more.

KMI-LNG can also be expanded to integrate other customized solutions and technologies such as augmented reality-based field inspection tools, multi-sensor systems for improved diagnostics, preparation of earthquake emergency response procedures, assessments for non-earthquake hazards, and more.

2

## **PROVEN LEADER IN THE ENERGY SECTOR:**

Kinematics has delivered solutions for the energy sector for decades, and is uniquely positioned to understand and meet the needs of its customers. The KMI-LNG platform represents the most-recent advances in Kinematics' history of innovation to meet the needs of LNG operators, and demonstrates a true commitment to driving the technologies and solutions for this sector into the future.

3

## **Leading the Market Since 1969:**

Since 1969, Kinematics, its subsidiaries, and partners have been the global market leaders in designing technologies, products, and solutions for monitoring earthquakes and their effects on people and structures. Our products represent the de facto world standards.

When implementing critical infrastructure, it's imperative that you select a partner you can trust. In addition to delivering its world-leading LNG management platform, Kinematics is trusted by organizations across the world to provide operational, engineering, and other services.

*"Technology You Can Trust"*



*Advancement through Innovation*

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