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## LNG2023 FINAL PAPER

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**PAPER TITLE:** LESONS LEARNED FROM THE PANDEMIC IN LNG TERMINALS

### Abstract (250 words):

The GIIGNL Technical Study Group performed a survey and held webinars on the impact of the pandemic and on the lessons learned, which involved experts from each stage of LNG value chain. The objective of the study is to present the best practices in export and import terminals that could be implemented permanently in the operations.

The operational side appeared to be the most affected with the highest challenges related to managing physical deliveries with COVID constraints. LNG terminals were most impacted as they had to maintain the continuity of operations.

Among other solutions were splitting of teams, reduction of team rotations, onsite accommodation for workers, avoiding public transportation, car sharing, work from home (including engineering functions) and reduction of paperwork to the minimum. Resources were optimized for marine transfer operations. A new procedure for ship-shore interface was introduced including full digitalization of exchanges and excluding any human interaction, setup of a food bank and sanitary corridors. Measures for truck loading operations required drivers to stay either in a truck or in a dedicated waiting room. Beyond operational practices, introducing clear health and safety instructions to employees and

contractors and providing equipment/tools to work remotely played an important role in the organization of work. We believe the lessons presented will help optimize resources as well as maintain and increase efficiency of LNG facility.

## **Paper:**

### **Objective**

The objective of this document is, to provide a general overview of the main actions and strategies that LNG terminals operators of the GIIGNL member companies implemented to overcome the tremendous multidiscipline crisis generated by the pandemic, keeping a healthy workforce while continuing with a safe operation.

The areas of the study included: organization, Health, Safety, Security and Environment (HSSE), including a response plan, Maintenance and Engineering, including disciplines working remotely, Operations, Marine, Technology Support.

### **Content Disclaimer**

The purpose of this document is to summarize the lessons learned from the measures implemented by LNG terminals throughout the Covid-19 pandemic and identify those measures which worked best in order to share them across GIIGNL member companies. These recommendations shall not be considered a standard nor a specification and should only be viewed as a summary of the best practices used within the industry through the Covid-19 period. Readers should ensure that they are in possession of the latest information, standards and specifications for any procedures and equipment they intend to employ. Although GIIGNL has attempted to use the most up to date and accurate information available, GIIGNL shall not be held responsible for the adequacy, accuracy, completeness, or correctness of such information. GIIGNL including its members, disclaim any direct or indirect liability as to the information contained in this document for any industrial, commercial, or other use whatsoever.

### **Executive Summary**

This paper is a compilation of worldwide experiences from GIIGNL member companies during the Covid-19 pandemic 2020-2022.

The LNG industry like any other industry suffered immense consequences, however nothing compared to the health and humanitarian crisis that required rapid and unquantifiable efforts and measures to contain the pandemic.

The LNG industry rapidly proved to be very resilient and adapted and modified certain processes to comply with extremely drastic sanitary measures from health organizations and governmental regulations and guidelines. This unprecedented crisis put the LNG industry to the test, as the industry was forced to implement many changes requiring new strategies, developments, technologies, policies, procedures in a timely and reliable manner. Company leaders had to manage decisions arriving from the uncertain situation at a very fast pace, while keeping work force healthy and maintaining operations of critical infrastructure and business continuity.

Most member companies adjusted operations in the field and rearranged work schedules establishing camp sites, on or near the facilities, hotels, etc.; implementing multiple recommended measures to keep the primary/essential workforce

healthy. During the initial phase of the pandemic, these measures were in place for more than a year, and only priority work was scheduled creating a backlog on some of the areas such as planned preventive maintenance activities.

Six months after vaccines became available in mid-2021, most companies reported that strategies to return to office were established, following proper protocols and controls. Approximately two years after the remote work/work model from home was established, since conditions were stable enough to initiate return to the office. However, many member companies reported that new work schedules were approved based on the experience obtained through the pandemic (i.e. new hybrid and remote work schedules were implemented).

Some of the key takeaways which allowed to respond to the demands derived from the Covid-19 crisis in an effective way included:

- A well-organized crisis management team,
- Quick response to critical activities,
- Creation and approval of policies-procedures in a timely manner,
- Keeping the workforce fully informed,
- Incorporating psychological and motivational activities,
- Keeping company technology programs up to date,
- Establishing a plan to keep company emergency/crisis room fully functional,
- Providing continuous and appropriate updates of emergency procedures and practice crisis scenarios,
- Incorporating higher hierarchy level of the company (Board of Directors, etc.) in the crisis management dry runs,
- Identifying and preparing for long lasting crisis scenarios in the different areas.

## **1. Introduction**

The Groupe International des Importateurs de Gaz Naturel Liquéfié (GIIGNL), through its Technical Study Group (TSG), proposed to draft a position paper that collects the experiences of GIIGNL member companies during the Covid-19 pandemic and the lessons learned, notably with regards to the operations of the LNG terminals. The main focus is on LNG import terminals and how the pandemic affected the operations, business continuity and safety of the facilities.

In this regard, GIIGNL held several virtual meetings with member companies during the peak of the pandemic, in order to understand how companies were managing the crisis. The meetings were followed up with two surveys to capture the lessons learned and to record the process. 43% of the GIIGNL members who responded to the survey belong to the European Region, 28% to the American region and 29% to the Asian region.

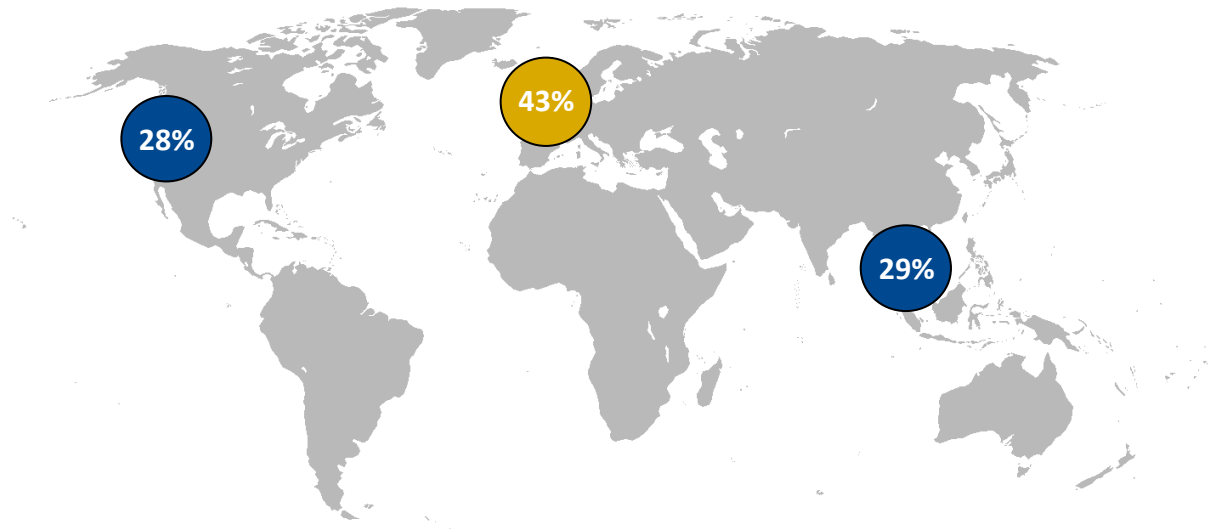


Figure 1 GIIGNL survey respondents by region

The results of the survey allow to identify how the learned experiences could be used to support future methods, management decisions and leadership. It is certain that some of the actions that were implemented will stay as new methods of conducting business. In this respect, GIIGNL member companies reviewed the areas that were mostly affected during the pandemic to obtain potential benefits from what was learned, share these opportunities amongst GIIGNL members and fill in any gap that these may have to confront any other major crisis.

Since the start of the Covid-19 pandemic crisis, companies reacted quickly and implemented in a very short time procedures required for safe and reliable operations. However, it was a long lasting and unprecedented crisis that affected certain areas and created backlogs that required recovery once the conditions allowed to do so.

The LNG industry has rapidly adjusted to manage the unprecedented crisis; however, it should review and prepare itself for similar situations that may arise, including other scenarios, that may require additional changes.

Any change brings, complexity, uncertainty, and opportunities. The LNG industry, will also adapt and evolve, becoming strong and responsive to operational, organizational, and technological changes.

## 2. Governance

The first immediate action required in any crisis has to do with establishing a governance structure. In the case of LNG terminals, a crisis team was established in first instance to cooperate in a cross-functional manner and to develop the strategies that would allow to implement the immediate changes that were required by at corporate level. Each role therefore determined their needs accordingly.

Some companies established crisis centers within a few days of the outbreak of the crisis, whereas some other companies had to implement a crisis group. In some cases, it took a few weeks to have a fully functional team. From the survey, 64% of companies had a well-established crisis management team and 36% implemented a new team during the pandemic.

### **3. Immediate Impact**

This impact was gauged by a series of direct group meetings held virtually with import terminal operators from member companies. The main areas of impact were:

#### **Staff Organization – Personnel**

As established by the sanitary protocols, physical contacts with the “outside world” was extremely limited during the Covid-19 pandemic. Therefore, terminal operators had to implement mechanisms such as reducing the personnel dedicated to Operations & Maintenance (O&M) to the minimum possible, without putting the operations management at risk. In this regard, non-essential personnel were asked to work from home.

Some members also established pre-existing business continuity plans or emergency plans with different stages that were implemented according to how the situation evolved.

Several member companies reported that during the process in which they defined the magnitude of the crisis and identification of consequences and routes to address different action plans, a medical specialist in the field was hired as a consultant to keep the crisis management team and the workforce informed of the developments and technicalities of the pandemic. Regular updates were implemented with the participation of the entire workforce to keep everyone informed of any development including the medical perspective from the subject matter expert with Q&A sessions to mitigate uncertainties linked to the pandemic.

#### **Operations**

Operations was one of the areas where GIIGNL members companies claimed that some of the greatest changes had taken place.

In the case of marine transfer activity, it was performed with less or no-contact with the shipping crew, and in the case of truck loading activities, there was less contact with truck drivers. Moreover, during this time no visitors were allowed onsite.

For cargo unloading, some members indicated that different vessels had different requirements. However, terminal operators indicated that paperwork was avoided unless strictly necessary. Arm connection/disconnection was often a critical point, and, in some cases, the loading masters and surveyors went onboard the vessels, whereas some other

times they did not. In the case that surveyors did not go onboard the vessel, arm connection/disconnection was monitored remotely. Any contact with ship crew was avoided and communication with the vessel was done by phone and by email.

Takeaways from the initial impact:

- High importance to implement business continuity plan.
- No large delays occurred in the operations.
- Truck loading: drivers stayed either in the truck or in a dedicated waiting room.
- Paperwork was avoided where possible.
- Maintenance work was reduced to corrective maintenance and preventive maintenance of devices critical for safety/reliability.
- Major overhaul work was postponed.
- In general shift rotations was modified, with longer working days.
- Some members activated retired SMEs to supervise key areas where the conditions and protocols allowed to do so.

#### 4. Overall Impact

Member companies were asked to evaluate the overall impact according to three categories: high, moderate, and low. However, these categories did not include any specific causes affecting the overall impact. Overall, 21% reported a high impact and 79% of the companies observed a low and moderate impact.

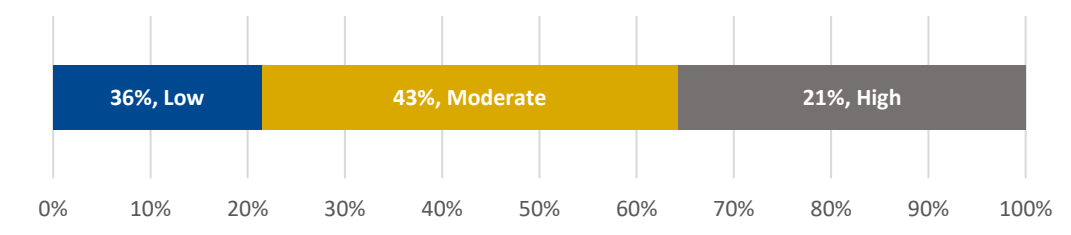


Figure 2 Impact of Covid-19 on GIIGNL members companies

#### 5. First Month - Three (3) Main Priorities

Member companies participating in this study have shared the three main priorities during the first 30 days of the crisis. Answers can be classified and summarized in 3 main areas:

Keep Personnel Safe and Healthy	Business Continuity	Governance – Logistics
<ul style="list-style-type: none"> <li>Understanding the risks associated with the pandemic, taking</li> </ul>	<ul style="list-style-type: none"> <li>Maintain enough personnel in the shifts.</li> </ul>	<ul style="list-style-type: none"> <li>Establish an emergency team.</li> <li>Formulate emergency plans.</li> </ul>

<p>measures to protect people, especially those who were vulnerable and managing irrational reactions.</p> <ul style="list-style-type: none"> <li>Emotional containment and mental health</li> <li>Covid-19 protocols implementation at all offices and project sites.</li> <li>Protocols to address sick employees, keeping people safe at work, modifying work schedules for affected employees.</li> <li>Study epidemic prevention policy.</li> <li>To make no contact LNG unloading</li> </ul>	<ul style="list-style-type: none"> <li>Create back-up shift teams, former shift workers or even retired personnel.</li> <li>Supply Guarantee (TSO)</li> <li>Implementation of a Reduced Operations Mode, only essential personnel at the facility.</li> <li>Only commercial services and corrective maintenance kept on the terminals during this period.</li> <li>Electronic signature for work permit process</li> <li>Minimize contact and not increasing operations risk.</li> </ul>	<ul style="list-style-type: none"> <li>Work on policies and procedures to restart work.</li> <li>To separate workers who use personal transportation from public transportation users.</li> <li>Home office resources management</li> <li>Shifts and office space reorganization to limit contact and increase social distancing.</li> <li>Study epidemic prevention policy.</li> </ul>
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## 6. Challenges

Member companies were asked to list the biggest challenges according to certain categories, without providing any detail of the specific causes affecting each category. Most of these challenges were related to operational issues and material/equipment, adding up to 66%.

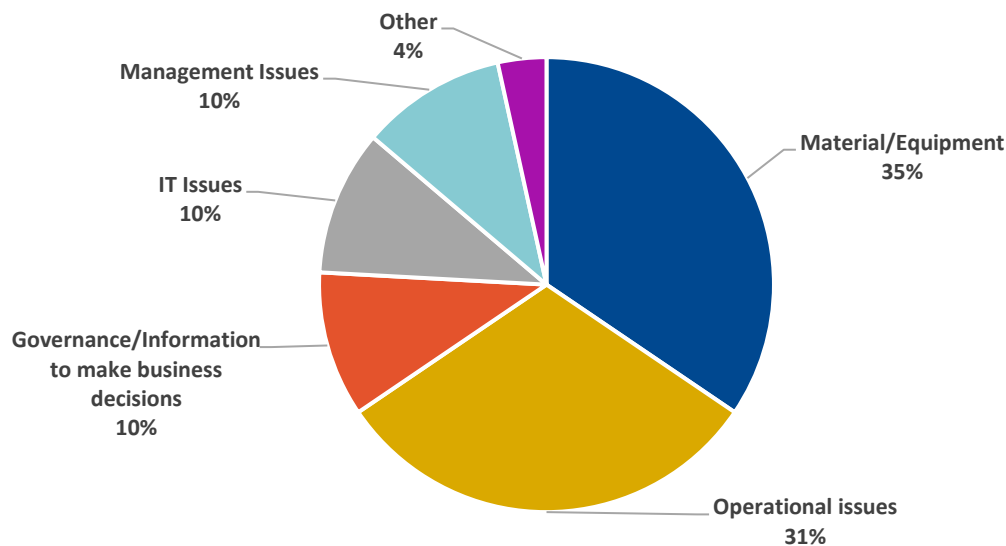


Figure 3 Top Challenges



## 7. Policies and Procedures

During the Covid-19 pandemic, GIIGNL members reported that they had to implement policies, procedures, immediate general requirements for organization change, communication protocols, leadership, as well as to maintain a cohesive team.

Some of the measures implemented can be summarized in the table below.

Health and Safety	Human Resources	Business	Organization / Office	Policies / Protocols
<ul style="list-style-type: none"> <li>Protecting yourself and others</li> <li>Vaccination Incentive program.</li> <li>Agreements with hospitals</li> <li>Provision of additional PPEs and sanitization apparatus at sites</li> <li>Hands free biometrics timeclock</li> <li>Hands free doors operation (open/close)</li> <li>Hands free water taps operations.</li> <li>Health and safety rules</li> <li>More care package e.g mask, disinfectants, snacks, fruits etc were given to staffs.</li> <li>Enhanced Medical Certificate (MC) was given to include covid quarantine.</li> </ul>	<ul style="list-style-type: none"> <li>Technology Reimbursement Policy</li> <li>Enhanced Benefits for Leave</li> <li>Family Care Support for Covid-19</li> <li>Paid Sick Supplemental Paid Sick Leave</li> <li>Employee Resources /Expense Policy.</li> <li>Increased health insurance coverage</li> <li>Surveys to employees to review company response.</li> </ul>	<ul style="list-style-type: none"> <li>Manuals for contractors during Covid</li> <li>Business continuity Plan</li> </ul>	<ul style="list-style-type: none"> <li>Work from Home Guidelines / Protocols</li> <li>Remote work for administrative staff</li> <li>Hybrid (in-site and home-office) system for entire personnel at the company</li> <li>Covid-19 situation room updates</li> <li>Office Safety – Covid-19</li> <li>Return to the office Procedure.</li> <li>Volunteer Trial, Return to office Survey, Room updates.</li> </ul>	<ul style="list-style-type: none"> <li>Leader Covid-19 guide</li> <li>Implementation of Quarantine/Covid -19 Safety Protocols</li> <li>Enhanced policies covering Covid-19 pandemic.</li> <li>Covid-19 national emergency - local, state, and federal health and emergency response Crisis Manual Activation</li> <li>Company Contingency Plan development</li> <li>Recovery plan</li> <li>Update and Q&amp;A Sessions</li> </ul>

The results of the survey showed that 64% of companies supported home office set-up for employees working from home. In addition, 43% of the respondents said that they had implemented policies to help employees, and 100% responded that immunization campaigns were very responsive.

## 8. Technology

Technology was an important enabler that supported business continuity through the pandemic. 86% of member companies that answered the survey reported to have implemented a certain degree of technology to support distancing and the overall continuity of the activities.

One area of concern for these technologies, was to understand the level of reliability and security of some of these applications. The majority of member companies reported that it took them weeks to complete the validation and implementation of these new technologies, and some reported that it took them months to implement these new technologies. 86% of the member companies reported that the implementation took them a few weeks to complete.

Some of the technologies that were reported to have been implemented during the calls and captured in the survey can be grouped in 4 categories: Applications for remote meetings, digital signatures, mobile devices, drones.

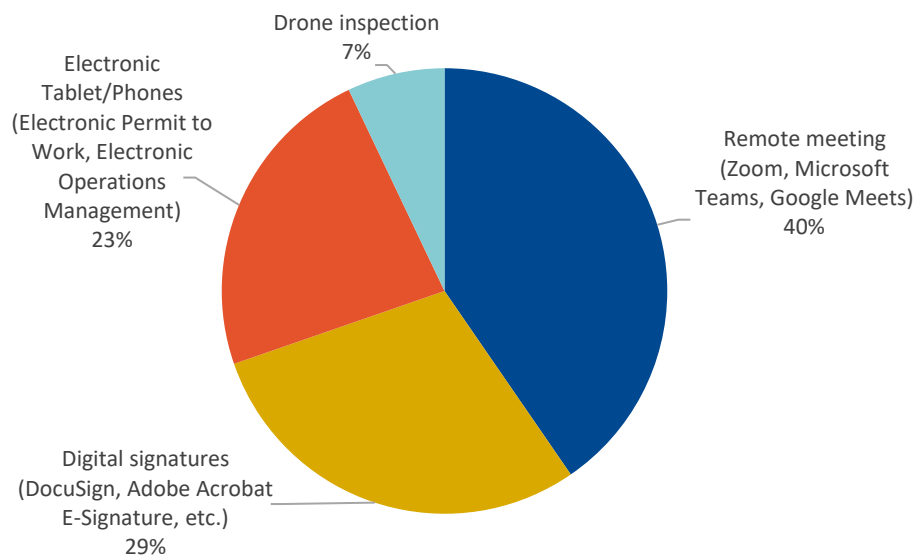


Figure 4 Types of New Technology Implemented by Operators

## 9. Organization/Work Schedule

The Covid-19 pandemic forced member companies to change their work schedules and to work remotely. In this regard, member companies who participated in the survey reported various work schedule transitions during the pandemic. During each period, each company assessed the most convenient work schedule for their personnel. In some cases, companies had to continue working remotely for up to 18 months following health institutions recommendations in their country/location. 2 out of 10 companies observed some kind of decline in productivity which affected the overall situation.

Hybrid work was the predominant model established after activities were normalized. This new way of working represents a big change from the traditional work model. However, from the surveyed companies, 63% of companies answered they have adopted the hybrid model, that is partly working in the office and partly working from home, for those employees who are willing to and whose duties allow to do so. Hybrid schedule does not fit all. New policies and procedures were incorporated to manage this new process.

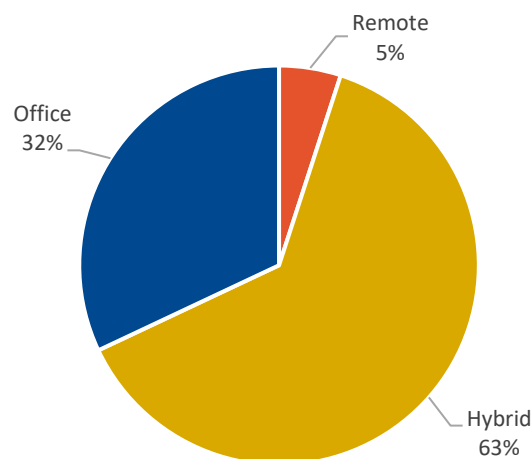


Figure 5 Work Schedule of the companies.

Hybrid schedules changed the way in which several activities that were not common practice in the industry are managed. Some member companies implemented technical training through e-learning platforms -these were previously used for regulatory training. Web conferencing technology was broadly used before the pandemic, and this technology enhancement allowed to implement safe and massive video conferencing applications very quickly, that enabled the hybrid schedule for many management functions. E-signing was another tool that has used in many sectors and has been widely accepted. Further development and acceptance of these applications has fostered the implementation of hybrid work schedules.

## 10. Services/Consumables/Spare parts

One major concern which hindered the continuity of the operations during the lock-down, had to do with availability of services and parts. However, overall, LNG import terminal operators involved in the survey revealed minor impact in this area. Only some project delays were highlighted but these had no impact on the continuity of the operations. Despite the increase in delivery times for spare parts, the continuity of the operations was maintained since companies'

inventories of parts were enough to keep the operations ongoing. The main areas affected were vendor availability for onsite assistance, delay on capital projects and long-term maintenance jobs, workforce, and quality of workmanship from vendors to catch up with work and postponement of inspections. Alternative shops are now being used and/or explored.

## 11. Stabilization Period

Member Companies responded that there were two stabilization periods; one from the initial lock down declaration that was centered on how to keep personnel isolated and healthy to support the operation of the terminals and business continuity, and second, the period to establish return to normal conditions taking account of the changes that each company had implemented according to their standards, policies, and procedures. Member companies reported that the first stabilization period took up to 3 months, 86% within 2 months and 14% between 2-3 months, according to the survey results.

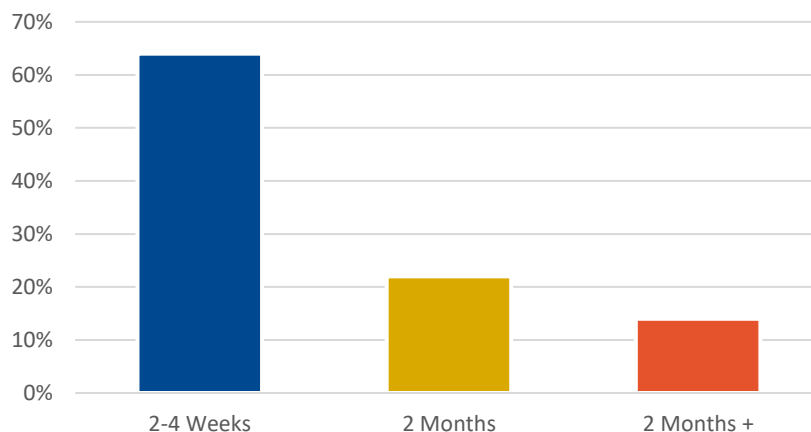


Figure 6 Stabilization period 1

Final stabilization to return to the new norm took between 18 to 24 months since the initial lock down.

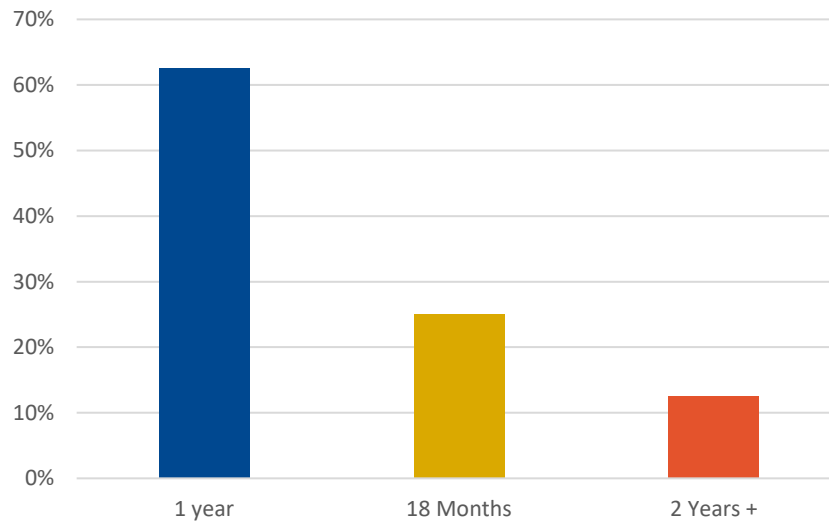


Figure 7 Stabilization period 2

## 12. Maintenance

In the survey, GIIGNL members were asked to answer whether Covid-19 had translated into any induced backlog for their maintenance activities. In this regard, member companies expressed that maintenance activities were initially reduced to a minimum without jeopardizing the safety or continuity of the operation. However, this led to controllable backlogs, where the issues with a greatest impact had to do with projects that were in the execution stage.

In most cases, the strategy followed was to minimize preventive maintenance activities and inspections on non-priority and non-safety related assets. Companies reported that this situation forced teams to implement more efficient planning and maintenance routes, which included the avoidance of personnel crossing each other through the facility. In some cases, companies reported that 3% - 7% backlogs were due to Covid-19.

Companies reported to give priority to and focus on complying with regulatory requirements such as maintenance of safety valves, and corrective maintenance which affected send out capabilities. It was also reported that in some regions, suppliers lead time of some spare parts had caused some delays.

In summary, maintenance indicators were affected due to the lack of spare parts and qualified personnel. 72% of the survey results showed that there was some degree of maintenance backlog induced by the pandemic.

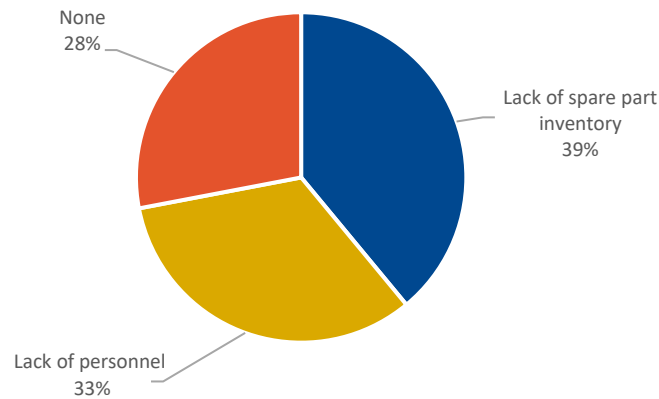


Figure 8 Issues affecting Maintenance Indicators

### 13. Operations

One of the questions that was posed to GIIGNL member companies in the survey was related to the changes permanently implemented in the operations of LNG terminals. In summary, no major changes were implemented for the day-to-day operations. During the peak of the crisis, the operations shift schedule and working hours was changed to account for the reduced amount of available essential personnel. Additionally, key personnel were set in camps in, near the facilities or in nearby hotels where available. In addition, shift handover was done by phone to avoid direct contact with each other. Various applications were deployed to support the use of remote meetings with multiple parties including local and international vendor's assistance. Examples of digital signature, electronic permit to work management system, remote custody transfer of LNG unloading process including pre-unloading meeting supported the continuity of the operations.

### 14. Marine

The interaction in marine operations was carried out by phone, emails, or radio during the first lockdown during the pandemic. Most of the respondents to the survey said that no members of the site team were allowed to board the vessel including the loading master. Instead, they used a remote system to control the arms and used the CCTV to observe/aid arm operation/connection/disconnection. Ship to shore meetings were organized remotely.

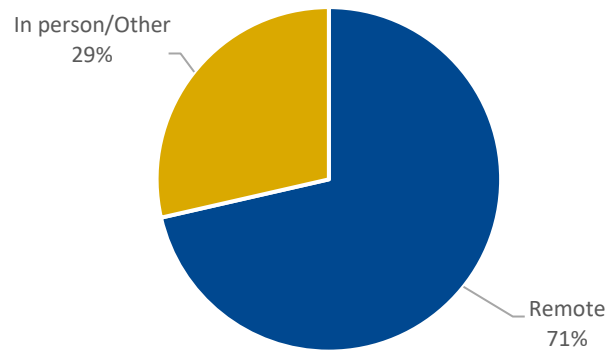


Figure 9 Pre-Unloading/Loading Meetings during the Pandemic

## 15. Lessons Learned

One of the questions asked in the survey was related to the things that companies would do different in the event of a similar crisis. In this regard, member companies said that they would now be able to anticipate better based on these experiences. They also mentioned that on-site Covid-19 testing was not beneficial, due to the minimal number of positive cases identified, whereas they preferred the measure regarding “Stay Home if you are sick” as beneficial.

GIIGNL members have also claimed that they would have more spare parts on stock, and that a document of lessons learned to consolidate operations and company strategies during a similar crisis would be useful. In addition, some respondents said that they would use one standard for guidance and avoid multiple changes on the policies.

Some of the enablers were:

- Adaptability as a key factor to maintain company governance in the transition to a different work environment.
- Quick reaction from technology providers to enable a secure digital workplace. It enabled convenient and reliable connectivity and supported remote environments for managing different business needs remotely. It enabled the possibility to review field operations and incorporate changes where safe and reliable operations could continue effectively.
- Facilitate tools for a proper implementation of a remote workplace. This required assignment of extraordinary funds and policies to allow workforce to acquire basic office equipment in a timely manner, so operations and business continuity was not jeopardized.
- Establishing a crisis team with rotating members so there was always a fresh team, which enabled flexibility and support of business decision making processes.
- Create policies and procedures to support required changes to be implemented and keep governance under a healthy framework.

- Support companies' workforce by facilitating immunization campaigns, following the protocols from health organizations and the instructions from federal authorities.
- Creation of different work schedules: Fully remote, hybrid and implement flexibility for the field workforce.
- Implement electronic signatures to facilitate administrative and approval process of main workflows.
- Automate processes that would support efficient crisis management.
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Additional takeaways from the survey that was conducted amongst GIIGNL member companies are related to the operations management of the crisis. In this regard, the following measures have been identified as positive:

- Having different scenarios for shift rotations as contingency.
- Having a pre-established back up work force (SMEs), through for example retired employees.
- Compensation of the O&M personnel during the Reduced Operations Mode.
- Establishment of onsite camps in motorhomes or other means, for the essential Operations and maintenance personnel in the LNG plants, to protect the health of essential workers, critical for operations continuity.
- Leadership of the company and their HSE departments in managing the crisis.
- Positive reaction of the workers, who responsibly assumed the measures recommended by the company.

Additionally, it can be mentioned that the crisis has changed people's mindset, since things are not taken for granted anymore.

Certain member companies reported that they requested or provided support to other companies. GIIGNL Central-Office promoted this collaboration within member companies early on during the crisis, by coordinating and moderating various meetings with the participation of more than 35 member companies. 29% of companies said to have requested the support from other LNG companies.

## **16. Conclusions and Recommendations**

The LNG Industry rapidly reacted to protect the health of employees and business continuity, maintaining compliance with the World Health Organization and local regulations and guidelines. Company leaders had to manage extreme uncertain and unprecedented conditions for a long period of time, that required policies and procedures to support proper governance of the situation.

Return to the new norm required a great deal of planning as many member companies reported that new work schedules were approved based on the experience obtained through the pandemic (New hybrid and remote work schedules were implemented).

GIIGNL members identified the following items as best practices:



- Having a well-organized crisis management team,
- Responding quickly to critical activities,
- Creating and approving policies and procedures in a timely manner,
- Keeping your workforce fully informed,
- Incorporating psychological and motivational activities,
- Keeping company technology programs up to date,
- Establishing a plan to keep company emergency/crisis room fully functional,
- Updating emergency procedures and practice crisis scenarios appropriately,
- Involving the higher level of the company (Board of Directors, etc.) in the crisis management dry runs,
- Identifying and preparing for long lasting crisis scenarios in your areas,
- Establishing a knowledge/SME bank from active retirees, former employees.