



Message from Karim Chapot, Technical Director, GTT



LNG carriers are among the safest commercial ships in the world.

The LNG shipping industry's track record is outstanding, with no major incident occurring in more than 50 years of operations at sea.

The design and construction of the ships, and in particular the LNG containment system, plays a significant role. Another key reason is undoubtedly the excellence of operations of LNG ships.

As you will read in this special issue, the combination of the operational expertise of LNG crews with a deep understanding of LNG behaviour helps maintain the excellent track record of the industry.

GTT has developed models to assess how the cargo behaves based on its composition, temperature, pressure and other parameters. Such knowledge combined with a shared experience with seafarers sits at the core of GTT's Emergency Response Service (ERS).

I hope you will enjoy to learn more about how GTT's ERS (HEARS®) helped Teekay face a rollover situation on one of their LNG carriers.

Karim Chapot

SERVICES

The [Emergency Response Services](#) (ERS) can help ship-owners to respond to unexpected events.

As you will read in this article, GTT's ERS – named HEARS® –, can also provide assistance to minimise the commercial incidents for the client.



In 2018, the [Methane Spirit](#), a 165,500 m³ Liquefied Natural Gas (LNG) carrier owned by [Teekay](#) faced a potential rollover situation during a loading operation.

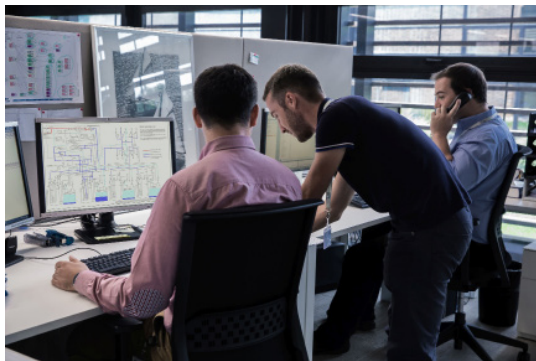
Two days before loading, Teekay called for GTT's assistance through its [24/7 Emergency Response Service \(HEARS®\)](#).



Whilst in ballast conditions, the vessel had a significant amount of light LNG remaining in her tanks and was about to load a cargo of heavier LNG. Because the heavy LNG was about to be loaded from the bottom of the tanks, below the light LNG, there was a possible risk of a rollover phenomenon. “A rollover may happen when a layer of light LNG sits on a layer of heavy LNG and when both layers are not mixing. When cargo mixing process happens, the tank pressure spikes, which may potentially lead to the lifting of the pressure relief valves” explains [Nicolas Dupont, HEARS® Manager](#). “Even though this phenomenon is often expected to only happen onshore, it can also happen at sea. Several cargo mixing related events on-board LNG carriers have already been reported.”

Before calling GTT, Teekay had prepared a specific loading procedure in order to manage the rollover risk.

The issue was that the total loading duration would be increased by up to 27 hours, more than twice the normal duration. Looking to address the safety concerns and any issues that may arise, Teekay decided to call for GTT’s technical assistance.



HEARS®’s officer on duty for the weekend received the first call on a Saturday. The loading was scheduled in less than 48 hours.

“The first moments were dedicated to assessing precisely the situation. For that, we worked closely with Teekay fleet management and the crew on-board the vessel” explains [Nicolas Dupont](#).

“Teekay shared with us the specific loading procedure that the crew had prepared and explained the objective was now to limit as much as possible the impact on the schedule while managing the rollover issue. We started looking for other possible solutions, with this objective in mind.”

During the next hours, several options were considered and analysed by the team:

“We then selected and focused on a solution that had the benefit of maintaining the usual safe loading duration while, of course, managing the rollover issue. In order to be able to preserve the usual loading duration, our approach was to act before the loading and then, adhere as much as possible to the usual loading procedure. Thanks to our in-house expertise, we were able to mitigate the rollover risk by optimising the arrival conditions of the vessel at the loading terminal. Based on the ship conditions and piping arrangement, simulations have been made to find the best LNG volume to distribute between the cargo tanks prior to the next port of call. An optimised distribution was proposed as a preventive recommendation to ensure a good mix of LNG blends during loading. During this operation, LNG spraying was recommended to further reduce the rollover risk while maintaining an appropriate pressure inside the cargo tanks and the insulation spaces. The main purpose was to not disturb the usual loading plan for the client.”

A few hours after the first call, the GTT [Emergency Response Team](#) drew up a customised procedure and shared it with Teekay.

The owner approved the procedure and decided to apply it. The crew then prepared the vessel to arrive at the loading terminal in optimised conditions, as per the new proposed procedure. The vessel was ready to be loaded.

Then, after the successful completion of the loading, the [Master of the Methane Spirit](#) confirmed that all went as planned: “No abnormalities or spike in tank pressures have been observed since completion of loading operations.” Moreover, the loading operation’s duration was the same as any regular loading operation, thus achieving Teekay’s objective.





The first priority of the HEARS® team is to minimise potential risks for staff and personnel, property and the environment. When immediate threats have been managed, our response team looks to secure operations and minimise the commercial impact for the client. "When possible, our objective is to be able to continue the vessel's operations as close as possible to a normal situation. When necessary, we are also able to decommission, inspect and repair the tank with a very limited impact on the commercial schedule thus saving time" explains [Nicolas Dupont](#).

[HEARS® Manager](#) said HEARS® receives between 5 to 10 calls a year:

"We are expecting to receive more and more calls in the coming years due to a growing fleet of LNG carriers and especially with merchant ships now starting to use LNG as fuel".

He added: "In addition to managing rollover risk, our ERS also helps our clients in situations such as gas leakage, emergency terminal departures, issues with nitrogen system, water ingress in the insulation system through the inner hull or the management of tank pressure increasing when the vessel is in degraded conditions. The response team is equipped with several simulation tools, especially designed to meet the emergency requirements. Because each situation is different, these simulation tools can take into account the weather and shipping conditions, in order to provide the most suitable option to the owners. For example, I am thinking of the safest cargo distribution in case of an emergency departure, or isolated vapour pocket prevention in case of grounding, or even the holding pressure time and Boil-Off Gas management. Combined with the experience of the response team, this ensures to stay one step ahead and make the correct and timely decisions, all limiting the off-hire period for the vessel."

Because the first hours following an incident are the most critical, emergency preparedness is key. Thus, GTT has set-up an emergency preparedness program with its clients that includes joint emergency response procedures, training of seafarers to crisis management through technical emergency exercises and regular joint drills.

As the [Teekay Fleet Director](#) shares with us: "Teekay values the HEARS® service that GTT provides as it delivers assurance to owners when faced with unexpected events involving cargo management."

A significant number of owners trust HEARS®, with over 25% of the membrane fleet currently in service having joined the HEARS® program.

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- 7-11 October 2019
- 25-29 November 2019

MEMBRANE TECHNOLOGIES

- 14-17 October 2019
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