

Overview graphic.  
(Photo credit: Author)

## With FLYING PLUG, NG3 connects tanker vessels to shore power

By Damien Féger, CEO, NG3.

Like other type of vessels, tankers cannot escape from the IMO requirement to drastically reduce their emissions by 2030, and the industry has identified shore power as one of the solutions to be considered. This is illustrated by the recent issuance of a shore power guidance note for tankers by OCIMF, the Oil Companies International Marine Forum.

Compared to other vessels, tanker vessels main differences are that:

- In most cases, their cargo is highly flammable;
- In most cases, they are berthing alongside a pier only at midship, in front of their cargo manifold connecting interface.

Based on this, first approach would be to locate the shore power interface at midship, taking advantage of the nearby existing cargo loading arms pier, but this would bring the risk of mixing high electrical power with cargo transfer operations, with, in case of failure of the transfer equipment, potential leakage of highly flammable gas or liquids.

To avoid this risk, NG3 is proposing, with FLYING PLUG, a shore power connection at the aft of the vessel, out of the whole vessel's cargo hazardous area. FLYING PLUG is based on our well proven PLUG 11 kVolt shore power connection solution already in use on the whole Norwegian Color Line RoPax vessels fleet, with, since 2011, more than 20 000 connexions (and still counting).

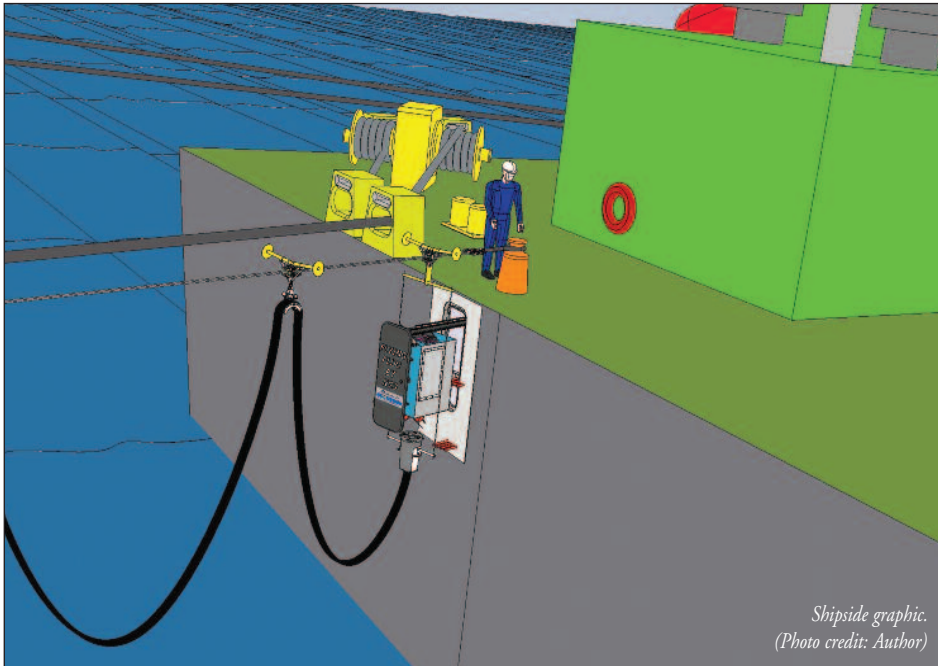
Beyond the use of this self-mating/de-mating connexion PLUG technology, FLYING PLUG game changing solution is based on the use of a zipline design, where both the power cables and the PLUG connector are coming from the shore towards the vessel's aft side suspended below a pair of support cables installed between a vessel's fixed point and one of the terminal's aft mooring dolphins.

The ship side interface is identical to the PLUG one we have in operations on numerous RoPax for more than a decade, except that it is just located below this fixed point, and is rotating, so that it can be aligned, depending on the vessel's size in the same plane as the terminal side mooring point.

The quay side interface, to reduce harbour engineering, is directly attached to an existing aft mooring dolphin, and is used to store the festoon of power cables and the connector when not in use and to also receive the set of winches required to tighten the supporting cables and move along them the set of dollies which support, first, the PLUG connector basket and the following power cables festoons.

Operations to establish the connexion are the following:

- Initially, the ship side watertight door is closed so that all the ship side electrical components are fully protected from the environment while at sea;
- Once the aft mooring lines are set up, the supporting cables are connected and tightened to the vessel fixed point, so that both the ship and quay side interface are aligned in the same plane;
- The ship side interface is then slid out and aligned in this plan;



Shipside graphic.  
(Photo credit: Author)

- Once this is done, the terminal side winches are used to pull the dollies toward the vessel until the connector basket is just below the ship side PLUG hoisting system;

- Crew can then remotely hoist the self-mating / de mating PLUG connector from its 'flying' basket towards the ship side socket to establish the connexion;

- The system is then ready for power exchange

The overall duration of the connexion operation is expected to be less than 10 minutes, mobilising only one crew on board, and does not require any direct handling of the power cables and connectors.

Disconnection operations are the same, in reverse.

One will note that by design, FLYING PLUG brings the additional safety benefits of allowing an emergency release capability (such as required for gas tankers by SIGTTO, the Society of International Gas Tanker and Terminal Operators).

If required crew can remotely trigger the release of the connector hoisting chain until it reaches, and releases, its last link and free the vessel from the shore power line.

From an operational and environmental point of view, FLYING PLUG's key benefit is that connexion and disconnection operations can be performed by the ship and quay side

personnel in charge of the aft mooring lines, avoiding any interferences with the midship personnel who can remain focused on the connexion/dis-connexion of the cargo manifold.

*“The industry has identified shore power as one of the answers to work towards the IMO requirement to drastically reduce emissions by 2030. FLYING PLUG is a game changing solution.”*


This means that the vessel can switch to shore power within few minutes after arrival and departure, maximising the financial and environmental return on investment for the whole function.

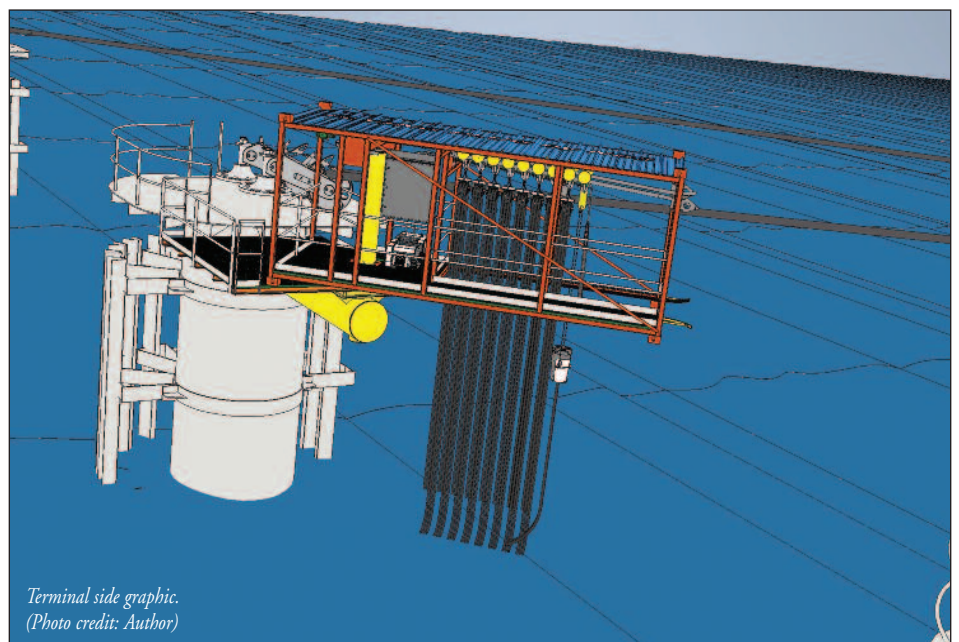
The FLYING PLUG ship side interface being located at the aft of the vessel, close to the vessel's main switch board, avoids any length of power cables to be routed from this switchboard to midship.

One will note that tide, draft and vessel's aft distance from midship variations are simply compensated by the angle and flexibility of the festoon of cables.

To simplify logistics and installation, we propose to implement the terminal side interface within a standard 20 feet container structure, which would be lowered on a simple tubular structure welded to one of the existing mooring dolphins. Installation on site would therefore be possible in a matter of hours.

Last but not the least, FLYING PLUG, being not limited by the weight of its cables and connector compared to manual solutions, offers a potential for growth in power exchange demand, addressing in advance, the battery charging needs of future hybrid or, even full electric tankers.

FLYING PLUG is compliant, with class societies, OCIMF and SIGTTO safety requirements, and for the shore side interface, will be CE marked. 



Terminal side graphic.  
(Photo credit: Author)