



FIRE SECURITY

Lifetime extension, repair and fire protection of electrical cables
LNG VESSELS AND PLANTS WORLDWIDE



Last updated September 2021



PROTECTING ELECTRICAL CABLES ON LNG VESSELS AND PLANTS WORLD WIDE



Jesper Rexen, Managing Partner at Fire Security Middle East oversees the LNG sector at Fire Security. As a founder of Fire Security Middle East in 2003, he has more than 15 years experience in the field and has seen more than twenty LNG carriers being upgraded since 2015 ranging from MOSS type, Q-Flex, Q-Max and conventional LNG carriers.

tion of Q-Flex, Q-Max and ARC-7 designs. These vessels carry very costly and very sensitive cargo and can experience loss of operations due to damaged cables on cargo pumps whilst others have experienced small fires in their machinery spaces which lead to high levels of loss of production. Here Fire Security's DNV approved coating systems have been utilized for repairs and environmental protection both on deck and for fire technical upgrades of cables in high risk areas below deck. Fire Security's main objective is to enhance the safety onboard and protect against both loss of life and loss of production in the event of a fire.

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Managing Partner

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The Global LNG market is growing rapidly and therefore the fleet of LNG carriers continues to experience tremendous growth. The world's first LNG carrier Methane Pioneer was launched in January 1959 delivering its cargo from the US to the UK. Since then these types of carriers have developed into the most sophisticated commercial vessels operating on the world's oceans. In recent years, the size and capacity of LNG new builds has increased rapidly with the introduc-

Fire Security Middle East also operates onshore in LNG refineries and holds a three-year repair and coating contract with Shell GTL where thousands of meters of early ageing damaged HV cables have been repaired and coated. In 2004 Fire Security upgraded all cables above ground fire technically for Technip at the Oryx GTL refinery in Ras Laffan, Qatar.

Fire Security Middle East delivers turnkey projects globally, with riding crews on passage or during your dry-docking cycle and we remain available to conduct surveys of your cables anywhere in the world.

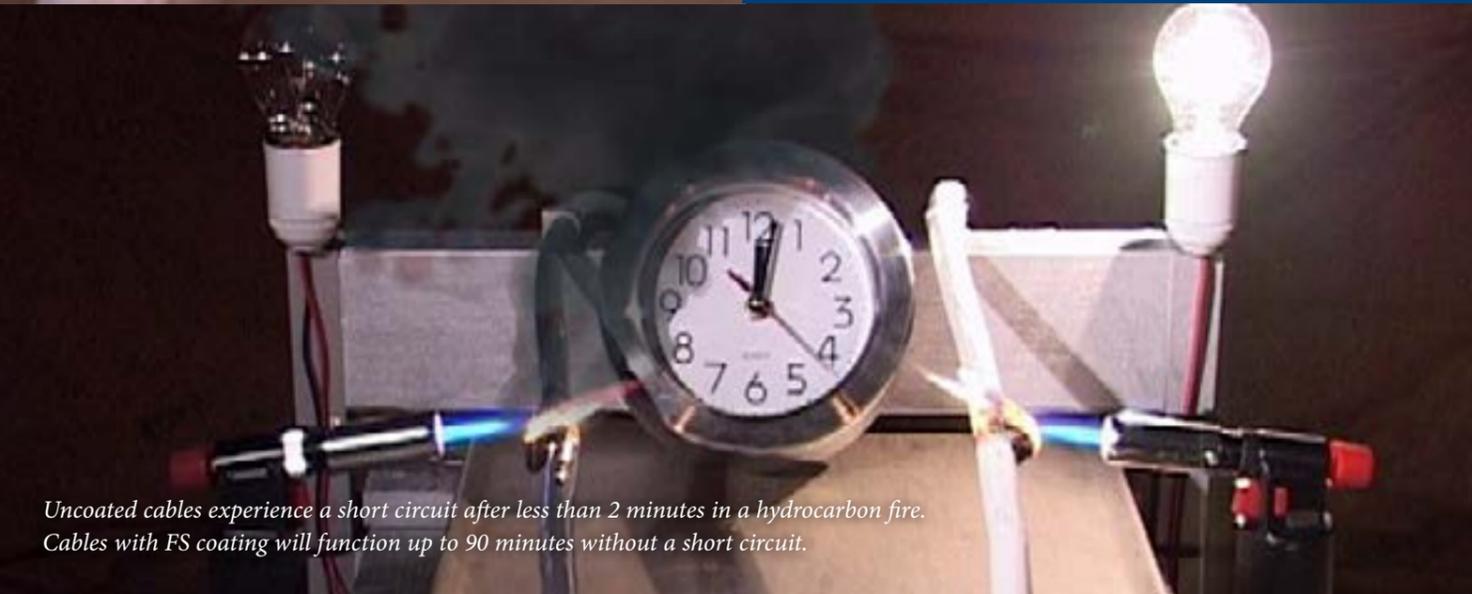


FS-1 is an intumescent coating that will expand 100 times its thickness during a fire - thus protecting the cables from fire damage and making sure the cables function when needed the most.

SAVING COST, SAVING ASSETS, SAVING LIVES

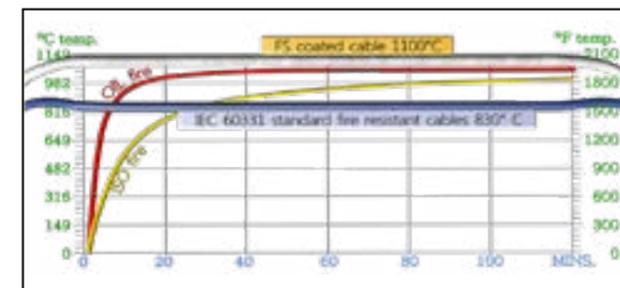
In a fire situation our systems will prevent:

- Ignition of the cable insulation
- Release of toxic fumes from the cable insulation
- Release of poisonous gas (HCL) from the cable insulation
- The cable tray from melting and collapsing



Uncoated cables experience a short circuit after less than 2 minutes in a hydrocarbon fire. Cables with FS coating will function up to 90 minutes without a short circuit.

Will your cables survive a hydrocarbon fire?



The red curve represents the temperature of an oil fire - up to 1100° Celsius - the temperature to which Fire Security has tested their coatings. This is the temperature you will be facing if you had such a fire.

How the protection works

During a fire, the coating will expand up to 100 times its thickness, thus protecting the cable from fire damage. Coated cables will function during a fire and be usable afterwards. If the fire is extinguished within reasonable time, there is no need for cable replacement.

The yellow curve shows the temperature of an ISO fire - 830° Celsius, which is a normal cellulose fire.

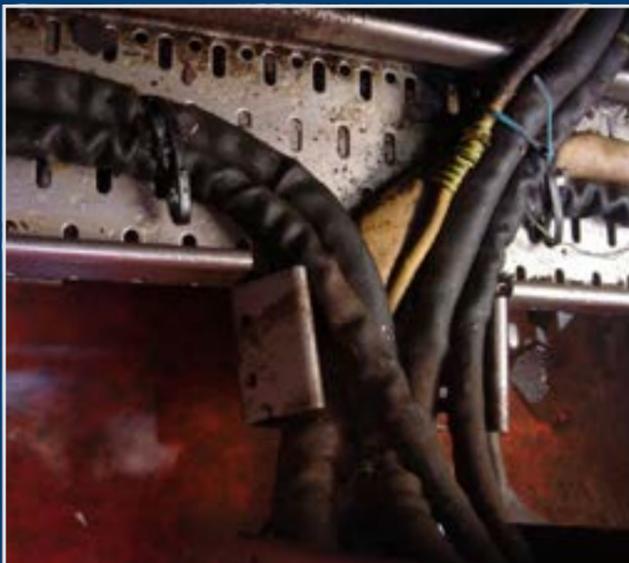
ELECTRICAL CABLE LIFE EXTENSION CONSISTS OF THE FOLLOWING:



FS Coating restores and upgrades the cables fire protection and smoke class as well as increases the short circuit delay in a fire situation.



FS Coating enhances the cables UV resistance, ozone resistance and increases the dielectric strength.



FS Coating offers excellent mud protection, oil and chemical protection.



FS Coating brings back and upgrades insulation properties, FS offers to repair cables where the outer sheath is damaged.

DAMAGED CABLES CAN BE REPAIRED DURING NORMAL OPERATION. NO SHUTDOWN IS REQUIRED.



Damaged electrical cable



Repaired electrical cable



Fire Security is protecting electrical cables on LNG ships and plants worldwide, including Shell's \$19bn (£12.2bn) Pearl Gas to Liquid (GTL) facility in Qatar.




FIRE SECURITY

CERTIFICATE

Fire protection of electrical cables at

BLNG SWITCH-HOUSE NO 1

Fire Security is a Norwegian company specializing in cable repair, protection and life time extension.
Our systems are available for application worldwide with specially trained personnel.

We confirm that we have coated and protected the cables in Switch house 1.
For this protection we have utilized our approved coating system FS 5.
The application has been done in accordance with our documentation
and P.O number. PO1507/342.

Completion: December 2015
Quality Guarantee. Date: December 28. 2015


 Jim Sollesvik
 Technical Department


 FIRE SECURITY s.s


 Leif Harald Tveitnes
 President

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After an assignment is completed we certify the work done, the relevant standards involved and the agreed guarantees.



Date: 21/02/2016

Ref: Ops/056/15

REFERENCE LETTER

To : *Jesper Rexen*

Fire Security Middle East

Office 1216, Building C1 - Ajman Free Zone

Subject : Life Extension Repairs And Fireproofing of Cargo Electrical Cables On-board ADNATCO NGSCO LNG Fleet.

This letter has been issued to Fire Security Middle East . Ajman, UAE, in recognition for their technical contribution and outstanding works carried out to improve the condition of the electrical cabling protection for cargo system on-board ADNATCO NGSCO LNG fleet vessels.

Fire Security Middle East has successfully completed life extension repair, and fireproofing of brittle electrical cables on our 08 LNG fleet vessels :

LNG / C Mubaraz

LNG / C Mraweh

LNG / C Al Hamrah

LNG / C Umm Al Ashtan

LNG / C Al Khaznah

LNG / C Shahamah

LNG / C Ghasha

LNG / C Ish

Work was conducted safely and efficiently under passage by riding application squad certified in rope access with no interruption to ship's operations.

FS5 repair and coating system was applied on live electrical cables and intrusive repairs on expansion joints were carried out in the following areas:

Deck level main cable trays - Cable trays running full length above all dome tops - Manifold areas - Port and Starboard Compressor House.

Youcef Grebici

Sr. Technical Superintendent - LNG Fleet

Ahmed al Muhairi

LNG Fleet Manager



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Mr. Jesper Røxen
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 UAE
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24th Jan. 2013

Our Ref: QSGTLOLENG.2013.001.001

Dear Mr Røxen,

RE: Coating of HV cables using Fire Security FS5

This is to confirm that the HV cables used in Qatar Shell Pearl GTL with outer sheath HDPE which had been shown cracks have been repaired by coating with FS5 in a very professional way, maintaining the specified quality and to a very high safety standard.

The cables affected were 33, 11 and 6.6kV around 100 circuits where coated wherever the cables are not underground.

The work was completed in December 2012 and we are satisfied with Fire Security coating system.

Kind regards,

Henk F. J. Kommers
 Electrical Engineering Manager / Senior Electrical Authority
 Qatar Shell GTL Limited

Qatar Shell GTL Limited
 Incorporated in Bermuda
 Registered Number EC 34279,
 Registered Office: 4th Floor, Cedar House, 41 Cedar Avenue, Hamilton HM 12, Bermuda



MOL LNG Transport (Europe) Ltd.
 3, Thomas More Square, London E1W 1WY

Mr. Jesper Røxen
 Fire Security Middle East F.Z.E.
 Office 1216, Building C1
 Ajman Free Zone
 United Arab Emirates.
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September 20, 2018.

MOL Ref: Electrical Cable Fire Protection Project

Dear Mr. Røxen,

RE: Passive fire protection of electrical cables in high risk areas onboard MOL LNG Carriers by way of cable coating.

This is to confirm that MOL Fleet Team 1 & Fleet Team 2 have utilized Fire Security Middle East for passive fire protection of electrical cables within high risk areas on several of our LNG vessels.

These applications have enhanced the fire protective properties of our electrical cables by utilizing Fire Security's FS1 intumescent coating system.

The projects have been safely completed with riding crew rope access application teams, ensuring no disturbance to our operations.

We are hereby pleased to give Fire Security our best recommendation based on their smooth deliveries to MOL LNG since 2016.

Yours sincerely,

Euan McIntyre
 Fleet Manager
 MOLLNG (Europe)



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 Registered in England No. 5954128



FIRE SECURITY

Our products have been approved by leading classification societies and authorities:
U.S. COAST GUARD, Lloyd's Register, Achilles, Bureau Veritas, DNV, RINA, NMA, ABS, FM, UL



SUSTAINABLE SOLUTIONS

Fire Security protects and extends cable life using non-toxic materials.

SAVING LIVES, COSTS and THE ENVIRONMENT

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