7TH ANNUAL SF_6 GAS MANAGEMENT SEMINAR 2022

Consult-Elect
Connecting Power & Solutions

SF_6 Gas Applications on Cruises and Oil Platforms

Guillaume Carrière

Director of Operations

Consult-Elect Inc.

Contents

- Introduction
- High humidity & corrosion
- Safety in enclosed spaces
- Ventilation
- Ergonomics
- Conclusion

Introduction

- Offshore platforms and cruises' MV substations present particular challenges while performing maintenance services.

- Electrical installations on these are different from your typical utility installations and require extra precautions when handling SF_6 gas.

Introduction

- Ships and platforms all face similar and particular issues due to the excessive amount of wear they live through their expected lifecycles.

- Sometimes located in areas where accessibility is complicated, to say the least, planning an intervention on these type of facilities becomes a whole project on it’s own.

High Humidity Environment

Main Issues:

- If a SF_6 filled equipment has to be opened due to a maintenance, humidity inside the gas compartment needs to be highly controlled.
- Molecular sieves will loose their properties faster when expose to marine environments.
- High humidity in a SF_6 filled compartment will affect the equipment's functioning.

High Humidity Environment

Solutions:

- Open compartments must be intervene in the least amount of time possible to avoid humidity inside.
- Change of molecular sieves after the service is highly recommended.
- Ensure correct vacuum times.
- Comply with manufacturers' SF_6 quality & purity requirements.

Marine-Grade Corrosion

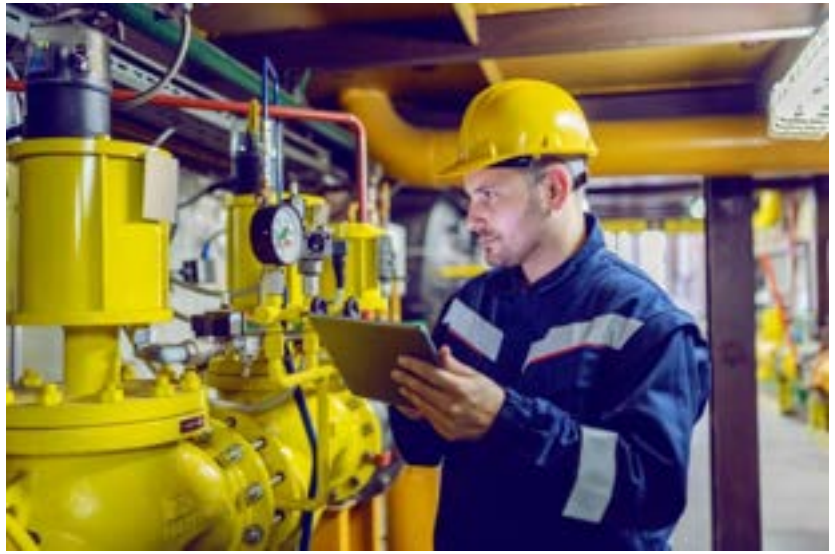
Main Issues:

- Corrosion is a main issue for the installations within offshore platforms and cruises.
- It will affect everything: from the fasteners that keep the system gas-tight, to the equipment's main shell, and everything in between.
- Relentless and implacable, corrosion could be amplified by electric currents and the salinity in the environment.

Marine-Grade Corrosion

Solutions:

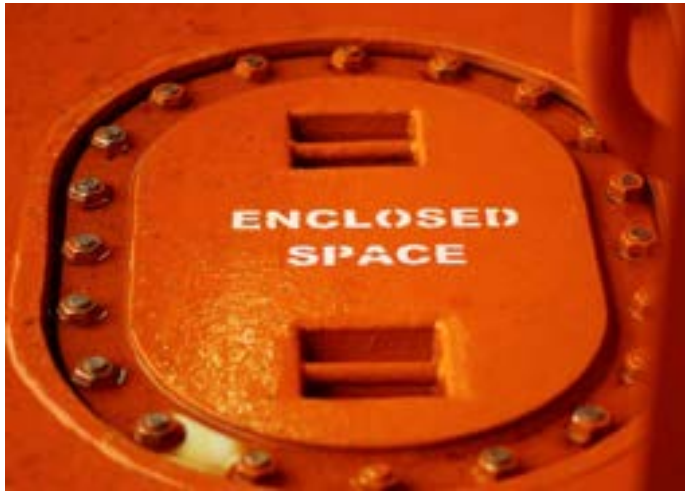
- Preventive maintenance to the equipment should require corrosion inspection performed often and periodically.
- Ensure the correct specifications on watertight seals and o-rings.
- Comply with manufacturers' corrosion protection requirements for the particular equipment.



Safety in Enclosed Spaces

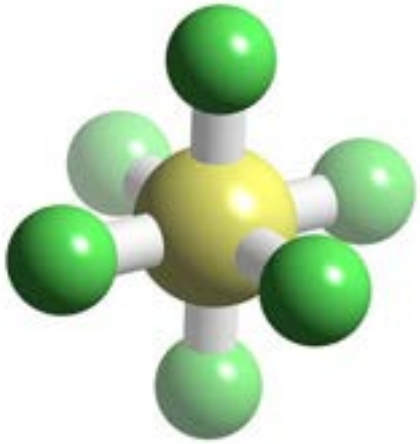
Main Issues:

- A cruise ship or a cargo vessel is a huge “enclosed space”.
- SF_6 leaks become much important to locate and contain ASAP.
- Engine rooms and electrical installations are normally located on the bottom-rear of the ship.
- Preparation is the key when handling SF_6, but accidents can happen.



Dealing with Emergency Release of SF_6

- If the release of SF_6 is inevitable or has happened without control due to a malfunction of the equipment:
  - Make sure that all the valves on the system (cylinders, SF_6 group, hoses, and other compartments) are **closed**, if it is safe to do so.
  - Always make sure there is enough ventilation when a SF_6 filled equipment has an important leak
  - Avoid low places (like basements and trenches) where SF_6 can gather after released.



Ventilation While Handling By-Products

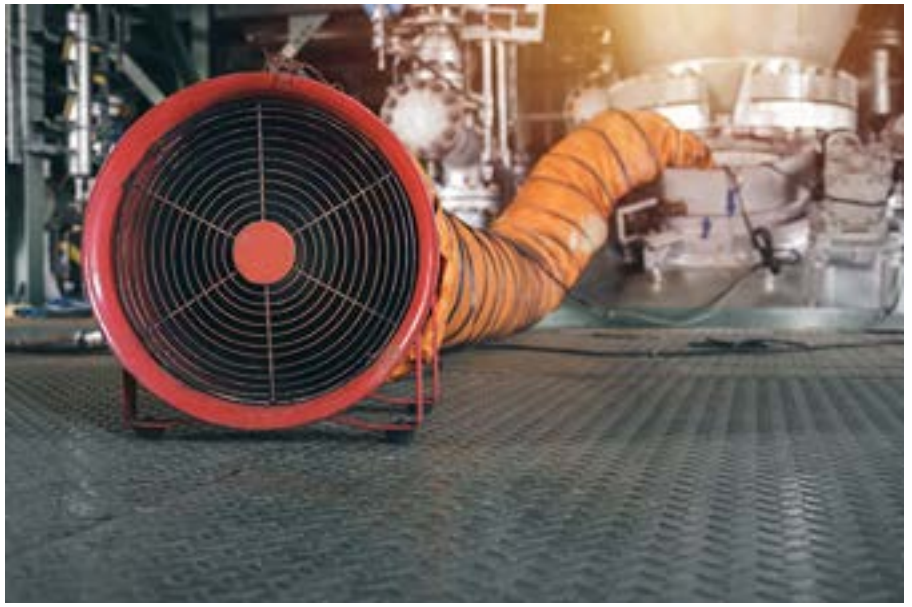
Main Issue:

- Dealing with SF_6 by-products in a non-ventilated area is extremely dangerous.
- Getting enough ventilation into an area deep inside the ship can be a very tough task and requires extra planning.
- Time is always a constraint working inside a vessel (cargo ships, cruises, sea platforms, etc).

Ventilation While Handling By-Products

Solutions:

- Planning, planning, planning…
- Forced ventilation becomes crucial when a leak is detected on an equipment.
- The use of special PPE is mandatory and, although very helpful, it will not make the task more enjoyable (pungent *«rotten eggs»* smell)…



Ergonomics

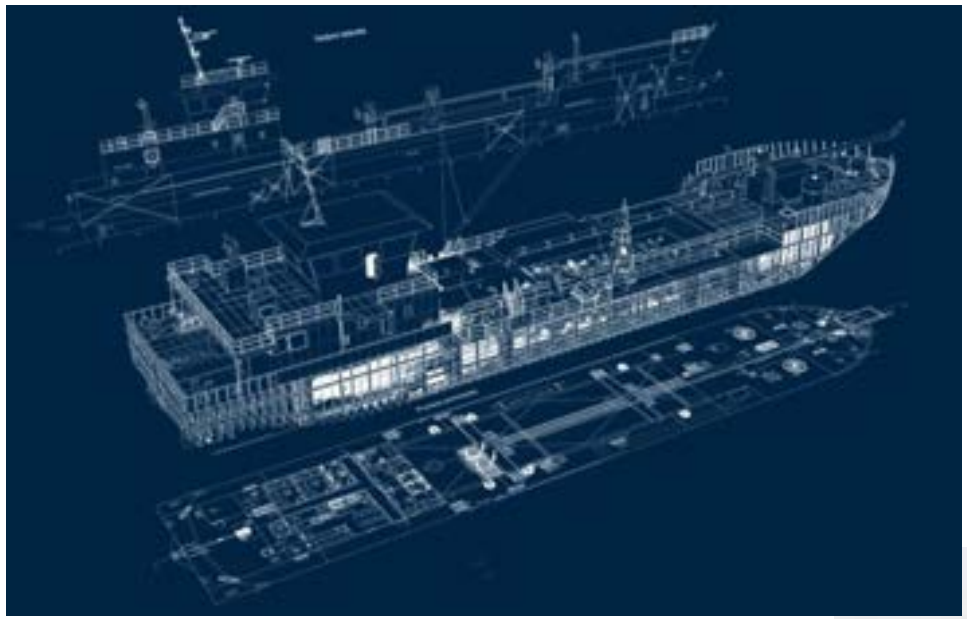
Main Issues:

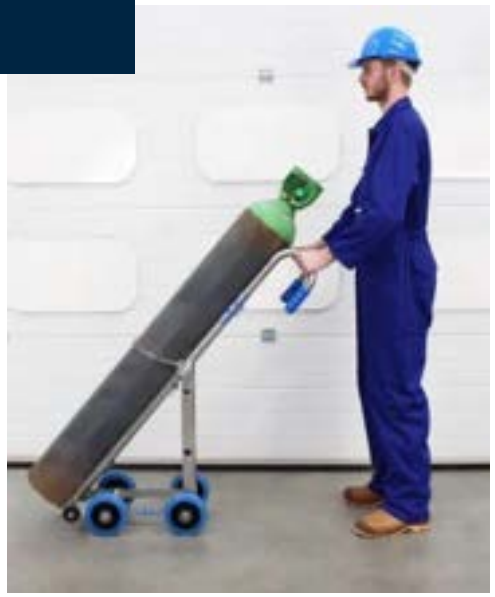
- Generally speaking, spaces inside a ship are very tight and uncomfortable to be in.
- SF_6 equipment and cylinders are, most of the times, heavy and not designed to be carried around inside a boat.
- Stairs (steep and dangerous) and doors (small and with funny shapes) are already difficult enough to navigate without carrying anything in your hands.
- Working in rooms close to the ship's engine, temperature/noise/vibration are things that need to be taken into account.

Ergonomics

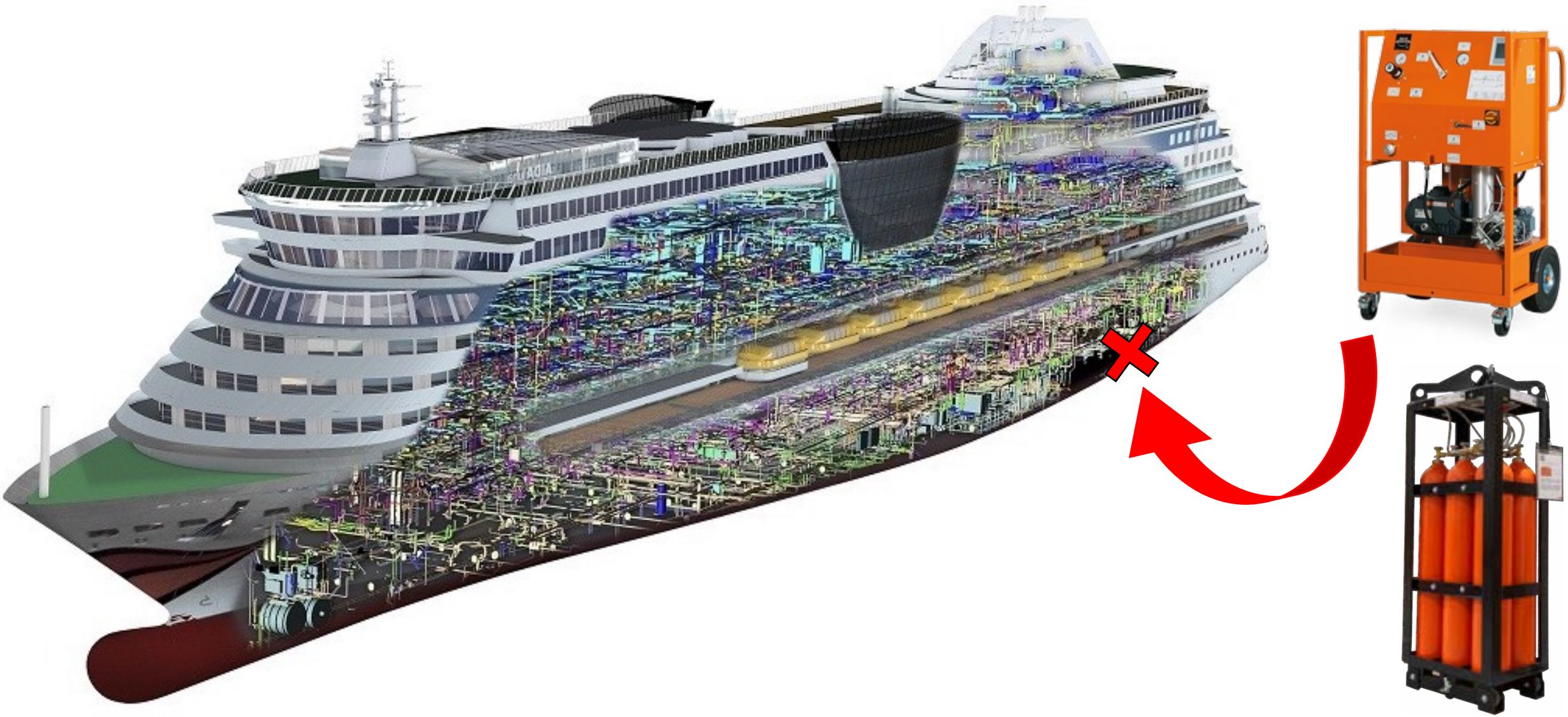
Solutions:

- Once again: plan, plan, plan…
- Programmed breaks are a must while working under uncomfortable conditions (*i.e.* relatively high temperature/humidity).
- Always consider the amount of effort and time to get all the materials/equipment into the vessel in your schedule.
- The bigger the boat = the more complicated to get into…





Getting stuff into/out of a ship… during a blackout!



Questions?

SF_6 Gas Applications on Cruises and Oil Platforms

Guillaume Carrière

Director of Operations

Consult-Elect Inc.