



Engine room fires can be avoided

Fires are often
caused by small details
going wrong



2/3 of all fires start in the engine room ... most of them can be avoided



The direct cost of an engine room fire can be in the range of 1-4 million USD for a cargo vessel – and much more for a passenger vessel. Off-hire and loss of goodwill adds to this figure and is perhaps the most difficult asset to replace.

Engine room fires also represent a hazard for crew members working in that area and fire fighters.

There is also a risk of the fire spreading to other areas of the vessel. Recent incidents such as “Romantica” in the Mediterranean, where the fire damaged the entire passenger vessel, and the sinking of the cruise liner “Sun Vista” off Malaysia, have demonstrated that engine room fires could threaten the safety of the entire vessel.

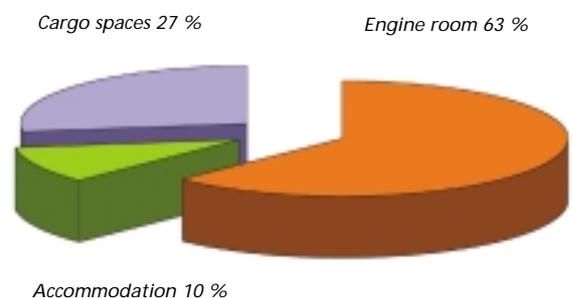
According to DNV statistics, a shipowner operating 20 vessels can expect one major engine room fire every 10 years. Ship management should therefore include a clear policy of how to avoid such incidents.

DNV FOCUS: ENGINE ROOM SAFETY – CHALLENGES AND SOLUTIONS

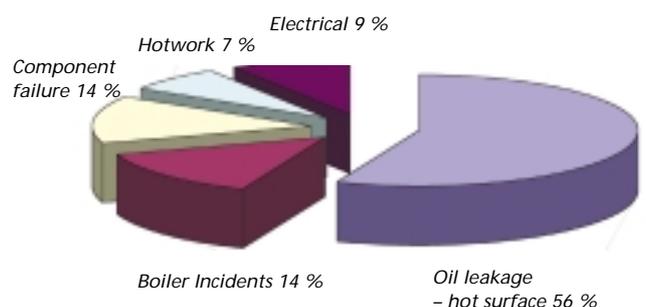
Fires are often caused by small details going wrong. Preventing fires can be a difficult task when you do not know where to focus, and good experience data are often difficult to find.

The DNV CADA casualty database provides unique

CAUSES OF FIRE



ORIGIN OF FIRE





Connie Forslund, Gunnar Mortensen og Vidar Kvamme

"Thanks to DNV we were able to remove hazards in a cost efficient way."

With 2,000 passengers and crew on board, a fire is one of the most feared incidents for a cruise vessel. Being aware of this, RCCL requested DNV to make an on-site survey on one of their oldest cruise vessels.

The survey included identification of hot surfaces, assessment of fuel system as well as active and passive fire protection.

"Nordic Empress" now has several safety barriers to avoid incidents in the engine room developing to a serious emergency situation.

Removal of hot surfaces and correct installations of couplings and hoses in fuel oil system has reduced risk of fire significantly. If a fire should occur, a local fire fighting system can be used to avoid

escalation and keep temperatures low. If the local system does not put out the fire, fire fighters could then operate more efficiently than on other vessels, as they are provided with lightweight equipment. As the final barriers, the vessel has also the SOLAS required fixed gas extinguishing system and A-class fire divisions towards accommodation spaces.

technical details regarding fires. A research project on 165 fires on board the DNV fleet from 1992 to 1997 resulted in some interesting findings; for instance, engine room fires represent almost two thirds of all fires.

The conclusions on causes of engine room fires were even more interesting. 56% of all engine room fires (excluding yard repairs) were caused by the combination of oil leakage onto a hot surface. Whereas sources for oil leakage are many and difficult to reduce, it is relatively easy to identify and remove hot surfaces.

REGULATIONS

New and Retroactive SOLAS Requirements

LOCAL FIRE FIGHTING SYSTEMS

Water-based fire-fighting systems are required for all new cargo and passenger vessels from 1 July 2002. Existing passenger vessels should comply by 1 October 2005. Several systems are now DNV type approved. Certificates are available on our Internet site www.dnv.com. See enclosed DNV Paper for more information.

DOUBLE FUEL PIPES/HOT SURFACES

All vessels constructed before 1 July 1998 are to comply with new SOLAS Regulations on fuel oil systems (double piping on high-pressure fuel lines) by 1 July 2003.

The introduction of requirements on hot surfaces into SOLAS (maximum 220°C) from the same date could initiate more focus from port states on this item.



Phasing out Halon as extinguishing system

Existing Halon systems are not yet banned by IMO. Price and limited availability cause concern among ship owners.

EU/EEA flagged vessels are to comply with EC Regulation 2037/2000, which requires decommissioning of Halon Systems by December 2003. For more information, please see enclosed DNV Paper on the phasing-out of Halon 1301.



Rolf Kjær, Technical Director, Color Line:

"We do everything to prevent it from happening again."



"Prinsesse Ragnhild", July 1999: all passengers are evacuated due to fire in main engine room. Following this fire, Color Line was determined to do everything to prevent this from happening again.

Where many ship operators would have repaired the vessel and perhaps updated the fire fighting equipment somewhat,



"The day-to-day support provided by DNV was important to us after the fire on 'Prinsesse Ragnhild'. Together we found a solution that we feel very comfortable with."

Color Line decided to pursue the causes of such incidents – on all their vessels.

Only days after the incident, the first vessels were surveyed. Hot surfaces were identified using thermoscanning equipment, and the condition of the oil lines was assessed.

Many of the hot surfaces were of limited size and could be difficult to find without the right equipment. The good news was that bringing the engine room up to date with respect to hot surfaces did not cost

more than 10–20,000 USD. No high price for such good insurance.

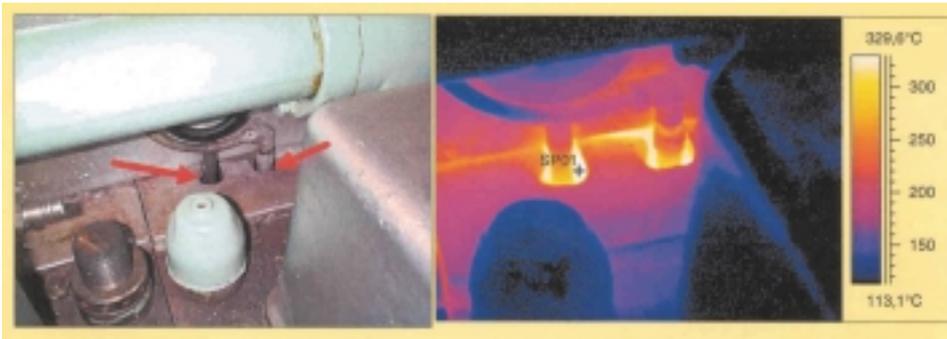
Some flexible hoses were replaced. Fastening arrangements that introduced sharp bends on hoses were removed to provide increased reliability of hoses. Local fire fighting systems, in accordance with the new SOLAS requirements, were installed (five years before the schedule later decided by IMO).

What to look for:

HOT SURFACES

Most fuel oils may spontaneously ignite if they hit surfaces with temperatures above 250°C. Class rules require that all surfaces above 220°C are to be shielded or insulated.

As commonly noted by our surveyors, such protection is often impaired under operation. Several methods can be used to detect hot surfaces – for more information see enclosed DNV Paper.



The picture shows cylinder hoods and engine body (only 100°C) and cut out for sensors (more than 300°C).

FUEL LEAKAGE

Sources of fuel leakage appear to be randomly distributed between flexible hoses, couplings, clogged filters and fractured pipes. Attention should be paid to installation, location and condition of all these components.

We recommend that oil systems within engine room on ships in operation are inspected periodically also by owner, as an addition to class inspections. DNV main rules on fuel systems (Pt.4 Ch.1 Sec.5, D) as well as our optional rules on additional fire protection (new Pt. 6 Ch. 4 Sec.3, B) can be used as a checklist when performing such inspections.



Flexible hoses should only be installed where necessary to absorb vibrations. Bends on oil hoses, sharper than that shown on this picture, should be avoided.

FIRE



Det Norske Veritas is an autonomous, independent Foundation with the objective of safeguarding life, property and the environment. The DNV organisation comprises 300 offices in 100 countries, with a total of 5,500 employees.

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