

## FLYER TO RO-RO VESSEL OPERATORS AND THE PORTS INDUSTRY

### *Commodore Clipper* – Fire on the main vehicle deck due to an overheating reefer cable connection



*Commodore Clipper*

During an overnight passage from Jersey to Portsmouth on 16 June 2010, a fire was detected on the main vehicle deck of the ro-ro passenger vessel *Commodore Clipper*. The officer of the watch and duty engineer initially thought the alarm was due to a fault with the fire detection system, and the vehicle deck water drenching system was not started until 20 minutes later.

The fire developed in an unaccompanied curtain-sided refrigerated trailer that was carrying a load of potatoes. The trailer roof shielded the flames from the drenchers and the fire continued to burn. The trailers were tightly stowed; crew had great difficulty gaining access to the fire and were unable to extinguish it.

Unprotected cables and pipework running above the fire were soon damaged in the high temperatures that were generated by the burning curtain-side and cargo packaging materials. The vessel lost power to forward mooring deck winches and bow thrusters, control of the rudders was disrupted and the port rudder suddenly moved hard to starboard. Loose cargo partially blocked the deck drains and drencher water caused *Commodore Clipper* to list. Drenching was stopped while water drained to prevent further risk to the vessel's stability, but each time it was stopped, the fire grew in intensity.



With tugs standing by, *Commodore Clipper* entered harbour and berthed alongside. The control circuits for the ro-ro hydraulics had been burnt out, but the engineers managed to bypass the system and were able to open the stern door. Few foot passengers were carried on the route and *Commodore Clipper* never used a gangway. Although the port was able to provide a gangway, it was difficult for personnel to move through the tightly stowed vehicles on the upper vehicle deck to get from the gangway into the accommodation. It was decided that it was safer to leave the 62 passengers on board rather than risk evacuating them by the gangway, lifeboat or marine evacuation system.

The local fire and rescue service (FRS) attempted to gain access to the seat of the fire, but struggled to get past the vehicles and make their way through the cargo debris. Firefighters, crew and stevedores worked together to contain the fire, unlash and remove undamaged trailers. As they got deeper into the main vehicle deck, the smoke became thicker and it was no longer possible to work without wearing breathing apparatus (BA). Firefighters could not reach all the seats of fire without the trailers being removed from the main vehicle deck. The vessel's supply of spare BA cylinders had been used up and the stevedores had no previous experience of working in BA. There was a pause in fighting the fire while it was decided what to do next.

*Commodore Clipper's* crew had previously trained with the local FRS on exercises and managers had developed a good relationship. Fortunately, their BA sets were compatible and the FRS agreed to lend the crew additional cylinders so that they could continue to unlash the trailers and guide the firefighters. As senior fire officers and company managers were considering how they could get the remaining trailers off the vessel, one of the stevedores volunteered to drive his tugmaster while wearing BA. The stevedore was familiarised with the equipment and a number of firefighters stood by to monitor his safety and assist him if necessary. He carried on towing the trailers off the vessel until he reached the five units that were on fire. Still alight, the trailers were towed off the vessel and finally extinguished. Once a route through the main vehicle deck had been cleared the passengers were escorted off, nearly 20 hours after the fire had first been detected.

Subsequent investigation found that the fire was due to one of the ship's reefer cables being assembled incorrectly. The reefer cable plugs used 'insulation displacement connectors' (IDC) that are meant to speed up assembly by avoiding the need to strip insulation from cable ends. However, the insulation had been stripped away, and as the design relied on the insulation to help secure the cable in place, the connection became loose. This led to a local high-resistance fault and then arcing in one of the phases. The electrical protection in the vessel's circuit breakers was not able to detect this fault and heat built up inside the plug until the plastic casing ignited. The socket on the trailer was mounted close to the load-bed where the curtain-side was secured. In tests, the material ignited readily and flames spread quickly.

Fortunately, no-one was hurt on *Commodore Clipper* and the accident is a good illustration of how a vehicle deck fire can affect many different aspects of the vessel's operation. The total constructive losses of the ferries *Und Adriyatik* and *Lisco Gloria* show what can happen in similar circumstances if vehicle fires develop out of control.

The MAIB has also published a detailed report, **24/2011** about the accident which identifies all the safety issues raised by the case.



## Safety Lessons

### Ro-ro ferry operators

1. Check their vessels' vehicle decks for critical and vulnerable systems, and take action as necessary to improve their resilience to fire damage.
2. Check all reefer trailer power cables regularly. Consider upgrading existing electrical protection to a system that can detect in-line phase faults and provides residual current detection.
3. React quickly and positively to early indications of fires on vehicle decks. Fires in densely packed vehicle spaces can grow very quickly and, once they are established, can be very difficult to put out.
4. Existing vehicle deck drenching systems may not be able to extinguish the fire; there is not always a requirement for structural fire protection between vehicle decks, heat can transfer through decks and spread the fire very quickly. Boundary cooling is essential.
5. Review emergency response plans and identify the most effective options for vessels that trade on regular routes to obtain assistance from external authorities.

### Port operators

1. Consider which berths in the port are best suited to supporting a vessel that needs assistance to deal with an emergency incident. Identify and record the capabilities and limitations of berths.
2. Work with vessel operators to identify and record how passengers could be evacuated and cargo moved to assist the emergency services in responding to an incident involving a vessel in the port.
3. Identify and record how other aspects of the existing port infrastructure and resources could be used to best effect in supporting a vessel that is alongside and needs emergency assistance.
4. Liaise with local emergency services to ensure that they understand the capabilities or limitations of the port's resources and infrastructure and what it is able to provide to help support vessels in distress.

This flyer and the MAIB's investigation report are posted on our website:

[www.maib.gov.uk](http://www.maib.gov.uk)

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**Marine Accident Investigation Branch  
November 2011**