

# MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

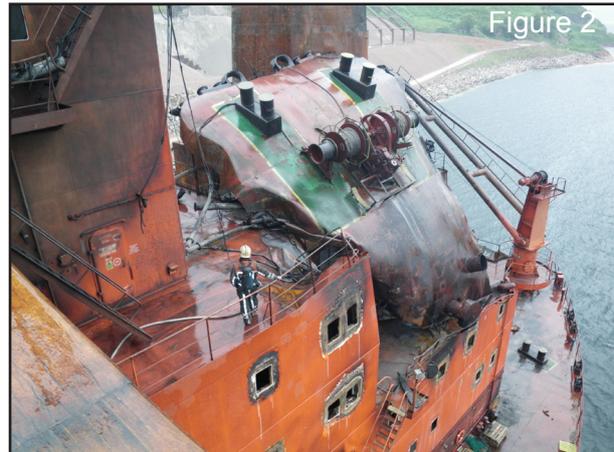
## FLYER TO SHIPPING INDUSTRY

### **YEOMAN BONTRUP: RADIATION HAZARD IDENTIFIED FOLLOWING A FIRE**



On 2 July 2010, a fire was discovered on the vertical cargo conveyor belt of the self-unloading bulk carrier *Yeoman Bontrup* while the cargo hopper was being repaired. The crew tackled the fire from the conveyor tunnels under the holds, but it quickly spread throughout the cargo handling area and into the accommodation. The fire also spread into the engine room by heat transfer through the bulkheads and via an open connecting door, and then to the steering gear compartment which contained a number of hydraulic systems as well as stocks of oils, greases, and ship's-use chemicals. There, the fire caused a large explosion that blasted the entire poop deck into the air and onto the funnel deck (**Figures 1 & 2**). Fortunately, there were only minor smoke inhalation and bruising injuries.

The fire was most likely caused by hotwork repair debris falling from the cargo hopper at the top of the tower into the flammable side curtain of the vertical conveyor belt.



### **RADIOACTIVE ISOTOPES**

Silometer devices, containing radioactive Cobalt 60 isotopes, were fitted to the cargo hopper to detect excessive build up of cargo in the self-unloading system. The silometers had not been used for 10 years, and the outer shells of the source containers were in an extremely poor condition. However, the radioactive isotopes inside them were still active. During the fire, the lead shielding around one of the radioactive source containers melted, exposing the radioactive source container itself (**Figure 3**).



The onboard risk assessments did not include the risk of exposure to gamma ray radiation, and the Safety Management System did not provide any guidance on inspecting the silometers or safety precautions to be taken. Consequently: welding operations regularly took place in the hopper area without any precautions being taken to warn or protect the personnel involved; when the fire broke out none of the firefighters or salvors was warned of the potential hazard; and inspectors and surveyors investigating the cause of the fire were consequently exposed to low levels of radiation when they inspected the cargo hopper area. Fortunately, the source containers were not breached; had this occurred the fire could have spread radioactive particles throughout the surrounding area, generating a severe risk to health.

As automation on board ships has increased, so has the use of radiation sources in control devices. This is especially so in bulk carriers and dredgers. While the Ionising Radiation Regulations 1999 apply to radioactive equipment ashore in the UK, and there are clear instructions for handling cargoes containing radioactive sources, currently there are no international regulations specifically governing radioactive sources used in ship's equipment. Consequently, the MAIB has recommended the flag state to submit proposals to the IMO to introduce standards for management of radioactive sources for use in the marine environment.

## **SAFETY LESSONS**

- Where appropriate, ship owners and managers should ensure their Safety Management Systems provide comprehensive guidance for the control, use, inspection, maintenance and disposal of radiation sources fitted to their vessels to ensure that risks of exposure to radiation are minimised.
- Such guidance should include the potential risk to health from exposure to radiation resulting from an accident such as a fire or collision.
- Emergency plans should ensure that the presence of radiation sources is brought to the attention of attending emergency services (eg. Fire and Rescue Service) so that the radiation risk is given due consideration.

This flyer and the MAIB's investigation report are posted on our website:  
[www.maib.gov.uk](http://www.maib.gov.uk)

For all other enquiries:

Marine Accident Investigation Branch  
Mountbatten House  
Grosvenor Square  
Southampton  
SO15 2JU

Tel: 023 8039 5500  
Fax: 023 8023 2459  
Email: [maib@dft.gsi.gov.uk](mailto:maib@dft.gsi.gov.uk)