



Into the Flames



Example of the scale of today's passenger vessel



The Scandinavian Star during evacuation



The Scandinavian Star at the peak of its fire



Debris resulting from the catastrophe on the Star



Wall-to-Wall TV's documentary **Into The Flames** was first broadcast on UK's Channel 5 in June 2000. The first programme "**Fire at Sea**" concentrated on the unique problems created by fire on board a ship - from the aspects of evacuation, fire fighting and ship design. On the principle that a passenger vessel combines a number of populated scenarios, such as a hotel, restaurant, leisure centre, all under one roof, the potential fire hazard is greater. Furthermore, the design and construction of a ship with its layers of decks and network of corridors presents a daunting proposition to evacuate quickly in the event of a fire emergency.

The programme highlighted 4 infamous examples of Fire at Sea incidents involving passenger vessels.

1. The Scandinavian Star – a Swedish Ferry caught fire on a trip from Norway to Denmark in April 1990, carrying 482 passengers and crew, 158 people died due largely to smoke inhalation of carbon monoxide and hydrogen cyanide.
2. The Yarmouth Castle burned & sank in November 1965 killing 91
3. The Ecstasy – in 1998 this cruise liner out of Miami, USA with 2500 passengers on board caught fire and although there were no fatalities, 55 people needed treatment for smoke inhalation.
4. The Achille Lauro – in 1994, after a fire in the engine room sank 200 miles off the coast of Somalia, killing 4 out of 900.

The Scandinavian Star - a hurried refurbishment of this 5-year-old ship with a multinational crew, had left it ill equipped for recovery from a fire emergency. A fire quickly filled parts of the ship with dense poisonous smoke. *Apparently*, the passengers and crew were successfully evacuated, but as fire fighters (specially trained Norwegian "smoke divers") subsequently arrived on the scene, they realised that 158 bodies were trapped on a lower deck, and had perished due to smoke poisoning having been unable to find their way out in the chaos.

Many were piled up at ends of blind corridors or within feet of a safe exit. The signage, in English and Spanish was found to be confusing to Scandinavian passengers and showed conflicting directions to the nearest safe exit. This tragedy has been the trigger for a wide series of initiatives worldwide, designed to learn from the mistakes encountered. Initiatives featured in the programme included specialist fire fighting training and techniques, as well as design improvements to ensure that future generations of ships are less likely to burn.

The experience of the Scandinavian Star has particular relevance to some significant footage on this video that features the directional sound characteristics provided by Sound Alert's Localizer[®] evacuation system which could address some of the issues surrounding rapid evacuation of vessels, particularly in a smoke-filled environment. It was based on a reconstruction conducted on a real ship, by Professor Ed Galea, Head of the Fire Safety Engineering Group at the University of Greenwich - an expert of people's behaviour in evacuation. Using volunteers, he illustrates the typical challenge facing victims trying to find their way out of the confusing maze of identical corridors that is common on many passenger ships.



Ed negotiating a smoke-filled corridor



View from a thermal imaging camera



Confused volunteers



Localizer-assisted safe evacuation

Ed initially demonstrates the disorientation, severe restrictions and dangers that exist in smoke situations before venturing into the smoke and wandering clueless along corridors with dead ends. He illustrates the confusion and the gambles people make when deciding which way to turn in smoke. After making some critical incorrect decisions as to directions to follow, and after valuable minutes exposed to the hazard, he comments: "If this was real smoke, I would be in a lot of trouble now. I've inhaled a lot of smoke and smoke contains carbon monoxide and hydrogen cyanide gas and after exposure of this duration, I would probably be unconscious right now." The film goes on to say that normal systems can only direct passengers to the nearest exit. Ed continues: "This may in fact point you to an area where the fire has originated, which is not a point of safety but a dangerous direction to move in."

With the aid of a thermal imaging camera and some volunteers, we are able to see the dilemmas that Ed and the subjects encounter as they negotiate the corridors on board the experimental vessel. It is important to remember that in a fire, the biggest risk to life is poisonous smoke – speed of exit is critical to survival – every second is precious.

In visibility of about half a metre, two different groups each with 10 volunteers were subjected to similar scenarios, but using different methods of escape. Group 1 was asked to find their way out from a cabin through smoke-filled corridors to a safe exit aided only by a conventional alarm system and signage. Group 2 was released into exactly the same environment but with the addition of Localizer sound evacuation beacons to assist them towards the safe exit.

The results were staggering. The first group explored a variety of options to attempt to vacate the area. After wandering off in different directions they experienced, in many cases, extreme confusion with some choosing to follow the unsafe route of exit. It took over 2 minutes to complete the evacuation and in a real situation, half of them would have died. The second group, however, had a 100% successful evacuation – escaping in less than half the time thanks to the Localizer beacons. Their route involved the ascent of a staircase to reach safety, where additional swooping sequences indicated whether to take an upward or downward direction, proving effective use of the Localizer, and as pointed out by the narrator: "In a ship fire, every second counts...improvements such as this are vital in minimising the death and devastation of the future Fires at Sea...because cruise ships are getting bigger, the potential for disaster is growing."

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