

# Marine Safety Flash

## A16-29 (16<sup>th</sup> August 2016)

### Electrical burn out and potential fire

#### Incident Overview

A crew-member was walking down the stairwell from A deck to the laundry on Main deck to complete routine check on progress of washing machines when they noticed an electrical burning smell. Along with the Duty Watchkeeper, the crew-member investigated and found the electrical junction box for a Washing Machine with a small amount of flame burning out the top.

The watchkeeper immediately activated the closest manual call point fire alarm and alerted other crew in the vicinity. After radio confirmation of the fire alarm the muster signal was sounded by Master on bridge.

The Chief Engineer isolated the power to the laundry and extinguishers were standing by for use, however owing to the difficult position of the junction box behind the machines and up at the deck head level, the IR used a mop head (dry with a non-conductive handle) to smother the small fire in the junction box. This proved effective in extinguishing fire.

After the location was confirmed as safe the ETO commenced opening the junction box open and the other boxes in the laundry to investigate. It was found that the WAGO connector on one phase of the 440V supply cable for the Washing Machine had burnt out.

#### Key Findings

The fire was caused by the incorrect application of a WAGO push wire connector. The connector is for rigid cable only and is not suitable for the flexible fine stranded power cable of a washing machine. When flexible cables are fitted to PUSH WIRE connectors, due to the flexibility of the fine strands, the wire cannot be pushed properly into the spring loaded fitting. The resultant reduction in effective wire conductor area at the connection in this case caused overload and subsequent heat generation resulting in fire.

The recommended connector for flexible cable is a screwed terminal block.

#### Recommendations

1. Discuss the use of WAGO/push type electrical connectors at your next safety meeting. (Include the potential consequences for using equipment outside of specifications)
2. Include the use of WAGO/push type electrical connectors within all Engineering Handover notes for discussion and information.
  - Specifically the use of such items should be strictly used within the design requirements of the equipment listed within the specification.

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Fig. 1 Arrangement of washing machines (Lower) and Dryers (Upper). Location of fire highlighted.



Fig.2 Detail view of fire damage to Junction Box and cable conduit.



Fig. 3 Detail view of internals of burnt out Junction Box for washing machine No.2



Fig. 4 Detail view of internals of burnt out Junction Box showing failed connector.



Fig. 5 Lid of Junction Box for Washing machine 4 showing evidence of previous heat damage



Fig. 6 Top cover of WAGO PUSH WIRE connector box. Note clear instruction that connector is not permitted for fine stranded flexible wire.