



Safety recommendation no. 171

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Safety deficit

In an encounter involving two steamships in the Lucerne lake basin on Lake Lucerne on 19 August 2016 at approximately 13.35, the steamship Unterwalden (DS Unterwalden) suddenly veered to the left and so collided side-on with the steamship Schiller (DS Schiller).

The collision between the DS Unterwalden and the DS Schiller in the Lucerne lake basin was due to the fact that the rudder deflection to port could not be corrected in time when two steering commands were given almost simultaneously at two control stands. The rudder steering software was programmed to continue carrying out the first command received even after further commands had been given by another control signal transmitter.

The following contributed to the accident:

- A requirements and testing process that did not describe precise specifications for the functionality and testing of the software and did not explicitly exclude undesirable states.
- The Failure Mode and Effects Analysis FMEA did not cover a steering failure, software error or operational error or their impact on operational safety in different situations.
- The lack of clear behaviours or procedures for the handover or takeover of the different control stands led to several control signal transmitters operating at the same time.

The following helped to reduce the impact:

The initiation of an emergency manoeuvre (emergency stop – engines 'full back') by the crew reduced the impact of the collision.

The following factors did not contribute to the accident, but were identified in the investigation as potential areas in which safety improvements can be made:

- The design of the control signal transmitters poses risks to operational safety as there are no emergency running properties in the event of conceivable defects in the switch element and insufficient protection against moisture.
- No shielded cables were used to transmit the control signals from the control signal transmitters in the control stands to the PLC in the aft peak.
- The control signals from the control signal transmitters in the three control stands are electrically connected in parallel and received via two digital inputs in the PLC. This means the control commands from the control stands cannot be separately evaluated in the PLC, pending commands cannot be prioritised and control processes cannot be seamlessly traced.
- Since computer-based control processes are not stored, they cannot be traced; if this were the case, it would be easier to understand the control processes in the event of an incident.

The possibility of saving computer-based control processes is little used. In the event of malfunctions or events, recorded data can be valuable in ensuring optimum traceability. When evaluated, it provides a basis for improving technology, processes or specifications, thereby increasing reliability and preventing or minimising the impact of further incidents.

Safety recommendation

The Federal Office of Transport (FOT) should establish which data must be present and available in existing and new systems from a risk and safety perspective and ensure that data storage options are exploited.

Addressees

Bundesamt für Verkehr

Stage of the implementation

Partially implemented. The Federal Office of Transport (FOT) is of the opinion that the European Standard laying down Technical Regulations for Inland Navigation Vessels (ES-TRIN) does not prescribe mandatory, continuous data storage of nautical and technical data or incidents and that furthermore, as far as it is aware, no such regulations are currently being drawn up. It would be too complex and too cost-intensive to develop such data recording systems because of the widely varying equipment found on different vessels.

The FOT will monitor the market and work in the relevant international expert bodies to bring about a solution specific to the inland navigation industry.

Investigation report concerning the safety recommendation

Schlussbericht
Vorbericht
