Office of Transport
Safety Investigations

CSIRS Outcome Report

Confidential Safety Information Reporting Scheme (CSIRS)
C1012B: Response to defects detected during train preparation

The issue

The Office of Transport Safety Investigations (OTSI) received a notification of train units with faults in data loggers resulting in an 'F' (failure) flag indication remaining in service after being reported.

OTSI action

OTSI provided advice of the CSIRS Safety Notification to Sydney Trains, and requested specific information on data logger functionality, frequency of functionality checks, redundancy and repair records.

Operator response

In response, Sydney Trains advised:

- Start-up checks by drivers verify that the power supply and speed signal are active to the data logger and that the data logger performs self-checks
- While drivers check that the power supply and speed signal are active, they '… do not check for [F] flags'
- Although an F-flag on the data logger LCD may indicate the data logger is not recording data correctly, redundancy for almost all inputs is provided by other data loggers in the train consist
- Initially the LCD was accessible to the driver, but access was deemed unnecessary and removed as there was no requirement for a driver to check the data logger LCD.
- The presence of an F-flag is checked every 120 days by maintenance staff
- Where train crew identify an F-flag during this 120-day period (Figure 1), a service technician inspects the unit when it next arrives at a maintenance depot.

OTSI requested further information and Sydney Trains advised that:

- Where 50% or more of the data loggers on an 8-carriage train set (four data loggers fitted) present an F-flag, the set is removed from service immediately
- Newer train sets give an immediate indication of a data logger fault (including an F-flag equivalent) to the driver through an in-cabin screen
- Older train sets require a physical check of the data logger for an F-flag, (with access not always available).

OTSI action

OTSI reviewed the information provided by Sydney Trains and found that maintenance records indicated that when F-flag faults were recorded in the maintenance system, they were addressed in accordance with Sydney Trains' procedures.

Other findings included:

- On at least one occasion, a driver report of an F-flag was not recorded in the maintenance system
- There is inconsistency between F-flag identification on older and newer train sets – on newer train sets datalogger faults are identified immediately allowing more timely rectification compared to on older train sets where the physical check for an F-flag occurs every 120 days
- Sydney Trains expects a train set to be declared a failure once 50% or more data loggers have an F-flag. However, there is no method to identify this status on older train sets if it occurs before the 120-day inspection
- Sydney Trains' minimum operating requirements specification does not specify data logger F-flag actions on train sets where only two data loggers are fitted, that is, on 4-carriage train sets, Endeavour and Hunter rail cars and 8-carriage Waratah sets.

Operator response

In response to the OTSI findings, Sydney Trains reiterated that for older train units, data logger self-checks which confirmed power to the data logger and a speed signal, combined with physical checks for an F-flag every 120 days was a sufficient risk control.

Sydney Trains advised it would review its minimum operating requirements to clarify the minimum number of operating data loggers on train units which carried only two data loggers.

OTSI observation

Data loggers provide critical evidence after an incident to identify the driver commands and/or response of a train unit leading up to an event. This enables an investigation (internal or external) to quickly identify, or discount issues related to driver actions or mechanical defects. Further, data loggers can be used to proactively monitor and verify driver conformity with safety processes and procedures, particularly where concerns have been previously identified.

While most train unit responses can be identified through other functional data logger recordings within a train unit consist, the ability to do so is significantly reduced where other data loggers on the same consist are also defective. This is reflected by Sydney Trains' minimum operating requirement that only 25% of fitted data loggers may be defective before the train unit is declared a failure and removed from service.

There is evidence of a discrepancy between how old and new data logger status is monitored. The fault status of newer units is indicated to the driver in real time during service, whereas the status of older sets is monitored every 120 days during maintenance activities.

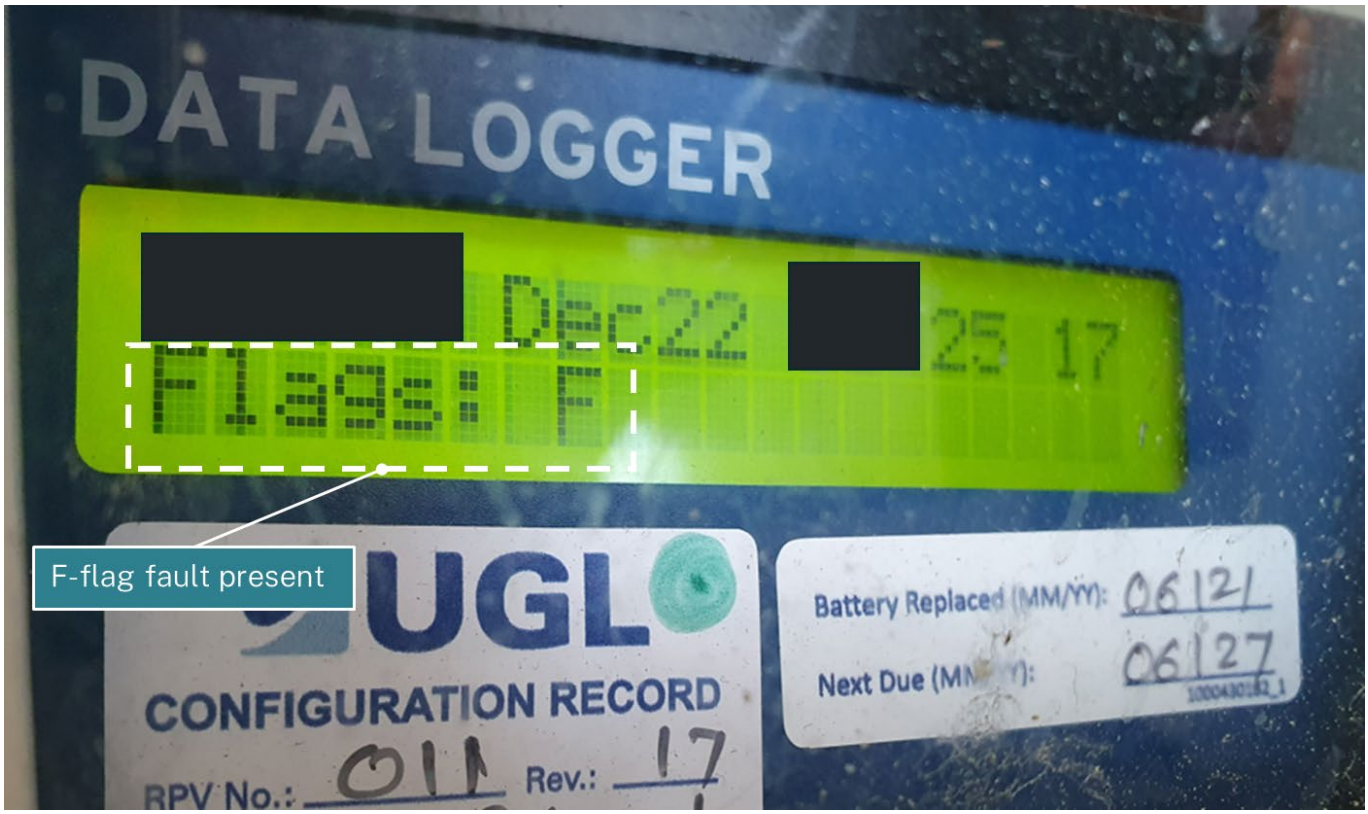
Sydney Trains did not advise how monitoring data logger status every 120 days reliably ensured it was operating within its minimum operating standards. As an example, OTSI is aware that in December 2022 during preparation activities of an 8-carriage Tangara set (i.e. outside the 120-day maintenance check), it was identified that 3 of the 4 fitted data loggers were displaying an F-flag indication.

Conclusion

Although the original report of defective data loggers remaining in service after being reported was found to be unproven, OTSI identified opportunities for Sydney Trains to improve safety through review of its standards and practices to provide assurance that it is satisfying its own minimum train unit operating standards for data loggers.

OTSI has engaged with the reporter and briefed them on the contents of this CSIRS Outcome Report.

Figure 1: Tangara train unit data logger, showing presence of F-flag fault



The Confidential Safety Information Reporting Scheme (CSIRS) operates under the provisions of Section 46E of the Passenger Transport Act 1990. It is a voluntary, confidential and non-punitive scheme that enables employees in the public passenger transport sectors of the rail, bus and ferry industries to report safety matters.

OTSI provides feedback to each reporter on the investigation outcomes of a CSIRS report. In selected matters that have significant operational safety matters, OTSI also publishes a CSIRS Outcome Report. For more information on CSIRS, go to otsi.nsw.gov.au.