



Defence
Infrastructure
Organisation

Safety Alert Parts A, B & C

Subject: Generator Firewire Failure

Number SA 2021/02

DIO Sponsor: Bryan Dunn

Date of issue: 23rd June 2021

Contact if different from above Sponsor:

Matthew Spare
Engineering & Construction
Defence Infrastructure Organisation
Kingston Road, Sutton Coldfield, West Midlands, B75 7RL

Telephone: 0121 311 2115
Email: matthew.spare101@mod.gov.uk

This Safety Alert is to be read by the following so appropriate action can be taken:

- 1. DIO Service Manager (or equivalent for non-NGEC contracts)**
- 2. DIO's Maintenance Management Organisations**
- 3. Others**

Others interested in the content of this Safety Alert might include:

DIO Staff and Contractors; Public, Private Partnerships, Private Finance Initiatives Project Managers/Commercial Officers, Commanding Officers / Heads of Establishment (CO/HoEs) and representatives; and Chief Environment and Safety Officers (CESOs) or equivalent, Estate Facilities Managers (EFMs), Senior Estate Facilities Managers (SEFMs), CAEs, Authorising Engineers and Authorised Persons

When it takes effect: Immediately

When it is due to expire: When updated or rescinded.

Health and Safety

This Safety Alert does not necessarily cover all aspects of the subject matter and readers should make themselves aware of other potential issues. Readers should also not rely on DIO publications as their only means of becoming aware of safety, operational or technical issues, but they should consult widely across other media to maintain awareness.

Aim

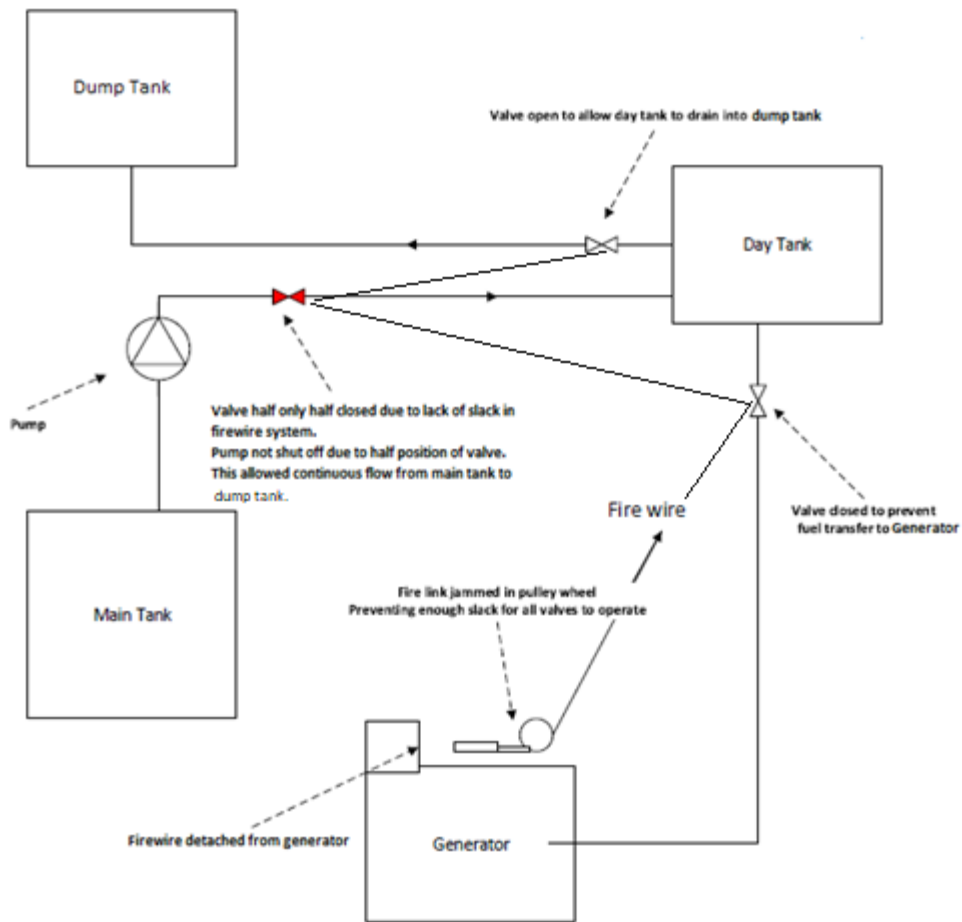
To bring to the attention of appropriate persons the risks associated with firewire systems on electrical generators and similar equipment, and to highlight the importance of correct operation and maintenance of these systems.

Introduction

1. Compliance with the contents of this Alert will enable compliance with the Health & Safety at Work etc. Act 1974 and its subordinate Regulations.
2. The appropriate MOD officer shall arrange for the Maintenance Management Organisation (MMO) contractor to carry out all actions in accordance with this Safety Alert.
3. Any work required because of this Safety Alert must be carried out in accordance with JSP 375 Parts 1 & 2.
4. On MOD Establishments occupied by United States Visiting Forces (USVF) responsibility is jointly held by USVF and DIO(USF). At base level this jointly managed organisation is to take appropriate action to implement the contents of this Alert. Where this Alert contains procedures, which differ significantly from USVF practice a DIO (USF) code of practice will be issued.

Background

5. A recent incident on an MOD establishment has highlighted potential issues with firewire systems, where a fuel dump tank was overfilled as a result of a failed firewire system. The firewire is a system incorporating a fusible link which is designed to break in the event of a fire and operate a number of valves in order to shut off and dump the fuel supply.
6. Failure of the firewire system led to a significant fuel spill and environmental pollution with associated remediation costs.
7. The subsequent investigation found a significant contributor to this failure was that the mechanism which connects the fusible link to the generator had become loose. This caused the firewire slacken and the fusible link to jam on the first pulley wheel, which prevented all 3 valves connected to the fire wire from operating correctly.
8. The generator stopped working due to the closure of the valve supplying fuel to the generator from the day tank. The valve from the main fuel supply tank was in a half open / half closed position which failed to shut off fuel supply from the transfer pump and allowed fuel to continue to flow to the day tank. The valve from the day tank to the dump tank remained in an open position due to the firewire, whereas usually this would be closed. When the day tank level dropped to minimum, the transfer pump started, and fuel flowed direct via the day tank to the dump tank. This pump operated continuously, eventually causing the dump tank to be overfilled. A drawing of the firewire system and some photographs can be seen below.



Mechanism which became loose and detached from generator, subsequently becoming jammed in the firewire pulley wheel.

Overview of generator firewire system

- This incident highlights the importance of a correctly maintained and operational safety system, particularly in relation fuel shut-off, where overfilling of fuel tanks is a risk.

Requirements

10. A review of all generator firewire systems should be undertaken to evaluate the general condition and ensure correct operation of the system, including checking for looseness of connections as a result of vibration or movement. The system should be evaluated to ensure that in the event of a fire, there is sufficient wire between the fusible link and the first pulley such that system will operate as required, operating all valves as necessary. This may be completed initially by means of a full functional test of the system, replicating the effect of the system operating in the event of a fire. This should also include evaluation of the need for remote monitoring of alarms, for example where local alarms may not be adequate to alert relevant persons that a fault has occurred on the system.
11. A review should also be undertaken that fuel pumps or similar systems incorporate appropriate tripping mechanisms to prevent continuous running of pumps in scenarios where tank overfilling is a risk.
12. Consideration should be given to updating of mechanical firewire systems to solenoid type shut-off systems, that can be linked to the fire alarm or other shut down systems, as a mechanism for controlling fire risks in generator rooms.
13. The MMO should assure themselves that the arrangements are suitable and sufficient.
14. Any work incurring expenditure of MOD funding requires appropriate authority from the MOD officer responsible for the establishment.

Part A

15. DIO and others responsible for infrastructure delivery, are to identify how many firewire systems are on the MOD estate that are of the same or similar design as those described.
16. Technical verification should be provided that firewire systems are operational and suitable for the environment in which they are installed, in accordance with the requirements detailed in paragraphs 11 and 12 above. The HoE should be made aware of any issues, and residual risks.
17. The MMO is to notify DIO Technical Services and any other relevant parties of any changes required to comply with the requirements of this Safety Alert.

Part B

18. Should the functional test determine the firewire system does not function as intended, a design review should be undertaken by a competent person and remedial actions identified. This review should also determine any benefits of upgrading to solenoid shut-off systems where appropriate, as per the requirements detailed in paragraph 13.

End