



Briefing Report

GEL Review of the Incident at Creux Harbour

9th September 2023

Background:

This briefing paper is concerning a number of incidents that occurred in Sark over the period of 8th and 9th September which resulted in a member of the public receiving a serious electric shock on the afternoon of the 9th September which required hospital treatment. The incident review by GEL was requested by both Sark Electricity Limited and John Guille, one of the organisers of the event at Creux Harbour. A visit to Sark to review the events took place on the 4th October 2023.

Details of Incidents

Shed Incident

On Friday 8th September a Sark resident received a large electric shock at the Harbour in the fisherman's sheds when removing a plug from a socket. This socket is situated in one of the fisherman's sheds owned by another resident, this supply is used to power a freezer in a shed on the other side of the boat yard.

Harbour Incident

On Saturday 9th September members of the Sark Race Committee were setting up the event at Creux Harbour. SEL had installed a temporary supply board which was wired into the supply at the main shed at Creux Harbour. This board is used for other events on the island and was intended to supply all of the electrical appliances used at the Carnival.

During the setup of the other equipment (which started at 8:30am) it became apparent that people and animals were receiving electric shocks from various items of metallic equipment. At 9:30am some of the mains powered electrical equipment connected to the temporary distribution board lost supply. Shortly after this, all-electrical supplies in the Creux Harbour area went off. The SEL distribution board was checked, and it was noted that none of the breakers had tripped.

9:30am SEL were called to the Harbour in respect to a power failure.

The SEL senior engineer attended and completed his initial review, once it was apparent that a mains fault was the likely cause, he called the other SEL engineer to attend to assist with fault finding. They decided to isolate the Creux harbour area and did this by disconnecting the tails feeding the Creux harbour from the Crane shed termination box. At this point supplies to the Harbour Café and New harbour Jetty were still live.

They then carried out some further fault finding and located the fault to a failed heat shrink low voltage straight through joint situated just outside the entrance to the Harbour Café.

Due to the ongoing power supply problems, the event Committee decided to get a mobile generator to site to power the event. The committee brought one of the island's mobile generators to the event site. The generator is regularly used to power private houses on the island so was thought to be in good working order. They then ran two long extension leads to the generator via a homemade temporary distribution board. They were unable to install an earth stake for the mobile generator and there was no RCD protection on either the generator output or the temporary supply board.

Despite all the aforementioned actions, people still appeared to be experiencing electric shocks from various items of metallic equipment at the event site. The Committee said they turned off all the equipment that was connected to the mains power sockets in the shed to prevent further shocks, although when questioned, no one was certain that all equipment was unplugged (and therefore all conductors physically disconnected) from all mains supplies in the area.

As far as the Committee were concerned, the whole event was now being powered off the generator with the exception of the PA system which was still being powered off an extension lead to the café.

At this point people were still receiving shocks off the PA system. Another resident attended and connected the PA system to a small stand-alone portable generator. After this no more shocks were received from the PA system.

At 12:15pm a member of the public (Ben Perree) was found slumped over the front draw bar of the refrigerator trailer. The onsite first aiders went to assist. One of them received a shock when he touched Ben's shoulder to remove him from his position. He was able to pull him off the trailer metal work and upon discovering he was unconscious, the emergency services were called.

After this incident, the mobile generator was turned off and the SEL Engineer PJ turned off the mains supply to the harbour area from the Harbour Hill substation circuit breaker. The only electrical equipment that was still running was the PA system, powered from the portable generator which continued to function normally with no more electric shocks being reported for the remainder of the event.

Contributing factors (why it happened)

Shed Incident

On inspection on 04/10/23 it was clear that the plug in question had been changed prior to GEL's arrival. This suggests that the old one was in poor condition.

Looking at the condition of the freezer in an adjacent shed which this extension lead feeds, it was found to be in extremely poor condition. This needs to be addressed as a fire and electric shock risk.

In conclusion, this fault had no effect on the events of the day. On speaking with various stakeholders in the area, there were indicators of developing mains cable issues prior to the main incident on the 9th (flickering lights, poor power quality etc.).

Harbour Incident

Following GEL's review of the events, it is reasonably foreseeable to conclude that the cause of the various electric shocks received at the Creux harbour event on 9th September were caused by a rise of

potential on the earthed components of all equipment connected to the mains supply at the Creux Harbour shed and/or Crane Shed.

This rise in potential on all conductive components bonded to earth was caused by the network fault that occurred immediately outside the Harbour Café service, in very close proximity to the Harbour Café main earth stake. The cable fault had an earth fault characteristic and was not cleared by the upstream protection system. This is supported by the café owners' account of flickering lights and SEL Engineers description of the condition the insulating sleeving was found in. The fault would have caused an earth potential rise to occur in the soil in very close proximity to the fault, as the café earth stake was located within this area, this too would have experienced a rise in potential becoming "live".

From the Harbour Café service to the crane shed and onwards to the Creux harbour shed all buried cables are plastic coated SWA type which is not grounded by earth stake or any other means at any point (other than the Harbour Café service). As the protective armoring of all these cables are bonded to each other at all termination points, the symptoms of "live" earthing were experienced from anything plugged in to any electrical outlet that was sourced from the SEL supply at both the Crane Shed and Creux Harbour Shed. It is important to note that this effect would have been seen on any plugged-in appliance, regardless of status of switch on socket. Given the various accounts of the set up on the day of the event it is highly likely that at least one cable was connected between either trailer unit and the SEL supplies. In this scenario any conductive component of the trailers would be "live". Human contact between any conductive component and ground would have caused an electrical current to flow through the body and that person would have received an electric shock at this point.

This hypothesis is further supported by the fact that all electric shocks were reported to have stopped occurring as soon as SEL engineers isolated the earth fault from source by opening the 125A Square D circuit breaker at Harbour Hill substation, subsequently isolating the fault.

Corrective action to deal with factors which were the cause of the incident	Responsibility	Priority Low Med High
Consideration be given to the installation of a distribution pillar by the Sark Harbour Café. From this pillar there can be three feeds to different parts of the harbour with better protection, earthing and isolation if needed.	SEL	Med
To carry out testing and setting audit of all protection systems on this part of the network and renew or upgrade if needed.	SEL	Med
The installation of utility provided earth stakes around the harbour.	SEL	Med
Introduction of better testing procedures to check that isolations have been carried out correctly.	SEL	Med
Corrective action to deal with factors which were not the cause of the incident but should be carried out to improve electrical safety	Responsibility	Priority Low Med High
Installation of an RCD and earth stake to the generator that was used on the day to power the event. Also installation of RCD on the board fitted to the generator used that day.	Sark Government/ Event Committee	Med
To ensure there is an earth stake fitted when the generator is in use and RCD test carried out.	Sark Government/ Event Committee	Med