

# Scottish Construction Safety Group

## Minutes of the meeting of September 21st 2017

There were 28 attendees and guests

Roddy welcomed the group to the first meeting of the current session and introduced Jim Denholm, Health and Safety Consultant of Scottish Power Energy Networks (SPEN) who presented on the topic of safety from overhead power lines and safe digging practices in relation to buried electrical services.

Jim commenced by discussing some of the information and guidance sources such as GS6 and HSG 47 as well as how various electricity transmission companies share information with the aim of protecting the services as well as people who may come into proximity of transmission systems. There is extreme danger presented by electricity and contact with overhead services has resulted in 8 fatalities, 59 injuries and some 3000 vehicle incidents. Many of these incidents arise in the agricultural sector as a result of transmission lines crossing agricultural land. The increasing size of agricultural vehicles and equipment and construction equipment are a key reason contacts occur. Some agricultural vehicles now have operating heights of 4.5 to 5m and as high voltages (33,000 volts and over) can jump gaps there are significant risks associated with large vehicles and equipment. The likelihood of power jumping and distance it can jump increases with moisture in the air.

Overhead power lines carry a variety of voltages, the largest of these being 400,000 and 275,000 volts on easily recognisable pylons. The greater the voltage the higher it is required to be above the ground. The specified heights are 400,000 – 7.3m; 275,000 – 7.0m; 132,000 – 6.7m with lower voltages at 5.2m, however where these pass over roads, this increases to 5.9m. A number of power lines are carried on timber poles which can be broadly similar to other overhead services. The key way to differentiate is by the presence of yellow 'danger of death' signs fitted to power transmission poles. The routine checking for the presence and visibility of these signs is risk based and can vary from 1 year to a maximum of 4 years. The most easily confused overhead power supply is a form called Aerial Bunched Connector which may be mistaken for telecommunication cables. The 'danger of death' signs on the supporting poles are the key differentiator.

In relation to ongoing maintenance of the network and checking the clearance distances, transmission companies are subject to the Electricity Safety, Quality and Continuity Regulations (ESQCR). SPEN utilise a range of techniques to monitor their network including the use of LIDAR - a surveying method that measures distance with pulsed laser light, and measuring the reflected pulses with a sensor. Differences in laser return times and wavelengths are then used to make digital 3D models.

In response to a question from the floor, Jim advised that much more effort is expended on surveying and checking overhead services than those underground. Construction of overhead lines is significantly cheaper than underground and the checking and surveying is similarly cheaper for those services seen above ground. The risk profile is quite different in that the vast majority of overhead services are not insulated and therefore present a risk if contacted.

There is a variety of power transmission equipment mounted on poles including transformers and switching equipment. The connections to those are known as jumpers which are not insulated and can be at heights lower than those previously mentioned. Jim highlighted a particular piece of pole mounted equipment called an auto re-closer which is designed to re-energise a conductor after something has caused a circuit breaker to trip. The auto re-closer will operate a number of times in

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order to re-energise supply reducing the timescales for locating, checking and rectifying the fault before manual reconnection.

Situations commonly identified in construction where conductors could be contacted or where power could jump include the use of excavating machinery; the use of mobile or lorry mounted cranes; materials and equipment being stored below overhead power lines; scaffolds built close to power lines particularly in urban settings and where supplies connect to dwellings. Clearly these types of situations increase the likelihood of people being injured by contact with power. If such contact is made then the results can include respiratory failure; cardiac arrest; loss of limbs and fatalities. The release of energy from power supplies can vaporise metal – either the conductor or any metal item which contacts it. The temperatures and blast involved can cause significant burns and are the key reason for the use of flame proof clothing when working in proximity to power supplies – whether overhead or underground.

SPEN assisted in the development of GS6 – Avoidance of Danger from Overhead Electric Power Lines (4<sup>th</sup> edition 2013) and they also provide assistance in planning of work or activities in proximity to overhead power lines through site visits. The responsibility to do so is placed on all transmission companies by ESQCR. It is regrettable that the advice provided is not always heeded or implemented. All transmission companies are obliged to assess any request to de-energise overhead power lines in relation to the numbers and types of consumers likely to be affected by any such de-energisation and it is not uncommon for temporary generator supplies to be implemented. Any damage incidents to power equipment result in significant costs for repair or replacement and SPEN (and others) are effective at identifying those at fault and charging for repairs and replacement. However they invest significantly in proactive work and publications to attempt to reduce the likelihood of damage incidents. There are a number of web based resources available via the Scottish Power website <https://www.spenergynetworks.co.uk/pages/safety.aspx>

Jim moved on to underground services and made reference to 12 deaths and 600 serious incidents in relation to contact with underground services and detailed the average direct cost of repairs in 2015 for a variety of voltages – 33kv – £9800; 11kv – £6876; 415v – £2820.

Common issue recognised after damage to underground equipment included, lack of record information, lack of detailed information, failure to have or use suitable cable location equipment and techniques, and failure to follow recognised safe digging practices or wear appropriate clothing and use insulated tools.

Roddy and the group thanked Jim for his presentation.

Alan Brown of Sibbald training advised of an upcoming event in relation to service strikes taking place at Blackridge which was open to all.

**Dates of forthcoming meetings are**

**19/10/17 SGB Mast climbers**

**23/11/17 Information Commissioners Office - Data Protection**

**18/1/18      15/2/18      22/3/18      19/4/18      24/5/18**

**Topics including – lifting, legal update, occupational health (physicians view), toxicological information on drug and alcohol testing and fire risk assessment, will be matched to dates shortly.**

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