

SAFETY ARTICLE

Electrocution Risks When Working Near Overhead Power Lines

Workers who are erecting, moving or working from metal or conductive scaffoldings or boomed vehicles or handling high objects close to overhead power lines and also handling equipment or materials near power lines are at risk of being electrocuted if no proper precautions are taken. Electrocution can happen even without getting into contact especially for the high voltage overhead lines through electrical flashovers. The following are some of the examples of accidents that happened in the past that we can learn from:

Case No. 1 (One Person Serious Injured)

On 18 January 2008, a team of workers who were repairing a warehouse erected a mobile metal frame scaffolding (approximately 42 feet high) to facilitate the works. On oversight, the workers were moving the scaffolds too close to the LIVE 33 kV (33,000 volts) overhead power lines (refer picture 1a & 1b) that caused an *electrical flashover* thereby providing a path to the ground for the electric current. One of the workers who was grasping the metal scaffolding sustained serious injuries (refer picture 1c & 1d). The accident caused power supply interruption that affected many customers.



Picture 1a



Picture 1b



Picture 1c



Picture 1d

Case No. 2 (One Fatality)

On 4 August 2008, a driver of a lorry-trailer was uploading a mobile piling rig onto the trailer. In the process the mobile piling rig moved too close and eventually *came into contact* with the LIVE 11 kV (11,000 volts) overhead power lines (refer picture 2a and 2b). This contact energized (charged) the lorry at 11 kV. The electric charge was insulated from the ground by the lorry's tyres and dry tarmac road surface. However when the driver tried to open the door of the vehicle, he became a path to the ground for the electric current. The driver was electrocuted and died on the spot (refer Picture 2c).



Picture 2a



Picture 2b



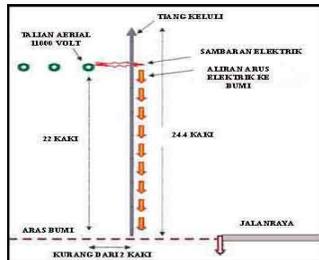
Picture 2c

Case No. 3 (Three Fatalities)

On 4 September 2008, a team of workers for a telecommunication company were removing an existing wood pole and wanted to replace it with a steel pole to support telecommunication cables. The steel pole was about 24.4 feet in height whilst the nearby 11 kV overhead power lines was at 22 feet above ground level (which is well above the statutory requirement under The Electricity Rules 1999 (refer picture 3a and sketch 3b)). When the workers were erecting the steel pole, they moved it *too close* to the LIVE 11 kV overhead power lines. The resulting electrical flashover through the air provided a path to the ground for the electric current. The three workers holding the steel pole stood no chance and were electrocuted (refer picture 3c). The fourth worker was escaped but sustained electrical burns on his right foot.



Picture 3a



Sketch 3b



Picture 3c

SAFETY MEASURE RECOMMENDATIONS:

From the above accounts of the risk of hazards posed by the overhead power lines and metal or conductive scaffoldings or boomed vehicles or equipments near to it, the following precautions are to be observed to prevent electrocution resulting in injuries or fatalities:

- Employers, contractors and workers should comply with The Electricity Rules, 1999 particularly:
 - Rules 42 (d) which states "no person shall, without the lawful authority of the owner, management or licensee of the installation, as the case may be, undertake any work or engage in any activity within 2134 millimetres (7 feet) horizontally or 2743 millimetres (9 feet) vertically of any aerial conductor operating at low voltage.
 - Rules 43 (j) which states "no person shall, without the lawful authority of the owner, management, or licensee of the installation, as the case may be, undertake any work or engage in any activity within 4.57 metres (15 feet) of an aerial conductor operating at high or extra high voltage".
- Employers should notify in writing to the nearest SESCO Office when scaffoldings or vehicles or equipments or other materials or high objects are to be erected or moved in areas with overhead power lines where the required clearances cannot be maintained. This is necessary to enable SESCO to assess the situation for appropriate safety measures to be implemented. The safety measures before any work is initiated may include de-energizing the power lines or covering them with insulating hoses or blankets or demarcate the area for safe working clearances or where works are to be carried out where prolong shutdown is not possible thus requiring complete re-siting of the overhead lines. The costs for implementing the safety measures shall be borne by the contractor.
- Employers must ensure and verify with SESCO that the recommended safety measures have been implemented and to observe all other safety precautions prior to carrying out any work near the overhead lines. Employers should inform their workers about the hazards of erecting, moving, or working from scaffoldings or vehicles or equipments or other materials or high objects near overhead power lines or other energized circuits. These instructions should emphasize that most overhead high-voltage power lines are not insulated and that if in doubt, the workers should assume that such lines are not insulated.
- Managers and work supervisors should conduct initial and daily surveys at the worksite before initiating any job to ensure compliances with the safety measures. Employers should also ensure the workers are adequately trained to enable them to work near overhead power lines according to an established safe working procedure which should include handling of emergencies, ability to perform cardiopulmonary resuscitation (CPR) and other types of training deemed necessary.

CONCLUSION

Many employers, contractors, supervisors and workers may be unaware of the risk of hazards of working near overhead power lines. If the above control measures are adhered to, particularly with regard to safe working clearances from the aerial conductor, incidences of electrocutions such as those manifested above could be prevented.

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