Mitigation of the Impacts of Climate Change – Surveyor's Role

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SUMMARY

MITIGATION OF THE IMPACTS OF CLIMATE CHANGE – SURVEYOR'S ROLE By Francis Tham Dip (Land Surveying) Royal Melbourne Institute of Technology Licensed Surveyor (Victoria) Registered Surveyor (New South Wales) Australia. 1. Introduction Climate Change is real, particularly, in one of the driest continent on earth such as Australia. During the last two decades, we saw a gradual increase in drought conditions resulting in less rainfall and the drying out of vegetation and soils. Although wild fires (bushfires as they are known in Australia) are common features of the Australian landscape, many studies in Australia have provided evidence that climate change has increased the risk of conditions that make bushfires possible. A recent catastrophic event, known as The Black Saturday Bushfires, started on the 7th of February 2009 in Victoria, Australia. A total of 173 people were confirmed to have died as a result of these fires. Surveyors do not seek to guide the political debate on policies of greenhouse gas reduction or the implementation of an Emission Trading Scheme, rather our interest is to see that any impacts resulting from climate change are mitigated and managed. In Australia, the common cause of bushfires is the clashing of overhead conductors in the rural areas during extreme weather conditions of high ambient temperature and gale force strength dry northerly wind. This is where surveyors are called to assist with high tech laser scanning technology to detect dangerous spans of overhead wires that are likely to fail under such conditions. Once identified immediate remedial maintenance can be undertaken to ensure safe statuary clearances between conductors are corrected and maintained. 2. Application of Terrestrial Laser Technology for Bushfire Mitigation and Network Electrical Modelling The clashing of conductors is a major risk factor and one of the causes of bushfire in the rural areas. For the low voltage (LV) conductors, this clashing issue can be mostly addressed by the installation of spreaders at the appropriate intervals; however, it is difficult to do the same for circuit-to-circuit conductors. For safety and reliability of the network, it is critical that these conductors are properly kept apart, particularly under extreme weather conditions. With the best intention of design and construction, power poles, due to the deterioration of their structures and in-situ soil conditions, could lean over, thus increasing the span sags and resulting in clearances being breached. This problem is further exacerbated under extreme weather conditions when there are significant load differences between the upper and lower circuit conductors. 3. Mobile Laser Scanning With significant numbers in pole population, mobile scanning has been proven to be an efficient and effective way to identify non-conforming spans of conductors that breach the required clearance. With twin laser scanners mounted on a vehicle travelling at speed up to 80km/hour, the conductors are scanned and the captured data used for analysis via PLS-CADD, a line design software

commonly used by Electricity Distribution Businesses (EDB). Some EDBs have conducted experiments on the use of airborne LIDAR mounted under aircrafts or helicopters. However, problems were encountered as a result of the direct overhead (non-oblique) scanning and the speed of the aircraft which rendered conductors not “picked up”/defined sufficiently clear enough to be used for analysis. 4. Identification of Non-Conforming Spans Using Software PLS-CADD With the captured data defining conductor catenaries, vegetation density and ground profile, the separations of Ground Clearance, Circuit-to-circuit Clearance, Vegetation Encroachments and even Phase-to-phase Clearance (when the image is clear enough) can be interrogated using PLS-CADD. Non-conforming spans are then identified as illustrated in RED by the following profile drawing. Once identified, the culpable spans can be redesigned using the same digital data to initiate site work to rectify the dangerous situations. A network condition and risk modeling can also be undertaken as the captured data are able to be easily integrated into EDB’s Corporate Asset Management System. 5. FIG Conference Proposed Paper I belong to a unique group of surveyors who is not involved in land developments or major construction projects. I have worked in the electricity industry for over 30 years using surveying knowledge and experience but supplemented by a detailed understanding of electricity transmission and distribution, in particular, structural aspects of the electrical network. This proposed paper will outline recent projects undertaken in developing a terrestrial and later a mobile scanning system linked to a high degree end-to-end automation system (to ensure efficiency) within PLS-CADD to identify these non-conforming spans. Several EDBs have expressed interest in its application in light of a Victorian Bushfire Royal Commission Report and its recommendations.