FAULT DETECTION FOR POWER CABLE PROTECTION SYSTEMS

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PROJECT OBJECTIVES

To improve the overall efficiency and reliability of the electrical network, while maintaining the condition of electrical network equipment.

PROJECT SUMMARY

A prototype diagnostic tool is made using Arduino and a 3D printed model to be mounted onto the pilot termination block. A continuity tester program installed within the tool using LabVIEW and Arduino is integrated into the diagnostic tool. The program can identify the condition of each wire based on the resistance value and display the results on the User Interface of the LabVIEW program.

An average cable diagnosis currently takes about 54 seconds when done manually. On the other hand, the prototype can be mounted onto the termination block and a diagnosis of the cable's overall health can be completed within 30 seconds or less.

The model can also perform functions such as shorting to ground and shorting between pilot cable cores, complementing with the continuity tester to provide condition monitoring for pilot cables in the distribution network. By doing so, the model helps to improve the reliability of the electrical network, maintaining Singapore's worldclass System Average Interruption Duration Index (SAIDI). The model simplifies the tedious process of checking the health of the cable to a click of a button.

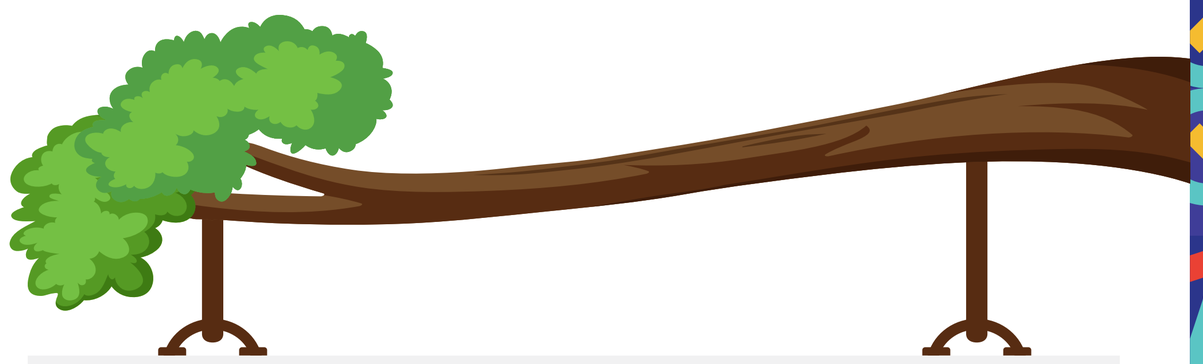
Mass production of the product for use by engineers on the ground can help to reduce the amount of manpower and cost required to check the health of the cable. This ultimately lowers the amount of carbon footprint with reduced transportation or unnecessary maintenance/ replacement of the cables in the event where the cable is not healthy.

PROJECT OUTCOMES

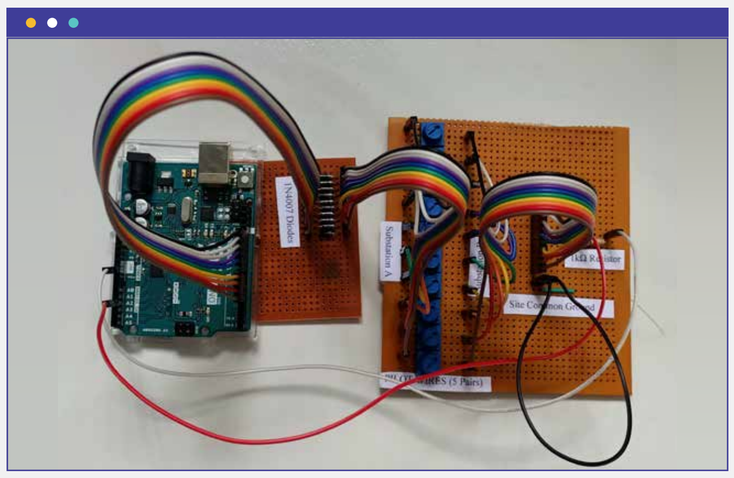
1. Prototype successfully reduces the time taken to conduct continuity test from 20 seconds to 1 second.

2. Prototype can measure the resistance of pilot wire with an average accuracy of 98%.

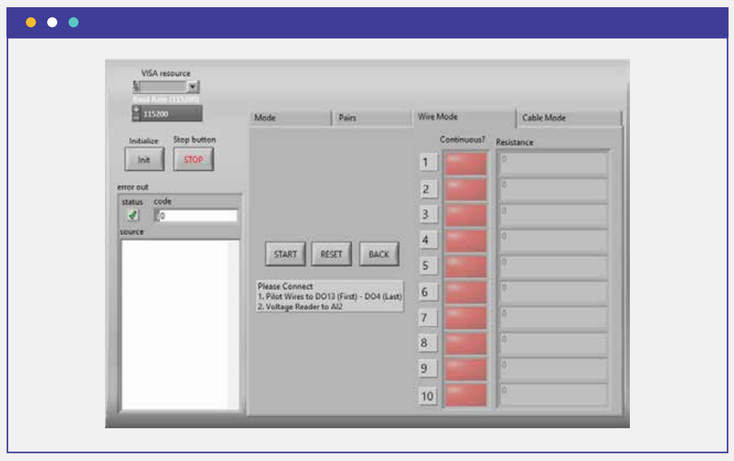
3. Up to a maximum of 10 wires can be tested in one click of a button. For a 20-wire pilot cable circuit, this test must be conducted twice.



Connection of Prototype



LabVIEW VI



Prototype Mount

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