

## Faculty of Engineering

### Summer Research Program 2022-2023

Project Title: Image assisted separation of sub-sea flowlines

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### Objective

Australia's oil and gas industry will need to decommission more than 1000km of subsea flowline used in the off-shore facilities before 2050. Instead of sending these flowlines to the landfill, it will be beneficial to separate and recycle the useful materials in an environmentally responsible way.

This is the 2<sup>nd</sup> phase of the research efforts aiming to enable automation process to separate different layers of the decommissioned subsea flowlines. The objective is to translate the digital image information to the subsequent automated system via PLC programming or other smart automation platform (e.g. JAVA or Python to robotic interface). This task involves designing an interface which allows for a process of communication relaying the optimized approach to the automated separation system itself.

### Project Details

Our overall program is to design a system capable of processing different types of flexible pipes with various sizes and configurations while also: 1) Maintaining the integrity and purity of the materials within the pipes and minimising overall material loss; 2) Reducing the generation of airborne dust particles in processing; and 3) Producing a modularised system which enables a mobile implementation able to accommodate the changing processing demands in remote locations.

The whole program structure is shown in Figure 1 below. In our previous efforts, we have successfully applied image processing to determine the flowline characteristics and also determined the suitability of the flowline into the automated separation system. In addition, we are able to use the information to decide the best separation approaches. However, among the limited number of flowline separation systems on the market, most are purely mechanical based that is not only manpower intensive, but also prone to occupational and health concerns. In order to further improve the current practice, this task involves designing an interface which allows for a process of communication relaying the identified optimized approach to the

separation system itself. The team will evaluate the feasibility of producing a communication protocol which integrates the advanced automation features into traditional separation systems to obtain better results with regard to maintaining the integrity of high value materials within the pipes and reducing the concentration of harmful airborne particles produced in the process.

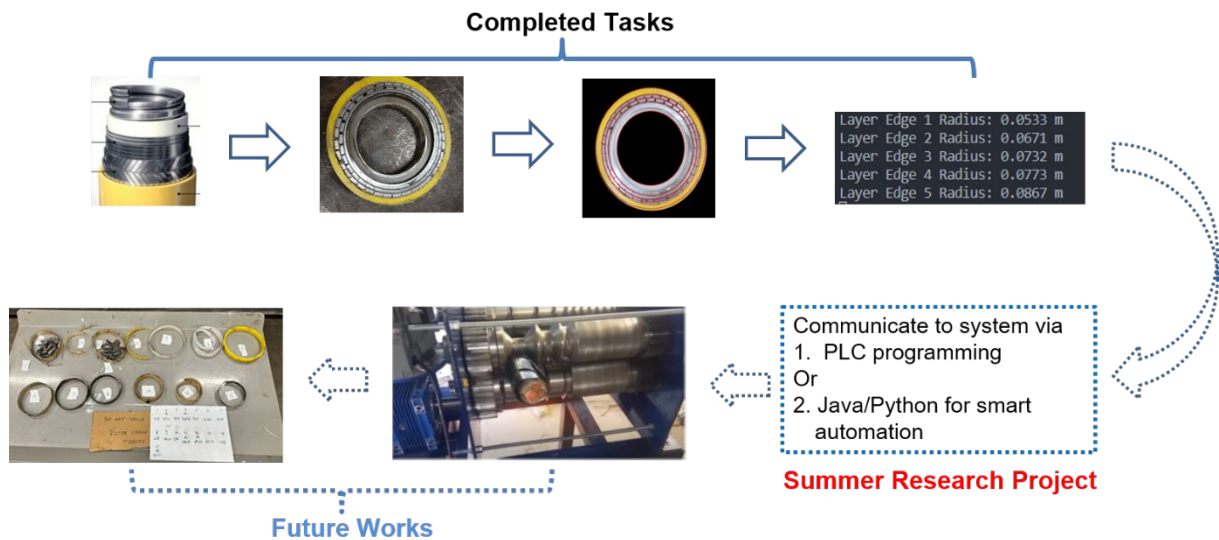


Figure 1 Illustration of overall program structure and task of Summer Research Project

## Prerequisites

The candidate should have 1) good knowledge (or experience) with PLC programming or robotic system; 2) demonstrate good portfolio in GitHub or Bitbucket; 3) good teamwork and communication skills.

## Additional Information

Applicants can contact project PI, A/P Victor Chang, for more information. An interview will be needed before commencing the project.

**Submit as a word document - no more than one page long.**