

CASE STUDY: BIO PRODUCTS GROUP

AN IOT SENSOR-BASED SOLUTION TO DETECT EARLY SIGNS OF BLOCKAGES

THE BRIEF

Bio Products Group is a Warrington based family-owned SME business established in 2015. Its mission is to become a leading product disrupter by creating sustainable, recyclable hygiene products for use in everyday life. This means they carefully design and manufacture products (Bio Pipe, Bio Pad, and Bio Hose) that can stand the test of time and, where possible, be 100% recycled.

The technology they use has been proven scientifically proven to improve the physical characteristics of the plastic surface enabling the prevention of the adhesion of bacteria, which forms a slime that attaches to the surface of the pipe, grows, and blocks the drains causing water leaks, which is very costly from a maintenance, operational and health and safety aspect in a supermarket environment.

Bio productions group requires C&W 4.0's support to test and evaluate the efficacy of their technology and to find a method to monitor their pipe's performance. The support from C&W4.0 will help Biopipe to reduce time/product to market and increase productivity and efficiency.

THE APPROACH

CW 4.0 team at Liverpool John Moores University worked with Bio Products Group to scope out the challenges into practical steps and identified the academic expertise within the School of Engineering knowledge base at LJMU to address the challenge. A sensor-based IoT solution was proposed with the aim to detect early signs of blockage within the pipe.

An undergraduate student was appointed, and the project had successfully developed a prototype setup with YF-S201 water flow sensor to measure the flow rate and volume within the pipe. The system was integrated with a microcontroller pushing the data into the cloud allowing the pipeline to be monitored both in situ and remotely.

THE BENEFITS

This setup has been tested successfully in the lab at LJMU with real-time waterflow data analysis and IoT interface display. This work under CW 4.0 scope provides the company with a solution that can effectively evaluate the performance of its products, it also allows Bio Products Group to be able to carry out a comparison study between their product Bio pipe and a standard plastic pipe, providing evidence to help them reduce the time-to-market and open up new global markets.

CW4.0 team also assisted Bio Products Group with their prototyping development via assessing LJMU's digital fabrication workshop. A prototype model was manufactured using 3d printing technology that significantly reduced the cost and the time required during the designing phase of the company's product development.

Robert Stuart – Biopipe Products Group, This is the first time we have worked with a university to help develop a solution to enhance our business and its products further. The CW4.0 at LJMU has been fantastic every step of the way; they clearly understood our business and the products we create and put forward a new innovative prototype that will help further prove the concept of our drainage system.

Utilising the expertise at LJMU has been eye-opening; most of our work has been completed in-house or sub-contracted to private companies, and we've felt isolated at times due to the nature of our work. Having access to the students and staff to talk about our business, our journey and bring together all that knowledge has been a perfect partnership; they have opened us up to areas and networks I thought were impossible for an SME like ours.

Most trials of our drainage system can take 1-2 years before go or no go from the customer, and most of the data we accumulate over that time can be biased towards the product.

Our challenge to Dr Yong was how can we prove the concept of our product quickly and with independent, unbiased data. With Dr Yong's in-depth knowledge of sensor technology and together with the graduate student, they put forward an idea of how this type of technology can help us achieve our goal. This type of tech was not something we had considered before, and going through the process has been very insightful, and I am excited to try the finished prototype in a live environment and evaluate the results.