Project Summary

June 2022

NWCAM

North West Centre for Advanced Manufacturing

Abbott

Company overview

Abbott is a global healthcare leader that helps people live more fully at all stages of life. Its portfolio of life-changing technologies spans the spectrum of healthcare, with leading businesses and products in diagnostics, medical devices, nutritionals, and branded generic medicines.

In 1994 Abbott established its first Irish diagnostics manufacturing facility at the Finisklin Business Park in Sligo. The facility manufactures reagents that are used for the diagnostics analysis and screening of numerous diseases and conditions with a focus on infectious diseases and cancer. The reagents include line diluents and wash buffers that are used in hospital and clinical laboratories all over the world. ADD (Abbott Diagnostics Division) Sligo is a centre for the manufacture of reagents and accessories for ADD's new Alinity series of platforms, supporting immunoassay, transfusion, and haematology applications.

The project

- Optimising laser welding parameters for polypropylene bottles

Industry focus

Laser transmission welding is an important manufacturing tool for a wide variety of polymer products including consumer goods, automotive components and medical devices. Abbott Sligo uses laser welding to attach lids to bottles. Focusing on production line efficiencies, Abbott identified three main topics to be addressed in the project:

1. Enhance weld integrity in the laser-welding process of bottles — to include the analysis of voids generally caused by variations of melting and cooling within the weld area;
2. Improve throughput on an automated bottling production line — to improve productivity and reduce waste;
3. Reduce welding cycle time — to improve production efficiencies.

Research partnership

With a history of industry-led R&D, Atlantic Technological University (ATU) at Sligo offered complementary research strengths to respond to Abbott's industrial challenges. ATU's Precision Engineering and Manufacturing (PEM) Centre at Sligo has expertise in material science, laser processing, micro matching, polymer processing, rapid prototyping, process control and statistical process analytics. The project research team included five co-investigators, one research assistant, and one PhD researcher.

Project outputs

The project enabled enhancements to be made to the laser-welding process. This resulted in increased productivity on the automated bottle-filling line, reduced levels of waste, and production cost savings; and enhanced the environmental sustainability of the facility.

The NWCAM project helped to inform the development of the next generation of fill-line equipment and positively impacted on productivity levels of current fill lines. A key objective of the project was to improve processing times for laser welding of bottles in the fill lines. The NWCAM research demonstrated a number of key manufacturing elements that work collectively to maximise productivity and efficiency in laser welding.

A vast amount of knowledge and know-how has been generated from this project. ATU's Technology Transfer Office is currently assessing the opportunities for intellectual property (including patentable subject matter and design rights) and global licencing of the applied technology outputs to Abbott or other businesses.

Project benefits

- Access to academic R&D expertise
- Cross-border collaboration between Abbott, ATU, Ulster University and other NWCAM partners to deepen the understanding of laser welding
- Development of two-way knowledge exchange between ATU and Abbott
- Increased competitiveness of the life and health sciences sector through innovation
- Industry-related skills development of academic researchers
- Knowledge dissemination to the wider life and health sciences sector through academic publications and conference presentations
- Technology transfer from ATU to Abbott in Ireland and further afield
- Upskilling of Abbott staff with regards to new production techniques (in Sligo and other facilities)

Project legacy

Dr David Tormey reflected on ATU's engagement with Abbott: "Abbott has been greatly supportive throughout the project. The NWCAM process facilitated valuable knowledge exchange with Abbott, and enabled the development of a firm foundation of expertise for future R&D activity. Most notably, Abbott is currently in discussions with ATU about new areas of collaboration and opportunities which are aligned to Abbott's research interests and sustainability targets."