Automation of Ultrasonic Cleaning and Blast Processes at Zimmer Orthopaedics

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Implementation of automation technology into any modern manufacturing process poses many serious challenges and opportunities.

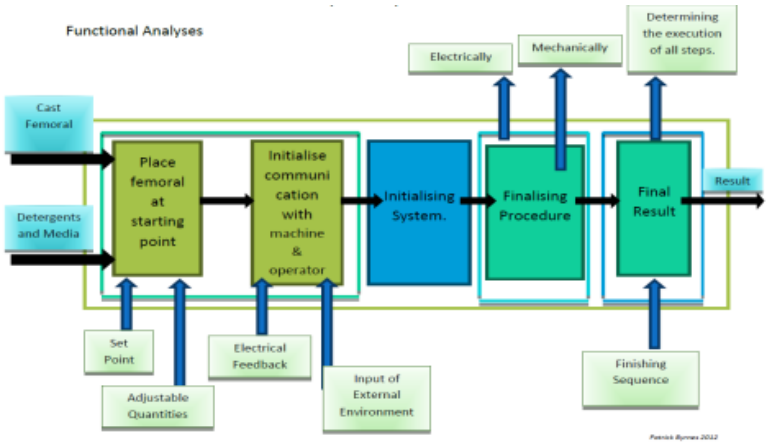
Key factors such as timing and scheduling, financial planning, technical support acquisition and provision, quality control and cost saving all illuminate themselves as a threat to project success. These factors are never more critical to success than in the medical device industry – additional challenges include strict medical body regulation and the highest quality standards.

Medical device companies, who do take the plunge into the automation world, often face enormous corporate investments and suffer large lead times of implementation, all in the interest of stream lining production and lowering product cost.

Femoral Orthopaedic Implant

Current Process Manufacturing Route

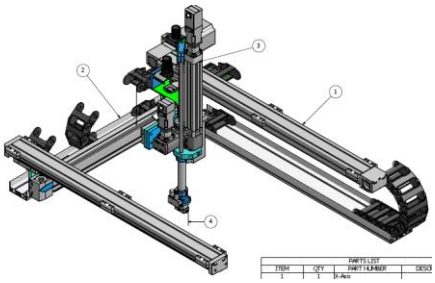
The achievement of a yellow belt in Six-Sigma and the valuable experience gained on work placement at Zimmer Orthopaedics, Ireland, enabled the author, through independent scrutinisation and analysis of existing manufacturing practices and the development of streamlined ergonomic techniques, to identify, formulate and progress this real world manufacturing project.



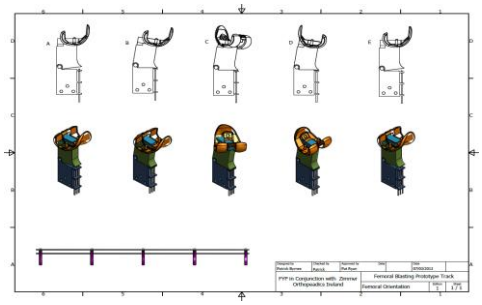
Extensive Systematic Design

Initial analyses identified existing ultrasonic cleaning and blast processing lead times as severe and sustained 'bottle neck' locations. Rigorous time studies, capability studies and gauge repeatability and reproducibility studies are carried out in order to fully characterise and simulate the current process. Various modes of systematic and experimental process design are undertaken by the author to raise the project classification / approval to that of 'budget venture'.

Breaking the manual mould, while simultaneously incorporating technology at minimal cost, is key to project feasibility and recognition. Design concept development, assessment, progression and optimisation are undertaken. Prototype manufacture, commissioning, testing and optimisation is achieved.



CAD Concepts Generation



Part Orientation Plotting

Prototype Development

The critical integration of FDA and ISO quality standards into final design is central to the project ethic and success. The student developed solution dramatically reduces the sub-process cycle time, providing efficiency savings of over €120,000 annually with a payback period of less than 4 months and frees up four personnel from repetitive tasks. The developed process solution is to be integrated into Zimmer's current manufacturing process.

Ireland hosts over 250 medical device technology companies - many of which contribute to the orthopaedic implant manufacturing industry. The innovation incorporated into this developing budget product has already attracted significant third party interest. The application to smaller outsource manufacturing companies is under progression. The devised process solution significantly demonstrates further applications in the manufacture of other medical device products.

The expertise gained led to the author forming and registering his own start-up company BYNCO Labs, specialising in providing innovative solutions in budget automation projects for the medical device manufacturing environment - first purchase order received in June 2013.