

Project Title: 'Reducing energy and carbon footprints in manufacturing through sustainable machining (MANU-FOOT project)'
Principle Investigator: Dr P Mativenga (University of Manchester)
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Grant Value: £75,000

The manufacturing industry is an essential part of the economy in the North West of England but it also contributes a large share of its carbon output and it is estimated that about 40% of global carbon footprints are attributable to industrial activity. A key part of manufacturing is machining which is used to shape materials into products for many applications such as aerospace, automotive and medical devices. This project focuses on reducing the emissions from work which involves machining therefore contributing to the development of a more sustainable manufacturing sector. Currently manufacturing processes are designed only from technical and economic point of view without energy considerations.

This project aims to get an accurate picture of the energy requirements and carbon footprint of the manufacturing sector in the region. A methodology manufacturer's can use to work out the energy and carbon footprint of products developed using machining will be developed as part of this project. The impacts of varying production times and levels of machine utilization on environmental footprints will also be examined. It is hoped that by enabling companies to easily work out the size of the carbon and energy footprint attributed to their products will make it easier for them to reduce their overall footprints. Another way in which carbon emissions can be reduced for machining is to try and address



the problem of energy being lost due to friction. Friction occurs in machining because tools become worn and corroded and it is estimated that some 30% of all energy generated in industrialized countries is lost this way. One potential method of addressing this problem is through the use of extra hard nanostructure tool coatings and their effectiveness in addressing the problem of friction will be assessed as part of this project. It is intended this project will lead to the creation of an industrial guide on curbing the effect of machining on energy consumption and carbon footprints.

This project integrates on-going work at Manchester on high value manufacturing, product re-use and coatings and hence develops technical solutions for boosting industrial productivity while making products with reduced damage to the environment. Thus the project is about how we make the region richer while safe-guarding the life of future generations.