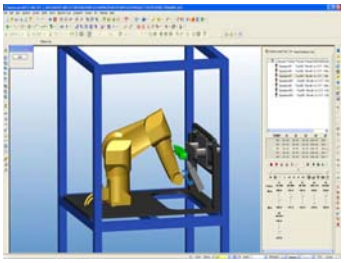
ZERO WASTE MANUFACTURING

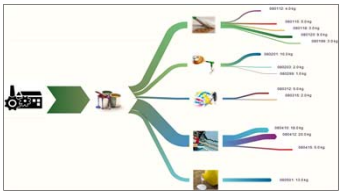
DEFINITION OF PROJECT

Investigate methods, tools, technologies and processes that support the long term goal of zero waste in manufacturing, whilst ensuring that environmental impacts of waste management activities over their entire life cycle are understood and reduced.

Future recycling technology is needed in order to recycle new and emerging products. This has been highlighted by the increased use of critical materials including Rare Earth Elements (REE) and Strategically Important Metals (SIM).



Waste flow methodologies are needed to understand the waste generation associated with a product or product family during manufacturing. Investigations focus on waste generation across a supply chain rather than in isolation within a factory so that the full impact of a product(s) waste can be understood and assessed.



Assessment of waste management supports selection of the most appropriate waste management options. Investigations are examining and assessing the actual environmental and economic impacts of current waste management options and developing alternative strategies.

Case Studies

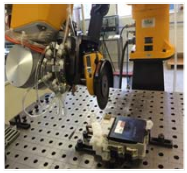
ROBOTIC DISASSEMBLY OF VEHICLE COMPONENTS

'Separation of valuable materials pre-fragmentation via automated robotic processes can significantly improve recyclate purity and therefore value recovery.'

METHODOLOGY:

1. Manual Disassembly to explore component structure & material composition.
2. Initial semi-automated robotic disassembly to investigate robotic dismantling processes.
3. Optimised robotic disassembly to separate valuable materials expediently and efficiently.

1. Manual disassembly



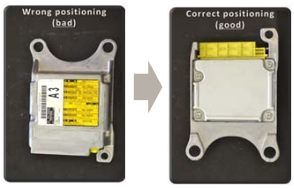
2. Automated robotic disassembly

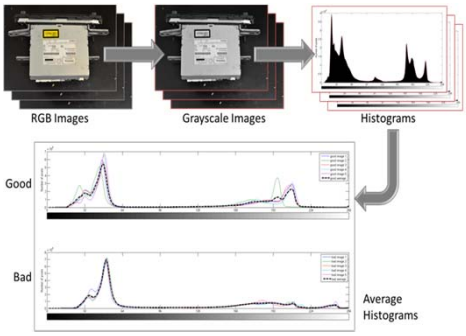
3. Concentration of valuable materials

POSITIONING ASSESSMENT IN ROBOTIC DISASSEMBLY

OUTLINE:

1. Identify correct positioning of car components to enable automated robotic disassembly
2. Continuous acquisition & processing: real-time control
3. Self-learning capability
4. Applicable to various components



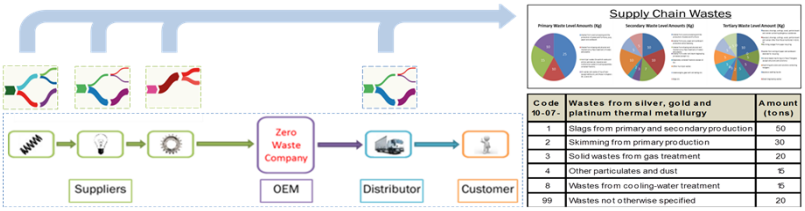


WASTE FLOW MODELLING: QUANTIFICATION AND CATEGORISATION TOOL

Many companies state they are eliminating waste, yet there is no decrease in waste heading to landfills. Where is the waste coming from?

PROPOSED SOLUTION

Develop modelling tools to give clear visual representation of 'waste flows' at various stages of the supply chain.



Supply Chain Wastes

Code 10-07-	Wastes from silver, gold and platinum thermal metallurgy	Amount (tons)
1	Slags from primary and secondary production	50
2	Skimming from primary production	30
3	Solid wastes from gas treatment	20
4	Other particulates and dust	15
8	Wastes from cooling-water treatment	15
99	Wastes not otherwise specified	20

EPSRC Centre for Innovative Manufacturing in INDUSTRIAL SUSTAINABILITY

SMART
ECO-FACTORY GRAND CHALLENGES

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