

Bromford Iron & Steel Co Ltd
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EnTRESS SOLUTIONS

- Process Mapping
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Bromford Iron & Steel Co Ltd
Is a leading producer of hot rolled flats, sections & custom profiles supplied worldwide. Part of the OSSL Group, they are based in West Bromwich where, for over 200 years they have built a reputation for outstanding quality and industry leading customer service.

Background to the support provided

Our initial Meeting was at Bromford Iron & Steel in West Bromwich

Wishing to raise its environmental, resource efficiencies & generally improve profitability of the company which, by the very nature of hot rolling, has very high energy costs, a number of 'possible projects' had already been identified internally. Creating a starting point was however proving difficult & an interest in setting up a Knowledge Transfer Partnership (KTP) with the University in order to 'buy in' expertise & support to work through the 'projects' was expressed. EnTRESS agreed to carry out a baseline audit of the process with a view to creating a snapshot of the current situation. Establishing the level of resource, process & environmental issues will enable the company to prioritise future development. The project report, is to be used to form the basis of a subsequent KTP application.



What was accomplished ?

The knowledge transfer process

Starting point for the project was a baseline process / resource audit this was carried out on the main billet rolling mill to establish principal areas of concern and possible improvement projects.

In addition, a thermal imaging survey of the same production line was also carried out, to establish the presence of 'hidden' thermal issues and gauge machine/equipment condition indicators.



During the audit the following principal issues were identified.

- Significant waste heat from the soaking furnace is vented to atmosphere via an extensive system of ducting to a single large chimney.
- End cropping of the steel billets was carried out early on in the process, which leads to the scraping of a section of material and the current cropping shear was liable fail because of the significant

mechanical loads placed upon it. Subsequent repair costs & associated loss of production were therefore an issue.

- The company had expressed a wish to crop billets further on in the rolling process when the billet cross-section has been reduced.
- The cooling water used within the rolling process currently has a chemical treatment cost of around £7k per year.
- In addition, as it circulates within the process, the cooling water picks up significant amounts of lubricating oil which in turn, has to be removed prior to reuse or discharge.

With a number of process concerns & possible areas for improvements identified, additional research was carried out to provide data on the options for either immediate solution to the issues identified or at the very least, indicative solution strategies for the company & University to subsequently follow up. Most notable is a submission for a Knowledge Transfer Partnership (KTP) agreement. This data & solution options were set out in detail in a formal report, presented to the company along with an electronic copy of all findings & data.



What's Available

- Fully funded one to one mentoring and business support for the development and/or adoption of environmental technologies, processes and improvements.
- Access to, and collaboration with, leading research provided through the University of Wolverhampton.
- Fully funded in-house resource efficiency audits for Black Country SMEs.
- Technical Review Workshops providing assessments on current products, and associated R&D opportunities.
- Environmental Impact Challenges set by large commercial and public organisations providing SMEs with business opportunities.
- Technology Showcases promoting the uptake of environmental innovations developed by SMEs.



Solutions Identified

It was suggested that the significant level of waste heat from the soaking furnace, currently vented to atmosphere could be harnessed in two distinct ways. Firstly, further investigation should be carried out on the use of the waste gasses fed back in to the furnace system to improve pre-heating efficiency.

The second efficiency identified is the possibility of introducing a heat exchanger into the furnace vent system to heat water. The thermograph on the previous page shows that even the outside of the stack is nominally 88.0 deg C despite internal insulation. This was indicative of the level of expensive waste heat escaping.

The primary issue for Bromford was the cropping of the steel billets. Carried out early on in the process, lead to the scrapping of a section of material. Removal of the shearing process and replacement with an alternative cutting process, later on in the rolling sequence would result in a billet end of reduced size being

cut. This reduced the level of process scrap by around 2.2kg per billet, this material saving can be converted into saleable product leading to additional revenue of around £30 -34.5k, depending upon level of production & steel price.



Grey Water

Rolling of steel sections uses a significant amount of cooling water, as part of the process survey water usage & treatment was considered. The production facility has a roof area of approximately 6250m² based on a company floor plan. The average rainfall for the area as reported by the Met Office is 681mm/year.

(<https://www.metoffice.gov.uk/public/weather/climate/gcqdfnbth>).

This collection area could generate around 3830m³ of rain water per year, if only some of this 'grey water' is collected it could be diverted into the current water cycle to possibly remove the need to extract (& pay for) water from other sources.

Water Treatment Oil Removal

A common problem with this type of process is contamination of cooling water with lubricating oil. This is currently addressed by a series of settling ponds & weirs which gradually removes the oil, this in its self creates a significant disposal problem of the resulting mixture of oil slurry & absorbent material. Trialing of a 'rope' based oil skimmer has been carried out, which did remove the surface oil film in a relatively short time. This did however come with a £6k price tag. Subsequent investigations for this project has identified a suitable alternative unit This unit has been quoted by the UK distributor to be significantly cheaper and will lift oil off the water surface for separate collection.

Technology Solutions Increase Competitiveness

Operations Director Andrew Rich: "These investments will deliver positive results across the board. Image measuring technologies will improve product quality, reduce customer waiting time and so drive better service and enable us to increase productivity. Our condition monitoring capabilities will reduce down time and our exposure to the associated risks."

Bromford invests £50,000 to fuel growth

As part of a decade-long commitment, Bromford has also invested in an image-measuring machine to replace old "shadow graph" technology. The machine has been fully programmed by the in-house Bromford technical team and has now gone live on the production line.

Bromford has also invested in a new condition monitoring system within its cogging mill. The system has already contributed to increased uptime. The firm has undergone radical development since its acquisition by the OSSL Group in 2014.



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What is EnTRESS ?

ENTRESS is a new environmental innovation project drawing on University of Wolverhampton expertise, part funded by the European Regional Development Fund (ERDF).

What we do?

Support for Black Country SME's who want to modify their practices for increased sustainability.

Eligibility Criteria:

Open to all Black Country (Sandwell, Dudley, Walsall & Wolverhampton) Small to Medium Size Enterprises (SMEs).

EnTRESS Case Study
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Knowledge Transfer Manager, Andrew Barnett is seen here handing over of the final technical report to Bromford's Operations Director, Andrew Rich.

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