

Midland Steel Case Study **NightingaleHQ**

Halving rebar scrap rates to achieve industry gold standard

Midland Steel, a leading supplier of reinforcing steel in Ireland and the UK, is currently trialling the **GoSmarter Rebar Optimiser** to tackle the issue of optimising rebar cutting. Waste from rebar cutting accounts for 3–5% of total production globally, which can amount to up to 20 million tonnes of steel waste and cause 28.3 million tonnes of CO₂ emissions. By taking orders and inventory dynamically, we sought to solve this 1D Cutting Stock problem to reduce the overall amount of scrap being produced at Midland Steel. Using a combination of AI to extract critical sustainability data and advanced mathematical optimisation techniques, we were able to halve the scrap rate Midland Steel would have experienced.

APPROACH

The approach evaluates thousands of potential cutting combinations across full order sets to identify the most efficient sequences. It suggests cutting patterns that:

- Maximise bar utilisation
- Minimise waste
- Consider the carbon footprint of leftover material

The goal is to determine the optimal cutting pattern from a range of options to fulfil an order. This involves reducing material waste and lowering the carbon equivalent (CEQ) of scraps. Business preferences for off-cut lengths and frequency are factored in to deliver the best pattern recommendations for the rebar cutting process.

OBJECTIVES

- Process Integrate inventory and jobs-to-be-done data to reduce scrap. Existing rebar cutting methods produce significant waste due to offcuts that are too short to be reused:
- Optimise based on analysis of cutting patterns that prioritises off-cut minimisation rather than simply filling available space
- Evaluate the impact of each cut on potential off-cuts and strategically decide whether to continue using an existing bar or start a new one

ACHIEVEMENTS

- ✓ Implementation of Rebar Optimiser using optimised 734 tonnes of steel across 193 jobs.
- ✓ Complementary waste management tools were also trialled: the Offcut Tracker App and the Scrap Weight Tracker App
- ✓ Less Waste: Cuts down on offcuts and scrap by optimising every cut.
- ✓ Lower Costs: Improves material efficiency and reduces steel usage.

KEY RESULTS

- ✓ Optimised production run and delivered 50% reduction in scrap
- ✓ Digitalisation of scrap management from paper to digital tools
- ✓ Reduction in carbon emission
- ✓ Reduction in Cost of handling waste
- ✓ Implementation of Offcut Tracker App and Scrap Weight Tracker App to track and manage waste more efficiently.

“This collaboration has delivered concrete results, proving that smart technology can have a direct, measurable impact on reducing carbon emissions in steel manufacturing. The integration of AI and digital tracking has significantly improved our operational efficiency and sustainability performance.” Production Manager, Midland Steel



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