

Foam Production Tracking System

Business Size: SME

Industry: Manufacturing (Foam Production)

Country: UK

Technology: .NET 8, React, TypeScript, SQL Server, SignalR, Xero Integration, Claude Code

Objective: Replace a spreadsheet-based tracking process with a real-time production system

The Brief

A foam manufacturer asked OCS to design and develop a system to track orders and stock from initial order, through production, cutting and dispatch.

The client had an established spreadsheet-based process, a clear direction for the system they wanted to move towards and documented process flows.

The new system needed to integrate with the client's financial system, introduce barcode scanning for stock tracking and dispatch and provide greater visibility of available stock throughout the production process.

The business and physical process changes required had not yet been fully defined. OCS worked with the client to develop and refine these requirements before development began, ensuring the system reflected how the operation worked in practice. It was agreed upfront that the build would be carried out using an AI-assisted development approach, with AI supporting development efficiencies while human expertise, judgement and oversight remained integral throughout the project.

Background

The client produces polyurethane foam in long, continuous blocks before cutting it to the exact sizes required for individual orders. The production process spans ordering and production through to storage, foam curing, cutting, lane allocation and dispatch. As the business had developed, these activities had been managed through a central spreadsheet alongside established working practices and the experience of the team. The next stage was to bring these processes together into a single system, providing greater visibility across the operation while capturing the knowledge and processes that had become embedded within the business.

Challenges

As OCS mapped the operation in more detail, several opportunities to improve visibility, control and consistency became clear:

- **Real-time order visibility:** Understanding where a block of foam was within the production process could require someone to physically check its location. This made it difficult to provide immediate updates on order progress
- **Stock control:** Orders were recorded largely as free text, meaning that determining available stock often required a physical count rather than a real-time system check
- **Offcut management:** Foam remaining after a cut was not always recorded as available stock, meaning usable material could be treated as waste
- **Compression requirements:** Certain orders required foam to be compressed before dispatch. The process needed a more reliable way to track this requirement and prevent an uncompressed block from being dispatched

- **Process resilience:** Important operational knowledge was held by a small number of experienced team members. The new system needed to capture this knowledge within the process so that operations could continue consistently when individuals were unavailable
- **Making better use of historical data:** Years of completed order information were held within the spreadsheet but were difficult to analyse. The new system provided an opportunity to turn this data into useful operational information, including product demand, lane activity and potential bottlenecks.

Solution and Implementation

Rather than simply adding barcode scanning to the existing process, OCS mapped the journey of a piece of foam through the operation:

Produced → Imported → Stored → Cut → Allocated → Dispatched

The system was then designed around this journey, creating a clear digital record as each block and cut piece moved through the operation. The build was carried out by an AI-assisted development team, with Claude Code working alongside OCS developers as a pair programmer throughout the project.

Claude Code was used extensively for coding, scaffolding new screens, creating API endpoints and database changes, freeing developer time for the areas that required greater judgement and problem-solving. The OCS team also used Claude to support the creation of unit tests and the automated test suite across the backend and frontend. Tests covered order and stock logic, block modelling rules and the API layer, allowing test coverage to develop alongside the feature work.

The approach also proved particularly useful when working with the cutting machine's printer protocol. The team was able to test variations quickly against the real hardware and make changes to the handheld application on the same day that feedback was received from the warehouse floor.

All AI-generated code, including tests, was reviewed by an OCS developer as part of the team's standard AI-assisted development methodology. Business logic and key technical decisions remained with OCS, based on an understanding of the client's processes and requirements rather than being delegated to AI.

One of the most important design decisions was to model long foam blocks and the pieces cut from them as separate but linked items, rather than treating inventory as a single flat list. A long block remains available until it has been fully used. When a length is cut from it, the remaining material is automatically recorded as available stock for a future order. This provided a reliable way to manage offcuts and make better use of existing stock.

Orders were converted from free-text entries into structured order lines, allowing the system to check live stock availability. Compression was also modelled as a defined state within the process rather than relying on a note or individual knowledge.

Each cut piece of foam receives its own barcode, which is printed automatically when it is produced. A dedicated handheld application allows operators to scan a block, confirm its destination lane and move it through the process. The workflow also supports scanning several blocks being allocated to the same lane in a single pass, reflecting how operators work on the factory floor. Where a block still requires compression, the system prevents it from being marked as ready for loading.

The cutting machine also provided an opportunity to capture production information directly from the source. Each cut produces a precisely measured piece of foam, with the machine's label printer originally controlled by software supplied by the equipment manufacturer.

During a site visit, OCS identified that the machine recorded a set of measurements to a local file for every cut. The team reverse engineered the printer's communication protocol from the live installation and developed a replacement process that monitors each cut, drives the printer directly and reports the result to the central system immediately.

The office-facing system replaced the spreadsheet input tabs with a structured order screen that validates information as it is entered and checks live stock availability before an order is confirmed.

Customer information is retrieved through an integration with the client's Xero financial system, while the same integration supports the automatic generation of invoices and dispatch paperwork.

The system also retains the ability to export live order information to a spreadsheet when required, with a cached snapshot available should the central system be temporarily unreachable.

Results

The client's operation now runs through a single system from production through to signed delivery. Foam can be imported from production records, cuts are reported directly from the machine, stock is allocated through barcode scanning and dispatch paperwork is generated automatically.

- **Real-time stock visibility:** Stock availability can be checked in seconds without requiring a physical count
- **End-to-end traceability:** Orders and individual blocks can be tracked through the production process, providing a clear view of their current status and location
- **Improved stock utilisation:** Remaining material from cuts is recorded as available stock, helping reduce unnecessary waste and make better use of existing foam
- **Greater process consistency:** Key operational steps and requirements are built into the system rather than relying solely on individual knowledge
- **Connected systems:** Production, stock, order, customer and financial information are brought together, reducing the need to reconcile information between separate processes
- **Accessible production data:** The client now has a structured record of production and order activity that can be queried and used to support operational decision-making.

Lessons Learned

The main lesson from the project was the importance of observing how operators actually work rather than relying solely on what is described during requirements meetings. Early assumptions were based on scanning one block at a time. Observing the production floor for a single shift showed that operators naturally grouped several blocks together when moving them to a lane. This insight led to a change in the scanning workflow and resulted in a process better aligned with the way the team actually worked.

The project also demonstrated where an AI-assisted development approach can add the most value. It proved particularly effective for work requiring rapid iteration, such as testing the cutting machine's hardware protocol and responding quickly to feedback from the production environment.

The approach also allowed the automated test suite to develop alongside the application rather than being treated as a separate activity towards the end of the project.

At the same time, the project reinforced the importance of human oversight. Every AI-generated change was reviewed by an OCS developer before being introduced to the client's systems, with particular care taken around business logic, integrations and code interacting directly with production hardware.

The combination of AI-assisted development and experienced human judgement enabled the team to iterate quickly while maintaining control over the technical and business decisions that mattered most.