

INDUSTRY 4.0 NETWORK SITE VISITS

Red Steel Shopfloor Intelligence – measuring more than productivity



The Profile:

Red Steel's foundations were laid in the 1960s as a building company specialising in steel construction and Red Steel was officially formed in November 2002, before purchasing Woolaway Steel Structures in January 2003.

They specialise in structural steelwork and undertake contracts predominantly in the lower North Island of New Zealand from their purpose built facility in Pandora, Napier constructed in 2015.

Red Steel is an active member of Steel Construction New Zealand (SCNZ) and in 2014 became the second fabricator to be certified under the Certified Fabricator Scheme.

The Background:

In the steel construction industry, the scheduling of work is essential in order to deliver the correct components to site in the correct sequence to allow the erection process to progress in the right order. This flows up the value stream to prioritise the workflow in the fabrication shop. It is important to know what components have had the precursor process completed (mainly cutting and drilling).

To help manage these processes, Red Steel planned to move towards an in-house, cloud based solution called Contracka, that allowed bespoke customisation and avoided the escalating costs of extra licenses on externally governed products. This transition had the potential to leave them with reduced visibility of what components had been cut and drilled prior to manufacture though, and could have greatly damaged their ability to accurately schedule work in the fabrication shop.

The robust Steel Fabrication Certification (SFC) that structural steel fabricators in New Zealand comply with requires detailed traceability of manufactured components (similar to ISO 9001). To deliver against these traceability outcomes could potentially require labour intensive processes that are prone to inaccuracies from human errors.

Red steel needed a solution that could help ensure visibility and traceability was maintained while not introducing labour intensive administrative processes.

The Solution:

In order to close these gaps and deliver the right information about production and traceability to the workshop manager

and client respectively, Red Steel tapped into new Internet of the Things (IOT) capabilities from their equipment provider (Peddinghaus).

The tracking system, rather than simply monitoring uptime/productivity - which is becoming more common across industry - was able to identify which part had been manufactured, as well as details around what machine it was manufactured on, when, and potentially combine this information with machine parameter meta data as well.

This process works by using the programme file that instructs the machine how to process the part, which includes the part number from the original model produced by their in-house detailing team. It then captures the associated data when running each part of the programme to show when each component was manufactured and the associated data. Originally this data was automatically exported into an .XML (excel) format that constantly updates when new components are added. As a basic report this could be filtered and analysed manually if required.

The main success was to automate this process further to automatically update the 'part status' in Red Steel's system, and therefore identify which components in each project were complete through which process. These tracking systems historically have relied on manual intervention (often using bar code scanners) to capture this data. Although this data is useful, it is a waste of time from a value add perspective and therefore results in less shopfloor efficiency.

Next steps:

The next step with the project was to replicate a similar outcome on the 'plate line' to determine which plates have been manufactured for each assembly within each project. At this point, all the required information on raw materials for assembly will be available and therefore permit effective scheduling so fabricators will only be provided with the information for the jobs where 100% of the components are available - this helps avoid any rework and reduces work in progress.

In addition, starting to introduce other essential meta data to further automate the traceability elements such as heat number and operator added extra value. For example if a component was cut out of specification, they could associate all the relevant factors such as machine parameters (vibration, temperature), operator, raw material heat number, what programme it was running etc., to truly understand where a fault has arisen quickly and put corrective actions in place.

Key Learnings / Take-Aways

- Look to trial new processes in low/no code customisable solutions online prior to developing in-house to 'fail fast' and avoid costs.
- With IOT solutions look beyond pure uptime and productivity measures to understand if there is meta data that can add extra value to processes.
- Understand the value that a 'track & trace' system could have for your components when it comes to scheduling and root cause analysis of non-conformances.

About the site visits & Industry 4.0

The purpose of the Demonstration Network is to drive uptake of Industry 4.0 technologies among New Zealand manufacturers with the aim of increasing their productivity and global competitiveness. The Network of Site Visits (NSV) are part of the [Industry 4.0 Demonstration Network](#), which also includes a mobile showcase and smart factory showing cutting-edge industry 4.0 technologies in action. The NSV takes selected companies through a fully-funded assessment process to help them accelerate their own journey towards Industry 4.0, and sees them share their knowledge with other manufacturers.

Further questions?

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