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CONSTRUCTION PRODUCT
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Technical Insights:

Understanding the role of Factory Process Control in Modern Methods of Construction and Platform systems

In February 2022 the Construction Innovation Hub conducted interviews with UK Construction industry professionals to gather information which could help create a set of First Article Inspection (FAI) Guidelines detailing a standardised way to approach Factory Process Control (FPC) for manufactured construction products and platform solutions. Highlights and recommendations can be found below.

What is Factory Process Control?

The importance of process control in manufacturing was universally recognised by the participants in the research. Factory Production Control (FPC) covers the procedures which are put in place to allow a manufacturer to maintain consistency in quality and to keep records of non-conforming products, processes or materials, in order to make improvements. Process Controls ensure that manufacturing processes are carried out in a consistent manner. It is fundamental in Modern Methods of Construction (MMC) as manufacturing of vital building components happens at offsite factories.

Factory Process Control is a way to ensure high standards of quality in product design. It is often reviewed by external auditors and when processes change, these need to be approved by the auditing body. If not approved, the certification body will not audit against it, which can result in certification not happening on time (resulting in a negative impact on the customer perception of the product which is no longer certified). In some cases, it can lead to the product being removed from the market until the certification is approved again. Regular audits happen at the factory every six months.

Some organisations have a quality plan to ensure compliance in external audits. Other organisations have their own in-house solutions like databases that drive their internal process. Product testing at critical time points in the production process is seen as standard. Ensuring efficacy and functionality of the product is critical.

MMC and Factory Process Control today

There is no standardised method for process control within manufacturing in MMC and there was little recognition that this is something that is missing in the industry by those that contributed to our research. Each company interviewed in effect took this absence of a standard as the ‘status quo’ and worked around it by introducing their own approaches, steps, and measures to address process control. This led to a variety of solutions being in place.

Auditors generally took the view that there is usually a process in place within construction (albeit not consistent across organisations), which is led by the product manufacturer themselves and is often governed by either the standard that the component company is trying to achieve or be certified against or the quality plan that the company has to draw up for the purposes of external audit or product certification.

For the design, manufacture and build process, the RIBA stages 1-7 were called out as being followed by some MMC companies. Others who did not specifically talk about following the RIBA system observed some or all of the gateways listed below:

- Release of products sold into the design phase
- Pre-design acceptance of information by the client
- Release of production information into the factory
- Authorisation to proceed on foundation for construction and scaffolding
- Delivery (goods on site) and checked.
- Build
- Final handover check

Ideally, checks made at these gateways acted as a go/no-go to the next stage in the design, manufacturing and build process. However, this was not always the case and in the case of non-conformities, fixes were known to happen on-site as well as in the factory.

In high volumes businesses, there was an emphasis on process validation, and many claimed to have a strong culture internally and a focus on campaigns around quality and validation. For smaller companies, some were at the outset of their journeys, struggling to standardise what they are doing but recognising that in doing so, the whole process becomes more efficient and results in a better-quality product. The mantra of increased efficiency, increased quality and a reduction in cost and time was relevant across the board.

For the most advanced companies, a statistical sampling process was taken to check the quality of the product after launch in addition to earlier processes. This is consistent with manufacturing processes in other sectors. For some organisations, the Quality Assurance team are used as 'an independent second line of defence,' helping to control quality and spot errors before products leave the factory floor.

The benefits of implementing Factory Process Control

Proper validation for manufacturing processes will provide a vital component of a Building Safety Case required by April 2022's Building Safety Act for high-risk buildings. Undertaking a thorough validation process also reduces risks associated with liability as the product moves down the supply chain, should a fault occur outside the remit of the manufacturer.

- Prevents rework from structured risk assessment upfront.
- Reduces cost
- Trail manufacturing runs ensure run rate and quality are met before production launch.
- Measurement systems and statistical processes ensure efficiency is monitored and evaluated from the outset.

Hub tools for Factory Process Control

The Hub has developed a Quality Assurance framework for manufactured construction products known as CPQP which contains tools to help ensure the quality of new construction product manufacturing processes and products. The Hub's Digital Routes to Compliance tool and Validation and Verification (V&V) Guidance can be incorporated to aid in the validation journey and to provide evidence in all stages of product integration. The Hub has also developed guidelines for First Article Inspection (FAI) which helps to validate new manufacturing processes.

The current regulatory landscape resulting from the Building Safety Act necessitates the need to cascade quality critical (safety critical) requirements to their respective suppliers for buildings considered high risk so as residential building over 18m tall. This is more than providing a factory control process, manufacturers must showcase its application.

Find out about solutions developed by the Hub's Quality Assurance and Conformity Assessment teams here

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