

## Why can manufacturing can get Quality-in-design right and construction rarely seems to?

David Myers & Martin Andrew



David is Quality and Programme Management consultant specialising in helping organisations deliver results that improve their business efficiency and increased profit to the bottom line. During his career, David has spent 30 years delivering large scale global automotive Powertrain projects with Ford Motor Company and JCB. He has also spent 10 years on the construction industry at Heathrow Airport where he has become a leader in client-side project process delivering projects of up to £300M. David is both fascinated and frustrated by the differences in Quality of delivery between the manufacturing and construction sectors.

A Fellow of the UK Institute of Mechanical Engineering , David is also a Chartered Quality Professional (member of the Chartered Quality Institute in the UK) and an expert in the cost effective delivery of Quality in construction projects from the Client side.

Contact: [davidjmyers1@outlook.com](mailto:davidjmyers1@outlook.com); [linkedin.com/in/david-myers-3535591](https://www.linkedin.com/in/david-myers-3535591)



Following a career in agricultural and environmental research, teaching and consulting, Martin has been involved in the ISO Management Systems space for some 15 years – initially as a Management Representative for global civil infrastructure companies, and more recently as self-employed Lead Auditor engaged by several Certification Bodies, for four ISO Management Systems Standards (Quality, OHS, Environmental and Information Security). He is also a contracted Quality Manager or Internal Auditor for several small technology companies, and he chairs the Australia-NZ Impartiality Committee for another global Certification Body. Martin was a Board Director for the Australian Organisation for Quality (AOQ) for some 10 years to 2022, and he is a former National President. He played a leading role in the organisation of five Qualcons, including the one held jointly with the Asia Pacific Quality Organisation in 2021. He is Co-editor of Quality Business. Martin is a Fellow and Life Member of AOQ, a Juran Medallist and a NZOQ Special Service Award recipient.

Contact: [martin@martinandrewsolutions.com.au](mailto:martin@martinandrewsolutions.com.au); [linkedin.com/in/martinhandrew](https://www.linkedin.com/in/martinhandrew)

## **Editor's note**

This article relates to another published in *Quality Business* a few years ago<sup>1</sup>. The 'Quality in Construction Design Tool' was developed by a small, international team including the two authors of this article. The team has continued to meet annually to review progress with the tool's usage and any issues raised. The tool is available from the authors.

This article has a strong UK focus, reflecting the experience of several members of our international team. However, the context described in our article has strong similarities with the contexts in Australia and New Zealand.

## **Background**

Comparisons between manufacturing projects and construction projects are fascinating and frustrating. During the 1980's and 1990's, Manufacturing learned how to deliver high quality products, led by Japanese companies (e.g. electronic goods, motorcycles and cars) who adopted the lessons of American quality gurus W Edwards Deming and Joseph Juran. (You can read more about these gurus in *Quality Business* Issues 1 & 2 this year).

Today, many manufactured products are, to the customer's eye, just about perfect – 99+% of customers have no issues. In comparison construction quality is often called out by the end customers. In the UK, satisfaction with residential properties stands at around 87%, or 13% of customers have one or more quality issues with their new homes.

Despite the best efforts of many well qualified, driven people, construction quality has only made slow progress during the last 30 years. The UK's 'Get It Right Initiative' (GIRI; a group of industry experts, organisations and businesses dedicated to eliminating error and improving the UK construction industry) has identified that on average, construction projects are still late and 20% over budget.

## **Potential Root Causes**

The root causes of construction project quality (and cost and time) issues are many, but a few key ones are: -

- Construction Projects (especially infrastructure projects) are often complex, one off solutions, using one-off bespoke Quality systems.
- Clients are often relatively inexperienced and unaware of how their actions affect the project cost, timing and quality.
- Contractual arrangements are often complex and inconsistent, encourage adversarial relationships between the parties and lead to defensive behaviour.
- Disparate supply chain competence driven by lowest cost as a key priority.
- Definition/design stage runs late without any extension to completion date. This leads to programme squeeze and acceleration of the construction phase – sometimes including construction starting without full design definition.
- Construction project process is not well defined or well followed especially at the client - architect – designer - contractor level.

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<sup>1</sup> Andrew, M, Stojanovski, Z, Montgomery, J, Morrison, J (2021) *Quality in Construction Design Best Practice Tool*. *Quality Business* 2021(3): 4-12.

This article examines this last potential root cause.

**Firstly, what do we mean by Process and what is the current position in Construction?**

Process Levels	Definition	Current Situation
High Level Project Process	Outline project process e.g. RIBA Process. Definition of key steps without clearly defined responsibilities.	Well understood by most professionals in construction
Corporate Process Client, architect, designer, contractor etc.	A definition of how a corporation undertakes a project.	Generally, well defined but flexibly delivered to meet time and cost demands
Methodology How do the Client, Architect, Designer, Contractor and sub-contractors work together?	A definition of “who does which key steps” in a project. Aligned to a project and its contractual arrangements.	A clearly defined methodology is rarely developed – the team work it out as they deliver the project
Procedures	Detailed definition for simple, repeated processes e.g. ensuring bolts are torqued correctly or how to take a concrete sample.	Employed by many organisations but inconsistent under time/cost pressures.

Note: ‘RIBA’ is the Royal Institute of British Architects

Examples of missing Methodology during this phase of the project include: Stakeholders identification & engagement; Management of requirements; and Communication. Thus the project is inadequately executed.

**How is Process used in a typical manufacturing project?**

Manufacturing companies typically have well defined processes for both the product development (prototyping phase) and for the volume production phase. The product development phase is more analogous to a construction project which usually produces a “one-off” product.

Manufacturing product development processes are well documented, strictly applied and continually updated as better ways are discovered to yield consistent outputs that satisfy the customer. Working away from process is not tolerated without the support of technical management at the highest level. The process adherence is maintained and driven by the key managers within the team. In summary, process governance is seen as critical for success and is driven by top management.

**How does this compare with Construction projects?**

Construction projects have two key differences:

1. Often there is little, or no process agreed and documented between the Client – Architect – Designer – Build contractors. For example, in the UK, projects are delivered using RIBA project phases and gateways which are at a high and generic level. Detailed process and delivery timelines, especially during the design phase, are considered “flexible”.

2. During the construction phase, the delivery schedule (with the process embedded) is usually extremely detailed but often seen as extremely flexible. Why is this? Construction project teams often have a great “can-do” attitude and feel that the process is flexible if the cost and timing targets can be met. Analysis of many quality issues will reveal the root cause of a process deviation taken to maintain project cost or timing.

For example, when a client pushes for project timing to be maintained or pulled ahead, how often do you hear the client ask – How will you maintain the delivery quality whilst meeting my request? How often does the contractor layout all the quality risks and gain concurrence before going ahead? Workarounds are developed without the wider implications being thought through and mitigated.

Optimistic “can-do” is getting in the way of consistent, high quality outcomes.

### **Similarities and differences**

The product development phase in manufacturing is broadly analogous to a construction project in that it is a one-off exercise. However, a key difference is that the construction project team often changes significantly from project to project (because different parties are involved, and individuals are usually contracted for an individual project, and then move on) whereas manufacturers commonly have the same team rolling on from one project to the next.

Manufacturing is market driven and the production line a high cost asset, thus the design process must meet the timing demands of the production plant and ultimately the wants of the end customer. In construction projects, the design phase usually drives constraints into the construction phase leading to compressed timing and the apparent need for process flexibility.

### **Ways of ameliorating these differences**

Improvements in the areas described above can be delivered using agreed and documented processes during the design phases of a project. Opportunities include:

- 1) Use of the, freely available, Quality in Construction Design Tool which has embedded a best practice process for the design phase in an effective way – it just needs project specific responsibilities to be added.
- 2) Application of the new BS99001, a construction specific version of ISO9001 that was written by a large team of construction experts with the intent of documenting processes to avoid common delivery issues in construction projects. Once again, it just needs project specific responsibilities to be added. (Manufacturing and other industry segments have their own ISO9001 based industry specific standards already.) The Quality in Construction Design Tool meshes well with BS99001; e.g. clauses 5.1.2 Customer focus, 6.1 Actions to address risks and opportunities, 7.1.2 People, 7.1.6 Organizational knowledge, 8.2.3 Review of the requirements for products and services, 8.3.4 Design and development controls, 10.3 Continual improvement are incorporated into our Tool.
- 3) Where possible (typically with large infrastructure clients), maintain long term relationships between client, architects, designers and construction contractors by

keeping design/build teams together; and reusing design and specification elements. This enables a best practice Methodology to be developed, documented and utilised. It also avoids the forming/storming/norming/performing stages of team development typical of many construction projects.

Implementing these elements will begin to embed standardisation and consistency which the best people can then hone to deliver competitive advantage and thus consistently high quality outcomes.