

Monitoring and supervision in construction

Part 2: Avoiding error

Cliff Smith of the Get it Right Initiative (GIRI) explains how the organisation is working to reduce error in the construction industry and offers some examples of approaches in practice.

Introduction

The widespread view in the construction industry is that supervision and monitoring are discrete procedures that take place during the delivery of a construction project, terminating when the building is complete. Monitoring may continue beyond handover, either to ensure the building is performing as required, or to resolve any snagging issues that remain.

To have a beneficial impact on error reduction, the Get It Right Initiative (GIRI; <https://getitright.uk.com/>) advocates that monitoring should form part of a wider feedback loop. GIRI also subscribes to the view that supervision is not solely the remit of supervisors and managers on the site; it occurs at all levels of the team and throughout the project. There is an onus on all project partners, and all staff, to report or prevent any action they witness that may lead to error, and leaders are responsible for creating an environment in which staff are empowered to act in this way.

GIRI is about creating a positive error management environment in the construction industry, and the organisation has developed a number of tools that can be used to do this. These include webinars, forums, research, peer group networking, and training. GIRI's training was developed by the industry, for the industry, and focuses largely on behavioural and cultural change; underlining the importance of planning, the benefits of carrying out a 'pre-mortem' before starting work, and the role of all parties in creating an environment within which staff feel comfortable highlighting potential problems and 'pressing pause to eliminate error'.

It is worth setting out what GIRI understands by the terms 'monitoring' and 'supervision' and how they differ. Monitoring is the process of

checking on work that has been done, over a period of time, and reporting whether it has been done correctly, in accordance with the design. It assists in identification of any corrective action needed to prevent a defect being repeated, thus creating a feedback loop.

Supervision is the process of overseeing work that is being carried out, to ensure that it is being done on schedule, within the budget, and to the correct specifications.

What do we mean by error?

In the context of quality assurance (QA) or quality control (QC), QA focuses on errors in standards and procedures, whereas QC focuses on errors in built compliance – i.e. ensuring that the work that has been done complies with drawings, specifications and tolerances.

There are various definitions of error, all of which are recognised and accepted by GIRI. First, there is the dictionary definition that states an error is 'a mistake or inaccuracy'. More particular to the construction industry are the following two definitions: 'an action or inaction that results in a requirement for rework, extra work or that produces a defect'; and 'the process of non-compliance that results in waste'.

Whatever definition is used, GIRI's work is about *avoiding* errors.

Lessons from errors

GIRI tends to look beyond the boundaries of a project, in considering the long-term impact that supervision and monitoring can have on error reduction. Often, disappointingly, there is an absence of any error management process through which learning points from one project could be used to prevent the same error occurring in the future, or to improve outcomes on subsequent

projects. This would reduce or eliminate the costs, delays, safety risks and reputational damage caused by such errors.

So, what happens in the monitoring process? In general, if an error is identified, someone will probably take corrective action; money will be spent and delays incurred in putting it right. There will be additional risk from rework, and more material waste is likely to be generated. But in most cases the incident will be considered complete once it is corrected.

GIRI believes that monitoring should extend beyond handover of a project, and, *crucially*, that the identification of an error should not just result in corrective action. There should be a feedback monitoring process such that others can be

Case study 1

Feedback loop – saving costs through learning from previous errors

GIRI training paid dividends on Galliford Try's Grantham Southern Relief Road (Phase 2) project, which involved piling works for a new bridge using a top-down construction method. The same method had been used by the contractor on a previous scheme, with serious errors leading to high costs. To try to prevent the same problem occurring, leaders from within the company, client, designer and supply chain were brought together to focus on this element of the project, creating a forum for open, frank discussions.

Pre-emptive actions taken resulted in more than 200 contiguous piles being completely defect free, with 100% vertical tolerance compliance. The impact went beyond that project, as the same tools and ideas were applied by one of Galliford Try's regional managers to a different project that was experiencing difficulties with surfacing works.

GIRI's Get it Wrong exercise and the 'cause, concern, countermeasure' approach were used to drill down into the difficulties affecting the project and mitigation actions were successfully applied.

made aware of the error, how it occurred and actions that should be taken to avoid it being repeated on future projects. Just as importantly, we want the industry to be more open to sharing these learning points with others, to drive improvements across the sector as a whole. Anonymised data and purpose-built apps can assist with this.

Collective responsibility

GIRI also believes that there must be greater emphasis on collective responsibility for getting things right. It is not the responsibility of just the person whose job title includes the word 'supervisor' to ensure processes that could result in errors are addressed, in the same way as responsibility for monitoring and highlighting errors should not fall solely on the person who is employed for that purpose.

But this will not happen unless the culture of the organisation, and working environment of the project, empowers or even encourages employees to act in this way. GIRI training focuses on behavioural change at all levels, aiming to create an environment where staff do not blindly follow instructions or specifications when they know that doing so will lead to error.

All those in authority have a responsibility to encourage the right behaviours. GIRI has courses for leaders, for supervisors and managers, and for those involved with interfaces, and in the future plans to develop training for operatives.

The role that culture plays in eliminating error is also highlighted in the *GIRI Design Guide* (<https://designguide.getitright.uk.com/>), which was published online in 2022 and shares a series of good-practice recommendations to address the root causes of error that may occur during the early stages of a project. Following these recommendations can have a significant impact on the avoidance of error throughout the delivery of a project.

Finally, GIRI's technology working group has an ongoing remit to highlight the role that technology can play in identifying and eliminating error. The group meets on a regular basis to share information and discuss the benefits and shortcomings of emerging technologies that are identified as having potential error-reduction applications.

Case study 2

Role of technology – Heathrow cargo tunnel monitoring

The cargo tunnel is an 870m long, critical subsurface link between Heathrow Airport's central terminal area and Terminal 4. It was built in the 1960s and had a partial refurbishment in the 1990s. The current scheme involves a major overhaul to replace multiple life-safety systems, ranging from ventilation to lighting, and retrofitting of a fixed fire-suppression system. Work can only take place between 9pm and 5am and the tunnel must be returned to full service every morning.

As part of the works, there is a focus on digital transformation through the use of digital tools. These include laser scanning to validate existing conditions and minimise design and installation errors, federated

3D BIM models, 4D digital rehearsals, and clash detection to identify issues that needed to be resolved before the project got to site.

Contractor Mace is using Heathrow's Boston Dynamics autonomous self-charging robot dog 'Spot' with a Trimble X7 scanning device to monitor progress on a daily basis, comparing as-built scans with the digital model to check the work that has been done, and look for errors.

Senior project manager Marta Nowotny reported to GIRI members that the project 'had seen real power in early and collaborative decision making and the use of digital technologies to engage with stakeholders and monitor construction quality.'

Case study 3

Encouraging a culture of openness around error – VolkerFitzpatrick lessons-learned application

An app to capture and disseminate lessons learned is helping VolkerFitzpatrick identify trends, share good practice, and develop a culture of openness around error. Its development was driven by a desire to move away from an inefficient paper-based process towards capturing and sharing significant learnings more quickly and in a way that could benefit other projects.

The app was designed to be simple and easy to use both on mobiles and laptops. Issues are divided into those that need to be avoided (errors) and those that should be repeated (good practice). Three text boxes identify the lesson learned, provide details, and explain the implications. Most other fields are tick boxes that help identify the stage of the project lifecycle to which the issue relates, to ensure the lessons learned can be searched effectively.

VolkerFitzpatrick wanted to further build on their culture, which is not just about sharing good practice, but also sharing errors and poor practice so that other projects avoid making the same mistakes. Senior management support was essential to ensure people felt confident about sharing both the good and bad from their projects. A committee was established to review data coming from the app and identify any trends, action improvements and disseminate information promptly.

The benefits of the app are real-time sharing of lessons learned and best practice from a single, easily searchable location, as well as improved information on risk and better project risk registers. It is also helping to further develop a culture that encourages open reporting of issues as well as best practice.

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Case studies provided by GIRI members, on projects where these products or processes are being used, provide valuable insights into how and where they are being applied, and lessons on what might be done to improve outcomes.

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