Building in Quality

A Guide to achieving quality and transparency in design and construction

RICS

CIOB
THE CHARTERED INSTITUTE OF BUILDING

RIBA
Architecture.com

This guide was compiled under guidance from the
Building in Quality Working Group:

Nigel Ostime (Chair), Delivery Director, Hawkins\Brown
Ayo Allu, Managing Director, KLOK Project Management Ltd
Micheal Butcher, Project Manager, McLaren Construction
John Gray, Partner, Head of Production Information, HTA Design LLP
Chris Langdon, Development and Investment Director, Engie
Matt Thompson, Researcher and Writer, Matt Thompson Communications
Cindy Walters, Director, Walters & Cohen Architects

Supported by

David Barnes, Public Affairs Manager, CIOB
Linda Stevens, Head of Client Services, RIBA
Alex Tait, Head of Technical Practice, RIBA
Steven Thompson, Professional Groups Associate Director of the Built Environment, RICS

The Working Group is grateful for the contributions of:

Ann Bentley, Global Board Director, Rider Levett Bucknall
John Cole, Architect, author of the *Report of the Independent Inquiry into the Construction of Edinburgh Schools*
Lanre Gbolade, Senior Product Innovation Manager
Paul Kalkhoven, Head of Technical Design, Foster + Partners
Mike Packham, Managing Director, BWA

Dame Judith Hackitt's independent review of building regulations and fire safety highlights the need for a 'golden thread' of good information that will enable future building owners to better manage their buildings safely. The Quality Tracker extends that notion to the wider objective of achieving long-term quality in our built environment.

Building in Quality
A Guide to achieving quality and transparency in design and construction
Guide to the Quality Tracker

Royal Institute of British Architects (RIBA) with Chartered Institute of Building (CIOB)
and Royal Institution of Chartered Surveyors (RICS)

Contents

Our challenge

This guide summarises the result of more than a year of deliberation and consultation on the issues around the all-too-common shortfall in quality in construction projects and the development of a Quality Tracker to address these issues. In going through that process, a key outcome has been the coming together of the three institutes: RIBA, CIOB and RICS, something that has not happened in this way before. And it is only by working together, collaboratively, that our industry will realise the improvements this initiative is seeking to achieve.

Following the Grenfell Tower fire, the Hackitt Review, and the findings of the Edinburgh Schools Inquiry, there is a clear appetite for improving quality and we hope this toolkit will be a catalyst for that change.

The Quality Tracker will provide a core component of what Dame Judith Hackitt called the 'golden thread' that has been missing to date. We are convinced that projects that implement the tracker from inception to completion will see a step-change in the results achieved.

With its link to the project brief, the tracker will keep the focus of the whole project team on the level of quality being targeted, making it more likely that it will be realized through all the project stages to the eventual built form.

The Quality Tracker is the result of concerted effort by the whole working group but particular thanks go to John Gray of HTA Design, who initiated its format and, along with Chris Langdon of Engie, played a key part in its development. Thanks also to Matt Thompson for his invaluable research and insight and for developing the content of this guide, and to Linda Stevens whose tireless coordination has been essential in its delivery.

This is just the start though. No one we consulted wanted to deliver poor outcomes. But to effect change we need to face up to the enormous challenges in front of us and transform the way we design and procure our buildings. The guide is a call to clients, their professional advisers and the constructors of our buildings to pilot and provide feedback on the toolkit. We will then publish the final version in 2019.

Nigel Ostime
Chair of the RIBA Client Liaison Group and Building in Quality Working Group

Summary

The Building in Quality Working Group, made up of representatives from the RIBA, CIOB and RICS, proposes a digital tool – the Quality Tracker.

It is designed to manage the persistent headline issues highlighted by numerous reported construction and quality failures in housing developments, the Edinburgh Schools Inquiry and the Grenfell Tower fire.

The RIBA, RICS and CIOB are encouraging the construction industry to pilot the Quality Tracker, which is available to download for free,[1] on a representative range of projects and will publish the final version in 2019.

The five reasons for using the Tracker:

1. **Fragmented procurement.** Because of the fragmented nature of building production, with its complex contractual arrangements and the chance that the clients will change pre-completion, there is no consistent method of governance for achieving quality targets from concept to completion.

   Chain of Custody. **The Quality Tracker helps by setting up a chain of custody for passing on the quality baton, thereby establishing a golden thread from inception to first occupation.**

2. **Unpredictable quality outcomes.** The first users – new owners, tenants, asset managers – of a newly built project have no way of detecting whether it has the potential to be of poor long-term quality despite having complied with statutory requirements.

   Golden Thread. **The Quality Tracker passes on professional assessments of the quality of the final building to the first users.**

3. **Undifferentiated aspirations.** Clients who actively strive for good long-term quality outcomes during their projects have limited ways to differentiate their building from buildings owned by clients who are less interested in long-term quality.

   Market advantage. **Clients who adopt the Quality Tracker will demonstrate their commitment to quality.**

4. **Hidden project risk.** Tracking quality for the duration of the project is much harder than tracking time and cost. As a result, professionals, contractors, and suppliers joining a project team must contract with the employer without a clear understanding of the state of the project's quality objectives, if any. Forced to guess, they cannot cost their risk in getting involved accurately.

   Quality risk transparency. **By using the Quality Tracker, clients will give quality equal visibility and significance to time and cost. Because the Quality Tracker tracks quality at every RIBA Work Stage, it can be shared with any party in the supply chain in advance of their joining the project.**

5. **Compromised reputation.** The construction industry's reputation is tarnished by its inability consistently to achieve quality outcomes.

   Better Outcomes and Reputation. **Using the Quality Tracker will incentivise achieving better long-term quality in buildings, which is good for human health, safety, and wellbeing and beneficial from a social, economic and environmental point of view, improving the construction industry's reputation.**

The Working Group also found that the targeting of good long-term quality is difficult because of the lack of evidence and understanding about the processes that lead to high quality outcomes. There is pressing need for research.

The five missing pieces

- **A common definition.** The industry needs a universally agreed definition of quality that encompasses all the beneficial outcomes possible. This will allow it to set targets for quality that all members of the project team understand in the same way and that are meaningful for the users.
- **Better ability to predict future quality.** The industry needs a robust system based on evidence (from the insurance industry as well as practitioners) for predicting quality in advance of completion for all dimensions of quality to be as visible and trackable as cost and programme concerns.
- **Methods of measurement.** The industry needs to be able to measure all dimensions of quality to know what works, what to monitor, and how to assess progress against targets.
- **Benchmarks.** The industry needs comprehensive validated data to produce a full suite of benchmarks to improve quality targeting.
- **Risk control and handling uncertainty.** The industry also needs to understand what the risks to quality are, and how uncertainty affects quality targets, and develop better ways to eliminate or mitigate both.

1. https://www.architecture.com/working-with-an-architect/building-in-quality-pilot

RIBA

This guide – and the digital management tool it introduces – are welcome and timely contributions to possibly the most pressing issue of our day: quality.

While our profession is often dazzlingly successful – and we have the world-wide reputation to prove it – there are also still far too many instances where, for complex reasons, things go wrong.

This realisation is nothing new. Indeed, how to improve quality and value have been important themes for the whole of my working life. However, several recent events, culminating most tragically in the Grenfell Tower fire, have sparked a renewed commitment in all corners of the industry to put things right.

That's why the Building in Quality initiative, led by the RIBA in partnership with the CIOB and the RICS, and agreed at the highest possible level in a Joint Memorandum of Agreement signed in March 2018, is so vitally important.

No client, developer, investor, architect, engineer, cost consultant, contractor or subcontractor actually *wants* to build a poor-quality building. The fact that it happens, however, means that we need to find a way to improve collaboration between our respective professions to let quality flourish.

This guide takes the first step by suggesting a nuanced definition of quality and analysing the dynamics that influence it over the course of a project. It reframes the issue, allowing us properly to anticipate the known unknowns, acknowledge the potential for unknown unknowns, and honestly assess their impact on the quality plan as we go.

We want a common understanding of the quality goals at all stages. We want to facilitate tender pricing certainty and better align design to end-value. We want to communicate clearly how early decisions impact future quality.

Ultimately, we want quality trade-offs to be openly and regularly disclosed all the way through to end users, closing the loop back to the project originator.

This guide analyses how that might be done. It makes new headway into clarifying the issues and spelling out the challenges, and its proposed Quality Tracker offers hope for better-quality outcomes.

We owe it to our clients, investors and, most importantly, the people who live, work and play in our buildings to make it work. I urge you to read the guide and volunteer to pilot the Quality Tracker.

Once and for all, let's build in quality.

Ben Derbyshire
President, RIBA

CIOB

In February 2017, Professor John Cole published a report into the defects that led to the closure of 17 schools in Edinburgh. The guide's publication coincided with declining consumer satisfaction with new homes, which highlighted serious quality failings in the housing sector.

Following the fire at Grenfell Tower in June 2017 that claimed the lives of 72 people it became clear that changes are desperately needed to the way in which construction quality is being managed.

As the professional body responsible for construction management, the Chartered Institute of Building (CIOB) had a duty to respond, and last year we launched a Commission of Past Presidents to investigate the issue of quality in construction.

In the last year, we have undertaken desktop research and gathered evidence from across the industry to identify the main issues and to better understand the behaviours, both individual and corporate, that are promoting or preventing the delivery of quality on construction projects. The factors are far-ranging, from regulations, standards and codes through to education, training and knowledge.

The Commission decided to focus on the need to promote and embed a new quality culture in the industry based on taking pride in the buildings and infrastructure that we create. To achieve this we have identified three key recommendations. The first is to produce a Quality Code that captures best practice and sets the standards expected from the industry. The second is to develop a competency-based quality qualification, which will be available to all, regardless of level or experience. And thirdly we will ensure that quality has a greater emphasis within the CIOB's Education Framework.

In the last year I have spoken to professionals from across the industry, and what is heartening is the recognition of the issues and the urgent need for change. It is why we have committed to working with the RIBA and RICS on the Building in Quality initiative, and I encourage CIOB members and other professionals in the construction industry to support this initiative and work together to build a better industry for the benefit of society.

Paul Nash
Past President, CIOB
Chair of the CIOB Construction
Quality Commission

RICS

Our primary concern at RICS is public safety, particularly for those who live in or use the buildings that we help to develop. Cost is a key priority for our private and public sector clients but should not be pursued at the expense of building in quality.

Business decisions are, of course, usually driven by the numbers, with the time to completion being an important but related area. However, it is not just about the money – we need to take a big-picture view of the whole development process and provide meaningful advice to those same clients, however unwelcome that advice is.

In this respect, chartered surveyors have a particularly important role to play in ensuring that quality is baked into every development. We must make sure that good quality is visible in both the procurement and the selection of suitably qualified contractors. We need to ensure that an appropriate budget allocation allows for quality to be realised from the initial conceptual design right through to the occupied building.

Quality in building should not be considered as simply a 'nice to have'. It should not be allowed to be quietly dropped if other financial pressures come to bear. We need to harness the potential for being able to build in quality to all of the projects that we advise clients on. This is why RICS is happy to endorse and support, alongside our good friends at RIBA and CIOB, this Building in Quality initiative. It builds upon my signing of the Joint Memorandum of Understanding document earlier this year, quite rightly focusing on the issue that is critical to the long-term wellbeing of our industry.

Quality is not just about designing and building to satisfy the rules, provide technical compliance with the brief and meet the budget. That is just the minimum quality standard. True quality goes far beyond that. It needs to be the constant theme that underpins the whole of the project life cycle, running as a golden thread from start to finish.

John Hughes,
President, RICS

History of the BiQ initiative

Fig 1 The Grenfell Tower in the aftermath of the tragic 2017 fire

The Building in Quality (BiQ) initiative grew from the RIBA Client Liaison Group's 2016 *Working with Architects* client survey.[2] It found much to celebrate in how architects are perceived by their clients, but contractor-clients stood out as the least satisfied of all client types, particularly in design and build procurement routes.

Suspecting that the dissatisfaction between architects and contractors went both ways and very likely led to poorer quality outcomes, the RIBA Client Liaison Group decided to address the issue.

In 2017 it set up a Working Group in partnership with the CIOB, aiming to improve the relationship between contractors and architects.

The initiative gained momentum in the wake of the report into the Edinburgh Schools defects and, later, the tragic Grenfell Tower disaster (see below), and grew in scope to

EDINBURGH SCHOOLS AND GRENFELL TOWER

The Edinburgh Schools defects scandal and the Grenfell Tower fire both spawned official inquiries. Their subsequent reports made for uncomfortable reading and are proving very influential.

John Cole's February 2017 *Report of the Independent Inquiry into the Construction of Edinburgh Schools*[3] focused specifically on safety issues arising from poor workmanship and the lack of inspection. He was at pains to emphasise that the problems are merely a symptom of a wider dysfunction in the construction industry. The executive summary concluded:

> 'Frequently clients [under PPP arrangements] have limited direct access to the architects and engineers who design their projects or to any reports they may produce other than through the contractor. Not only does this inevitably impact on the overall design quality achieved, but with these changes the presence of architects and engineers on site has reduced. Increasingly, Clerks of Works and resident engineers are also not being employed to assist in the protection of the quality of construction.'

A year later, Dame Judith Hackitt's final report into the Grenfell Tower fire, *Building a Safer Future. Independent Review of Building Regulations and Fire Safety*[4] recommended a 'very clear model of risk ownership, with clear responsibilities for the client, designer, contractor and owner to demonstrate the delivery and maintenance of safe buildings'. She also called for a 'golden thread' of information to record a transparent audit trail 'all the way through the life cycle of a building from the planning stage to occupation and maintenance'.

Both reports criticised the industry's contractual and organisational systems, and cultural norms, for failing to deliver safe buildings reliably.

If this bare minimum of quality – safety – cannot currently be reached consistently or reliably, how can the industry hope to deliver higher aspirations for built quality?

The RIBA, RICS and CIOB propose a Quality Tracker, which establishes a chain of custody to govern quality from beginning to handover, as the tool to answer this question.

2. https://www.architecture.com/knowledge-and-resources/resources-landing-page/working-with-architects-survey
3. http://www.edinburgh.gov.uk/info/20074/schools/1423/independent_inquiry_into_school_closures_published/1
4. https://www.gov.uk/government/publications/independent-review-of-building-regulations-and-fire-safety-final-report

Fig 2 Oxgangs school, Edinburgh, in the wake of the wall failure

Fig 3 Front cover of Dame Judith Hackitt's report

cover the broader issue of how to achieve quality outcomes in construction. With the RICS joining in, the drive became known as the Building in Quality (BiQ) initiative.

Aware that the hope vested in widespread future change (from alliancing contracts, integrated project insurance, digital technology, design for manufacture and assembly, and so on) is potentially some years off, the RIBA, RICS and CIOB set themselves the urgent task of improving quality outcomes for today's context.

It proposes setting up a chain of custody using a digital tool to monitor 'quality pathways' in a way that is transparent not just to the client and the project team, but also to suppliers hoping to join the project team and to the completed building's users. This will keep quality on the agenda in the way that financial accounts and programmes do for cost and time.

On 7 March 2018, the RIBA, the CIOB and the RICS signed a high-level Joint Memorandum of Understanding for working together to develop this tool. (See Fig 5.)

In the three months that followed, the RIBA Client Liaison Group has consulted the construction industry on a draft Quality Tracker, precipitating a strong cross-disciplinary response that has informed, improved and clarified the final version described in this guide. (See below)

THE INITIAL CONSULTATION PROCESS

The BiQ Working Group put a draft version of the Quality Tracker out for consultation during May 2018 in the form of an online questionnaire. It consisted of eight in-depth questions. Around 120 people responded. Of those, 24 per cent worked for contractors or subcontractors, 20 per cent worked in infrastructure, and 16 per cent worked for firms of architects. 36 per cent had either a qualification in or responsibility for quality management.

Respondents were generally positive or optimistic about the initiative but harboured some significant hesitations.

The main takeaway was that the Quality Tracker was tackling the right issue and was on the right lines, but that the devil was in the detail. The final published version takes these comments into account and is a significant evolution from the consultation version.

The loudest messages were:

- There was confusion about what the tool was tracking – value, quality, risk or what?
- A way to measure quality is a huge missing piece of knowledge.
- There was support for keeping the process simple, but plenty of evidence in responses to indicate that this might be difficult to achieve in practice.
- There was a strong sense that the Quality Tracker needs to be trialled in practice.

Fig 4 The Joint Memorandum of Understanding, signed by the RIBA, RICS and CIOB in March 2018

Fig 5 Ben Derbyshire, RIBA President, flanked by Paul Nash, past-President of the CIOB (left) and John Hughes, RICS President (right), after signing the Joint Memorandum of Understanding.

THE BIQ AGENDA

The critical factors impacting quality during projects which set the agenda for the Quality Tracker are:

Value context

- Unlike programme and cost, there is no universally accepted definition of quality, leading to confusion and neglect.
- Actual experience of quality is not adequately measured or fed back and so the industry does not improve, has incomplete benchmarks, and cannot convincingly justify adequate investment.
- Not all clients' return horizons incentivise investing in long-term quality.

Project management

- Quality targets are not set at the start or adequately communicated across the team for the duration of the project.
- The quality of the end product is not managed consistently for the duration of the project.
- Long-term stakeholders are not involved at the outset.
- Time and cost are more visible, measurable and 'provable' than quality.

Procurement

The nature of procurement is fragmented:

- complex interactions of many different teams with separate liabilities defined by multiple contracts
- different, sometimes conflicting motivations leading to less verification and inspection
- incentives to meet time and cost targets impact potential to achieve quality
- liability and risk are transferred down the supply chain to those least equipped to handle them.

Uncertainty and risk

- Planning permission jeopardy builds in risks and uncertainty, disincentivising early actions that are widely considered to improve long-term quality.
- Construction projects are especially vulnerable to uncertainty, volatility, complexity and ambiguity, which can impact quality objectives.

Skills

- Design team skills in practical buildability and construction technology have declined, with more design left in the hands of subcontractors, with no integrating oversight.
- Subcontractor site operatives' skills have declined.

Scrutiny

- The clerk of works, site supervisor, and/or site inspector roles have declined, meaning that inadequate fire safety or structural work, for example, does not get picked up before it is covered up.
- Design and construction professionals' work is rarely validated in use, hampering their ability to assure quality in the built asset.

Why quality matters

"Achieving all the possible quality outcomes is challenging"

The single word 'quality' in this guide is taken to mean 'good long-term build quality, incorporating good functionality and good impacts'.

This is explored in more detail on page 16.

Quality in buildings is critically important. It isn't just a measure of regulatory compliance or aesthetic appeal, although both are certainly important. Neither is it merely about satisfying clients' briefs so that the building allows them to perform better and contribute more, perhaps, to the national economy. Nor is it just a way to boost the UK construction sector's reputation and market share against international competition.

Since we live out our lives in buildings, quality is also about the greater public good we expect from them to promote human health, safety and wellbeing, be sustainable and address today's many social, cultural, environmental and economic concerns.

The case for public good is strongest in our public buildings, where taxpayer value depends critically on the achievement of long-term quality dividends. Hospital buildings must help to improve our health outcomes, school buildings must boost academic performance, social housing must set the scene for improving life chances all without damaging the environment or detracting from a sense of place or becoming obsolete before the end of their planned lives.

None of these outcomes is trivial. Achieving them all is challenging.

HOW HAS THE INDUSTRY ADDRESSED QUALITY?

Over the years there have been many efforts to improve quality in construction. The fact that the issue has resisted a convincing solution suggests that it is unlikely to be solved easily.

Report after report has denounced the industry's poor performance and suggested cures. The Latham Report (Constructing the Team, 1994)[5] criticised the industry for being ineffective, adversarial, fragmented and incapable of delivering for its customers. The Egan Report (Rethinking Construction, 1998)[6] repeated many of those messages, calling for a quality-driven agenda and integrated processes and teams, among other things.

By the time the UK government published its Construction Strategy in 2011,[7] it estimated that public procurement was so wasteful that efficiency savings of between 15 and 20 per cent were possible. While not a direct indicator of quality, this level of waste nonetheless must erode it.

Most recently, the 2017 Construction Sector Deal,[8] more optimistic in tone, is targeting better homes that are cheaper to run; smarter and safer buildings; and lower emissions and cleaner air. All these issues are facets of quality.

Fig 6 Good team outcomes start with mutual understanding.

5. http://constructingexcellence.org.uk/resources/constructing-the-team-the-latham-report/
6. http://constructingexcellence.org.uk/resources/rethinking-construction-the-egan-report/
7. https://www.gov.uk/government/publications/government-construction-strategy
8. https://www.gov.uk/government/publications/construction-sector-deal/construction-sector-deal

"Even the minimum standard of regulatory compliance is far from guaranteed"

THE ARCHITECT *Cindy Walters*

Cindy Walters of Walters & Cohen Architects is co-director of a small London-based architectural practice. With many years' experience of many different procurement routes working in the public and private sectors, she has good insights into the issue of quality. She has recently started a PhD looking at how to harness the research architects carry out in practice, and is a member of the BiQ Working Group.

For her, quality is of fundamental importance to the built environment, and its apparent erosion in modern procurement practice is, as she puts it, 'an existential threat' to the architectural profession.

Among the greatest challenges to quality, she feels, is in achieving legacy quality, which tends to be decided at the front end of projects. A key point she raises is the uncertainty injected by the UK's planning system.

The problem revolves around the time spent on the planning application and developers' motivation to invest in sufficient detail at that stage.

The jeopardy around planning – will it be granted, won't it be granted, and what compromises will the planning authority insist on? – naturally enough encourages developers to invest less upfront. When the permission comes through, however, the clock starts ticking and the client wants to build yesterday.

Somewhere in the maelstrom, the time needed to fully work through the design for regulatory compliance and functional efficiency gets lost, setting the project off on an uneven path towards quality. This is deeply frustrating for an architect committed to doing the opposite. 'How do you explain that it is better to spend money up front? It's quite hard.'

Walters draws a comparison with the introduction of the CDM Regulations and the greater focus on health and safety, and even the evolving interest in BREEAM. 'We never used to talk about health and safety or environmental issues but now they are embedded. We go through checklists every meeting or so to check against your set of defined objectives. Endorsed by industry, trialled by some key construction professionals to demonstrate its value: that's exactly what the outcome of the BiQ initiative and Quality Tracker should be.'

She sees the Tracker as a way to put a marker down at the start of any project and for keeping quality on the agenda at every stage of the development process. 'Giving quality due prominence is not about gold taps. It sets the tone for the project. The idea that you can cut corners on quality and somehow benefit in terms of time and money is misguided. You need all three.'

Different kinds of quality

Minimum quality

Taking your eye off the quality ball can have serious impacts not just for the client but for the building's users and the local community as a whole. Indeed, the possibility of below-par buildings poses a wider socio-economic, environmental and cultural threat that is part of the justification for the legislation that controls planning, health and safety, and building.

A built asset that complies with legislation is the minimum quality standard. Unfortunately, as the inquiry into the Edinburgh schools defects shows, even this minimum standard is far from guaranteed.

Beyond that, parties to construction project teams have different understandings about what is meant by quality. These understandings tend to fall into two loose but equally important categories.

Legacy quality

Legacy quality is the building's fitness for purpose, functionality, health and safety, aesthetics, flexibility, sustainability, resilience, social value, ability to promote human wellbeing, and so on. It is evidenced only after the passage of time, and is largely in the hands of the client's designers, engineers and consultants. This is what John Cole, author of the official inquiry into the Edinburgh Schools defects, describes as the 'what' of quality (see 'The public client' text box on page 15).

"As designers hand over to builders, there is a potential discontinuity that can reduce quality"

Build quality

Build quality is understood to be workmanship and materials as evidenced physically in the completed building, and is largely in the hands of the client's contractors, subcontractors and their supply chains. John Cole describes it as the 'how' of quality.

As the designers hand over to the builders, there is a potential discontinuity that can reduce quality. They are differently motivated under their respective contracts, especially under design and build forms, restricting them from taking a more unified approach to quality even if they wanted to.

The value of quality

It does not necessarily follow that higher quality means more cost, but this is often the case. High-quality builds and designs can require extra care, which adds time, which in turn adds cost. Sometimes they require greater competence, experience or craftsmanship, which again adds cost and, being in short supply, delay. Higher-quality materials, equipment and systems tend to cost more, too.

Clients with a long-term stake in the building and whose capital and operating cost centres are adequately linked are more willing to incur this extra cost. This is in the expectation that it will pay off over time in cheaper running costs, easier maintenance, better staff productivity, greater footfall, more flexibility, or whatever their measure of long-term success is.

On the other hand, clients who sell on completion and whose main, perfectly legitimate purpose is making profits have no such incentive.

Parties looking to buy, rent, invest in or manage new assets have no sure way to know what kind of building they are looking at.

"Clients who sell on completion have no incentive to invest in long-term quality"

BUSINESS AS USUAL – HOW QUALITY IS MANAGED TODAY

Clients currently manage quality in a variety of ways:

The brief

Quality targets are documented in the brief (see, for example, the RIBA's Briefing Toolkit).[9] At the early stages, its content is fluid, gradually becoming more concrete as the business case develops and options are appraised iteratively. Briefs are the standard mechanism for capturing the client's requirements.

Design champions

Design champions are sometimes appointed by the client from within their organisation to represent their interests and ensure a construction project reaches the quality they need or want. Their role is to define the quality vision and articulate it clearly in the brief and to the consultant team. Thereafter, their role is to monitor and evaluate design quality during the design process.

Client advisers

Client advisers are independent professionals qualified to help inexperienced clients in identifying and achieving their desired project outcomes. Their role is very similar to that of a design champion, although the scope of their services can extend beyond just the design phase. The RIBA holds a register of accredited Client Advisers.[10]

Site inspectors or clerks of works

Appointed by the client, site inspectors or clerks of works regularly inspect the quality of workmanship to give an independent ongoing assessment of progress on site. Over recent years they have been less and less frequently employed on the grounds that they are duplicating a role that the contractor should be fulfilling anyway. However, their use has recently been mandated for use on all public construction projects in Scotland as a direct consequence of the inquiry into the Edinburgh schools defects.

9. https://www.architecture.com/knowledge-and-resources/resources-landing-page/briefing-template-and-tracker
10. https://www.architecture.com/working-with-an-architect/client-adviser

Quality management

Capable of being third-party certificated to an international standard, the process of quality management includes planning, control, assurance and improvement of outputs. While it helps an organisation to produce, maintain and improve the quality of its outputs, it is not necessarily applicable to a team of different organisations working together on a single one-off output.

Value management or value engineering

Value management is a collaborative technique used to define the client's objectives to ensure value for money. Since it addresses value, it also addresses quality.

Although often vilified as an excuse for cost-cutting, that is not its purpose. As the Housing Forum's 2018 Stopping Building Failures report[11] says, provided the process is conducted transparently from Stage 0 or 1, the process promotes collaboration and communicates the project's objectives, needs and critical issues. With a strong understanding from day one, designs are likely to be better aligned to the business case.

OGC gateways

The Office of Government Commerce (OGC, once part of HM Treasury) Gateway Review Process was a whole system of management checks and balances that came with supporting guidance, now archived.

One of those guidance documents was *Achieving Excellence Guide 9 – Design Quality*.[12] It advocates 'gateways' – decision points at which design quality is assessed. While it does not shed light on how to assess quality, it includes several pieces of advice for consideration at different stages of a project.

> 'High quality design does not have to be expensive, but the client must commit to a clear budget and ensure that designers know what this is. Late changes to the budget have a much greater effect on the design quality than early changes.'

> 'Sufficient time must be allowed for all stakeholders including the design members of the integrated project team to work through their ideas, communicate with the rest of the team and provide maximum added value.'

> 'Design quality does not stop being an issue during construction… The project sponsor and the design champion must find a way that fits with the procurement route being used, to maintain contact with ongoing design solutions and how well they interpret the project requirements.'

Industry schemes

Industry bodies have produced various schemes over the years to boost the chances of improving quality outcomes. They are criticised for failing to link adequately to those building the project.

Design Quality Indicators

The most well-known scheme, Design Quality Indicators (DQI), is owned by the Construction Industry Council. Used on hundreds of mostly large public projects since its inception in 2002, it is a facilitated process that 'enables every aspect of design quality to be assessed at each stage of the construction process, from inception to post occupancy analysis'.[13]

The recent Procuring for Value report (2018) from the Construction Leadership Council advocates it as a tool for measuring value.[14]

Balanced scorecard

The balanced scorecard is a quality management system that gives matters that are difficult to evaluate – such as social value - due weight in any performance assessment so that they may be balanced against matters that are more easily evaluated, such as cost.

The UK's Cabinet Office encourages its use on public projects of more than £10m.[15]

Other schemes

Other schemes include the Housing Quality Indicators, the Achieving Excellence in Design Evaluation Toolkit (AEDET, used in healthcare buildings) and the Design Excellence Evaluation Process (DEEP, used by the Ministry of Defence).

11. http://www.housingforum.org.uk/news/view?id=160
12. http://webarchive.nationalarchives.gov.uk/20110802161417/http://www.ogc.gov.uk/documents/CP0069AEGuide9.pdf
13. http://cic.org.uk/services/the-design-quality-indicator-dqi.php
14. http://www.constructionleadershipcouncil.co.uk/news/procuring-for-value/
15. https://www.gov.uk/government/news/launch-of-the-procuring-for-growth-balanced-scorecard

The need for validation

Many projects have been very successful at delivering extraordinarily complex buildings that meet the client's quality targets. The opposite can also be said.

Despite the importance of quality, the majority of construction project teams do not follow up to confirm that they have achieved their quality goals. This means that their outputs are rarely calibrated in the light of validated evidence. It also means that there is no database upon which to set benchmarks.

Even when post-occupancy evaluations and user satisfaction surveys are used, the findings tend to be kept confidential, meaning that the lessons cannot be learnt by the industry as a whole.

In short, a large part of our evidence about what causes quality is speculative, circumstantial and indirect. This makes it difficult to set meaningful targets for quality or to know how to monitor progress against targets.

"A large part of our evidence about what causes quality is speculative, circumstantial and indirect"

Evidence of a systemic issue

The Edinburgh Schools building failures lend credence to the theory that the general situation is considerably worse than it appears at first sight.

Evidence in 2016 of just one building failure at the Oxgangs Primary School raised suspicions that many schools would be similarly affected. Of the 154 properties assessed during the subsequent inquiry, 17 were found to have similar defects to those identified at Oxgangs.

On the face of it a problem of workmanship and lack of inspection, these failures were not an anomaly – they were a symptom of a greater problem.

John Cole's 2017 inquiry report[16] found that the work was not down to just one contractor or one team but involved many different, unrelated contractors. This implicates the system as a whole for failing to take adequate responsibility for getting the right outcomes. Any solution must go back up the value chain all the way to the client – and possibly beyond. As a result of the inquiry, for example, site inspection on public projects is now mandated by the Scottish government.[17]

Fig 7 John Cole's Edinburgh Schools report uncovered evidence of systemic causes for building failures in a large number of public buildings.

Data from insurers

Achieving quality is at least in part a function of how well project teams work together. Unfortunately, despite lots of stories indicating the existence of problems in these relationships, we don't know what or how extensive they are and thus the overall size or shape of the issues remains hidden.

Insurers have some of this data. Their involvement in legal disputes and claims during construction projects allows them to assess their risks and to set premiums at appropriate levels. Despite being paid for, ultimately, by their construction industry clients, insurers keep this data private.

The RIBA, RICS and CIOB hope that the BiQ initiative (and others like it) will encourage a step-change in transparency and information-sharing from insurers.

A 2018 report from the Housing Forum, *Stopping Building Failures: how a collaborative approach can improve quality and workmanship*,[18] reported evidence from warranty provider BLP suggesting that 90% of defects in housing are attributed to poor workmanship. It noted, however, that the design professions must also shoulder some of the blame in the form of unbuildable designs and drawings which site operatives find difficult to interpret, which again points to a systemic problem.

Global building design and management consultancy Arcadis produces a yearly *Global Construction Disputes Report*[19] informed by data off its own books. It has consistently

16. http://www.edinburgh.gov.uk/news/article/2245/independent_report_into_school_closures_published
17. https://www.gov.scot/Topics/Government/Procurement/policy/SPPNSSPANS/ScottishProcurementConstructionPolicyNotes/CPN01-2017
18. http://www.housingforum.org.uk/news/view?id=157&x[0]=news/list
19. https://www.arcadis.com/en/united-states/our-perspectives/global-construction-disputes-report-avoiding-the-same-pitfalls/

THE PUBLIC CLIENT *John Cole*

John Cole is a prominent expert in the field of quality management. An architect by training, he has vast experience on the client side commissioning healthcare buildings. He also led the influential inquiry into the Edinburgh schools defects, where evidence from one poorly executed wall collapsing at a primary school raised suspicions about the quality of building work in many other schools and other public buildings. These suspicions were confirmed, and Cole's 2017 report laid bare the root causes.

His experience gives him unique insights into the whole question of how to achieve quality in construction. While allowing that the topic is immensely complex, his central thesis is a common-sense project management one, structured around a useful definition of quality that splits it into the 'what' and the 'how' of a building, what we in this report call legacy quality and build quality. In his analysis, the 'how' should never compromise the 'what'.

As he says, 'You need to know in advance what quality you're aiming for in relation to the overall design quality, the quality of materials used and the quality of construction in the use of those materials. In many of the problematic buildings that I've looked at, that has been an underlying factor – clients haven't invested the necessary time and resource to fully understand what outcome they want from a project and clearly describe that outcome. If you don't know where you're going, you won't know if you haven't got there.'

Clients should spend more time defining what good quality looks like and, since some clients are relatively uninformed, they will require qualified professionals to facilitate this process. Thereafter, he feels, there needs to be ongoing dialogue between the real client and the design team, with design reviews held at pre-set milestones to confirm that the required defined quality is being delivered. Secondly clients should provide for the necessary professional and site inspection oversight to ensure that the work as executed on site complies with the specified quality and statutory requirements.

He is concerned that this regularly does not happen in a design and build environment. "Evidence has shown that contractors frequently do not want architects or other design team members influencing the real client in relation to design decisions that, for commercial reasons, the contractors may not want to implement. Also, contractors do not inspect the quality of construction work on site. This leaves many clients exposed."

Despite the primacy of the 'what', he is quick to point out that the 'how' is extraordinarily important, and indeed regrets architects' loss of expertise in this area, which he puts down to pressure on fees, education and acceding to forms of procurement that exclude them from gaining essential knowledge and experience by regular attendance on site.

A skills shortage is even more in evidence in the traditional trades that constitute the construction workforce, a situation that threatens the ability of the industry to deliver quality and which is exacerbated by a lack of adequate supervision and inspection by the management teams in contracting organisations.

A further risk to quality is the increasing delegation of significant elements of the design to subcontractors. Such designs are frequently developed and built without appropriate coordinating control from the original design team. It is in the boundaries between such work packages where most problems are found.

One of several positive outcomes from his Edinburgh Schools Inquiry is that the Scottish government has issued guidance to all client bodies in Scotland requiring them to provide for adequate professional independent scrutiny, including where appropriate the appointment of clerks of works for all public projects.

For these reasons, Cole fully endorses the chain of custody concept at the heart of the BiQ initiative. 'Any model such as the Quality Tracker that facilitates that process has got to be beneficial to the industry. Call it the baton pass, or the golden thread – the integrity of the design intent must be protected through the construction process and building life. We need to speak the same language, understand what we mean by quality and invest in those processes that both define it and help ensure its delivery.'

"The integrity of the design intent must be protected through the construction process and building life"

"Three-quarters of CIOB survey respondents believe the current management of quality is inadequate, with cost overriding quality concerns"

identified a failure to administer contracts properly, a failure to understand contractual obligations, and incomplete design information or employer requirements as among the top causes of disputes.

In the summary of their 2015 report they say, 'One cannot ignore the dynamic of client organisations driving faster-paced programs to deliver their assets, which can cause increased risks and possible shortcuts in delivery. There is an interesting link here with the fact that projects with disputes tend to be late and over budget, with issues of compromised quality and scope for clients.'[20]

Data from the industry

The lack of evidence has frustrated the All Party Parliamentary Group (APPG) for Excellence in the Built Environment from the Commission of Inquiry into the Quality and Workmanship of New Housing in England.

Their 2016 report *More Homes, Fewer Complaints*[21] relied on data from the Home Builders Federation's annual *National New Homes Survey*. It inferred a decline in quality in recent years based on homeowner satisfaction surveys. Satisfaction dipped from 90% in 2014 to 86% in the 2015 survey, which equates to around 15,500 homebuyers who were not satisfied. The APPG deemed this 'unacceptable' and concluded that the main problems were workmanship and lack of inspection.

The CIOB set up a Construction Quality Commission in 2017 to ask contractors (including CIOB members) how quality in construction projects is currently managed. Their survey found that three-quarters of respondents believe the industry's current management of quality is inadequate, with a focus on cost overriding quality concerns.[22]

Representing the smaller end of the contractor market, the Federation of Master Builders recently addressed the 'prevalence of rogue and incompetent builders, and wider concerns about standards, regulation and compliance within the industry'. Its report, *Licence to build: a pathway to licencing UK construction* (2018)[23] sets out the case, heavily endorsed by its members, for a licensing scheme to increase quality and standards across the whole industry.

The Get it Right Initiative[24] is a group of industry experts, organisations and businesses invested in reducing avoidable errors and improving the UK construction industry. Targeting skills development, it is responding to the evidence of waste in the industry, closely related to improving quality outcomes.

What is quality?

There is no universally agreed definition of quality. This can lead to confusion and conflict. Without clarification, there is huge potential for people on the same team to misunderstand each other.

Everyone agrees that quality means regulatory compliance at the very least. Thereafter, it depends on your perspective.

"Having no universally agreed definition of quality leads to confusion and conflict"

Quality can just mean 'conformance to specification' or 'freedom from deficiencies.' [25]

However, it can go much further to mean 'added features which provide customer satisfaction', or, more often, 'meeting customer needs in the context of a strategic business plan'.

The differences for the client are substantive, depending on their return horizon.

Existing definitions

The ISO 9000 family of internationally agreed quality management standards define quality as 'a set of inherent characteristics [in this instance, of a built asset] that fulfils requirements'.[26]

When it comes to assets that have to secure planning consent, the requirements in question go beyond what the client wants to include those imposed by the relevant local authority (to protect the interests of the local community).

Moreover, if the project engages the services of professionals, their duty is wider still. Their professional code of conduct means that they have a duty to consider the impact of a project on people and the environment, which extends the scope of the term 'requirements' to include social value and human wellbeing generally.

The Commission for Architecture and the Built Environment (CABE, subsumed into the Design Council in 2011) based its definition[27] of quality on the three Vitruvian principles, rewording them slightly:

1. functionality – does it work?
2. firmness – will it last?
3. delight – does it look good?

20. https://www.arcadis.com/en/united-kingdom/our-perspectives/construction-disputes-rise-in-value-over-60-percent-to51million/
21. https://policy.ciob.org/resources/appg-excellence-built-environment-homes-fewer-complaints/
22. https://www.ciob.org/campaigns/construction-quality-commission
23. https://www.fmb.org.uk/about-the-fmb/policy-and-public-affairs/quality-and-professionalism/

"To survive intact, quality must be indelibly and clearly baked into the construction drawings and specification, and not subject to uninformed variation"

This was reworked by the Construction Industry Council's Design Quality Indicators (DQI),[28] widening the scope in useful ways:

1. build quality (performance of the completed asset);
2. functionality (how useful the asset is in achieving its purpose); and
3. impact (how well the asset creates a sense of place).

The BiQ definition

The BiQ Working Group thought that the DQI definition was more appropriate to the unique circumstances of the construction industry and adopted it for the BiQ initiative, updating the definition of 'impact' to mean 'how well the asset adds social, economic, cultural, and environmental value and improves human wellbeing'.

BIQ'S THREE DIMENSIONS OF QUALITY:

1. **Build quality** (performance of the completed asset)
2. **Functionality** (how useful the asset is in achieving its purpose)
3. **Impact** (how well the asset adds social, economic, cultural, and environmental value and improves human wellbeing)

Quality from whose point of view?

There are several different overlapping quality systems at play during construction projects, including the project management quality, individual project team members' service quality, technical quality of their output, the supply chain's quality of materials, and the project team's performance quality.

While it is difficult to disentangle them, the focus of this initiative is on the long-term quality of the built asset as experienced by the people who buy, use or manage it.

We are especially interested in the users' – i.e. after completion, the asset's new owners, tenants and asset managers – experience of the asset.

Quality dynamics

The three dimensions of quality may typically only be considered during different windows of opportunity.

At the start of a project, it is very difficult to pay much heed to build quality whereas it is the best moment to focus on impact and functionality. As the project goes out to tender, there is virtually no opportunity to develop functionality or impact but these qualities can be eroded in translating the design into a building. To survive intact, they must be indelibly and clearly baked into the construction drawings and specification, and not subject to uninformed variation.

Architects suspect that contractors sometimes do not understand their design intent. Contractors encounter architectural drawings that cannot be built. Specifications increasingly leave the design to subcontractors. This suggests that legacy value, the 'what' of quality, is not always successfully baked in, leaving the project vulnerable to poorer quality outcomes.

It is likely that these problems arise because the window of opportunity for considering build quality does not always overlap to any great extent with functionality and impact.

Since impact and functionality must be considered early to make the business case and secure planning permission, the solution probably lies in involving contractors earlier (see Fig 8).

Long-term, changes in procurement – alliancing contracts, integrated project insurance, DfMA, and so on – will help to make this possible.

"The solution probably lies in involving contractors earlier"

For the time being, there is no solution. The BiQ initiative is trying to bridge the gap.

"The focus of the BiQ is on the long-term quality of the built asset as experienced by users"

24. https://getitright.uk.com/
25. https://www.iso.org/iso-9001-quality-management.html
26. For example, https://oqrmmodel.wordpress.com/2013/02/14/iso-9000s-definition-of-quality/
27. http://webarchive.nationalarchives.gov.uk/20110118130418/http://www.cabe.org.uk/buildings/good-design
28. http://www.dqi.org.uk/howdoesdqiwork.php

THE CONTRACTOR *Micheal Butcher*

Micheal Butcher, Project Manager with McLaren Construction, is a member of the BiQ Working Group and contributed to the CIOB's Past Presidents' Quality Commission Working Group discussion. With extensive experience of managing commercial and residential construction projects in and around London, he is very alert to the quality challenges facing the industry.

For him, quality means two things: meeting the client's requirements and, even before that, meeting minimum standards. While he thinks that contractors can add significantly to the quest for quality, especially if they are involved early enough, he can't help reflecting on recent high-profile building failures. 'The fact that people's lives are in our hands is not taken seriously enough. I'd like to think that the problems are created by the minority, but the chances are that they're deeply embedded in a culture that puts time and profit first.'

He sees plenty of pinch points strangling quality along the procurement process, from a dilution of skills and a drastic reduction in the amount of inspection on site, to the inadequate communication of construction information and the sheer information overload.

The root cause of these issues is twofold. First, whether it is the contractor, subcontractor, architect, product manufacturer, approved inspector or almost anyone else involved in the process, they are commercially driven to push the boundaries or accept compromises. 'It's always because someone in good faith is trying to squeeze out a little more profit, make the industry leaner or look for efficiencies. At a certain stage a tipping point is breached.'

Second, many clients, especially one-off or inexperienced ones, either don't understand the risks that arise from their decisions or don't fully appreciate their severity. This isn't to apportion blame. It is merely an observation based on experience. He gives the example of assessing the suitability of contractors. 'Many contractors are perfectly competent but must be selected based on suitability instead of price. Not everybody could have built the Shard, and yet sometimes that approach is taken on schemes.'

The seeds of poor quality are planted at feasibility stage. For example, the client, perhaps because planning permission has yet to be granted or because the funders haven't yet signed on the dotted line, might push the architects to slash their fees to minimise their financial exposure. 'The architect wants to win the job and so they'll remain competitive by reducing their scope of services. What the client doesn't understand is that that comparatively small reduction in fees starts a spiral of negative impacts that can never be recovered.'

He thinks the Quality Tracker has huge potential to improve outcomes. Its main benefit is to make the consequences of various client decisions more immediately apparent. Indeed, the message conveyed simply by using it is perhaps more important even than its content. He warns, though, that it will only work if the industry uses and keeps improving it.

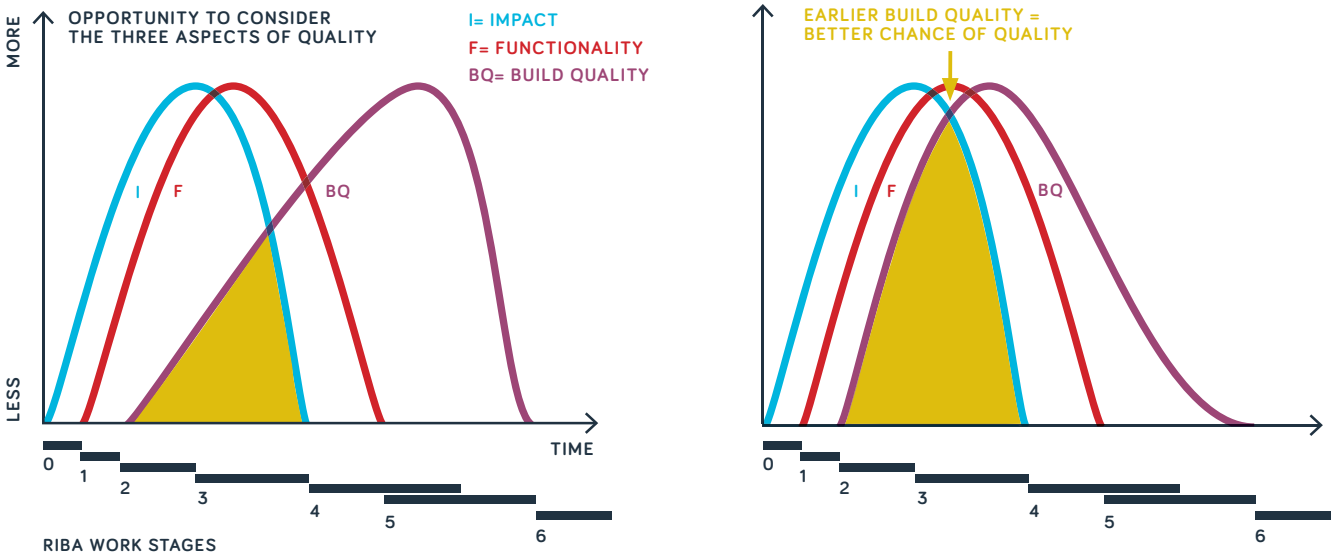

Fig 8 The opportunity to consider impact and functionality fades after the early stages of the project, especially in design and build procurement. Once codified in production drawings and the specification, the focus shifts as the baton is passed on and build quality takes centre stage.

We can hypothesise that if there was more overlap in the opportunity to consider the three aspects of quality (right-hand graph), the chances of achieving good quality outcomes would be improved.

"What the client doesn't understand is that a comparatively small reduction in fees starts a spiral of negative impacts that can never be recovered"

Quality must be predicted

Except in repeatable, factory-made buildings which have been fine-tuned through prototyping and user feedback, quality can usually only be experienced and confirmed *after* the project team has been disbanded. This makes the project team's efforts to achieve quality a matter of prediction rather than fact.

The earlier on in the process, the less validated evidence there is to back up predictions of future quality. In these earlier design stages, teams currently depend on their training and experience to optimise the likelihood of achieving quality. While clients are reportedly very satisfied with this service,[29] by definition it cannot be validated in the light of evidence from use.

The causal link between what is commissioned, what is designed, what is built and what quality benefits ensue is not well understood. This is recognised in the 'Soft Landings'[30] approach to the design, build and commissioning of building services, which is a direct response to the widely reported performance gap between what was intended in the design and what the occupier actually experiences in practice.

Uncertainty limits quality assurance

The quality experienced by the users is only partly the result of the project team's combined professional competence, experience and skills. There are many other influential factors at play beyond the control of the project team; some during the project, others after it is complete.

These factors share one common characteristic: uncertainty.

During the project, it can, for example, run out of funding; encounter labour or skills shortages; underlying economic conditions can render it unviable; force majeure shocks can cause problems, and so on.

After completion and handover, the users can fail to use or maintain the asset as designed, and their ability to care for it may be at the mercy of many socio-economic forces.

Because so much is out of the project team's hands, they can only optimise the likelihood of achieving quality, not guarantee it. (See Fig 9.)

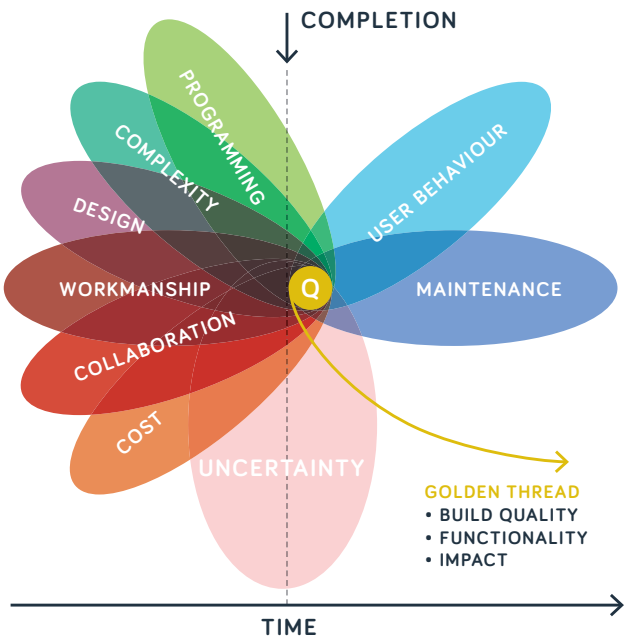

Fig 9 While professionals on project teams control many factors that affect the quality of an asset, these factors are all at the mercy of uncontrollable influences such as uncertainty, the effects of which can strike at any time, and future user behaviour and maintenance regimes, both of which will only kick in after completion. On top of that, not all of the professionals' techniques for achieving quality are validated and so their effect after completion is not assured. The likelihood and impact of these risks can be assessed and mitigated, though, if time and resource is given to undertake that task. As with most issues related to quality, the client and the designers must recognise the challenge and decide to manage it.

29. https://www.architecture.com/knowledge-and-resources/resources-landing-page/working-with-architects-survey
30. https://www.bsria.co.uk/services/design/soft-landings/

"It's not about how much quality you can afford, it's about building the right thing"

THE DELIVERY ARCHITECT *Paul Kalkhoven*

Paul Kalkhoven is Head of Technical Design at Foster + Partners, leading the team that reviews projects in the pre-construction stages to maintain and improve technical design standards. In that sense he is the construction quality focus, ensuring that design intentions are properly championed and communicated to the contractor.

For him, the full definition of quality is very wide, but boils down to making buildings that are suited to human beings, respectful of their environment and context, and that bring pleasure and delight. But achieving that is complex. 'Buildings have to do a lot of things for a lot of people for a long time. There is never just one answer.'

Nonetheless, the possibilities do need to be optimised and reduced to a single design codified in production information, and that's the role of architects. Their vision must be capable of being built. 'It is the building that does the talking. You can't say "I had a lovely design but it was messed up along the way." Depending on contractual arrangements, you need to have a way to see it through.'

He sees quality in the context of the overarching value equation. 'There is a lot of money involved, and in the end one has to make sure that the investment meets the brief. Cost and quality can fight each other but it really shouldn't be like that. It's not about how much quality you can afford, it's about building the right thing.' Quality is often a 'soft target', its weakness being that it is difficult to quantify. That is where the Quality Tracker can help.

He thinks that many of today's procurement mechanisms are incentivising parties to cut cost at the expense of quality. He points in particular to the situation where there is no supervision or inspection of site operatives. 'For parties to be effectively self-certifying and then having the incentive to save money is not a happy combination.'

The advantage of the Quality Tracker is that it helps to raise the quality issues early, helps to achieve consensus across teams and potentially identifies quality issues to clients. He sees it having particular value in educating not just the client but younger members of project teams, too. 'Since most people don't carry out that many contracts during their professional careers, one's personal practice is built on comparatively little experience. The Quality Tracker will nudge that in the right direction, allowing best practice to pass on and filter through.'

In summary

Five headline problems

Despite the long history of grappling with the issue of how to achieve quality in the built environment, five problems persist.

1. **Fragmented procurement.** Because of the fragmented nature of building production, with its complex contractual arrangements and the chance that the clients will change pre-completion, there is no consistent method of governance for achieving quality targets from concept to completion.
2. **Unpredictable quality outcomes.** The building's new users have no way of detecting whether newly built projects have the potential to be of poor long-term quality despite the building having met planning conditions, complied with regulations and secured building regulations approval. Because of the hidden history of their production, ostensibly comparable buildings can in fact have significantly different chances of achieving long-term quality.
3. **Undifferentiated aspirations.** Clients who actively strive for good long-term quality outcomes during their projects have limited ways to differentiate their building from buildings owned by clients who are less interested in long-term quality.

THE FACILITIES MANAGER *Mike Packham*

Mike Packham is the Managing Director of BWA, a consultancy specialising in construction, real estate and facilities management. He is a chartered quantity surveyor, qualified property developer and project manager, and although he is now in charge of the facilities management side of their business, he has worked with clients at every stage of the building life cycle.

Inevitably, his understanding of quality is tightly focused on the end user. This isn't just about technical issues such as how the heating and air-conditioning work. It's about how the building supports the occupying organisation's grander purpose. In general, he thinks design and delivery teams could do better. 'I genuinely believe that contractors, architects, engineers – the whole team – don't get it. They insist on doing things that simply store up problems for facilities managers.'

Packham does, however, concede that getting quality right from a facilities manager's (FM) point of view is far from easy. Assets are often designed without a known end user, and even then a building must be capable of some flexibility to accommodate changes in ownership and use over time. He also acknowledges that design teams can't be expected to listen if there is nobody to listen to. To that end, he wishes that more projects adopted the Soft Landings approach, which facilitates early discussions with end users. A balance must be struck, though. 'Even if you get the FMs involved upfront, you don't want to make the building too bespoke if it's a leased building, for example. The best-fit building will no longer be best-fit once a new occupier comes in.'

As a chartered surveyor, he's frustrated that quality is so resistant to comprehensive measurement, making it hard for different parts of the project team to speak the same language. 'I'm always keen on reducing the answer to numbers, and we don't really have the numbers that define quality or the impact that has on the productivity of the organisation. If we haven't got the information – and we're certainly not collecting it as thoroughly as we should be – then we can't assess quality.'

He supports the Building in Quality initiative and the Quality Tracker's risk management methodology. Provided the client empowers quality custodians to be honest when they use it then he thinks it will help to mitigate quality risks. 'There's value to it if it enables project teams to think about the issues they are imposing and their downsides. Anything that helps to emphasise the quality of the end product and maintains initial quality targets will be supported by FMs.'

4. **Hidden project risk.** Clients' time and cost considerations can block out quality ones to the detriment of their ultimate objectives simply because they lose sight of quality or because it is so hard to see. Even with the help of the various schemes outlined above, tracking quality for the duration of the project is much harder than tracking time and cost. This also means that professionals, contractors, suppliers and other consultants joining a project team must contract with the employer without a clear understanding of the state of the project's quality objectives, if any. Forced to guess, they cannot cost their risk in getting involved accurately.
5. **Compromised reputation.** The construction industry's reputation is tarnished by its inability consistently to achieve quality outcomes, with associated problems of loss of trust among clients and the wider public.

Five missing pieces

We hypothesise that the target of good long-term quality is difficult because of the lack of evidence and understanding about the processes that lead to quality outcomes. We currently lack:

1. **A common definition.** While there have been many attempts, there is no universally agreed definition of quality. The industry needs one that encompasses all the beneficial outcomes possible. This will allow it to set targets for quality that all members of the project team understand in the same way and that are meaningful for the users.

"The more conversations there are, the more quality expectations will rise up the agenda"

2. **Better ability to predict future quality.** Although project teams can aim for high quality, it is very unclear whether they are successful, with a widely reported gap between design intentions and performance in use in the few instances where verification is attempted. Especially early on in a project, assessments of future quality depend on professional consultant predictions based on a few validated methodologies and many unverified rules of thumb. These are less convincing than easy-to-see cost and programme concerns. The industry needs a robust system based on evidence for predicting quality in advance of completion for all dimensions of quality to gain equal visibility.
3. **Methods of measurement.** We need to be able to measure all dimensions of quality to know what works, what to monitor and how to assess progress against targets. Currently, we don't always know with confidence what built characteristics contribute to impact quality, for example, and so we don't know what to monitor or how to assess progress against those kinds of target.
4. **Benchmarks.** We need comprehensive, validated data to produce a full suite of benchmarks to improve quality targeting.
5. **Risk control and handling uncertainty.** We need to understand what the quality risks are, how uncertainty affects quality targets, and better ways to eliminate or mitigate both.

THE DEVELOPER *Chris Langdon*

A chartered surveyor and valuer by training with a background in local authority regeneration and wide development experience with several well-known contractors and developers, Chris Langdon is currently Development and Investment Director for Engie. A committed member of the BiQ Working Group, he has a sharp long-term investment-focused perspective on the question of sustainability and quality in the built environment.

For him, developers are too often focused on the short term. 'Quality in construction is generally used to refer to workmanship and materials as visible, tangible outcomes that purchasers and investors see and touch. I think this is a somewhat limited use of the word.'

He would rather they had longer-term investment horizons where it made sense to talk about the lasting qualities of buildings beyond completion, what in this guide is called legacy quality.

In common with several contributors to the BiQ initiative, he sees these different dimensions of quality as holding instant potential for conflict. As he puts it, 'That decoupling of quality and value moves the goalposts from brief to procurement and is divisive. The quality indicators don't survive. By the time you've got a bit down the road, the project is increasingly driven by cost.'

He implicates our delivery mechanisms for being about the short term and for failing to optimise good quality, but still has faith that teams can produce long-term quality and understand how it can be delivered. 'Styles may change but principles of good design remain. We can aim to build a beautiful place that also serves a functional purpose. A good designer knows how to achieve that.'

At the very least, you must set clear objectives, and then manage them. 'Some projects won't demand high quality standards but where there are high expectations, the processes and resources must be in place to maintain and protect them.'

And that is the benefit he sees in the Quality Tracker. It sets up a golden thread and assists continuity from design to construction, enabling conversations between those who want to engage in quality and sustainability. And as he says, 'The more conversations there are, the more quality expectations will rise up the agenda.'

Ultimately, he thinks that a savvier consumer and prosumer market for places and buildings will force contractors and developers to pay greater heed to the issues that they perhaps only pay lip service to at the moment. That will force longer-term thinking.

31. http://cic.org.uk/news/article.php?s=2018-07-10-clc-rally-industry-with-launch-of-procuring-for-value-report
32. https://www.linkedin.com/pulse/riba-vp-research-strategy-flora-samuel/

The implication of this analysis is that risks to quality cannot currently be fully managed or comprehensively measured, and so quality cannot be guaranteed.

There is a pressing need for research to resolve these issues. A recent Construction Leadership Council report published in the wake of the UK government's recent Construction Sector Deal, Procuring for Value[31] calls for the government to support better evidence and benchmarks for public buildings. Similar moves are afoot among professional institutions. For example, the RIBA's VP of Research Professor Flora Samuel is pushing for post-occupancy evaluations as standard in the architectural profession.[32]

The work-arounds and the issues they raise

Despite the structural problems, experienced industry professionals from the institutional sponsors agree that:

- Even if quality cannot currently be measured quantitatively, high, adequate, or relatively low long-term quality are generally understood targets that professionals on the project team can act upon successfully in the development process. (Note that all these targets are equally legitimate, depending on the overall value equation.)
- There are several barriers, which can be conscious, unwitting, uncontrolled or unforeseen, that are thought to minimise the likelihood of achieving good long-term quality.

These points raise three ethical questions:

1. If construction industry professionals **have consciously set low targets for quality on the client's instruction or with their agreement**, do they have a duty to divulge it to users? Where the design is for a basic, temporary, functional, summer facility, for example, the case for targeting low quality is clear and users will expect nothing less. The case becomes less clear-cut where the building's purpose calls for higher quality and where the users might reasonably expect high quality.
2. If the professionals in the project team confidently suspect that the project is currently or has during its production **faced severe barriers to achieving quality**, do they have a duty to divulge this knowledge to prospective new members of the project team and the users?
3. Should the professionals in the project team disclose these pieces of information **even if their immediate client or the head client does not wish it**?

In answer to the first two questions, the BiQ Working Group felt that construction professionals probably do have a duty to disclose – to the extent that they are confident enough in their ability to predict outcomes.

Professional indemnity insurers are likely to be wary of any such disclosures in relation to build quality, and caution policy-holders either to be very careful in their choice of words or to keep their counsel.

The third question is harder to answer. Given the lack of validated evidence behind professionals' predictions of future quality, it is reasonable for clients to resist disclosures which can arguably be described as no more than educated guesswork. Disclosures of this kind should only be made where the client agrees.

These realities once again emphasise the pressing need for evidence, auditing and benchmarks in the quest to improve quality outcomes. They also signal the potential of partnering agreements where the 'in it together' contractual environment is likely to free project teams up to disclose more openly.

Nonetheless, the Working Group felt that disclosure had moral force. It could also benefit clients and would be a net gain for the industry for the following five reasons:

1. It will allow clients who invest in increasing the likelihood of long-term quality to differentiate themselves convincingly from others.
2. Professionals, consultants, contractors and suppliers joining mid-project will be able to understand their risks appropriately, averting downstream arguments.
3. The user group will have a clearer idea of the limitations of the building they are buying into.
4. It will incentivise achieving better long-term quality in buildings, which is good for human wellbeing and beneficial from a social, economic and environmental point of view.
5. It will improve the construction industry's reputation.

Since the existing mechanisms for managing quality don't currently protect legacy quality strongly enough, the BiQ intiative is looking to achieve it with a Quality Tracker.

THE CIVIL ENGINEER *Ann Bentley*

Ann Bentley, Global Board Director for Rider Levett Bucknall, qualified as a civil engineer, spent time as a project manager with vast experience of the public sector, is a Fellow of the RICS and, most recently, is the author of CLC's *Procuring for Value*, a report that responds to the UK government's Construction Sector Deal. She has valuable insights into the whole subject of quality.

For her, the quality debate boils down to three different measures. The first is buildability, which she puts down to hugely ramped-up time pressures and a loss of specialisation: 'We're forcing people to become jacks of all trades. With the deregulation of the public sector – which has brought many advantages – we've also lost some detailed knowledge.'

Her second measure is the quality of construction. She contrasts her experience of the railway sector, where the risks are so high that clients double down on built quality, to the housing sector, where her experience is that contractors try to get away with 'it'… That's not all builders in all cases, but it is certainly a culture, particularly at the subcontractor end of the business.'

At the coalface of delivery, work becomes a numbers game, which incentivises the lowest acceptable standard. 'The trouble with that', she says, 'is that if there is no site supervision or it's going to be covered up then the lowest acceptable standard might not be the lowest legal standard.'

Her third measure is about the brief. The brief is the document that defines the purpose. 'A building can be beautifully designed and perfectly built but it will still fail the quality test if it doesn't meet the functional requirements of the building occupant. Of the three, that's the one that's the most important because it is really difficult to put right.'

She is drawn to the BiQ's chain of custody idea, and likes its alignment with Dame Judith Hackitt's golden thread concept. 'We've made an industry where almost nobody is accountable until the builder gets sued, so I like the transfer of accountability that the Quality Tracker embodies.'

The solution: tracking pathways to quality in a chain of custody

The RIBA, RICS and CIOB propose the Quality Tracker – a free-to-download digital system for monitoring the risks to quality at the end of RIBA Work Stages.[33]

How the system is designed to work

Quality governance

The Quality Tracker is at the heart of a chain of custody system for overcoming the often fragmented composition of project teams and the resultant inconsistent governance of quality.

Championed by the client (perhaps at the behest of purchasers, investors or the client's professional advisers), agreed by the project team, and recorded and signed off impartially at the end of defined stages by the nominated quality custodians, the form establishes a chain of responsibility. Started at project inception, the quality baton is passed on until finally issued to the client's representative, the investors, the purchasers and/or tenants as a verified statement of the ways in which risks to quality were handled during the project.

Risk assessments at each Work Stage can be interpreted with reference to the quality targets, which should be set out clearly and unambiguously in the project brief (in its most recent state of development).

The Quality Tracker

The Quality Tracker consists of one cover sheet and eight main pages – one per RIBA Work Stage – allowing project teams to assess and monitor known risks to quality over the entire course of a project.

The cover sheet summarises:

- the project's quality status for the current Work Stage;
- the status at previous Work Stages; and
- an overall quality statement to be written at the start of the project, summarising the client's broad quality objectives as set out in the brief.

Each Work Stage-specific page of the Quality Tracker is a table organised into four columns (see Fig 10.):

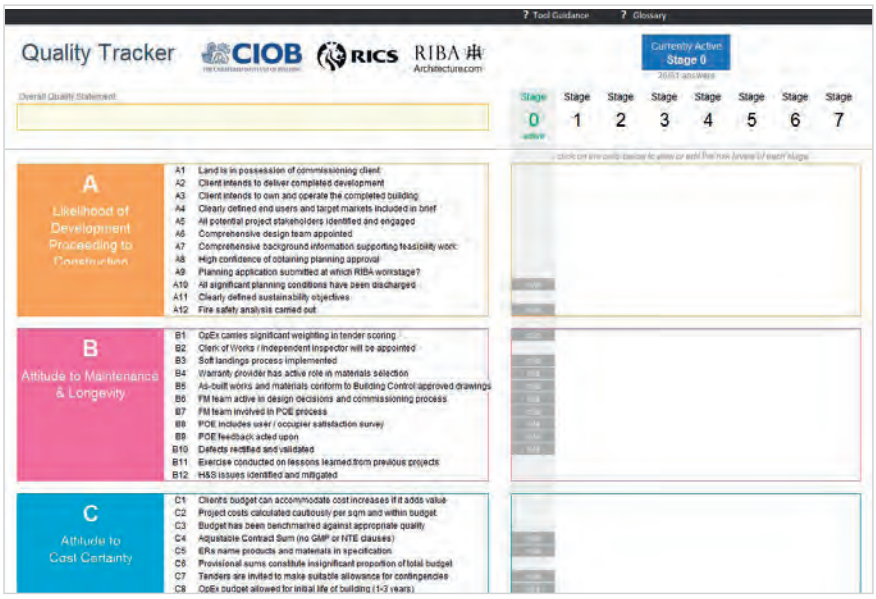

Fig 10 A screenshot from the Quality Tracker showing the quality risk categories and risk reduction indicators for RIBA Work Stage 0..

33. www.architecture.com/working-with-an-architect/building-in-quality-pilot

"Successful outcomes depend on a common understanding of what quality means upfront with key partners and then putting measures in place to track quality objectively"

THE SOCIAL HOUSING PROVIDER *Lanre Gbolade*

Lanre Gbolade's blend of experience is rare. Although a qualified architect and RIBA Council member, he also holds an MSc in project management. His CV includes a stint working with residential developer clients in design management roles, and he is currently Senior Product Innovation Manager with a leading registered housing association. Working on the client side for a non-profit social business that operates the assets it builds gives him deep insights into the challenges of delivering quality.

He is very clear that quality is a multifaceted concept. As well as encompassing technical aspects of air quality, thermal performance, acoustics and space standards, and so on, quality is also about how the building interacts with its local context, its character, the urban design, the open spaces, and its impact on the local community.

In his experience, successful outcomes depend on a common understanding of what quality means upfront with key partners and then putting measures in place to track quality objectively. 'Presently you could argue there is too much scope for disagreement. The earlier you get project members involved, the better their understanding of what quality is early on, the better the end product will be. That way you can eradicate some of the defect issues that the industry often sees post-completion.'

He thinks the Quality Tracker and its alignment to the RIBA Work Stages could help in this respect. 'It's like an overarching project risk tracker of the kind that most clients are already familiar with. By highlighting risks to quality early and tracking them through into the actual build stage, it could stop them materialising with great impact only when it's too late.'

He implicates contemporary contractual arrangements for aggravating the problems in consistently achieving quality, and is an advocate of innovative collaborative alliancing agreements, automation and off-site manufacturing to improve outcomes. 'The idea is that we iron out the fragmentation within development from design through to construction. By adopting a manufacturing approach we can prototype and test some of our products and settle the level of project quality long before we deliver the building on site.'

He supports the Building in Quality initiative. With the three major industry institutes championing it collaboratively, he thinks it will gain good traction, provided their members actively promote it to their clients. He particularly likes its focus on the whole-life aspect of quality, which is critical to everything he does in his professional life. 'Making sure that those who use the building are getting quality for many years is very much a key priority.'

1. The left-hand column identifies generic quality risk categories. These are the broad classes of risks affecting the likelihood of achieving quality outcomes.
2. The next column lists risk reduction indicators for each of the categories. These are statements framed in such a way that answering 'yes' will tend to increase the likelihood of achieving quality outcomes.
3. The next column is where the quality custodians give the consensus assessment of the statements. The only possible options are 'yes', 'no', 'partly' or 'not applicable'. Assessments are automatically colour-coded, allowing the current likelihood of achieving quality to be seen at a glance:

   red – high risk for 'no'

   amber – medium risk for 'partly'

   green – low risk for 'yes'.

   A 'not applicable' answer does not affect the overall quality risk rating.
4. The final right-hand column allows room for the quality custodians to add commentary to explain or qualify the assessment.

A box at the top right of each page records critical project-specific information, allowing changes in key personnel and even clients to be tracked.

Once signed off, completed Work Stage pages are locked to prevent retrospective amendment.

Locked pages are designed to be shared with outsiders, including consultants and suppliers hoping to join the project, and, of course, the completed building's users.

Set-up

The client commits to defining quality in the brief and to using the Quality Tracker from the outset of a new project through to completion by signing a **Memorandum of Understanding** (a template version is available for download)[34] with their project team. Clients may adopt the Quality Tracker beyond Stage 0 and fill it in retrospectively if they wish.

The Memorandum of Understanding requires updates to the Quality Tracker to be included in project reports.

The client or its agent assigns responsibility to up to four specific people, representing the Client, the Project Lead, the Lead Designer, and the Contractor, for maintaining and signing off the Quality Tracker at each RIBA Work Stage. Called quality custodians, the client grants them the authority to assess the project according to their professional judgement and by consensus with the rest of the project team. The system adopted for consensual sign-off will vary depending on circumstances, but the project team must agree it upfront with the client.

It is not intended that custodians should have any special training beyond a construction-related professional qualification. The institutional sponsors intend custodians to be intimately acquainted with the project and preferably bound by a code of professional conduct. Chartered members of the RIBA, RICS and CIOB are suitable candidates. During the construction phase, a Clerk of Works is also appropriate.

Although there might be fewer than four quality custodians during the life of a single project, there can never be more than four at any one time.

The quality target as defined in the brief, the name(s) of the relevant quality custodian(s) and the project details are entered at the top of each page of the Quality Tracker.

Process

At the end of each Work Stage, the currently appointed quality custodians assess the truth or otherwise of the quality risk indicator statements, generating a patchwork of red, amber and green ratings. A Quality Checklist will help in the assessment process.[35]

- The custodians must assess only on the basis of current information.
- The custodians' assessments must be made with consensus from the whole project team as far as possible, with reasoning and any dissent from this position recorded in the right-hand column.
- The custodians sign off the stage on the Quality Tracker by dating it and circulating the updated version.
- If the custodians assigned for the next stage are different, the current custodians formally hand over responsibility to those people.
- This process is repeated for every RIBA Work Stage.

Due diligence evidence

The latest mid-project iteration of the Quality Tracker must be disclosed to every new consultant tendering to join the project team or, indeed, to new owners hoping to buy the uncompleted project.

The final version of the Quality Tracker must be issued by the last quality custodians for the benefit of prospective post-completion stakeholders, including the new owners, asset managers, tenants, occupiers and investors.

Encouraging use with simplicity

Aware of the potential to turn off hard-pressed professionals with more paperwork, the BiQ Working Group aimed for clarity and simplicity. They agreed that the form needed to be detailed enough to be useful but simple enough to be understood easily by everyone, including the users.

Robustness of risks

The BiQ Working Group relied on industry reports, members' professional knowledge and experience, and feedback from its pan-industry consultation during May 2018 (see 'The initial consultation process' on page 8) to identify and agree the risk indicators that can affect the likelihood of achieving quality.

The rating system and its interpretation

The BiQ Working Group was wary of instituting a rating system that might imply objective accuracy in risk assessment where none is currently possible. It therefore adopted a simple traffic light (RAG) system that limits rating to the extent currently agreed to be feasible.

Although it is probable that some risks matter more than others, there is no objective measure of the extent of this effect. The ratings are thus not weighted. Equally, the Quality Tracker does not allow ratings to be aggregated, once again

34. www.architecture.com/working-with-an-architect/building-in-quality-pilot
35. www.architecture.com/working-with-an-architect/building-in-quality-pilot

to avoid giving the false impression that the system is scientifically validated.

The Working Group was also very aware that highest quality as an end target is not always the best value option, and therefore it must not be thought of as invariably desirable. Similarly, lowest quality must not always be equated with undesirable.

In this way, custodians assess quality risk indicators in relation to the quality targets laid out in the brief, not against a notional absolute level of quality.

All projects are likely to have a smattering of red ratings, especially early on in a project when planning consent and viability are uncertain. Indeed, a red rating may very well signal good common sense.

Information record only

The form is for information only. It serves to shine a spotlight on the risks to achieving quality in the same way that calendars and financial statements shine light on progress against programme and budget.

If clients wish, they may use it as a stop-go gateway system, such that progress is halted until high risks are satisfactorily addressed.

Legal status of the form

During a project, the form is designed to be disclosed to prospective new project team members to help them to understand the current state of the project. This allows them to assess their risks more fully before agreeing a contract.

The final signed-off version of the form is issued as a history of the barriers encountered during the course of a project. It is designed to be disclosed to prospective users before they buy or sign a contract as part of their due diligence.

However, the form is not a certified guarantee or warranty of the quality of the building on completion. This is because:

- there is not enough evidence linking present project actions to future quality as experienced in use; and
- future quality as experienced in use depends heavily on factors beyond the project team's control.

For either the custodians or the members of the project team that contribute to Work Stage assessments, the form expressly does not carry any legal liabilities additional to those they already bear contractually. The power of the Quality Tracker lies in the professional integrity of the custodians.

The next steps

The BIQ initiative's next step is to pilot the Quality Tracker's functionality and usefulness on a representative range of real projects, capturing whole project teams' impressions.

The initiative's institutional sponsors expect the Quality Tracker to be promoted to clients by their members where they are bound by a code of professional conduct.

The institutional sponsors aspire to the Quality Tracker being adopted as the standard for delivering appropriately high quality assets that positively support a socially, environmentally, culturally, and economically sustainable built environment.

"The power of the Quality Tracker lies in the professional integrity of the custodians"

"I urge you to participate in this important initiative, and sign up to pilot the Quality Tracker and provide feedback. It is an immediate and usable tool to address the challenge of the cultural change that is needed to bring a shared commitment to improving the quality of the construction industry product, and generating greater value for the benefit of long term client outcomes and society"

Stephen Hodder MBE PPRIBA, Hodder + Partners, Deputy Chair of the Construction Industry Council.

Visit www.architecture.com/working-with-an-architect/building-in-quality-pilot to sign up to pilot the Quality Tracker and download the documents.

This guide introduces a Quality Tracker that benefits the construction industry in five ways:

1. Chain of Custody – it will set up a formal chain of custody for quality, allowing clients who adopt it to give quality due visibility in the value equation for the duration of the project.

2. Quality Risk Transparency – it will allow the client and parties joining the project to understand their risks better, increasing transparency and averting disputes.

3. Market Differentiation – it will allow clients who adopt it to demonstrate their commitment to appropriate quality in comparison to those who do not adopt it.

4. Golden Thread – post-completion purchasers, tenants, investors, and asset managers will have a clearer idea of the development history of and quality targets for the building they are buying into.

5. Better Outcomes and Reputation – it will incentivise achieving better long-term quality in buildings, which is good for human health, safety and wellbeing and beneficial from a social, economic and environmental point of view, improving the construction industry's reputation.

Royal Institute of British Architects
66 Portland Place
London W1B 1AD

0207 580 5533
www.architecture.com

Registered charity number: 210566

RIBA Architecture.com