Construction Phase Handbook

November 2019

Scottish Government
Riaghaltas na h-Alba
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Chapter 1

Introduction

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Construction Phase

Introduction

1.1. This Handbook focuses on the construction of the built asset as distinct from the preparation for its construction. It aims to help prepare clients for their role in managing the progress of their projects during the construction. It is not intended as a technical manual; it is expected that clients will either have their own in-house technical resource or hire it in. The Scottish Government Construction Capability Assessment will help to identify any skills and experience gaps and assist in developing the team. This chapter provides an overview by way of an introduction to the client's role during construction.

Overview

2.1. Clients own their project and it is they who stand to gain or lose the most and, therefore, must be at the heart of driving it towards its outcomes and success. The client should take every step to facilitate their understanding of the nature of construction and construction project management. That understanding and expertise may not be available in the client organisation and therefore it may be necessary for the client to hire in a *'client advisor'* to ensure that the client can act effectively as an *'intelligent client'* and oversee the delivery of the project.

2.2. The intensity of the project will ebb and flow throughout the lifecycle and some stages will need more input from the client than others. This is not to say that it can be put aside or ignored at any time; rather the client must recognise the requirements at each stage and ensure that they are always in a position to make the appropriate decisions, provide direction or support when it is required and that the associated procedures are in place and accessible.

2.3. There will be significant demands on the client during the construction stage and a disengaged client can easily be blindsided by an event with the potential for serious damage to the prospects for project success. Therefore, they must be proactive in leading the project and ensuring that it achieves its outputs and outcomes.

2.4. From time to time, throughout the construction phase, there will be occasions when the way is lost or strayed from. This could be as a consequence of, for example, external changes or unforeseen conditions. Whatever the cause, a client who is fully engaged with the project will be better prepared and equipped to work with the project delivery team to bring the project back onto track; or, better still, prevent it from going off course in the first place.

Direction

3.1. It is not the role of the client to simply pay for the project and then take no further interest. The client determines and is responsible for the delivery of the objectives of the project and sets the philosophy, tempo and standard for that delivery; including such aspects as quality and fair payment. This requires the client to be visible, involved, informed and focused and to build strong relationships with all

stakeholders across the project as a whole. They must fully involve themselves in the delivery of their asset whilst recognising and understanding where the lines of responsibility are drawn and give the project and contractor teams sufficient space to do their jobs. This is not necessarily a balance which will emerge automatically; it requires open and clear two-way lines of communication.

3.2. Throughout construction there will be a constant need for decisions to be made by the client and often these will be required urgently; for example where a change to the design is required. This requires the client to be approachable, available and have processes in place to efficiently manage all eventualities whether routine or exceptional occurrences.

3.3. Clients must challenge their consultants and contractors to ensure that sufficient impetus, resource and expertise is being applied and that appropriate advice is being provided and decisions made to ensure that the asset is delivered to the specified time, quality and cost.

Achieving the Balance

4.1. As noted above, it is important that the client understands the lines of responsibility and maintains an appropriate grip on the project without over managing the team. This is important for a number of reasons. An overly hands-on client may stray across the contractual line and not allow the contractor to do their job, or divert them from their priorities and consequently create difficulties and confusion about the requirements. Conversely, a client who is disengaged and leaves the contractors and consultants to 'get on with it' without challenging performance and progress against the deliverables, risks a project going out of control and losing focus. Both of these are likely to negatively impact time, cost and quality and lead to poor outputs and contractual disputes. Therefore, clients must develop a situational approach which recognises when to push the team forward, when to pull it over to a new approach or direction and when to leave the team to get on with things. Understanding of the situation can be aided by the use of monitoring tools and metrics generally provided by consultants and contractors.

4.2. Essentially this is about strong leadership and clear and appropriate communication, ensuring that everyone on the project is fulfilling their contractual requirements or job specifications. The client owns the business case and it is the business case which justifies the project, therefore the client must ensure that there is no deviation from it without formal agreement. Good project management can assist this, in particular, pro-active performance and quality management and effective systems to manage changes to the contracted delivery specification.

Focus

5.1. The client must focus on the following key tasks:

- **Strategy** The client owns the project and therefore must set the strategy for its delivery. Any changes to this can only be made by the client.

- **Project environment** The culture surrounding the project comes from and is maintained by the client. For example, embedding quality in a project

early on and continuing to reinforce its importance will help to ensure its delivery in the project output. Conversely, a client which shows no interest in achieving a quality output will be handed a problem asset.

- **The team** A construction project relies on an appropriately resourced team. The team may change over the course of the project and it is essential that, whatever its makeup, it is effectively managed, co-location of multi-disciplinary teams has been shown to help in in team cohesion and success. The client must manage those relationships to get the best out of the team. Annex A sets out some of the key players who may be involved in the construction phase. This list is neither prescriptive nor exhaustive and the actual make up will be determined by the requirements of the project.

- **Business case** Regardless of the scale, complexity or cost of a project a business case should be prepared. This is owned by the client and provides the basis, justification and standard for delivery.

- **High-level progress** The client should focus on the wider picture rather than on monitoring detailed progress of low level tasks.

- **Decision making** The client must make decisions quickly and, importantly, accurately. During construction each decision will have a number of dependencies and delayed decision making can have serious consequences on completion. Therefore, efficient systems must be in place to support the client to deal with change and take action as appropriate and necessary.

- **Communication** This is at the heart of good project management and the client must ensure there are clear lines of communication and that everyone knows what they are, and what their part in them is. This includes internally within the project and externally to stakeholders. Having a clear meeting schedule setting out attendance requirements along with the remit and frequency is essential.

- **Stakeholder Engagement** Stakeholders define the authorising environment for a project and must be managed according to their interest whether these are ministers, senior management, site neighbours, end users, funders, or the public etc.

- **Project Monitoring** Clients must ensure appropriate project monitoring and evaluation processes and tools (such as a Benefits Register and Realisation Plan) are in place and applied to deliver, assess and disseminate lessons throughout the whole life cycle of their project. Project monitoring is a separate exercise to Scottish Government Gateway Reviews (see Chapter 13 of the Project Initiation and Business Cases Handbook) or the Scottish Futures Trust's Key Stage Reviews, however the information gathered through appropriate monitoring can be used to support these reviews.

- **Lessons learned** Clients must seek to learn from other projects and apply those lessons in time to benefit their project. They should also ensure

that learning opportunities are recognised, studied, recorded and immediately applied.

- **Health & Safety** The client is identified, under the Construction Design Management (CDM) Regulations, 2015 as being accountable for the impact that their decisions and approach have on the health, safety and welfare on the project. The main duties for clients are to make sure their project is suitably managed, ensuring the health and safety of all who might be affected by the work, including members of the public. Identifying and immediately applying lessons regarding the success (or otherwise) of the health and safety practices planned and adopted throughout the whole life cycle, is essential to improving future health and safety processes and roles.

Key Tools

6.1. Good project management, monitoring and evaluation are essential to assist the client in maintaining a good hold on the project, this includes the following:

- **Project Execution Plan** This is a document which sets out what is to be done, who is to do it and when it is to be done. It also sets out the administrative framework for delivery including protocols for meetings, risk and costs etc. This will provide the baseline against which progress of the project is managed. This is normally prepared by the external construction project manager. It is essential that it is finalised prior to contracts being awarded as compliance with it may form a part of some contracts.

- **Programme** This sets out what happens, when and in relation to what other activities. This will be prepared by the project manager to cover the whole project period and by the contractor to cover the specific and detailed construction period. The client must ensure that sufficient time is given for the overall delivery and that strategic milestones are achieved.

- **Risk Management Plan** Risk is covered in Project Initiation and Business Cases Handbook. Active risk management is essential at all levels of the project and should be driven by a specific person within the permanent client team, ideally a member of the project board or accountable directly to the project board.

- **Change Control** Once the design is fixed, changes must only be considered and implemented by a formal approval process. This is known as change control. It is essential that an efficient system is put in place for processing changes and approving or rejecting them. Final sign off will normally be by the project sponsor, although the *Change Management Plan*, which will form part of the *Project Execution Plan*, may set levels of delegated authority including approval at project board level. Changes to the design can come thick and fast and are usually time critical. Late decisions will have a detrimental impact on the programme and consequently on time and project cost.

- **Delegated authority** Everyone on a project should know exactly what their authority is, that is what level of decision they are empowered to make. As well as understanding and accepting their individual responsibilities, project team members must appreciate the remit of others and the team's collective duties. This will usually be set out in an appointment letter for senior project officers and/or in the project execution plan for others. Requirements may change as the project progresses and levels should be reviewed regularly and the relevant protocols amended as required.

- **Tolerances and exceptions** It must be clear what the levels of tolerance for deviation from the plan are at which a report must be made to the next level of management in the project. The project manager must raise an exception report to the client where the project moves out-with tolerances for time, cost and quality set in the Project Execution Plan and agreed at project board. Similarly, there will be levels which require the project board to be informed. Tolerances will generally be defined along the following lines:

    - **Time**: x weeks or days, or more, plus or minus of the programme at any or a specific point in time.

    - **Cost**: x% or £x, or more, plus or minus of the estimated project or construction spend. This may also be benchmarked against a specific item of spend, milestones or any other relevant and measurable figure.

    - **Quality**: An exception against quality standards may be raised as a result of a flag raised by a Clerk of Works, or other relevant quality assurance system.

- **Reporting** Routine reports and returns will be required throughout the project and this should be set out at the beginning in the project execution plan. These, together with reporting against exceptions to tolerances, provide project owners with their eyes and ears on the health of the project and likelihood of whether it will come in on time and to cost and quality. Clients should challenge reports to ensure they are robust and that the appropriate action is being taken in response.

- **Communications plan** Good management of communications can assist any project in ensuring that the right information hits the right targets, at the right time. This is a two way street and will help inform the project as well as stakeholders. It is therefore essential to plan communications so that messages and handling is clear and that the right person deploys the right messages.

- **Cost Management Plan** Larger projects are likely to have a cost consultant managing the project cost plan and a project manager managing the cash flow projection. The client needs to be able to marry up all of these documents with the budget and ensure that funds are drawn down and paid out on time so that decisions can be made based on the most up to date cost figures and projections.

- **Quality** The client must create a quality culture within the project. In recent times there have been a number of prominent cases where the quality of construction outputs has not been delivered. The nature of quality must be clear and understood by the client and the delivery team including consultants and contractors. It has two elements to it. Firstly, it is about defining a specification which meets the functional requirements of the use and users of the built asset and, secondly, it is about delivery in all respects of that specification through its design, procurement and construction. Quality is an essential part of any construction project and it is for the client to ensure that quality is built into outputs from the very start of the project and that quality management systems are maintained throughout to assure its delivery.

- **Project Benefits Register and Realisation Plan** Benefits management is central to delivering projects and programmes successfully. The identification of benefits should occur before a project is initiated and be developed throughout the project's whole life cycle. The client must allocate appropriate resources at the outset of the project to determine clear objectives, which reflect their own requirements and those of their stakeholders. The realisation of benefits illustrate a project's success in delivering positive and measurable improvements.

- **The Construction Phase Plan** Where appropriate, under the Construction (Design and Management) (CDM) Regulations 2015 a *Construction Phase Plan* is required for every construction project. The Plan helps to organise the *Principal Contractor* (defined on the HSE webpages) and facilities their working with others to make sure that the work is carried out without risks to health and safety. It will also assist the *Principal Contractor* to comply with CDM Regulations 2015.

Summary

7.1. The client's role in the construction phase is pivotal and needs strong leadership if the project is to deliver the business case.

Annex A

Construction Key Players

Client Home Team	Client Consultant Team	Contractors
IDM SRO Project Owner Project Sponsor Project Manager Project Finance Officer Project Administrator Client Advisor	Project Manager – client's representative managing project on a day to day basis. Contract Administrator – responsible for administering the construction contracts. Role may be carried out by any of the main consultants as appropriate although most frequently by the PM. Cost Consultant – provides estimates and advice regarding the costs of the construction. Designers Architects Mechanical & Electrical Acoustics Structural Construction Design and Management Co-ordinator Traffic planner Ecologist Archaeologist Site inspectors Commissioning Engineer BIM Advisor Space planner	Site Agent Commercial Manager (The contractor may have different teams in place during the pre-construction, construction and post-construction phases)

Notes:

1. The exact make-up of the various teams will be dependent on the nature of the project. The key point from the client's perspective, is to understand who is who on their project and ensure that the appropriate lines of communication are established and maintained.
2. The Client Consultant Team list is not exhaustive, but identifies some of the more common consultants. The key relationships will be with the Project Manager, Contract Administrator, Cost Consultant and Designer(s).

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Chapter 2

Health and Safety

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Introduction

1.1. As has already been discussed in the overview chapter, the culture of a project derives entirely from the client. It informs everything that is done from design development to the way in which the contractor conducts itself during construction and the quality of the output. This is particularly true for health and safety. There are statutory obligations on all involved in construction including the client; however this is a minimum baseline. A client which takes little or no interest in health and safety above that baseline will encourage the same attitude in its consultants and contractors. Therefore the attitude, decisions and actions of clients will directly influence the health, safety and welfare of those who work on a project whether they are directly or indirectly employed by the client and indeed those members of the general public who come into contact with it.

1.2. A well trained, skilled and looked after workforce as part of a safety conscious construction industry is as much a contributor to effective construction outputs and outcomes as good design is. Clients set the standards they expect of their contractors in every aspect of construction and health and safety is no exception.

1.3. All clients must strive to be best practice clients and, in terms of their health and safety responsibilities, in conjunction with their legal obligations and responsibilities which are discussed later in this chapter, must:

- Demonstrate a high level of commitment through leadership, clearly defined policies and visible senior management involvement and compliance with all relevant legislative and other requirements.

- Develop and support a culture of co-operation, co-ordination, communication and competence both in their integral organisation and with their contractors and consultants.

- Promote a culture within their own project organisation that encourages all parties to make suggestions for improving health and safety performance including doing so anonymously; and

- Consider benchmarking safety performance for monitoring purposes.

Legislation

2.1. The Health and Safety Executive (HSE) sets the strategy, policy and legal framework for health and safety in Great Britain.

2.2. The Construction (Design and Management) Regulations 2015 (CDM 2015) require all those involved in a construction project to:

- Sensibly plan the work so the risks involved are managed from start to finish.

- Have the right people for the right job at the right time.

- Cooperate and coordinate work with others.

- Have the right information about the risks and how they are being managed.
- Communicate this information effectively to those who need to know.
- Consult and engage with workers about the risks and how they are being managed.

2.3. Comprehensive information is available on the HSE website:

http://www.hse.gov.uk/construction/cdm/2015/index.htm

CDM Dutyholders

3.1. The CDM 2015 Regulations differentiate between various roles on a construction project and between those conducted in respect of commercial (which includes public sector) or domestic projects. The regulations place obligations on *Dutyholders* defined by the role and type of project as set out in the table at Annex A which is extracted from the HSE webpages. Note that we have not listed the roles on a domestic project as this does not apply to public sector construction projects.

Contracting Authority Responsibilities

4.1. For the purposes of the CDM 2015 Regulations, contracting authorities fall under the definition of commercial clients. Where this chapter of the guidance refers to commercial clients this should be read as referring to contracting authorities.

4.2. Commercial clients set the agenda for how projects are run, including the management of health and safety risks. Whatever the project size, where the commercial client has contractual control, appoints designers and contractors, and determines the money, time and other resources for a project they are fulfilling the role of a commercial client according to CDM 2015. Where this is the case, the regulations make clear that the commercial client is accountable for the impact their decisions and approach have on health, safety and welfare on their project.

4.3. A commercial client's duties begin from the very start of a project, i.e. as soon as there has been a decision to go ahead with the project and early planning and design work begins. These duties continue to the end of a project and beyond. The commercial client will continue to have responsibility for health and safety issues that arise from the maintenance and use of the building after construction work is finished. This responsibility continues until the client disposes of their interest in the building.

4.4. Most clients, particularly those who only occasionally commission construction work, will not be sectoral experts or be likely to retain a resource with the appropriate detailed skills, knowledge or experience of the construction process within their permanent complement. However, where no internal resource is available, they must make suitable arrangements for their project so that it can be managed in a way that integrates health and safety into design, construction, operation and decommissioning and complies as a minimum with current legislation. This requires the client to make suitable arrangements for managing the project; this may include engaging the services

of, for example, a Safety, Health, Environmental and Quality (SHEQ) or Health and Safety manager or other appropriately qualified person for the project.

4.5. For all projects, commercial clients must:

- Make suitable arrangements for managing their project, enabling those carrying it out to manage health and safety risks in a proportionate way. These arrangements include:
    - appointing the contractors and designers to the project (including the principal designer and principal contractor (in writing) on projects involving more than one contractor) while making sure they have the skills, knowledge, experience and organisational capability.
    - allowing sufficient time and resources for each stage of the project.
    - making sure that any principal designer and principal contractor appointed carry out their duties in managing the project.
    - making sure suitable welfare facilities are provided for the duration of the construction work.
- Maintain and review the management arrangements for the duration of the project.
- Provide pre-construction information to every designer and contractor either bidding for the work or already appointed to the project.
- Ensure that the principal contractor or contractor (for single contractor projects) prepares a construction phase plan before that phase begins.
- Ensure that the principal designer prepares a health and safety file for the project and that it is revised as necessary and made available to anyone who needs it for subsequent work at the site.

Notification

5.1. Notifiable projects are planned construction work lasting longer than 30 working days and involving more than 20 workers at any one time; or where the work exceeds 500 individual worker days. For such projects public bodies must:

- Notify HSE in writing with all required details of the project
- Ensure a copy of the notification is displayed in the construction site office

Leadership

6.1. Clients must take a keen and serious interest in how safety is being managed on their project. For example:

- Discussing with each of the *Dutyholders* to check that they understand, and are complying with, their own responsibilities under CDM 2015 Regulations;

- Insisting that safety is high on the agenda at meetings including project boards, design and construction progress meetings;

- Nominating an individual at project board level to oversee project health and safety;

- Conducting audits through the Health and Safety Manager of the Principal Contractor's construction phase plan.

6.2. Project delivery models which allocate responsibility for developing the detailed design to the main contractor require particular attention from clients, who should have sufficient access to information, professional opinion and the people involved in design decisions even where these are commissioned/controlled by the main contractor. Clients should not enter into any contract which precludes them from satisfying their CDM obligations for design, construction, operation and decommissioning.

6.3. Commercial clients should not seek, through the allocations and transfers of risk as set out in the construction contract, to divest their duty for the finished asset to provide a safe environment to the public. Nor should they regard that such a divestment is either desired or effected by the construction contract. This duty cannot be delegated, divested or otherwise disposed of. Clients should ensure that the delivery model for the construction project does not militate against them being able to verify the health and safety associated with both the physical elements and the activities involved in their permanent integration during design and construction, and subsequent implications for operation and decommissioning.

Summary

7.1. Construction is an inherently dangerous industry but it need not be. Good health and safety impacts on all those who have contact with construction whether workers on sites or the general public. With good systems in place and compliance with Health and Safety and other current legislation, it can be safer. This is everyone's responsibility but critically the role of the client is central to creating a shared awareness and a project wide safety culture and attitude focussed on preventing incidents on site.

ANNEX A

CONSTRUCTION ROLES AND DUTIES

CDM Dutyholders (who are they)	Main Duties (what they need to do)
Commercial clients – Organisations or individuals for whom a construction project is carried out that is done as part of a business.	Make suitable arrangements for managing a project, including making sure: • other dutyholders are appointed as appropriate • sufficient time and resources are allocated Make sure: • relevant information is prepared and provided to other dutyholders • the principal designer and principal contractor carry out their duties • welfare facilities are provided
Designers - Organisations or individuals who as part of a business, prepare or modify designs for a building, product or system relating to construction work.	When preparing or modifying designs, eliminate, reduce or control foreseeable risks that may arise during: • construction • the maintenance and use of a building once it is built Provide information to other members of the project team to help them fulfil their duties.
Principal designers - Designers appointed by the client in projects involving more than one contractor. They can be an organisation or an individual with sufficient knowledge, experience and ability to carry out the role.	Plan, manage, monitor and coordinate health and safety in the pre-construction phase of a project. This includes: • identifying, eliminating or controlling foreseeable risks • ensuring designers carry out their duties Prepare and provide relevant information to other dutyholders. Liaise with the principal contractor to help in the planning, management, monitoring and coordination of the construction phase.
Principal contractors – Contractors appointed by the client to coordinate the construction phase of a project where it involves more than one contractor.	Plan, manage, monitor and coordinate health and safety in the construction phase of a project. This includes: • liaising with the client and principal designer • preparing the construction phase plan • organising cooperation between

	contractors and coordinating their work Make sure: • suitable site inductions are provided • reasonable steps are taken to prevent unauthorised access • workers are consulted and engaged in securing their health and safety welfare facilities are provided
Contractors – Those who carry out the actual construction work, contractors can be an individual or a company.	Plan, manage and monitor construction work under their control so it is carried out without risks to health and safety. For projects involving more than one contractor, coordinate their activities with others in the project team – in particular, comply with directions given to them by the principal designer or principal contractor. For single contractor projects, prepare a construction phase plan.
Workers – Those working for or under the control of contractors on a construction site.	Workers must: • be consulted about matters which affect their health, safety and welfare • take care of their own health and safety, and of others who might be affected by their actions • report anything they see which is likely to endanger either their own or others' health and safety • cooperate with their employer, fellow workers, contractors and other dutyholders

***** Organisations or individuals can carry out the role of more than one dutyholder, provided they have the skills, knowledge, experience and (if an organisation) the organisational capability necessary to carry out those roles in a way that secures health and safety.

Construction Phase Handbook

Chapter 3

Quality

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Quality

Introduction

1.1. The purpose of any construction project is to deliver an output which contributes to one or more outcomes. In order to do this the output, a physical built asset – whether a road, a hospital, a school or other public structure - must meet the requirements of the client in all respects.

1.2. There are many techniques which can be used in order to increase the likelihood of a successful delivery and a quality management system is a key tool for the assurance of project delivery. This chapter provides an overview of the client's role in achieving quality, in particular during the construction phase; although it should be noted that the delivery of quality outputs is secured in all phases of the project delivery from the moment of inception.

Background

2.1. There have been a number of high profile cases recently where public sector works projects have failed to deliver on time or to quality and in some cases with catastrophic results. Notable amongst these is Grenfell Tower, Edinburgh Schools and a number of hospital projects. 72 people died in the Grenfell Tower fire and another 70 people were injured. There were no deaths as a result of the failures of the Edinburgh Schools but the Report of the Independent Inquiry into the Construction of Edinburgh Schools (2017) led by Professor John Cole CBE, noted that this was down to good fortune.

2.2. The delivery of quality is at the heart of the problems that arose on these projects and the subsequent reviews concluded that it is absolutely the responsibility of the client to provide the leadership and management to ensure that quality is delivered in all respects and by everyone involved in their project – regardless of the procurement route used. The quality culture of a project will derive from that of the client organisation.

2.3. Research by the Get It Right Initiative (GIRI)[1] has found that errors in the construction industry cost between £10-25bn per year across the sector and client bodies in the UK. Reducing the requirement for remediation by improving quality and reducing errors would significantly reduce that figure. It noted that whilst the cost often lands initially with contractors this is generally passed on to clients.

2.4. The indirect costs may be significantly more than project costs resulting from errors. All public sector construction projects contribute towards the delivery of public value, for example improved efficiency in delivering health outcomes, or improving transport efficiency. The delay or failure of a public project will have impacts reaching further than simple project costs. The Edinburgh School closures resulting from the failure of construction elements led to disruption across the whole of Edinburgh's schools estate and required a major operation to ensure the continued education of

[1] Get it Right Initiative, Research Report Revision 3 April 2016

pupils and reassurance of the affected communities as well as the physical remediation of the schools.

What is Quality?

3.1. The successful delivery of a construction project depends on many, sometimes competing, factors coming together. Quality is one such factor and an important one. Quality is objective not subjective and must be measureable against a defined standard. It must not be mistaken for a simple aesthetic, a shinier finish or more expensive components. It is a combination of a number of aspects and can be defined as follows:

> *Quality has two elements to it. Firstly, it is about defining a specification which meets the functional and operational requirements of the use and users of the built asset and, secondly, it is about delivery in all respects of that specification through its design, procurement and construction.*

Figure 1.

3.2. Delivery of the specification in itself will comprise a number of aspects of the project and the following schematic describes the key elements which, when they are all present and correct *in all respects,* will mean a quality output has been achieved.

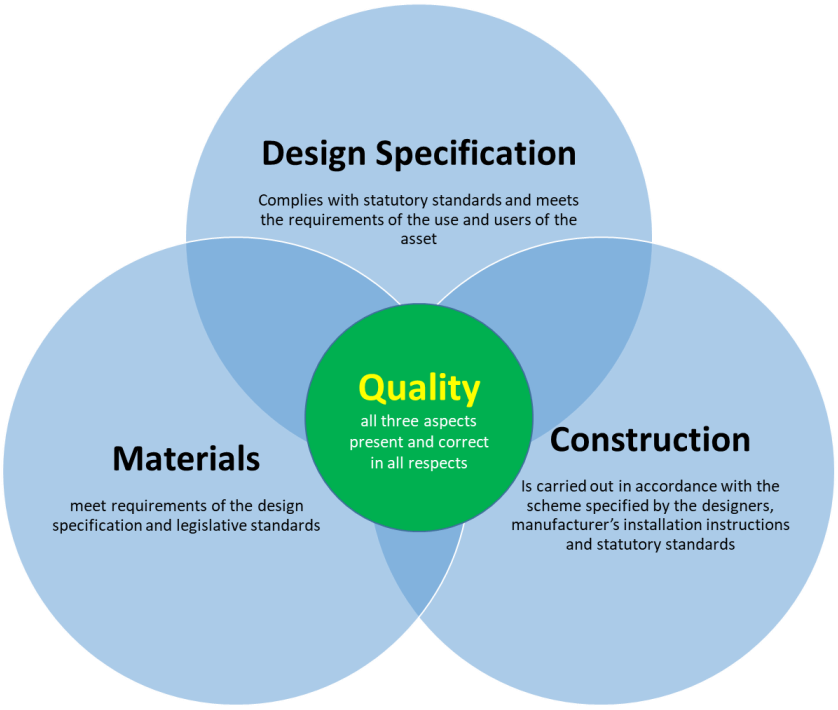


Figure 2: Quality

3.3. Acceptable quality will not be delivered where there is un-remediated deviation from the specification. Therefore, there must be procedures in place to ensure its delivery and deal with any deviation from the specification. Remediation may include correcting the deviation or redefining the specification. This applies to each of the three requirements:

- **Design.** If the design does not meet the statutory and functional requirements of the use and users of the building, acceptable quality is not present.

- **Materials.** If the materials are not ordered, supplied and/or received according to the design specification or manufacturer's standard as set out in the contract, acceptable quality is not present.

- **Construction.** If construction is not in accordance with any or all of the design specification, manufacturer's instructions and statutory requirements, acceptable quality is not present.

3.4. There must be a continual review on behalf of the client by personnel with the requisite skills, expertise and experience of each aspect to ensure that the requirements are being met. This review must be routine as well as in response to planned or 'accidental' deviations. Each aspect should not be viewed in isolation. A change in one is likely to have a knock on impact on another. Therefore, a change prompted by a planned deviation during, for example, construction must be reviewed against that phase but also against the outputs of the design and materials aspects and any remedial action taken.

3.5. The delivery of quality, as described above in *Figure 2*, is a non-negotiable. Contractors and consultants are obliged to deliver it according to their contracts. The contract must set out what is required to deliver the output. The specification should define exactly what is required, no more no less; if more is required then the specification must be amended to reflect that.

3.6. Although the contractor is contractually obliged to deliver the specification the client cannot simply sit back and leave it all to the contractor. They must be proactive in ensuring and assuring that an effective quality management system is in place and being followed regardless of whether the procurement strategy and associated contract documentation places the majority of the risk with the contractor. This requires a collaborative approach led by the client.

3.7. Effective communication is essential and this starts with the client ensuring that everyone involved in the project whether part of the client team, the consultants or the contractors and their sub-contractors, is clear about what is required of them both individually and collectively as a team. This will be done through a number of documents including the business case, personal job descriptions and contracts as well as being reinforced during meetings.

3.8. Procedures must be put in place to deal with issues relating to deviations from the quality standard set out in the specification. Remedial action to address such

deviations must be taken and can include action to either correct the deviation or review whether the design specification requires to be redefined.

Procurement

4.1. Recent reviews have highlighted the positive impact that robust procurement strategies, subsequent contract management and client-based site inspection can have on quality. It is not acceptable for a client to choose a contract route based on the belief that this will absolve them of any of the project risk or subsequent service delivery risk and discharges these responsibilities and associated risk to the contractor.

4.2. Chapter 5 of the Construction Procurement Handbook has a full breakdown and assessment of the main contract forms used to commission public building projects. It includes a matrix that highlights the different requirements, strengths and weaknesses of each strategy, supporting clients to choose the most appropriate contract type for successful delivery of outputs and outcomes. The guidance underlines the importance of not simply choosing a contract which absolves the client of the risk associated with the project.

Quality Management Systems

5.1. The management of quality is a fundamental pillar of overall construction project management and is often the difference between success and failure. Quality management in construction is a combination of the roles and responsibilities, policies, processes and procedures put in place to underpin and support a client's quality environment and culture. These provide the structure that delivers the organisation's ethos and must be fed from the top of the organisation and reinforce that the delivery of quality outputs is a non-negotiable aspect of everything the organisation does, not just in construction projects. These principles along with legislation and guidance – known as the Quality Management System (QMS) – will deliver the quality output desired.

5.2. Quality management incorporates a range of different activities:

- Quality Management System: An organisation-wide approach to directing, controlling and coordinating quality (See Annex A)

- Quality Planning: This ensures that quality requirements are addressed throughout the lifecycles. (See Annex B)

- Quality Control: This focuses on process outputs to ensure that standards are actually met. (See Annex C)

- Quality Assurance: This gives confidence that standards and requirements are being met. (See Annex D)

- Quality Improvement: This process reviews all of the above activities and adapts the system to suit the requirements of the business. (See Annex E)

Leadership

6.1. For a QMS to function and operate effectively, to ensure delivery of the required standard, it is essential that the client's quality systems and policies are driven from the top down by senior management. This means clients must take a proactive role in planning, implementing and operating the QMS, whether directly or through the management of their representatives. The QMS is a reflection of their quality culture and environment, not an add-on or isolated system.

Roles and Responsibilities

7.1. It is essential that the roles and responsibilities of organisations and individuals are set out clearly and understood by all from the outset of a project and this must include clearly defined approval and authority levels. Chapter 3 of the Project Initiation and Business Cases Handbook highlights in greater detail the types of roles and associated responsibilities that are typical within a publicly procured construction project team. These roles should be considered in conjunction with those required by the Construction (Design and Management) Regulations 2015. Guidance on Health and Safety can be found in Chapter 2 of the Construction Phase Handbook.

7.2. From a quality perspective, the formal management system provides the foundation on which a QMS is built. To successfully implement the system it is necessary to establish a culture within the business that embraces quality as a default setting for all aspects of the business. As clients establish unity of purpose and direction for the project, this culture must be set by them and instilled in the project team to ensure all members understand its importance and significance. They should create and maintain an environment in which people can become fully invested in achieving the project's objectives.

7.3. Defining processes and documenting them, where appropriate, is a comparatively simple task. It needs to be based around what people are doing now and encourage them to evolve and develop these into a single way of working. Developing the procedures must recognise actual levels of expertise and experience, including what is required and what might need to be developed or brought in from outside the project team and identifying the means of integrating that into the delivery team.

7.4. A suitably experienced quality management team can also help to develop an appropriate project culture through working directly with the supply chain, where the contract terms permit, as well as providing more formal training and other forms of communication.

Building Standards

8.1. The purpose of the building standards system is to protect the public interest. It is not intended to provide protection to a client in a contract with a builder. The system is pre-emptive and the role of the verifier is to protect the public interest by providing an independent check of applications for building warrants. The applicant for building warrant, or relevant person or their agent, is responsible for achieving compliance with the building standards at all stages of design. Applicants and verifiers can be

supported by certifiers of design and certifiers of construction who are members of schemes appointed by Scottish Ministers.

Budget, Time and Resource

9.1. It is essential that appropriate budgets, timescales and resources are deployed on a project. A project lacking in adequate provision in any, or all, of these elements will be at risk of failure. Risks to the project will include programme delays, non-compliance with regulation, health and safety failures, each of which will pose a risk to the levels of quality which can be achieved and the ability to deliver the required specification. Deficiencies in any of these is likely to have an impact at some point on the aspects described in figure two and will require review and remediation accordingly.

Workmanship

10.1. The standard of workmanship must be continually assessed and, where necessary, challenged by the client. Regular inspection is an essential function of ensuring that the works progress as intended, both in terms of quality and compliance. This requires the appointment of a suitably qualified inspector reporting directly to the client, for example a Clerk of Works; see Construction Policy Note 1/2017 Site Inspection and Assurance. It is essential that the party, or parties, charged with inspecting the works on behalf of the client have sufficient time allocated to deal with the size and complexity of the project.

10.2. The inspection programme process should take the form of a 'top down approach', meaning the client should ensure they promote and maintain a culture of quality through their direct leadership and that of the design team. In turn, this responsibility should be shared down the chain of command of a project, from main contractor to sub-contractor, sub-contractor to sub-contractor and so on. All of these parties have a responsibility for the delivery of quality.

10.3. These inspections are carried out to give an independent overview of the works, either by the client or a third party appointed by the client. Whilst contractual responsibility for meeting the specification lies with the contractor, a client must check work is being delivered accordingly, either through an appointed inspector or, if this is not possible, organised on-site visits, offsite visits, quality meetings, and both arranged and ad-hoc inspections.

Review Processes

11.1. It is essential for clients to set out how work is to be monitored, measured, analysed and evaluated to establish that activities planned or being undertaken are suitable, adequate and effective in delivering the project goals. This ongoing review process is iterative, where each stage is formally holistically reviewed and collaborative action taken to remediate any non-conformities. To be effective, those charged with undertaking the review must have access to all necessary information to allow them to discharge their duty.

11.2. The flow chart at figure 3 provides a possible review process for ensuring that all stages of the project are reviewed to ensure that they achieve a quality output. Note that although this suggests reviews at given points, review should be continual. Reviews should include checks to confirm that all statutory obligations have been complied with. The type of review, and how it is conducted, will be appropriate to the scale and complexity and the stage of the project. For example, the client review during construction will include inspection of works by a clerk of works where appropriate. These should not be confused with gateway or key stage reviews although can be considered as part of the level 1 assurance process.

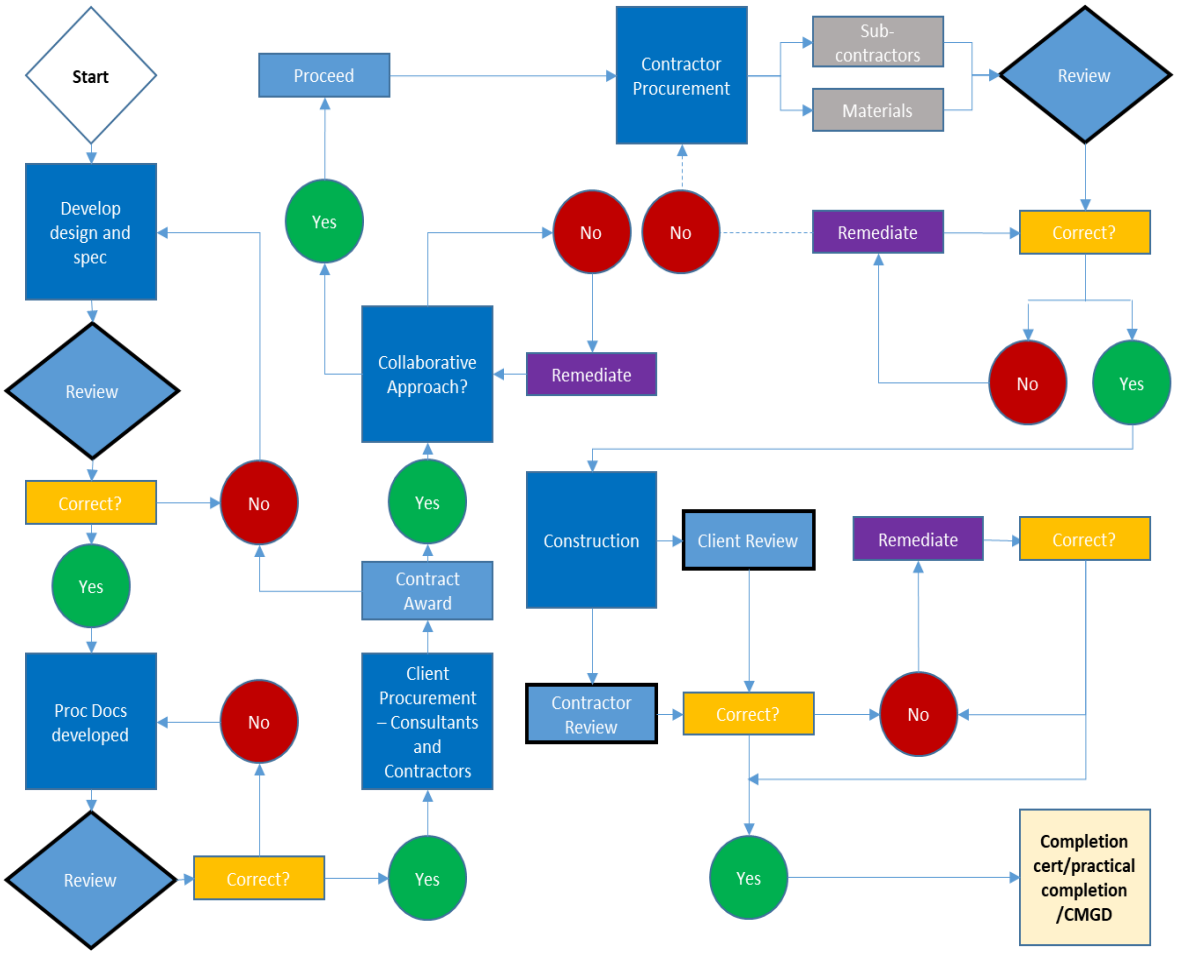


Figure 3

Gateways

12.1. As design and construction projects progress from inception through design and construction to completion and operation, it is vital that the client retains control of the brief, the direction of development and of costs. Typically, this is done by the introduction of key decision points, or gateways, the points at which the client assesses the state of development of the project and its fitness to progress. This allows the client to consider whether: it satisfies their strategic objectives; it is affordable; value is being delivered; and that risks are acceptable. If such a process is not introduced, there is a tendency for projects to gradually wander off-course, with programme, budget and brief negatively impacted. Further guidance on project

assurance can be found in Chapter 13 of the Project Initiation and Business Cases Handbook.

Post Completion

13.1. A 'post project review' should begin during the defects liability period, when the client first occupies the development. A post project review is undertaken to evaluate the effectiveness and efficiency of the project delivery process. This must include a review of the delivery of quality outputs and whether the design specification was achieved with or without any remediation and how that was done. This is essential so that lessons learned may be applied to other projects.

Summary

14.1. Successful project delivery relies absolutely on the delivery of quality as defined in paragraph 7 and is the responsibility of everyone associated with the project. The client must provide the leadership and management to embed a quality culture within the project. Good quality management not only assures the delivery of the built asset but also of the service to be provided through the asset.

ANNEX A

Quality Management Systems

Overview

1. A Quality Management System (QMS) is an all-encompassing approach to directing, coordinating and controlling quality. It is a set of policies, processes and procedures required for planning and executing production, development and service in the core business areas that can impact the organisation's ability to meet specific requirements.

2. A client's QMS should integrate the various internal processes and procedures within the organisation to provide a process approach for project execution. This is a preventative approach, requiring proactive behaviours to prevent issues occurring wherever possible, as opposed to remedying them once they have occurred.

3. A process based QMS enables the contracting authority to identify, measure, control and improve the various core business processes that should ultimately lead to improved outputs and associated outcomes. Specific elements of this overarching methodology are described in greater detail in the other annexes.

Quality Management Systems for Clients

4. Contracting authorities will have a number of stakeholders and interested parties. These stakeholders might include customers, employees, funding partners, contractors, regulatory authorities and so on. All of these stakeholders will have their own requirements, which must be fulfilled. A QMS is a system that will support a client to ensure they meet the requirements of their customers, shareholders and regulation. In outline, it supports this by requiring the following to be done:

- Say what you do (document your QMS)
- Do what you say (follow that documentation)
- Prove it (audit)
- Improve it

5. Most definitions of quality management emphasise the use of some type of system that is repeatable, measurable and constantly improving. For example, in an ISO 9001 quality system, a structured way of delivering a better service or product is supported by documented information such as procedures, work instructions, policies and forms.

6. Regardless of the type of system deployed, the key is to provide all those who execute the quality system with documented, understandable and workable instructions which define both expectations, responsibilities and actions to achieve the stated specification, or 'acceptable quality'. These systems will also require some type

of external and internal auditing process which ensures that the system is in compliance with requirements.

7. The QMS is based on detailed planning and enhanced by quality manuals and tools. An effective QMS should identify risks and provide ways to manage and mitigate them. By identifying and managing these risks, a QMS can also provide an organisation with a more robust system for dealing with planned and unplanned deviations from the specification, ensuring the successful delivery of the asset and associated outcomes.

Quality Management System Process

8. The QMS proposes that the entire business becomes an interactive and linked system of processes that can deliver products and services. For each process within the system, a methodology known as Plan, Do, Check, Act (PDCA) can be applied:

- **Plan**: Establish the objectives and processes necessary to deliver results in line with customer service requirements and company policies.
- **Do**: Implement the process.
- **Check**: Monitor and measure processes necessary to deliver the results.
- **Act**: Take action and continually improve performance.

9. Although a QMS requires certain documents (such as non-conformance reports, a change register and an approved supplier list), a common misconception is that it can be overly burdensome and time-consuming. It should in fact be lean and agile; developed to suit an organisation or specific project according to its size, complexity and risk profile.

10. For a QMS to function and operate effectively to deliver the required standard of product or service detailed in the specification, it is essential that the quality systems and policies are driven from the top down by senior management. Commitment and support is also required from the leadership team to ensure that the QMS delivers the intended outcomes through communication of the policies, correct allocation of responsibilities and the provision of adequate and appropriate training and resources to deliver the project.

ANNEX B

Quality Planning

Introduction

1. Quality planning is the formal analysis and development of the arrangements for how quality will be delivered on a project. In construction, it is about planning for the effective use of resources (people, plant, and equipment) as well as space, information, time, and money to deliver on time, on budget, and to the specification, or 'Acceptable Quality'. It is a proactive process aimed at avoiding situations which may have detrimental impacts on all aspects of project delivery and ultimately the business deliverables of a client.

Overview

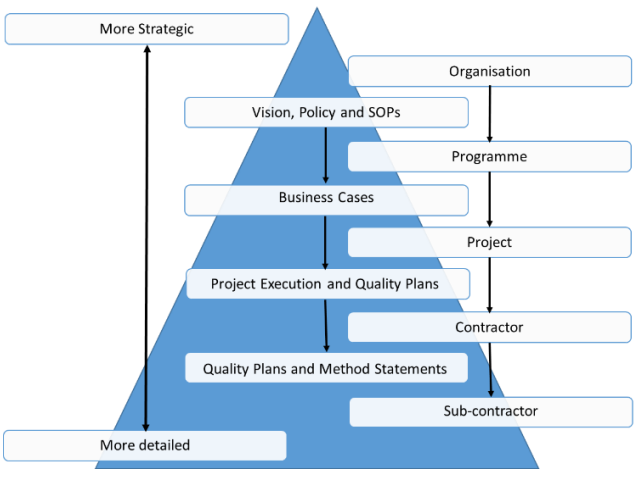
2. Quality planning should encompass all aspects of quality delivery from the overarching client organisational culture down through project governance to the contractors and their sub-contractors. It is good practice for an organisation to define the arrangements and standards for managing and delivering quality and there are two common documents that support this:

- Quality Manuals are generally used to define the generic arrangements for the whole organisation.

- Quality Plans are prepared to cover specific situations, such as an individual project or element of construction work.

3. All quality plans at all levels, from client to the sub-contractors, must be integrated and complimentary to each other and seek to deliver overall organisational aims and the business case of specific projects. The following diagram describes the relationship of quality planning from the most strategic at organisational level where Standard Operating Procedures (SOPs) will be in place through programme and project level where business cases and quality plans will inform activity but be derived from organisational SOPs and down to contractor and sub-contractor quality plans and method statements.

Hierarchy of thinking, planning, delivery and assurance



4. Note that quality plans are produced by both the client and the contractor, they must be complementary but will focus on different aspects. From a contractor's perspective, a Project Quality Plan (PQP) is produced by applying the company's internal systems to the specific construction project requirements, either on or off-site. Examples of this might include the process for ordering and accepting deliveries, the calibration procedure for plant and equipment, or the way labour is recruited, inducted and trained. It must cover the approach to achieving the required quality and how quality will be checked and recorded. The PQP must be drafted by the contractor and provided to the client, before the start of the construction works, as compliance with it should form part of the contractual agreement. The contents of the PQP must be reviewed by the client who must satisfy themselves that it is comprehensive and complete. It must also be kept up to date during the course of the construction contract.

Client

5. The client's PQP is likely to be required by designers and procuring departments and is therefore prepared as part of the project initiation and business case phase of work. It may include the process for appointing consultants, assessing design strategies or the method for reporting to the project sponsor.

6. The client's project manager develops and owns the client's PQP focusing on arrangements, including inspection and other assurance methods, to ensure the contractor delivers the required specification and that the project team deliver the required outputs and subsequent outcomes. To do this, the client's PQP must clearly outline the activities, standards, tools and processes necessary to achieve quality in the delivery of a project and, critically, who is specifically responsible for what within that plan.

Contractor

7. A contractor's PQP can help clients identify how the contractor intends to control the quality of materials and standard of workmanship on site to meet the specification and therefore achieve acceptable quality. This can offer the client an insight into the processes that the contractor will deploy to ensure they uphold the quality management obligations. It gives the client an early opportunity to carry out a gap analysis of the contractor's quality management preparations before they are committed by a contract.

Content

8. Every PQP should be both specific and proportionate to the size of the project and avoid duplicating information that is available elsewhere. The exact contents will be particular to each project but content should include:

- Project Personnel – Details of the Investment Decision Maker, Project Owner, Project Sponsor, Project Manager, Client Advisor and their roles and responsibilities. The contractor's personnel, both based on and off site, should be detailed and their roles and responsibilities clearly articulated.

- Quality Policies – Information regarding company quality policies and procedures, for example ISO 9001 certification. Additional criteria or policies should also be detailed, such as those required by the client or funders.
- Communications – Details of start-up meetings, project meetings, quality meetings and so on. Descriptions of how this information will be disseminated to the supply chains should also be referenced.
- Quality Assurance – How will the Quality Management System be implemented, assessed and reviewed, including how documents are controlled, to assure quality.
- Monitoring and Reporting - Describe the process and procedures for assessing construction work and delivering continuous improvement.
- Inspection and Test Plan – At what stages should the contractors work be assessed by the client or their advisors.
- Change Management – What processes and procedures are in place to ensure change is effectively managed and de-risked?
- Non-Conformance – How will the team deal with non-conformances to prevent them happening again and assist continual improvement?
- Resources – Describe the resources required, including personnel and any training specifically required for the project.
- Standards – List any standards that will apply and the tools and reference material required to implement them.

9. A robust PQP may be multi-layered, that is covering different aspects or levels of the delivery, depending on the complexity of the project and should also form part of a suite of documentation to support the overall governance of a project, outlined in 4.1, *Chapter 2 of the Project Initiation and Business Case Handbook*.

10. The client's PQP should sit within the overarching Project Execution Plan (PEP) which sets out the overall strategy for managing the project, describing who does what and how, and defining the policies, procedures and priorities which will be adopted. On larger projects, the PEP may include (or reference) a number of more detailed plans focusing on specific issues such as; the health and safety plan, risk management plan, value management plan, stakeholder management plan, and so on.

11. Both the PEP and the PQP can help track and control projects which have the potential to progress erratically and intermittently. They should describe the project and processes in such a way that a competent person could take over and maintain the programme, service and performance in the unexpected absence of the individual currently in position.

12. Preventing mistakes is much more time and cost effective than correcting them, which is why establishing a robust PQP is a good way to improve quality. The upfront investment of creating a coherent and comprehensive PQP often pays big dividends throughout the life of a project.

13. Above all, the information must provide for the effective management of quality on the construction project, with all its complexities and interactions. It should be available when needed and organisations must ensure there is full control over any revisions and securely retain all previous versions.

ANNEX C

Quality Control

Introduction

1. Quality control is the function of quality management that ensures that outputs comply with the requirements of the specification set out by the client. It is the method that enables the measurement of the quality characteristics of materials, elements (prefabricated units) and service. It compares them with the established ‘standards’ and analyses the differences between the results obtained and the results required in order to make resolutions which will correct any differences.

Standards

2. The British Standards Institution (BSI) defines a standard as 'something that is generally accepted'. British Standard (BS) publications are technical specifications or practices that can be used as guidance for the production of a product, carrying out a process or providing a service. ISOs (International Standard Organisation) are international standards intended to be used throughout the world.

Specification

3. In construction, the project specification will typically refer to a range of standards for materials to be used, quality of workmanship, test to be performed and so on. By establishing standards, greater reliability and consistency can be ensured in terms of the quality, compatibility and compliance of the particular product, service, or material.

4. A robust and unambiguous specification, communicated in a clear and effective manner, will positively contribute to the quality outputs of a project by ensuring those involved fully understand the requirements, simplifying and accelerating tests and inspections. This can be achieved by ensuring the outputs are achievable and measurable, with subjectivity replaced by objectivity, resulting in a clearer definition of exactly what is required.

Control Activities

5. Control activities in construction, such as verification of compliance with specifications, validation of specific processes, monitoring of activities, inspections and tests, which the materials, elements or services undergo must also be established. These activities can be defined through inspection, testing plans, action plans and where applicable specific tests (for example, slump tests for concrete).

6. Ensuring personnel are provided with adequate training, appropriate instructions and clear checklists is an important part of the quality control process. This is enhanced through on-site supervision and monitoring and an ongoing process of feedback to ensure continuous improvement.

7. A comprehensive record needs to be kept of all validation sign-offs and inspections of work. Supporting such records with photographic evidence would be

beneficial. There are new technologies available to assist with this and their use is encouraged. Full adoption of these technologies will require accessibility by all those directly involved.

Certification

8. The quality control of a product or process can sometimes be replaced with certification of the quality characteristics by third parties. Whilst products that have received officially recognised quality marks may be exempt from controls and reception tests (for example a sling for lifting), the contractor's QMS would require use of product with the correct certification, in lieu of on-site testing.

9. On larger projects it may be appropriate to appoint a resident site inspector or inspectors, often referred to as a clerk of works (see Construction Policy Note 1/2017 Site Inspection and Assurance), to inspect the construction works as they proceed on behalf of the client (for example the installation of fire protection measures), providing certification of the works through independent assessment.

10. It is possible to certify almost any product, process, service or (management) system and, for reference, some examples of UK construction certification schemes include BRE Global Limited (BRE), British Board of Agrément (BBA), BSI Assurance UK Limited (BSI), Kiwa BDA, Lucideon CICS Limited and UK Certification Authority for Reinforcing Steels.

11. All of the above organisations are in turn accredited by the United Kingdom Accreditation Service (UKAS). UKAS is the sole national accreditation body for the United Kingdom. They are recognised by the UK Government, to assess against internationally agreed standards, organisations that provide certification, testing, inspection and calibration services. Therefore, public sector project specification often requires certification bodies to be accredited by UKAS.

ANNEX D

Quality Assurance

Introduction

1. Successful implementation of a Quality Management System (QMS) can enable an organisation to offer assurances about the standard of quality it can provide. Construction quality assurance is a way of preventing defects and mistakes when delivering materials, products and services to customers. This gives confidence that items or services meet requirements and will perform adequately in service.

Assurance Activity

2. To achieve confidence in the output, a set of planned and systematic actions must be incorporated, as part of the QMS, to ensure that products and services consistently comply with the specified requirements and project objectives. These planned actions not only involve checking the final quality of products and services to avoid defects (as is the case in quality control) but also checking quality in a planned way at all the production stages.

3. For the contractor during the construction phase, this might include having procedures in place to ensure the correct drawing revision is being used on site, implementing a policy and process to manage and control change, or having a system to deal with non-conformance to prevent the reoccurrence of mistakes and facilitate continuous improvement.

4. For a client at the start of a project, the most efficient way to confirm a contractor has a suitable QMS and the ability to manage the requirements of the specification, is often to assess their accreditations. Consultants will be expected to be appropriately qualified for the job they have been asked to do and for appropriate activity such as design integration and validation to take place regularly. ISO 9000 standards are widely used and generally accepted in most countries although others are available and procurement documentation should ensure that evidence of an equivalent standard will be accepted. The standards provide guidance and tools for organisations who want to ensure that their products and services consistently meet client's requirements and contractual specifications.

5. A client may request that a contractor has achieved a suite of quality accreditations that evidence their ability to offer assurance in regards to quality on construction projects. Accreditations should require the independent auditing of the organisation on an annual basis, allowing them to confidently evidence certified competence.

6. The function of the accreditations are important as the contractor, likely approached during the initiation and procurement stages, has incumbent responsibilities through these standards. For example, ISO 9001 requires that appropriate processes and procedures are in place to record and communicate the outcome of meetings and that design change is effectively managed. The standards

also ensure that the supply chain is regularly monitored through an approved supplier list.

7. Ensuring the principle contractor has a robust QMS or recognised quality accreditations is an effective way for the client to quickly understand the commitments a contractor has made to achieving and assuring quality. However, whilst quality may be the contractor's physical responsibility to deliver, it remains the client's absolute responsibility and they must therefore ensure they drive performance throughout the project, in addition to any quality certification held by the contractor.

8. The client should undertake this responsibility by utilising their own processes and procedures, holding the contractor and consultants to account at each stage of the construction work. This may be achieved by directly scrutinising the evidence (written checklists, photo/video, drainage tests, pre-pour inspections etc.), but equally by attending meetings, site inspections, checking certificates and so on.

9. On larger projects, the client's representative(s) should undertake this work (in addition to the contractor's own quality control measures) as they proceed to verify compliance with the requirements of the specification. They may be based on site permanently as regular and specific inspections may be required as part of the general contract conditions. It is essential that they have access to all the relevant information with respect to the works.

10. It must be noted that the appointment of representatives or a clerk of works does not alleviate or lessen the responsibility of the client to ensure quality is delivered. Whilst the client has an absolute responsibility to deliver quality this does not nor should it absolve the contractor from of their responsibility for the physical delivery of a quality output in accordance with the contract. The client should remain proactive, continually challenging and questioning the project team to ensure the best outputs are achieved by the project.

11. Consideration should be given to having standalone quality management meetings (separate from the regular project management meetings) during the construction phase. There should be representation at these meetings from sub-contractors and designers as well as the client and main contractor. Checks on the operation of the various assurance and inspection mechanisms should be reviewed as well as discussing any reported non-conformances.

ANNEX E

Quality Improvement

Background

1. A fundamental element of an effective Quality Management System (QMS) is the assessment and checking of work in order to facilitate continuous improvement. In general terms this is a circular practice, or cycle, to target a specific improvement or address a lingering issue.

2. No process is perfect; there is always room to improve. However, continuous improvement is not change for change's sake. Incremental changes are made after reviewing ongoing processes and procedures to establish where enhancements would benefit the system and this can be repeated endlessly. It is also used to ensure good practice can be learned and passed on. This ongoing practice highlights that a responsible client should not rest on their laurels; continuous improvement must always be the goal.

Overview

3. Understanding the construction industry as a collective system, rather than one that is fragmented with numerous, independent roles and tasks will help everyone in the chain improve. Clients, architects, designers, contractors and subcontractors need to work collaboratively in long-term partnerships in order to fully understand and improve the whole process. Quality in construction will not be significantly improved and delivered simply through intervention on site; a more holistic approach of the process needs to be taken.

4. For clients to recognise the importance of their role in the improvement of the whole industry, they need to fully understand how their decisions affect quality in the project and consequently during the lifecycle of the asset. They should consider the impact of changes in the whole process, from design to completion, to drive consistent delivery.

Process

5. During the lifecycle of a construction project, continual improvement should be considered and undertaken from two different perspectives; firstly from a specific small-scale perspective, and secondly from a larger, overarching broad view for overall project lessons learned.

6. This broader view should be implemented at each of the key milestones throughout the project lifecycle, acting as a hold point to ensure a full review is carried out, prior to moving onto the next process. For example, development of the design and specification should be reviewed once complete and not allowed to progress to the development of the procurement documentation until it is fully signed off. Similarly, the procurement exercise should not be allowed to commence until the development of the documentation has been fully reviewed and signed off. In Design and Build procurements the client should ensure that the contractor has sufficient suitable

processes in place to review designs in line with the schematic defining acceptable quality in the main part of this chapter.

Benefits

7. The improvement opportunities offered by quality management of the whole of the project management process can be huge. The Get it Right Initiative sets out some of these https://getitright.uk.com/. Every problem on a construction site offers an opportunity for the appropriate project team members to carry out meaningful investigations into the systemic issues and analysis of how the whole process should be improved.

Collaborative Working

8. It must not be assumed that because the issue is 'on site' that it is simply something to be resolved by the construction team. Wider examples could include a lack of information or the supply of incorrect information, a delay in decision making or the non-payment of invoices within agreed timeframes. These are all examples of issues that will have a significant impact on the project but are not directly related to on-site activities.

9. Clients are responsible for ensuring the contractor understands that when issues arise, they need to feedback any learning to the client, designers and subcontractors, even if that slows project delivery in the short term, as it will pay dividends to all parties in the long term.

10. A client should enable not only the contractor but the whole of the supply chain to succeed by supporting their efforts in learning from their mistakes, conducting proper root cause analysis of quality matters that do arise, and improve the underlying systemic issues that would support continuous improvement. Each improvement made within the supply chain should, even indirectly, benefit the delivery of the asset. This learning process requires distinct and identified lines of communication. This might include toolbox talks, meetings, root cause analysis and project reviews, the requirements of which can be incorporated into contractual documentation.

This publication is available at **www.gov.scot**

Any enquiries regarding this publication should be sent to us at

The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

ISBN: 978-1-83960-364-8 (web only)

Published by The Scottish Government, November 2019

Produced for The Scottish Government by APS Group Scotland, 21 Tennant Street, Edinburgh EH6 5NA
PPDAS655542 (11/19)