

How quality management, efficient programming and cost management enable effective project management of a Birmingham landmark development

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1. Introduction

Across the construction industry, clients are always looking for better quality, lower costs and shorter lead in times (Oakland and Marosszeky 2017). Snow Hill Wharf (SHW), the Birmingham landmark residential development for a London-based property developer, is a prime example of how a company is striving to meet customer demands by delivering London luxury on a Birmingham budget. There are multiple factors that enable a project to achieve high standards of quality within budget and programme. This portfolio will discuss three of these factors - the importance of quality management, efficient project programming and cost management measures – through the lens of SHW and its project team, focussing on the key responsibilities of the Project Manager (PM) when implementing these strategies. Furthermore, this portfolio will critically analyse the implementation of these strategies and their effectiveness in delivering the SHW project.

2. Quality Management

The concept of quality can be difficult to define due to meaning different things to different people (Howarth and Greenwood 2018). This can cause issues when trying to determine whether something is of good quality. Within the construction industry, many companies aim to overcome this issue by implementing quality management systems. Armand V Feigenbaum is considered the creator of the Total Quality Management system (TQM) (Howarth and Greenwood 2018), a method designed to combine quality development, maintenance and improvement across a business in order to achieve maximum customer satisfaction. Furthermore, TQM systems are an effective tool to help construction companies complete projects on time and within budget as poor quality materials, workmanship or due diligence can be costly. However, there are several factors that can inhibit the successful implementation of TQM on construction projects (Haupt and Whiteman 2004).

TQM can be inhibited by the inability to measure success or results on a construction site (Haupt and Whiteman 2004). Lack of methodology to control quality can be a significant barrier to the completion of a project on time and within budget (Shriener et al. 1995). However, there are several systems that can be used to support TQM by allowing construction teams to measure success (Wruck and Jensen 1998).

The SHW project team have instigated several 'quality checks' at all stages of production. In order to help the contractors remain consistent with the quality of work they produce, SHW uses benchmark plots to evaluate progress. As discussed by Oakland and Marosszeky (2017), benchmarking is a useful tool in TQM as it is a way to measure performance, enabling the production of quality products on a consistent basis whilst also minimising costs from poor workmanship and delays from rejected plots. The accepted quality of the benchmark plots is decided between the design team, the project team, and the customer service team. The use of benchmarking at SHW allows the PM to measure progress and address any quality issues that may arise, thus overcoming the issues discussed by Haupt and Whiteman (2004). Contractors are required to handover a certain number of apartments per week to the project team for inspection. This ensures that works are being completed on time and to the standard required. Where works are not up to standard, the contractor will be requested to revisit and carry out remedial works at their own cost.

Another barrier to successful implementation of TQM is a lack of committed or involved management (Haupt and Whiteman 2004) who are united in one vision. As discussed by Glover (2000) and Shriener et al., (1995), limited involvement from management can impede a successful TQM system as it can cause a lack of integration between project teams and other departments (Glover 2000). This can lead to a breakdown of communication between various stakeholders and could hinder the ability to agree on a particular standard of quality. The SHW PM has aimed to overcome this issue by ensuring that all departments are involved from an early stage. When agreeing quality standards for benchmark plots, senior management oversee the snagging process, often using previously completed schemes elsewhere as a method of measuring quality. The level of standard required is then communicated to the PM and customer service teams who complete the snagging process together. The input of the customer service team is essential as they act as representatives for customers, key stakeholders. Stakeholder satisfaction is key to the success of SHW and the responsibility of ensuring this ultimately relies on the joint efforts of senior management, the PM and customer service teams (Oakland and Marosszeky 2017).

Historically, low bid strategies have been the common method used to award contracts (Haupt and Whiteman 2004). However, this method does not allow for sufficient quality assessment and can lead to severe quality issues. Deming's opinion is that this method of awarding contracts should be ended (Yong and Wilkinson 2001) as its obsession with bottom line figures creates a significant stumbling block for companies trying to implement a successful TQM system (Shriener et al. 1995). SHW has successfully navigated this issue by achieving a balance between cost and quality. Quality forms part of the bid criteria and through the collaboration of the PM and commercial team, each package is considered carefully before being awarded to ensure that quality is not being compromised when seeking cost savings. At tender stage, contractors are assessed on their ability to meet the high standards set by the project team. The PM does this in several ways including review of the contractor's quality management system, assessment of design competency and investigation into where products and materials are sourced. This method of quality management is discussed by Howarth and Greenwood (2018). Carrying out these checks at an early stage enables the PM to remove contractors from the tender process who do not meet the company's quality standards. This inevitably has resulted in contracts being awarded in some cases to contractors who did not have the lowest bid, but were viewed as being the most competent at delivering the desired quality by the SHW team.

In summary, a successful TQM system is reliant on the support and directive of the PM and successful implementation in the supply chain. This can be difficult to manage; however, the PM must ensure there is a unified effort from the project team and contractors to achieve a particular standard. The PM is therefore responsible for the training (Howarth and Greenwood 2018) and, in some cases, discipline of those who do not adhere to the TQM system in place. They are also responsible for overseeing the selection of competent contractors and ensuring these contractors maintain the required standard of work without impacting programme or cost, as will be discussed in the next sections of this portfolio.

3. Project Programming

It is essential for a PM to have a systematic approach for managing the duration of a project and any delays that may occur (Shahsavand, et al. 2018; Hoshino and Livengood, 2011). A successful construction project programme will identify a variety of key deadline dates that are critical to the completion of the project, ensuring the construction team can deliver on time and within budget. The duration of a project is determined by the critical path – the key activities that must be completed to complete a project (Lockyer and Gordon 2005). If activities that form part of the critical path are disrupted, it can lead to programme delays and increased costs. There are several factors that can cause delays to a programme and they can be grouped into two categories – internal causes and external causes (Ahmed et al. 2003). Internal causes are those that stem from within an organisation and can range from poor contractual management (Abd El-Razek et al. 2008), design changes, improper planning by the PM (Sambasvian and Soon 2007), and insufficient funds (Gade 2016; Shahsavand, et al. 2018; Sweis et al. 2008). External causes stem from outside of the organisation and are often beyond the organisation's control, such as poor weather conditions, changing socio-economic conditions of the country, and labour and material shortages (Gade 2016). These causes can have a negative impact on the critical path and can leave a company exposed to extended programmes and its associated costs.

As discussed by Memon, et al. (2011), delay in the design process can negatively impact the critical path and ultimately result in a programme delay. Furthermore, if the design is poor or not completed in detail, the project will face further delays and increased costs resulting from variations and re-design (Memon, et al. 2011). The PM has a responsibility to ensure that design consultants keep to programme and that all designs are reviewed and approved in a

timely manner to ensure delays are prevented (Arain and Hong 2009). At SHW, the PM helps to oversee the technical department to ensure that drawings are kept up to date and that any design changes are communicated as soon as possible to the contractors impacted. The conversion of two duplexes into luxury penthouse apartments has put the project team under pressure to complete the redesign and procure the required materials without impacting the programme. The PM implemented a tender events schedule to help track target dates for the penthouse redesign and procurement, holding weekly meetings with representatives from all involved departments to ensure that delays are not incurred. Effective and frequent communication is essential to enable seamless coordination between the involved departments (Doloi 2013), thus allowing the redesign and procurement to take place without effecting programme.

Memon, et al. (2011) highlights that improper planning and scheduling pose a significant risk to programme. Furthermore, an unrealistic programme or a contract duration that has been estimated incorrectly can lead to cost overruns (Memon, et al. 2011; Abdullah, et al. 2009) and a breakdown in relationships between contractors and the client as it sets unrealistic expectations for all parties involved. Accurate planning relies on the project team having a clear understanding of the scope and proposed timescales as well as the tools to monitor progress through the duration of the project (Doloi 2013). This enables the project team to report back to the PM of any issues that have or may arise, allowing the PM to proactively address delay risks before it becomes too late (Doloi 2013). SHW utilises a 'Key Dates' schedule to track handover dates and benefits the project team as well as the contractors to ensure everyone is working towards the same completion date. Furthermore, the PM holds weekly contractor meetings with trades who are identified by the project team as a risk to the critical path. This allows their progress to be monitored more closely and any issues to be addressed quickly and efficiently to avoid programme overrun, reflecting Doloi's (2013) discussion on the importance of proactively addressing issues. These meetings are also an opportunity for the contractor to raise any concerns they may have regarding material or labour supply so that the PM can look for alternative options. These conversations became more important when the project began to feel the impacts of BREXIT and COVID-19.

BREXIT and the COVID-19 Pandemic have been key risks to the construction industry, causing labour and material shortages that have put projects at risk of delayed programmes (Pamidimukkala and Kermanshachi 2021). These issues, although having arisen outside of the

company (Gade 2016), have fallen to the SHW PM to address. During the early stages of the global pandemic, the PM saw fit to close the site for two weeks to implement health and safety measures. Although this created an initial delay to programme, it ultimately allowed the site to reopen and remain open throughout the pandemic. To help mitigate the delay caused, the PM arranged for the site to be open on the weekend to allow contractors the opportunity to make up for lost time. Where contractors experienced labour shortages, it was their contractual obligation to find alternative labour to ensure they did not fall behind programme. BREXIT and Covid-19 have resulted in material shortages (Malik, et al. 2019; Salami, et al. 2021), which has negatively impacted the SHW programme. To combat the delays caused, the project team have explored vesting options for certain materials, such as timber, to ensure that the project continues to run smoothly without any impact on the critical path.

4. Cost Management

Financial difficulties and overrunning costs are one of the key risks facing clients and contractors in the construction industry (Memon, et al. 2011). Inaccurate cost estimation, a poor design, scope gaps and poor site management are all factors that can lead to cost overruns. Although cost management largely falls to the commercial team to oversee, the PM still has a responsibility to understand the cost position of the project in able to ensure that any decisions made regarding design or programme changes have a minimal impact on the budget.

The design stage of a project gives the earliest indication of potential costs (Akintoye 2000; Cheung et al. 2008). A design that is not complete, incorrect, or of poor quality will consequently mean that the initial budget estimation is not correct. Furthermore, it will impede accurate tender sums which will result in increased costs when there are variations to the design later in the project (Akinci and Fischer 1998). A clear design at tender stage enables contractors to realistically value the works, leaving less room for error and subsequent variations (Akinci and Fischer 1998). The PM assisted at the design stage by reviewing drawings, technical details and scopes of works to highlight any missing information. They also acted as a centre of communication, ensuring that all parties were kept up to date with the latest information. Lack of communication at the design stage can easily impede the project team's ability to keep to the budget as a design that is not reflective of the client's wishes will result in variations and subsequent cost implications (Doloi 2013). As highlighted by Chan and Kumaraswamy (1997),

the most common reason for cost overruns during the construction phase are a result of unforeseen design issues not recognised at the design stage.

Accurate cost estimation from the start of a project is essential to effective cost management (Hicks 1992). This implies to the initial cost estimation based on the designs to form the project budget as well as tender submissions from contractors. If the initial cost budget is incorrect, the project team will not be able to award tenders without cost overruns. Similarly, an incorrect estimation by a contractor could increase costs later in the form of variations if the incorrect estimation was due to inaccurate information provided by the project team (Skitmore and Wilcock 1994). The SHW project team have attempted to mitigate these issues by ensuring that each package is scrutinised at tender stage to ensure that the tender submission is inclusive of the scope of works. Fisher, et al. (1995) discusses the benefits of benchmarking contractor tender submissions against one another to determine which is the most accurate cost estimation, a method that is utilised at SHW. The team benchmark costs by obtaining multiple tender submissions for each package, allowing the team to identify contractors who may have over or under priced. Each tendering contract is required to attend several mid and post tender meetings. These form an important part of the tender process as it is where negotiations take place to ensure the best price is achieved and that the contractor can comply with all scope and contractual requirements (Laryea 2013). The PM is involved with these meetings to oversee construction and programme details to guarantee that the contractor is compliant with all the scope requirements. Where a package value is over budget, the PM works with the tendering contractor to identify any value engineering opportunities – a method of analysis that reduces costs without impacting the overall aesthetic or quality of the product (Cheah and Ting 2004) – and communicate these to the senior management team for approval. These steps at tender stage and the involvement of the PM has enabled the SHW team to confidently manage cost and forecast an accurate final account position for each package.

Cost overruns in construction projects are typically seen as a sign of inefficiency (Flyvbjerg et al. 2004), such as poor site and contractual management and decision making (Iyer and Jha 2005; Trost and Overlender 2003). Poor site management can refer to incorrect allocation of resources, late notice decisions, and low labour productivity (Doloi 2012). Poor contractual management can be a lack of material cost control (Doloi 2012), not enforcing contractual clauses and not taking advantage of contra-charge opportunities. At SHW, variations and contra-charges are identified by the site managers, verified by the PM, and tracked on a register

to ensure that all cost saving opportunities are realised. This ensures the commercial department can maintain an up to date cost position and are able to forecast any future costs that may arise from a particular variation. The PM is involved with both site and contractual management as they must oversee progress and decisions on site and understand how this will impact the budget (Frimpong et al. 2003). A clear understanding of the contract as well as progress on site will enable the PM to make quick and effective decisions. It will also allow the PM to help identify any risks or opportunities, which can be tracked on a register and used for cost forecasting, as is the case at SHW where the risks and opportunities register is reviewed monthly by the PM and commercial team to forecast final accounts and the total project expenditure.

Although a contractor is responsible for maintaining a certain level productivity to keep to programme and delivery the desired product, the responsibility for choosing the right contractor for the package lies with either the client or those selected to represent the client, such as the PM (Doloi 2013). A contractor that is not properly vetted could lead to programme delays and cost increases caused by poor productivity and workmanship. As discussed previously, the SHW PM is involved with all stages of the tender process and the involvement with each account does not end there, with the PM attending monthly payment review meetings where they provide key insight onto how each contractor is performing and progressing. This ultimately influences each contractor payment and ensures the project team are not overspending.

5. Conclusion

This portfolio has explored three key areas of construction project management and their effective implementation on a live project. Quality management is an ever-evolving issue within the construction industry as customer wants and needs continue to change. TQM can be a useful tool to manage all aspects of a project, but must be implemented correctly by the PM and used efficiently by the project team (Haupt and Whiteman 2004). SHW is a prime example of how a successful TQM system enables the delivery of a luxury product within budget.

SHW has faced the same challenges as many construction projects including changes in design, pressures on programme, and the consequences of BREXIT and COVID-19. However, through innovative leadership and coordination between the project team and contractors, the

importance of which is discussed by Glover (2000), the impacts have been minimal and have not had a significant overall impact on the critical path or total project cost.

The problems and solutions highlighted by academics - including effective project planning and site management (Doloi 2013), the importance of a detailed design (Akinci and Fischer 1998; Memon, et al. 2011) and an in-depth tender process (Laryea 2013), and the usefulness of cost management tools and programmes (Fisher, et al. 1995) – have been realised and implemented at SHW, demonstrating how quality management, efficient programming and cost management enable effective project management of a Birmingham landmark development.

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