

CONSTRUCTION ENGINEERING MASTERS DISSERTATION ABSTRACT

An exploration of the causes of delays in the detailed design of multi-disciplinary bridge projects

On-time delivery is a key success factor for construction and there are pressures to make construction quicker and more efficient. Despite this, a high proportion of construction projects of all sizes, worldwide, finish late. The problem of delay in construction has been widely studied and many factors have been identified. However, the consistent identification of leading causes of delay is problematic. There is ongoing debate about the extent to which the planning fallacy and optimism bias are responsible, compared with failures of project management, and causes of delay in design have been less well covered. Therefore, this research has explored the extent to which failures of effective planning compared with failures of effective delivery contributed to delays in the detailed design of multi-disciplinary bridge projects in the UK.

The research adopted a mixed methods approach using multiple case studies. The case studies involved four projects comprising 27 bridges, all from a single design organisation working under design and build contracts. A comparison of as-built and as-planned programme activities was undertaken to compute delay for each activity. Interviews were held with 12 project participants and senior project leaders. A model for delay was developed from a thematic analysis of the interviews and was used to assign delay causes to the programme data. In addition, a richer understanding of delay causes was developed from analysis of the interview data.

The key numerical finding from the case studies was that they showed an approximately equal split between planning-related and management-related causes of delay in detailed design. This finding was supported by the deeper qualitative exploration of the interviews. In addition, although not the explicit subject of this study, organisational factors such as relationships, trust and programme ownership were highlighted as important both in causing and mitigating delay. The most significant causes of delay were identified as: inadequate overall imposed duration; start date slippage; unrecognised increase in effort due to concurrency; scope change during delivery together with failures in recognising change and assessing time impacts of change; barriers to deploying more resource; and systemic feedback loops resulting in mitigations worsening rather than reducing delay. It was concluded that effective planning and effective management are both important in avoiding delay in detailed design, with this finding supported by both quantitative and qualitative results.

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