Total Quality Management in Design and Build: Auditing report analysis to develop a monitoring protocol for infrastructural projects

**Citation for published version (APA):**

**Document status and date:**
Published: 01/01/2009

**Document Version:**
Publisher’s PDF, also known as Version of Record (includes final page, issue and volume numbers)

**Please check the document version of this publication:**
- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

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Subject
In Design-and-Build projects as contracted by the Dutch Directorate-General for Public Works and Water Management, the supplier is responsible and liable for the process quality. The client uses audits to monitor the supplier’s performance on critical processes. Although these auditing systems are in use for infrastructural construction projects, their validity and reliability has not been tested.

Goal
The goal of this research is test the validity and reliability of the used monitoring system by analyzing audit reports from projects.

Results
The result is an adaptive monitoring protocol to be used for different types of civil engineering projects.

New highway design in The Netherlands

Company size
Company type
Company’s experience in this project
Tendering process

Number of auditors
Experience of auditors
Age of auditors
Auditor’s company
Combination of auditors
Function of auditors

Technical complexity (1-5)
Size (€)
Size (time)
Time pressure (1-5)
Project type
Project phase

Traffic density during execution (1-5)
Problems with authorities (1-5)

Supplier-related factors
Client-related factors
Project-related factors
External factors

Input variables
The supplier as a dynamic system

1. Quality Management capabilities
2. Communication capabilities
3. Technical capabilities
4. Planning capabilities
5. Financial capabilities
6. Safety capabilities
7. Coordination capabilities
8. Risk Management capabilities

State variables

Performance of the suppliers

Output variables

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Subject
This research project investigates Total Quality Management for infrastructural construction projects. It focuses on Design-and-Build projects as contracted by the Dutch Directorate-General for Public Works and Water Management. One supplier or a consortium of suppliers is both responsible and liable for design and construction phase. For the client this means a change in supplier selection, a different collaboration with the supplier, and a shift from product quality-check to process quality-control. This last change is subject of this research. Process control calls for a Total Quality Management approach to guarantee the end quality. Audits are used to check the supplier’s performance on critical processes. Although these systems are in use for infrastructural construction projects, their validity and reliability has not been tested.

Goals
The objective of this research is to improve Total Quality Management for Design-and-Build infrastructural construction projects. Its goal is twofold: (i) to develop a theoretical framework of critical success factors for large construction projects, and (ii) to write and validate an adaptive monitoring protocol.

Strategy
The data that will be used in this research are audit results that come from project databases. The approach of this research is an explanatory analysis of existing audit reports from Design-and-Build projects to develop a dedicated Total Quality System.

Expected Results
The expected result is a validated monitoring protocol that can be adapted to changing project characteristics.

Preferred Partners Applications / Sponsors
Rijkswaterstaat (Dutch Directorate-General for Public Works and Water Management) and DHV.

Prime Publication / Prototyping

Research Period
2005-2010