

Number of variations and the impact of variations



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Controls for Variations and Variation Orders have been suggested by many researchers

(Mokhtar et al., 2000; Ibbs et al., 2001). Below are 30 approach identified from a literature review to reduce number and the impact of Variations.

These approach were categorized into three categories: Design stage, Construction stage and Design-

Construction interface stage.

Design Stage Approach to Control Variations

Item

Variation Reduction approach

Descriptions

Source

1

Review of contract documents

Comprehensive and balanced Variation clauses would be helpful in improving coordination and communication quality . Conflicts between contract documents can result in misinterpretation of the actual requirement of a project.

(CII, 1994a)

2

Freezing design

Variations in design can affect a project adversely depending on the timing of the occurrence of the changes. Therefore, freezing the design is a strong control method.

Many owners freeze the design and close the door for variations after the completion of the drawings.

(CII, 1990a)

3

Value engineering at conceptual phase

During the design phase, value engineering can be a cost saving exercise, as at this stage, Variation in any design element would not require rework or demolition at the construction site. Value engineering at the conceptual stage can assist in clarifying project objectives and reducing design discrepancies.

(Dell'Isola, 1982).

4

Involvement of professionals at initial stages of project

Involvement of professionals in design may assist in developing better designs by accommodating their creative and practical ideas. This practices would assist in developing a comprehensive design with minimum discrepancies . Practical ideas that are not accommodated during the design phase may affect the project adversely. Variation during the construction

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phase is a costly activity as it may initiate numerous changes to construction activities.

(Arain et al., 2004)

(O'Brien, 1998).

5

Employer's involvement at planning and design phase

Involvement of the Employer at the

design phase would assist in clarifying the project objectives and identifying noncompliance with their requirements at the early stage . Hence, this may help in eliminating Variations during the construction stage where the impact of the Variations can be severe

(Fisk, 1997)

6

Involvement of contractor at planning and scheduling process

Involvement of the Employer at the design phase would assist in clarifying the project objectives and identifying noncompliance with their requirements at the early stage . Hence, this may help in eliminating Variations during the construction stage where the impact of the variations can be severe.

(Fisk, 1997).

7

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Thorough detailing of design

A clearer design tends to be comprehended more readily. This would also assist in identifying the errors and omissions in design at an early stage. Eventually, thorough detailing of design can eliminate Variations arising from ambiguities and errors in design.

(O'Brien, 1998)

8

Clear and thorough project brief

A clear and thorough project brief is an important control for Variations in construction projects as it helps in clarifying the project objectives to all the participants. Eventually, this may reduce the design errors and noncompliance with the Employer's requirements.

(O'Brien, 1998)

9

Reducing contingency sum

The provision of a large contingency sum may affect the construction team's working approaches. This is because the designer may not develop a comprehensive design and would consequently carry out the rectifications in design as Variations during the later stages of the construction project. Therefore, reducing the contingency sum would be helpful in ensuring that the professionals carry out their jobs with diligence.

Construction Stage Approach to Control Variations

Item

Variation Reduction approach

Descriptions

Source

1

Clarity of Variation Order procedures

Clarity of Variation Order procedures is an integral part of effective management of Variation Orders. Early in the project construction stage, the procedures should be identified and made clear to all parties. Clarity of Variation Order procedures would help in reducing the processing time and other mishandling issues.

(Mokhtar et al., 2000)

(Ibbs et al., 2001).

2

Written approvals

Any Variation in the work that involves a change in the original price must be approved in writing by the Employer before a Variation can be executed. Any party signing on behalf of the Employer must have written authorization from the Employer. It is difficult to prove the right for compensation if there is no such authorization from the Employer. In the hectic environment of construction, many verbal agreements can be forgotten, leaving the

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Contractor without any legal proof to get compensation for the Variations works.

(CII,

1990a; Hester et al., 1991; Cox, 1997).

3

Variation Order scope

A well defined scope can assist the professional team in recognizing and planning appropriately to minimize the negative impact of the Variation. The original scope should be clear and well defined to distinguish between a Variation of scope and a Variation due to design development. It is common that there are disagreement between parties in a project was about defining the Variation scope. Thus, the effective definition of the scope of work helps us to identify and manage Variations.

(lbbs et al. 2001).

(CII , 1994b)

4

Variation logic and justification

Variation logic and justification for implementation was one of the principles of effective change management. This principle required a change to be classified as required or elective. Required changes were required to meet original objectives of the project while elective changes were additional

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features that enhanced the project. Knowing the logic and justification behind the proposed

Variations assist the professionals in promoting beneficial Variations and eliminating non-beneficial Variations.

Proposed by (Ibbs et al. 2001).

5

Appointment Project manager from an independent firm to manage the project

Involvement of a project manager from an independent firm would assist in eliminating Variations that arise due to the lack of coordination among professionals. This practice may assist in reducing design discrepancies through early reviews of the contract documents and drawings.

(Arain et al., 2004)

6

Restricted pre-qualification system for awarding projects

A restricted pre-qualification system for awarding projects would act as a filter to select only the capable Contractors for project bids.

(Chan and Yeong, 1995; Fisk, 1997)

7

Employer's involvement during construction phase

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Involvement of the Employer during the construction phase would assist in identifying noncompliance with the requirements and in approving the Variations promptly . The involvement of the Employer during the construction phase allows to keep him aware of ongoing activities and assist in prompt decision making.

(lbbs et al., 2001).

8

Avoid use of open tendering

Competitive open tendering usually encourages the Contractor to price very low to win the contract, especially in bad times when they are in need of jobs. This practice would give rise to the Contractor trying to claim more to compensate for the low price award. Avoiding the use of open tender would help in eliminating the risks of unfair bids. This may also help in reduces Variations that may arise due to the contractor's bidding strategy.

(Chan and Yeong, 1995)

9

Use of project scheduling/management techniques

To manage a Variation means being

able to anticipate its effects and to control, or at least monitor, the associated cost and time impact. The most known scheduling techniques in the construction industry are CPM, PERT and Gantt chart; Microsoft Project

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These techniques are helpful in identifying the critical path of any Variations on subsequent construction activities. Well planned and close monitoring on the schedule plan will helps to reduce the Variations effects on the project.

(Hester et al., 1991)

(Clough and Sears, 1994).

(Mokhtar et al., 2000).

10

Comprehensive documentation of variation order

Through timely notification and

documentation of Variation Orders, participants will have kept their rights and thereby their option to pursue a subsequent claim or to defend against a claim. One of the most aggravating conditions is the length of time that elapses between the time when a proposed contract modification is first announced and when the matter is finally rejected or approved as a Variation Order. Documentation of Variation and claims had assisted in tracking the effects of the Variation and claim events on time and cost. A documented source of knowledge about previous Variation instructions would be helpful in making decisions concerning the appropriate handling of Variation instructions.

(Cox, 1997; O'Brien, 1998).

(Fisk, 1997)

Cox (1997)

Design-Construction Interface Stage Approach to Control Variations

Item

Variation Reduction approach

Descriptions

Source

1

Prompt approval procedures

One of the most aggravating conditions is the length of time that elapses between the time when a proposed contract modification is first announced and when the matter is finally rejected or approved as a Variation . However, the longer the period between recognition and implementation, the more costly the change will be.

(Fisk, 1997).

2

Ability to negotiate Variation

Ability to negotiate Variation is an important factor for the effective control of Variations. Effective negotiation can assist the professional team in minimizing the negative impacts of the Variation. There are certain skills required for effective negotiation of Variations, i. e., the knowledge of

contract terms, project details, technology, labour rates, equipment, methods and communication skills.

(Clough and Sears, 1994)

(Cushman

and Butler, 1994)

3

Valuation of indirect effects

Consequential effects can occur later in the downstream phases of a project. Therefore, it is essential to acknowledge this possibility and establish the mechanism to evaluate its consequences.

Professionals should thus evaluate the total overall effects a change may have on the later phases of a project, in order to manage the Variations effectively.

(Ibbs et al., 2001).

4

Team effort by Employer, consultant and Contractor to control Variation

Coordination is important in a multi-participant environment as in most construction projects Detrimental Variations, which affect the projects negatively, can usually be managed at an early stage with due diligence in coordination.

(CII, 1994a; Assaf et al., 1995).

5

Utilize work breakdown structure

A work breakdown structure (WBS) is a management tool for identifying and defining work. A Contractor should consider using the this as an evaluation tool, especially on large projects. If a Variation involves work not previously included in the WBS, it can be logically added to the WBS and its relationship with the other WBS element can be easily checked. Domino effects can also be traced by the use of WBS.

(Hester et al., 1991; Mokhtar et al., 2000).

(Hester et al., 1991)

6

Continuous coordination and direct communication

coordination, and frequent communication

are essential to reduce miscommunication among team members, hence reduce the chances of occurring Variations

(Assaf et al.,

1995).

7

Control the potential for Variations to arise through contractual clauses

Selection of the appropriate standard contract form (JKR, PAM2006 etc) with the necessary and unambiguous Variation clauses would be helpful in the management of Variations.

Clear procedures presented in the contract and fair allocation of risks can help in resolving disputes through negotiation rather than litigation.

(Cox, 1997)

8

Comprehensive site investigation

Comprehensive site investigations assist in proper planning for construction activities. Differing site conditions are an important cause of delays in large building projects.

Therefore, a comprehensive site investigation would help in reducing potential Variations in a project.

(Fisk, 1997).

9

Use of collected and organized project data compiled by Employer, consultant and Contractor

The Variations works should always be documented for future references.

Hence, better controls for Variations were achievable by sharing a database compiled by all the team members

(Fisk,

1997).

10

Knowledge-base of previous similar projects

From the outset, project strategies and philosophies should take advantage of lessons learned from past similar projects. If professionals have a knowledge-base established on past similar projects, it would assist the professional team to plan more effectively before starting a project, both during the design phase as well as during the construction phase, minimize and control Variations and their effects.

(CII, 1994b).

11

Comprehensive analysis and prompt decision making through computerized knowledge-based decision support system

A Decision Support System (DSS) approach for management decisions seems to be the ideal approach to follow. The system would be helpful in presenting an example scenario of the causes of Variations, their relevant effects and

potential controls that would assist in decision making at the early stage of the Variations occurring.

(Miresco and

Pomerol, 1995).