

MANAGEMENT OF VARIATIONS WITH THE USE OF STANDARD FORMS OF CONTRACT IN PUBLIC SECTOR BUILDING PROJECTS IN SRI LANKA

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Abstract

In most of the public construction projects in developing countries, a large number of ‘variations’ that result from the changes made to the original scopes of the projects urge the need of variation management by the parties to a contract. This study explores the ways of managing variations in public sector building projects executed in Sri Lanka with the use of Standard Forms of Contract. It applied a qualitative research approach and used a comprehensive literature review expert interviews for data collection. Manual content analysis was used to analyse the collected data. The findings reveal numerous causes of variations for which the Employer, Consultant, Contractor, or certain other factors are responsible. The research also reveals that the variations could be minimised by adopting strategies, such as the preparation of a fully detailed Employer’s brief, review of the design and deployment of qualified personnel. The study proposes to modify the variation clause by adding more explanations in the Standard Form of Contract to facilitate effective variation management in Sri Lanka.

Keywords: *Causes of Variation; Forms of Contract; Management Strategies; Public Sector Building; Variations.*

1. Introduction

The construction industry in a developing country is a major contributor to the economic growth of the country, which makes use of human and physical resources while improving the economic efficiency of its processes (De Valence, 2019). The industry can afford to maintain strong links with other industries because of its large and responsive nature (Durdyev and Ismail, 2017). Hence, the contribution of the construction industry to the country’s economic growth and national development is highly acknowledged, especially in developing countries (Niazi and Painting, 2017). However, changes or variations in contracts are common in modern construction projects (Onkar and Bhirud, 2015). These constant variations have an adverse impact on the public sector building projects in developing countries leading to time and cost overruns, work disruptions, conflicts and disputes. Moreover, causes of variations depend on the country, while in a particular country they depend on the sector and its associated development activities (Mhando et al., 2018).

Sri Lanka is a developing country, where the state sector plays a key role in the construction industry supported by the private sector (De Valence, 2019). Central Bank of Sri Lanka (CBSL) (2020) reported that the construction industry has contributed 6.9% to the national Gross Domestic Product (GDP) in 2019. The construction cost of projects has increased progressively over the past decade because of increased demand, increased cost of labour and building materials (Ministry of Finance, 2017), and in particular, due to the variations occur in construction projects (Abidemi et al., 2018). Gunarathna et al. (2018) revealed that a majority of variations in construction projects in Sri Lanka occurs because of the changes made to the initial design by the Employer and the Engineer leading to conflicts in terms of time, cost and quality. Most of the government construction projects in Sri Lanka have many variations, which results in claims and disputes (Jayawardena, 2014). The majority of the claims arise from time and cost overruns; and other deficiencies in the contract (Niazi and Painting, 2017). Therefore, managing variations related costs has been a major concern in the construction industry in Sri Lanka.

In Sri Lanka, the Construction Industry Development Authority (CIDA) has published a series of Standard Bidding Documents (SBD), called ‘Forms of Contracts’, for the procurement of works in contracts executed in the country. They offer a range of contractual provisions that can be used to manage variations in construction projects. Previous studies focused on variation management in the construction industry in Sri Lanka have not discussed the provisions in the Standard Form of Contract for managing the variations in public sector building projects by the parties to a contract. This study,

therefore, explores the ways of managing variations in public sector building projects in Sri Lanka by the parties to a contract by focusing on provisions in the CIDA Standard Forms of Contract. The study initially focuses on identifying causes of variations and the deficiencies of variation clause in CIDA Standard Forms of Contract. Thereafter, the study proceeds to investigate the strategies that will overcome the impact of the variations.

2. Literature Review

2.1. VARIATIONS IN CONSTRUCTION PROJECTS

The term 'variation' refers to any type of deviation from the defined scope or schedule in the initial contract (Keane et al., 2010). According to CIDA/SBD/02 (2007), a variation may include changes to the quantities, quality, levels, positions and/or dimensions, omission or addition of any work and changes made to the sequence or timing of the execution of the Works. Since it is rarely possible to complete a project without making changes to the initial scope of works, variations have become common in construction (Sunday, 2010).

2.2. CAUSES OF VARIATIONS

Many causes of variations have been identified by researchers, and most of those researchers have related the causes to construction project factors such as time, cost and quality, and project stakeholders (Bello and Saka 2017). Abidemi et al. (2018), Jayawardena et al. (2014), Halwatura and Ranasinghe (2013), and Keane et al. (2010) have discussed the causes of variations under four categories: Employer-related variations, Consultant-related variations, Contractor-related variations and other causes, which are beyond the control of the parties. This study used these same categories to explore the causes of variations in public sector construction projects executed in Sri Lanka. 'Changes made to the plans or scope' by the Employer and the 'inadequate project objectives' are prominent causes among the Employer-related causes of variations (Abidemi et al., 2018). The most significant Consultant-related cause identified by Abidemi et al. (2018) and Alaryan et al. (2014) is 'inadequate working drawing details'. According to Mhando et al. (2018) and Onkar and Bhirud (2015), 'design discrepancies' is significant in the public sector building projects in developing countries. 'Differing site conditions' is the most prominent cause of Contractor-related variations in public sector construction projects in developing countries (Sunday, 2010, Jayawardena et al., 2014). 'Weather conditions' highly contribute to variations in developing countries (Jayawardena et al., 2014; and Abidemi et al., 2018). However, Onkar and Bhirud (2015) mentioned that 'weather conditions' and 'unforeseen problems' are equally important other causes of variations in construction projects.

2.3. MANAGEMENT OF VARIATIONS

Variation management in construction contracts involves identifying, initiating, instructing, approving, and valuing variations (Ministry of Finance, 2017). According to Arain and Pheng (2005), the construction process can get affected by variations and unpredictable factors depending on the performance of the parties to the contract, availability of resources, environmental conditions, the involvement of other stakeholders and contractual relations. The authors further explain that if project team members have proficient knowledge and previous experience in similar projects, proper planning could be facilitated throughout the design and construction phases to minimise and control variations and their consequences. Table 1 presents the strategies that will help to manage variations that were identified by past researchers and by the expert interviewees.

2.4. STANDARD FORMS OF CONTRACT

The Standard Forms of Contract set out the basic procedures and rules for managing variations (Singh, 2002). In commercial contracts, there has to be a provision to make changes to a contract in writing signed by or on behalf of both parties to the contract (Halwatura and Ranasinghe, 2013). The

National Procurement Agency (NPA), Sri Lanka (2007) recommends procuring entities to use the series Standard Bidding Documents (SBDs) published by Construction Industry Development Authority (CIDA) as Forms of Contract with minimum changes made to the general provisions, where necessary. The CIDA/SBD/02 (for major contracts) stipulated a few clauses as provision for variations that encompass how to initiate variation by the Engineer, the Contractor's obligations, what constitutes a variation, the process of value engineering, management of provisional sum and dealing with minor or incidental works in the contract.

2.5. THE NEED FOR MANAGEMENT OF VARIATIONS

Undoubtedly, managing variations is one of the most critical factors in building projects that lead directly to the successful project completion. The significant increase in labour and material prices together with the increased demand that exists for construction has increased the costs of building projects in Sri Lanka (Ministry of Finance, 2017). These causes are common in public sector building projects in developing countries (Onkar, 2015; Abidemi et al., 2018). Mhando (2018) states that a large number of variations found in these projects affect the cost and construction programmes of the projects. Arain and Pheng (2005) explained that disputes in contracts arise because of the shortcomings in the contractual provisions in the contracts. According to the Ministry of Finance (2017), variations have to be properly managed using the provisions in the conditions of contract. The rights and obligations of each party to the contract have to be properly defined in the contract to ensure a fair distribution of risks among the parties concerned. Thus, to enhance the variations management in government building projects in Sri Lanka, it is necessary to be aware of their causes to realise the impact towards project execution and the strategies that can be adopted to manage these variations.

3. Methodology

The research question of the study was 'How to manage the variations in public sector building projects in Sri Lanka?'. Thus, a comprehensive literature review was first done followed by expert opinion survey to collect the empirical data through qualitative means. Seventeen experts, who were well conversant with managing variations in construction projects and with more than 15 years of experience in such projects were selected using non-probability purposive sampling. The expert interviews were conducted to check initially, the validity of the literature findings on causes of variations and strategies to manage variations. Subsequently, interviewees were encouraged to present their viewpoints on causes of variations, modifications to CIDA Standard Forms of Contract and strategies to manage variations in the public sector building projects in Sri Lanka. The collected data were analysed using manual content analysis, which is appropriate for analysing qualitative data (Kumar, 2011).

4. Findings and Analysis

4.1. CAUSES OF VARIATIONS IN PUBLIC SECTOR BUILDING PROJECTS IN SRI LANKA

The interviewees were asked to comment on the causes of variations in public sector building projects that were identified from the literature and present any other causes of variations they have encountered while working in Sri Lanka (Table 1). The highlighted causes in Table 1 are the new causes identified by the interviewees as specific to Sri Lanka. All the respondents accepted, 'changes made to the plans or scope' and 'inadequate project objectives' as Employer-related causes of variations in construction projects in Sri Lanka.

Table 1. Causes of variations in public sector building projects in Sri Lanka

Causes	I-1	I-2	I-3	I-4	I-5	I-6	I-7	I-8	I-9	I-10	I-11	I-12	I-13	I-14	I-15	I-16
Employer-related Causes																
Changes made to plans or scope	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Inadequate project objectives	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Replacement of materials or procedures	√	√	√	√	√	√	√	-	√	√	√	√	√	√	√	√
Impediments to prompt decision-making	√	√	√	-	-	√	-	√	√	-	√	√	√	-	√	√
Obstinate nature of the Employer	-	-	-	√	-	√	√	√	√	√	√	√	√	√	-	√
Changes made to the schedule	-	-	-	√	√	√	-	√	√	√	√	√	√	-	√	-
Financial problems of the Employer	√	-	√	-	-	√	-	-	-	√	-	-	√	√	√	-
Changing of the Employer	-	-	√	-	√	-	-	-	-	-	-	-	-	-	-	√
Changes made to the Employer's requirements	-	-	√	√	√	-	-	-	-	-	-	-	-	-	-	-
Changing of the land/ location	-	-	√	-	√	-	-	-	-	√	-	-	-	-	-	-
Absence of financial arrangements	-	-	-	-	-	√	-	-	-	√	-	-	-	-	-	-
Differences in business strategies	-	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-
Consultant-related Causes																
Inadequate working drawing details	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Design discrepancies	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Errors and omissions in the designs	√	√	√	√	√	√	-	√	√	√	√	√	√	√	√	√
Changes made to the design/ specifications	√	√	√	√	√	√	-	√	√	√	√	√	√	√	√	√
Unavailability of the required data	√	-	√	√	-	√	√	√	√	√	√	-	√	√	√	√
Incompatibilities among contract documents	√	-	√	√	-	√	-	√	√	√	√	-	√	√	√	√
Lack of coordination	-	-	-	√	-	√	√	√	√	√	√	√	√	√	√	√
Lack of judgment and experience	-	-	-	√	-	√	√	√	√	√	√	√	√	√	√	√
Lack of knowledge on the material availability	-	-	-	√	√	√	-	√	√	√	√	√	√	√	√	√
Inadequate scope of work given for Contractor	√	-	√	√	√	√	-	√	-	-	-	-	-	√	√	√
Inadequate investigations	-	-	-	-	-	-	√	√	-	-	-	-	-	-	√	-
Inadequate design periods	-	-	-	-	-	-	√	√	-	-	-	-	-	-	√	-
Design developments	√	-	√	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractor-related Causes																
Differing site conditions	√	√	√	-	-	√	√	√	√	-	√	√	-	√	√	-
Misinterpretation of contract documents	-	√	-	-	-	√	-	-	√	√	-	-	√	√	√	-
Lack of strategic planning	-	-	-	-	-	-	-	-	√	√	-	-	√	√	√	-
Unavailability of materials and equipment	-	-	-	-	-	-	-	-	√	√	-	-	-	√	√	√
Lack of communication	-	-	-	-	-	-	-	-	√	√	-	-	√	√	√	-
Shortage of skilled manpower	-	-	-	-	-	-	-	-	√	√	-	-	√	√	√	-
Defective workmanship	-	√	-	-	-	-	-	-	-	-	-	-	√	-	√	√
Financial difficulties	-	-	-	-	-	-	-	-	-	-	-	-	√	√	-	√
Weak procurement process	-	√	-	-	-	-	-	-	√	-	-	-	-	-	-	√
Value engineering options	√	-	√	-	-	-	-	-	-	-	-	-	√	-	-	-
Other Causes																
Changes in government regulations	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Unforeseen problems	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Unavailability of construction materials and equipment due to closure and siege	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Internal political problems	√	√	√	√	-	√	√	√	√	√	√	√	√	-	√	√
Change in economic conditions	√	√	√	√	-	√	-	√	√	√	√	√	√	-	-	√
Socio-cultural factors	√	√	√	√	-	√	√	√	√	√	√	√	√	-	-	√
Safety considerations	√	√	√	√	-	√	√	√	√	√	√	√	√	-	-	√
Weather conditions	-	√	-	√	-	√	-	√	-	√	√	√	-	√	√	√
Public objections and issues related to environmental clearance	-	-	-	-	-	-	-	-	-	√	√	-	-	-	-	-
End-user requirements	-	√	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Moreover, ‘Changing of the Employer’ and ‘changes made to the Employer’s requirements’ were highlighted through expert interview survey as the two most significant Employer-related causes of variations specific to the public sector building projects in Sri Lanka. ‘Inadequate working drawing

details' and 'design discrepancies' are the two most prominent Consultant-related causes as conformed by the interviewees, whereas 'inadequate investigations' and 'inadequate design periods' were the two most significant Consultant-related causes specific to Sri Lankan public sector building projects. Even though the Contractor does not contribute to variations, differing site conditions could be a cause of variations during the construction phase, as confirmed in literature and through the expert survey. Besides, the interviewees argued, value engineering options may cause variations in Sri Lanka due to lack of knowledge and experience in implementing such methods in the local context. 'Changes in government regulations', 'unforeseen problems', and 'unavailability of construction materials and equipment due to closure and siege' were the other causes confirmed by all the interviewees as the causes related to public sector building projects in Sri Lanka. Furthermore, 'public objections and issues related to environmental clearance' were found to be a major causes of variations in Sri Lanka, which is beyond the control of the parties to the contract.

4.2. MANAGEMENT OF VARIATIONS BY THE PARTIES TO THE CONTRACT

The interviewees were also requested to verify the strategies to address the causes of variations that were identified from the literature, are applicable in Sri Lanka and to propose any new strategies that would avoid or minimise the causes of variations in public sector building projects in Sri Lanka (Table 2). The strategies that are applicable specifically in Sri Lanka and, which are not mentioned in the literature are highlighted in Table 2. All of the interviewees confirmed that the Employer has to 'provide a fully detailed Employer's brief' that was recognised from the literature and 'define project objectives clearly at the inception stage' to minimise variations, as a specific strategy to the Sri Lankan context.

Table 2. Strategies to manage variations in public sector building projects in Sri Lanka

Proposed Strategies	I-1	I-2	I-3	I-4	I-5	I-6	I-7	I-8	I-9	I-10	I-11	I-12	I-13	I-14	I-15	I-16	I-17
Strategies to manage variations by the Employer																	
Provide a fully detailed Employers' brief	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Deploy in advance suitably qualified personnel									√	√							
Adopt standardisation of materials and documents	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√
Establish realistic time frames				√	√	√		√	√	√	√	√	√		√		√
Assess probable risks through initial investigations									√	√							
Settle all land-related issues as early as possible	√		√							√							
Arrange to fund according to realistic budget plans	√		√			√				√			√	√	√		√
Appoint a technical person to assist in design works																	√
Define project objectives clearly at the inception	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Establish a proper communication system	√	√	√			√		√	√		√	√	√		√	√	√
Arrange team-building activities/ regular meetings				√		√	√		√	√	√	√	√	√		√	√
Establish policy decisions at the inception	√		√														√
Appoint an independent party to delegate the authority of project management						√											
Impose contract boundaries	√	√	√	√		√	√	√	√	√	√	√	√				√
Educate the general public through awareness programmes on the level at which politicians can interfere with the project					√							√	√	√			√
Conduct advanced environmental impact assessments for large scale projects																	√

Proposed Strategies	I-1	I-2	I-3	I-4	I-5	I-6	I-7	I-8	I-9	I-10	I-11	I-12	I-13	I-14	I-15	I-16	I-17
Recommend available/ standard materials															√		
Build awareness about safety manuals/standards	√	√	√	√	√	√	√		√	√	√	√				√	√
Conduct feasibility studies											√	√					
Strategies to manage variations by the Consultant																	
Coordinate with the Employer									√	√							
Monitor the construction programme continually						√											
Review the design/ produce coordinated drawings	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Identify the Employer’s requirements in advance									√	√							
Prepare a coordination matrix/ coordination plan				√	√	√	√	√	√	√	√	√	√	√	√	√	√
Deploy qualified and knowledgeable staff				√	√	√	√	√	√	√	√	√	√	√	√	√	√
Site investigations before the finalise the design	√	√	√			√	√	√	√	√	√	√	√	√	√	√	√
Make provisions for pre-ordering of materials									√	√			√	√	√	√	√
Draft the standard contract document		√				√			√	√			√	√	√		√
Use straightforward contract language										√							
Allow contingency provisions	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Advise the Employer on established brands/ alternatives of materials and goods						√									√		
Estimate the cost using historical data and conduct a market survey if possible	√	√	√	√		√		√	√	√	√	√	√			√	√
Incorporate relevant safety standards for contract documentation																	
Consider historical data (flood levels, rainfall, etc.) and incorporate them into the design		√		√		√		√		√	√	√		√	√	√	√
Be well-conversant with existing government regulations and potential changes	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Attend continuous professional development events and technical sessions for knowledge upgrading											√	√					
Phase-out the work to suit the available budget																	√
Conduct a market analysis and obtain suppliers’ correspondence on the required materials and equipment									√								
Specify a range of products/ alternatives for items, where necessary									√	√			√	√	√	√	√
Strategies to manage variations by the Contractor																	
Propose value Engineering options						√											
Update the construction programme and inform the consequences to the other parties											√						
Consider a risk factor at the time of tendering										√							
Raise ‘Request for Information’ as early as possible																	√
Deploy a competent staff									√	√			√	√	√		√
Establish a proper communication network among the project team									√	√			√	√	√		√
Arrange manpower subcontractors									√				√	√	√		√
Adopt low labour incentive methods									√	√							
Supervise the staff and provide training facilities, whenever necessary		√											√		√	√	√
Pre-arrange funding														√	√	√	√

‘Review the design’, ‘produce coordinated drawings’ and ‘allow contingency provisions’ were the strategies proposed by the previous studies and conformed by all the respondents. In addition, ‘well-conversant with the existing government regulations and potential changes’ was discussed as the prominent strategy to manage variations in the Sri Lankan context that can be adopted by the Consultant. The research findings revealed less number of strategies, giving the responsibility to the Contractor in managing variations. However, the Contractor can contribute to manage variations by deploying competent staff and by establishing a proper communication network among the project team members in the Sri Lankan public sector building projects.

4.3. MODIFICATIONS REQUIRED IN THE STANDARD FORMS OF CONTRACT TO FACILITATE VARIATION MANAGEMENT

CIDA/SBD/02 (2007) has provided contractual provisions to manage variations in construction projects in Sri Lanka. As indicated in Table 3, the interviewees agreed that the stipulated provisions were adequate for the time being especially in public sector building projects in Sri Lanka. They suggested that ‘Sub-clause 13.4: Provisional Sums’ be defined separately from ‘Clause 13: Variations and Adjustments’ since the two clauses refer to two different scenarios, which have to be handled separately. The Particular Conditions of Contract have to stipulate a maximum limit for the provisional sums and specify the evaluation method, the party who will design the work and when the provisional work items would commence. It was also proposed to remove ‘Sub-clause 12.4: Omissions’ from ‘Clause 12: Measurement and Evaluation’ and include it under Clause 13. The interviewees further, stated that it is necessary to have a time frame for the Engineer to approve a proposed variation relating to the scope of works, programme and costs as described in ‘Sub-clause 13.3: Variation Procedure’. Then the Works relating to the variation have to commence upon a fair and reasonable approval of the same, thereby reducing the risks that the Contractor and Employer will have to face in this regard. According to Sub-clause 13.1, the Engineer may initiate the variations without obtaining the prior approval of the Employer. This could lead to the wrong use of the clause as some tend to cover-up their faults at the design stage. This shall be enlightened more as stipulated in the FIDIC Form of Contract under Sub-clause 3.1: Engineer’s Duties and Authority, where the Engineer shall obtain special approval from the Employer for the works instructed under the variation clause except in an emergency, or if such variations would not increase the amount prescribed in the contract.

5. Discussion

The interviewees discussed that the change in specifications is a common cause of variations in public sector building projects in Sri Lanka. Mhando et al. (2018) discussed that the unavailability of detailed drawings and specifications before the commencement of the tendering stage would lead to claims and disputes at a later stage. Hence the respondents also argued, the Employer’s requirements at the outset of the project. Proper coordination of the design process by the Consultant as discussed by Abidemi et al. (2018) and confirmed by the interviewees will minimise the ambiguities in the drawings and avoid missing elements in the design. Bello and Saka (1995) indicated that the appointment of an independent cost advisor is a good strategy for effective cost management starting from the inception of a project. Thus, the interviewees proposed to have an independent quantity surveyor to assist the Employer in the cost related matters of the project. The Contractor is entitled to receive payment for variations under the contract with the rate or the price determined by the Engineer. However, even when the rate of a particular item has not been reasonably determined by the Engineer, the Contractor has to carry out the work diligently without any delay, which will lead to disputes as it will be unfair for the Contractor, especially in public sector building construction projects. The interviewees stated that it is necessary to have a time frame for the Engineer to approve a proposed variation relating to the scope of works, programme and costs as described in ‘Sub-clause 13.3: Variation Procedure’. Then the Works relating to the variation have to commence upon a fair and reasonable approval of the same, thereby reducing the risks that the Contractor and Employer will have to face.

Table 3. Compatibility of Sub – Clauses in Variations and Adjustments in CIDA/SBD/02 Conditions of Contract

Sub-Clause	Clause Particulars	Applicability		Major amendments required (if)	Any other proposals to improve
		Adequate	Inadequate		
13.1	Right to Vary – Initiation of variations, what constitutes a variation	Agreed by all the interviewees	–	–	–
13.2	Value Engineering – the process of value engineering	Agreed by all the interviewees	–	–	–
13.3	Variation Procedure – the flow of establishing a variation order	Agreed by all the interviewees	–	–	<ul style="list-style-type: none"> ▪ The works coming under variations should be implemented after getting them approved in terms of quality, time and cost (I 06) ▪ Reasons for variation should be indicated in the variation order (I 15)
13.4	Provisional Sums – Executing a provisional sum item by the Contractor under the variation procedure	Agreed by 16 interviewees	I-05	<ul style="list-style-type: none"> ▪ Excluding the clause from the section and having it separately (I-05) 	<ul style="list-style-type: none"> ▪ Some additional information should be provided in Contract Data (I 15)
13.5	Day Works – Executing a work of minor or incidental nature as a variation on day works basis	Agreed by all the interviewees	–	–	–
12.3	Evaluation – valuation of variations	Agreed by all the interviewees	–	–	<ul style="list-style-type: none"> ▪ Adjustment of Sub-clause 12.3 (a) ii. (I 09)

6. Conclusions

The study classifies causes of variations in public sector building projects as Employer –related; Consultant-related; Contractor-related; and other causes. The most significant Employer-related causes are ‘changes made to plans or scope’ and ‘inadequate project objectives’, whereas ‘inadequate working drawing details’ and ‘design discrepancies’ are the most prominent Consultant-related causes in public sector building projects in Sri Lanka. Even though the Contractor is not responsible for variations most of the time, ‘differing site conditions’ could be a cause of variations at the construction phase. ‘Changes in government regulations’ and ‘unforeseen problems’ are the noteworthy causes that come under other causes. The strategies to avoid or minimise variations has to be adopted by the party responsible for the variation while other parties also can adapt their strategies to avoid the variation. The respondents suggest several amendments to Clause 13.0: Variations and Adjustments in CIDA/SBD/02 Conditions of Contract. They propose to combine all the relevant clauses of variations under one section; including Sub-clause 12.4: Omissions under Clause 13; and excluding Sub-clause 13.4: Provisional Sums from Clause 13. Further, the delegation of authority to the Engineer shall be rationalised in a way that no party to the contract get affected on Engineer’s instructions under Sub-clause 3.1. The study revealed a range of causes of variations and strategies to manage variations in public sector building projects in Sri Lanka. The outcome of the study would be useful to the parties to a contract to identify the possible causes of variations in advance. Further, the strategies mentioned

could be used to overcome the effects of variations and avoid disputes among the parties to a contract. The study can be extended by modelling a management framework for variations in construction projects in Sri Lanka.

7. References

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