

**A LONGITUDINAL ANALYSIS ON VARIATIONS IN
WATER SUPPLY PROJECTS IN SRI LANKA:
EMPLOYER'S PERSPECTIVE**

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Degree of Master of Science in Project Management

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DECLARATION

I declare that this is my work and this dissertation does not incorporate without acknowledgment any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgment is made in the text.

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The above candidate has carried out research for the Masters Dissertation under my supervision.

Name of the supervisor: Dr. (Mrs.) Chandanie Hadiwattage

Signature of the supervisor:

Date : 07.09.2024

A longitudinal analysis on variations in water supply projects in sri lanka: Employer's perspective

The water supply industry in Sri Lanka plays a critical role in ensuring the availability of safe and reliable water to its population, yet it faces challenges such as variations in construction projects that can significantly impact project outcomes. This study aimed to explore the reduction of Sri Lankan Water Supply Construction Variations. Different water supply projects of 15 districts for the last five years (from 2019 to 2023) were considered for the analysis. The foundational data for this thesis were acquired with authorisation from the National Water Supply and Drainage Board in Sri Lanka. The raw data has been analysed and found seven different types of variations repeatedly and mostly occurring in the recent water-related projects in Sri Lanka. They are extra work variations, special schedule of rate, omission orders, time extension claims, delay claims, savings orders, and in lieu orders. The most affected type of variation among the identified projects in the 15 districts was found by categorising the entire variation quantitatively, on a longitudinal cross-sectional basis, and by monetary values of the variations. When considering the frequency according to the nature of variations, the Special Schedule of Rate (SSR) holds the highest percentage (62%). However, when considering the monetary values, the Omission Order has the dominant impact with a percentage of 65.46% against the contract sum of all considered water supply projects. When employing a threshold of a 3% increase in the initial contract value as a marginal criterion, it is noteworthy that over 50% of water supply projects in Sri Lanka have surpassed this marginal threshold. The variations have occurred due to different causes, which are defined moral understanding of projects and expert opinions. They are design issues, scope changes, unforeseen site conditions, delay caused by the owner, variation in quantity, government regulations, oral change orders, and force majeure claims. The most dominant cause of variations among the identified projects in the 15 districts is found by categorising the entire variation according to the quantitative. The most frequently occurring cause of claim was the unforeseen site conditions. In summary, this research presents promising solutions to effectively manage the variation orders that occurred in water supply projects in Sri Lanka.

Kywords : Water supply construction Variations, Variation orders, Causes of Variations, Quantitative analysis, Financial analysis

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LIST OF ABBREVIATIONS

Abbreviation	Description
BOQ	Bills of Quantities
CBO	Community-based organizations
CEA	Ceylon Environment Authority
DI	Ductile iron
ERQ	Export Retention Quota
EWO	Extra Work Order
GCC	General Condition of contract
HDPE	High Density Polythene pipe
HSR	Hiway schedule of rates
ILU	In Liu Order
MOV	Motor operated valve
NWS&DB	National Water Supply and Drainage Board
O&M	Operation and maintains
OIC	Officer in charge
OMM	Omission Order
PRDA	Provincial Road Development Authority
RDA	Road Development Authority
RM	Regional Manager
RRM	Random Rubble masonry
SGS	Society Generate de Surveillance S,A
SL	Srilanka
SSR	Special Schedule of Rate