

## REFERENCES

1. Al-Kharashi, A., & Skitmore, M. (2009). Causes of Delays in Saudi Arabian Public Sector Construction Projects. *Construction Management and Economics* (27), 3-23.
2. Assaf, S., & Al-Hejji, S. (2006). Causes of Delays in Large Construction Projects. *International Journal of Project Management* (24), 349-5.
3. Clarke, A. (1999). A Practical use of key success factors to improve the effectiveness of Project Management. *International Journal of Project Management, Vol.17* (No.3), 139-145.
4. Clough, R. S. (2000). *Construction Project Management* (4th Edition ed.). New York, USA: John Wiley & Sons.
5. Elyse. (2009, May 20). *AntiClue: PMP Tools*. Retrieved October 13, 2010, from AntiClue: <http://www.anticlue.net/archives/000916.htm>
6. Faridi, A., & EI-Sayegh, S. (2006). Significant Factors Causing Delay in the UAE Construction Industry. *Construction Management and Economics* (24), 1167-76.
7. Frimpong, Y. E., & Oluwoye, J. H. (2003). Significant Factors Causing Delay and Cost Overruns in Construction of Ground Water Project in Ghaha. *Journal of Construction Research* (4(2)), 175-187.
8. Gibson G.E., a. W. (2001). Scope Definition , A Key to Project Success. *COBRA 2001* (pp. 2-11). RICS Foundation, Caladonia University.
9. Hanna, A. C. (2002). Quantitative Definition of Projects Impacted by Change Orders. *Journal of Construction Engineering and Management*, 128, No.1, 57-64.
10. Hendrickson C. (2008). *Fundamental Concepts for Owners, Engineers, Architects and Builders*, 2.2. (a. A. Hendrickson C., Producer) Retrieved 08 08, 2010, from Project Management for Construction: [http://pmbook.ce.cmu.edu/02\\_Organizing\\_For\\_Project\\_Management.html](http://pmbook.ce.cmu.edu/02_Organizing_For_Project_Management.html)
11. Jawad, R. A. (2009). Variation Orders in Construction Projects. *Journal of Engineering and Applied Sciences*, 4 (3), 170-176.
12. Latham, M. (1994). *Constructing The Team*. Joint Review of Procurement and Contractual Arrangements in the United Kingdom Construction Industry, Department of The Environment. HMSO.

13. Liberman B. (2001). *Management: The Rational Edge*. Retrieved 08 08, 2010, from The Rational Edge:  
[http://www.therationaledge.com/content/nov\\_01/m\\_projScopeManagement\\_bl.html](http://www.therationaledge.com/content/nov_01/m_projScopeManagement_bl.html)
14. Ling, F.Y.Y., Low, S.P., Wang, S.Q. and Lim, H.H. (2009). Key Project Management practices affecting Singaporean firms' project performance in China. *International Journal of Project Management*, 27, 59-71.
15. Long, N., Ogunlana, S., Quang, T., & Lam, K. (2004). Large Construction Projects in Developing Countries : A Case Study From Vietnam. *International Journal of Project Management* (20(7)), 553-61.
16. Machal T. (2003, February 03). *White Papers: TechRepublic*. Retrieved 08 10, 2010, from TechRepublic: [http://articles.techrepublic.com.com/5100-10878\\_11-5034294.html](http://articles.techrepublic.com.com/5100-10878_11-5034294.html)
17. Marchewka, J. (2006). *Information Technology Project Management*. New Delhi.
18. Mbachu, J. and Nkado, R. (2007). Factors Constraining Successful Building Project Implementation in South Africa. *Construction Management and Economics*, 25, 39-54.
19. Nayyar, M. (1994). Scope Management. *MSc dissertations in Civil and Environmental Engineering*. Massachusetts Institute of Technology, Pakistan.
20. Ndiokubwayo, R. (2008). An analysis of the impact of variation orders on project performance. *CPUT Theses & Dissertations*. Peninsula: Cape Peninsula University of Technology.
21. Osman, Z. O. (2009). The Potential Effects of Variation Orders in Construction Projects. *Journal of Engineering Annals*, VII (Fascicule 2), 141-152.
22. PMBOK -Project Management Institute. (2004). *A Guide to The Project Management Body of Knowledge* (4th Edition ed.). Pennsylvania: Project Management Institute.
23. Salama M., H. A. (2009). Investigating the Causes of Variation Withing the Construction Projects in UAE. *Procs 25th Annual ARCOM Conference* (pp. 949-957). Nottingham: Association of Researchers in Construction Management.

24. Sambasivan, M., & Soon, Y. (2007). Causes and Effects of Delays in Malaysian Construction Industry. *International Journal of Project Management* (25), 517-26.
25. Sears, S. S. (2008). *Construction Project Management* (5th Edition ed.). New Jersey: John Wiley & Sons.
26. Thompson, A. (1990). *Architectural design procedures*. London: Edward Arnold.
27. Toor, S. a. (2008). Problem Causing Delays in Major Construction Projects in Thailand. *Construction Management and Economics*, 26, 395-408.
28. Wanigasekara, K. (2008). Southern Highway-Robbery or Construction? *Sri Lanka Engineering News*, 43 (06), 3.
29. Zhu Y., a. C. (2004). A Conceptual Framework of Ontology-based Program/Project Scope Control. *International Latin American and Caribbean Conference for Engineering and Technology*. Florida.
30. Zikmund, W. G. (2010). *Business Research Methods, 7e* (7th Edition ed.). New Delhi, South Western: Cengage Learning.



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## BIBLIOGRAPHY

1. Athapattu, A. R. (2010). Causes of Delay in Hotel Refurbishment Project in Sri Lanka. *MBA Diss.* University of Moratuwa.
2. Clarke, A. (1999). A Practical Use of Key Success Factors to Improve the Effectiveness of Project Management. *International Journal of Project Management, Vol.17* (No.3), 139-145.
3. ICTAD. (2002). *Client Guide - General* (1st Revision ed.). Institute of Construction Training and Development.
4. ICTAD. (2002). *Client Guide - Selection of Consultants* (1st Revision ed.). Institute of Construction Training and Development.
5. ICTAD. (2002). *Form of Agreement - Standard Condition of Engagement - Parts I & II* (1st Revision ed.). Institute of Construction Training and Development.
6. ICTAD. (2002). *Report of the Committee on Upgrading Consultancy Services in Sri Lanka* (1st Revision ed.). Institute of Construction Training and Development.
7. ICTAD. (2002). *Scope of Consultancy Services* (1st Revision ed.). Institute of Construction Training and Development.
8. ICTAD. (2007). *Standard Bidding Document - Procurement of Works - Major Contracts*. Institute of Construction Training and Development.
9. ICTAD. (2007). *Standard Bidding Document - Procurement of Works - Minor Contract*. Institute of Construction Training and Development.
10. ICTAD. (2007). *Standard Bidding Document for Procurement of Works*. Institute of Construction Training and Development.
11. ICTAD. (2007). *Standard Bidding Document for Design and Build Contracts*. Institute of Construction Training and Development.
12. ICTAD. (2002). *Standard Specification for Building Works (Vol I)*. Institute of Construction Training and Development.
13. ICTAD. (2002). *Standard Specification for Building Works (Vol II)*. Institute of Construction Training and Development.
14. ICTAD. (2000). *Standard Specification for Electrical & Mechanical Works* (2nd Edition ed.). Institute of Construction Training and Development.

15. ICTAD. (2002). *Standard Specification for Ground Water Exploration & Exploitation*. Institute of Construction Training and Development.
16. ICTAD. (2002). *Standard Specification for Reclamation Works*. Institute of Construction Training and Development.
17. ICTAD. (2002). *Standard Specification for Water Supply Sewerage & Storm Water Drainage* (2nd Edition ed.). Institute of Construction Training and Development.
18. Kometa, S.T., Olomolaiye, P.O. and Harris, F.C. (1994). Attributes of UK construction clients influencing project consultants' performance. *Construction Management and Economics*, 12, 433-43.
19. Lim, C. S. (2000). An Exploratory Study into Recurring Construction Problems. *International Journal of Project Management* (18(3)), 267-73.
20. Love, P. (2002). Influence of Project Type and Procurement Method on Rework Costs in Building construction Projects. *Journal of Construction Engineering and Management*, 128, No.1, 1-29.
21. Minister of Finance (1992). *University of Financial Regulation*. Ministry of Finance.
22. Minister of Finance. (2006). *Procurement Guide Line - Consultancy Service*. Ministry of Finance.
23. Minister of Finance. (2006). *Procurement Guide Line - Goods & Works*. Ministry of Finance.
24. Olander, S. (2007). Stakeholder impact analysis in construction Project Management. *Construction Management and Economics*, 25, 277-287.
25. Shehu, Z. and Akintoye, A. (2010). Major Challenges to the Successful Implementation and Practice of Programme Management in the Construction Environment: A Critical Analysis. *International Journal of Project Management*, 28, 26-39.
26. Ssegawa, J. M. (2002). Construction Variations: A Scope or A Necessity? *Proceedings of the First International Conference of CIB W107* (11-13 Nov. 2002), 87-96.
27. Ubhayawardhana, W. K. (2008). An Empirical Study of Factors Affecting Software Project Scope Creep in Sri Lanka. *MBA Diss.* University of Moratuwa.

## APPENDIXES

### Appendix A– Questionnaire

The information gathered about your personnel views of the matters in order to use them in research study on Scope Changes of Public Sector Building Constructions.

The findings of this Research would be directed to relevant authorities for their consideration. The valuable time you dedicate on this questionnaire would be a contribution in making Preventive Measures on the matter.

This information sheet is kept confidential and no one would know particulars of respondents.

You are kindly requested to provide correct and impartial information on relevant issues. If you have any doubt about the meaning of the questions, please do not hesitate to contact me on 071-4295145.

**Place an ‘X’ against the correct option considering significant level.**

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MSc in Construction Project Management

Deputy Vice-Chancellor

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1.0 Category of represent:

Client

Contractor

Engineer

2.0 Mark the importance of each factor for Scope Changes.

No	Factor	Highly significant	Significant	Moderately significant	Low significant	Very low significant
3.1	Constructive changes (changes due to error, omission or failure) by Client	<input type="checkbox"/>				
3.2	Constructive changes (changes due to error, omission or failure) by Engineer	<input type="checkbox"/>				
3.3	Constructive changes (changes due to error, omission or failure) by Contractor	<input type="checkbox"/>				
3.4	Constructive Changes (changes due to error, omission or failure) due to lack of communication.	<input type="checkbox"/>				
3.5	Changes due inferior quality constructions at site	<input type="checkbox"/>				
3.6	Directed Changes (change of requirement or inevitable)	<input type="checkbox"/>				
3.7	Changes due to extreme weather conditions	<input type="checkbox"/>				

3.0 Mark the importance of each Root Cause contributed in “Constructive changes by Engineer”

No	Cause	Highly significant	Significant	Moderately significant	Low significant	Very low significant
5.1	Lack of uniformity in works by different personnel	<input type="checkbox"/>				
5.2	Lack of coordination among regulatory bodies	<input type="checkbox"/>				
5.3	Too lengthy decision making and communication mechanism	<input type="checkbox"/>				
5.4	Lack of expertise Engineering knowledge	<input type="checkbox"/>				
5.5	Inadequate staff of Engineer and other administrative problems.	<input type="checkbox"/>				
5.6	Less detail designs	<input type="checkbox"/>				
5.7	Low constructible, complex or over designs	<input type="checkbox"/>				
5.8	Inaccurate budgeting, estimation and specifications	<input type="checkbox"/>				
5.9	Conflicts between contract documents	<input type="checkbox"/>				
5.10	Unrealistic Planning and scheduling	<input type="checkbox"/>				
5.11	Poor Contract Management	<input type="checkbox"/>				
5.12	Tender drawings & specifications not adequate to cost evaluation	<input type="checkbox"/>				
5.13	Lack of knowledge on available materials and new techniques	<input type="checkbox"/>				
5.14	Non-availability of modern tools	<input type="checkbox"/>				
5.15	Poor co-ordination among the team of Engineer	<input type="checkbox"/>				
5.16	Lack of experience in terms of type of projects	<input type="checkbox"/>				
5.17	Delays in certification of payments	<input type="checkbox"/>				
5.18	Ignorance of the Engineer	<input type="checkbox"/>				
5.19	Inadequate or Unrealistic scope statement	<input type="checkbox"/>				

4.0 Mark the importance of each Root Cause contributed in “Constructive Changes by Client”.

No	Cause	Highly significant	Significant	Moderately significant	Low significant	Very low significant
4.1	Financial management problems	<input type="checkbox"/>				
4.2	Confusing and ambiguous requirements of client	<input type="checkbox"/>				
4.3	Client does not have Engineering Expertise	<input type="checkbox"/>				
4.4	Lack of client participation in planning process	<input type="checkbox"/>				
4.5	Lack of client participation in construction process	<input type="checkbox"/>				
4.6	Poor co-ordination among team of Client	<input type="checkbox"/>				
4.7	Lengthy and inflexible decision making process	<input type="checkbox"/>				
4.8	Inadequate or Unrealistic preliminary scope statement	<input type="checkbox"/>				

5.0 Mark the importance of each Root Cause contributed in “Constructive Changes by Contractor”



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No	Cause	Highly significant	Significant	Moderately significant	Low significant	Very low significant
6.1	Predicted capacity of contractor at grading is not available in practice	<input type="checkbox"/>				
6.2	Cash flow problems of the contractor	<input type="checkbox"/>				
6.3	lack of tools, equipments, plants and human resources	<input type="checkbox"/>				
6.4	Conflicts between main contractor and subcontractors	<input type="checkbox"/>				
6.5	Poor material procurement process	<input type="checkbox"/>				
6.6	Poor site management	<input type="checkbox"/>				
6.7	Poor qualification of the contractor’s technical staff	<input type="checkbox"/>				
6.8	Contractor tries to pressure the owner	<input type="checkbox"/>				
6.9	Contractors unrealistic tenders	<input type="checkbox"/>				

6.0 Mark the importance of each Root Cause contributed in “Constructive Changes due to lack of communication ”.

No	Cause	Highly significant	Significant	Moderately significant	Low significant	Very low significant
7.1	Lack of contribution in communication by client	<input type="checkbox"/>				
7.2	Confusing and ambiguous requirements of client	<input type="checkbox"/>				
7.3	Contractor’s inadequate response	<input type="checkbox"/>				
7.7	Lack of knowledge of contractor	<input type="checkbox"/>				
7.5	Weak Internal communication among design team	<input type="checkbox"/>				
7.6	Design visualizing not adequate	<input type="checkbox"/>				
7.7	Deficiency in communication mechanism	<input type="checkbox"/>				
7.8	Inadequate staff of Engineer	<input type="checkbox"/>				
7.9	Poor communication management by Engineer	<input type="checkbox"/>				

7.0 Mark the importance of each Root Cause contributed in “Constructive Changes due to inferior quality constructions at site”.

No	Cause	Highly significant	Significant	Moderately significant	Low significant	Very low significant
8.1	Tender drawings & specifications not specifically define the work	<input type="checkbox"/>				
8.2	Standard specifications not cover whole process	<input type="checkbox"/>				
8.3	Standard certification of material is limited to few	<input type="checkbox"/>				
8.4	Lack of Laboratory facilities and high cost for testing	<input type="checkbox"/>				
8.5	Lack of Supervision	<input type="checkbox"/>				
8.6	Lack of experience in terms of type of projects	<input type="checkbox"/>				
8.7	Limitation imposed in evaluation process	<input type="checkbox"/>				
8.8	Deficiencies in eligibility criteria's in tender documents	<input type="checkbox"/>				
8.9	Political influences	<input type="checkbox"/>				
8.10	Generalizing the situation by all stakeholder	<input type="checkbox"/>				

8.0 Mark the importance of each Root Cause contributed in “Directed Changes”.

No	Cause	Highly significant	Significant	Moderately significant	Low significant	Very low significant
9.1	Change requirements or client’s idea.	<input type="checkbox"/>				
9.2	Shortage of materials/ Labour	<input type="checkbox"/>				
9.3	Technology Development	<input type="checkbox"/>				
9.4	Change in public / government rules and regulations	<input type="checkbox"/>				
9.5	Difficulties in obtaining work or material transport permits	<input type="checkbox"/>				
9.6	Adverse ground conditions / Obstructions	<input type="checkbox"/>				

9.0 Mark the importance of each Root Cause contributed in “Changes due to extreme weather conditions ”.

No	Cause	Highly significant	Significant	Moderately significant	Low significant	Very low significant
10.1	 Lack of weather forecasting facilities	<input type="checkbox"/>				
10.2	Scheduling without considering the typical weather	<input type="checkbox"/>				
10.3	Unpredictable weather conditions	<input type="checkbox"/>				