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APPENDICES

APPENDIX A

TO WHOM IT MAY CONCERN

7 AUGUST 2010

RESEARCH INTO REFURBISHMENT TIME PERFORMANCE

This is simply a brief introductory letter to inform you that Ms. Chew Lee Fuan is conducting research into the time performance of construction refurbishment Singapore. She is working under my supervision at the University of Malaya, Malaysia.

Ms Chew Lee Fuan is a postgraduate student, who is taking Master of Science (Building). I am aware of the considerable pressure on your time, but shall be most grateful if you will complete the questionnaire attached to Ms Chew Lee Fuan's letter enclosed and return it to her at your earliest convenient opportunity.

With much appreciation.

Yours faithfully,

Associate Professor Dr. Sr Azlan Shah Ali

PhD, MSc, B(Hons), FRISM, FCIOB, MRICS

Deputy Dean (Higher Degree)

Faculty of Built Environment

University of Malaya

Tel:+603-79676880

Fax: +603-79675713

Dear Sir/Madam,

Semi Structured Interview on Construction Time Performance of Refurbishment Projects In Singapore

I am writing to ask if you would be kind enough to provide me with some information about your company and your general views on the construction time performance of refurbishment projects in Singapore.

I am a postgraduate student from University of Malaya in Malaysia, doing my master studies, supervised by Associate Professor Dr Sr Azlan Shah Ali. My research started in February this year and is now entering the preliminary data collection stage.

I am sending this letter to you and to other construction companies operating in Singapore. You will appreciate that I am anxious to get a reply from each person I write to in order to get as many points of view as possible, so I do hope that you will be willing to cooperate.

The semi structured interview will take about half an hour. I would be obliged if you would ask a senior member of your company who participate actively in the construction of refurbishment projects to complete it.

I hope that your company will be able to benefit directly from this research, when fully completed, as the results obtained will be sent to you free of charge upon request. It is generally agreed that time performance is the most difficult tasks faced by management level. I anticipate that the final results obtained will contribute to improving this situation.

Please be assured that both your identity, that of your company and information provided will remain strictly confidential. I would be very grateful if you could return the completed questionnaire to me as soon as possible.

I hope you will agree to assist me in my research.

Yours faithfully,

Chew Lee Fuan

APPENDIX B

Interview Sheet

Reference No: _____

Name of Interviewee:

Role in the project:

Tel:

Date:

Time: Start:_____ End: _____

Verify:

Experience in construction industry:_____ years

No of refurbishment work/project involved: _____ numbers

1. Based on reading, delays are evidently frequent problems in the construction refurbishment of many developed and developing countries like Singapore. **What is opinion on above statement?**

2. It is difficult to control and manage the time performance of construction refurbishment due to its uncertainty and complexity such as incomplete design before refurbishment works started on site. **Does this problem occur in Singapore**?

3. What are the major problems in controlling time performance of refurbishment projects? How the problems are normally handled?

4. How do you decide the construction duration for a refurbishment project?
    i. As tendered by the contractor

ii. Based on previous similar project

iii. Used documented procedure for estimation of construction duration

iv. Others: _____

5. How do you rate degree of importance for the following factors that affect time performance of refurbishment projects in Singapore.

Scale:	very least important 1 2 3 4 5 very important

a)Contractor's finance related

i. Improper management of funds by contractor.
ii. Inability for contractor to keep materials due to cash flow problem.
iii. Delayed payment by main contractor to subcontractor or suppliers.
iv. Lack of working capital.
v. Non-payment of salary to workers causing slow down.
vi. Low design fee for consultant causing error in design thus delaying the project.

b)Contractor related factors

i. Lack of experience in the nature of work.
ii. Poor planning and management.
iii. Mistakes during construction.

c)Designers related factors

i. Slow decision making or frequent change of decision which affect the progress of work
ii. The state of completeness of design before the refurbishment project commenced on site.
iii. Lesser experience of designer on refurbishment projects

d)Client attributes

e)Contractual relationship related factors

i. Poor coordination between different parties who are involved in the projects
ii. Conflicts / disputes between contractor and superintending officer
iii. Lack of communication between superintending officer and contractor
iv. Lack of teamwork among the different parties working on project
v. Occupancy in a refurbished building

f)Skilled labor related factors

g)Material related factors

h)Project or site related factors

i. Uncertainty and complexity of the project
ii. Difficulty to gain access to site and existing building
iii. The structural work of existing work
iv. Variation or additional works

i)Unpredictable weather condition

6. Any additional factors that not in the list but you think is important towards contributing to delay for refurbishment projects in Singapore.

Thank You

APPENDIX C

SURVEY ON THE FACTORS INFLUENCING TIME PERFORMANCE OF CONSTRUCTION REFURBISHMENT PROJECTS IN SINGAPORE.

SURVEY ON THE FACTORS INFLUENCING TIME PERFORMANCE OF CONSTRUCTION REFURBISHMENT PROJECTS IN SINGAPORE.

NOTE ABOUT THE QUESTIONNAIRE:
Before you answer all the following questions, please select the completed refurbishment project that designed by you. the selected project must satisfy the following criteria.

- **Contract value of the project more than $250,000 (Two hundred fifty dollars)**
- **The procurement system was either traditional or design and build**

You answer should be based on the refurbishment project that you have chosen. If you have involved in two refurbishment projects, please fill in twice for this questionnaire.You can fill in as many projects as you involve.

Your identity and that of your firm will remain strictly confidential to us.

Definitions:
Refurbishment refers to upgrade, major repairs work, renovations, rehabilitation, alterations, conversions, extensions and modernization of existing building, but exclude routine maintenance and cleaning work.

Your Personal Particulars

Name of the refurbishment project

Name

Contact number

*** Email address**

*

1.0 What is your job title?

- [ ] Managing Director
- [ ] General Manager
- [ ] Contract Manager
- [ ] Operational Manager
- [ ] Construction Manager
- [ ] Project Manager
- [ ] Engineer
- [ ] Quantity Surveyor
- [ ] Site Executive

Others, please specify it.

*

1.1 How long have you worked in construction industry?

- [ ] Less than 5 years
- [ ] 6-10 years
- [ ] 11-15 years
- [ ] 16-20 years
- [ ] More than 20 years

*

1.2 How long have you been involved in construction refurbishment projects?

- ☐ Less than 5 years
- ☐ 6-10 years
- ☐ 11-15 years
- ☐ 16-20 years
- ☐ More than 20 years

*** 2.0 Project Characteristics:**

2.1 Please indicate the type of building of the refurbishment project selected.

- ☐ Residential
- ☐ School, College
- ☐ Office
- ☐ Industrial
- ☐ Hospital
- ☐ Hotel

Others, please specify.

*** 2.2 Please indicate the size of the project**

- ☐ Less than $250,000
- ☐ $250,000 to $1 million
- ☐ $1 million to $10 million
- ☐ More than $10 million

2.3 Project duration (Excluding extension of time)

Weeks

2.4 Project duration (Including extension of time, if any)

Weeks

3.0 Factors Affecting Construction Time Performance For Refurbishment Projects

Construction time is elapsed period from possesion of site to practical completion of project. Hypothesized factors that can influence construction time performance are listed under the the following headings.

Please indicate the significance of each factor by ticking the appropriate scale from 1 to 5, 1 is being not significant and the scale increases in level of significance where 5 is extremely significance. Please relate answer to the project that you have experience with.

* 3.1 Finance related factors

To what extent the following factors, through your experience, can affect time performance of refurbishment projects in Singapore.

	1	2	3	4	5
Lack of working capital on part of contractor to start work	☐	☐	☐	☐	☐
Delayed payment by main contractor to subcontractors and supplier which interrupt the progress of work	☐	☐	☐	☐	☐
Non payment of salary to workers causing slow down	☐	☐	☐	☐	☐

*

3.2 Contractor related factors

To what extent the following factors, through your experience, can affect the time performance of refurbishment projects in Singapore.

	1	2	3	4	5
Lack of experience in the nature of work.	☐	☐	☐	☐	☐
Poor site planning and management.	☐	☐	☐	☐	☐

* 3.3 Designers related factors

To what extent the following factors, through your experience, can affect the time performance of refurbishment projects in Singapore.

	1	2	3	4	5
Slow in decision making or frequent change in decision which affect the progress of work.	☐	☐	☐	☐	☐
The state of completeness of design before the refurbishment projects commenced on site.	☐	☐	☐	☐	☐

*

3,4 Client attributes

To what extent the client attributes, through your experience, can affect the time performance of construction refurbishment in Singapore.

	1	2	3	4	5
Client Attributes	☐	☐	☐	☐	☐

* 3.5 Contractual relationship related factors

To what extent the following factors, through your experience, can affect the time performance of refurbishment projects in Singapore.

	1	2	3	4	5
Poor in coordination between different parties involved in projects.	☐	☐	☐	☐	☐
Conflict/disputes between Contractor and Superintending officer.	☐	☐	☐	☐	☐
Occupancy in a refurbished building.	☐	☐	☐	☐	☐
Lack of teamwork among different parties working on project.	☐	☐	☐	☐	☐

*

3.6 Skilled labour related factors

To what extent the following factors, through your experience, can affect the time performance of refurbishment projects in Singapore.

	1	2	3	4	5
Shortage of qualified/skilled labours.	☐	☐	☐	☐	☐

*** 3.7 Material related factors**

To what extent the following factors, through your experience, can affect time performance of refurbishment projects in Singpaore.

	1	2	3	4	5
Shortage of construction materials.	☐	☐	☐	☐	☐

*** 3.8 Project or Site related factors**

To what extent the following factors, through your experience, can affect the time performance of refurbishment projects in Singapore.

	1	2	3	4	5
Uncertainty and complexity of the project.	☐	☐	☐	☐	☐
Difficulty to gain access to site and existing building.	☐	☐	☐	☐	☐
Necessary variation or additional works.	☐	☐	☐	☐	☐

*** 3.9 External factors (Sources from Building contract-Singapore Institute of Architect)**

To what extent the following factors, through your experience, can affect the time performance of refurbishment projects in Singapore.

	1	2	3	4	5
Unpredictable weather condition.	☐	☐	☐	☐	☐

Please give other factors (other than listed above) in your opinion can influence construction time performance:

Recommendations

Please provide recommendations that you think can improve construction time performance of refubishment projects in Singapore.

Thank you very much for taking part in this questionnaire survey. Your cooperation and time spent in filling up this questionnaire is greatly appreciated.

If you have any comment concerning the questionnaire or the research topic, please write to chewleefuan@siswa.um.edu.my

Faculty of Built Environment
University of Malaya
50603 Kuala Lumpur
Malaysia.

APPENDIX D

Frequencies

Statistics

		Time Performance Index	Finance-Lack of working capital on part of contractor to start work	Finance-Delayed payment by main contractor to subcontractors and supplier which interrupt the progress of work	Finance-Non payment of salary to workers causing slow down	Contractor-Lack of experience in the nature of work.
N	Valid	33	33	33	33	33
	Missing	0	0	0	0	0
Mean		1.0942	3.76	3.15	3.00	3.52
Std. Deviation		.15321	.830	.755	.829	.834

Statistics

		Contractor-Poor site planning and management.	Designers-Slow in decision making or frequent change in decision which affect the progress of work.	Designers-The state of completeness of design before the refurbishment projects commenced on site.	Client attributes	Contractual-Poor in coordination between different parties involved in projects.
N	Valid	33	33	33	33	33
	Missing	0	0	0	0	0
Mean		3.45	4.42	4.33	4.21	4.15
Std. Deviation		.905	.751	.736	.696	.566

Statistics

		Contractual-Conflict/disputes between contractor and superintending officer.	Contractual-Occupancy in a refurbished building.	Contractual-Lack of teamwork among different parties working on project.	Skilled labour-Shortage of qualified/skilled labours.	Material-Shortage of construction materials.
N	Valid	33	33	33	33	33
	Missing	0	0	0	0	0
Mean		3.52	3.91	3.79	4.52	4.36
Std. Deviation		.834	.631	.600	.667	.603

Statistics

		SIte-Uncertainty and complexity of the project.	Site-Difficulty to gain access to site and exsiting building.	Site-Necessary variation or additional works.	External-Unpredictable weather condition.
N	Valid	33	33	33	33
	Missing	0	0	0	0
Mean		4.85	4.55	4.85	1.70
Std. Deviation		.364	.506	.364	.847

Frequency Table

Time Performance Index

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.86	1	3.0	3.0	3.0
	.89	1	3.0	3.0	6.1
	.90	1	3.0	3.0	9.1
	.95	1	3.0	3.0	12.1
	1.00	10	30.3	30.3	42.4
	1.06	2	6.1	6.1	48.5
	1.07	1	3.0	3.0	51.5
	1.08	3	9.1	9.1	60.6
	1.08	1	3.0	3.0	63.6
	1.10	1	3.0	3.0	66.7
	1.11	2	6.1	6.1	72.7
	1.17	3	9.1	9.1	81.8
	1.27	1	3.0	3.0	84.8
	1.33	4	12.1	12.1	97.0
	1.57	1	3.0	3.0	100.0
	Total	33	100.0	100.0	

Finance-Lack of working capital on part of contractor to start work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	2	6.1	6.1	6.1
	Fair	10	30.3	30.3	36.4
	Significant	15	45.5	45.5	81.8
	Extremely significant	6	18.2	18.2	100.0
	Total	33	100.0	100.0	

Finance-Delayed payment by main contractor to subcontractors and supplier which interrupt the progress of work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	5	15.2	15.2	15.2
	Fair	20	60.6	60.6	75.8
	Significant	6	18.2	18.2	93.9
	Extremely significant	2	6.1	6.1	100.0
	Total	33	100.0	100.0	

Finance-Non payment of salary to workers causing slow down

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	9	27.3	27.3	27.3
	Fair	17	51.5	51.5	78.8
	Significant	5	15.2	15.2	93.9
	Extremely significant	2	6.1	6.1	100.0
	Total	33	100.0	100.0	

Contractor-Lack of experience in the nature of work.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	3	9.1	9.1	9.1
	Fair	14	42.4	42.4	51.5
	Significant	12	36.4	36.4	87.9
	Extremely significant	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Contractor-Poor site planning and management.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	3	9.1	9.1	9.1
	Fair	18	54.5	54.5	63.6
	Significant	6	18.2	18.2	81.8
	Extremely significant	6	18.2	18.2	100.0
	Total	33	100.0	100.0	

Designers-Slow in decision making or frequent change in decision which affect the progress of work.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	1	3.0	3.0	3.0
	Fair	2	6.1	6.1	9.1
	Significant	12	36.4	36.4	45.5
	Extremely significant	18	54.5	54.5	100.0
	Total	33	100.0	100.0	

Designers-The state of completeness of design before the refurbishment projects commenced on site.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	1	3.0	3.0	3.0
	Fair	2	6.1	6.1	9.1
	Significant	15	45.5	45.5	54.5
	Extremely significant	15	45.5	45.5	100.0
	Total	33	100.0	100.0	

Client attributes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	1	3.0	3.0	3.0
	Fair	2	6.1	6.1	9.1
	Significant	19	57.6	57.6	66.7
	Extremely significant	11	33.3	33.3	100.0
	Total	33	100.0	100.0	

Contractual-Poor in coordination between different parties involved in projects.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	3	9.1	9.1	9.1
	Significant	22	66.7	66.7	75.8
	Extremely significant	8	24.2	24.2	100.0
	Total	33	100.0	100.0	

Contractual-Conflict/disputes between contractor and superintending officer.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	4	12.1	12.1	12.1
	Fair	11	33.3	33.3	45.5
	Significant	15	45.5	45.5	90.9
	Extremely significant	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Contractual-Occupancy in a refurbished building.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	8	24.2	24.2	24.2
	Significant	20	60.6	60.6	84.8
	Extremely significant	5	15.2	15.2	100.0
	Total	33	100.0	100.0	

Contractual-Lack of teamwork among different parties working on project.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	10	30.3	30.3	30.3
	Significant	20	60.6	60.6	90.9
	Extremely significant	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Skilled labour-Shortage of qualified/skilled labours.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	3	9.1	9.1	9.1
	Significant	10	30.3	30.3	39.4
	Extremely significant	20	60.6	60.6	100.0
	Total	33	100.0	100.0	

Material-Shortage of construction materials.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	2	6.1	6.1	6.1
	Significant	17	51.5	51.5	57.6
	Extremely significant	14	42.4	42.4	100.0
	Total	33	100.0	100.0	

SIte-Uncertainty and complexity of the project.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Significant	5	15.2	15.2	15.2
	Extremely significant	28	84.8	84.8	100.0
	Total	33	100.0	100.0	

Site-Difficulty to gain access to site and exsiting building.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Significant	15	45.5	45.5	45.5
	Extremely significant	18	54.5	54.5	100.0
	Total	33	100.0	100.0	

Site-Necessary variation or additional works.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Significant	5	15.2	15.2	15.2
	Extremely significant	28	84.8	84.8	100.0
	Total	33	100.0	100.0	

External-Unpredictable weather condition.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very least significant	17	51.5	51.5	51.5
	Least significant	10	30.3	30.3	81.8
	Fair	5	15.2	15.2	97.0
	Significant	1	3.0	3.0	100.0
	Total	33	100.0	100.0	

APPENDIX E

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Finance-Lack of working capital on part of contractor to start work	33	2	5	3.76	.830
Finance-Delayed payment by main contractor to subcontractors and supplier which interrupt the progress of work	33	2	5	3.15	.755
Finance-Non payment of salary to workers causing slow down	33	2	5	3.00	.829
Contractor-Lack of experience in the nature of work.	33	2	5	3.52	.834
Contractor-Poor site planning and management.	33	2	5	3.45	.905
Designers-Slow in decision making or frequent change in decision which affect the progress of work.	33	2	5	4.42	.751
Designers-The state of completeness of design before the refurbishment projects commenced on site.	33	2	5	4.33	.736
Client attributes	33	2	5	4.21	.696
Contractual-Poor in coordination between different parties involved in projects.	33	3	5	4.15	.566
Contractual-Conflict/disputes between contractor and superintending officer.	33	2	5	3.52	.834
Contractual-Occupancy in a refurbished building.	33	3	5	3.91	.631
Contractual-Lack of teamwork among different parties working on project.	33	3	5	3.79	.600
Skilled labour-Shortage of qualified/skilled labours.	33	3	5	4.52	.667
Material-Shortage of construction materials.	33	3	5	4.36	.603
SIte-Uncertainty and complexity of the project.	33	4	5	4.85	.364
Site-Difficulty to gain access to site and exsiting building.	33	4	5	4.55	.506
Site-Necessary variation or additional works.	33	4	5	4.85	.364
External-Unpredictable weather condition.	33	1	4	1.70	.847
Valid N (listwise)	33				

APPENDIX F

Frequency Table

Finance-Lack of working capital on part of contractor to start work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	2	6.1	6.1	6.1
	Fair	10	30.3	30.3	36.4
	Significant	15	45.5	45.5	81.8
	Extremely significant	6	18.2	18.2	100.0
	Total	33	100.0	100.0	

Finance-Delayed payment by main contractor to subcontractors and supplier which interrupt the progress of work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	5	15.2	15.2	15.2
	Fair	20	60.6	60.6	75.8
	Significant	6	18.2	18.2	93.9
	Extremely significant	2	6.1	6.1	100.0
	Total	33	100.0	100.0	

Finance-Non payment of salary to workers causing slow down

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	9	27.3	27.3	27.3
	Fair	17	51.5	51.5	78.8
	Significant	5	15.2	15.2	93.9
	Extremely significant	2	6.1	6.1	100.0
	Total	33	100.0	100.0	

Contractor-Lack of experience in the nature of work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	3	9.1	9.1	9.1
	Fair	14	42.4	42.4	51.5
	Significant	12	36.4	36.4	87.9
	Extremely significant	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Contractor-Poor site planning and management.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	3	9.1	9.1	9.1
	Fair	18	54.5	54.5	63.6
	Significant	6	18.2	18.2	81.8
	Extremely significant	6	18.2	18.2	100.0
	Total	33	100.0	100.0	

Designers-Slow in decision making or frequent change in decision which affect the progress of work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	1	3.0	3.0	3.0
	Fair	2	6.1	6.1	9.1
	Significant	12	36.4	36.4	45.5
	Extremely significant	18	54.5	54.5	100.0
	Total	33	100.0	100.0	

Designers-The state of completeness of design before the refurbishment projects commenced on site.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	1	3.0	3.0	3.0
	Fair	2	6.1	6.1	9.1
	Significant	15	45.5	45.5	54.5
	Extremely significant	15	45.5	45.5	100.0
	Total	33	100.0	100.0	

Contractual-Poor in coordination between different parties involved in projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	3	9.1	9.1	9.1
	Significant	22	66.7	66.7	75.8
	Extremely significant	8	24.2	24.2	100.0
	Total	33	100.0	100.0	

Contractual-Conflict/disputes between contractor and superintending officer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Least significant	4	12.1	12.1	12.1
	Fair	11	33.3	33.3	45.5
	Significant	15	45.5	45.5	90.9
	Extremely significant	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Contractual-Occupancy in a refurbished building.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	8	24.2	24.2	24.2
	Significant	20	60.6	60.6	84.8
	Extremely significant	5	15.2	15.2	100.0
	Total	33	100.0	100.0	

Contractual-Lack of teamwork among different parties working on project.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	10	30.3	30.3	30.3
	Significant	20	60.6	60.6	90.9
	Extremely significant	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Skilled labour-Shortage of qualified/skilled labours.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	3	9.1	9.1	9.1
	Significant	10	30.3	30.3	39.4
	Extremely significant	20	60.6	60.6	100.0
	Total	33	100.0	100.0	

Material-Shortage of construction materials.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fair	2	6.1	6.1	6.1
	Significant	17	51.5	51.5	57.6
	Extremely significant	14	42.4	42.4	100.0
	Total	33	100.0	100.0	

SIte-Uncertainty and complexity of the project.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Significant	5	15.2	15.2	15.2
	Extremely significant	28	84.8	84.8	100.0
	Total	33	100.0	100.0	

Site-Difficulty to gain access to site and exsiting building.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Significant	15	45.5	45.5	45.5
	Extremely significant	18	54.5	54.5	100.0
	Total	33	100.0	100.0	

Site-Necessary variation or additional works.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Significant	5	15.2	15.2	15.2
	Extremely significant	28	84.8	84.8	100.0
	Total	33	100.0	100.0	

External-Unpredictable weather condition.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very least significant	17	51.5	51.5	51.5
	Least significant	10	30.3	30.3	81.8
	Fair	5	15.2	15.2	97.0
	Significant	1	3.0	3.0	100.0
	Total	33	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Finance-Lack of working capital on part of contractor to start work	33	2	5	3.76	.830
Finance-Delayed payment by main contractor to subcontractors and supplier which interrupt the progress of work	33	2	5	3.15	.755
Finance-Non payment of salary to workers causing slow down	33	2	5	3.00	.829
Contractor-Lack of experience in the nature of work.	33	2	5	3.52	.834
Contractor-Poor site planning and management.	33	2	5	3.45	.905
Designers-Slow in decision making or frequent change in decision which affect the progress of work.	33	2	5	4.42	.751
Designers-The state of completeness of design before the refurbishment projects commenced on site.	33	2	5	4.33	.736
Client attributes	33	2	5	4.21	.696
Contractual-Poor in coordination between different parties involved in projects.	33	3	5	4.15	.566
Contractual-Conflict/disputes between contractor and superintending officer.	33	2	5	3.52	.834
Contractual-Occupancy in a refurbished building.	33	3	5	3.91	.631
Contractual-Lack of teamwork among different parties working on project.	33	3	5	3.79	.600
Skilled labour-Shortage of qualified/skilled labours.	33	3	5	4.52	.667
Material-Shortage of construction materials.	33	3	5	4.36	.603
SIte-Uncertainty and complexity of the project.	33	4	5	4.85	.364
Site-Difficulty to gain access to site and exsiting building.	33	4	5	4.55	.506
Site-Necessary variation or additional works.	33	4	5	4.85	.364
External-Unpredictable weather condition.	33	1	4	1.70	.847
Valid N (listwise)	33				

APPENDIX G

Reliability

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****** Method 1 (space saver) will be used for this analysis ******
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R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

		Mean	Std Dev	Cases
1.	F1	3.7576	.8303	33.0
2.	F3	3.1515	.7550	33.0
3.	F4	3.0000	.8292	33.0
4.	C1	3.5152	.8337	33.0
5.	C4	3.4545	.9045	33.0
6.	D1	4.4242	.7513	33.0
7.	D3	4.3333	.7360	33.0
8.	D4	4.2121	.6963	33.0
9.	CO1	4.1515	.5658	33.0
10.	CO2	3.5152	.8337	33.0
11.	CO5	3.9091	.6307	33.0
12.	CO6	3.7879	.5999	33.0
13.	S1	4.5152	.6671	33.0
14.	M1	4.3636	.6030	33.0
15.	P1	4.8485	.3641	33.0
16.	P2	4.5455	.5056	33.0
17.	P5	4.8485	.3641	33.0
18.	E2	1.6970	.8472	33.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	70.0303	34.0928	5.8389	18

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
F1	66.2727	30.7045	.2933	.7794
F3	66.8788	28.6723	.5999	.7549
F4	67.0303	29.0928	.4821	.7636
C1	66.5152	28.6326	.5341	.7591
C4	66.5758	27.6894	.5867	.7535
D1	65.6061	29.4962	.4941	.7633
D3	65.6970	30.0303	.4365	.7678
D4	65.8182	29.9659	.4777	.7651
CO1	65.8788	30.9848	.4426	.7693
CO2	66.5152	29.0076	.4889	.7630
CO5	66.1212	32.6098	.1507	.7864
CO6	66.2424	30.7519	.4481	.7684
S1	65.5152	33.4451	.0263	.7948
M1	65.6667	32.1042	.2378	.7809
P1	65.1818	33.3409	.1473	.7840
P2	65.4848	33.8201	.0029	.7918
P5	65.1818	33.8409	.0282	.7881
E2	68.3333	30.1667	.3447	.7753

Reliability Coefficients

N of Cases = 33.0 N of Items = 18

Alpha = .7833

APPENDIX H

Correlations

Correlations

		Time Performance Index	Finance-Lack of working capital on part of contractor to start work	Finance-Delayed payment by main contractor to subcontractors and supplier which interrupt the progress of work	Finance-Non payment of salary to workers causing slow down	Contractor-Lack of experience in the nature of work.	Contractor-Poor site planning and management.	Designers-Slow in decision making or frequent change in decision which affect the progress of work.	Designers-The state of completeness of design before the refurbishment projects commenced on site.	Client attributes	Contractual-Poor in coordination between different parties involved in projects.	Contractual-Conflict/disputes between contractor and superintending officer.	Contractual-Occupancy in a refurbished building.	Contractual-Lack of teamwork among different parties working on project.	Skilled labour-Shortage of qualified/skilled labours.	Material-Shortage of construction materials.	Site-Uncertainty and complexity of the project.	Site-Difficulty to gain access to site and existing building.	Site-Necessary variation or additional works.	External-Unpredictable weather condition.
Time Performance Index	Correlation Coefficient	1.000	.244	.299	.391*	.169	.204	.185	.091	.098	.274	.375*	.130	.359*	-.140	-.031	.352*	.006	.212	.272
	Sig. (2-tailed)	.	.172	.091	.025	.348	.255	.302	.614	.589	.123	.031	.469	.040	.435	.866	.045	.971	.237	.126
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Finance-Lack of working capital on part of contractor to start work	Correlation Coefficient	.244	1.000	.537**	.600**	.404*	.345*	-.174	-.095	-.113	-.014	.034	.027	.167	-.207	-.244	.214	.174	.214	.014
	Sig. (2-tailed)	.172	.	.001	.000	.020	.049	.333	.598	.533	.938	.850	.879	.354	.248	.172	.232	.332	.232	.939
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Finance-Delayed payment by main contractor to subcontractors and supplier which interrupt the progress of work	Correlation Coefficient	.299	.537**	1.000	.672**	.271	.513**	.009	.045	.012	.180	.212	.051	.221	-.175	.043	.197	.248	-.061	.532**
	Sig. (2-tailed)	.091	.001	.	.000	.126	.002	.962	.805	.948	.317	.236	.778	.216	.329	.811	.271	.164	.737	.001
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Finance-Non payment of salary to workers causing slow down	Correlation Coefficient	.391*	.600**	.672**	1.000	.355*	.379*	-.109	.172	-.045	-.019	.201	.065	.169	-.417*	-.037	.097	.028	.097	.350*
	Sig. (2-tailed)	.025	.000	.000	.	.043	.030	.548	.338	.802	.918	.262	.721	.347	.016	.839	.592	.878	.592	.046
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Contractor-Lack of experience in the nature of work.	Correlation Coefficient	.169	.404*	.271	.355*	1.000	.257	.347*	.472**	.277	.300	.442*	-.064	.326	.068	.079	-.062	-.120	-.062	.029
	Sig. (2-tailed)	.348	.020	.126	.043	.	.148	.048	.006	.118	.090	.010	.723	.064	.705	.661	.733	.507	.733	.874
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Contractor-Poor site planning and management.	Correlation Coefficient	.204	.345*	.513**	.379*	.257	1.000	.137	.225	.241	.223	.421*	.333	.234	-.101	.108	.220	-.042	-.073	.170
	Sig. (2-tailed)	.255	.049	.002	.030	.148	.	.447	.208	.177	.213	.015	.058	.191	.576	.548	.219	.816	.685	.345
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Designers-Slow in decision making or frequent change in	Correlation Coefficient	.185	-.174	.009	-.109	.347*	.137	1.000	.498**	.453**	.192	.466**	.134	.357*	.272	.246	-.075	-.270	.075	.158
	Sig. (2-tailed)	.302	.333	.962	.548	.048	.447	.	.003	.008	.283	.006	.457	.042	.126	.168	.679	.129	.679	.381
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Designers-The state of completeness of design	Correlation Coefficient	.091	-.095	.045	.172	.472**	.225	.498**	1.000	.456**	.153	.374*	.039	.329	.063	-.123	-.295	-.425*	-.295	.106
	Sig. (2-tailed)	.614	.598	.805	.338	.006	.208	.003	.	.008	.395	.032	.831	.062	.728	.495	.095	.014	.095	.557
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Client attributes	Correlation Coefficient	.098	-.113	.012	-.045	.277	.241	.453**	.456**	1.000	.330	.358*	.204	.298	.495**	.238	-.252	-.109	-.252	-.140
	Sig. (2-tailed)	.589	.533	.948	.802	.118	.177	.008	.008	.	.061	.041	.255	.092	.003	.183	.156	.546	.156	.437
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33

		Time Performance Index	Finance-Lack of working capital on part of contractor to start work	Finance-Delayed payment by main contractor to subcontractors and supplier which interrupt the progress of work	Finance-Non payment of salary to workers causing slow down	Contractor-Lack of experience in the nature of work.	Contractor-Poor site planning and management.	Designers-Slow in decision making or frequent change in decision which affect the progress of work.	Designers-The state of completeness of design before the refurbishment projects commenced on site.	Client attributes	Contractual-Poor in coordination between different parties involved in projects.	Contractual-Conflict/disputes between contractor and superintending officer.	Contractual-Occupancy in a refurbished building.	Contractual-Lack of teamwork among different parties working on project.	Skilled labour-Shortage of qualified/skilled labours.	Material-Shortage of construction materials.	Site-Uncertainty and complexity of the project.	Site-Difficulty to gain access to site and exsiting building.	Site-Necessary variation or additional works.	External-Unpredictable weather condition.
Contractual-Poor in coordination between different parties	Correlation Coefficient	.274	-.014	.180	-.019	.300	.223	.192	.153	.330	1.000	.431*	-.042	.364*	.444**	.146	.267	-.077	-.027	.141
	Sig. (2-tailed)	.123	.938	.317	.918	.090	.213	.283	.395	.061	.	.012	.818	.037	.010	.418	.133	.670	.883	.435
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Contractual-Conflict/disputes between contractor and superintending officer.	Correlation Coefficient	.375*	.034	.212	.201	.442*	.421*	.466**	.374*	.358*	.431*	1.000	-.004	.287	.011	.126	.353*	.189	.071	.106
	Sig. (2-tailed)	.031	.850	.236	.262	.010	.015	.006	.032	.041	.012	.	.984	.105	.950	.485	.044	.293	.693	.559
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Contractual-Occupancy in a refurbished building.	Correlation Coefficient	.130	.027	.051	.065	-.064	.333	.134	.039	.204	-.042	-.004	1.000	.153	-.149	-.022	-.046	-.132	.209	.099
	Sig. (2-tailed)	.469	.879	.778	.721	.723	.058	.457	.831	.255	.818	.984	.	.396	.409	.904	.800	.464	.244	.583
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Contractual-Lack of teamwork among different parties working on project.	Correlation Coefficient	.359*	.167	.221	.169	.326	.234	.357*	.329	.298	.364*	.287	.153	1.000	.177	.036	-.179	-.225	-.179	.254
	Sig. (2-tailed)	.040	.354	.216	.347	.064	.191	.042	.062	.092	.037	.105	.396	.	.325	.840	.318	.208	.318	.154
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Skilled labour-Shortage of qualified/skilled labours.	Correlation Coefficient	-.140	-.207	-.175	-.417*	.068	-.101	.272	.063	.495**	.444**	.011	-.149	.177	1.000	.380*	-.026	.041	-.179	-.329
	Sig. (2-tailed)	.435	.248	.329	.016	.705	.576	.126	.728	.003	.010	.950	.409	.325	.	.029	.887	.822	.318	.062
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Material-Shortage of construction materials.	Correlation Coefficient	-.031	-.244	.043	-.037	.079	.108	.246	-.123	.238	.146	.126	-.022	.036	.380*	1.000	-.010	.270	-.010	.090
	Sig. (2-tailed)	.866	.172	.811	.839	.661	.548	.168	.495	.183	.418	.485	.904	.840	.029	.	.956	.128	.956	.619
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Site-Uncertainty and complexity of the project.	Correlation Coefficient	.352*	.214	.197	.097	-.062	.220	-.075	-.295	-.252	.267	.353*	-.046	-.179	-.026	-.010	1.000	.463**	.529**	-.005
	Sig. (2-tailed)	.045	.232	.271	.592	.733	.219	.679	.095	.156	.133	.044	.800	.318	.887	.956	.	.007	.002	.979
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Site-Difficulty to gain access to site and exsiting building.	Correlation Coefficient	.006	.174	.248	.028	-.120	-.042	-.270	-.425*	-.109	-.077	.189	-.132	-.225	.041	.270	.463**	1.000	.293	-.021
	Sig. (2-tailed)	.971	.332	.164	.878	.507	.816	.129	.014	.546	.670	.293	.464	.208	.822	.128	.007	.	.098	.908
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Site-Necessary variation or additional works.	Correlation Coefficient	.212	.214	-.061	.097	-.062	-.073	.075	-.295	-.252	-.027	.071	.209	-.179	-.179	-.010	.529**	.293	1.000	.126
	Sig. (2-tailed)	.237	.232	.737	.592	.733	.685	.679	.095	.156	.883	.693	.244	.318	.318	.956	.002	.098	.	.483
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
External-Unpredictable weather condition.	Correlation Coefficient	.272	.014	.532**	.350*	.029	.170	.158	.106	-.140	.141	.106	.099	.254	-.329	.090	-.005	-.021	.126	1.000
	Sig. (2-tailed)	.126	.939	.001	.046	.874	.345	.381	.557	.437	.435	.559	.583	.154	.062	.619	.979	.908	.483	.
	N	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).