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Primary Factors		Secondary Factors	Work Category									
	SM secondary factors		SO	RRM	BW	RCC	PW	TW	WP	P	C	A&G
Design and Engineering Factors		Changes in Design (to on site conditions, client request)	SO(7)	RRM(11)	BW(3)	RCC(6)		TW(3)		P(1)		A&G(3)
		Errors or omissions in Drawings and Specifications(unclear)	SO(3)	RRM(1)		RCC(6)						
		Lack of coordination among design consultants	SO(1)	RRM(1)	BW(1)	RCC(2)	PW(1)					
		Changes made at the request of an end user/regulatory body	SO(2)			RCC(1)					C(1)	
		Insufficient time to prepare contract documentation										
		Inadequate client brief to prepare detailed documentation										
Client Factors		Lack of experience and knowledge of DC process										
		Lack of funding allocation for site investigations										
		Inadequate client participation at the design stage		RRM(1),	BW(3)	RCC(1)		TW(1)	WP(2)	P(1)	C(1)	A&G(1)
		Low fees payment for preparing contract documentation										
		Changes made by client at the construction stage	SO(3)	RRM(1),	BW(4)	RCC(3)		TW(2)		P(1)	C(1)	A&G(1)

Table 4.1 Field Rework Data Summary

[illegible]

CHECKLIST For Brick Work	
Item	Inspection Parameter
1	Quality of materials available for use: whether prior approval is taken
2	Bricks
3	Sand
4	Cement
5	Readiness for work
6	Check setting out of walls (offsets need subsequent checks).
7	Check wall thickness.
8	Check corners/tees are at right angles.
9	Check provisions of expansion joints as per design
10	Check for details of Openings, Embedment's etc. [Size, Shape, Position etc.]
11	Check mortar mix with specification / BOQ.
12	Check whether Bricks/Blocks are adequately wetted.
13	Check existing walls, columns are set to meet new walls
14	Check that the bricks are correctly positioned in every layer as per type of bond, especially at corners/tees
15	Check joints and bedding mortar thickness.
16	Check for lintels/cill beams over Openings.
17	Check whether timber frames are available.
18	Workflow Checks
19	Subsequent checks for verticality.
20	Check RCC / masonry joints / bonds.
21	Subsequent checks for levelness of courses
22	Subsequent checks for workmanship/skill
23	Check one time continuity height of wall
24	Check for correct height of wall.
25	Check whether the debris has been removed on completion.
26	Check curing of wall after the period of completion

Table: 4.2 Checklists for Brick Work

CHECKLIST FOR Floor Tiling	
Item	Inspection Parameters
1	Quality of materials available for work: whether prior approval is taken
2	Sand
3	Cement
4	Tiles -tile specification/code:size,color,texturefinish
5	Tiles grout-specification,color,material
6	Preparation for Screed Laying
7	Check for surface preparation,cleanliness,roughness required
8	Check required cross/falls
9	Check minimum thickness of screed
10	Check provision of expansion joints
11	Check mix proportion to specification
12	Check whether finished levels match other areas.
13	Check whether adequate level drops placed.
14	Check any dryness of surface while leveling mortar
15	Subsequent checks for workmanship/skill
16	Preparation for Tile Laying
17	Check for surface preparation,cleanliness,roughness required
18	Check for approved tile specification-Type/Identification or code no.
19	Check whether approved shop drawing followed,laying pattern,design
20	Check setting out done as per shop drawing
21	Check that adequate references are marked to control errors being carried forward.
22	Check levels/cross/falls kept as per shop drawing
23	Check that tools & accessories are acceptable for use.
24	Check whether instructions are issued and understood by the workers with regard to skirting.
25	Check for protection and curing instructions.
26	Check while working for quality and specifications
27	Check for workmanship while working
28	Check whether arrangements are made for in-process & final inspection.
29	Check whether instructions are issued and agreed on final cleaning & polishing.
30	Check for protection and curing instructions.
Check for protection and curing instructions.	
32	Check whether instructions are issued and agreed on final cleaning & polishing.

Table: 4.3Checklists for Floor Tiling

CHECKLIST For Plastering	
Item	Inspection Parameter
1	Quality of materials available for use: whether prior approval s taken
	Cement
	Sand
5	Surface Preparation
1	Check for rebates / openings / embedment.
2	Check whether the surface is clean, and free from all dust, loose materials, grease, etc.
3	Check whether the surface is well wetted (dampened evenly).
4	Check for accuracy of finishing surface.
5	Check quality of additives if any
8	Check that mortar mix is as specified.
9	Ensure that plastering is left properly keyed.
10	Check whether the final finish is true and as per specified texture.
11	Check for dimensional accuracy of reveals, cills, openings [Size and Shape] etc.
12	Check Corners, Edges etc.
13	Check whether positions of frames and Embedment are acceptable compared to finished plaster line.
14	Workflow checks
15	Check frequently for verticality of surface
16	Check frequently for final finish required

Table: 4.4Checklists for Plastering

CHECKLIST For Ceiling Work	
Item	Inspection Parameter
1	Quality of Materials available for use: whether prior approval is taken
2	Species of timber/class
3	Moisture content
4	Wood preservatives
5	Other materials ,nails,anchorbolts
6	Preparation for formation
7	Check whether the correct drawing is in use
8	Check heights
9	Check lines and levels
10	Check whether the correct timber size and thickness is used
11	Check whether free from saps,shakes,cracks,large loose or dead knots and other imperfections
12	Check from attacks by insects
13	Check whether wood preservatives are applied as per specification
14	Check joining details
15	Surface in contact with concrete or masonry
16	Check for fan holes, light points & other service installation & points

Table: 4.5 Checklists for Ceiling Work

List of Appendices

Appendix A-Interview Guide

Questions for Interview

1.0 General Information Form

Contact Person: -----Designation: -----

Date of interview: -----

Company Name: -----

Name of theProject: -----

Contact's Phone-----

Contact's E-mail Address: -----

Project Location-----

Project Completed Date (MM/DD/Year):

2.0 Project Characteristics

1. Principal type of building (up to 4 storey buildings):

No of floors:

Floor area:

2. Select the category that best describes the nature of this project:

The Project Nature: New, Renovation Addition, Expansion (Pl underline)

3.0 Questions:

5. For each selected trades, what are causes for rework.
6. What best practices are proposed to minimize rework for each work category
7. What should be included as checklist indicators to minimize rework for each work category
8. Indicate any impact of rework on project performance or productivity other than cost and time

4.0 List causes for following trades in rework occurrences.

No	Work category	Causes(write down possible causes for these trades)
1	Setting out	
2	RRM	
3	Brick work	
4	Reinforced Concrete work	
5	Plaster work	
6	Tile work	
7	Waterproofing	
8	Painting	
9	Carpentry works	
10	Al and glass works	



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5.0 Best practices to minimize rework/checklist indicators:

No	Work category	Proposed Best practices to minimize rework/checklist indicators:
1	Setting out	
2	RRM	
3	Brick work	
4	Reinforced Concrete work	
5	Plaster work	
6	Tile work	
7	Waterproofing	
8	Painting	
9	Carpentry works	
10	Al and glass works	

Appendix B-Supporting Documents-Possible Causes

1. Design Changes

- a. Changes made at the request of the unexpected site condition
- b. Changes made at the request of client
- c. Changes made at the request of an end user/regulatory body
- d. Errors in the contract documentation
- e. Omissions of items in the contract documentation.

2. Construction Changes

- a. Changes in construction method to improve constructability
- b. Changes in construction method due to site conditions
- c. Changes initiated by the client after work had been undertaken
- d. Changes initiated by the contractor to improve quality
- e. Errors due to inappropriate construction methods
- f. Omissions of some activity of task
- g. Damage caused by a subcontractor
- h. Poor workmanship
- i. Setting out errors

3. Client related

- a. Lack of knowledge of the D&C process
- b. Lack of funding allocated for site investigation
- c. Lack of client involvement in the project
- d. Inadequate time and money spent on the briefing process
- e. Poor communication with design consultants
- f. Payment of low fees for preparing contract documentation

4. Site Management

- a. Ineffective use of quality management practices
- b. Poor planning and coordination of resources(wrong material,equipmentand defective materials and equipment)
- c. Failure to provide protection to the works
- d. Poor coordination of design team members
- e. Time boxing
- f. Poor planning of workload
- g. Lack of skill manpower to complete tasks
- h. Ineffective use of IT
- i. Insufficient supervision
- j. Incompetent supervision

5. Subcontractors

- a. Damage to other trades due to carelessness
- b. Inadequate managerial and supervisory skills
- c. Low labour skills level
- d. Use of poor materials

Appendix C-Supporting Documents-Best Practices

1. Project Scope

- a. Project scope was re-evaluated before the project was documented
- b. Project scope definition was resolved before the project commenced
- c. End-users were involved in the development of scope
- d. Client had a disciplined approach to decision-making

2. Contract Documentation

- e. Contract documentation was of a high standard
- f. Contract documentation was cross-checked to ensure changes, were coordinated
- g. Design reviews and verifications were undertaken
- h. An assessment of the status of the design and the potential for change was provided to the contractor.

3. Project Communications

- a. Client's needs and practices were communicated to the project team
- b. The specifications for the performance and quality requirements for the building were clearly defined
- c. Roles and responsibilities of the project team were defined in terms of milestones
- d. Working procedures and communication lines were clearly defined
- e. Requests for information were answered in a timely manner
- f. Any change/error/omission that was identified was immediately reported and acted upon

4. Procurement Strategy

- a. Project quality management systems
- b. Prequalification
- c. Relational contracting

5. Design Management

- a. Value management
- b. Design for construction
- c. Computer visualization
- d. Involvement of subcontractors/suppliers during design
- e. Constructability analysis
- f. Design scope freezing
- g. Team building



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