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Research Paper

A Study on Multiple Crew Based Productivity Scheduling Method in Construction Projects

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Abstract

The development construction assumes a critical part in any developing nation. Now a days time, cost and productivity of project had become primary concern of all the construction projects so in order to tackle the time, work and resource productivity in the scheduling works. There is most likely that development is a key movement inside any economy; it impacts, and is affected by, the country's (GDP).The objective to investigation and find out the RII to identify rank of factor to influence multiple crew based productivity scheduling for construction projects on Chennai. To achieve this objective, 30 productivity scheduling factors of multiple crew which are grouped as seven groups: a)design and planning engineer crew ,b).engineering crew, a) construction supervisor crew, d) labour crew, e) fabrication crew, f) safety crew, g)quality crew and this are done by the questionnaire survey and representative by the statistical approach. The factors which effects on multiple crew based productivity scheduling are investigated and top 10 are the most critical factors which are given as follows: (1) Shortage of labours , (2) Shifting methods ,(3)Financial issues ,(4)Workmanship , (5) Insufficient lighting ,(6)Distribution of skill labour, (7) Skill of labour, (8) Weather conditions, (9) Preparing and assigning the resources ,(10) Length of working day. Despite the fact that the results of this investigation in factors affecting on multiple crew in the construction companies in Chennai to fill a gap of knowledge used by construction industry members to construct up a more deeper and wider viewpoint of the issues affecting the productivity of crew, and give direction to engineers, managers, experience persons of multiple crew force for effective utilization, consequently help with accomplishing a realistic level of effectiveness and financially effective activity.

Keywords: *construction projects ; Chennai ; multiple crew; productivity schedule; factors; Rank; Relative Importance Index.*

1. Introduction

Now a days time, cost and productivity of project had become primary concern of all the construction projects so in order to tackle the time, work and resource productivity in the scheduling works. There is most likely that development is a key movement inside any economy; it impacts, and is affected by, the country's (GDP). Given the uncertainties, administration is to manage the development business is an unsafe one. While these risks might be gotten from either external or internal factors, external factors impact development industry than the internal ones. Profitability remains is an issue in the development part, encouraging effective use of assets and cost funds.

Productivity is the most basic issues for the both developing and developed nations. The developed countries think about the importance of financial related advancement. Developingnations which go up against joblessness issues, swelling and resource deficiency hope to utilize and deal to financial advancement and enhance the lives of people (Talhouni1990; Rakhra 1991).There are numerous difficulties confronting the construction industry in Chennai, yet a standout amongst the most essential, the journalists banter about, is productivity scheduling. In spite of all the innovative progressions, plenitude of construction materials, apparatuses, and monetary means accessible to nearby contractual workers, development costs are always on the ascent, culmination terms of activities are considerably expanding, and most undertakings are altogether overwhelming their financial plans. Consequently, objective of this investigation is to find out the RII of the factors and giving rank to factors saw by project engineers and experienced people in construction industry to affects the multiple crew based productivity schedule for Chennai.

The literature review of the study are to the investigation to start the paper, shows the investigation methods and analysing data, results is obtained and discussion are given and concludes in addition to this investigations we have recognized different factors influencing multiple crew based productivity scheduling in construction projects and ranking them according to the questionnaire survey.

2. Methodology

Flow chart of the methodology of the project is shown in the figure.1in this methodology the literatures are collected and analysed for the research gap is that various factors that are affecting on the productivity in construction so in order to fill the gap various factors are to analysed with framing of questionnaire survey with respect to various different construction sites.

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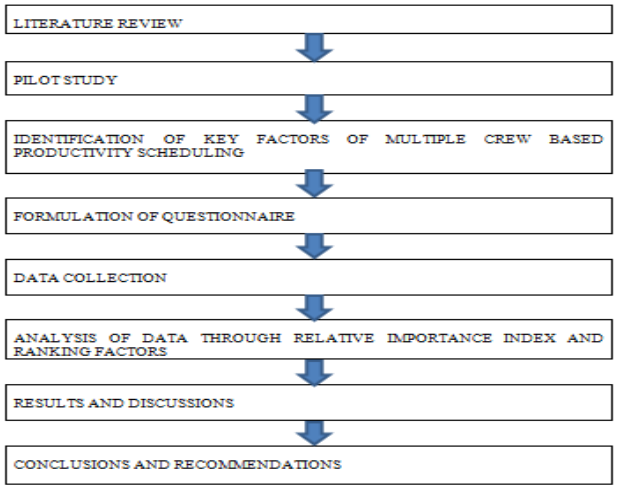


Fig 1. Methodology of the project

2.1. Questionnaire Design

The outline logic of the questionnaire relied upon the way that they should be straightforward, clear and justifiable for the respondents and in a similar time they should to have the ability to be translated well by the researcher. The questionnaire has an unequivocal preferred standpoint of requiring a smaller time to be responded and is more correct in the final result.

Factors influencing the multiple crew based productivity scheduling were recognized through the writing in light of past investigations together with data, update and changes by nearby master where an total of 30 factors were distinguished. The members were required to rate the factors in the way they influence construction industry on multiple crew based productivity scheduling considering about time, cost and quality using their own particular encounters on building construction. . Sum of 34 questionnaire surveys were over by, contractors, consultants, experienced engineer, and managers from different companies in the Chennai city.

3. Data Collection

The pertinent information to this study were gathered by closed-ended survey of questionnaire data. In light of connected past examinations on productivity and the commitment of nearby industry specialists, specialists30 factors were recognized and influential on multiple crew based productivity scheduling method in construction project in Chennai.

These components were grouped into the accompanying seven classifications based on past and as prompted by local experts: design and planning engineer crew factors, engineering crew factors, construction supervisor crew factors, labor crew factors, fabrication crew factors, safety crew factors, quality crew factors, to consider about the effects of the different levels of the members' experiences.

4. Data Analysis

According the following formula the relative importance index (RII) technique are used for analysing as in (Eq.2).

$$\text{RII}(\%) = \frac{3n_3+2n_2+n_1}{3(n_3+n_2+n_1)} * 100 \quad \text{(Eq.2)}$$

Here: n_1,$n_2$and n_3= respondents no of selected: 1)YES , 2) INSOME CASES and 3) NO. Ranging (1 to 3) are the respondents given according to weighting. The rank (R) is given to the different factors affecting on multiple crew based productivity scheduling by the relative importance index.These rankings made it conceivable to cross-analyze at the relative importance of the components as observed by respondents.

5. Results and Discussions

The amount effects of every one of the 30 factors explored on multiple crew based scheduling method is find out. Seven groups of overall factors are categorized as follows: 4, under theDesign and planning engineer crew; 4, under the Engineering crew; 4, under the Construction supervisor crew; 6, Labour crew;4, Fabrication crew;4, Safety crew and 4 under the Quality crew. The relative importance index , ranking inside the relating gathering, and overall rank. Since design and planning engineer and engineering crew are relative contain generally the factors, the exchange of elements grouped should be restricted to the positioned main of them.

5.1. Design and planning engineer crew

Table.1. RII ranking of design and planning engineering crew

Sr. no	Factors no	Factors of design and planning engineering crew	RII Ranking
1	3	Techniques and activities	47.67
2	2	Awareness of on site activities and project progress	40.1
3	1	Rework	36.67
4	4	Leadership	33.34

Relative importance index and the rank of four factors of design and planning engineering crew are categorized as below table.1 respectively.

The table.1 shows the questionnaire responses from the survey are ranked “Techniques and activities” are the most important factor affecting the multiple crew based productivity scheduling . The relative importance index of Preparing and assigning the resources are 47.67%. and it is positioned as the 1st factor in the design and planning engineercrew and is additionally positioned as the 15th in the impact in overall factors in the investigated, which has more influence of all the factors.

5.1. Engineering crew

Relative importance index and the rank of four factors of Engineering crew are categorized as below table.2 respectively.

Table.2. RII ranking of Engineering crew

Sr.no	Factor no	Factors of Engineering crew:	RII RANKING
1	8	Preparing and assigning the resources	56.65
2	7	Set out detailed works as per contract drawings	50
3	6	solve technical issues	38.67
4	5	Report preparation	33.14

The table.2 shows the questionnaire responses from the survey are ranked "Preparing and assigning the resources" are the most important factor affecting the multiple crew based productivity scheduling . The relative importance index of Preparing and assigning the resources are 56.65%. and it is positioned as the 1st factor in the engineering crew and is additionally positioned as the 9th in the impact in overall factors in the investigated, which has more influence of all the factors.

5.3. Construction supervisor crew

Relative importance index and the rank of four factors of Construction supervisor crew are categorized as below table.3 respectively.

Table.3. RII ranking ofConstruction supervisor crew

Sr.no	Factor no	Factors of Construction supervisor crew:	RII RANKING
1	12	distribution of skill labour	69.79
2	9	Inspection	46.57
3	10	unclear instruction	40
4	11	Slow mobilization of labour	36.27

The table.3 shows the questionnaire responses from the survey are ranked "distribution of skill labour" are the most important factor affecting the multiple crew based productivity scheduling . The relative importance index of distribution of skill labour are 69.79%. and it is positioned as the 1st factor in the Construction supervisor-crew and is additionally positioned as the 6th in the impact in overall factors in the investigated, which has more influence of all the factors.

5.4. Labour crew

Relative importance index and the rank of six factors of labour crew are categorized as below table.4respectively.

Table.4. RII ranking of labour crew

Sr.no	Factor no	Factors of labour crew:	RII RANKING
1	13	shortage of labours	76.67
2	14	Skill of labour	63.34
3	15	weather conditions	56.67
4	17	length of working day	56.57
5	16	working methods	53.34
6	18	Absenteeism	46.47

The table 4 shows the questionnaire responses from the survey are ranked "shortage of labours" are the most important factor affecting the multiple crew based productivity scheduling . The relative importance index of shortage of labours are 76.67%. and it is positioned as the 1st factor in the labour crew and is additionally positioned as the 1st in the impact in overall factors in the investigated, which has more influence of all the factors.

5.5. Fabrication crew

Relative importance index and the rank of four factors of fabrication crew are categorized as below table 5 respectively.

Table.4. RII ranking ofFabrication crew

Sr.no	Factor no	Factors of fabrication crew:	RII RANKING
1	22	Shifting methods	76.57
2	19	Material handling	53.24
3	21	Installation process	41.67
4	20	Scaffolding installation	39.67

The table 5 shows the questionnaire responses from the survey are ranked "Shifting methods" are the most important factor affecting the multiple crew based productivity scheduling . The relative importance index of Shifting methods are 76.57%. and is positioned as the 1st factor in the fabrication crew and is additionally positioned as the 2nd in the impact in overall factors in the investigated, which has more influence of all the factors.

5.6. Safety Crew

Relative importance index and the rank of four factors of safety crew are categorized as below table.6 respectively.

Table.4. RII ranking ofsafety crew

S.NO	Factor no	Factors of safety crew:	RII RANKING
1	26	insufficient lighting	70
2	25	working at high places	43.34
3	24	Accidents	39.9
4	23	voilation of safety precations	37.67

The table.6 shows the questionnaire responses from the survey are ranked "insufficient lighting" are the most important factor affecting the multiple crew based productivity scheduling. The relative importance index of insufficient lighting is 70%. And is positioned as the 1st factor in the safety crew and is additionally positioned as the 5th in the impact in overall factors in the investigated, which has more influence of all the factors.

5.7. Quality crew

The relative importance index and the rank of four factors of quality crew are categorized as below table.7 respectively.

Table.4. RII ranking of quality crew

S.NO	Factor no	Factors of safety crew	RII RANKING
1	30	financial issues	73.34
2	27	Workmanship	73.34
3	28	inefficiency of equipment	50
4	29	design codes & standards	46.67

The table 7 shows the questionnaire responses from the survey are ranked "financial issues" and "Workmanship" are the most important factor affecting the multiple crew based productivity scheduling. The relative importance index of financial issuses and Workmanship are 73.34%. and is positioned as the 1st factor in the quality crew and is additionally positioned as the 3rd in the impact in overall factors in the investigated, which has more influence of all the factors.

5.8 The Overall ranking

The overall ranking and relative importance indices of multiple crew based productivity scheduling factors questionnaire surveyed in construction projects in Chennai. The factors are summarized from the above crew groups like design and planning engineering crew, Quality crew, Safety crew, Fabrication crew , Labour crew ,Construction supervisor crew ,Engineering crew and top rankings from each group are as follows Techniques and activities, Preparing and assigning the resources, distribution of skill labour, shortage of labours ,Shifting methods ,insufficient lighting and financial issues.

The top 10 ranked factors affecting multiple crew based productivity scheduling are as follows (1)shortage of labours, (2).Shifting methods, (3)financial issuses, (4)workmanship (5) insufficient lighting (6) distribution of skill labour (7) Skill of labour (8) weather conditions (9)Preparing and assigning the resources (10)length of working day.

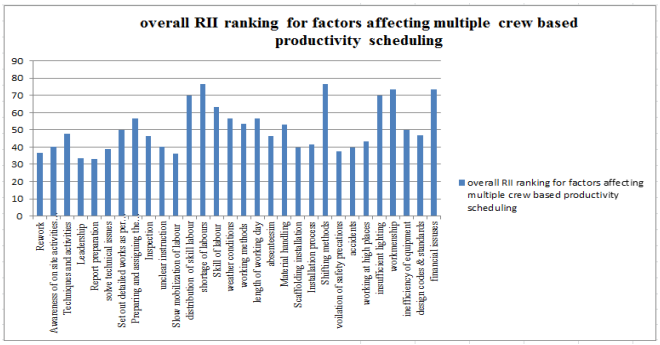


Figure.2. Overall ranking of multiple crew based productivity scheduling

According to the survey results the Overall Ranking of Factors affecting multiple crew based productivity scheduling are given in table.8respectively.

s.no	factors	Factors affecting multiple crew based productivity scheduing	RII ranking
1	13	shortage of labours	76.67
2	22	Shifting methods	76.57
3	30	financial issuses	73.34
4	27	Workmenship	73.34
5	26	insufficient lighting	70
6	12	distribution of skill labour	69.79
7	14	Skill of labour	63.34
8	15	weather conditions	56.67
9	8	Preparing and assigning the resources	56.65
10	17	length of working day	56.57
11	16	working methods	53.34
12	19	Material handling	53.24
13	7	Set out detailed works as per contract drawings	50
14	28	inefficiency of equipment	50
15	3	Techniques and activities	47.67
16	29	design codes & standards	46.67
17	9	Inspection	46.57
18	18	Absenteeism	46.47
19	25	working at high places	43.34
20	21	Installation process	41.67
21	2	Awareness of site activities and project progress	40.1
22	10	unclear instruction	40
23	24	Accidents	39.9
24	20	Scaffolding installation	39.67
25	6	solve technical issues	38.67
26	23	voilation of safety precations	37.67
27	1	Rework	36.67
28	11	Slow mobilization of labour	36.27
29	4	Leadership	33.34
30	5	Report preparation	33.14

7. Conclusions

This examination has distinguished and, in view of the measured relative importance index , decided the influence 30 factors affecting multiple crew based productivity scheduling in construction projects. The factors investigated were, what's more, characterized under the following seven groups:1.design and planning engineer crew ,2. engineering crew,3. construction supervisor crew, 4. labour crew, 5. fabrication crew, 6. safety crew, 7. quality crew.

The outcomes are found and identify and the factors are effecting as the salient influencing multiple crew productivity, contributing the essentialness of construction industry the concept are applied and finding the absence of constructability practices among the different planners, engineers and project managers in Chennai. Based on the results of this examination, it can, additionally, be induced that different group have a basic commitment to make to upgrade the productivity of agents and subsequently accomplish to increment for scheduling.

The study behind this investigation is to find out and distinguish the major factors affecting the multiple crew to increase the productivity scheduling in the construction projects through the experts. A review was created and responses were gathered from 10 different construction companies in the Chennai city. A sum of 30 factors questionnaire responses were taken from the contractors, consultants, experienced engineer, and managers from different companies.The survey results of top 10 factors in the construction projects are 1. Shortage of labours , 2. Shifting methods ,3. Financial issues ,4. Workmanship , 5. Insufficient lighting ,6.Distribution of skill labour, 7. Skill of labour, 8. Weather conditions, 9. Preparing and assigning the resources ,10. Length of working day.

Despite the fact that the results of this investigation in factors affecting on multiple crew in the construction companies in Chennai to fill a gap, which used to provide the information for the construction supervisions, contractors and project managers for decision making to improve the project guidance for focusing, following up on, and controlling for the factors which effects, it is additionally recommendations to imitate the investigation, the impression of designers ,engineers, labour, fabrication ,quality, safety groups in addition to construction supervisions, contractors and project managers to evaluate agreement level among the seven groups concerning rank of the factors are find of this investigations, hence enhancing the construction industry productivity scheduling in a domain of regularly expanding interest for lower schedule time and cost for the construction project.

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