ASSESING THE VARIOUS PROBLEMS FACING IN ARRANGING APPROPIRATE LABOUR AND QUALITY MATERIALS FOR HIGH RISE BUILDING WORKS AND PREPARING REMEDIAL MEASURES AND A FLOW-CHART FOR ADOPTION

Aravindan B[1], Arunima Jayakumar[2]

[1]*Student, Construction Engineering and Management, SRM University, Tamil Nadu, India*
[2]*Assistant Professor, Construction Engineering and Management, SRM University, Tamil Nadu, India*

Abstract

A big major, continental concern in construction industry is arranging the labour and quality materials accordingly. The organizations which don't recognize the upcoming problems due to mismanagement of labour and material works have justifiably been forced out of the mainstream of construction activity. A good project management is needed to drastically reduce the problems facing in labour and material works, which intern increases the chances of success. This paper concentrates on assessing the various problems facing in arranging appropriate labour and quality materials for high rise building works. The objective of the project is to study and analyze the various factors that affect labour and material works and to provide an effective flowchart with remedial measures which helps to reduce the problems arising from labour and quality material works in the construction industry. A set of questionnaires about labour and quality material works has been prepared, categorized into 7 sections and then distributed it to various companies and then analyzed. The analyzed and ranked data has been used to prepare remedial measures and a flowchart for adoption in construction industry.

Keywords: *Labour, Quality Materials, Material Management and construction etc…*

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1. INTRODUCTION

In this hybrid generation, change is becoming increasingly important where the tools like labour and materials should be used properly which in turn provide a useful way for construction organizations to manage that change effectively. Arranging proper materials and labour management for a particular project is a tedious process so, we are in need of accurate and consistent information about labour and quality material works at every stage due to the diversified nature of works and complex interrelated activities. Even many clients also focuses to finish off their construction projects as soon as possible to gain a better faster return to their investments. To achieve this margin a good management is required to manage the labor and material works without any unnecessary delays or occurrence of problems.

The most important resource in the construction industry is the labour, who combines with all the resources namely materials, equipment's and finances to produce numerous various construction projects successful. The different variable levels of labour affects their productivity levels, so by feeding them the skills of education and training, leadership mentality, interpersonal skills, security sensitivity, resource utilization, initiative, planning effectiveness, work method, personal health, motivational factor, tool types, machines, required materials, personal skills, ability to work under pressure, type of work to be done and supervisory personnel will effectively improve the productivity and reduces the problems arising from labour. Their sole objective is to achieve the given goal in time, goal harmony, maintaining a good work structure, improvement in productivity and quality of work life. Better positive results cannot be achieved without the adequate availability of skilled, semiskilled and unskilled labors.

Material management supports a central role in project planning, execution and controlling field in construction. Lack of required materials is the main issues at the time of construction works which quickly delays the process and causes the management more trouble also Materials causes the major expense in construing works for about 35-40 percentage, so the sole goal of material management is to make sure that the materials used for construction works are available at the point of use when needed with proper schedule. The projects schedule has been greatly influenced by the availability of materials in time. Poor material management results in large avoidable loss in cost during construction which is reduced by managing the materials accordingly may result in substantial saving in project costs. The main objective of the material management is efficient material planning, quality assurance, a good buying purchasing procedure for materials, a better storing and inventor control is needed.

In this study, the problems or factors which affects the arrangement of labour and material for high rise building works has to be identified and a proper set of questionnaire is prepared based on the identified problems to provide a remedial solution.

2. AIM OF STUDY

The aim of the study is to find out and sort out the problems facing in arranging appropriate labour and quality material for high rise building works and preparing remedial measures and a flowchart for adoption.

2.1 Objectives of the Study

The specific objectives are:

- To study and identify the critical factors affecting the labour and quality materials in construction projects.
- To provide a remedial measures with detailed flowchart for adoption.
- This study can assist professionals in taking proactive measures for labour and quality materials in a high rise construction project.

2.2 Scope of Study

This project concentrates on the arranging labour and quality materials for high rise building works in the construction industry. The main concept of this project is to develop a remedial measure with a flowchart for adoption to eliminate the highly problematic issues during the construction of the existing projects.

3. LITERATURE REVIEW

In recent decades, Construction industry faces challenges with regard to problems associated with productivity and the problems are usually associated with performance of labor. The performance of labor is affected by many factors and is usually linked to the performance of time, cost, and quality. Meanwhile identification and evaluating factors affecting construction labor productivity have been done in the last decade; however, a deeper understanding is still needed to improve the labor productivity. This study conducted with the aim to get the latest information on key factors that affect project performance in terms of project completion time and this is part of major research to model the interaction relationships between key factors affecting productivity. The results will become worthwhile information in determining the major steps to improve the performance of project completion time and also as part of further research in modeling the interaction relationship between the key factors affecting productivity to improve the labor productivity in Indonesian construction industry. (Soekiman A 2011).

Productivity remains an intriguing subject and a dominant issue in the construction sector, promising cost savings and efficient usage of resources. Productivity is one of the most important issues in both developed and developing countries. Construction projects are mostly labour-based with basic hand tools and equipment, as labour costs comprise 30 to 50 % of overall projects costs. The developed countries are aware of the importance of economic growth and social welfare. The main factors negatively affecting labour productivity are: material shortage, lack of labour experience, lack of labour surveillance, misunderstandings between labour and superintendent, and drawings and specification alteration during execution (Adnan Enshassi, 2007).

To examine the effectiveness of construction projects the main problem of procurement is related to schedule delays and lack of specified quality for the project. To prevent this situation it is often necessary to dedicate important resources like money, personnel, time, etc. Materials management is defined as a management system that is required in planning and controlling the quality & quantity of the material, punctual equipment placement, good price and the right quantity as required. Material management is a management system that integrates purchasing, shipping and material control from suppliers. Based on those definitions, generally materials management can be defined as a process of planning, executing, and controlling the right source of materials with the exact quality, at the right time and place suitable for minimum cost construction process. Three important phases that holds the key to a successful materials management are materials purchasing, materials usage, and storage .It is used to reduce the cost, which increases profitability and streamlines the production. Apart from management of material cost and its supply it helps in its proper utilization, transportation, storage, handling and distribution. Selection of personnel for marketing, purchasing, inventory control, stores management and materials handling and their training and placement is also to be seen by the materials management department this indicates that it is very essential to have a materials management department in any organization to support the management in the production activities (Phani Madhavi 2013).

Recently selection of materials is a complex and delicate task determined by the immense number of building material options. Likewise, multiple factors are often considered by the architect when evaluating the various categories of building materials. As a result, these sets of factors or variables often present tradeoffs that make the decision process even more complex. To ease the material-selection process, this article examines one aspect of the research objectives: the relevant factors or variables needed to develop a systematic and efficient material-selection system. Through the analysis of frequency data and results of a pilot study, it identifies some of the potential factors that will impact architects decisions in their choice of green vernacular building materials, during the design-decision making process. (Ibuchim Ogunkah 2012).

4. METHODOLOGY

The methodology flowchart shows the step by step procedure given below

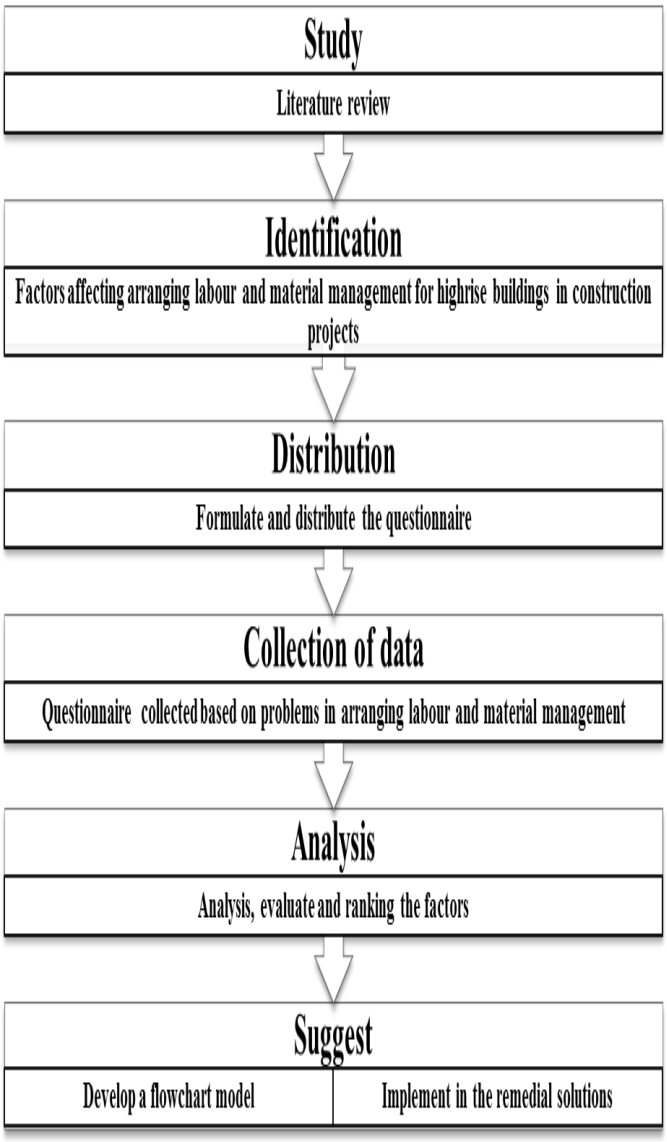


Fig -1: Methodology

The first and foremost step is to study the collected literature review and list the problems in arranging appropriate labour and material works. Then the identified issues are framed and formulated into a set of proper questionnaire and distribute it to the organizations. The distributed questionnaire's should be collected accordingly and using the help of RII analysis the factors has been ranked and cross checked using SPSS statistical analysis software. Then finally a model flowchart has to be developed and implement it in the current construction projects. Based on the knowledge gained on the literature study the project is carried out with the following flowchart.

5. RESEARCH & STUDY ANALYSIS

5.1 Responses from the Organizations

This questionnaire's has been given to professionals such as contractors, engineers, project managers, planning engineers, site engineers and the collected questionnaire's 31 out of given 40 has been analyzed.

Table -1: Total No. of respondents

Questionnaire	Total Numbers	Percentage
Total Distributed	40	100
Total Returned	31	91
Not Returned	9	9
Used for the Study	**31**	**91**

The table 1 and the Figure 2 below shows that ninety one percent of questionnaires distributed were successfully completed and returned accordingly. It shows that there were good responses form the organizations and it's been encouraging and helpful for the project.

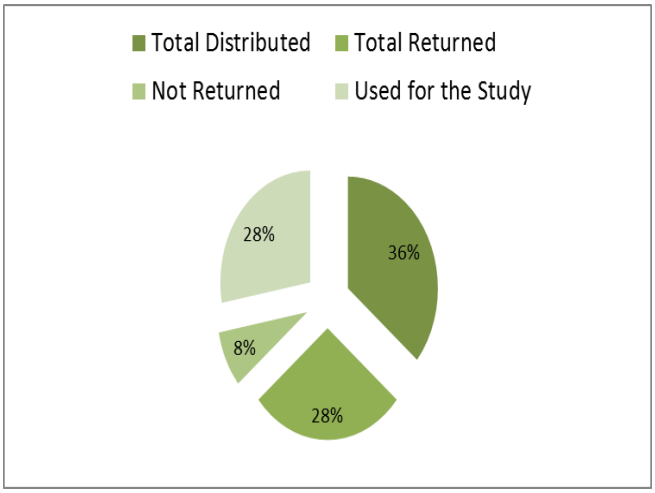


Fig -2: No. of respondents chart

5.2 Problems Affecting Labour and Quality Materials

Several authors have provided various different categorizations of labour and quality material arrangement problems, but the attempts they made to solve the issues is less, but with the help of the collected literature the most threatening factors or problems affecting arranging appropriate labour and material works for high-rise building have been identified. The questionnaires collected from the organizations are analyzed using RII relative importance indices and cross checked it with the help of SPSS statistical analysis program software to get accurate rank values. Out of 40 distributed questionnaires 31 were returned and the analysis has been done as per the methodology.

The questionnaires has been formed using Likert scale method and questions were formed as per the scale, the options provided for the questions are strongly disagree for one, disagree for two, neutral for three, agree for four, strongly agree for five the final option. Using this method the questions were formed and formulated.

Table -2: Likert scale for analysis

1	**Strongly Disagree**
2	**Disagree**
3	**Neutral**
4	**Agree**
5	**Strongly Agree**

The set of 60 Questions has been formed using the collected data about problems facing in arranging appropriate labour and material management for high-rise building works in construction projects. Where the questionnaire contains seven sections which are,

- Labour/manpower issues
- Managerial issues
- Motivational issues
- Material issues
- Schedule issues
- Quality issues
- Safety issues

5.2.1 Labour/Manpower Issues

Table –3: Summary of RII and SPSS cross checked rank of Labour/manpower issues

S.No	DESCRIPTION	RII VALUE	RANK
1	Use of alcohols and drugs by labors	0.787	1
2	Slow mobilization of labour	0.742	2
3	Labour Strikes due to payment delay and wages	0.735	3
4	Labour absenteeism	0.722	4
5	Poor workmanship during construction	0.677	5

Here the table 3 and figure 3 below shows that the section one labour and material issues analysis have ranked top five issues with the help of RII value which was cross checked using SPSS software, where the issues are use of alcohols and drugs, slow mobilization of labour, labour strike due to payment delay and wages, labour absenteeism and poor workmanship during construction.

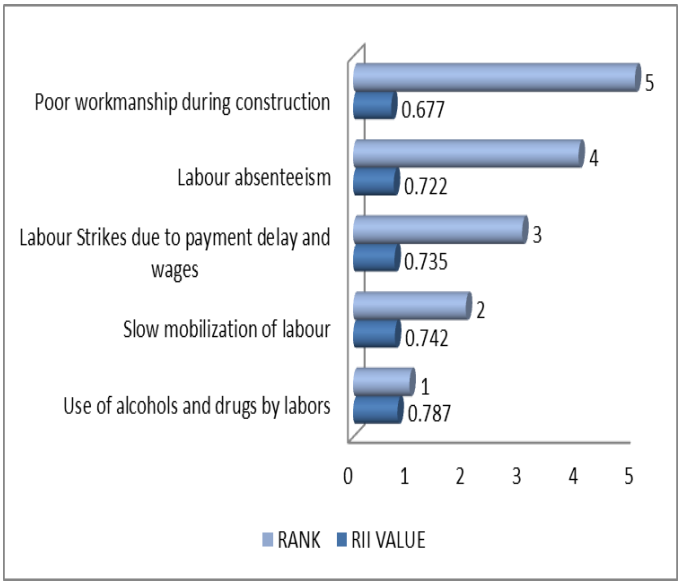


Fig -4: Bar chart for the labour/manpower issues results

5.2.2 Managerial Issues

Here the table 4 and figure 4 below shows that the section two managerial issues analysis have ranked top five issues with the help of RII value which was cross checked using SPSS software, where the issues are poor communication between labour and technical personnel, change in design while execution of the work, shortage of technical personnel, poor labour management in site, cost incurred for the medication of injured labour.

Table –4: Summary of RII and SPSS cross checked rank of Managerial issues

S.No	DESCRIPTION	RII VALUE	RANK
1	Poor communication between labour and technical personnel	0.787	1
2	Change in design while execution of the work	0.73	2
3	Shortage of technical personnel	0.71	3
4	Poor labour management in site	0.69	4
5	Cost incurred for the medication of injured labour	0.677	5

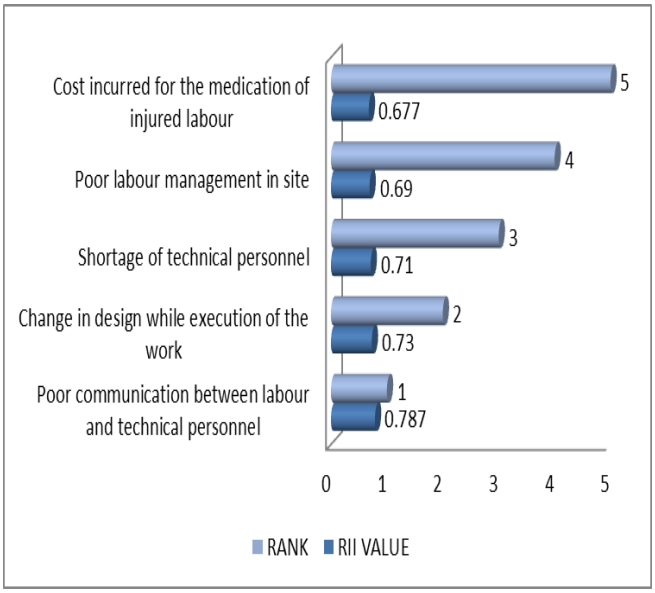


Fig -4: Bar chart for the managerial issues results

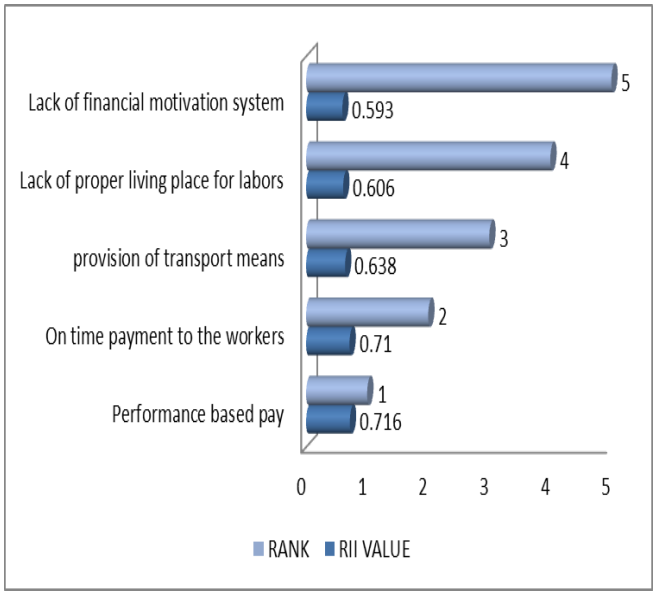


Fig -5: Bar chart for the motivational issues results

5.2.3 Motivational Issues

Here the table 5 and figure 5 below shows that the section three motivational issues analysis have ranked top five issues with the help of RII value which was cross checked using SPSS software, where the issues are performance based pay, on time payment to the workers, provision of transport means, lack of proper living place for labour, lack of financial motivation system.

Table –5: Summary of RII and SPSS cross checked rank of Motivational issues

S.No	DESCRIPTION	RII VALUE	RANK
1	Performance based pay	0.716	1
2	On time payment to the workers	0.71	2
3	provision of transport means	0.638	3
4	Lack of proper living place for labors	0.606	4
5	Lack of financial motivation system	0.593	5

5.2.4 Material Issues

Here the table 6 and figure 6 below shows that the section four Material issues analysis have ranked top five issues with the help of RII value which was cross checked using SPSS software, where the issues are escalation of construction material prices, non-availability of materials as per contract specifications, poor resource management, delays due to poor quality of materials, delay due to the material suppliers.

Table –6: Summary of RII and SPSS cross checked rank of Material issues

S.No	DESCRIPTION	RII VALUE	RANK
1	Escalation of Construction material prices	0.716	1
2	Non- availability of materials as per contract specifications	0.716	1
3	Poor resource management	0.716	1
4	Delays due to poor quality of materials	0.716	1
5	Delays due to the material suppliers	0.652	5

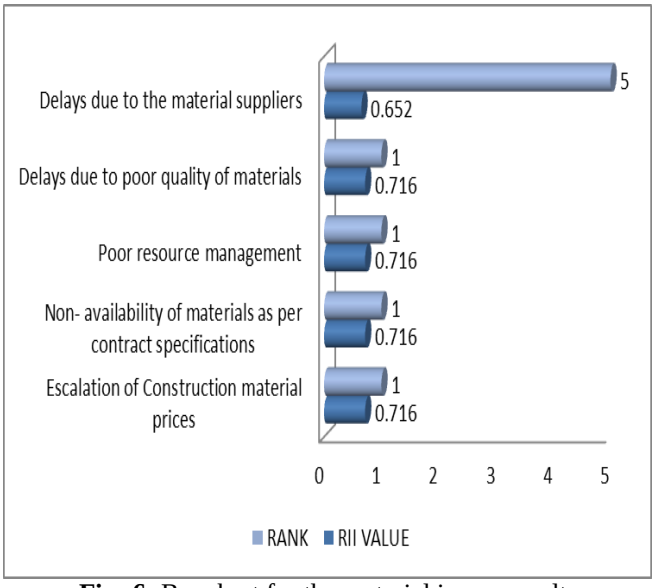


Fig -6: Bar chart for the material issues results

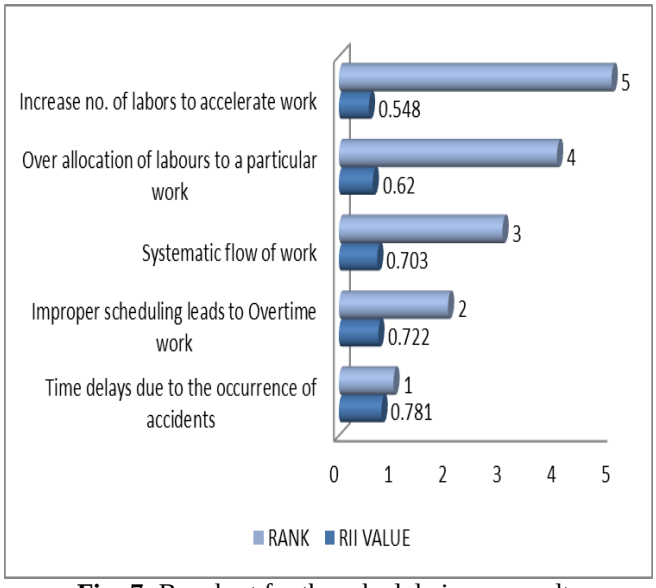


Fig -7: Bar chart for the schedule issues results

5.2.5 Schedule Issues

Here the table 7 and figure 7 below shows that the section four Schedule issues analysis have ranked top five issues with the help of RII value which was cross checked using SPSS software, where the issues are time delays due to the occurrence of accidents, improper scheduling leads to overtime works, systematic flow of works, over allocation of labors to a particular work, increase no. of labors to accelerate work.

Table –7: Summary of RII and SPSS cross checked rank of Schedule issues

S.No	DESCRIPTION	RII VALUE	RANK
1	Time delays due to the occurrence of accidents	0.781	1
2	Improper scheduling leads to Overtime work	0.722	2
3	Systematic flow of work	0.703	3
4	Over allocation of labours to a particular work	0.62	4
5	Increase no. of labors to accelerate work	0.548	5

5.2.6 Quality Issues

Here the table 8 and figure 8 below shows that the section four quality issues analysis have ranked top five issues with the help of RII value which was cross checked using SPSS software, where the issues are material selection and usage, high quality expectation un unrealistic activity duration, delay in quality inspection, inadequate materials for construction, low quality raw materials.

Table –8: Summary of RII and SPSS cross checked rank of quality issues

S.No	DESCRIPTION	RII VALUE	RANK
1	Material selection and usage	0.664	1
2	High quality expectation in unrealistic activity duration	0.62	2
3	Delay in quality inspection	0.554	3
4	Inadequate materials for constructions	0.503	4
5	Low quality raw materials	0.451	5

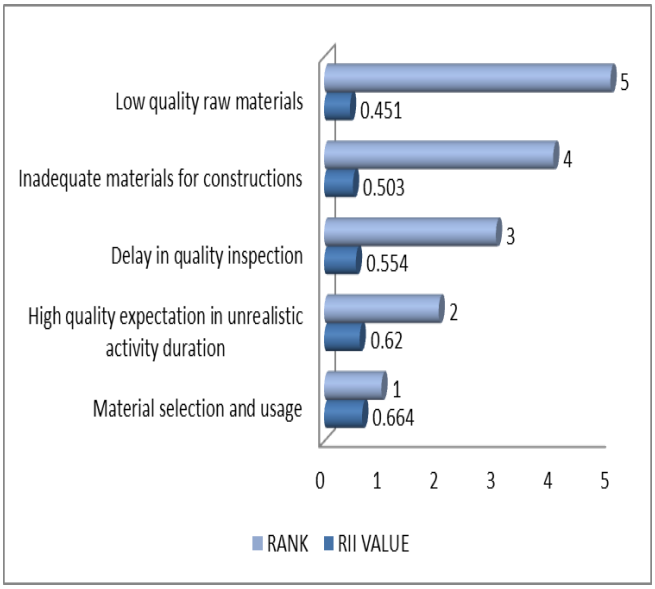


Fig -8: Bar chart for the quality issues results

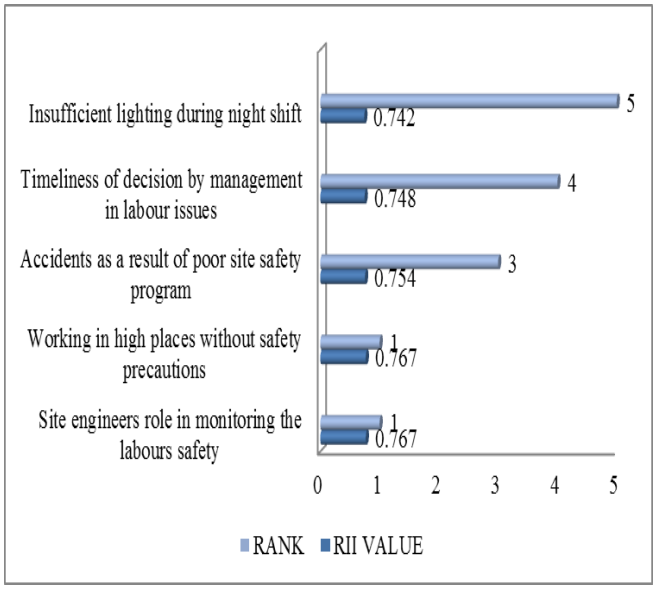


Fig -9: Bar chart for the Safety issues results

5.2.7 Safety Issues

Here the table 9 and figure 9 below shows that the section four safety issues analysis have ranked top five issues with the help of RII value which was cross checked using SPSS software, where the issues are site engineers role in monitoring the labour safety, working in high places without safety precautions, accidents as a result of poor site safety program, timeliness of decision by management in labour issues, insufficient lighting during night shift.

Table –9: Summary of RII and SPSS cross checked rank of Safety issues

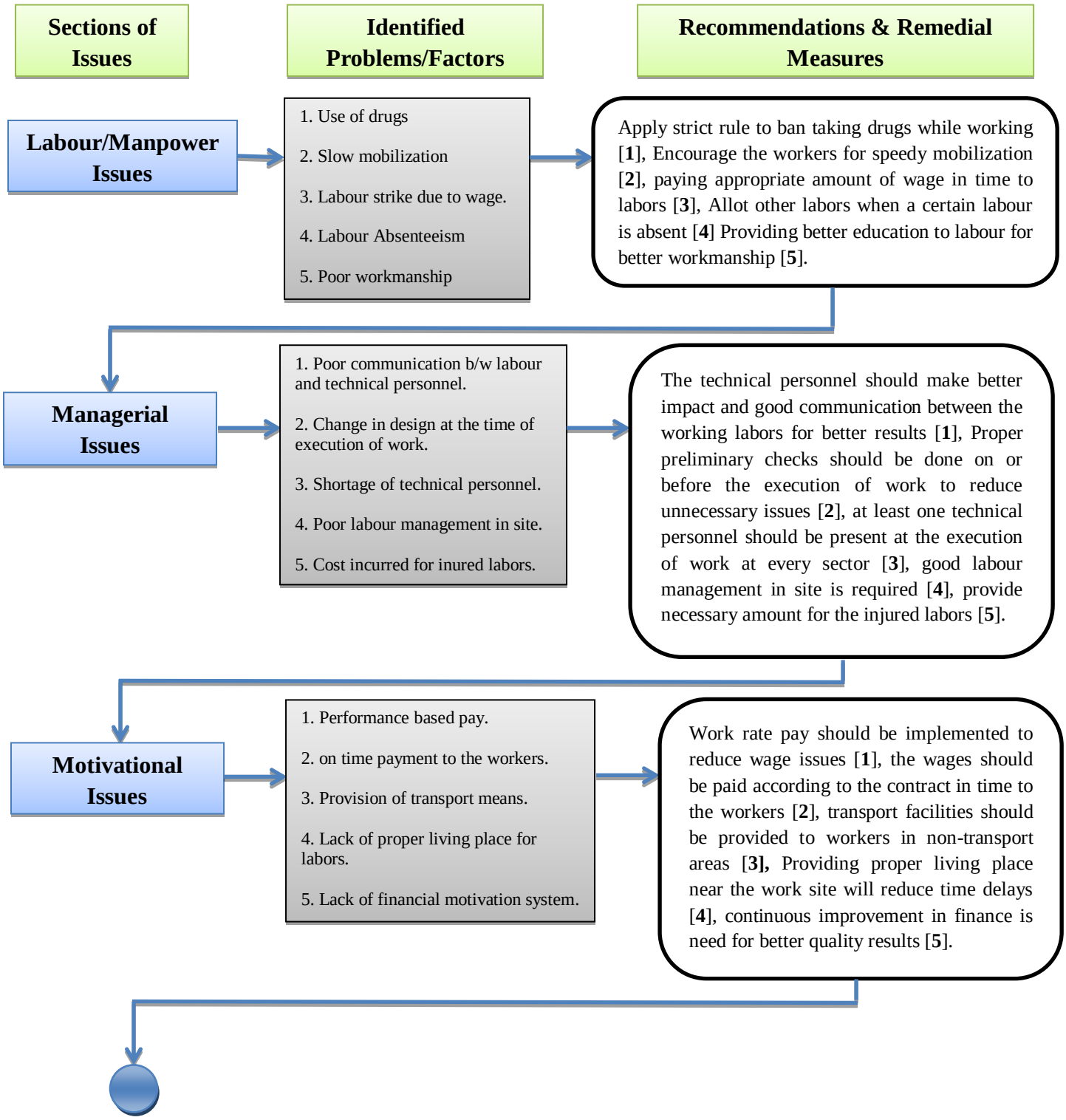
S.No	DESCRIPTION	RII VALUE	RANK
1	Site engineers role in monitoring the labors safety	0.767	1
2	Working in high places without safety precautions	0.767	1
3	Accidents as a result of poor site safety program	0.754	3
4	Timeliness of decision by management in labour issues	0.748	4
5	Insufficient lighting during night shift	0.742	5

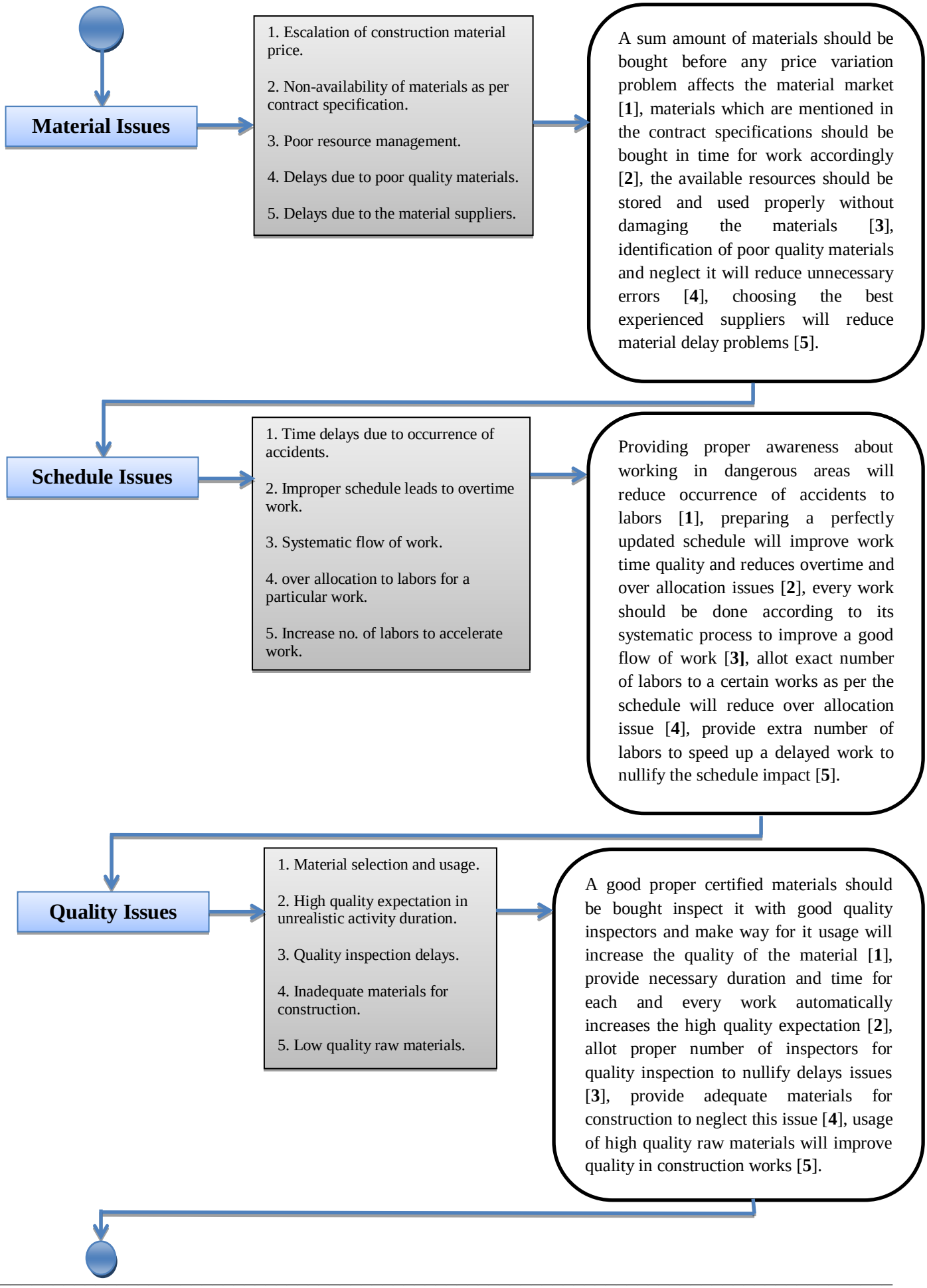
6. REPRESENTATION OF FLOWCHART

The essential requirements for the development of flowchart model has been developed using the collected questionnaires and identified factors which affects the arrangement of labour and materials for high-rise buildings.

The problems which affect the most are use of alcohols and drugs, slow mobilization of labour, labour strike due to payment delay and wages, labour absenteeism and poor workmanship during construction, poor communication between labour and technical personnel, change in design while execution of the work, shortage of technical personnel, poor labour management in site, cost incurred for the medication of injured labour, performance based pay, on time payment to the workers, provision of transport means, lack of proper living place for labour, lack of financial motivation system, escalation of construction material prices, non-availability of materials as per contract specifications, poor resource management, delays due to poor quality of materials, delay due to the material suppliers, time delays due to the occurrence of accidents, improper scheduling leads to overtime works, systematic flow of works, over allocation of labors to a particular work, increase no. of labors to accelerate work, material selection and usage, high quality expectation un unrealistic activity duration, delay in quality inspection, inadequate materials for construction, low quality raw materials, site engineers role in monitoring the labour safety, working in high places without safety precautions, accidents as a result of poor site safety program, timeliness of decision by management in labour issues, insufficient lighting during night shift.

6.1 Flowchart & Recommendations




Material Issues
1. Escalation of construction material price.
2. Non-availability of materials as per contract specification.
3. Poor resource management.
4. Delays due to poor quality materials.
5. Delays due to the material suppliers.
A sum amount of materials should be bought before any price variation problem affects the material market [1], materials which are mentioned in the contract specifications should be bought in time for work accordingly [2], the available resources should be stored and used properly without damaging the materials [3], identification of poor quality materials and neglect it will reduce unnecessary errors [4], choosing the best experienced suppliers will reduce material delay problems [5].
Schedule Issues
1. Time delays due to occurrence of accidents.
2. Improper schedule leads to overtime work.
3. Systematic flow of work.
4. over allocation to labors for a particular work.
5. Increase no. of labors to accelerate work.
Providing proper awareness about working in dangerous areas will reduce occurrence of accidents to labors [1], preparing a perfectly updated schedule will improve work time quality and reduces overtime and over allocation issues [2], every work should be done according to its systematic process to improve a good flow of work [3], allot exact number of labors to a certain works as per the schedule will reduce over allocation issue [4], provide extra number of labors to speed up a delayed work to nullify the schedule impact [5].
Quality Issues
1. Material selection and usage.
2. High quality expectation in unrealistic activity duration.
3. Quality inspection delays.
4. Inadequate materials for construction.
5. Low quality raw materials.
A good proper certified materials should be bought inspect it with good quality inspectors and make way for it usage will increase the quality of the material [1], provide necessary duration and time for each and every work automatically increases the high quality expectation [2], allot proper number of inspectors for quality inspection to nullify delays issues [3], provide adequate materials for construction to neglect this issue [4], usage of high quality raw materials will improve quality in construction works [5].

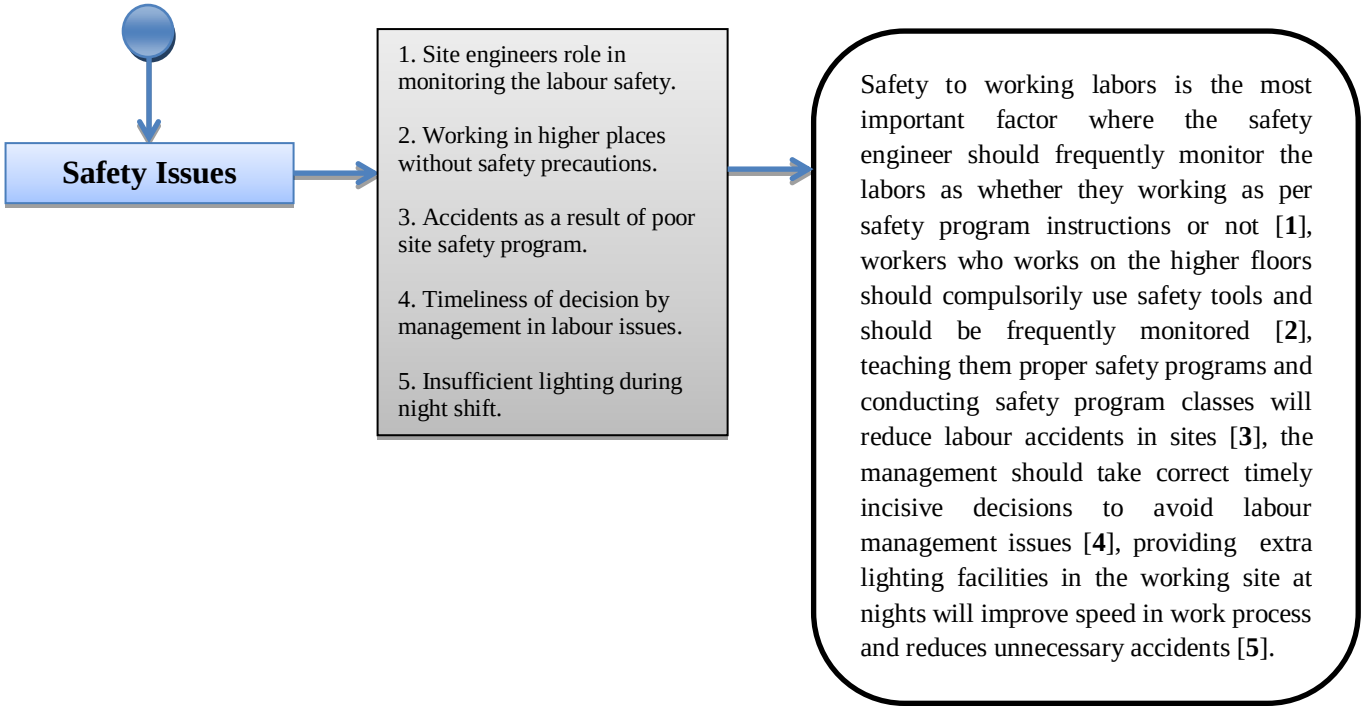


Fig -10: Framework for TQM

7. SUMMARY AND CONCLUSION

In conclusion, the top ranked problems or factors from each seven sections have been analyzed and a flowchart with recommendations and remedial measures has been prepared for adoption. From the results achieved the most of the labour and material works are significant and should be practiced.

From this flowchart process the most notable problems in each section has been found out which are use of alcohols and drugs, slow mobilization of labour, labour strike due to payment delay and wages, labour absenteeism and poor workmanship during construction, poor communication between labour and technical personnel, change in design while execution of the work, shortage of technical personnel, poor labour management in site, cost incurred for the medication of injured labour, performance based pay, on time payment to the workers, provision of transport means, lack of proper living place for labour, lack of financial motivation system, escalation of construction material prices, non-availability of materials as per contract specifications, poor resource management, delays due to poor quality of materials, delay due to the material suppliers, time delays due to the occurrence of accidents, improper scheduling leads to overtime works, systematic flow of works, over allocation of labors to a particular work, increase no. of labors to accelerate work, material selection and usage, high quality expectation un unrealistic activity duration, delay in quality inspection, inadequate materials for construction, low quality raw materials, site engineers role in monitoring the labour safety, working in high places without safety precautions, accidents as a result of poor site safety program, timeliness of decision by management in labour issues, insufficient lighting during night shift and rectified. To increase the performance of the labour and material works proper management program should be processed.

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BIOGRAPHIES

Aravindan B, Department of civil engineering, SRM University, Kattangulathur, Chennai.

Assistant Prof. Ms. Arunima Jayakumar, Department of civil engineering, SRM University, Kattangulathur, Chennai.