

USE OF ANDROID TOOL FOR QUALITY CONSTRUCTION

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Abstract—The construction industry has been struggling with quality issues for many years, which affect and the cost, customer satisfaction and business development. This paper focus on identification of prerequisite for Quality control of selective activities. This study leads to find out vital checks in activity which has to require more concentration while execution. It suggests using modern tool to check construction work with the help of Android application. To develop an Android application, this study carried out a survey for finding critical checks for selective activities. ISO certified organization and their middle management employee responded to master checklist. This data analysis forms a unique trend of vital, important and necessary checks. This is base for development of application.

Study concluded with the Vital checks in activity for quality concern, study carried by questionnaire survey, checklist rating and views. This solution will be unique one for construction industries, as android users are increasing rapidly.

Index Terms —Vital Checks, Android application, selective activities.

I. INTRODUCTION

The Indian construction industry has to moderate as per Technology and Modern android tool. It's very difficult to keep in mind and also difficult to keep hard copy with you for quality checks, a smart way with changes in the technology, android tool use in construction is suggested.

Today Android users are increased rapidly and using various apps, that type of application are helps to save human Time, Cost and Money. Why it can use in quality construction? Quality is satisfaction of customer's requirement and business computation in market tread. That type of human tendency use android application. So it has minded fully concentration on apps Vital, important, and necessity checks, directly proportional to construction quality.

The Indian origination is work on outcome base construction quality. Owner/Client, Contractor /Sub Contractor, Engineer, Supervisor are use android Phone so that whole organization are connected to one Android application of selective construction activity which has required More Cost, Time. The selections of Eight Selective activity are Excavation, reinforcement, formwork, Concreting, Brick Masonry, flooring, Plastering, and Painting. I was suggest him to while execution time it will more concentration on Vital, Important and Necessary Checks.

All data has been required as per quality construction checks in Android tool. It can Operate by site Engineer, supervisor. The progress report updated on continually activity done by android application user, user gives some rights to if any activity check can be added and changes it depends on type of Condition ,Finally Cost consumed is inserted ,and gives rating on check it depends on it assessment and criticality.

Factors Affecting to the Quality:

To maintain the quality throughout the project, following are the different factors affecting deeply to the quality.

- 1) Money and Time
- 2) Material
- 3) Manpower
- 4) Machines and methods
- 5) Market
- 6) Management
- 7) Checklist
- 8) Customer satisfaction

II. DEFINITIONS

Definitions of Quality:

There are several definitions of quality which are given by the different Quality Guru's. They are as follows:

"Quality is conformance to specification."- British Defence Industry QA Panel

"Quality is conformance to requirements."

- Philip Crosby

"Quality is fitness for purpose."

- Dr. Juran

"Quality is synonymous with customer needs and expectations."

- RJ Mortiboys

"Quality is a predictable degree of uniformity and dependability, at low cost and suited to the market."

- Dr. Edward Deming

"Quality is meeting the requirements of the customer – now and in the future."

- Mike Robinson

"Quality is the total composite product and service characteristics of marketing, engineering, manufacturing and maintenance through which the product and service in user will meet the expectations by the customer."

According to us, the definition of quality will be "Quality is the product which can be obtained by inspection so as to achieve customer satisfaction."

A. Quality Control

The dictionary defines Quality Controls the inspection, analysis and action required to ensure quality of output; the operational techniques and the activities used to fulfill and verify requirements of quality; a procedure for keeping quality of inputs or outputs to specifications. (Lydia Nyomek et al. 2010).

B. Quality Assurance

Quality assurance is about being "in control" of all major areas of your business so that you can assure quality. Being "in control"

also reduces variation, which improves quality. "Control" and "variation reduction" is accomplished using various methods. (Lydia Nyomek et al. 2010).

C. PQP- Project Quality Plan

The project quality plan (PQP) defines the quality planning for the whole project and is the principle quality management system documentation prepared for the project.

This Project Quality Plan (PQP) is distributed using QDMS (Quality Document Management System) to manage distribution and control updates where server or internet access is difficult or not available, a manual form (A04.F06 Document Distribution Record) can be used, records details of the documents holders who will be updated. QDMS is a software package that is used for the purpose of formally recording document transmittals and receiver acknowledgments. Quality planning described in this documents shall apply to all activities of work for the project which may encompass the design (if applicable), site works, supply, installation testing and commissioning. This plan shall apply to the associated resources and facilities employed on project. The plan also addressed control of all major subcontractors and suppliers.

III. OBJECTIVES

- 1) To improve the quality of specific activity.
- 2) To identify the vital checks required for quality.
- 3) To assess checks involved in construction activities.
- 4) Development of Android Application for saving time.

IV. NEED OF WORK

Now a day, the Quality construction is very necessary for the following purposes:

- 1) Quality Control (QC) is very essential in a business for it to succeed.
- 2) Quality Control co-ordinates activities to direct and control businesses with regards to quality.
- 3) Quality Control creates the techniques and activities used to fulfill requirements for quality in business.
- 4) Quality maintenance is needed a new technique over the paper work i.e. use of mobile application.
- 5) This application will save the time in conventional formalities.

V. SCOPE OF WORK

- 1) Setting out objectives
- 2) Literature survey
- 3) Site Visits
- 4) Identification of critical activities and factors affecting to it
- 5) Finding importance of factor in terms of grade
- 6) Development of android application.

VI. LITERATURE REVIEW

A. Quality Gurus

The movement of quality has been differentiated in the three groups of gurus since the 1940's:

Early 1950's Americans who took the messages of quality to Japan

Late 1950's Japanese who developed new concepts in response to the Americans

1970,s-1980's Western gurus who followed the Japanese industrial success

2.1. Nashwan Mohammed Noman Saeed (1) and Awad Sad Hasan(2) "THE EFFECT OF TOTAL QUALITY MANAGEMENT ON CONSTRUCTION PROJECT PERFORMANCE"

This study empirically examines the extent to which Total Quality Management (TQM) and project performance are correlated and the effects of TQM on project performance. In this study, a TQM framework is developed according to a comprehensive literature review. This framework demonstrates the relationship between TQM and construction project performance through examining the effects of nine TQM constructs on three element levels of project performance. The proposed model and hypotheses were tested by using data collected from Yemen construction firms. Then survey covered 40 companies chosen from construction sector (30% of sample size). 29 questionnaires were returned. The response rate was 72.5 %, normal for such research). The results of this aforementioned model support the proposed hypothesis (TQM has positive effects on teamwork satisfaction, quality of construction project implementation, client satisfaction, and construction project performance. Finally, this research culminates with TQM process for improving construction project performance, a discussion and the general conclusions are extracted in the light of the survey findings. The results finding are expected to provide useful information for future research directions especially as an indicator for the development of a suitable TQM framework for the construction firms.

2.2. Sugumaran B, Lavanya M.R "EVALUATION OF CRITICAL SUCCESS FACTORS IN CONSTRUCTION PROJECTS"

depicts that the construction industry is dynamic in nature due to the increasing uncertainties in technology, budgets, and development processes. Nowadays, building projects are becoming much more complex and difficult. The project team is facing unprecedented changes. He conducted in order to make an attempt to identify which variables influence the success of project implementation. Based on the results of the survey, we anticipate that patterns will emerge regarding the key performance indicators for measuring project success. These results could then be used in effecting successful projects. This study has chosen seventy seven factors categorized in seven groups that the questionnaire respondents were asked to rank and score. SPSS software is used to identify the CSFs which, in descending order of importance, were found to be: Decision making effectiveness, Project Manager's experience, Contractor's cash flow, Contractor experience, Site management, Supervision, Planning effort, Prior project management experience, Client's ability to make Decision.

2.3 Tey Kim Hai1, Aminah Md Yusof1, Syuhaida Ismail2 and Lee Foo Wei3 "A Conceptual Study of Key Barriers in Construction Project Coordination"

Construction projects have often suffered from high fragmentation, large waste, poor productivity, cost and time overruns, and conflicts and disputes for a long time. Thus, many new and innovative management and procurement systems in construction are introduced such as partnering, joint venture, alliances, supply chain management, enterprise resource planning (ERP), just in time (JIT), and total

VIII. OBSERVATION AND DISCUSSION

A. Excavation

The following Fig. no. 01 of Excavation activity show result are rating ranges 101 to 140 out of 150. Maximum no checks are having in 131 to 135 these are important which included check no. 03,06,10,13,18,21,34,35,36. The vital checks are ranged between 136 to 140 which is having Eight in number. The most important check is Availability of Relevant Foundation drawings. The shortest ranges 101 to 105 and 111 to 115 which is having one in number of checks.

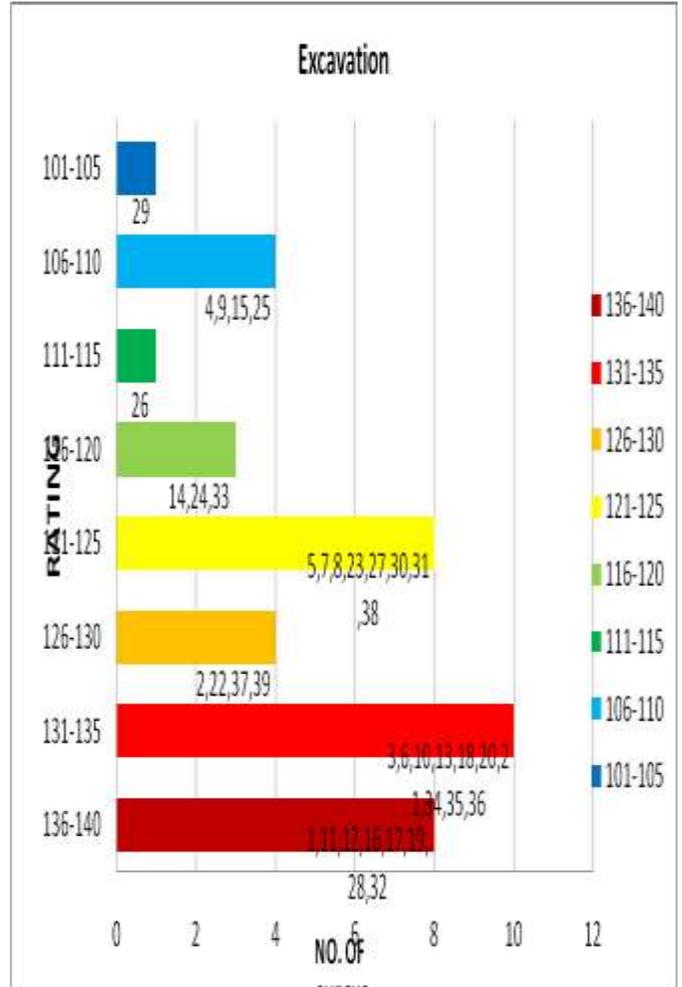


Fig. 01

B. Reinforcement

The following Fig. no. 02 of Reinforcement activity show result are rating ranges 95 to 145 out of 150. Maximum no checks are having in 126 to 130 these are important which included check no. 02,08,11,17,20,21,23,24,26,27,28,29,30,34,36,37. The vital checks are ranged between 136 to 140 which is having five in number. The most important check is Are test result of bars available at site before starting the work? The shortest ranges 95 to 120 which is having zero in number of checks.

quality management (TQM) to meet these challenges Hence, a study is carried out to investigate the key barriers of coordination in construction project. Through the literature review, five groups of key barriers are established in this paper, including the nature of construction, traditional contractual arrangement, and construction participants, characteristic of organization and construction management approach. The investigation of these key barriers is expected to assist the construction players in coordinating their projects towards a better implementation of the innovative management and procurement systems.

2.4. Dubem I. Ikediashi¹, Akaninyene Mendie², Emmanuel Achuenu³ and Michael G. Oladokun¹ “Key Performance Indicators of Design and Build Projects in Nigeria”

It reveals that eight Key Performance Indicators were identified. They are among others, job cost reporting, time performance and quality of work in that order. Also, eight most important Key Performance Indicators were also found to be relevant. They include among others, Health and Safety, Quality of Work and Cost per Unit. Besides, test of agreement conducted using Mann Whitney U test indicate that there was no significant difference in the rankings of time performance, Turnover, Rework/Quality of work among others while there was significant difference in the rankings of cost per/unit, job cost reporting, health and safety among others. It was recommended among others, that fundamental changes be made to reduce the high cost overruns associated with Design-Build projects.

VII. METHODOLOGY

1. Selection of construction Site

The proposed model and hypotheses were tested by using data collected from well known construction firms. Then survey covered 30 companies chosen from construction sector.

2. Collection of checklist

The Collection of checklist from well-known construction firms. Selected activities are Excavation, Reinforcement, Formwork, Concreting, Brick masonry, Flooring, Plastering, and Painting which is based on major cost contribution, quantity, aesthetics and safety.

3. Preparation of master checklist

The formation on Master Checklist on the basis of all points are importance and critical activity which most essential during construction period its effect on overall quality of the project, and gives expertise direction.

4. Rating of Master Checklist

1 - Not required, 2 - Required but not necessary, 3 - Necessary, 4 - Necessary at most, 5 - Vital activity.

5. Analysis of Master checklist

Analysis part leads to a comparative study within the checks for and activity. It finds a vital, important, necessary, need and not need.

6. Development of android application

Based on observation android application is developed to use at field and it show the correct direction to Owners, Engineers and Supervisors.

D. Concreting

The following Fig. no. 04 of Concreting activity show result are rating ranges 101 to 135 out of 150. Maximum no checks are having in 111to 115 these are important which included check no.03,08,11,13,16,22,23,24,25,29,33,40,43,45.the vital checks are ranged between 134 to 135 which is having two in number. The most important check is Are the latest "Good for Construction" drawings available? The shortest ranges 101to 105and 126 to 130 which is having two in number of checks.

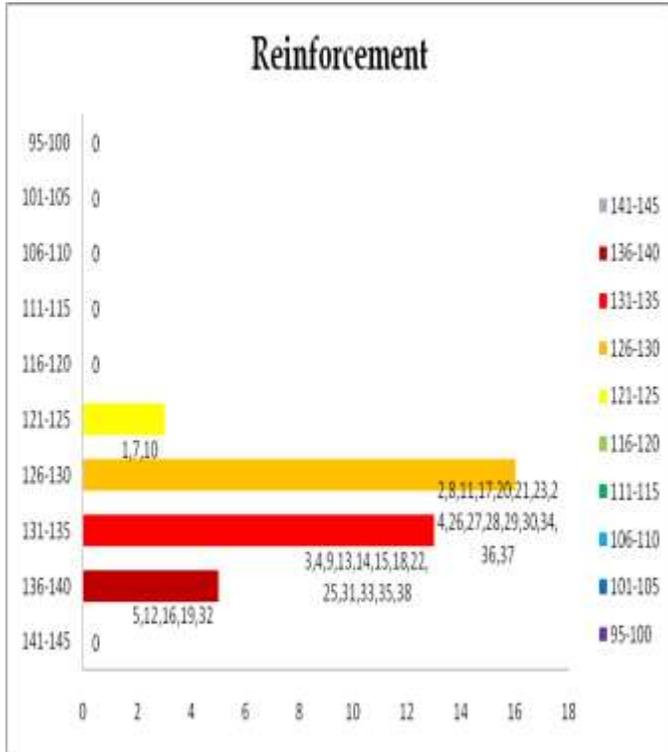


Fig. 02

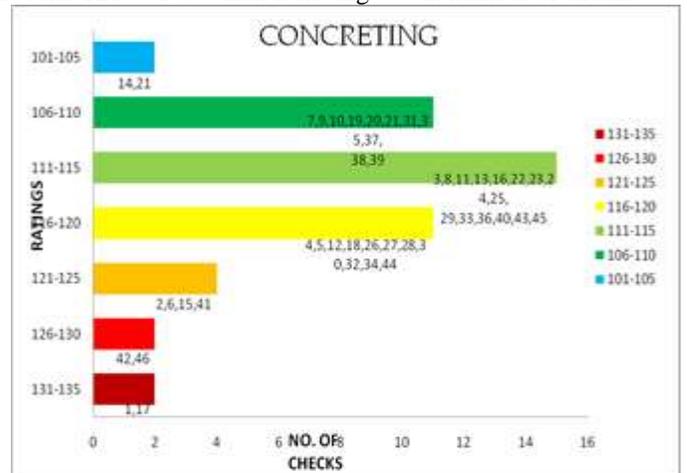


Fig. 04

C. Formwork

The following Fig. no. 03 of Formwork activity show result are rating ranges 106 to 142 out of 150. Maximum no checks are having in 131to 135 these are important which included check no.02,03,14,15,19,20,26,30,41,42,43,44,45,46,47,49,50,53. the vital checks are ranged between 141to 142 which is having three in number. The most important check is Before the pour has commenced, has the formwork been inspected and signed off / certified by an experienced structural engineer for its structural integrity and compliance to the formwork drawing? The shortest ranges is 111to 115 which is having one in number of checks.

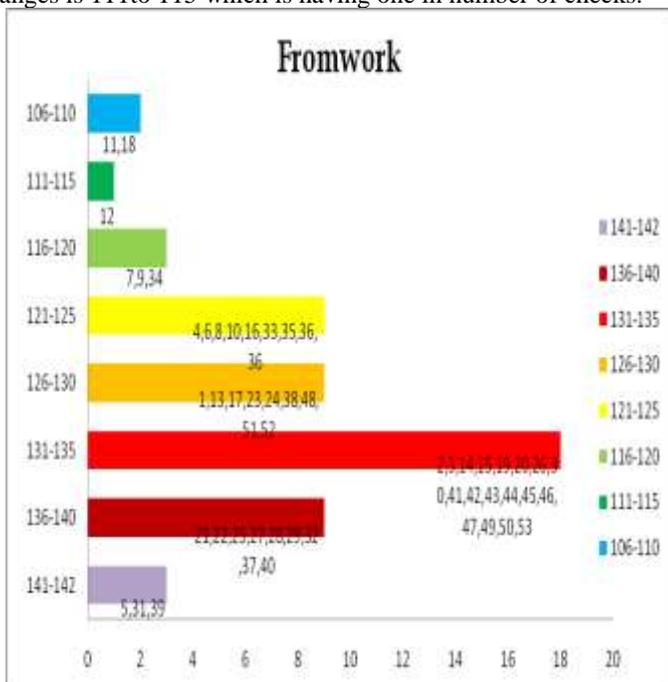


Fig. 03

E. Brick Masonry Work

The following Fig. no. 05 of Brick masonry work activity show result are rating ranges 95 to 145 out of 150. Maximum no checks are having in 116to 120 these are important which included check no. 04,08,19,21,22,24,26,28,36,39.the vital checks are ranged between 141 to 145 which is having one in number. The most important check is Check for orientation of door, windows as per architectural drawings. The shortest ranges 101to 105 which is having zero number of checks, 95to 100,106to 110and 141to145 which is having one in number of checks.

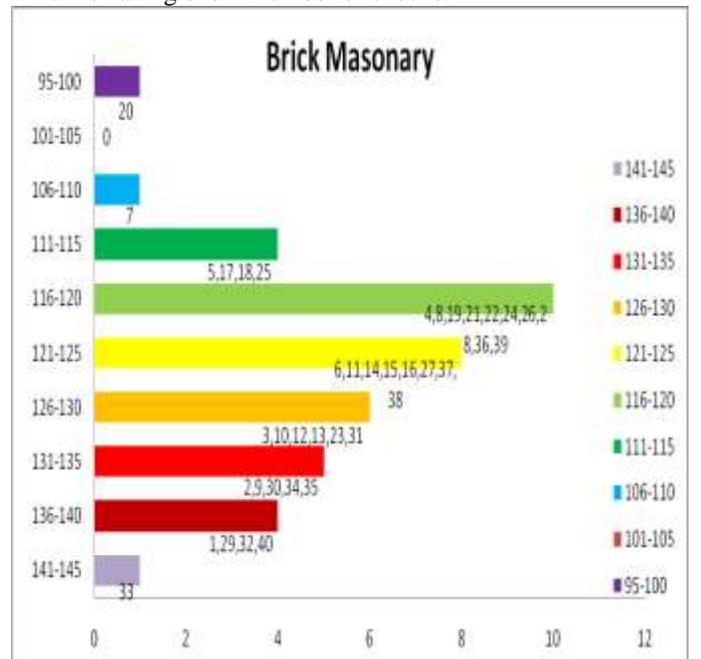


Fig. 05

6. Flooring

The following Fig. no. 06 of Flooring activity show result are rating ranges 116to 140 out of 150.Maximum no checks are having in 131to 135 these are important which included check no. 14,17,21,22,23,27,28,29,32,33,34,35,36.the vital checks are ranged between 136 to 140 which is having one in number. The most important check is Protect tile surface with tarpaulin sheet to avoid damage of surface. The shortest ranges 116to 120and 121 to 125 which is having Five in number of checks.

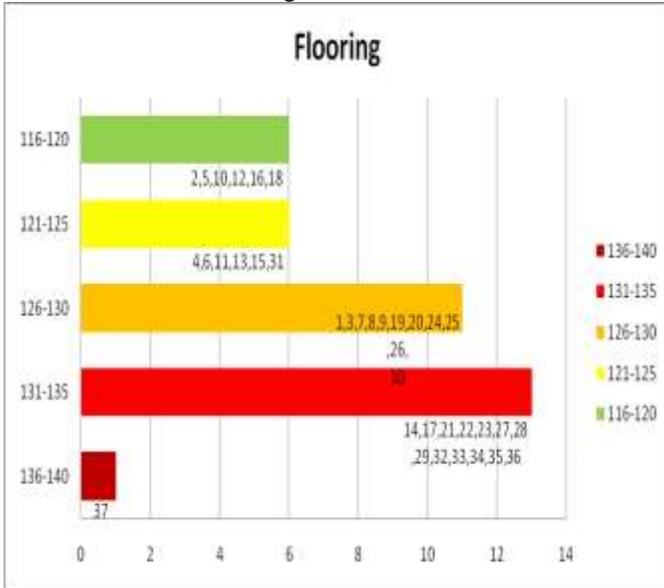


Fig. 06

F. Plastering

The following Fig. no. 07 of Plastering activity show result are rating ranges 111 to 140 out of 150.Maximum no checks are having in 126to 130 these are important which included check no.03,04,05,06,07,14,15,16,17,19,24,25,27,28,29,32,33,36,37,38 .the vital checks are ranged between 134 to 135 which is having two in number. The most important check is 1) Check the thickness and number of coats of plaster. It is specified and implemented? 2) Location of electrical points. The shortest ranges 111 to 115 which is having one in number of checks.

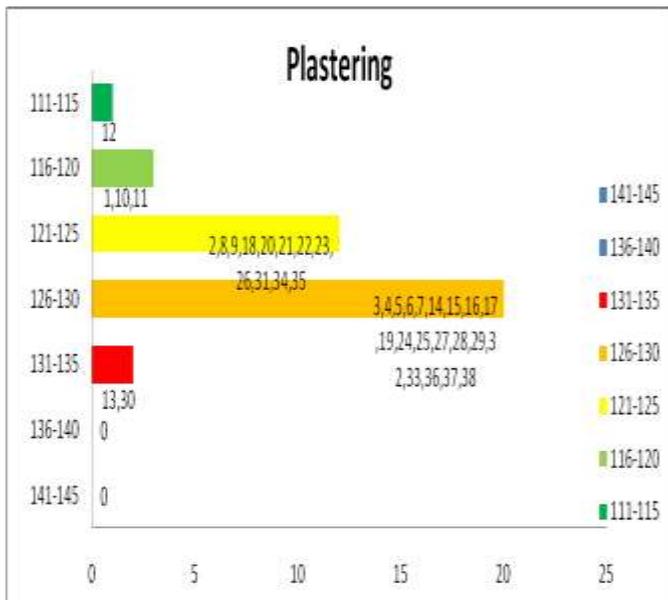


Fig. 07

The following Fig. no. 08 of painting activity show result are rating ranges 126 to 150 out of 150.Maximum no checks are having in 131to 140 these are important which included check no. 01,03,04,06,07,10,11,12,14,16,17,18,19.the vital checks are ranged between 131to 140 which is having Thirteen in number. The most important check is 1) Approved manufactures specification for painting available. The shortest ranges 101to 105and 111 to 115 which is having one in number of checks.

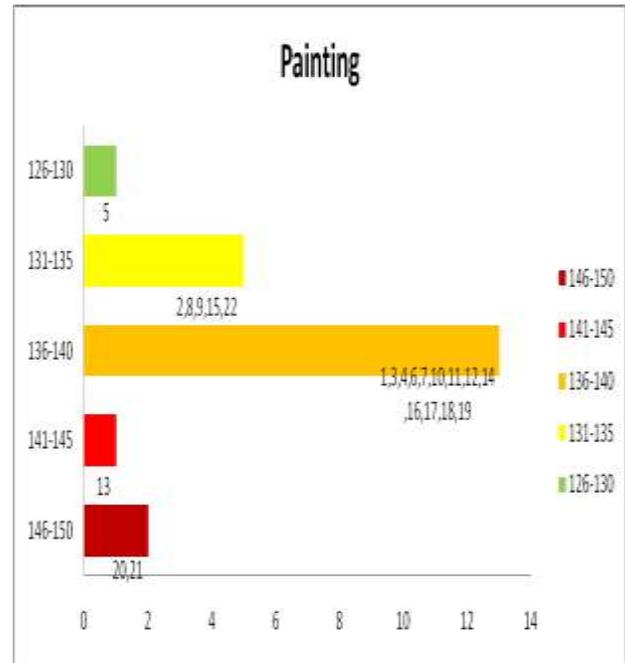


Fig. 08

Android Application

The following Fig.No.09 Show the android users required Logging before that he will be sign in and fill up the basic information of users



Fig.09

The following fig No.10 Show the All information Fill by users Home Page 1) View Profile 2) Add Organization 3) View Organization 4) Activity 5) Image Upload 6) Exit



Fig.10

The following Fig.No.11 Show All information of list of organization.



Fig.11

The following Fig.No.12 show the list of selective activity.



Fig.12

The Following Fig.No.13 Show the Red, Orange, Yellow colour are indicated Vital, Important, Necessary checks. Completed checks show in green colour.



Fig. 13

The Following Fig.No.14 Show selected activity its check in Red, Orange, Yellow colour are indicated Vital, Important, Necessary checks. Completed checks show in green colour.

ID	Checklist	Particulars	Rates	Cost	Remarks	Status	Username	Organization
Edit 1246	Brick Masonry Work	Availability of all drawings required for execution of work with concerned Engineer	4	50		P		chmudas
Edit 1246	Brick Masonry Work	Proper cleaning of floor before fix out	4			P		chmudas
Edit 1246	Brick Masonry Work	Check for fix out as per drawings	4			P		chmudas
Edit 1246	Brick Masonry Work	Handling of concrete surfaces of structural members like column, slab, beam, staircase, etc.	4			P		chmudas
Edit 1246	Brick Masonry Work	Cleaning of the bulged portion/ Honeycomb structure	4			P		chmudas
Edit 1250	Brick Masonry Work	Check for availability of materials	4			P		chmudas
Edit 1251	Brick Masonry Work	Cleaning of slab with broom prior for stacking of materials	4			P		chmudas
Edit 1252	Brick Masonry Work	Changes in brickwork as per customer requirement	4			P		chmudas
Edit 1253	Brick Masonry Work	Soaking of bricks in water prior to start of work	4			P		chmudas
Edit 1254	Brick Masonry Work	Check for door, window frames to be erected in position	4			P		chmudas
Edit 1255	Brick Masonry Work	Securing of work	4			P		chmudas

Fig.14

The following Fig.No.15 Show selection of check and upload image than send the email project manager.

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Fig.15

IX. CONCLUSION

- 1) Identification of selective critical activities and there quality which is more affecting to its parameter.
- 2) This is one step ahead to achieve a quality in selected activities; this study gives critical checks which needed a more concentration.
- 3) Finding vital checks of activity which is more affecting to it.
- 4) This study gives a comparative study within a check.
- 5) Assessment of critical activities and their checks are more concentration in construction.
- 6) Development of android application.
- 7) This study introduces use of modern technology in construction industry which leads to save time & help to keep environment GREEN.