#### **ENGINEERING CLINICS REPORT ON**

# APPLICATION DEVELOPMENT BASED ON CONSTRUCTION MANAGEMENT

Submitted by

SHANJAY K 18BCE032 THIYAGARAJAN M 18BCE056 YOKESH M 18BCE068 KAVIN KUMAR S 18BCE074 KAUSHIK R 18BCE076 DESHIK MANIAN S 18BCE080

in partial fulfilment for the award of the degree of

# BACHELOR OF ENGINEERING IN CIVIL ENGINEERING



# KUMARAGURU COLLEGE OF TECHNOLOGY COIMBATORE - 641049

(An Autonomous Institution affiliated to Anna University, Chennai)

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#### **BONAFIDE CERTIFICATE**

Certified that this report on "ENGINEERING CLINICS 04" is the bonafide work of SHANJAY-K/18BCE032, THIYAKARAJAN-M/18BCE056, YOKESH-M/18BCE068, KAVIN KUMAR-S/18BCE074, KAUSHIK-S/18BCE076, DESHIK MANIAN-S/18BCE080 carried out Engineering Clinics during the even semester of academic year 2019-2020. Certified further that to the best of my knowledge, the work reported herein does not form part of any other Engineering clinics project report work on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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**Internal Examiner** 

#### **ABSTRACT**

# APPLICATION DEVELOPMENT BASED ON CONSTRUCTION MANAGEMENT

The construction management app that we developed is a software stack for mobile devices as well as for computers that includes an operating system, middleware and key application. Nowadays construction ruling the world so it's management is much important to be considered in constructions so, to make it much easier and to manage the construction we developed an application which is useful in managing the construction works because construction includes lot of works. The application mainly made up of java language and the android studio fulfill graphics of the application. This application consist of admin details, client details, project manager details, project details and finally the estimation details which the details of the reports are directly mailed to the respective admins and to the clients so it is well protected one. The java language is used it makes the application to work faster and it is also user friendly. The goal of this application was to develop a detailed report that could locate these unique construction features without first going into the field, thus, saving time, money and reducing the risks associated with remote field localities for admins as well as to clients because the detailed reports has been mailed to them as conclusion this application is basically a useful and user friendly one.

#### **ACKNOWLEDGEMENT**

First of all, we express my profound gratefulness to **Dr. J. Srinivasan**, **Principal** for paving the doors of opportunities and go through to make use of it to the fullest.

We would also like to extend our heart full regards to our head of the department **Dr. N. Ramsundram**, **Associate Professor and Head**, Department of Civil Engineering, for guiding me in the right way, for being a solution provider and for being concerned about the student's progress always.

We heartfully express my gratitude and regards to our Engineering clinics coordinator **Dr. A. Geethakarthi, Associate Professor**, Department of Civil Engineering, for her moral support which played a vital role in motivating me to learn throughout the Engineering clinics project

We are indebted to express my heartfelt thanks to our project guide, **S. Anita, Asssistant Professor**, Department of Civil Engineering for her persistence guidance and suggestions during this project work.

We would like to acknowledge and express our gratitude towards my family.

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#### LIST OF SYMBOLS AND ABBREVATIONS

APP Application

CBM Construction Business Management

CM Construction Management

PM Project Management

ie That is

Etc., Extra

{ Start line of programme used

} End line of programme used

% Percentage

& And

^ Square

\* Multiple

# Numbers

@ at

\$ Dollars

#### 1. INTRODUCTION

#### 1.1 GENERAL:

**Construction management** (**CM**) is a professional service that uses specialized, project management techniques to oversee the planning, design, and construction of a project, from its beginning to its end. The purpose of CM is to control a project's time / delivery, cost and quality—sometimes referred to as a project management triangle or "triple constraints."

- CM is compatible with all project delivery systems, including design-bid-build, design-build, CM At-Risk and Public Private Partnerships. Professional construction managers may be reserved for lengthy, large-scale, high budget undertakings (commercial real estate, transportation infrastructure, industrial facilities, and military infrastructure), called capital projects.
- So the construction part is mainly to focus much on the management because it includes all the datas for example the estimation of every day work which involves in capitalisation it should much take in care thus developing an app will reduce all the burdens because the datas all are stored in electronically if we need any data we can get it at anytime in anywhere in the world so this should be much take in care then anything for this only we developed an app so that can be very useful as well as in user friendly manner.
- Today the technology is developed in all fields except in construction management because the reports or records are only available as a hard copy it may lost or damaged at anytime so to get rid of that we need to have soft copy of our reports this app can helpful for these conditions because it stores every data in a electronic manner. One should understand the difficulty of using the pen or pencil to write or store the report for this the app is developed to fulfill the necessity of using the mobile phones to store the datas in electronic way not only in mobile phones one can use laptops ad well as the lpad to use this app so it is a user friendly one again.

l

## 1.2 SCOPE OF THE PROJECT:

Anything with a beginning and an end, which creates a product or service, is a project. While the basic components of building a plan to implement that project is the same, there are differences in approach from industry to industry.
Construction project management (CPM), as the name implies, is focused on projects in the construction industry. But the constraints of time, cost and quality remain the same.
When making a construction management plan, the projects tend to be larger and more complex, however, and the project manager needs to know public safety and other skills beyond the typical ones for managing a project.
Project managers are assigned to a <u>construction</u> project during the design or once the design has been completed by a licensed architect or a licensed civil engineer. This is done by going through a <u>bidding</u> process with different contractors. The contractor is selected by using one of three common selection methods: low-bid selection, best-value selection, or qualifications-based selection.
A construction manager should have the ability to handle <u>public</u> <u>safety</u> , <u>time management</u> , <u>cost management</u> , <u>quality management</u> , <u>decision making</u> , <u>mathematics</u> , <u>working drawings</u> , and <u>human resources</u> .
Construction management software (CMS) refers to the systems that are currently available that help capital project owner/operators, program managers, and construction managers, control and manage the vast amount of information that capital construction projects create. A collection, or portfolio of projects only makes this a bigger challenge. These systems go by different names: capital project management software, computer construction software, construction management software, project management information systems. Usually Construction Management can be referred as subset of CMS where the scope of CMS is not limited to construction phases of project. Among main construction management software can be mentioned Procore and PlanGrid

☐ So, it is mainly developed to fulfill the above criteria

#### 1.3 OBJECTIVE:

- The present day world looks at evaluating the performance of high volume construction
- Based on this the construction management plays a major role in construction
- So this app is very much useful in giving the accurate information of construction process
- The successful development and implementation of all project's procedures. A project, regardless of its size, generally involves five distinctive phases of equal importance: Initiation, Planning and Design, Construction and Execution, Monitoring and Control, Completion. The smooth and uninterrupted development and execution of all the above phases ensures the success of a project.
- Productive guidance, efficient <u>communication and</u> <u>apt supervision of the project's team</u>. Always keep in mind that the success or failure of a project is highly dependent on <u>teamwork</u>, thus, the key to success is <u>always in collaboration</u>. To this end, the establishment of good communication is of major importance. On one hand, information needs to be articulated in a clear, unambiguous and complete way, so everything is comprehended fully by everyone and on the other hand, is the ability to be able listen and receive constructive feedback.

- The achievement of the project's main goal within the given constraints. The most important constraints are, Scope in that the main goal of the project is completed within the estimated Time, while being of the expected Quality and within the estimated Budget. Staying within the agreed limitations always feeds back into the measurement of a project's performance and success.
- Optimization of the allocated necessary inputs and their application to meeting the project's pre-defined objectives, is a matter where is always space for improvement. All processes and procedures can be reformed and upgraded to enhance the sustainability of a project and to <u>lead the team through the strategic</u> <u>change process</u>.
- Production of a complete project which follows the client's exclusive needs and objectives. This might mean that you need to shape and reform the client's vision or to negotiate with them as regards the project's objectives, to modify them into feasible goals. Once the client's aims are clearly defined they usually impact on all decisions made by the project's stakeholders. Meeting the client's expectations and keeping them happy not only leads to a successful collaboration which might help to eliminate surprises during project execution, but also ensures the sustainability of your professional status in the future.

So it is much more complicated so we need to use the application for this construction management

#### 1.4 NEED FOR STUDY:

Construction Management helps students develop the skills required to take on all the onsite responsibilities of a construction project. Some of the responsibilities you'll have as a construction manager include:

- Managing the budget, project expenses, and construction workers
- Collaborating with architects, civil engineers, and other specialists
- Updating clients on the status of the project
- Dealing with issues like delays, safety concerns, unmet deadlines
- Hiring subcontractors and supervising their activities

- So it is more complicated one we need to study about this before developing an app for this software.
- That should be take in care and the app should fulfill the all necessary needs above mentioned

#### 1.5 FUNCTIONS OF APPLICATIONS:

The functions of construction management typically include the following:

- Specifying project objectives and plans including delineation of scope, budgeting, scheduling, setting performance requirements, and selecting project participants.
- Maximizing the resource efficiency through <u>procurement</u> of labor, materials and equipment.
- Implementing various operations through proper coordination and control of planning, design, estimating, contracting and construction in the entire process.
- Developing effective <u>communications</u> and mechanisms for resolving conflicts.

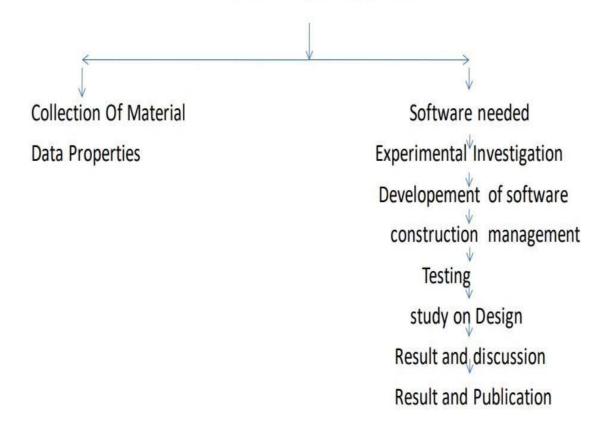
The <u>Construction Management Association of America</u> (CMAA) states the most common responsibilities of a Construction Manager fall into the following 7 categories: Project Management Planning, Cost Management, Time Management, Quality Management, Contract Administration, Safety Management, and CM Professional Practice. CM professional practice includes specific activities, such as defining the responsibilities and management structure of the project management team, organizing and leading by implementing project controls, defining roles and responsibilities, developing communication protocols, and identifying elements of project design and construction likely to give rise to disputes and claims.

So the app should be of this functions and should be carried out these kinds of functions in an effective manner.

#### **2.REVIEW OF LITERATUE**

#### 2.1 LITERATURE SURVEY:

## LITERATURE SURVEY



#### 2.1.1 DATA COLLECTION ON LITERATURE:

- The construction management includes more complex systems so using the collected datas the app should be designed then only it can fulfill the necessity of the engineers
- The main datas we collected are the construction management needs one admin which may be owner of any construction company then the company needs one client to give them jobs then the company admin need to give job to the project manager ie., He/She should assign project manager to that project then the project manager regularly take care the works conducted and to collect the datas and enter it in every day in records finally the project manager should also maintain the estimation of daily works
- This records should be correct and to maintain it without any problems to the records before submitting it to the admin this is the primary job for the project manager so these records should be in the form of electronic way then the records will be safe enough.
- We collected all these information and we added or designed in the app the each and every records added by the project manager using this app is directly send to the admin so this records are at safer side the project manager can also work without worrying about the records.

So without any questions we can say this app will fulfill all the necessary information that should be maintained by the project manager.

#### 2.2 IDENTIFICATION OF TECHNOLOGY GAP IN CONSTRUCTION:

- Nearly three-quarters (72%) of U.S. construction executives say the industry is not functioning at a rate of productivity suitable for infrastructure projects, according to a report from KPMG. Almost all, 92%, believe technology will change business and help amend that productivity gap.
- Executives indicate that integrated project management information systems (68%), BIM (53%) and use of 'advanced data analytics' (48%), will deliver the greatest return on investment.
- The <u>survey also reported</u> that the millennial demographic is closing in on baby boomers in the U.S. construction workforce, comprising 30.1% of overall payrolls, compared to 30.4%, respectively.
- The skilled labor shortage is a well-documented epidemic. As baby

boomers continue to reach retirement age and the younger generations enter the workforce in stronger numbers, companies must take steps to understand how best to recruit and retain these workers — and technology can help with that.

- According to Garrett Harley, vice president of strategic accounts for the building sector at Aconex, the proliferation of construction technology not only will increase productivity, but also will positively affect the labour market when it is used effectively as a recruitment tool. "Not many people coming out of school understand there's this much tech in construction. It's an exciting time to be a part of it," he said Adopting technologies to increase productivity can go hand-in-hand with helping to alleviate the effects of the labour shortage. Torcon, a Red Bank,NJ-based construction management and general construction firm, uses technology to streamline its processes by starting with tools, like BIM, early in the process. That process helps team members maintain transparency in their communications throughout the project.
- A number of representatives at <u>Autodesk University earlier this month</u> also touted technology's ability to help close the performance gap by building smarter. Extracting data through venues like LiDAR, photogrammetry and data sensing and visualization can help with quality control, safety tracking, site analysis and more.
- Machines also are starting to do what was once uniquely human work, freeing up available people to work on other tasks. A Pittsburgh-area company recently developed a <u>robot that can tie rebar</u> on bridges, thereby cutting labour hours in half and reducing worker safety risk. Built Robotics last month started testing an <u>autonomous track loader</u> that can excavate holes for building foundations 24 hours per day.

#### 3.METHODOLOGY OF WORK

#### 3.1DATA SURVEY:

- Seeing as over half of all construction companies use some form of project management software, many may choose to invest in it just to follow the crowd.
- But that wasn't enough for us.
- So we took a deep dive into the data with this construction management software research report. We discovered not only how effective this kind of software really is, but also who buys it and why.
- Construction management software is software that helps construction managers organize their construction projects and workforce. The software

typically includes tools for project management, financial job tracking, forecasting. change-order management, document management, collaboration, and estimating.

 Our construction management survey found exactly how construction management software helps construction companies manage their processes, what software worked best for which organizations, and how you can make sure that you're getting the best software for your company.

#### 3.1.1 LIST OF DATA COLLECTED:

The main datas collected are,

- The construction management needed the following aspects they are,
  - The admin details
  - The client details
  - The project manager detailsThe project details

  - The estimation details

#### 3.2ALGORITHM USED:

The main algorithm used in the design of application is JAVAscript

#### 3.2.1 OUTLINE OF THE PROGRAMME USED:

WE HAVE JUST PLACED THE LITTLE BIT CODE THAT WE USED TO DESIGN THE APP:

```
/*
* Author : ledboys18
* Generated on: 17-May-2020 10:32:26
* Version: 1.0
*/
application "Construction management basic"
{
date format = "dd-MMM-yyyy"
```

```
time zone = "Asia/Kolkata"
time format = "24-hr"
signin using = "Google"
section Add_client
displayname= "Add client"
icon = "tech-desktop"
form Add_client
{
displayname = "Client details"
success message = "Client details added Successfully!"
field alignment = left
Section
type = section
row = 1
column = 0
width = medium
)
must have Client_name
type = name
displayname = "Client name"
prefix
type = prefix
displayname ="Prefix"
```

```
visibility = false
value = {"Mr.","Mrs.","Ms."}
first_name
type = first_name
displayname ="First Name"
last_name
type = last_name
displayname ="Last Name"
)
suffix
type = suffix
displayname ="Suffix"
visibility = false
row = 1
column = 1
width = medium
personal data = true
Email
type = email
```

```
row = 1
column = 1
width = medium
personal data = true
Phone_Number
type = phonenumber
displayname = "Phone"
row = 1
column = 1
width = medium
personal data = true
customize
icon = "ui-1-bold-add"
actions
on add
submit
type = submit
displayname = "Submit"
```

```
reset
type = reset
displayname = "Reset"
on edit
update
type = submit
displayname = "Update"
cancel
type = cancel
displayname = "Cancel"
default list Add_client_Report
displayName = "Add client Report"
show all rows from Add_client
(
```

```
Client_name as "Client name"
(
displayformat =
[first_name+""+prefix+""+last_name+""+suffix]
Email
Phone_Number as "Phone"
options
icon = "design-bullet-list-67"
)
quickview
layout
type = -1
datablock1
(
layout type = -1
title = "Overview"
fields
Client_name as "Client name"
Email
Phone_Number as "Phone"
```

" The complete programme can be send it to you with pdf format the above is the sample programme we used"

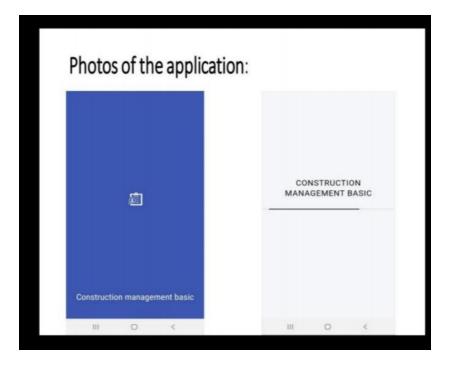
#### **4.RESULTS AND DISCUSSION**

#### 4.1RESULTS OBTAINED:

After all this works we successfully run the app without any problems and the little errors also corrected.

#### 4.1.1 REVIEW OF RESULTS:

#### WE HAVE INSERTED THE LAYOUTS OF OUR APP:



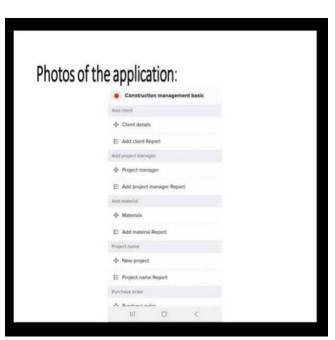


Fig 1.1 Fig 1.2

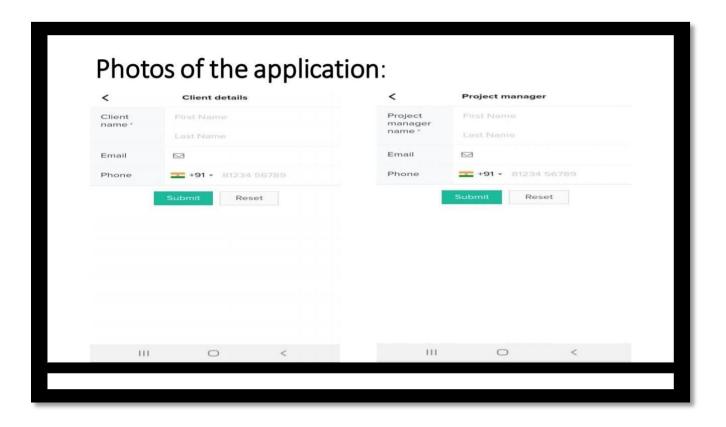


Fig 1.3

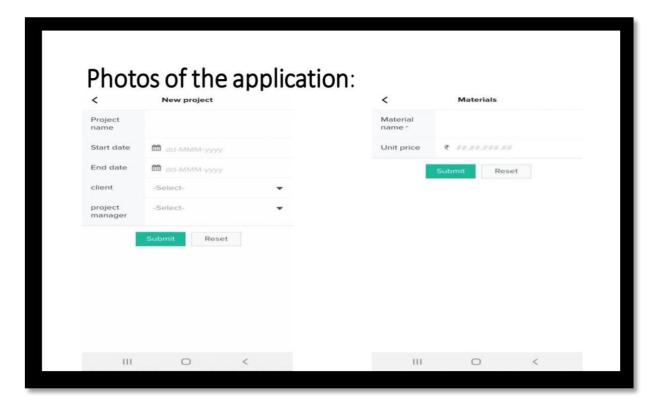


Fig 1.4

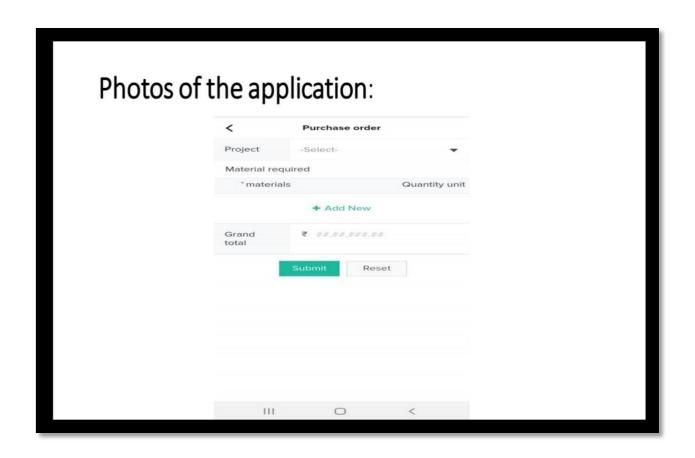


Fig 1.5

#### **TABLE 1.1**

## Table containing client details in app:

Name
@gmail.com
Country code/#########
_

#### **TABLE 1.2**

### Table containing project manager details in app:

Project manager name	Name
Email id	@gmail.com
Phone number	Country code/#########

#### **TABLE 1.3**

### Table containing project details in app:

Project name	Name
Start date	dd/mm/yy
End date	dd/mm/yy
Client name	Name
Project manager name	Name

#### **TABLE 1.4**

### Table containing materials details:

Materials name	Name
Unit price	\$ #######

### **TABLE 1.5**

## Table containing estimation details:

Project name	Name
Materials required	Quantity unit \$######
Total price	\$######

#### 5.SUMMARY AND CONCLUSION

In conclusion, project management software is a crucial tool in developing a project and thus every company should implement in it in their system. Project managers also need to take advantage of the effectiveness of project management software to ensure that the project they are carrying out become successful.

The employees and other stakeholders who are assigned so tasks should also utilize the software in order to complete their tasks on or before the set deadlines.

IT Pro administration all operational maintenance is handled through the Project Online service. You no longer have to commit IT resources to task such as updates, disaster recovery, and maintenance. Also, preventive maintenance scripts are run on your databases to prevent problems before they happen.

The final objective of whatever research is to improve the knowledge and provide tools to improve it. In whatever company and in whatever project the end objective is to meet project's overall objectives as defined by the scope, time, cost, quality and client satisfaction. The overall role of PM, in this scenario, is to harmonize the functions of planning, communicating, monitoring and control the project in order to meet this project's overall objectives.

This research was focused on the improvement of Project communication and documentation, one of the main functions of PM. In this sense, the improvement of DM implicates an improvement of PM. And if we improve PM, the project overall objectives are indirectly improved .Therefore, this thesis aims to contribute to improving productivity of SMEs through DM and Project Communication.

Larger business partners (often with bigger IT budgets) and early adopters of IT, demand that the small companies working with them adopt the same systems. In order to meet at least some of these demands, small companies are forced to invest in isolated solutions that fix immediate problems. This approach results in unnecessary expense and purchase of disparate systems which eventually need to be replaced. The best course of action is to adopt the same enterprise-wide infrastructure and technology as larger companies, but on a smaller scale, and implement a scalable solution which can grow with the company. The tools are readily available and can be bought at a moderate cost, using standard "off the shelf" components, and tailored custom-designed solutions should be avoided at all cost.

Basically, what most small companies in terms of Project Management internally require is the ability to manage and share company's documents . The real benefits start to become visible when certain core applications are moved away from the individual PCs and run on the server such as an EDMS. These tools should centralize the specific information to the organization in an easily accessible environment, allowing users to store, access, and modify information easily and fast. The main basis for effective EDM is that all the information (letters, reports, databases, drawings, etc.) must be in electronic format, which is either created electronically or scanned in from a paper version. This includes hand written notes and sketches as well as large maps and complex drawings.

Many companies use EDMS to standardize the way information is accessed and passed through the company. This makes it easier for anybody with correct privileges to find and access the document they want. An EDMS helps users to perform their work easier and provides the company with security, data reliability and work process management. Many of these features eventually save time, simplify work, protect the investment made in creating these documents, enforce quality standards, enable an audit trail and ensure accountability.

Besides that, most small companies will be externally obliged to adopt the same systems as those adopted by the large companies who are working with them for the management of the whole project.

While the emphasis has traditionally been on the need to manage the interface between the project and the client's organization, it is now shifting towards the need to manage the flow of activities and information through the project life cycle.

In doing that, electronic data exchange, in particular WPMS, has shown to have tremendous potentials not only in adding value to the internal performance of an organization, but also to the whole supply chain and therefore to the client. Unlike many IT tools, web-based tools are very much concerned with the exchange of information across the project life cycle. Their successful implementation therefore will not only require a state of readiness within one organization, but also within all those involved in this process. This makes the successful implementation of such tools difficult to be planned for and managed.

#### **5.1 FINAL CONCLUSION:**

Today, the traditional approach of PM has shifted from e-mail notification with attached changed document, to a series of tota WPMS solutions. Widespread use of various networks, Internet, server and database technology, enables WPMS systems to provide up-to-date document-related information and management tools like document version control, retrieval, review, approval, etc. Project partners have the opportunity to choose the manner of notification through local PCs, faxes or mobile phones.

#### THE ROLE OF INDIVIDUAL TEAM MATES ARE:

- 1.Idea thinking-By all team members
- 2.Case study-Thiyagarajan 18BCE056
- 3. Collection of domain information-Kaushik 18BCE076
- 4.Design of software-Yokesh 18BCE068
- 5. Graphics and design-Shanjay 18BCE032
- 6.Programming-Deshik manian 18BCE080 and Kavin kumar 18BCE074