

Use of Advance Software's in Construction Industry

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Abstract— The construction industry has always been project-oriented, limited attention has been paid to Software use, particularly in the transitional countries. This paper contributes to a deeper understanding of the needs of use of software's for better construction work. To improve the performance of the construction projects and to get them complete as per the scheduled time, the best way is to make use of advance software's from planning phase to execution phase of the construction projects. Innovative construction accounting software plays an important role within the construction industry, and today, most of construction companies organize, plan and estimate project costs using a software solution. This sophisticated software, designed specifically for the construction industry, aids communication, decision-making, budget management, job scheduling and cost control. This paper will give you a brief idea about software available in market, their need, benefits and uses. Also, different software's use for different activity are mention in this.

Index Terms— Software in construction, Advance software, construction industry.

I. INTRODUCTION

Now a day's technology is constantly evolving and rapidly changing the landscape of many different industries. This ranges from increasing the efficiency of day-to-day operations to manufacturing new and advanced high-tech products. Construction industry is one of the largest growing industry, especially in developing countries like INDIA. There for to run the project smoothly and with low risk it is necessary to use advance software's in companies. Still many companies are using conventional methods of management which directly reduce the overall efficiency of project. Today, all kind of software's from initial stage to finalizing stage of project are available in market so, it is depending on company, how they accept the change in technology and adapt it. Technology is changing the industry in two key ways,

- Creating more efficient day-to-day operations.
- Shifting toward smarter building structures.

II. HISTORY

Tools used for planning, accounting, and collaboration for the Construction industry starts in the 1980's and grew as the broader software market expanded and improved in kind. Unique to the Construction industry, however, was the

development of BIM (Building Information Modelling) software. The computing concepts that would one day lead to the existence of BIM date back to the 1960's with the first true graphical interface arising from Sage Software. In the 1980's, there was a wave of innovation around modelling that led to the development of several key methods for reducing cost of design and tracking in construction projects. The development and use of the Building Description Systems (BDS) added to this by allowing individual elements of building construction to be broken down and added to graphic models. Using similar technology to BDS, CAD programs enabling virtual design arose, with the first available on a personal computer "ArchiCAD" debuting in 1984. ArchiCAD remains a major player in the BIM/CAD markets today for small residential projects. Shortly after this in 1988, two engineers from Parametric Technology Corporation (PTC) developed a platform intended to handle more complex functions than ArchiCAD called "Revit." Revit was acquired in 2002 by CAD leader Autodesk, which had been selling its own virtual modelling software "AutoCAD" since 1982. Through use of time modelling, and visual programming environments, Revit set a new standard in the world of BIM. AutoCAD and Revit continue to lead the BIM market today as iterations and revisions power continued improvements within the space.

A. Construction Industry Software Market

More than 200 construction software solutions are offered in the market, all of them packed with functionalities such as field service management, customer management, accounting, program and portfolio management, project scheduling, bid management, and project estimating. The industry is currently undergoing consolidation with large companies merging with smaller firms.

III. SOME ADVANCE SOFTWARE'S AVAILABLE IN MARKET

The various advance software's that can be used in the construction industry are as follows,

- Building Information Modelling (BIM) or 3D Modelling
- Geographical Information System (GIS)
- Revit
- Navis
- Primavera

- Microsoft Project (MSP)
- STAAD Pro
- ETABs
- CCS Candy Software (For Cost estimation and quantity Estimation) etc.
- Also, many other software available for different activities.

IV. PROBLEMS FACING THE CONSTRUCTION INDUSTRY

There are numerous problems and challenges confronting construction industry today. Some challenges or problems faced in project are as follows,

- Improper planning and scheduling.
- Messy tracking of cash flow.
- Communication issues.
- Difficulty in document management.
- Lack of monitoring.
- More cost, less quality.
- Finance and payments.
- Mistakes in estimation.
- Adaption of conventional methods.
- Shortage of materials.
- 2D Drawings causes miscommunication.
- Reworks etc.

V. NEED OF SOFTWARE

We discussed about software's and their growth. But the question is that "why we need this?" A simple answer is to solve optimum issues currently we are facing during execution of project. Like problems in planning, designs, resource management and cost flow etc. Some points for that we need software's are as follows.

A. Centralization of Project Stockholders

We know where there is small-scale project or large-scale project, many persons involve in that directly or indirectly. And this people contains their own data to input. Software's help to manage all data in well format to maintain it during and after completion of project.

B. To Make Billing Process Easy

Define abbreviations and acronyms the first time they are used in the text, even after they have already been defined in the abstract.

C. Abbreviations and Acronyms

This is one of the important and tedious task related to costing of project. Software's provide an easy platform to handle billing by uploading required data and documents.

D. On Site Development and Problem Solving

Project faces new challenges every day from top management to labors. Many software available that give facility to upload problem facing during work and solve immediately.

E. Resource Management

Project manager need overall view to allot the resources. Software gives project managers a granular view of which resources are being used, when, and where. When a team member calls in sick one day, or any other obstacle presents itself, the project manager should have the tools to accommodate accordingly.

VI. AVAILABLE SOFTWARE'S

A. Construction Management Software

A software that helps construction managers organize their construction projects and workforce. The software includes tools for project management, planning, financial job tracking, forecasting, change-order management, document management, collaboration, and estimating. In recent years, construction management apps went all the way from desirable to essential, having in mind that it is almost impossible to track progress and liaise with contractors without one. The most advanced among them will also allow you to assess construction risk, and control costs with at least a basic accounting kit. Types of software are.

1) Capital project management software (CPMS)

This type of software is used by building owners and construction managers to improve capital planning and accelerate project schedules.

2) Project management information systems

This solution is used by construction managers to keep their projects organized. Software like MS project and Primavera can use for project management, resource allocation and project tracking. A survey says that.

- The average spend on construction software is Rs. 1 to 2 lacks.
- 30% of respondents spent more than they expected to on construction software.
- It takes more than twice as long to conduct an estimate without proper software.

B. Design Software

There are many different software packages used by architects and engineers. For their rough schematic designs, many starts in a 3D modelling program like Sketch up or Rhinoceros. Architectural 2D drawings are usually produced in Autodesk AutoCAD, though there are some other programs out there. Many firms are now started to use BIM (building information modelling) software, which creates a 3D model of the building and holds a database of project information. Traditional drawings can be made from this BIM model, and consultants and the builder can use it to coordinate construction. Autodesk Revit is the most used BIM software but there are other options like Vector works or ArchiCAD. For structural designing purpose many software's are available like STAAD Pro, Etabs etc. This provide us design as per our country code and requirement. This considers different loads like Dead load, Live load, Earthquake load for design. Use of this software's reduces risk of design failure and helps to excess use of material or reduce their wastage. Use of design software's provide us,

- Civil 3D features can help civil engineers build tomorrow's infrastructure today
- Effective use of simulations, visualizations, and water analysis tools to improve communication, project delivery, and decision-making.
- Design to build: Seamless end-to-end processes when handing over site data to architects and design data to the construction team.
- Connect design processes to the cloud: Using Autodesk BIM to capture existing design information and import it to civil 3D for enhanced design, teams around the globe can access information, enhancing efficiency.

C. Analyzing Software's

Analyzing our design is also an important factor. Life and quality of structure depends on analyzing the design. Today, there are several software available out there to design, analyse and build large projects in no time. The 3D integrated structural design and analysis software are widely common among structural designers. These structural analysis and design software boost productivity and are user-friendly. They make structural modelling and load analyzing more seamless and efficient, thus reducing the time and effort required for finite element analysis.

D. Navis Work

Navis works (known for a while as Jetstream) is a 3D design review package for Microsoft Windows. Used primarily in construction industries to complement 3D design packages (such as Autodesk Revit, AutoCAD, and Micro Station) Navis works allows users to open and combine 3D models, navigate around them in real-time and review the model using a set of tools including comments, redlining, viewpoint, and measurements. A selection of plug-ins enhances the package adding interference detection, 4D time simulation, photorealistic rendering and PDF-like publishing. Other are STAAD pro, SAFE, RISA etc.

E. Construction Estimation Software

Construction cost estimating software is computer software designed for contractors to estimate construction costs for a specific project. A cost estimator can use estimating software to estimate their bid price for a project, which will ultimately become part of a resulting construction contract. Some architects, engineers, construction managers, and others may also use cost estimating software to prepare cost estimates for individual project.

F. GIS (Geographic Information System)

A geographic information system (GIS) is a system designed to capture, store, manipulate, analyse, manage, and present spatial or geographic data. GIS applications are tools that allow users to create interactive queries (user-created searches), analyse spatial information, edit data in maps, and present the results of all these operations. GIS (more commonly GI

Science) sometimes refers to geographic information science (GI Science), the science underlying geographic concepts, applications, and systems. GIS can refer to a number of different technologies, processes, and methods. It is attached to many operations and has many applications related to engineering, planning, management, transport/logistics, insurance, telecommunications, and business. For that reason, GIS and location intelligence applications can be the foundation for many location-enabled services that rely on analysis and visualization.

G. Other Services

1) SAP

Systems, Applications & Products in Data Processing, is a German-based European multinational software corporation that makes enterprise software to manage business operations and customer relations. SAP solutions connect resources and processes across the engineering, construction, and real estate operations value chain by integrating industry-specific solutions on premise, in the cloud, and through mobile devices. More than 3,100 construction businesses worldwide use SAP solutions.

2) ERP

3) Enterprise resource planning (ERP) is business process management software that allows an organization to use a system of integrated applications to manage the business and automate many back office functions related to technology, services and human resources.

Construction ERP system help us in: -

- Purchase Management.
- Human Resource Management.
- Vendor Management.
- Material Management.
- Contract Management.
- Report and document Management.

VII. BENEFITS

For implementing newest technological software in Construction Company, some benefits are as follows.

- Cost cutting by close monitoring and controlling and avoiding delay.
- Collaboration in real time with timely updating to engineers, architects and contractors for completing work before dead line.
- Happier clients- it will possible by providing good quality, we need to find good products as per requirement. As much as client will happy that much profit will increase.
- Providing good service also shows that how effective your company is in market. Makes Management Easy.
- Construction Management Software Controls and Maintain Documents work.
- Allows easy way for all Information to be Accessed and Shared
- Integrated Software for Construction Risk Assessment

- Helps to Improves Business Growth and Development
- Helps to Improve Quality

VIII. LIMITATIONS

As every things have their own limitations, some limitations for software are

- Construction software rarely improves communication with subcontractors.
- Requires High investment for small projects
- High skill employee requires to handle software efficiently
- Regular updating requires.

IX. CONCLUSION

As we know Construction industry have lots of competition. There is tight margin, Need to complete work in less time with desired quality. So, to stand in market we need to take the help of this software's.

From this study we can also conclude that,

- Use of advance software is need of future projects for every stage of it and to maintain their consistency.
- This will help us to build smart infrastructures.
- Software help us to monitor, plan and execute activities effectively.
- This also reduce the risk of deadline crossing.
- Software are the way to reduce overall cost of project.
- Software also reduce the fare of design failure and

increase quality.

- This can become a key of successful management.
- This can show us future structure today.
- There is many software's available for different activities in market.
- This are not only help us in activity but also help to run organization effectively.

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