

Inventory Management Software for Construction Industry

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Abstract— Inventory is the supply of raw materials, partially finished goods called work-in-progress and finished goods, and organization maintains to meet its operational needs. It represents a sizeable investment and a potential source of waste that needs to be carefully controlled. Inventory is defined as a stock of goods that is maintained by a business in anticipation of some future demand. The quantity to which inventory must fall in order to signal that an order must be placed to replenish an item. The reporting capabilities of the Inventory management software will help on top of the inventory status at any point in time. The tool will keep one prepared, and ready with what is required, well in advance. This paper review various softwares such as Oracle NetSuite ERP, Vyapar - Accounting & Invoicing, Quickbook, Zoho Inventory , Marg Erp 9, Slek Bill India and Tally ERP 9 which can be use for inventory management in the construction industry.

Keywords: Inventory, Software, Accounting

I. INTRODUCTION

The use of software in inventory management can reduce, time required, expenses on management, etc., whereas it increases the efficiency and accuracy of work. Inventory management is all about knowing the status of goods/stock at a given point in time. It is also a way of managing all the products that are in stock - optimizing the overall quality, flexibility, speed, cost and ensuring that the flow of goods is uninterrupted and fluid. This is very important because of the vast amount of data at hand that needs to be tracked and verified. It is therefore important to know a few things that

the inventory management software keeps track of, as well as provides answers to what and when required, which include:

- The amount of stock in the warehouse
- The ordering of fresh supplies
- The quantity ordered, including, what was ordered, how much & when
- Storage of stocks
- The quantity of fresh stock received, when, how much and from whom.

Construction site has usually short of manoeuvre space and storage area. Most materials require proper storage and cover up again weather to avoid damages and deterioration. Therefore ordered at the right time, delivered on the right time for use will minimized the holding stock and wastage. The process will gain economy in purchasing, maximizing storing capacity at site, reduce wastage, and shorten the procurement lead time. Failure in managing site inventory will result in cost overrun, delays in project completion and reduce overall project performance. As show in Figure 1.1 the flow chart of the typical site inventory management system. In which not only the physical flow of management to be adhere to, the analysis of material and item is also important. Items and materials being analyzed and keep reasonable stock level will reduce down time during installation. Hence good inventory control has potential to reduce construction costs, reduce project delays, improve productivity, reduce labour working hours and promote time savings. The saving on wastage alone has significance impact on profitability of the project.

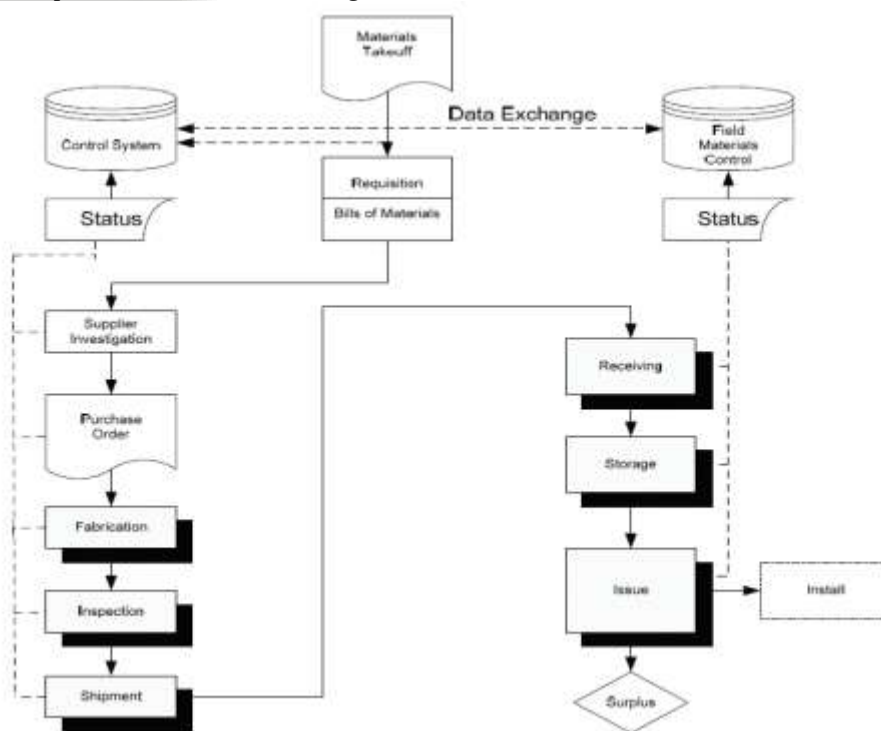


Fig. 1.1: Flow Chart of Typical Site Inventory Management System

II. OBJECTIVES

- To study the importance of inventory management
- To review different inventory management software

III. LITERATURE REVIEW

The study by Song, 2005 and Nasir, 2008 have elaborated that construction materials contributed 50 to 60% of the total project costs. It is obvious that if there is some saving from the material inventory control than the Project will gain profitability. The Construction Industry Cost Effectiveness Committee (CICE) of the Business Roundtable (1982) asserted that materials inventory control is a "Distinct management system that can make the significant contribution to the cost effectiveness of construction projects". Previous research highlighted the effect of materials inventory control demonstrated the cost effectiveness of materials inventory control systems (Bell and Stukhart 1986, Bell and Stukhart 1987, Thomas et al. 1989). The first research on materials inventory management in the construction industry (building project) was initiated by the Business Roundtable in 1982. The report from Business Roundtable Construction Industry Cost Effectiveness Committee (CICE) also stated that the cost of construction materials and equipment usually makes up 60% of the total project cost. Construction labor cost attributes only 25% of the total project cost. Kini (1999), states that for a typical industrial facility, the cost for engineering design is 10% to 15% of the total cost and the cost for equipment and materials is 50% to 60% of the total cost. Studies by the Construction Industry Cost Effectiveness Committee (CICE) and the Construction Industry Institute (CII) together confirmed that raw materials management (MM) system can contribute a 6% improvement in craft labor productivity (CII 1986). An additional 4-6 % in craft labor savings is expected when the craft labor uses the materials inventory control system to plan their work when there are available raw materials (CII 1986). This 10-12 % reduction in labor cost essentially originates from avoiding non-productive idle time or down time of the manpower due to searching for materials waiting for new arrival of material.

In 1996, Construction Industry Institute (CII) Implementation Team was setup to revise the "Project Materials Management Handbook" which was published in 1988. The CII team conducted a questionnaire survey from their member firms on how the use of new concepts and technologies in materials management can benefit their company's profitability and performance. The average percent improvements reported by the respondents were:

- Reduced bulk surplus, 40%;
- Reduced site storage and handling, 21%;
- Improved supplier performance, 24%;
- Improved craft labor productivity, 16%;
- Improved project schedule, 16%;
- Reduced management manpower, 15%; and
- Reduced risk, 5% (CII 1999).

Dr. G. Brindha, "Inventory Management", International Journal of Innovative Researching Science

Engineering and Technology, Vol.3. Issue 1, January 2014. Dr. Brindha (2014) pointed out that the inventory and material management is common problem faced by all organizations in any sector of the economy. This paper discusses the effective use of company's available resources to avoid the "out of stock" situation. The proposed reduction of risk and avoidance of high obsolescence is also discussed. In construction site there are hundreds and thousands of materials going into store, draw from store, installing / fixing at site, mixing the ingredient at site. But all in all they can be classified into three main categories of inventory are raw materials, work in progress and finished goods.

From this three categories of inventory, one can further divided into high level and low level goods depending on their usage on site. Various tools of inventory management such as ABC analysis, Economic Order Quantity (EOQ), FSN, VED, SDE, GOLF and 3 D MUSIC analysis model are explained below and the combine use of these two analysis matrix will give greater performance on Inventory Control. There are many analysis models able to contribute the formulation of improving inventory control and management so that it can maximize the profitability of the project.

Appended below a brief introduction of various inventory control analysis model.

IV. VARIOUS SOFTWARES FOR INVENTORY MANAGEMENT

A. Vyapar - Accounting & invoicing

It is inventory management software for construction industry. This Inventory Software can be used by freelancer, SMEs, Agencies, and enterprises. It provides main features like Barcode Integration, Budgeting, Customer Management and more. Vyapar is the simplest GST ready Accounting, Invoicing and Inventory management software. It helps manage invoices/receipts, estimates, payments, inventory, and clients. Moreover, its GST compatibility enables to create and share GST compliant invoices and tally them, generate precise financial reports, calculate taxes automatically, and also file GST tax returns.

Vyapar is the simplest to use Accounting, Invoicing & Inventory management software. It can be of great help for any businesses. It lets you track your daily transactions, cash-in, and cash-out. Besides, you can create personalized GST compatible invoices, manage cheque and bank accounts, handle inventory with low stock reminders, view how business is doing with various reports, and send personalized bulk messages to all the vendor parties. Following are some benefits of Vyapar software.

- Being GST compatible, it frees user from the hassles of additional CESS, reverse charge, place of supply, and E-Way bills.
- Track your Receivables/Payables, total stock value, cheques, and more right from your desktop or mobile.
- Generate, print, and share customizable bills using users WhatsApp and email.
- Works efficiently without the internet. Thus, one can manage the business at any time.

- Keep updated with inventory by tracking and controlling individual items via their expiry date, batch, and other options.
- Market user's business by sending bulk SMS. Reach to all the customers in one go.
- Send payment reminders so that the payments are made on time.
- User can assess business performance on a daily, monthly, or yearly basis.
- Leverage auto-backup facility to retain the business data.
- Eliminate the efforts to make data entry manually. Import all of the items from the excel sheet in one go.

Key features of Vyapar App are as follows.

- Estimate & Quotations: Create and send detailed estimates and quotations to the customers in a few clicks.
- Track Orders: Keep track of sales and purchase orders and generate bills for the same in no time.
- Record Expenses: Optimize the business expenditure and save money by keeping a record of the money spent.
- Receivables & Payables: Keep a check on the amount you will receive and the amount you need to pay. Also, set reminders for the same.
- Delivery Challan: Generate challans for delivery and attach them to the consignment. Also, convert them into bills and share the same with the customers.
- Bank Accounts: Add, manage, and track all the payments received in user's bank accounts, e-wallets, and more.
- GST Invoicing / Billing: Create GST ready bills in the suggested GST Invoice format. Also, share them within seconds.
- Business Reports: Obtain a detailed analysis of the ledger account, gauge the business status/profits, and make informed decisions.
- Data Safety & Security: Auto backup for all the data in encrypted format in a private and secure location ensures data protection.

B. Oracle NetSuite ERP

It is an Inventory Management System that is available on Web App, Windows, Macintosh platforms. This Construction industry software also provides mobile support on IOS, Android platforms. Oracle NetSuite is the 1 cloud ERP solution in the world. It provides a centralized platform to manage all back-office processes, like accounting, eCommerce, and CRM. NetSuite has inbuilt business intelligence, reporting, and renders real-time visibility across user's organization. It empowers the industries to reduce IT costs, unleash growth, and eliminate operational incompetence- allowing to focus on revenue-generating decisions, rather than your back-end systems.

Netsuite houses all of accounting information, including amortization schedules, journal entries, bills, vendor information, revenues, open, cost of sales, and so much more. NetSuite is connecting entire company, from pole to pole, connecting sales to service and maintaining a level of transparency. Accounting team is able to have all

their information on one system, which allows them to build reporting straight into Netsuite with live access to the real-time data. Netsuite is a great tool to save the accounting teams a lot of time while minimizing errors.

C. Quickbook

This inventory management software includes various functions like accounting, banking integration, budgeting for construction industry. QuickBooks provides yearly payment methods. QuickBooks is an online accounting software for business owners to make stay on top of their finances. Easy to use interface, 100% data security and features such as online bank connect and Whatsapp integration helps business owners to focus on growing their business.

QuickBooks is very simple and easy to use online accounting software which helps to manage business finances in just a click. One can quickly do invoicing, bookkeeping, and billing because QuickBooks gives the things needs the most, all in one place. It provides features like:

- Online banking integration
- Free training set up
- Automatic payment tracking
- 60 plus business reports that provide insights
- Work with your accountant
- Access to open APIs
- Easy and custom invoicing with email and Whatsapp integration

D. Zoho Inventory

It is a Cloud Based inventory software that is suitable for construction industry. This solution has a broad range of features including Financial Management, Multi Currency, Supplier and Purchase Order Management and more.

With Zoho Inventory user can :

- Set a re-order level and get notified whenever your stock goes below re-order level
- Create invoices, bills and shipping labels from a single application &
- Centralized inventory system for multiple warehouses.
- Integrate with shipping carriers, payment gateways, accounting and CRM software in simple steps
- Keep track on the movement of each item in your inventory with Serial number tracking and have better control over your expiable stock with Batch tracking feature
- Send regular updates about the location of the package to your customer after shipping it from your store
- Set workflows and automate some of your regular operations with simple steps so that, user can focus more on growing the business
- Make informed business decisions with our extensive reports.

E. Marg ERP

This inventory management system is designed specifically for the construction industry. It provides fundamental modules like Expense Tracking, Supplier and Purchase Order Management, Warehouse Management and more.

Marg inventory software for individual shop or retail chain is designed to handle all the needs in most efficient, effective & accurate way.

Key Features of MARG inventory software are:

- Rate Management
- Warehouse Management
- Discount system
- Order Management
- Free Scheme (Bonus)
- Barcode Management
- Expiry Management
- Push Sale
- Credit Management
- Cashier & Home Delivery Management
- Integrated Banking Options

Marg is the complete solution for all types of trades. User can easily maintain his inventory & accounts.

F. Sleek Bill India

It is an Inventory Software that is suitable for startups, SMEs, agencies in construction industry. This software supports English language and doesn't provide customization. Sleek Bill is Simple, efficient and free Billing Software. Specially designed for the Indian market.

Key Features of Sleek Bill software are:

- Sleek Interface Design- This invoice software has never looked this good or been this simple to operate. The intuitive design makes it one of the most accessible billing software available.
- Advanced Document Options- Sleek Bill will do all the work from calculating to formatting and printing, even delivering invoices to the customers.
- Fast & time saving- Sleek Bill is one of the fastest invoicing software solutions available online. It won't just help to edit beautiful invoices but will also email them instantly to clients.
- Backup / Restore users Data- The backup and restore feature helps to protect owner's invoicing database from unfortunate events or to transfer it from one PC to another.
- Tax, Retail & Excise Invoices- Make new financial documents such as Excise, Tax & Retail invoices. It is optimized to be compliant with Indian law.
- Print or Email Invoices- Sleek Bill doesn't stop at offering the best billing software solution on the Indian market; it also comes with Printing and Emailing features integrated.
- Service Tax & Tax Groups- It fully support Service Tax with Education Cess and SHE Cess listed and applied appropriately. Also, you can add up to 4 taxes in a group and apply them to any product.
- Here are some plus points of Sleek Bill which I found pretty cool:
- The platform is extremely easy to understand. You can learn the software in few minutes without any help.

Follow these three simple steps to use the software.

- Create an account
- Confirm it and
- Start with the invoices instantly.

Sleek Bill India is compatible with GST and compliant with inventory features. It is the best-in-class software that offers premium services at exclusive and affordable ranges.

The offline and online configurability with multi-user accessibility allows you to access the application from any remote location. The sync of offline and online version enables owner to export data of clients and vendors from desktop to cloud and vice versa. Sleek Bill India invoicing software allows to add vendors to get precise and concise reports of your PO's and bills.

G. Tally ERP 9

Started in the year 1986, & today it is India's leading business management software for GST, accounting, inventory, banking, and payroll. Tally ERP 9 is a reliable solution that is ideal for small, medium, and large multinational enterprises. Tally is a comprehensive suite of functional solutions that can be customized if required. Power-packed with several advanced features, Tally enhances seamless task flow management by enforcing business process management. It has a minimalistic clean interface and is highly user-friendly.

Key feature are:

- Powerful remote capabilities that boost collaboration
 - Easy to find qualified personnel
 - Easy to customize
- One major aspect that many organizations use Tally.ERP 9 software is payroll management. It facilitates the disbursement of salaries to the entire workforce. Auditing is also made simple by utilizing Tally as it carries out regular, timely checks. It ensures that all latest GST rules and regulations are being followed, thereby boosting compliance.

Document management is an easy task with companies that are using Tally. It saves all important files such as invoices, bills, receipts, and vouchers in its archives folder. Tally provides quick and convenient access to all this vital data as all billing related files can be retrieved instantly. It also enables business owners to keep track of their inventory as it informs them when stock levels are low so that they can replenish essential items.

Key functions of Tally ERP 9 are:

- With its highly scalable functionalities, Tally ERP 9 enables businesses to grow.
- Tally ERP 9 lets user to generate data from anywhere. Moreover, user can customize the data as per the business needs.
- It can fetch data from different locations and create a consolidated report.
- Its TallyVault feature keeps the financial data safe and secure. One can generate keys and restrict the access only to himself.
- User can easily transfer the accounting data from existing software to Tally without any glitches.

V. CONCLUSION

Inventory management is a crucial function of so many businesses. Think about grocery stores: When they're out of stock, there is a direct impact on the bottom line. However, grocery stores typically have a wide enough product

mix such that customers have options for alternatives if a specific item is unavailable. The same is not true when managing a construction project. When you're out of stock in the construction industry, you feel it. After all, 50 to 60% of all construction costs come from materials, which means that successfully managing materials on a project can mean the difference between big profits and out-of-control costs. With multiple job sites and a variety of different types of materials and equipment, construction managers have to juggle a lot of moving parts.

That's why strong, measured inventory management is so important to a successful construction project. Any slip-ups when it comes to inventory have extremely costly effects.

In the current business climate, with the rate of new construction sites surging, more construction managers are relying on cloud-based construction management software for smarter inventory management. If anyone shopping for a construction management software platform that will allow owner to manage the inventory and materials more effectively, make sure they have the following four features for smarter construction inventory management.

– Resource tracking and allocation

Data is vital to any business these days, and the rise of information technologies in the last 20 years has created a whole arsenal of new tools project managers can use to make smarter, more efficient decisions.

Newer construction management platforms, for instance, have capabilities that allow for the precise tracking and allocation of inventory, materials, and assets, all of which can be associated with a particular phase within a project's timeline.

Software such as this gives construction managers a bird's eye view of an entire project, while also providing the sort of granular, real-time data necessary to make informed decisions.

– 'On-the-go' purchase order solutions

When owner need additional materials, new equipment, or extra supplies, it's time-consuming to send each request through the home office and check how it lines up with all the other aspects of the business. That's why owner need a platform that uses a purchase order solution that is completely interconnected with all aspects of your inventory management, including accounts payable, work orders, equipment, maintenance, documents, labor, time, and materials.

If one shopping for construction management software, choose a platform that leverages cloud technology, so owner will be able to effectively manage all the purchasing and inventory needs from anywhere, with the insight necessary to keep the project on time and within budget.

– Simple document management

As a construction manager, one need to be able to access, upload, and manage documents on the go, do not overlook this feature of software. A fully-integrated document management system means that documents or images associated with particular aspects of a project are accessible wherever and whenever they are needed.

Purchase orders, contracts, submittals, work orders, RFIs, job site photos—these are all important documents

upon which big decisions depend. If the projects require to make real-time decisions, then document management, including the ability to upload documents of all types from anywhere, is a necessary step toward smarter inventory management.

– Overall workflow management

Every construction project has inherent risks involved: unexpected increases in material costs, unreliable or faulty materials, delays or fluctuating deadlines, and talent and labor shortages. One need to manage inventory well, but managing the workflow, budget, and time associated with that inventory is just as important.

That's the beauty of cloud-based construction management software: just as one is able to manage inventory and materials, owner also able to manage aspects of the project's workflow, including job costs, progress, budget, time to complete, change orders, project logs, and more. A dedicated overall workflow management platform is perhaps the most effective step one can take to keep the project on time and budget.

Above checklist can help to select best software for inventory management in construction industry.

REFERENCES

- [1] Abdul Hamid Jaafar. (2009) Attitude and behaviour factors in waste management in the construction industry of Malaysia.
- [2] Akintoye, A., G. McIntosh and E. Fitzgerald (2000). "A survey of supply chain collaboration and management in the UK construction industry." *European Journal of Purchasing & Supply Management* 6(3-4): 159-168
- [3] Anuprakash N. and Nandhini N. "Study on stock management practices in construction companies" *Research journal of management science*, vol. 2(4) 7-13, April 2013.
- [4] Begum (2009) :-Rawshan Ara Begum, Chamhuri Siwar, Joy Jacqueline Pereira,
- [5] Construction Industry Institute (CII). (1986). "Cost and benefits of materials management systems." Publication 7-1, November 1986.
- [6] Construction Industry Institute (CII). (1988). "Project materials management primer." Publication 7-2, November 1988
- [7] Jang, W. S. & Skibniewski, M. J. (2008). A Wireless Network System for Automated Tracking of Construction Materials on Project Sites. *Journal of Civil Engineering & Management*, 14(1), pp. 11- 19.
- [8] Kasim, N. B., Anumba, C. J. & Dainty, A. R. J. (2005). Improving Materials Management Practices on Fast-track Construction Projects. 21st Annual ARCOM Conference, Vol. 2, 793-802.
- [9] Kasim, N. B. (2008). Improving Materials Management on Construction Projects. Loughborough University: PhD Thesis.
- [10] Kasim, N. B. (2010). Towards a Framework for ICT-Enabled Materials Management in Complex Projects. *Journal of Techno-Social*.
- [11] The Business Roundtable. (1982). "Modern management systems." The Business Roundtable,

- Construction Industry Cost Effectiveness, November, Report A-6.
- [12] Yabuki, N., Shimada, Y., & Tomita, K. (2002). An On-Site Inspection Support System Using Radio Frequency Identification Tags and Personal Digital Assistants. Proc. on Distributing Knowledge in Building, Aarhus School of Architecture.
- [13] Zou, A. J. (2012). Optimization Research of Construction Inventory Management on Site Based on Inventory Theory. Applied Mechanics and Materials, Trans Tech Publ.
- [14] Zou, P. X. W., G. Zhang and J. Wang (2007). "Understanding the key risks in construction projects in China." International Journal of Project Management 25(6): 601-614.
- [15] M. Abas, S. B. K., R. Akhtar, I. Ahmad, M. Ullah, I. U. Haq (2016). "Identification of Factors Affecting Cost Performance of Construction Projects." Technical Journal, University of Engineering and Technology (UET) Taxila, Pakistan 21(1): 104-109.
- [16] Molnar, M., Andersson, R., & Ekholm, A. (2007). Benefits of ICT in the Construction Industry - Characterization of the Present Situation in House-Building Processes. Proceedings of the W78 Conference, Maribor
- [17] Moselhi, O. & El-Omari, S. (2006). Integrating Bar Coding and RFID TO Automate Data Collection From Construction Sites. Joint Int. Conf. on Computing and Decision Making in Civil and Building Engineering. Montreal: Concordia University. pp. 1734-1741.
- [18] www.softwaresuggest.com
- [19] blog.capterra.com