IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING SYSTEM IN HIGH RISE CONSTRUCTION PROJECTS

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Abstract : In construction projects, material management is carried out to minimize wastage of material, shortage of material, damage of material, lack of storage space, and delay in supply. For every construction industry material is required. In construction projects materials constitute major cost. Generally the cost of materials contains major cost of the project.
This paper deals with Application of ERP in Mumbai high rise construction Building Project ERP is used and I have make various entries in ERP system like Indent, GRN, ISSUE of each & every material required at IDEAL site and reports generated through this system will allow us to minimize the material wastage by tracking material inventory & stock ageing report allow us to plan and order material efficiently so that Finance can be use in the right time for the right required material. Output of ERP will also provide Engineer in charge on time tracking of material procurement.
The efficient procurement of material represents a key role in the successful completion of the work. Poor planning and control of material, lack of material when needed, poor identification of material, re-handling and inadequate storage cause losses in labor productivity and overall delays that can indirectly increase total project cost. Effective management of materials can reduce these costs.

IndexTerms **– ERP, Material management.**

I. INTRODUCTION

For every construction industry material is required. In construction projects materials constitute major cost. Generally the cost of materials contains 50% to 60% of total cost of the project.[1,3] In construction projects, material management is carried out to minimize wastage of material, shortage of material, damage of material, lack of storage space, and delay in supply.
The highly competitive environment, linked to the globalization phenomena, demands from industries more agility, better performance and the constant search for cost reduction. This goal can be achieved by improvements in internal materials handling management. Materials handling is intrinsically associated with production flow.
The efficient procurement of material represents a key role in the successful completion of the work. Poor planning and control of material, lack of material when needed, poor identification of material, re-handling and inadequate storage cause losses in labor productivity and overall delays that can indirectly increase total project cost. Effective management of materials can reduce these costs.

1.1 OBJECTIVES OF PROJECT:

i. To study the Concept of material management using Enterprise resource planning system in building construction project.
ii. ERP implementation construction management of High rise building construction.
iii. To compare material management of High rise building using traditional methods & Enterprise Resource Planning System.
iv. To give discussions and suggestions in application of Enterprise Resource Planning System in construction project.

II. LITERATURE REVIEW

A material management with ERP system provides a structure, including documentation, various techniques, different software's and processes, which enables the delivery of products and services to be controlled and managed to meet the specified requirements consistently. Various researchers have carried out work on issues such role of ERP in material management in construction industry, its implementation for construction project and its impact on construction project are discussed in literature review.

Lacouture D.C.et al. 2002, recommended a proposed ERP system for material management at Construction Site aiming: firstly to raise the quality level of works in construction projects, and secondly to reduce the cost of project as well as proper functioning of material resources and ultimately increase the life of materials. The procurement of materials at construction site is very necessary as we are implementing the ERP web based system for material management. An authors discussed that the initiative of implementing Internet-based solutions for the integration of the supply chain of materials will not succeed if there is no assurance of collaboration and communication among the parties in the

construction business. Neither EDI nor web-based supply chain applications can facilitate both the process integration and flexibility required by the construction processes practiced today. ERP is a suitable concept for this endeavour because it comprises principles that allow cooperation and collaboration in the management of construction materials. The research described in this paper follows upon recent publications on ERP modules in order to propose a set of applications in construction materials management systems, also expected benefits are related to conflict resolution and reduction of lead times and subcontractor overhead costs. The researcher have come out with certain conclusions, the construction industry has yet to utilize intelligent tools for the resolution of common conflicts in the planning, design, procurement and delivery of materials. ERP is a suitable concept for this endeavour because it comprises principles that allow cooperation and collaboration in the organization. ERP has provided benefits to the exchange of information and collaboration among autonomous systems in management of material at construction site. [1]

Fara Diva Mustapa et. al. 2012, focussed that the material shortage, delay in supply, price fluctuation, damage & wastage, lack of storage space of materials problems are which can be overcome with the use of ERP in material management. They have surveyed 10 construction firms those are working for more than 10 years in Sarwak. They found that, at the planning and procurement stage more ERP tools and modules are used than the logistic and inventory. They found that modern technology like RFID and bar code has not been utilized and considered as non-existent in construction firms for material management because of its high cost. [2]

Ar. C. S. Dudgikar et al. 2012, India has finally fallen into the groove as far as globalization is concerned. This has led to the domestic large and medium sized companies embrace standards and processes that measure up to global standards. It has become more the reason for IT solutions vendors to cheer up looking at the requirements of the Indian market. Statistics reveal that there has been a significant increase in the IT spends of Indian companies in the last few years. ERP was one of the first IT concepts to hit the Indian market, although with meager success. Enterprise Resource Planning (ERP) is software driven business management system, which integrates all facets of the business, including planning, manufacturing, sales, and marketing. The business environment has become increasingly complex and the marketplace has changed from local to global. Management is under constant pressure to improve competitiveness by lowering operating costs and improving logistics. Organizations therefore have to be more responsive to the customer and competition. And ERP as a business solution aims to help the management by setting better business practices and equipping them with the right information to take timely decisions. Construction management is a discipline comprising systematic approaches to control time, cost and quality of a construction project based on recorded research and experience. It is found that the majority of construction firms in India have awareness about the ERP systems but very few organizations have so far implemented such systems. The major reason is that the implementation of any ERP system needs a huge investment in time, money and resources. However, when implemented to solve the right problems, these ERP systems can be a powerful tool for business improvement. The construction industry is a highly fragmented industry. The goal of ERP is to support one time entry of information at the point where it is created and to make it available to all the participants within the organization. But interestingly it is found that there is no module for Quality Control or Total Quality Management in ERP solutions in India. This paper deals with the design of ERP module for quality control & its application in building

enterprise. Much of the discussion in this paper relates to the development and the implications of different quality requirements for construction as well as the issues associated with ensuring conformance with the help of ERP solution .For developing quality requirements, 5 m's of construction viz. men, money, materials, machines and methodology are considered. And quality parameters are developed relating to these 5 M's. For developing quality module of ERP, a resource (5 M's) based e-Model has been developed. The reports of this module have been designed in such a manner so as to give the concise and precise knowledge of quality parameters of a construction project to its various stakeholders such as builder, developer, contractor, project manager, quality inspector and last but not least the consumer. This paper even exhibits these reports which inform the various stakeholder and help them deciding the right quality benchmarks at a right time within a right budget. [3]

N. B. Kasim, 2011, had discussed process of material management. They have taken interview and questionnaire survey of A class contractors in Malaysia. The questionnaire survey was taken on implementation of ERP and interview was taken on acceptance of ERP for material management. They found that, main barrier of implementation of ERP is high cost and there was just average level of acceptance of ERP by the industries. In construction industries, for material management Microsoft office and handheld devices are widely adopted but bar code and RFID tools are not adopted.

Narimah Kasim et al. 2013, focussed that the poor material management can affect the overall construction time, quality and budget. Generally the material management information is shared by papers which are error prone. They have discussed the materials management on construction projects and potential to employ new web based systems in materials management practices. For large projects material management, complexity always increases. According to them the ERP can give good facility for these large projects. [4]

BooYoung Chung, et.al. 2009, Recently, a significant number of major construction companies embarked on the implementation of integrated information technology solutions such as enterprise resource planning ERP systems to better integrate various business functions. However, these integrated systems in the construction sector present a set of unique challenges, different from those in the manufacturing or other service sectors. There have been many cases of failure in implementing ERP systems in the past, so it is critical to identify and understand the factors that largely determine the success or failure of ERP implementation in the construction industry. This paper presents the process of developing an ERP systems success model to guide a successful ERP implementation project and to identify success factors for ERP systems implementation. Author identifies factors associated with the success and failure of ERP systems, and develops a success model to analyze the relationships between key factors and the success of such systems. The proposed ERP systems success model adapts the technology acceptance model and DeLone and McLean's information systems success model and integrates those with key project management principles. The goal of the ERP systems success model is to better evaluate, plan, and implement ERP projects and help senior managers make better decisions when considering ERP systems in their organization.[5]

Jyh-Bin Yang, et.al. 2007, the primary functions of Enterprise Resource Planning (ERP) are to integrate the inter-departmental operation procedures and Management Information System (MIS) modules, and to reallocate the resources of a company. How to successfully implement an ERP system in an organization is always a hot research topic for researchers

as well as a pending problem for an organization that wants to implement it. This research is a case study on the selection of system suppliers and contract negotiation during the ERP implementation of a local construction company in Taiwan. After reviewing the common key success factors discussed in the literature, this study discussed seven issues: coding system, working process reengineering, priority of ERP functionality implementation, customization, participant roles, consultant role and performance level of subcontractor, which also affected the implementation. Lessons learned from the case study in discussed seven issues are valuable for a construction company in deciding to implement an ERP system. Author suggests that additional case studies are necessary for the successful application of ERP systems in the construction industry. [6]

HANS VOORDIJK, et. al. 2003, In most large Dutch construction firms, Enterprise Resource Planning (ERP) systems have replaced non integrated information systems with integrated and maintainable software. The implementation of ERP systems in such firms is a difficult task. So far, ERP implementations have yielded more failures than successes. Author tries to understand the factors that lead to the success or failure of ERP in large construction firms by focusing on the fits between the following pairs of elements in ERP implementations: business and IT strategy, maturity of the IT infrastructure and the strategic role of IT, and the implementation method and organizational change. The premise of this study is that for an ERP implementation to be successful these elements must somehow fit together. Empirical research was conducted through a case study of three ERP implementations in different business units of a Dutch-based construction firm. Implementing different systems within one company is typical of the way large construction firms in the Netherlands have dealt with ERP. The study shows that the success of ERP implementations depends on consistent patterns between: IT strategy and business strategy, IT maturity and the strategic role of IT, and the implementation method and organizational change. [7]

Sudhanva Kadoli, et. al. 2014, India is a developing nation, with globalization widely making impact over its economy. It is observed that large amount of development is mostly concentrated towards the country's urban infrastructure. Due to larger population migrating towards cities it is necessary to accommodate and provide basic infrastructural facilities to their ever increasing demands. So it is necessary for the construction enterprises to efficiently manage their functioning and address the customer requirements by balancing the functioning of individual departments in the construction enterprise. Construction ERP is an ultimate solution to manage entire enterprise under a single roof. Author presents an efficient ERP system to manage different departments in accordance with for the managerial the company policies and customer requirements. ERP is responsible for integrating business processes within an enterprise. This will only automate the functioning of Construction Company. To enable decision making tier of the company based upon history and future risks BI and DSS are implemented using feedback logic. [8]

2.1 Literature gap: From the above literature reviews, we can conclude that the implementation of ERP system in material management for construction project can overcome the various issues regarding the cost control at the site during and at the commencement of project and it will provide the superior and smooth functioning of work and less time consuming system for construction project. With the help of the above information, we can implement and increase the use

of ERP in material management for construction project for effective quality as well as centralized best quality of material management.

III. METODOLOGY USING ERP REPORT GENERATION:

3.1 In any organisation having ERP following steps followed for material Procurement.

- In ERP Project is created by ERP Team and if required they create its Sub-Project like A-wing or B wing etc
- After this Budget is worked out by Billing & contracts Department which includes Labour and Material
- In labour, Contracts department identify different activities required for the Projects particular work example RCC contract. Then BOM is issued to different Contractors and contractor submit quotation. Contract department allot Work Order to the lowest quote and may be to company's old contractor.
- In this Project I have focussed on Material Management.
- For Material in ERP all Project quantities of different activities worked out by either Engineering execution department or by Quantity surveyor. Purchase department create item master for different materials and with rate in the ERP and then above Project quantities are entered in ERP in Different section wise work orders like RCC & Civil work, Electrical Work, Tiling & Flooring work, etc
- **My scope of Project starts from here**, when above procedure gets completed according to site requirement and material procurement schedule site engineer will make an **INDENT** with delivery date in the system which is filtered by two layers of approval level 1. Project Manager & level 2. GM- Projects
- Then this Indent is processed by Purchase Manager and he makes **PO** to relevant supplier after comparing price with different suppliers
- After receiving Materials as per indent (requisition) at site, Site engineer/Store keeper makes **GRN** in ERP system, then on daily basis Site engineer/Store keeper makes material **ISSUE** entries to contractor in ERP and If material issued to contractor was not consumed within a day or two which may get damaged, contractor returns to store keeper and he makes **ISSUE RETURN** entry in the system.

3.2 INDENT RECORD GENERATION

INDENT: Indent means 'requirement of materials'. An Indent is placed just before the production of Purchase order. The successive steps that are usually seen in every purchasing procedure are listed below:

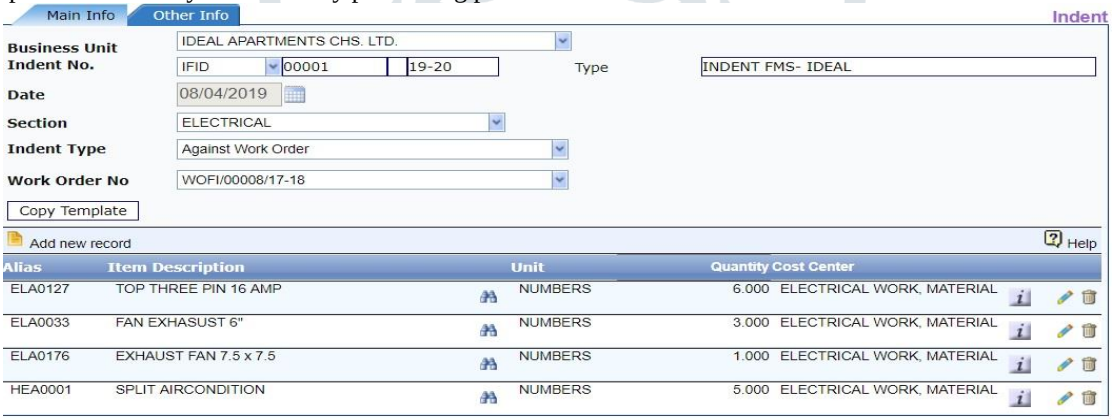

Fig 1 Indent Generation Snap Shot Step I

Business Unit: Select the Business Unit
Indent No.: Choose the Indent number
Type: The indent document type will automatically come into view in this field
Date: Enter the date
Section: Select the section/department from where Indent will be raised. Item related requirements come from this section. These item requirements are entered through Indent. Indent is usually maintained as date wise and section wise.
Indent Type: Select any of the Indent types Including 'Direct' and 'Against Work Order'. I consider 'Against Work Order', in this case new field 'Work Order No' will appear in the screen, from where we have choose the work order number

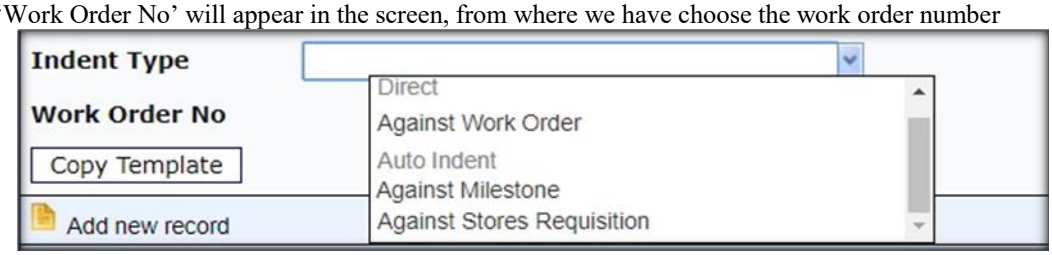

Fig 2 Indent Generation Snap Shot Step II

To add indent items, click 'Add New Record' link. This will enable to select an item along with its Unit of Measurement (UOM), Quality and Cost Centre. We can add as many items as we require

Fig 3 Indent Generation Snap Shot Step III

Other Info
The other info section of the interface is used to record indent related information including 'Delivery Name', 'Delivery Address', and 'Remarks'.

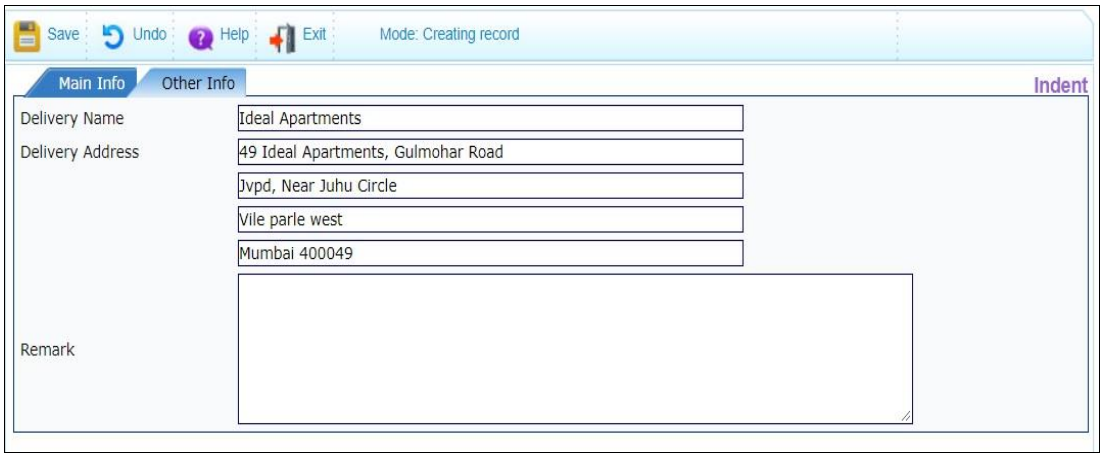

Figure 4 Indent Generation Snap Shot Step VI

IV. PREPARE YOUR PAPER BEFORE STYLING

IV. RESULTS AND DISCUSSION

4.1 Indent Register Results Report (from ERP)

Financial Year: 01-04-2019-31-03-2020

Indent Register

From 01-04-2019 To 01-05-2019

Run Time: 13:24:21

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Indent Date / Item Code	Indent No. / Item	Section	Unit	Work Order No. / Quantity	Pending Qty	Approximate Rate	Approximate Amount	Req. Delv. Date	Last Supply Details: Supplier	Date	Rate	Lead Date
05-04-2019	IOID/00001/19-20	ELECTRICAL		WOOIDEA/00003/17-18								
TUB0070	LED TUBELIGHT 22 W		NOS	40.000		238.36	9,534.52	06-04-2019	Arihant Electricals	05-04-2019	238.36	05 Apr 2019
WIC0140	CABLE ALUMINIUM UNARMOURED 4.0SQ.MM 2 CORE		MTR	180.000		10.36	1,865.34	06-04-2019	Arihant Electricals	05-04-2019	10.36	05 Apr 2019
	Total:						11,399.86					
08-04-2019	IFID/00001/19-20	ELECTRICAL		WOFI/00008/17-18								
ELA0127	TOP THREE PIN 16 AMP		NOS	6.000		45.00	270.00	22-04-2019	Sapna Electricals	08-04-2019	45.00	08 Apr 2019
ELA0033	FAN EXHASUST 6"		NOS	3.000		670.00	2,010.00	22-04-2019	GENERAL ELECTRIC STORES	08-04-2019	670.00	08 Apr 2019
ELA0176	EXHAUST FAN 7.5 x 7.5		NOS	1.000		885.00	885.00	22-04-2019	GENERAL ELECTRIC STORES	08-04-2019	885.00	08 Apr 2019
HEA0001	SPLIT AIRCONDITION 1.5 TON = 04 NOS. 02 TON = 01 NOS.		NOS	5.000		32,421.88	162,109.38	22-04-2019	RELIABLE SERVICE CENTER-NEW	08-04-2019	32,421.88	08 Apr 2019
	Total:						165,274.38					
08-04-2019	IFID/00002/19-20	FINISHING		WOFI/00006/17-18								
DOS0110	SAFETY DOOR SHUTTER 35MM THICK 01 NOS.		SFT	28.000		257.01	7,196.39	22-04-2019	Sona International	09-04-2019	195.00	08 Apr 2019
DOS0111	BEDROOM DOOR SHUTTER 35MM THICK 03 NOS.		SFT	73.000		231.66	16,911.18	22-04-2019	Sona International	09-04-2019	195.00	08 Apr 2019
DOS0112	TOILET DOOR SHUTTER 30MM THICKNESS 04 NOS.		SFT	73.000		231.66	16,912.64	22-04-2019	Sona International	09-04-2019	190.00	08 Apr 2019
DST0005	MAGNET PVC DOOR MAGNET IVORY COLOUR		NOS	4.000		30.00	120.00	22-04-2019	SHREE SHANTI HOMES LLP	09-04-2019	30.00	08 Apr 2019
DOI0006	HINGES BRASS 4" X 1-1/4" X 1/8"		NOS	24.000		84.00	2,016.00	22-04-2019	SHREE SHANTI HOMES LLP	09-04-2019	84.00	08 Apr 2019
MTS0002	METAL SCREW FULL THREAD 38MM X 8MM		NOS	250.000		0.44	110.00	22-04-2019	SHREE SHANTI HOMES LLP	09-04-2019	0.44	08 Apr 2019
MTS0008	METAL SCREW FULL THREAD 25MM X 6MM		NOS	100.000		0.23	23.00	22-04-2019	SHREE SHANTI HOMES LLP	09-04-2019	0.23	08 Apr 2019
DOL0035	BEDROOM DOOR LOCK		NOS	3.000		1,967.00	5,901.00	22-04-2019	SHREE SHANTI HOMES LLP	09-04-2019	1,967.00	08 Apr 2019
DOL0036	TOILET DOOR LOCK		NOS	4.000		1,967.00	7,868.00	22-04-2019	SHREE SHANTI HOMES LLP	09-04-2019	1,967.00	08 Apr 2019
	Total:						57,058.21					
08-04-2019	IFID/00003/19-20	PLUMBING		WOFI/00005/17-18								
SAT0033	WALL HUNG WC SPLENDOR		NOS	3.000		12,711.86	38,135.58	12-04-2019	SHREE SHANTI HOMES LLP	25-04-2019	12,711.86	08 Apr 2019
SAT0094	WASH BASIN TABLE TOP BASIN FONTE 61 X 46 CM		NOS	2.000		3,972.88	7,945.76	15-04-2019	SHREE SHANTI HOMES LLP	25-04-2019	7,457.63	08 Apr 2019
SAT0094	WASH BASIN TABLE TOP RUBBIC 48 X 36.5 CM		NOS	1.000		3,972.88	3,972.88	15-04-2019	SHREE SHANTI HOMES LLP	25-04-2019	7,457.63	08 Apr 2019
CPS0098	DIVERTOR UPER PART FLR-5065K		NOS	3.000		556.63	1,669.89	19-04-2019	SHREE SHANTI HOMES LLP	16-04-2019	556.63	08 Apr 2019
CPS0097	WASTE COUPLING FULL THREAD 3.5" LONG		NOS	1.000		285.65	285.65	19-04-2019	SHREE SHANTI HOMES LLP	16-04-2019	285.65	08 Apr 2019
CPS0031	OVER HEAD SHOWER -OHS-1999		NOS	3.000		1,083.50	3,250.50	19-04-2019	SHREE SHANTI HOMES LLP	16-04-2019	1,083.50	08 Apr 2019
CPS0067	SHAWER ARM SHORT BODY 6" (SHA-477)		NOS	3.000		329.98	989.94	19-04-2019	SHREE SHANTI HOMES LLP	16-04-2019	329.98	08 Apr 2019
CPS0099	SPOUT SPJ-5429		NOS	3.000		689.50	2,068.50	19-04-2019	SHREE SHANTI HOMES LLP	16-04-2019	689.50	08 Apr 2019
CPS0135	2 WAY BIB COCK (FLR 5041N)		NOS	3.000		1,058.88	3,176.64	19-04-2019	SHREE SHANTI HOMES LLP	16-04-2019	1,058.88	08 Apr 2019
CPS0162	JET SPRAY WITH TUBE & HOOK STAINLESS STEEL ONLY		NOS	3.000		600.85	1,802.55	19-04-2019	SHREE SHANTI HOMES LLP	16-04-2019	600.85	08 Apr 2019
CPS0077	SINK COCK KITCHEN (5347N)		NOS	1.000		1,024.40	1,024.40	19-04-2019	SHREE SHANTI HOMES LLP	16-04-2019	1,024.40	08 Apr 2019
CPS0072	ANGLE COCK KITCHEN 5053 N		NOS	1.000		674.73	674.73	19-04-2019	SHREE SHANTI HOMES LLP	16-04-2019	674.73	08 Apr 2019
CPS0136	EXPOSED PART SINGLE LEVER BASIN MIXER -FLRCHR5233K		NOS	3.000		1,521.83	4,565.49	19-04-2019	SHREE SHANTI HOMES LLP	16-04-2019	1,521.83	08 Apr 2019
CPS0096	KITCHEN SINK WITH WASTE COUPLING SQUARE 24" X18"		NOS	1.000		2,859.33	2,859.33	19-04-2019	JYOTI (INDIA) METAL INDUSTRIES PVT.LTD	23-04-2019	2,859.33	08 Apr 2019
PLU0010	NANI TRAP JALI		NOS	2.000		42.00	84.00	19-04-2019	SHREE SHANTI HOMES LLP	09-05-2019	45.00	08 Apr 2019
GEY0001	PVC BEIGE IN COLOUR WITH HOLE PROVISION FOR WASHING MACHINE PIPE GEYSER 3 LTR RACOLD MAKE 4.5 KW RECOLD		NOS	3.000		2,649.38	7,948.14	19-04-2019	SHREE SHANTI HOMES LLP	09-05-2019	2,649.38	08 Apr 2019
	Total:						80,453.98					
15-04-2019	IFID/00004/19-20	INFRA		WOFI/00001/17-18								
CLB0001	BRICKS 9"X3"X4"		NOS	500.000		6.20	3,100.00	20-04-2019	SUPREME CERAMICS	15-04-2019	6.20	15 Apr 2019
CMP0001	CEMENT POZOLANIC PORTLAND (PPC)		BAG	20.000		292.97	5,859.40	20-04-2019	SUPREME CERAMICS	15-04-2019	292.97	15 Apr 2019
	Total:						8,959.40					
15-04-2019	IFID/00005/19-20	CIVIL		WOFIDEA/00001/16-17								
SAN0019	SAND RIVER IN BAG		BAG	100.000		101.00	10,100.00	20-04-2019	SUPREME CERAMICS	15-04-2019	101.00	15 Apr 2019
	Total:						10,100.00					
	GRAND TOTAL:						333,245.83					

4.2 Material Utilization Report (from ERP)

IDEAL APARTMENTS CHS. LTD.

Material Requirement and Utilization Report (Transfer Based)

As on 08-Jun-19

Accounting Period : 01-04-2019-31-03-2020

Run Date : 8-Jun-19

Run Time : 12:43:00

Amount in Rupees

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Item Name	Alias	UOM	Requirement Qty	Requirement Amount	Procurement Qty Indent	Procurement Qty P.Ord	Procurement Qty GRN	Utilization Qty Trans.	Utilization Qty Consume	Utilization Amount Consume	Balance Qty To Indent	Balance Qty With Contractor	Balance Qty To Transfer	Balance Qty To Consume	Balance Amount To Consume
Sub Project : IDEAL CHS															
Contractor : FMS															
Work Order : WOFI/00001/17-18															
BRICKS															
BRICKS 9"X3"X4"	CLB0001	NOS	25,000	125,000	14,642	14,642	14,592	0	14,562	71,094	10,358	-14,562	25,000	10,438	53,906
		Total :	**25,000**	**125,000**	**14,642**	**14,642**	**14,592**	**0**	**14,562**	**71,094**	**10,358**	**-14,562**	**25,000**	**10,438**	**53,906**
CEMENT															
CEMENT ORDINARY PORTLAND (OPC) GRADE 53	CMO0002	BAG	100	27,500	100	100	100	0	100	20,200	0	-100	100	0	7,300
CEMENT POZOLANIC PORTLAND (PPC)	CMP0001	BAG	7,000	1,526,000	1,415	1,415	1,410	0	1,404	308,363	5,585	-1,404	7,000	5,596	1,217,637
		Total :	**7,100**	**1,553,500**	**1,515**	**1,515**	**1,510**	**0**	**1,504**	**328,563**	**5,585**	**-1,504**	**7,100**	**5,596**	**1,224,937**
DOOR HARDWARE															
PAD LOCK 7 LEVER X 65MM - 3 KEY	DOL0016	NOS	10	3,500	10	10	10	0	10	4,800	0	-10	10	0	-1,300
		Total :	**10**	**3,500**	**10**	**10**	**10**	**0**	**10**	**4,800**	**0**	**-10**	**10**	**0**	**-1,300**
ELECTRICAL FITTING															
LIGHTING DESIGN 01 LOGO PATTERNS USING GLASS RODS	ELF0036	NOS	5	1,040,000	5	5	5	0	5	881,000	0	-5	5	0	159,000
		Total :	**5**	**1,040,000**	**5**	**5**	**5**	**0**	**5**	**881,000**	**0**	**-5**	**5**	**0**	**159,000**
GARDEN ITEMS															
BALANCING BEAM	PGE0013	SET	1	12,429	1	1	1	0	1	13,531	0	-1	1	0	-1,102
CRAWL TUBE	PGE0017	SET	1	31,206	1	1	1	0	1	32,311	0	-1	1	0	-1,105
CROSS & ZERO	PGE0014	SET	1	7,958	1	1	1	0	1	9,060	0	-1	1	0	-1,102
DOUBLE SEE SAW	PGE0015	SET	1	16,899	1	1	1	0	1	18,003	0	-1	1	0	-1,104
HALF ROUND NET SCRAMBLER	PGE0010	NOS	1	79,488	1	1	1	0	1	80,603	0	-1	1	0	-1,115
SELF STANDING FRAME FOR ALL EQUIPMENT	PGE0018	SET	1	55,883	1	1	1	0	1	56,994	0	-1	1	0	-1,111
TODDLER FRP WAVE SLIDE	PGE0016	SET	1	22,264	1	1	1	0	1	23,368	0	-1	1	0	-1,104
TRIPLE DECK PLAYSTATION	PGE0012	SET	1	406,828	1	1	1	0	1	400,759	0	-1	1	0	6,069
		Total :	**8**	**632,955**	**8**	**8**	**8**	**0**	**8**	**634,629**	**0**	**-8**	**8**	**0**	**-1,674**
GYM EQUIPMENT															
COMMERCIAL ELLIPTICAL TRAINER	GYM0002	NOS	1	270,240	1	1	1	0	1	270,240	0	-1	1	0	0
COMMERCIAL MOTORIZED AC TRADMILL	GYM0001	NOS	2	675,600	2	2	2	0	2	675,600	0	-2	2	0	0
COMMERCIAL MULTI GYM	GYM0005	NOS	1	326,072	1	1	1	0	1	326,072	0	-1	1	0	0
COMMERCIAL UPRIGHT BIKE	GYM0004	NOS	1	145,717	1	1	1	0	1	145,717	0	-1	1	0	0
DUMBELLS RACK	GYM0008	NOS	1	56,510	1	1	1	0	1	56,510	0	-1	1	0	0
MULTI PURPOSE BENCH	GYM0007	NOS	1	56,510	1	1	1	0	1	56,510	0	-1	1	0	0
RUBBER COATED SOLID DUMBBELLS	GYM0017	SET	1	140,461	1	1	1	0	1	140,461	0	-1	1	0	0
RUBBER FLOORING	GYM0020	SFT	600	42,000	463	463	463	0	436	38,240	137	-436	600	164	3,760
		Total :	**608**	**1,713,110**	**471**	**471**	**471**	**0**	**444**	**1,709,350**	**137**	**-444**	**608**	**164**	**3,760**
INTERCOM SYSTEM															
BUILDING INTERCOM SYSTEM	INT0001	NOS	1	45,000	1	1	1	0	1	39,600	0	-1	1	0	5,400
INDICATOR PORT	INT0003	NOS	2	9,000	1	1	1	0	0	0	1	0	2	2	9,000
KRONE MDF SYSTEM SIDE	INT0004	NOS	1	3,500	1	1	1	0	1	2,500	0	-1	1	0	1,000

Amount in Rupees

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Item Name	Alias	UOM	Requirement Qty	Requirement Amount	Procurement Qty Indent	Procurement Qty P.Ord	Procurement Qty GRN	Utilization Qty Trans.	Utilization Qty Consume	Utilization Amount Consume	Balance Qty To Indent	Balance Qty With Contractor	Balance Qty To Transfer	Balance Qty To Consume	Balance Amount To Consume
TELEPHONE INSTRUMENT	INT0002	NOS	69	39,675	56	56	56	0	32	15,840	13	-32	69	37	23,835
		Total :	**73**	**97,175**	**59**	**59**	**59**	**0**	**34**	**57,940**	**14**	**-34**	**73**	**39**	**39,235**
MISCELLANEOUS															
CHANGING ROOM	PVP0247	NOS	1	36,000	1	1	1	0	1	36,000	0	-1	1	0	0
SHOWER ROOM	PVP0248	NOS	1	48,500	1	1	1	0	1	48,500	0	-1	1	0	0
		Total :	**2**	**84,500**	**2**	**2**	**2**	**0**	**2**	**84,500**	**0**	**-2**	**2**	**0**	**0**
READY MIX CONCRETE															
RMC M10 GRADE	RMC0002	CMT	13	62,075	12	12	12	0	11	54,580	2	-11	13	2	7,495
RMC M20 GRADE	RMC0006	CMT	75	413,580	62	62	62	0	62	332,608	14	-62	75	14	80,972
		Total :	**88**	**475,655**	**73**	**73**	**73**	**0**	**73**	**387,187**	**15**	**-73**	**88**	**16**	**88,468**
SAND															
SAND CRUSHED	SAN0001	BRASS	8	40,000	6	6	6	0	6	29,422	2	-6	8	2	10,578

SAND RIVER	SAN0003	BRASS	41	328,000	40	40	40	0	40	284,718	1	-40	41	1	43,282
SAND RIVER IN BAG	SAN0019	BAG	15,085	1,206,800	15,085	15,085	15,085	0	15,085	1,131,199	0	-15,085	15,085	0	75,601
		Total :	**15,154**	**1,674,800**	**15,146**	**15,146**	**15,146**	**0**	**15,146**	**1,511,686**	**8**	**-15,146**	**15,154**	**8**	**163,114**
STONES															
KOTA FLOORING 23"X23"	KOS0067	SFT	3,340	187,058	3,196	3,196	3,196	0	3,196	124,647	144	-3,196	3,340	144	62,411
KOTA RISER CUT SIZE	KOS0107	SFT	1,759	110,846	1,599	1,599	1,599	0	1,599	99,544	160	-1,599	1,759	160	11,303
KOTA SKIRTING CUT SIZE	KOS0108	SFT	803	47,361	736	736	736	0	736	31,117	66	-736	803	66	16,244
KOTA TREAD CUT SIZE	KOS0106	SFT	3,165	221,573	2,945	2,945	2,945	0	2,891	241,922	220	-2,891	3,165	274	-20,349
		Total :	**9,068**	**566,838**	**8,477**	**8,477**	**8,477**	**0**	**8,423**	**497,230**	**591**	**-8,423**	**9,068**	**645**	**69,609**
TILES															
32" x 32" AGL GLITZ ALBESCATO BRONZE	TIL0031	SFT	910	70,980	909	909	909	0	818	52,378	1	-818	910	92	18,602
32" x 64" GRESCASA PEARL GOLD	TIL0030	SFT	6,783	542,640	6,777	6,777	6,777	0	6,750	472,483	6	-6,750	6,783	33	70,157
ARDESIA IVORY GLOSSY WALL TILE 1200MM X600MM	TIL0020	SFT	3,875	170,771	3,875	3,875	3,875	0	3,565	157,110	0	-3,565	3,875	310	13,661
CEMENTO CENIZO SATIN TILE 1200MM X 600MM	TIL0017	SFT	4,712	207,658	4,712	4,712	4,712	0	5,224	230,034	0	-5,224	4,712	-512	-22,376
CERAMIC TILES 300MM X 300MM	FLT0001	SFT	70	1,540	0	0	0	0	0	0	70	0	70	70	1,540
CHINA MOSAIC TILES	FLT0032	SFT	8,000	144,000	8,000	8,000	8,000	0	8,000	118,640	0	-8,000	8,000	0	25,360
DURBAN MAROON TILE 600MM X 600MM	TIL0019	SFT	2,341	163,870	2,340	2,340	2,340	0	2,480	176,566	1	-2,480	2,341	-139	-12,696
LIZA GRIS WALL TILE 1200MM X 600MM	TIL0018	SFT	6,821	300,601	6,820	6,820	6,820	0	6,526	287,706	1	-6,526	6,821	296	12,896
MATRIX GRIS DECOR TILE 300MM X600MM	TIL0022	SFT	2,155	135,162	2,155	2,155	2,155	0	2,063	109,819	1	-2,063	2,155	92	25,342
OMINI WHITE TILE 800MM X 800MM	TIL0024	SFT	38,911	1,879,401	38,902	38,902	38,902	0	38,695	1,855,228	9	-38,695	38,911	216	24,173
PRIVLEDGE CEMENT STONE TILE 300MM X 600MM	TIL0021	SFT	8,339	416,950	8,339	8,339	8,339	0	9,619	429,461	0	-9,619	8,339	-1,280	-12,511
PRIVLEDGE GRIS STONE TILE 300MM X 600MM	TIL0023	SFT	2,527	126,350	2,527	2,527	2,527	0	2,621	112,837	1	-2,621	2,527	-94	13,513
SAHARA COTTO PUNCH FINISH TILE 600MM x 600 MM	TIL0051	SFT	6,332	386,315	4,712	4,712	4,712	0	4,433	246,294	1,620	-4,433	6,332	1,899	140,021
SAHARA CREM TILE 600MM x 600MM	TIL0052	SFT	6,332	364,850	4,712	4,712	4,712	0	4,712	245,775	1,620	-4,712	6,332	1,620	119,075
SAMARA BEIGE TILE 300MM X 600MM	TIL0026	SFT	4,206	138,997	4,205	4,205	4,205	0	4,335	144,962	1	-4,335	4,206	-129	-5,965
SAMARA BRONCE TILE 300MM X 300MM	TIL0025	SFT	786	24,636	785	785	785	0	727	22,783	1	-727	786	59	1,853
TEAK WOOD TILE 1200 x 200	FLT0046	SFT	4,722	439,146	4,721	4,721	4,721	0	4,562	388,381	1	-4,562	4,722	160	50,765
TILES 600 X 600 MM	TIL0003	SFT	2,713	73,238	0	0	0	0	0	0	2,713	0	2,713	2,713	73,238
TILES FULL BODY 450 MM X 450 MM FOR PARKING	TIL0014	SFT	23,035	858,975	22,957	22,957	22,957	0	22,896	853,790	78	-22,896	23,035	139	5,185
TRAVENTINO GOLD	TIL0050	SFT	310	18,600	310	310	310	0	310	18,391	0	-310	310	0	209
WALL & FLOOR TILE BOSTON NOCE MATT 600MM X 600MM	TIL0015	SFT	3,131	183,070	3,131	3,131	3,131	0	3,333	202,051	0	-3,333	3,131	-202	-18,981
WALL & FLOOR TILE URBANITY GRIS 600MM X 600MM	TIL0016	SFT	7,270	320,389	7,270	7,270	7,270	0	7,235	249,156	1	-7,235	7,270	35	71,233

Item Name	Alias	UOM	Requirement		Procurement			Utilization			Balance				
			Qty	Amount	Qty Indent	Qty P.Ord	Qty GRN	Qty Trans.	Qty Consume	Amount Consume	Qty To Indent	Qty With Contractor	Qty To Transfer	Qty To Consume	Amount To Consume
FIRE RED MARBLE UNPOLISHED	ITM0053	SFT	80	25,680	80	80	80	0	80	26,000	0	-80	80	0	-320
GOLDEN SPIDER MARBLE UNPOLISHED	ITM0055	SFT	45	19,395	45	45	45	0	45	19,453	0	-45	45	0	-58
GOLDEN SPIDER MARBLE WITH POLISH	ITM0056	SFT	168	74,088	168	168	168	0	168	74,667	0	-168	168	0	-579
MARBLE ANTIQUE BEIGE	TRM0001	SFT	1,420	426,000	1,420	1,420	1,420	0	1,420	431,569	0	-1,420	1,420	0	-5,569
ST. LAWARANTE MARBLE	ITM0050	SFT	47	14,617	46	46	46	0	46	14,575	1	-46	47	1	42
ST. LAWARANTE MARBLE WITH POLISH	ITM0051	SFT	139	46,009	139	139	139	0	139	46,508	0	-139	139	0	-499
TEEMAX IVORY SOLID	INM0068	KGS	10	4,000	9	9	9	0	9	3,600	1	-9	10	1	400
WHITE SPOTTED MARBLE CUT SIZE	INM0234	SFT	10,102	808,160	9,959	9,959	9,959	0	9,959	432,058	143	-9,959	10,102	143	376,102
		Total :	**22,382**	**3,789,503**	**19,796**	**19,796**	**19,796**	**0**	**19,796**	**2,724,557**	**2,586**	**-19,796**	**22,382**	**2,586**	**1,064,946**
SAND															
SAND CRUSHED	SAN0001	BRASS	28	140,000	21	21	21	0	21	95,768	7	-21	28	7	44,232
SAND RIVER	SAN0003	BRASS	41	328,000	40	40	40	0	40	284,718	1	-40	41	1	43,282
SAND RIVER IN BAG	SAN0019	BAG	15,085	1,206,800	15,085	15,085	15,085	0	15,085	1,131,199	0	-15,085	15,085	0	75,601
		Total :	**15,154**	**1,674,800**	**15,146**	**15,146**	**15,146**	**0**	**15,146**	**1,511,686**	**8**	**-15,146**	**15,154**	**8**	**163,114**
STONES															
KOTA FLOORING 23"X23"	KOS0067	SFT	3,340	187,058	3,196	3,196	3,196	0	3,196	124,647	144	-3,196	3,340	144	62,411
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KOTA SKIRTING CUT SIZE	KOS0108	SFT	803	47,361	736	736	736	0	736	31,117	66	-736	803	66	16,244
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		Total :	**9,068**	**566,838**	**8,477**	**8,477**	**8,477**	**0**	**8,423**	**497,230**	**591**	**-8,423**	**9,068**	**645**	**69,609**
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ARDESIA IVORY GLOSSY WALL TILE 1200MM X600MM	TIL0020	SFT	3,875	170,771	3,875	3,875	3,875	0	3,565	157,110	0	-3,565	3,875	310	13,661
CEMENTO CENIZO SATIN TILE 1200MM X 600MM	TIL0017	SFT	4,712	207,658	4,712	4,712	4,712	0	5,224	230,034	0	-5,224	4,712	-512	-22,376
CERAMIC TILES 300MM X 300MM	FLT0001	SFT	70	1,540	0	0	0	0	0	0	70	0	70	70	1,540
CHINA MOSAIC TILES	FLT0032	SFT	8,000	144,000	8,000	8,000	8,000	0	8,000	118,640	0	-8,000	8,000	0	25,360
DURBAN MAROON TILE 600MM X 600MM	TIL0019	SFT	2,341	163,870	2,340	2,340	2,340	0	2,480	176,566	1	-2,480	2,341	-139	-12,696
LIZA GRIS WALL TILE 1200MM X 600MM	TIL0018	SFT	6,821	300,601	6,820	6,820	6,820	0	6,526	287,706	1	-6,526	6,821	296	12,896
MATRIX GRIS DECOR TILE 300MM X600MM	TIL0022	SFT	2,155	135,162	2,155	2,155	2,155	0	2,063	109,819	1	-2,063	2,155	92	25,342
OMINI WHITE TILE 800MM X 800MM	TIL0024	SFT	38,911	1,879,401	38,902	38,902	38,902	0	38,695	1,855,228	9	-38,695	38,911	216	24,173
PRIVLEDGE CEMENT STONE TILE 300MM X 600MM	TIL0021	SFT	8,339	416,950	8,339	8,339	8,339	0	9,619	429,461	0	-9,619	8,339	-1,280	-12,511
PRIVLEDGE GRIS STONE TILE 300MM X 600MM	TIL0023	SFT	2,527	126,350	2,527	2,527	2,527	0	2,621	112,837	1	-2,621	2,527	-94	13,513

V. CONCLUSIONS

The ERP is designed to integrate and partially automate many of the construction company's business processes such as material management human resources, accounts, billing and invoicing, administration, managing site, inventory and sales.ERP has provided benefits to the exchange of information and collaboration among autonomous systems in management of material at construction site. ERP is plays an ultimate role for especially the material management including planning, controlling etc. processes within an enterprise. ERP is applied in Mumbai construction of high rose building. Application of ERP gives immense ease in working culture of the system. Each record keeping and tracking and analyzing is just click away. This is reducing time as well as laborious man hours thereby replacing with accuracy.

V. ACKNOWLEDGMENT

I sincerely Acknowledge the guidance by Dr. P P Bhangale for guidance to make my project possible.

REFERENCES

[1] Castro-Lacouture, D. and Skibniewski, M , 2002, "*E-Work: The Next Iteration In Construction Materials Management Systems* ", Proceedings of the First International Conference on Construction in the 21st Century (CITC2002), Miami, Florida, USA, pp. 197-204

[2] Fara Diva Mustapa, 2012, "*ERP adoption in materials management among construction firms in construction industry*", Published in Humanities, Science and Engineering (CHUSER), 2012 IEEE Colloquium on 3-4 Dec. 2012, Kota Kinabalu, ISBN:978-1-4673-4615-3, pp 342 – 346

[3] Ar. C. S. Dudgikar, Er. M.B. Kumthekar, Er. S.R.Khot, "*Development of ERP Module for Quality Management in Construction Industry",* International Journal of Electronics and Communications IJEC, Volume – 1, Issue – 1, August 2012, ISSN 2279 – 0098

[4] Kasim Narimah,(2011),"ICT Implementation for Materials Management in Construction Projects : Case studies", *Journal of Construction Engineering and Project Management, 2233-9582*

[5] BooYoung Chung, Miroslaw J.Skibniewski and Young Hoon Kwak,"*Developing ERP Systems Success Model for the Construction Industry*", JOURNAL OF CONSTRUCTION Engineering And Management, ASCE, MARCH 2009, ISSN 0733-9364, 2009, pp 207-216.

[6] Jyh-Bin Yang, Chih-Tes Wu, Chiang-Huai Tsai, "*Selection of an ERP system for a construction firm in Taiwan: A case study",* Automation in Construction 16, 2007, 0926-5805, pp 787–796.

[7] Hans Voordijk, Arjen Van Leuven and Albertus Laan, 2003, "*Enterprise Resource Planning in a large construction firm: implementation analysis*", Construction Management and Economics July 2003 21, ISSN 0144-6193, pp 512-521

[8] Sudhanva Kadoli, Digvijay Patil, Ajit Mane, Ajinkya Shinde and Shrikant Kokate, "*An Enterprise Resource Planning (ERP) For A Construction Enterprise Along with Business Intelligence (BI)",* International Journal of Innovative Research in Science, Engineering and Technology, Vol. 3, Issue 2, February 2014, ISSN: 2319-875, pp 9487-9493.

[9] Jonathan Jingsheng Shi and Daniel W. Halpin, "*Enterprise Resource Planning for Construction Business Management",* Journal Of Construction Engineering And Management, Vol. 129, No. 2, ASCE, APRIL 2003, ISSN 0733-9364, pp 214-221.