

Customization of Materials Management Module of SAP ERP for Power Industries of C.G., India

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Abstract: Enterprise Resource Planning (ERP) systems, also called Enterprise Systems (ES) are among the most important business information technologies that emerged during the last decade. While no two industries ERP systems are the same, the basic concept of ERP systems is focused on standardization and synchronization of information, and as a result, improved efficiency and output. To implement an integrated system of materials management, there must be a central database wherein anyone in the company can find out all information about any material passing through the plant. ERP streamlines all the business functionalities and gives desired result in one click. Customization and configuration are parts of ERP implementation process. ERPs are always configured, and usually customized, when implemented. An ERP system can help to improve the communication within an organization. SAP is a state-of-the-art software for ERP implementation and customization. SAP is user friendly i.e. information will be obtained as and when required. We have adopted a case study approach for this paper. For this we have taken case study of Chhattisgarh State Government owned power company named as Chhattisgarh State Electricity Board (CSEB). In this paper, we have concentrated mainly on selected functionalities of Material Management module that are necessary for power industries of Chhattisgarh state for customization of SAP ERP software.

Keywords: Enterprise Resource Planning, System Application and Products, Materials Management Module, Customization, SAP R/3.

I. INTRODUCTION

Power industries of Chhattisgarh state are in the extension stage. So to expand their energy trading business and to become more profitable, they need to automate and integrate their business processes. It is also necessary for the power industries to make a global presence. To fulfil their requirements, ERP software package is an important tool. After comparing different types of ERP software; we find SAP is suitable.

A system that automates and integrates all modules of business areas is known as an ERP system or simply ERP. An ERP system is used to integrate several data sources and processes, such as manufacturing, control, and distribution of goods in an organization. This integration is achieved by using various hardware and software components. An ERP system is primarily module-based, which implies that it consists of various modular software applications or modules [1].

A software module in an ERP system automates a specific business area or module of an enterprise, such as production, finance, materials management, sales and distribution, etc. These software modules of an ERP system are linked to each other by a centralized database [1].

ERP system is a common term for a wide set of activities supported by multi-module application tool that helps organizations to manage their resources in better way. The ERP system has been shown to be able to provide significant improvements in efficiency, productivity and

service quality, and to lead to a reduction in service costs as well as to more effective decision-making (Ngai et al., 2008).

ERP implementations are usually large, complex projects, involving large groups of people and other resources, working together under considerable time pressure and facing many unforeseen developments (Akkermans & Helden, 2002).

Data accuracy is absolutely required for an ERP system to function properly. Because of the integrated nature of ERP, if someone enters the wrong data, the mistake can have a negative domino effect throughout the entire enterprise. Therefore, educating users on the importance of data accuracy and correct data entry procedures should be top priority (Stedman, 1999), (Stein, 1999).

Various issues at strategic, managerial, and operational levels should be addressed in order to achieve optimum outcomes from an ERP system (Al-Mashari & Zairi, 2000).

Materials Management deals with managing the materials (products and/or services) resources of an organization with the aim of increasing productivity, reducing costs, increase optimization and at the same time be flexible to accommodate changes [7].

A business process in SAP is termed as "Module". SAP's Materials Management (MM) is a part of Logistics area and helps to manage the procurement activity of an

organization from procurement process, inventory management, invoice verification, and material planning [7].

Materials Management is the backbone of the Logistics area which includes modules like Sales and Distribution, Production Planning, Plant Maintenance, Project Systems, Warehouse Management, which are highly dependent on Materials Management module [7].

Materials management is highly integrated with other modules such as FI(Financial Accounting), SD(Sales & Distribution), PP(Production Planning), QM(Quality Management), PM(Plant Maintenance) [7].

Customization enables organization to adapt the enterprise-neutral and industry-specific functions, delivered as standard, to the specific business requirements of enterprise.

It supports enterprise whenever we:

- Implement the ERP(SAP) System.
- Enhance the ERP(SAP) System.
- Upgrade to a new release or system.

Customization controls the behaviour of ERP (SAP) applications. Enterprises can only work with many ERP (SAP) applications after they have made the appropriate Customization settings – for example, after specifying in Customization, which currencies and purchasing groups are used in enterprise. Customization does not enable us to modify SAP standard functions [8].

Organizations might think that their needs are fairly close to everyone else's, and they don't really need customized ERP software. However, Generic approaches miss both simplifications and extra depth, specific to their way of doing business. Customization puts enterprise and their staff at the heart of the system [9].

Large companies have long understood the benefits of customizing their software and spend millions to achieve this goal.

Being fully customizable implies complete flexibility on defining:

- The screens and workflows.
- The data model.
- The reports [9].

Customizing refers to tailoring the SAP R/3 software based on the needs of the customer. Customizing in SAP R/3 helps in meeting a company's individual requirements based on its business. SAP R/3 transactions can be customized to best leverage SAP ERP [10].

To take an example of how SAP can be customized, consider a scenario of a company, which sells its products. The company may sell its products both in the domestic as well as in the export market. It is important that the company defines in SAP the correct business strategy. Customizing can be used for this purpose. Thus, the company may define a sales organization, define various distribution channels, assign distribution channels to sales organization, define pricing conditions, assign general ledger accounts, define tax determination rules etc. All of

the above is possible through customizing in SAP R/3. One important point to remember here is that "Customizing" in SAP R/3 is client specific. But important changes such as changes in pricing conditions are not client specific. Such changes affect all the clients in the system and are cross client [10].

II. CASE STUDY

A. Background of the company

CSEB was formed in accordance with the Section 5 of the Electricity Supply Act 1948 as per the Notification published in the gazette of the Government of Chhattisgarh dated 15 November 2000. CSEB became functional w.e.f. 01.12.2000. Chhattisgarh State Electricity Board has been reorganized into five companies in accordance with the provisions contained in the Section 131-134 of Electricity Act 2003 by the Govt. of Chhattisgarh vide Notification dated 19.12.2008 [11] :

- (1) Chhattisgarh State Power Generation Company Limited,
- (2) Chhattisgarh State Power Transmission Company Limited,
- (3) Chhattisgarh State Power Distribution Company Limited,
- (4) Chhattisgarh State Power Trading Company Limited,
- (5) Chhattisgarh State Power Holding Company Limited.

The holding company does the supervision, coordination, and facilitation of the remaining companies. The area served by the power utility company is 1, 35,191 Square KM and 9942 villages are covered under intensive electrification scheme.

B. Power plants of the company

EXISTING THERMAL POWER STATIONS	
Name of Power Station	District
KTPS Korba East PH-II (4X50 = 200 MW)	Korba
KTPS Korba East PH-III (2X120 = 240 MW)	Korba
Dr.SPM TPS Korba East (2X250 = 500 MW)	Korba
HTPS, Korba West (4X210 = 840 MW)	Korba
Co-Generation Power Plant (1X6 = 6 MW)	Kawardha
EXISTING HYDEL POWER STATIONS	
Bango Hydel (3X40 = 120 MW)	Korba
Gangrel Hydel (4X2.5 = 10 MW)	Dhamtari
Sikasar Hydel (2X3.5 = 7 MW)	Raipur
Mini micro (Korba West) (2X0.85 = 1.7 MW)	Korba

Fig. 1. Existing power plants [13]

C. ERP SAP in CSEB(CSPDCL)

The distribution company, which is called the Chhattisgarh State Power Distribution Company Limited(CSPDCL) decided to implement a centralized server based-IT Solution. This involved creating a wide-area network covering all the offices spread across the length and breadth of the state. The management decided

on an ERP solution to integrate all available modules and to computerize its business functionalities. This made it the first Government Power Distribution Utility in India which implemented SAP Solutions for billing [12].

The board was previously using software developed on COBOL and Sybase for its billing, stores, and finance accounting, and pay-roll. ERP-SAP was the best solution to integrate all available modules and computerize its business functionalities [12].

CSPDCL had started implementation of SAP in the year 2005. Indian IT company TCS(Tata Consultancy Services) was implementation partner. It is approximately Rs 150 Crore project. Its full implementation was scheduled till year 2009. Still this implementation project has not rolled out completely. Implementation modules are IS-U/CCS(Industry Specific solution for Utilities - Customer Care & Service) for LT(Low Tension) & HT(High Tension) Billing and Customer Care, MM(Materials Management), FI-CO(Financials - Controlling), HR(Human Resource), DMS(Document Management System), SRM(Suppliers Relationship Management), and EAM(Enterprise Asset Management). In CSEB Module wise or step-by-step implementation strategy was adopted. IS-U/CCS and MM modules had gone live in 2007. HR module had gone live in 2010. DMS module has gone live in 2011. FI-CO module has gone live in 2012. EAM module has gone live in December 2013.

CSEB, along with TCS, charted a roadmap, which included creating a state-of-the-art data centre for hosting the servers and migrating from a de-centralized system to a centralized one. This involved developing a huge WAN(Wide Area Network) across the state, connecting all the divisional head quarters in the first and Sub-Division offices later. With CSEB being the first utility to have adopted ISU-CCS System, tailoring the SAP system as per the billing logics was a major challenge.

This was achieved by involving the users directly with the developers of SAP system. Several innovative solutions were linked to the Core SAP IS-U implementation, which helped CSEB overcome challenges. The Material Management module had to be implemented at “one go” all across CSEB, which was a considerable challenge. However this had paid off, with the procurement and inventory processes now being conducted through the MM module [12].

III. METHODOLOGY OF CUSTOMIZATION

According to methodology, the power company named as CSEB was analyzed for MM module.

Then collection of data and information from this company, relevant to Material Management module of SAP s/w was done.

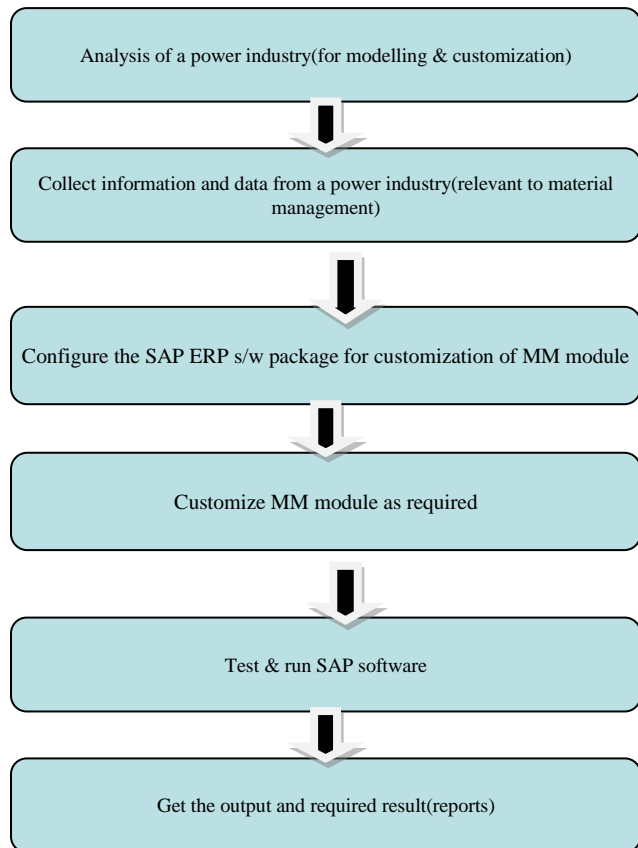


Fig. 2. Flow chart of Customization Methodology After that, SAP ERP software was configured. Following steps have been carried out under configuration process:

- Setting of Countries, Currencies, and Calendar,
- Define Region/State,
- Define Tax Jurisdiction,
- Set display Type for Date, etc.

In the next step of Methodology, MM module is customized. The tool used for customization is SAP IDES (Internet Demonstration and Evaluation System). SAP IDES is a normal R/3 system. It is simple to use, and is used for demos, online/classroom training, and presentations. Potential customers use IDES to trial and test software via Internet.

It supports latest release of the SAP ERP application that is SAP ERP Central Component (ECC6.0).

All the activities, carried out in this methodology, come under customization process.

This methodology includes both program customizations as well as report customizations.

In our approach, concentration was mainly on selected functionalities of Materials Management module that are necessary for power industries of Chhattisgarh state. These functionalities are as follows:

- Purchase Order creation

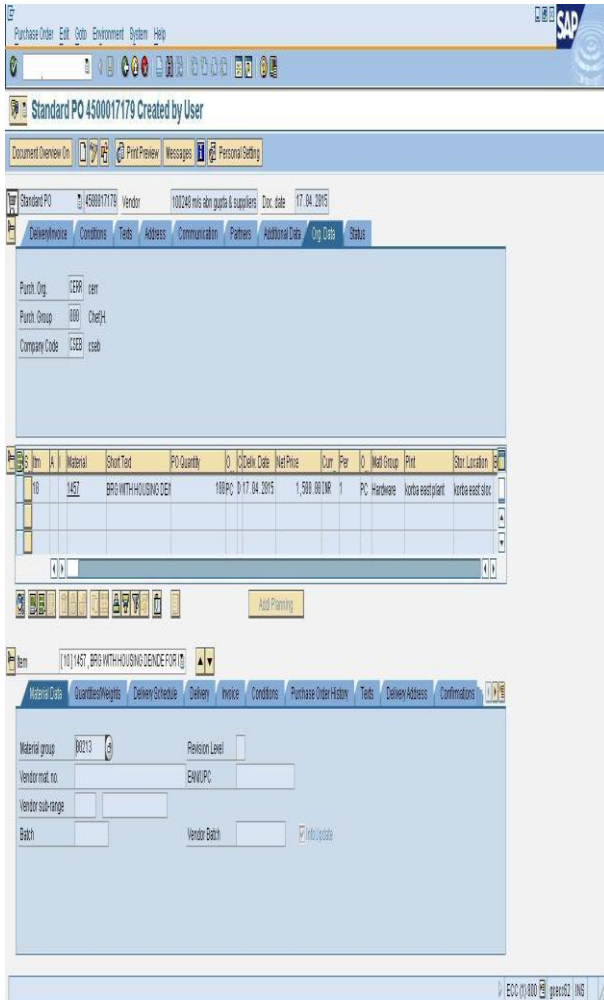


Fig. 3. Creation of Purchase order

- Goods receipt preparation

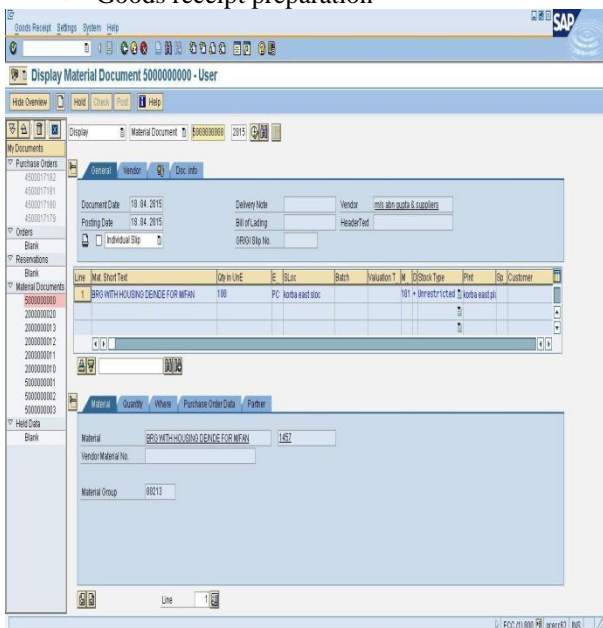


Fig. 4. Preparation of Goods Receipt

- Invoice verification

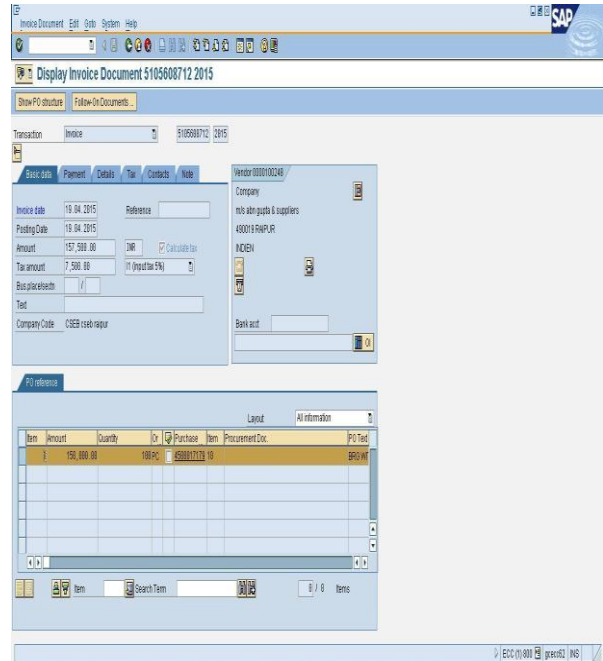


Fig. 5. Verification of Invoice

But, before implementing these functionalities, the following things were defined:

- Define company,
- Define company code,
- Edit address of company code,
- Define plant,
- Define and maintain storage location,
- Define and maintain purchase organization.

In such a way, demonstrable Enterprise Structure of CSEB was created. After customization, testing of SAP software was done. This step was repeated, until MM module of SAP software run successfully and completely.

- Stock transfer and transfer posting

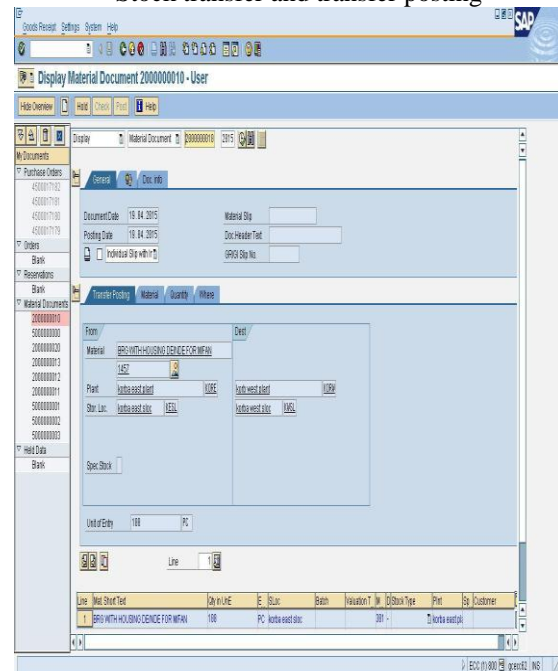
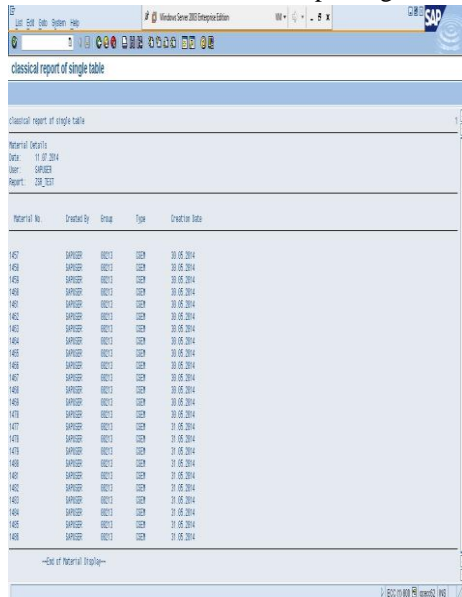


Fig. 6. Transfer of stock & posting

In the last step, mainly reports of different styles and formats were generated.

After customization, we can check list of materials, list of vendors, Check details of purchase order and goods receipt, and verify the invoices generated. We can check details of Stock transfer and transfer posting.



classical report of single table

Material Details
Date: 11.05.2014
User: SAPIER
Report: ZAR_001

Material No.	Vendor-Gr	Group	Type	Creation Date
1457	SAPIER	00013	UEB	30.05.2014
1458	SAPIER	00013	UEB	30.05.2014
1459	SAPIER	00013	UEB	30.05.2014
1460	SAPIER	00013	UEB	30.05.2014
1461	SAPIER	00013	UEB	30.05.2014
1462	SAPIER	00013	UEB	30.05.2014
1463	SAPIER	00013	UEB	30.05.2014
1464	SAPIER	00013	UEB	30.05.2014
1465	SAPIER	00013	UEB	30.05.2014
1466	SAPIER	00013	UEB	30.05.2014
1467	SAPIER	00013	UEB	30.05.2014
1468	SAPIER	00013	UEB	30.05.2014
1469	SAPIER	00013	UEB	30.05.2014
1470	SAPIER	00013	UEB	30.05.2014
1471	SAPIER	00013	UEB	30.05.2014
1472	SAPIER	00013	UEB	30.05.2014
1473	SAPIER	00013	UEB	30.05.2014
1474	SAPIER	00013	UEB	30.05.2014
1475	SAPIER	00013	UEB	30.05.2014
1476	SAPIER	00013	UEB	30.05.2014
1477	SAPIER	00013	UEB	30.05.2014
1478	SAPIER	00013	UEB	30.05.2014
1479	SAPIER	00013	UEB	30.05.2014
1480	SAPIER	00013	UEB	30.05.2014
1481	SAPIER	00013	UEB	30.05.2014
1482	SAPIER	00013	UEB	30.05.2014
1483	SAPIER	00013	UEB	30.05.2014
1484	SAPIER	00013	UEB	30.05.2014
1485	SAPIER	00013	UEB	30.05.2014
1486	SAPIER	00013	UEB	30.05.2014

Fig. 7. Classical Report Format

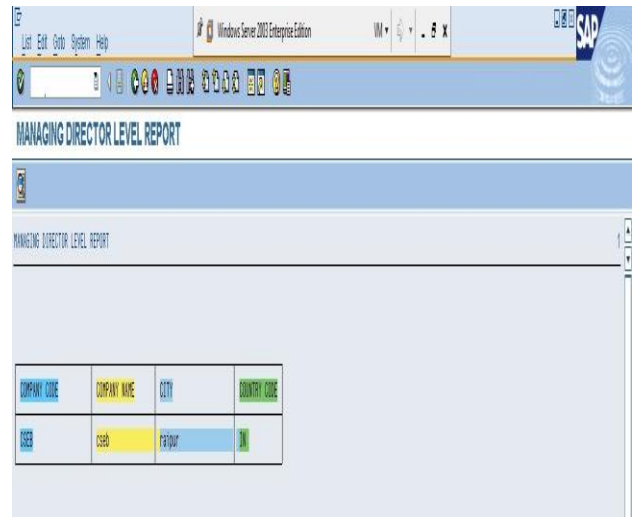
We can generate and view standard reports as well as customized reports. Reports are very important for a business organization. Here, we have used three different reporting formats namely:

1) Classical Report Format:

In a classical report, the output is displayed in a single list. Classical reports are simple reports, which are created by using the output data (final data that have to be displayed in a report) :

2) Interactive Report Format:

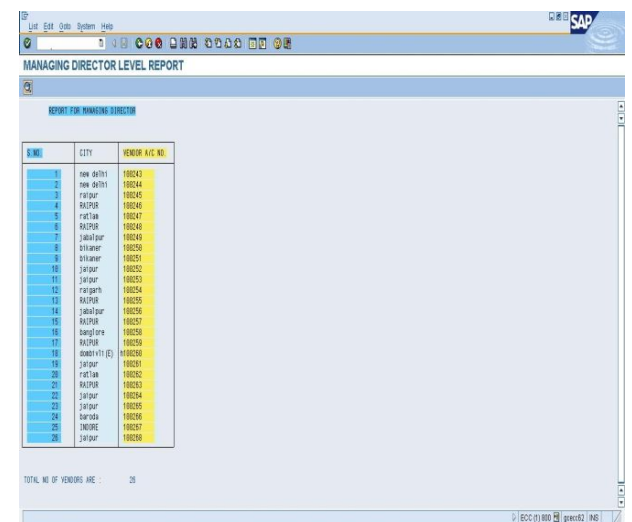
In an interactive report, we can view multiple lists simultaneously. With the help of interactive reports, first, an overview list (also called a basic list) is displayed, based on which further output lists (or called secondary lists) are displayed. These secondary lists are actually sub reports:



MANAGING DIRECTOR LEVEL REPORT

COMPANY CODE	COMPANY NAME	CITY	COUNTRY CODE
5000	COOP	PARIPUR	IN

Fig. 8. Interactive Report Format (screen 1)



REPORT FOR MANAGING DIRECTOR

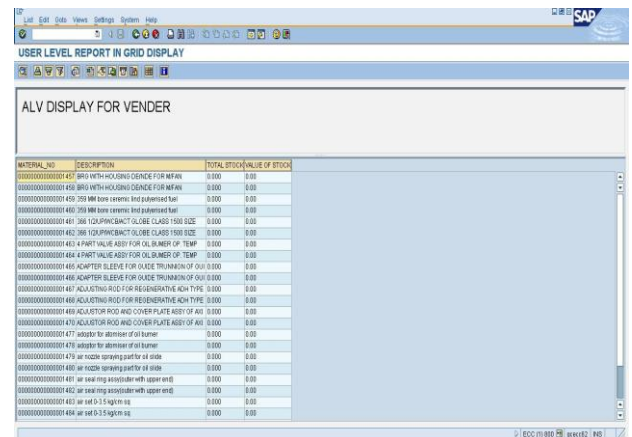
SUMI	CITY	VENDOR A/C NO.
1	new delhi	180043
2	new delhi	180044
3	PARIPUR	180045
4	RALPUR	180046
5	PARIPUR	180047
6	RALPUR	180048
7	PARIPUR	180049
8	PARIPUR	180050
9	PARIPUR	180051
10	PARIPUR	180052
11	PARIPUR	180053
12	PARIPUR	180054
13	RALPUR	180055
14	PARIPUR	180056
15	RALPUR	180057
16	PARIPUR	180058
17	RALPUR	180059
18	PARIPUR (E)	180060
19	PARIPUR	180061
20	PARIPUR	180062
21	RALPUR	180063
22	PARIPUR	180064
23	PARIPUR	180065
24	PARIPUR	180066
25	INDORE	180067
26	PARIPUR	180068

TOTAL NO OF VENDORS ARE : 26

Fig. 9. Interactive Report Format (screen 2)

3) ABAP(Advanced Business Application Programming) List Viewer (ALV) Report Format :

ALV reports, however, allow us to perform various functions with the displayed output, such as sorting, arranging, filtering, and retrieving data:



USER LEVEL REPORT IN GRID DISPLAY

ALV DISPLAY FOR VENDER

MATERIAL_NO	DESCRIPTION	TOTAL STOCK	VALUE OF STOCK
0000000000000001457	BRG WITH HOUSING/GENDE FOR MP AW	0.000	0.00
0000000000000001458	BRG WITH HOUSING/GENDE FOR MP AW	0.000	0.00
0000000000000001459	350 MM base ceramic ind pulvurised fuel	0.000	0.00
0000000000000001460	350 MM base ceramic ind pulvurised fuel	0.000	0.00
0000000000000001461	386 SOLIDWORKS/CLASSE CLASS 1500 SIZE	0.000	0.00
0000000000000001462	386 SOLIDWORKS/CLASSE CLASS 1500 SIZE	0.000	0.00
0000000000000001463	4 PART VALUE ASBY FOR OIL BURNER OP TEMP	0.000	0.00
0000000000000001464	4 PART VALUE ASBY FOR OIL BURNER OP TEMP	0.000	0.00
0000000000000001465	ADAPTER BELIEVE FOR GLADE TRUANKAN OP GUL	0.000	0.00
0000000000000001466	ADAPTER BELIEVE FOR GLADE TRUANKAN OP GUL	0.000	0.00
0000000000000001467	ADJUSTING ROD FOR REGENERATIVE ACN TYPE	0.000	0.00
0000000000000001468	ADJUSTING ROD FOR REGENERATIVE ACN TYPE	0.000	0.00
0000000000000001469	ADJUSTING ROD AND COVER PLATE ASBY OF AIR	0.000	0.00
0000000000000001470	ADJUSTING ROD AND COVER PLATE ASBY OF AIR	0.000	0.00
0000000000000001471	adapter for adjustment of burner	0.000	0.00
0000000000000001472	adapter for adjustment of burner	0.000	0.00
0000000000000001473	air nozzle spraying part for oil side	0.000	0.00
0000000000000001474	air nozzle spraying part for oil side	0.000	0.00
0000000000000001475	air seal ring associated with upper end	0.000	0.00
0000000000000001476	air seal ring associated with upper end	0.000	0.00
0000000000000001477	air seal ring associated with upper end	0.000	0.00
0000000000000001478	air seal ring associated with upper end	0.000	0.00
0000000000000001479	air seal ring associated with upper end	0.000	0.00
0000000000000001480	air seal ring associated with upper end	0.000	0.00
0000000000000001481	air seal ring associated with upper end	0.000	0.00
0000000000000001482	air seal ring associated with upper end	0.000	0.00
0000000000000001483	air seal ring associated with upper end	0.000	0.00
0000000000000001484	air seal ring associated with upper end	0.000	0.00

Fig. 10. ALV Report Format

IV. CONCLUSION AND SCOPE OF FURTHER WORK

Customization is essential for successful implementation of ERP software. It is observed that, whole ERP software package can be customized or we can select a module for customization. In this paper, customization of Materials Management module of ERP(SAP) software package has been discussed. This modular customization has been carried out according to CSEB MM module. In this paper, customization concept is mainly applied. There are two types of customizations:

Program customization and report customization.

It is a basic level of customization. So, it can be applied in power industries of Chhattisgarh. In this paper, concentration was mainly on report customization. Program customization was also performed, but in little extent. SAP is state-of-the-art software for ERP implementation, that is why, it is chosen.

An ERP implementation is considered to be successful, if it achieves a substantial proportion of its potential benefits. These benefits might include personnel reductions, a decrease in the cost of information technology, better inventory control, and an improvement in order and cash management. An alternate definition of implementation success is that the system achieves the level of Return on Investment (ROI) identified in the project approval phase. The non-financial improvements are probably the most significant. Many ERP implementations have failed, because, they did not achieve predetermined corporate goals.

This work can be extended further. Various other modules of SAP can also be integrated as and when necessary. Further report customization option is also open. Different types of reporting styles can be used for quick understanding of users at different levels of an organization.

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