

# Studies on Effective Usage of SAP ERP Tool to Control Materials Planned Delivery Time in Oil and Gas Industries

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## Abstract

The global competitions are making rapid changes in production. Procedure integration and seamless flow of information and data play a vital role in productivity. The planning order improbability, manufacturing lead time and lack of systematic approach are the main concerns in production industries. Enterprise Resource Planning (ERP) and Lean Manufacturing (LM) are the two distinct processes to deal with the above mentioned concerns for competitive manufacturing. ERP focuses on data and schedule accuracy and ensures repeatable and predictable processes. LM concentrates on identifying and eradicating or minimizing all kinds of manufacturing wastes and focuses on reducing process inconsistency. The paper narrates about some holistic approaches that can be practiced with SAP ERP tool in order to achieve the efficient materials planning, master production schedule and capacity planning.

**Keywords:** SAP ERP Tool, Planned Delivery Time, materials planning, master production schedule and capacity planning

## 1.0 Introduction

In the competitive world, organizations put themselves into an introspection of overall improvements of the industrial practices. Organizations realized that the requirement of the integration of the data and reports reduces the shortfalls of manufacturing efficiency and also production planning schedule. ERP implementation process can in fact perform as a mechanism for lean implementation [1].

The 'System Application Products' abbreviated as SAP is an extensively employed ERP application. An organization's operation control, management control and all types of resource planning can be improved using ERP software. The functional departments of an organization like quality control, inventory control, product marketing, plant maintenance, human resource, materials purchase can be aligned and made

to work with proper coordination using multi-module SAP software application. Many additional functions can be integrated using SAP software application [2-3].

The 'System Application Products' (SAP) popularly called as SAP is a broadly used and established ERP application. SAP utilizes ERP software applications to enhance the performance the current competitive world of the ERP tools SAP has emerged as robust tool in order to achieve the organization demands. SAP tool is one of the most broadly accepted options to accomplish a competitive advantage for manufacturing companies. SAP systems are planned to provide seamless integration of processes across functional areas with enhanced workflow, standardization of different business practices, and right to use the real-time data. In fact the elemental advantages of ERP systems do not come from their

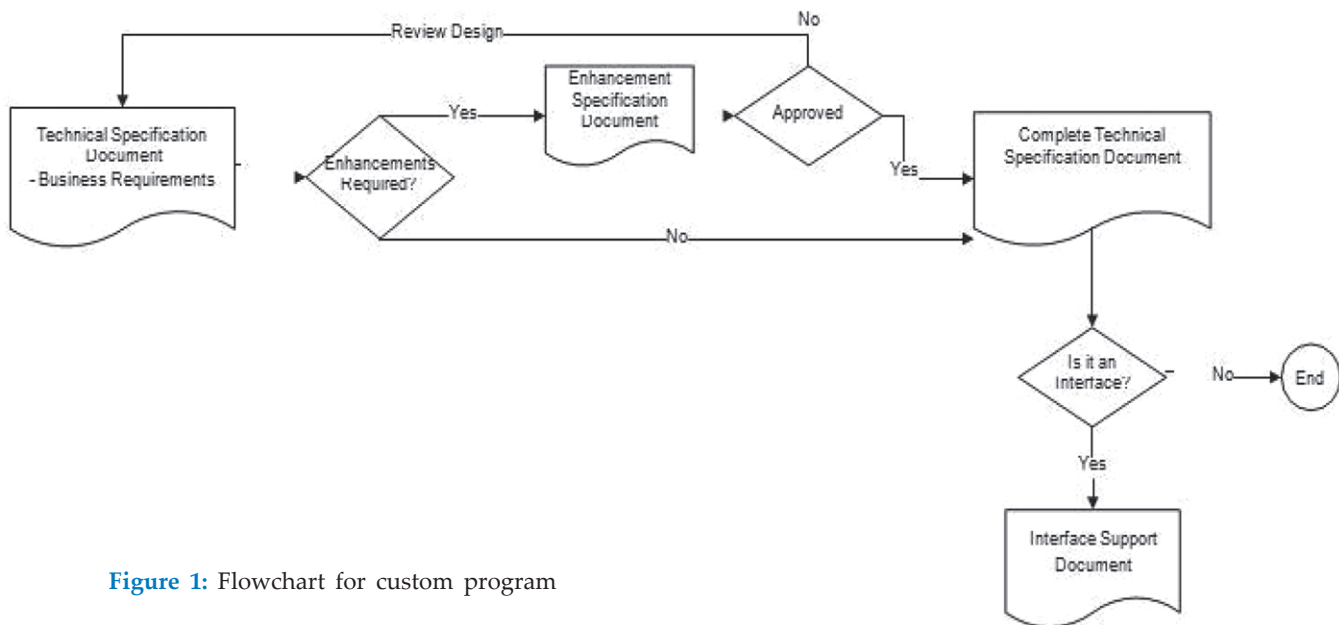


Figure 1: Flowchart for custom program

inherent “planning” capabilities but rather from their abilities to process transactions efficiently and to establish a planned record keeping structure for such transactions [4-7, 10].

The Agenda of this paper is to automatically calculate Planned Delivery Time from the purchase orders and update the same in the material masters of the ERP tool which helps in the materials planning, master production schedule and capacity planning. A new custom program has been developed to achieve this functionality and this will be assigned to Transaction: ZMM\_MAT\_PDT\_UPDATE

The current study therefore deals with different aspects of SAP as ERP tool and how it helps to accomplish the overall operational improvements. The major aspects studied as part of this study are: the advantages of SAP as an ERP application, logical approach to implement as SAP and potential usage of SAP in Oil & Gas Industries

## 2.0 Details of Research

SAP ERP promises an improvement of business processes. So SAP consultants keep on working towards zero defects layering through continuous improvements. The SAP consultants sit with quality circles leaders and try to understand the potential areas of process improvement. The quantifiable and qualitative decision discussed with functional teams across the plant through proper communication. The updation of the masterfile exercised to eliminate the drawbacks and thus bring benefits. There is a

business requirement to automatically calculate the planned delivery time (PDT) from the purchase order (PO) and update the same in the material masters. A custom program has been developed to achieve this functionality and the same has been assigned to transactions defined as ZMM\_MAT\_PDT\_UPDATE. The flow chart of custom program making is shown in Fig. 1.

There is an existing Transaction file in the name of ZMM\_UPD\_DELIVERY. The updating of ‘Planned Delivery Time’ (PDT) in master data has been done. The text file in master data containing material number, plant and planned delivery value have been modified to update the PDT in material master. The changes of

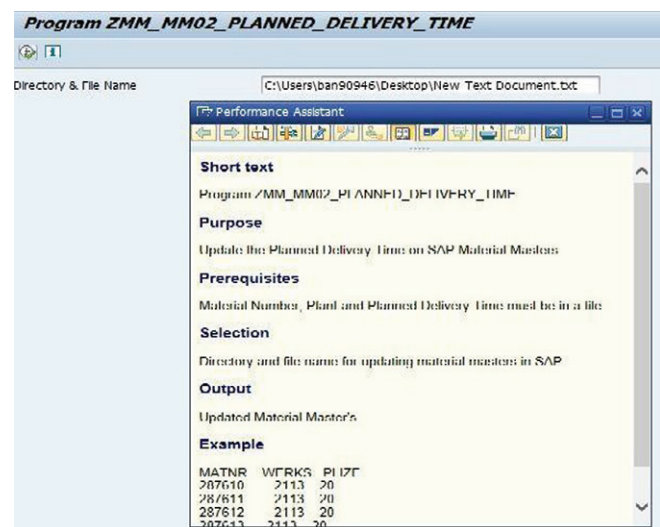


Figure 2: Particulars of text file to update PDT

PDT transactions in master data have been assigned to the SAP MRP Controller Role. The particulars of text file to update planned delivery time has been shown in Fig.2.

A six plants have been considered and the logic of automatic PDT calculation was exercised. Among six plants, three were onshore plants numbered with 4701, 4702 and 4708 and three more were the offshore plants with numbers 4704, 4705 and 4709. The 'material master' related to the offshore plants has considered extra 14 days into planned delivery time calculation to take care of any kind of uncertainties. The global control table showing variants has been shown in Fig.3.

There is already an established standard SAP program for PDT calculation assigned with WPDTTC transaction code. It has been programmed to

automatically calculate the PDT from purchase orders. The PDT is the arithmetic mean of the recorded delivery time extracted from the purchase order containing goods order date and receipt date. The PDT has been calculated mathematically as below and same has shown in Fig.4;

$$\text{PDT} = (\text{Goods receipt date} - \text{Purchase orders date}) / \text{Number of Purchase orders.}$$

The updating of calculated planned delivery time in material master file MRP2 at plant level has been done. The existing Z transaction: ZMM\_UPD\_DELIVERY has taken as reference to update the PDT. The program was assigned to transaction; ZMM\_MAT\_PDT\_UPDATE. The WDPTC available to calculate PDT has leveraged for PDT calculation. Based on the calculation, PDT updated from PLIFZ\_CALC to material master – MARC- PLIFZ. This update is based on the plant's purchase order. The Fig.5 shows the updated material master file.

The screenshot shows the SAP 'Change Material' interface for material 355301. The 'MRP 2' tab is active. In the 'Scheduling' section, the 'Planned Deliv. Time' is set to 11 days. Other fields like 'Procurement type' and 'Special procurement' are also visible.

Figure 3: Global Control Table

**ZCA\_CNTL\_TABLE: Display of Entries Found**

Table to be searched: ZCA\_CNTL\_TABLE Global Constant Control Table  
 Number of hits: 13  
 Runtime: 0 Maximum no. of hits: 50

Name	Key	Tab Cnt	Value	Purpose
ZMMMM_DELIVERY_D DAYS		1	14	
ZMMMM_DELIVERY_D OFFSHORE		2	4704	
ZMMMM_DELIVERY_D OFFSHORE		4	4705	
ZMMMM_DELIVERY_D OFFSHORE		6	4709	
ZMMMM_DELIVERY_D ONSHORE		1	4701	
ZMMMM_DELIVERY_D ONSHORE		3	4702	
ZMMMM_DELIVERY_D ONSHORE		5	4708	

Figure 4: Data file reference for PDT calculation

### 3.0 Results and Discussions

A in depth analysis about the setbacks due to lack of weightage given to PDT effective updating was made. It was noticed that on an average 25000 articles timely utilization was affected and thus a wastage of 1000 hours of labor time. The implementation of instant revision of planned delivery time calculation made the purchasing executives and plant executives to avail information to procure the materials based on production planning and recorded that delay of manufacturing and wastage of labor hours have considerably minimized. The executives become more proactive in terms of decision making for production, warehouse management, quality control, costs and operations and many more functional departments as observed. The advantages of planned delivery time instant updation can be seen through the Fig.6.

The ERP-based lean implementations methodology has a lack of comprehensive scientific literature though studying the existing application of lean production and ERP system at manufacturing organization followed by analysis about a range of approaches it has been able to recommend a structure for ERP-based lean implementations.

It is interpreted that theoretical and practical approaches to lean implementation and ERP implementation projects have been targeting the strategic vision and values of the organization. A clear strategic vision of the ERP and Lean implementation methodology can be communicated to the entire organization. The authors would like to suggest that

**Planned Delivery Time Evaluations**

Collapse

**Detail View**

Line	Info Record	POrg	PLTS	Vendor	V..	Material	PDT PO Document	EINE	MARC_PLIIFZ	LFMX	Calc. Plnd Del.Time	Deviation f.PDT Ente	PO Date	GR Date	Purch.Doc.	Material Doc.
5300186105	1750	4702	1039403	355301	28						38	10	2020/03/10	2020/04/17	4500237981	5003952584
5300186105	1750	4702	1039403	355301	28						0	28	2020/04/20	2020/04/20	4500238067	5003952585
5300186105	1750	4702	1039403	355301	28						0	28	2020/04/21	2020/04/21	4500238070	5003952593
5300186105	1750	4702	1039403	355301	28	11					13					
5300186167	1750	4705	1039366	355301	28						0	28	2020/04/28	2020/04/28	4500238078	5003952623
5300186167	1750	4705	1039366	355301	28	28					0					

Figure 5: Material Master file showing updated PDT

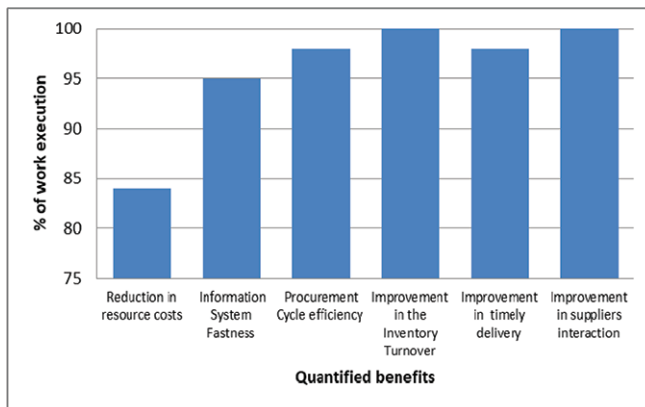


Figure 6: Performance measures of Oil &amp; Gas industries different works

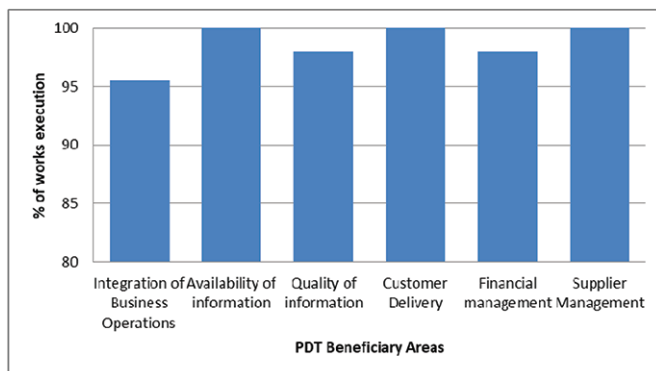


Figure 7: PDT % dependency in Oil &amp; Gas industries different works

the business management must give attention to approaches that can be exercised towards the improvisation in the methodology of lean production.

In the action of research approach, a structure for the materials planning, master production schedule and capacity planning has been developed. It is evident

that manufacturing organizations projects are often not successful in capturing the industrial practice processes defects as shown in Fig.7 [8]. Therefore, at the initial stage an utmost importance was given to the identification of process loopholes or drawbacks through brainstorming on lean-production in the entire implementation process then the SAP ERP tool has been customized. It is recommended that prior to the ERP system “go-live”, at least the basic foundations of lean like zero defects, standard work and 5S must be ensured.

In the manufacturing industry, pull production requires accurate and precise data in order to run the manufacturing process correctly and smoothly. Lean and ERP implementation leads to simplify the complexity in the manufacturing process and also helps to align the data integrity [9]. Thus ERP system implementation of the organization cannot be overlooked if the organization applies lean manufacturing.

## 4.0 Conclusions

The manufacturing efficiency has been noticeably affected by the implementation of SAP ERP customized process. The customized process in the standard practice eliminating manufacturing wastes. The organizations are now able to place the manufacturing process perfectly and can extensively schedule the materials planning, master production schedule and capacity planning.

Expertise of various organizations can trust that ERP implementation is the capability to restructure the engineering department of an organization thus can achieve the extra productivity and quality enhancements in the manufacturing process.

Implementation of ERP tools can accomplish the identification of industrial wastes and even build a platform for the enhancement of the process.

There would be no deficiency in the stocks and purchasing of the materials from the vendors in line. Thus there will be a certain waiting time of material procurement and production personnel will be in line with the productivity efficiency.

Finally it can be concluded that ERP tool acts as a catalyst for the deployment of lean practices and also can gain advantage from the approaches to production management.

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