DOKUZ EYLÜL UNIVERSITY
GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES

STOCK VALUE CALCULATION OF COMPANIES: AN APPLICATION FOR ENTERPRISE RESOURCE PLANNING (ERP) SOFTWARE

by
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İZMİR

STOCK VALUE CALCULATION OF COMPANIES: AN APPLICATION FOR ENTERPRISE RESOURCE PLANNING (ERP) SOFTWARE

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by
Ogün KARZAN

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M.Sc THESIS EXAMINATION RESULT FORM

We have read the thesis entitled "**STOCK VALUE CALCULATION OF COMPANIES: AN APPLICATION FOR ENTERPRISE RESOURCE PLANNING (ERP) SOFTWARE**" completed by **OGÜN KARZAN** under supervision of **PROF.DR. OKAN TUNA** and we certify that in our opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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Ogün KARZAN

STOCK VALUE CALCULATION OF COMPANIES: AN APPLICATION FOR ENTERPRISE RESOURCE PLANNING (ERP) SOFTWARE

ABSTRACT

Measuring business performance is critical in large companies. Since companies and competition are globalized and digitalized, transaction volume and reporting needs are increasing day by day. A systematic and effective cost accounting approach is required to measure the business's performance.

With the development and spread of computer and internet technologies, enterprise resource planning programs (ERP) have begun to be developed, which allow large enterprises to monitor their processes from a single source; manage and report their data from this source. The use of ERP software has become widespread due to the need of global companies to convert large operation data resulting from growing business volume into information in a fast, accurate, secure, and standard way.

One of the important functions of management reporting for manufacturing enterprises is the analysis of production costs. Correctly associating the production costs with the manufactured products and calculating the actual cost and inventory value of each product directly affects the pricing strategy and profitability of the enterprise. This data is used when making decisions that will shape the future of the business.

This study has examined the most critical functions of SAP software, one of the most used software in the ERP industry and one of the highest market shares regarding management reporting. The structures behind the plan cost and actual cost calculation, the integration of financial and logistics modules, are examined. The problems encountered during the actual cost calculations at the end of the period and their reasons are presented.

Keywords: SAP, management accounting, stock valuation, actual costing, controlling, product costing

İŞLETMELERDE STOK DEĞERLERİNİN HESAPLANMASI - KURUMSAL KAYNAK PLANLAMA YAZILIMINA YÖNELİK BİR UYGULAMA

ÖZ

Büyük çapta şirketlerde işletme performansını ölçmek kritik önem taşımaktadır. Şirketlerin ve rekabetin küreselleştiği ve dijitalleştiği bu dünyada, işlem hacmi ve raporlama ihtiyaçları da günden güne artmaktadır. İşletmenin performansı ölçebilmek için sistematik ve etkin bir maliyet muhasebesi yaklaşımı gerekmektedir.

Bilgisayar ve internet teknolojilerinin gelişmesi ve yaygınlaşması ile büyük işletmelerin süreçlerini tek bir kaynakta takip etmesine, verilerini yönetmesine ve raporlamasına imkân sağlayan kurumsal kaynak planlama programları (ERP - enterprise resource planning) geliştirilmeye başlanmıştır. Global firmaların, büyüyen iş hacmi sonucu oluşan büyük operasyon verilerini hızlı, isabetli, güvenli ve standart bir şekilde bilgiye çevirip raporlama ihtiyaçlarından ötürü ERP programı kullanımları yaygınlaşmıştır.

Üretim yapan işletmeler için yönetim raporlamasının en önemli işlevlerinden biri üretim maliyetlerinin analizidir. Üretim maliyetlerinin üretilen ürünlerle doğru bir şekilde ilişkilendirilmesi ve her bir ürünün fiili maliyeti ve stok değerinin isabetli bir şekilde hesaplanması işletmenin fiyatlandırma stratejisine ve karlılığına doğrudan etki eder. İşletmenin geleceğine yön verecek kararlar alınırken bu verilerden yararlanılır.

Bu çalışma, ERP sektöründe en çok kullanılan yazılımlardan biri olan ve pazar payı en yükseklerden biri olan SAP yazılımının yönetim raporlamasına ilişkin en kritik işlevlerini incelemiştir. Plan maliyet ve fiili maliyet hesaplamasının arkasında kullanılan yapılar, finansal ve lojistik modüllerin entegrasyonu incelenmiştir. Dönem sonu fiili maliyet hesaplamalar sırasında karşılaşılan sorunlar ve sebepleri ortaya konmuştur.

Anahtar kelimeler: SAP, yönetim muhasebesi, stok değerleme, fiili maliyet, kontrol, ürün maliyetlendirme

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ABBREVIATIONS

ERP	: Enterprise Resource Planning
SAP	: Systems Applications and Products
CO-PC	: Controlling - Product Costing
GR/IR	: Goods Receipt/Invoice Receipt
USD	: United States Dollar
MRP	: Material Requirements Planning

CHAPTER 1
INTRODUCTION

1.1 Motivation

Measuring the performance of companies' processes is vital for managers and decision-makers. Companies must search for improvement points in their processes. As J. Singh and H. Singh (2013) stated, "Ever since the industrial world began to experience tough global competition, the generic term continuous improvement has become the center of discussions." (p. 75). First step of continuous improvement is detecting the problems. Systematical approaches are necessary to see the improvement points, take corrective actions, and make decisions based on actual data. Management accounting perspective is the key to internal reporting. Management accounting is used for measuring the performance of companies. Management accounting involves identifying, measuring, analyzing, preparing, and interpreting financial information (Mihăilă, 2014).

Abdusalomova (2019) stated that the objectives of management accounting are:

- Timely submission of revenues and costs
- Budgeting of financial and economic activities
- Analyzing investment projects
- Caring out internal control
- Applying modern methods of cost accounting
- Calculating product cost estimates

Management accounting contains many challenges because all legal entities and plants' logistic and financial data must be included. Collecting and integrating this kind of data in a big company is a challenge and converting it into useful information is another challenge. Companies also must follow legal regulations for external reporting. Every company has specific processes, conditions, and management accounting principles that should be applied to each method. The benefits of

management accounting are finding improvement points, calculating the cost of products, and detecting gross and net profit of profitability dimensions which can be products, customers, regions, material groups, and so on, according to requirements.

Since the business volume is high in large-scale companies, computer, and technology-supported systems are needed for the timely submission of revenues and costs. ERP, for Enterprise Resource Planning, is also a tool for management accounting.

Large-scale companies have large business volumes, and complicated procurement, production, and sales processes. This complexity makes it difficult to calculate revenue, cost, gross and net profitability and involves many challenges. In a study published in 1996, management accounting-related challenges were defined into five categories (Dent, 1996).

- Fostering different perspectives
- Coordination of complexity
- Competitor analysis
- Resource allocation
- Overcoming centrifugal tendencies

Therefore, management accounting-related challenges and problems of large-scale companies are an area worth investigating. These challenges existed in the past, exist now, and will continue to exist in the future.

1.2 Literature Review

Before determining the scope of this study, a large literature review related to management accounting was made.

Product costing, inventory valuation, and cost accounting are subjects that have been studied for many years. Boyd and Cox III (2002) state that the primary purpose

of cost accounting is to support decision-making. Boyd & Cox III's study (2002) also explains the costing techniques' history.

Various methods are used to associate production costs with the products produced. Studies have been conducted on how different companies distribute variable costs and the complexity of costing (Cooper & Kaplan, 1988). A study of costing approach preferences also shows that one of the most widely used methods in the world is standard costing (Marie, Cheffi, Louis & Rao, 2010). Standard costing is a method of valuing transactions with a fixed price throughout the financial period and calculating the actual cost at the end of the period.

A study has also been published examining the history of standard costing, and its development in the United Kingdom and the United States from the late nineteenth century to the present. In recent years, it has been stated that the target costing approach has started to be preferred instead of the standard costing approach (Fleischman & Tyson, 1998).

Cost accounting also searches for the causes of variances in cost. Procurement price variances cause variances in periodic costs. There is a mathematical programming model study for exploring the impact of price fluctuation of raw materials on the cost of goods sold (Moheb-Alizadeh & Handfield, 2018).

A study on the implementation of the cost management system in the SAP environment was published in 2001 (Lodh & Gaffikin, 2003). In the last 20 years, there have been changes in SAP functions and project methodologies, so new studies and applications with updated functionalities are required.

A literature review study on management accounting and integrated information systems was conducted in 2007 (Rom & Rohde, 2007). This study seeks answers to the questions of what has been done so far and what can be done in the future.

Another study has been published focusing on the accounting logic of ERP. This study also includes a field study on SAP. There are details on how to use SAP's Accounting logic effectively for businesses (Heinzelmann, 2017).

There are different costing approaches in cost accounting. These different techniques have pros and cons. The study, which explains these approaches with examples from large companies and discusses the difficulties of implementing the right costing system, was published in 2012 (Fisher & Krumwiede, 2012).

A study has also been published that examines the contribution of material ledger functionalities and actual costing to purchase or produce decision makings. It has been determined that it contains guiding functions for production companies with multi-level production (Subrahmanyam, 2021).

1.3 Enterprise Resource Planning

Enterprise resource planning (ERP) software is packaged software solutions for integrating processes and functions to create a complete perspective in information technology structure (Klaus, Rosemann & Gable, 2000). ERP solutions are mandatory for large companies. Large companies have already adopted ERP. Likewise, medium size companies are adapting ERP solutions.

Many studies have been conducted on the history of ERP systems. In 2020, a literature review was published by Goldston (2020) to analyze and synthesize previous studies. In that study, the progress of ERP programs was explained in detail, from the introduction of computers into our lives in the 1960s to the present.

Most business processes directly affect the performance of the operation. Since the data load is high and time is precious, the need to run these processes from a single source in large enterprises has led to the development of enterprise resource programming software.

Product costing is a process that uses master and transactional data from all departments as a source, that's why the data load is inevitably high. Since various module data are used in product costing, all data must be accurate and complete for a correct product costing process.

Large-scale companies have a lot of logistic and financial processes that affect their performance. The main logistic processes for most manufacturing companies can be listed as follows:

- Purchasing & Procurement
- Production
- Quality Management
- Plant Maintenance
- Sales & Distribution

The main financial processes for most companies can be listed as follows:

- Asset Accounting
- Accounts Payable
- Accounts Receivable
- Product Cost Accounting
- Cost Center Accounting
- Profitability Analysis
- General Ledger Accounting
- Bank Accounting
- Budgeting
- Funds Management
- Treasury Management
- Cash Management

ERP software is used for monitoring and reporting the processes listed above. In addition, ERP software provides easy job tracking and reporting with many functions and standard reports.

1.4 Research Question

Before this study was conducted, a literature review on the use of management accounting and ERP was done. This study, unlike previous studies, aims to investigate problems companies deal with while using SAP ERP for management accounting and cost accounting processes. To understand these errors, first, SAP's stock valuation structure must be analyzed and clearly understood. One of the aims of this study is to reveal the root causes of these errors. At the end of the study, it is also aimed to make suggestions to prevent or reduce these errors.

There are different approaches in cost accounting, and every company has its own specific processes, challenges, and management reporting requirements. Also, SAP itself contains many challenges since it requires the collaboration of all departments to get accurate results.

1.4.1 Methodology of the Study

While doing this study, errors in management accounting-related support processes in SAP were examined. An SAP consultancy partner from Turkey provided various cases from their support department. The company name will not be shared in the study. However, since these are support processes for the problems dealt with in the live system, the data, and the study are reliable. These cases are categorized in the fourth chapter.

Customers using SAP take support services from SAP partner consulting firms for SAP-related errors. Therefore, SAP consulting companies, which provide support services to many different systems and customers, have been determined as data

sources. Because of the high demand for these support services, some SAP consulting firms have separate support units.

Support ticket management programs are used for the service tracking. Related people such as key users, process owners, responsible consultants and managers of two companies can check key figures such as status of the ticket, first response time, solution time. Messages contains solution also added to the tickets.

Stock valuation processes are carried out under the controlling module. Due to the scope of this project, which is explained in the next section, it has been determined as the data set of controlling and stock valuation related support calls between 2020 and 2022 in a consulting firm. The root causes of the errors in these tickets were analyzed and categorized in the findings section.

1.4.2 Scope

Management accounting has a wide variety of reporting requirements and various structures. While carrying out this study, the errors that occurred in systems whose projects were completed in accordance with SAP's best practices were preferred. The scope has been determined as product costing and stock value calculation.

During the study, organizational structures related to product costing, master and transactional data, standard cost with quantity structure, and actual cost calculation methods were investigated. The companies' errors during product costing processes in SAP and root causes were investigated.

In chapter three, previous studies on product costing and ERP programs have been compiled. Unlike previous studies, this study investigates the problems that may arise during product costing in SAP ERP, their root causes, and preventive actions. While doing this research, the complex structure of product costing and the points where it is integrated with other modules were carefully examined. The necessity of why all

modules should work in harmony as a team is explained, and what problems might arise otherwise.

1.4.3 Outcome

Thousands of companies follow their processes in SAP every year. This study explains the complex architecture of SAP in product costing. This complex nature of product costing causes many challenges. In this study, the most common errors encountered by companies in the product costing process are categorized and explained according to the root causes. This study aims to make suggestions to proactively minimize and prevent these challenges and errors.

1.5 Outline of This Thesis

Including this chapter, the thesis consists of six chapters. The first chapter is an introductory chapter that covers the purpose and motivation of this thesis, the literature review, and the problem definition. The second chapter explains the structure of controlling, which is the management accounting module, the details of the product costing submodule, its interaction with other modules, and the quantity structure and standard cost calculation issues. In the third chapter, the documents created with the standard prices during the period, the cost flow, and the steps related to the actual costing are detailed. In chapter four, common mistakes made in SAP systems while calculating inventory value, which is affected by master and transactional data from many modules, were discussed. The conclusion and future search suggestions are shared in the fifth chapter of the thesis.

CHAPTER 2
PRODUCT COSTING AND STOCK VALUATION IN SAP

SAP was founded in 1972 by five former IBM employees. SAP stands for Systems Applications and Products in Data Processing. SAP's purpose is to develop a standard application for real-time business processes (Leimbach, 2008).

Product costing is a complex topic, and there is an architecture and lots of logistic and financial data integration to collaborate for providing useful costing information.

In this chapter, SAP’s controlling and costing architecture will be analyzed.

2.1 Organizational Structure in SAP

The controlling module organizational structure is as in Figure 2.1. The controlling module is fed by financial and logistics transactions and uses the organizational units of other modules in its organizational structure.

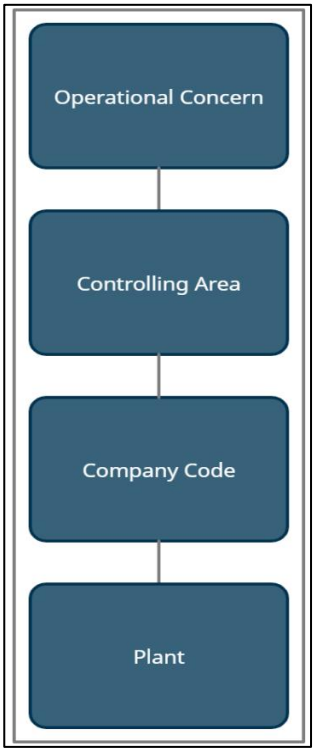


Figure 2.1 Controlling organizational structure

The plant is the highest-level logistic organizational unit where stock valuation and purchasing, production, and sales processes are managed independently. The plant is the organizational unit of the material management module. Many configurations are made at the plant level in the material management module. Single or multiple plants can be assigned to a single company code, so a 1:1 and n:1 relationship is possible between the plant and company code.

Company code is the organizational unit of the finance module. The company code corresponds to the legal entity in SAP. The general ledger is kept at the company code level for internal and external reporting purposes. In the finance module, most of the configurations are made at the plant level.

The controlling area is an organizational unit for the controlling module and is used to divide the organization from a cost accounting perspective. Controlling module data is managed at the controlling area level. There are two prerequisites for assigning the company code to the controlling area. One of them is that the company code and the controlling area use the same chart of accounts. The other is that the company code and control area use the same fiscal year variant.

The operational concern is the highest organizational unit in SAP. The operational concern is defined as activating the essential functions of management accounting. Operational concern includes configurations and data for profitability reporting. Defining an operational concern is optional. Single or multiple controlling areas can be assigned to an operational concern. The controlling area’s fiscal year variant must be the same as the operational concern’s. Otherwise, the control code cannot be assigned to the operational concern.

2.2 Controlling

Controlling is the module where calculations and reports are made for cost accounting, management accounting, internal order accounting, product costing, and profitability analysis. The controlling module's purpose is to provide decision-makers

information by transforming all data in the system into knowledge by the management accounting methodology.

Along with the expenses incurred in the procurement and sales processes, direct and indirect labor and other overhead production-related expenditures are all used in the calculations in the controlling module. Not only expenses but also logistics data are required for product cost calculation.

When defining the controlling area, parameters such as fiscal year variant, chart of accounts, and controlling area currency should be decided. Company codes using the same fiscal year variant and operational chart of accounts can be assigned to the same control code. Currency type selection criteria and finance–controlling reconciliation is explained in a sap blog (Agarwal, 2022).

2.2.1 Cost Center Accounting

Cost center accounting is a controlling submodule that classifies and reports expenses according to where they occur in the enterprise. An account assignment object is selected while posting expenses.

A cost center is an organizational unit and represents the location of the cost occurred (Livingston, 2023).

Cost centers are organized in a hierarchical tree structure defined as the standard hierarchy. In the standard hierarchy in Figure 2.2, the control code is located at level 0 and includes all cost centers and cost center groups. Level 1 breakdown corresponds to the company code, level 2 breakdown corresponds to the production place, level 3 breakdown corresponds to the division, and level 4 refers to the department. Level 5 is the level where cost centers are defined.

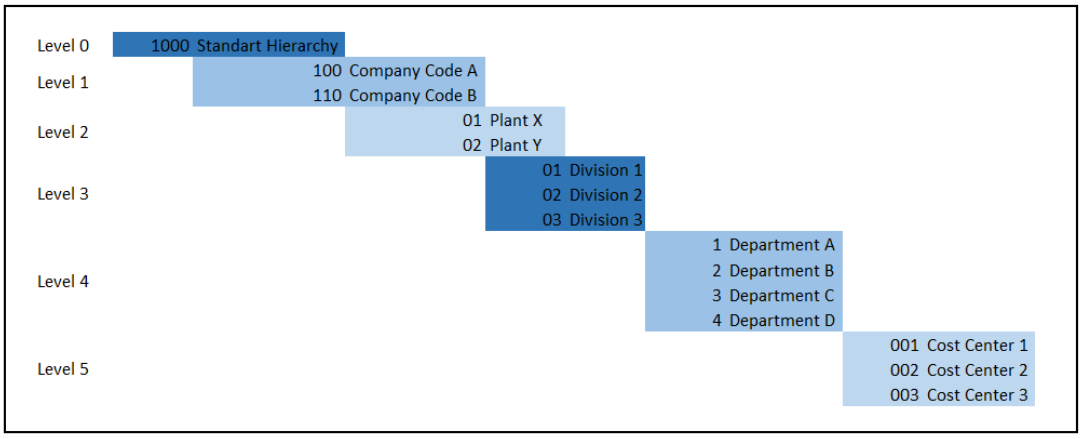


Figure 2.2 Standard hierarchy structure

Cost centers can be up to 10 alphanumeric characters in the SAP system. Smart coding logic is used when determining cost center codes. Cost center master data is defined based on the controlling area. The exact cost center code may be defined in different controlling areas. Since the structures of businesses are unique, applications may differ from system to system. Since more than one company code can be assigned to a controlling area and more than one plant can be assigned to a company code, the first three characters are allocated to the company code and the fourth and fifth characters to the plant. The sixth digit is used as the division, tseventh7th digit is the division, and the last three digits are used as the numerator. For example, in Figure 2.3, we can see that the 1100234003 cost center is the cost center with the number 003 of the 4th division of the 3rd division of the 02 plant under company code 110.

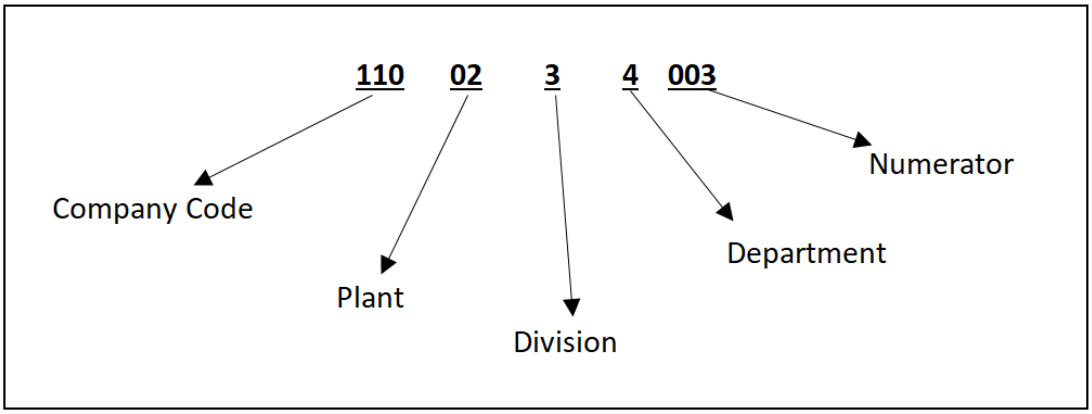


Figure 2.3 Cost center smart coding

2.2.2 Cost Element Accounting

Cost element accounting is the controlling submodule in that the accounts subject to management accounting are managed. According to the posting characteristic, general ledger accounts are organized into different cost element categories. There are two cost element types primary and secondary.

Accounts are assigned to specific cost element categories according to their characteristics. Primary cost elements are used for profit and loss statements and expense accounts. Accounts subject to management reporting are defined as primary cost elements. When an account is defined as a primary cost element, it needs the account assignment object while posting. Cost center, production order, profitability segment, internal order, and project structure plan item are the most used account assignment objects.

Since secondary cost types are used as technical accounts in costing transactions, they receive debit and credit entries with more than one object, and their balance is always zero.

Primary cost element categories and definitions are given in Table 2.1.

Table 2.1 Primary cost elements categories (Hota, 2020)

Category	Primary Cost Element
01	Primary costs/reducing revenues
03	Accrual/deferral per surcharge
04	Accrual/deferral per debit actual
11	Revenues
12	Sales Deduction
22	External Settlement

Some cost element categories are not used in product costing so only relevant categories are explained below.

Cost element 01 is used for expense postings on cost centers, production orders, and production-related overhead expenses such as depreciation, energy, and direct and indirect labor. Most P&L accounts and expense accounts are expanded into this expense type category.

Cost element category 11 is used for revenue accounts. These accounts can only be posted by customer billing to profitability segments. It is also possible to record manually in the system, but accounts with manual records for consolidation and accounts registered with invoices are separated in the system.

Cost element category 12 is used for sales deduction accounts. These accounts can only be posted by customer billing to profitability segments. The difference from category 11 is that the sign in profitability is the opposite.

Secondary cost element categories and definitions are given in Table 2.2.

Table 2.2 Secondary cost element categories (Hota, 2020)

Category	Secondary Cost Element
21	Internal Settlement
31	Order/project results analysis
41	Overhead Rates
42	Assessment
43	Internal Activity Allocation

Cost element category 21 is used for settlement between cost-carrying objects. For instance, a domestic order related to vehicle expenses has a debit balance of 300 USD. Settlement will credit the order by 300 USD with cost element type 21 and debit the receiver object by 300 USD.

Cost element category 31 is used as an interim account during the transfer of balances in the work-in-progress process to the balance sheet.

Cost element category 42 is used for cost distributions between cost centers and assessment from cost centers to profitability segments.

Cost element category 43 is used for cost allocation between cost centers and production orders.

2.2.3 Internal Order Accounting

Internal orders are account assignment objects that are defined to track expenses in more detail than the cost center. For instance, when it is desired to follow the fuel costs of the vehicles on a vehicle basis, creating a cost center for each car will cause a crowd in the standard hierarchy. In this case, an internal order type is defined for the vehicles, an internal order is opened for each car in the vehicle type, and the related expenses are recorded in its vehicle's order.

Internal order is used for the expenses for specific purposes and activities, and a has different features like budget control (Genez, 2015). But expenses should be settled at the end of the period. The asset under construction process is also manageable under internal accounting.

Internal orders can be statistical or real. While entering an expense posting in statistical internal orders, a real account assignment object, such as a cost center, must be entered with the internal order. For real internal orders, it is sufficient to enter only internal orders.

It can be checked from the order master whether an internal order is statistical or real. Figure 2.4 shows the control data section of internal order master data. If the statistical order checkbox is checked, order is statistical and cannot be an account assignment object by itself.

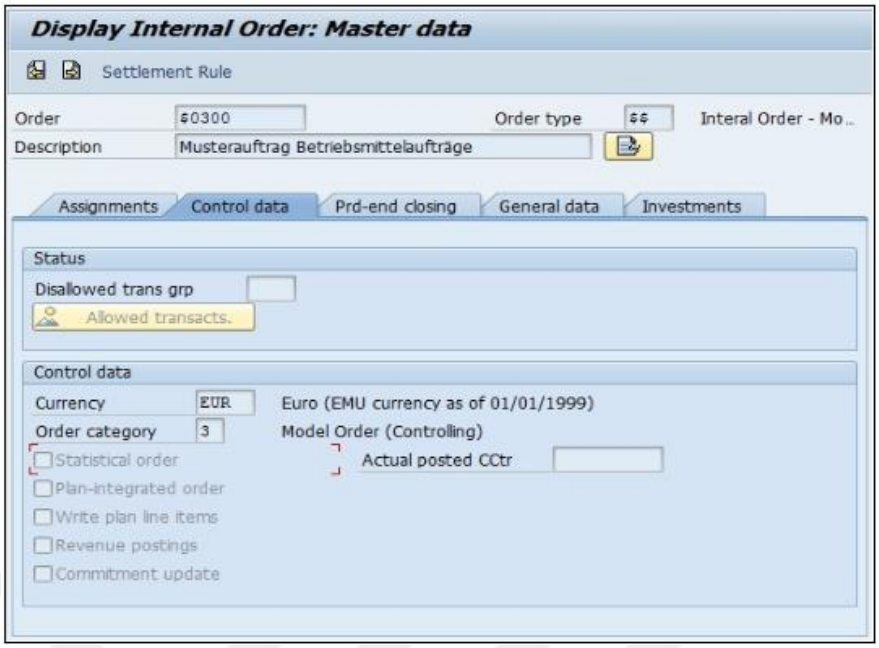


Figure 2.4 Internal order master data (Anonymous, 2012)

2.2.4 Profit Center Accounting

The profit center refers to the business's sub-units with income and expenses. Profit centers can be created parallel to the cost center structure. Master and transactional data, such as material, cost center, production orders, and sales orders, can contain profit center value. It allows obtaining balance sheets and profit and loss statements under the same legal entity.

Analyzing your company on the basis of profit centers is necessary to measure the performance of independent units within the company. It's called the companies-within-company approach (Genez, 2014).

2.2.5 Product Cost Controlling

Product cost control is an important topic of management accounting and cost accounting. In SAP, it is defined as the submodule of the controlling module with the CO-PC code.

Many decisions and configurations, such as determining cost objects, the way of including overhead expenses in the product cost, and the cost component structure, are made under this module. In actual costing, the material ledger functionality is used.

2.2.5.1 Material Ledger

Material ledger is a complex functionality of product costing. It is a ledger that records data on product cost in its tables, integrated with logistics and financial modules. It is done in material book adaptations of settings and preferences related to the product cost.

In a sap blog, the material ledger is defined as the tool that collects transactional data and using to valuate materials and the basis of the actual costing (Varaganti, 2020). The material ledger itself contains many challenges. The material ledger is an integration unit that records many transactions related to product cost in its own tables. Muhammed Muzammil Khan tried to explain this complexity in Figure 2.5.

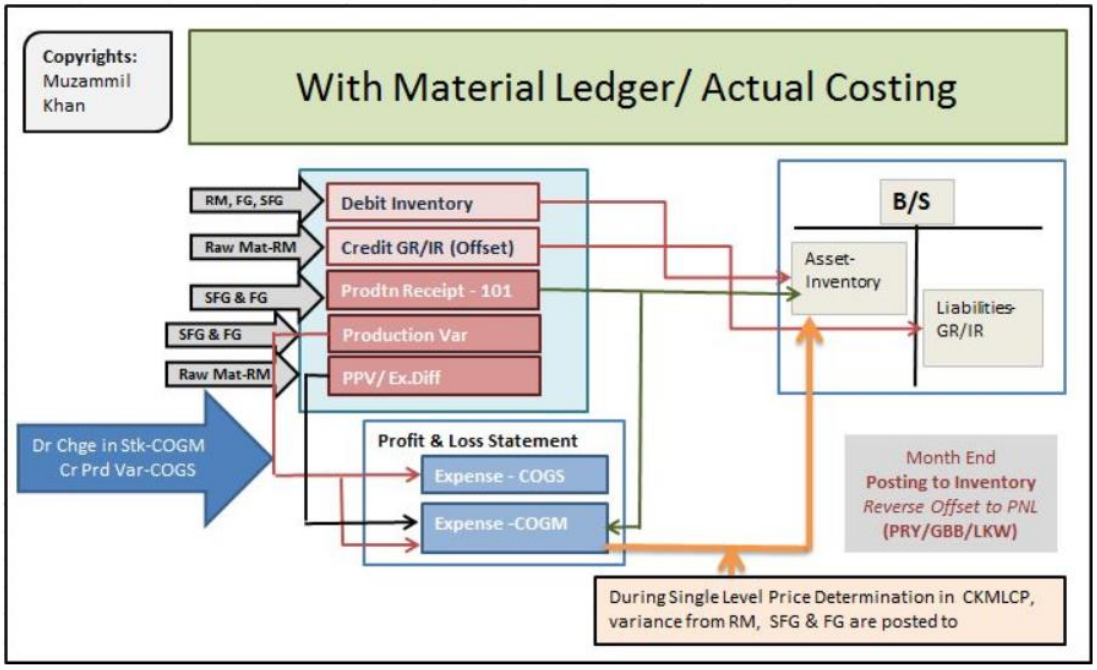


Figure 2.5 Entries for production variance with material ledger/actual costing (Khan, 2018)

2.2.5.2 Splitting Structure

The splitting structure is the configuration to allocate the overhead expense to production orders. Some expenses are posted to cost centers, and activity types are the key to distributing these expenses to production orders.

Usually, six activity types are used for cost centers. Each expense account which needs to be included in the production costing and posted to cost center are mapped to an activity type. Cost element groups are used to group cost elements. Also, there is a cost element group for the cost elements which should not be included in product costing. Configuration example can be seen in Table 2.3.

Table 2.3 Splitting structure mapping

Cost Element Group	Activity Type
A100	A100
A200	A200
A300	A300
A400	A400
A500	A500
A600	A600
NotSplit	-

The system allows us to define multiple splitting structures. Main production cost centers are assigned to a splitting structure. After the distribution cycles are executed, and production-related overhead expenses are collected to the main production cost centers, the system checks this configuration to map the expense accounts to activity types. Posting details are explained in the 5.7.4 section.

2.2.5.3 Cost Component Structure

The cost component structure is the product costing functionality that details the costs of a product. One new cost component item is defined for each detail in which the product cost is to be reported. Cost elements are assigned to cost component items, and together with other product costing configurations, the actual costs are based on

the cost component. Cost components are determined up to management accounting reporting requirements and unique for every system. Most preferred cost components are listed in Figure 2.6.

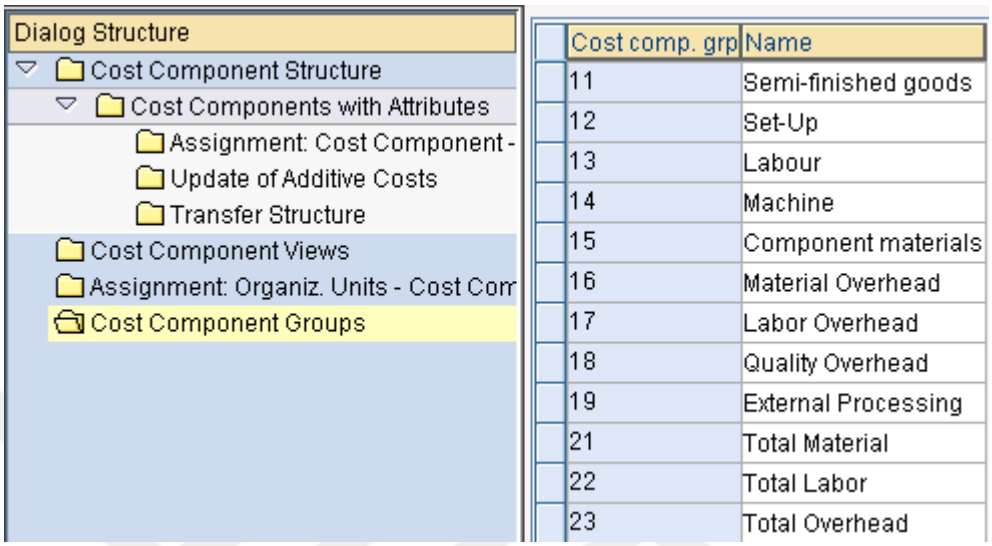


Figure 2.6 Cost component structure Sample (Jordan, 2020b)

Cost component items can be defined according to the categories of raw materials. For example, cost items such as paint, metal, and plastic are defined, and costs are separated by mapping with cost items of consumption accounts or by origin group. Activity types are also defined as separate cost components.

2.3 Financial and Logistic Integration

Before the live use of the SAP system begins, a preference is made in the system regarding the stock valuation level. Plant-level valuation is generally preferred, as other companies may be included in the system. There are two options for inventory valuation: the company code or the plant level. These units are included in the financial database tables as valuation areas.

Integration between material management and product costing modules is done with automatic account determination configuration. The valuation class is selected in the plant-specific material master accounting-1 view. When the receipt-related

document of material with stock valuation is posted in the material management module, the system checks the configuration table for the valuation class information in the material master data, the account key behind the movement type, and the valuation area of goods movement, and automatically find the accounts to be debited and credited in the accounting document behind the material document.

2.4 Price Determination

Stock valuation and quantity tracking configurations are based on plant and material type in SAP. The analysis made by the material management module decides whether to follow the quantity and stock value based on the plant and material type. For the materials whose quantity and value are tracked, a price determination master data is maintained.

Price control is the material master that controls the stock valuation of the material. It is maintained in the Account-1 view. Since the Accounting-1 view is plant-specific data, a material can have different price controls for another plant. Two types of price control are available for materials in the SAP system.

2.4.1 Standard Price

Materials with standard price control are valued at a fixed unit price during a financial month for stock valuation transactions like goods receipt against production order or purchase order, goods issue against production order, cost center, or delivery item. Variances regarding transactions are kept in cost items such as price difference accounts, cost centers, or production orders. The actual cost is calculated by distributing the variances with the actual costing activities at the end of the period.

SAP proposes standard price control for raw materials, semi-finished products, and finished products in its new systems.

2.4.2 Moving Average Price

Materials with a moving average price control are always at their actual value. Unlike the standard price, unit prices are not constant during the period, and their consumption can be valuated at different unit prices within a period. Since the variances are not kept on the material and are directly reflected in the stock value, the price difference account is not used, except for extreme cases.

Moving average price determination can be used for the valuation of trading goods, materials consumed to cost centers or non-production related materials.

2.5 Cost Estimate with Quantity Structure

To determine the standard prices of materials valued at standard prices, it is necessary to determine a method with a cost accounting perspective. The cost estimate with quantity structure functionality is used to calculate the cost of materials valued at the standard price.

Different companies may have different standard cost strategies; also, group companies in the same system may have different strategies on a company basis. SAP functionality allows this through the objects called costing variants. In each variant, different settings are set, and companies select variants according to their needs.

2.5.1 Costing Variant

The costing variant is the object that holds the standard cost settings according to the needs of the business. The settings of the costing variant are managed in five subsections. Dalai (2013) explained the details of configuration with screenshots from a sandbox SAP system. The system should be adjusted according to different business cases and preferences.

2.5.1.1 Costing Type

There are different prices, such as commercial, standard, and plan, in the material master data. The costing type determines which price will be updated.

2.5.1.2 Valuation Variant

In the valuation variant, strategies are defined regarding the valuation of the materials purchased from the supplier, the valuation of the activity types, and the valuation of contract manufacturing. A strategy example is shared in Table 2.4.

Table 2.4 Material valuation strategy for external procurement

Priority	Strategy Sequence
01	Planned Price 1
*02	Price from Purchasing Info Record
03	Standard Price
04	
05	

An example strategy is shared above. The system allows a maximum of five different preferences. Since different preferences can be made for purchasing info record, a maximum of three sub-strategies are selected. A sub-strategy example is shared in Table 2.5.

Table 2.5 Info record sub-strategy

Priority	Info Record Strategy Sequence
01	Net Purchase Order Price
02	Net Quotation Price
03	

When running cost estimation with the quantity structure, the system checks the procurement type in the material master. It tries to determine a standard price by following this strategy for materials whose procurement type is external procurement. It first checks the first strategy; if it cannot find a price from this source, it checks the second strategy, and if it still cannot find it, it checks the third strategy. If it finds a

price, it does not check the sub-step and accepts the price it finds as the standard price. If no price is found, the system will receive an error.

2.5.1.3 Date Control

The cost estimation may be calculated with the quantity structure for the first time for a material, or the prices may be updated monthly or annually. Costing validation dates, quantity structure dates, and valuation date preferences are made for the cost calculated with date control parameters.

2.5.1.4 Quantity Structure Control

Quantity structure control is the configuration in which preferences regarding the bill of materials and work plan are made.

In the system, there may be bills of materials and work plans defined for non-cost use and multiple bills of materials and work plans for a material. Selection preferences are made according to this configuration during the cost calculation with the quantity structure.

2.5.1.5 Transfer Control

Transfer control configuration is used for partial cost calculation. Without transfer control, the cost is calculated for a material's bill of materials and all materials in its subtrees. With the transfer control configuration, the system takes over the released cost calculation instead of recalculating materials with currently released standard costs.

2.5.2 Cost Estimation with Quantity Structure

Cost estimation is done with the quantity structure for the material in the plant. The cost estimation can also be calculated based on the sales order's item in the make-to-order scenario.

In the cost calculation selection screen, material, plant, and costing variant is selected. The system gets the default dates according to the date control configuration of the costing variant. Cost calculation can also be calculated for past dates, but these calculations cannot be saved.

Transaction checks the material's procurement type, and if the material is externally procured, the system checks the strategy from the valuation variant of the costing variant. If material is internally produced, the system checks for the bill of material and routing for the quantity structure. Transaction explodes bill of material of the material cost estimated and bill of material of components and routings. According to the formulas in the work centers, the quantity of controlling activity is calculated, and the activity costs are calculated by multiplying the activity quantity with activity plan unit prices. Table 2.6 shows the possible results after cost estimation.

Table 2.6 Possible statuses of standard price update

Process	Success	Error
Cost Estimation with Quantity Structure	KA	KF
Marking Price	VO	-
Releasing Price	FR	-

For cost estimation to be successful, material master data should be fully maintained; if the material is internally produced, there should be a bill of material and a routing; if the material is externally procured, a price should be determined according to the strategy in the valuation variant, the consumption account should be included in the cost component split structure, all the items in the routing should be included. The work centers' main production cost centers should have the activity's unit prices, and

the sub-components also should satisfy these terms in the cost calculation. In cases where these conditions are not met, various error messages may be encountered.

CHAPTER 3
COST FLOW

3.1 Postings During Period

In SAP, all transactions, such as plan cost, actual cost, and stock valuation, are done monthly. Different dates, such as posting date, document date, and entry date, are kept for transactions recorded in the system. The transaction's posting date is the important one and references the month of the transaction.

It is a prerequisite that a standard cost has been released for the relevant period before a document related to a material or activity is posted.

In accounting documents, two or more accounts get debit and credit entries. Debit entries are considered positive, credit entries are negative, and the amounts for debit and credit must be equal in an accounting document. The T technique will be used in the representations in the following sections. T's in the same row belongs to a single transaction, and the transaction information will be on the left. The balances to the left of the T's show the debit, and the balances to the right of the credit. In Figure 3.1, the T technique is shown.

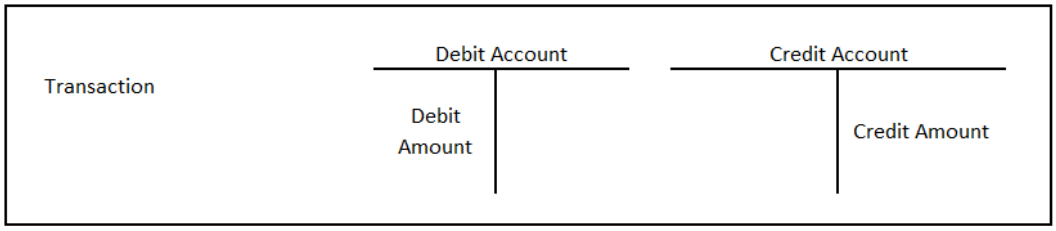


Figure 3.1 The T technique for accounting flow

3.1.1 Purchasing

Raw materials and semi-finished goods can be purchased from vendors, and purchasing expenses of production-related materials are included in production costs.

Assume the released standard cost of raw material A is 6 USD per piece for the month, and a purchase order is created for 100 pieces from the vendor; we can purchase 8 USD per piece due to market conditions.

3.1.1.1 Goods Receipt

Even though the goods receipt is a logistics transaction, the accounting document is created automatically behind it. According to the valuation class data in the material master, the system automatically creates the accounting document with the stock, price difference, and goods receipt/invoice receipt interim account assigned in the relevant configuration. In Figure 3.2, accounting document is shown.

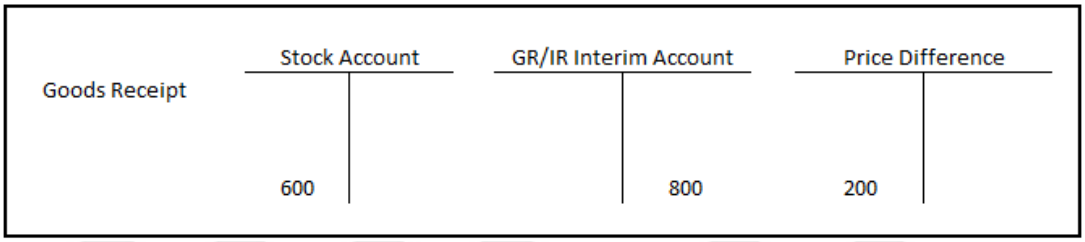


Figure 3.2 Goods receipt accounting document

The inventory account is debited by quantity*standard price amount. Goods receipt/invoice receipt interim account is credited by quantity*purchase order unit price amount. The difference is posted in the material with the price difference account.

3.1.1.2 Invoice Receipt

An invoice is a document that keeps the amounts based on the order item for the payment to be made to the supplier. Goods receipt and invoice receipt documents are posted based on the purchase order and the item. In Figure 3.3, accounting document for invoice receipt is shown.

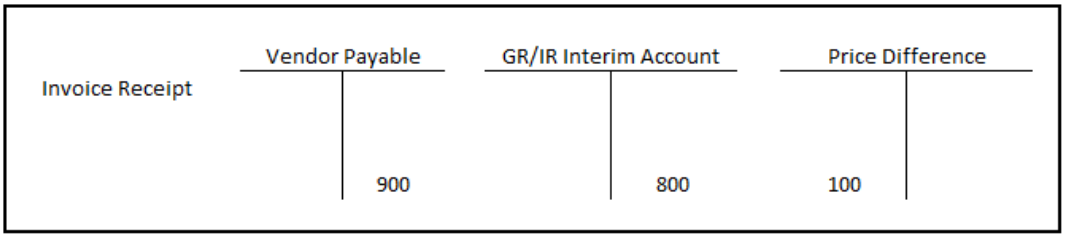


Figure 3.3 Invoice receipt accounting document

For some reason, the business may accept an invoice for an amount different from the amount in the order. In this case, the cost is reflected on the material through the price difference account.

With goods receipt posting, the interim account gets a credit record, and the balance is reset by getting a debit record with the invoice receipt. Thanks to the goods receipt invoice receipt interim account, purchase orders with goods receipt but no invoice receipt or without invoice receipt but no goods receipt can be detected.

After the goods receipt and invoice receipt, there is a balance of 600 USD in the stock account and 300 USD in the price difference account. The cost of 900 USD is reflected in the material cost with two documents.

3.1.2 Goods Issue Against Production Order

Raw materials and semi-finished products are components consumed in production orders. While the goods issue document is posted, inventory accounts get a credit posting, while consumption accounts get a debit posting. In Figure 3.4, accounting document for goods issue is shown.

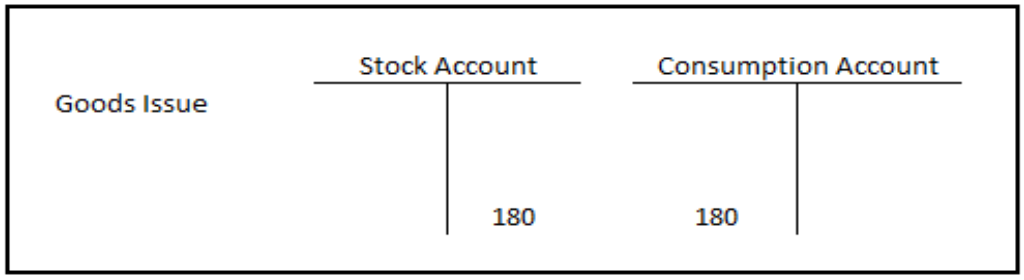


Figure 3.4 Goods issue to production accounting document

Raw material A has 6 USD/piece released as the standard price for the current period. A consumption expense of 180 USD will be reported as an expense in the cost reports related to the production order in the period. In the above example, we consume 30 pieces of A to production order 100001.

Variances will be reflected to produced materials after actual cost calculations.

3.1.3 Goods Receipt Against Production Order

When creating production orders, the material code to be produced is given in the header data. While the goods issue is debiting the production order, the goods receipt credits the production order and reduces the balance of the production order. In Figure 3.5, accounting document for goods receipt is shown.

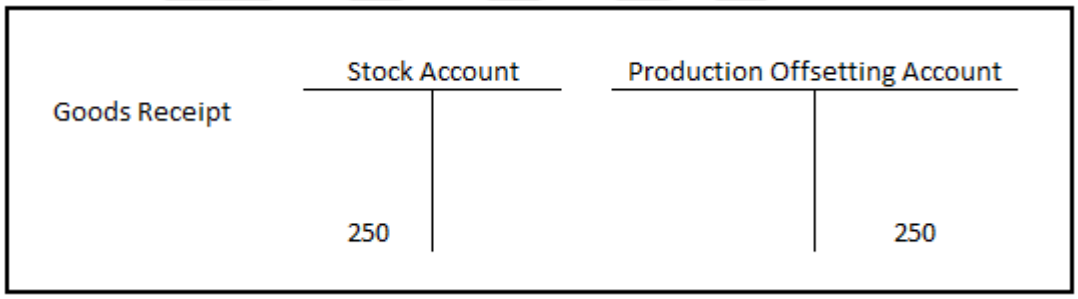


Figure 3.5 Goods receipt for production accounting document

3.1.4 Activity Consumption

Activity types are distribution keys that represent resources consumed for production. The overhead expenses posted to the cost centers are allocated to production orders by the activity consumption quantity. In Figure 3.6, accounting document for activity consumption is shown.

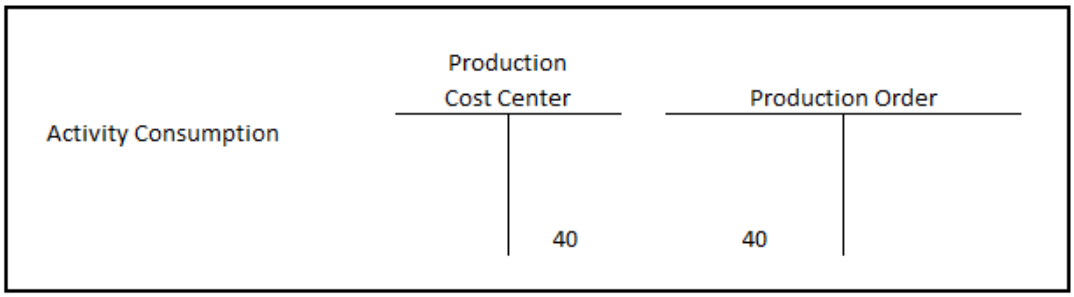


Figure 3.6 Activity consumption accounting document

The cost element of 43 type debits the production order while credits the cost center. Activity consumption quantity can be calculated according to the routing, or it can be entered manually. The amount is calculated by quantity consumed * activity plan unit price for the fiscal period.

3.1.5 By-Product Receipt

Valuable materials produced beside principal materials are called by-products. In cost accounting, by-products reduce the cost of the main product as much as their value. In Figure 3.7, accounting document for by product receipt is shown.

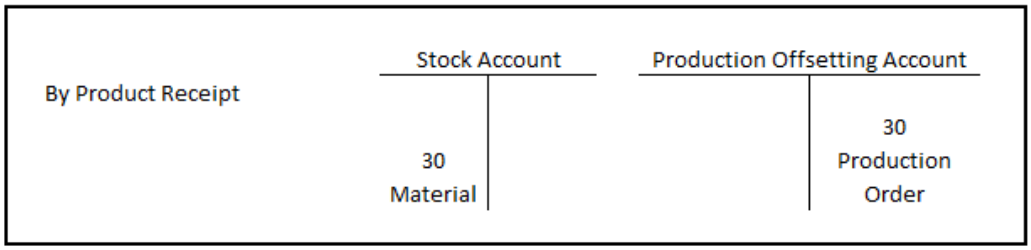


Figure 3.7 By product receipt accounting document

Since the production order receives a credit posting, the balance of the order is reduced. The actual valuation of the by-product receipt transaction is made at the standard price.

3.1.6 Goods Issue to Delivery Item

The cost of finished goods is posted when the finished product is loaded onto the vehicle to be sent from the warehouse to the customer. Finished goods are also managed with the standard price, so the cost of goods sold amount is quantity * standard price. In Figure 3.8, accounting document for goods issue to delivery is shown.

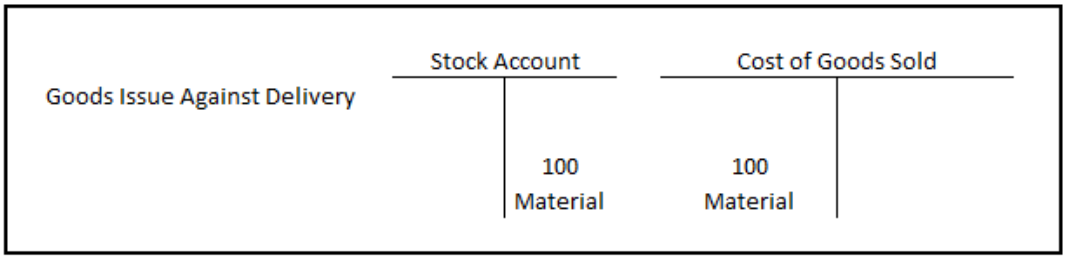


Figure 3.8 Goods issue to delivery accounting document

3.1.7 Expense Postings

Expense accounts are also defined as the primary cost element in type 1. Expenses are posted to cost centers, and the system asks for a controlling object while using a primary cost element. In Figure 3.9, accounting document for expense posting is shown.

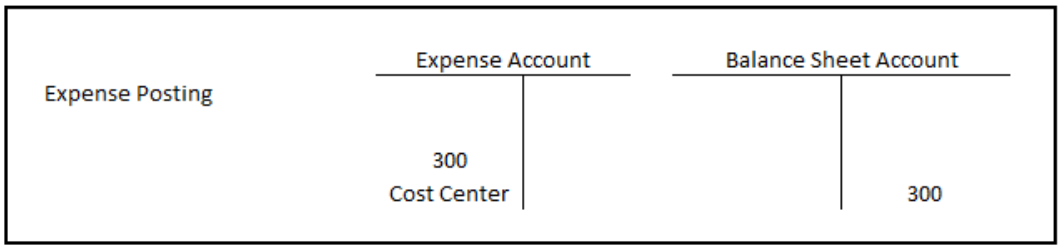


Figure 3.9 Expense posting accounting document

Expenses are collected in cost centers during the period. When all cost-related transactions are completed, actual costing activities are executed in the system.

3.2 Period Closing and Actual Costing

All transactions involving standard-cost materials are valued at the standard price during the period. Variances between standard and actual prices accumulate in production orders, cost centers, and price difference accounts.

Cost centers' expense postings from the accounting module are actual expenses. The activity consumptions credit cost centers, and these postings are plan postings.

Component and activity consumptions are posted from the plan price in the production orders, and the amount is calculated as quantity*plan unit price. Goods receipts related to production are found as credit balances.

Price differences from purchasing and opening stock are included in the price difference accounts.

These balances are used to calculate actual prices with the period closing activities.

3.2.1 Goods Receipt / Invoice Receipt Interim Account Balance Check

Goods receipt/invoice receipt interim account's balance must be zero to start the actual costing for a financial period. Otherwise, the line item report will be checked with posting dates to detect which purchase order has a balance.

3.2.2 Accounting Postings

All documents must be saved before starting the period closing. Payroll expenses, depreciation expenses, accounts payable, and accounts receivable must be posted. By defining validations in the system, new document saving may be restricted.

3.2.3 Distribution Cycle Run

Production-related expenses should be collected in production cost centers. Various methods can be used in the distribution of these expenses. Since some expenses are related to more than one production cost center, they were posted to auxiliary production cost centers.

The quantity of activity consumed, the total expense of some accounts, and statistical key figures are the most commonly used keys for distribution. In Figure 3.10, accounting document for distribution cycle is shown.

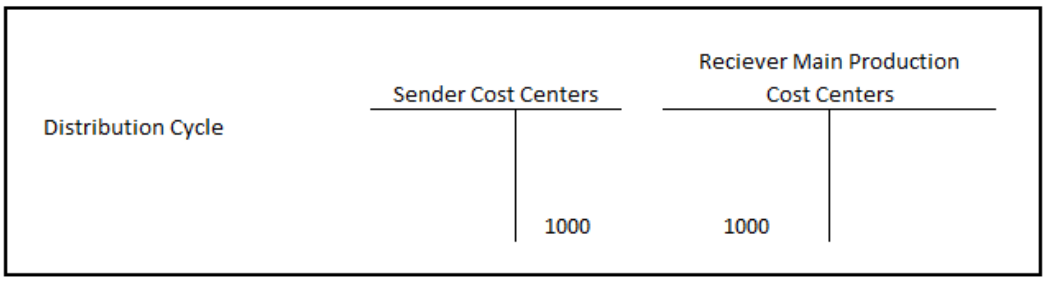


Figure 3.10 Distribution cycle accounting document

As a result of the distribution cycle, all overhead expenses posted to the cost centers should have been collected in the main production cost centers with activity consumptions.

3.2.4 Actual Activity Unit Price Calculation

For each production cost center, according to the splitting structure to which the production cost center is assigned, the total expense is calculated for each activity by grouping the expense account balances.

The system then divides the activity-related expenses by the activity quantity and calculates the actual unit price for each cost center and activity type. These actual unit prices are calculated for the company and controlling code currency.

3.2.5 Settlement of Production Orders

Components, activities, and manufactured products have a fixed standard price throughout the period. Component and activity consumptions debit the production order, and goods receipt of product credits the production order. The production order has a balance according to the quantities of these processes.

The settlement zeroed the production order balance and reflected these balances to produced material by price difference account. Production orders may have a debit balance or credit balance before settlement so that reflection may be debited or credited to the materials' price difference account. In Figure 3.11, accounting document for the settlement is shown.

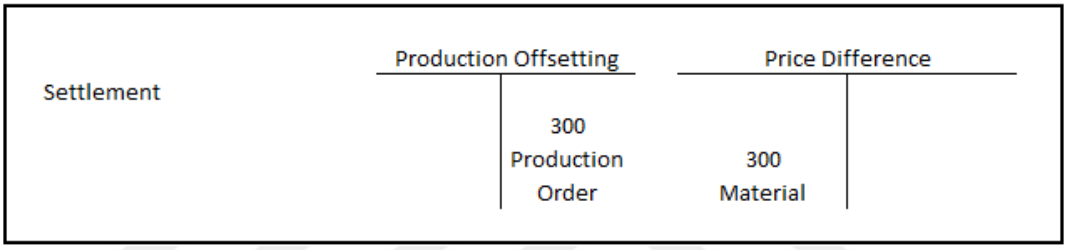


Figure 3.11 Production order settlement accounting document

If the production order has a debit balance, the production order is credited, and the material is debited with the price difference account. Debiting the price difference account means an increase in the material cost. If the production order has a credit balance, the production order is debited, and the material is credited with the price difference account. Crediting the price difference account means a decrease in the material cost.

3.2.6 Actual Costing Run

As a result of the previous steps, there is no balance left in the production orders. Standard price variances were reflected in the materials. Actual unit prices of activity types have been calculated but not yet reflected in materials.

All materials with cost-related transactions in the relevant financial period, with the materials procured from vendors at the lowest level, are leveled according to the production orders consumed.

Periodic cumulative values are calculated by adding the beginning inventory and goods receipts for the actual costing period as quantitative, standard price valuation, and price difference, prioritizing the materials at the lowest level. The sum of the standard valuation plus variances in the cumulative is the actual value. The actual unit price is calculated by dividing the actual value in the aggregate by the cumulative quantity. With this actual unit price, consumption and closing stock are valued. With the actual unit price calculated in the cumulative inventory, the consumption valuation will affect the cost of the upper-level material if the material is consumed to the production order, the cost of goods sold if the goods have been issued for delivery, and the inventory account if it remains in stock. The actual cost is calculated for all materials by calculating the actual costs from the lowest level to the highest level. Since the consumption of the activity is made to the orders, the variance of the activity cost is reflected in the actual cost of the produced material. In contrast, the cost center is posted in the other item. This resets the balance in the cost center. Suppose the plan unit price of activity is lower than the actual unit price. In that case, material cost will increase so that the cost center will be credited, and the material's price difference account will be debited.

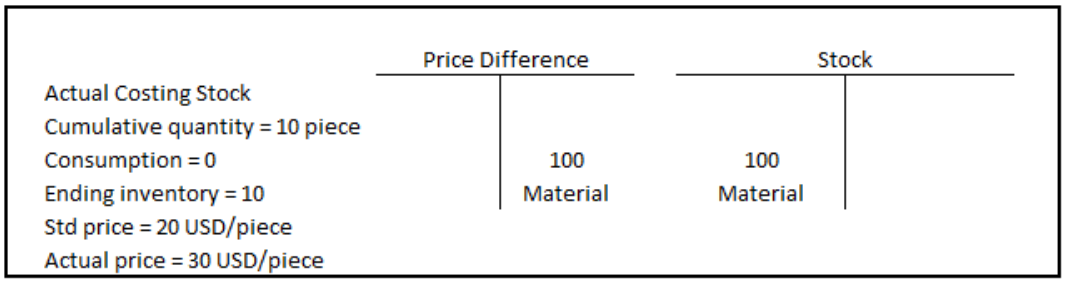


Figure 3.12 Period closing accounting document case 1

In Figure 3.12, accounting document for period closing is shown. In the above example, the variance on the material with a standard cost of 20 USD/piece is sent to the inventory account because the material is not consumed.

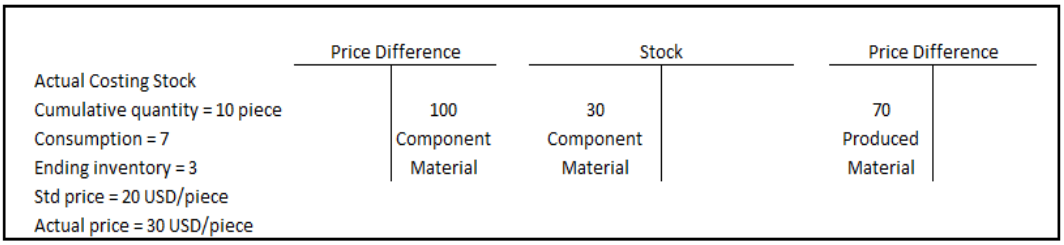


Figure 3.13 Period closing accounting document case 2

In Figure 3.13, accounting document for period closing is shown. In the above example, the variance on the component material with a standard cost of 20 USD/piece is sent to the inventory account and the produced material because seven pieces of the component material are consumed to the production order. This variance should be included in the cost of produced material.

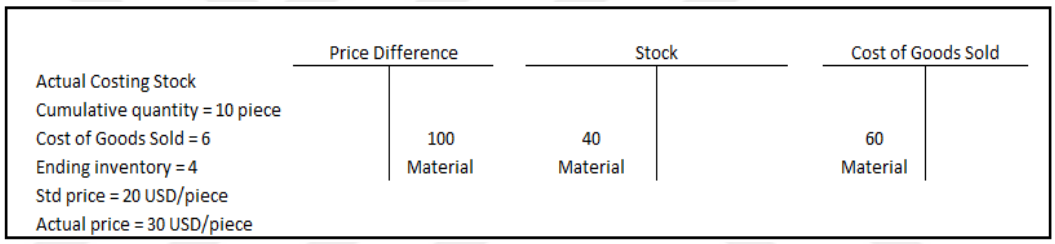


Figure 3.14 Period closing accounting document case 3

In Figure 3.14, accounting document for period closing is shown. In the above example, the variance on the material with a standard cost of 20 USD/piece is sent to the inventory account and cost of goods sold because six pieces of the component material are sent to the customer for the sales order. This variance should be included in the cost of goods sold. With this posting, the cost of goods sold account is updated with actual prices.

CHAPTER 4
FINDINGS: COMMON ERRORS AND CAUSES

Accurate calculation of product costs is critical for management reporting. The correct calculation of the materials' actual cost and profitability guides decision-makers.

With the actual costing activities, the actual value of each material is calculated, and the inventory account is valued at this actual unit price. The data used in these calculations are the master and transactional data of modules such as accounting, material management, and production planning. Errors in master and transactional data cause errors in calculating the actual stock value.

Various mistakes made in SAP systems and their effects on product costs will be detailed in this section.

4.1 Master Data-Related Errors

Objects defined once in the system and used in related processes are defined as master data. For example, material and vendor, for material management, bill of material, and routing are the master data created for the production planning module. It may be necessary to define new products, production lines, routings, new accounts in the chart of accounts, and cost centers in the systems. Since ERP is a living product, changes in the business should also be reflected in ERP programs.

The causes of incorrect master data maintenance are detailed below.

4.1.1 Material Management

Material master data is managed material management module. Since we calculate and confirm the standard price and our actual costs with the material ledger, it must be ensured that the master data is correct before recording a transaction for a material.

Incorrectly selected valuation class causes errors in automatically determined accounts such as stock, cost of goods sold, and consumption. If the error is not noticed before period closing activities, it will cause incorrect period closing and incorrect outputs.

Valuation class data is entered in accounting 1 view of the material. Accounting 1 view is plant-specific data; that's how the same material can have different values for different plants. Figure 4.1 shows accounting 1 view of a material.

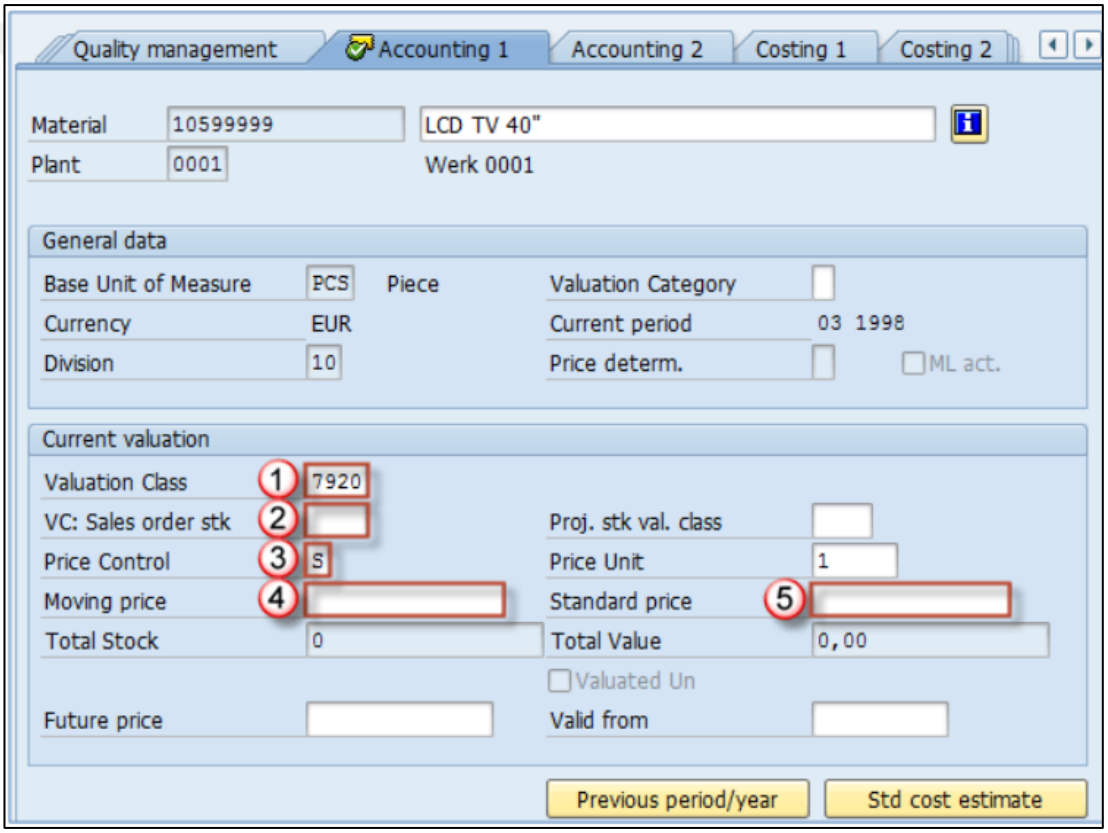


Figure 4.1 Valuation class master data in accounting 1 view (Carter, 2023)

Incorrectly selected procurement type will cause an error during the standard cost calculation with quantity structure because the system searches the bill of material and routing for the standard cost of internal procurement materials. In contrast, it searches for the standard cost according to the strategy in the costing variant for external procurement materials.

Views of the material master data are maintained if needed. Accounting and Costing views are mandatory for materials with value and quantity tracking. For example, an error is received during standard cost calculation if a product's accounting and costing views are not maintained.

4.1.2 Production Planning

Production planning is the module in which the master data for calculating the cost of semi-finished products and products are managed in a multi-level structure. Work center, routing, production version, procurement type and bill of material are production planning master data that affect product costing.

Procurement type is a material master data stored in MRP-2 view of the material. In Figure 4.2, MRP-2 view of a material is shown. Procurement type can take different values. Figure 4.2 contains possible values for procurement types. E is selected for materials whose are produced. F is used for the materials company purchase. X is used if a material is provided by both ways.

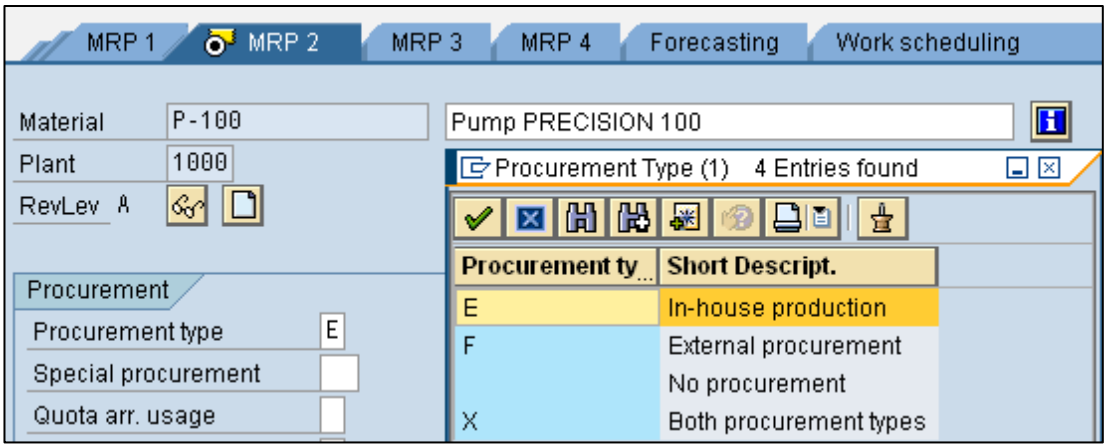


Figure 4.2 Procurement types in SAP (Jordan, 2020a)

Accurate bills of materials are critical for cost calculations and material requirement planning studies. The most common mistakes are connecting wrong material as a component in a bill of materials and making quantity errors in a bill of material items.

Component quantities from lower levels and their effects on standard cost are calculated according to the bill of materials.

Routing is the production planning master data in which the production operations of a material are defined. The times given in routing are converted into the amount of controlling activity with the formulas in the workplaces, creating overhead expenses at standard costs. Quantity and unit errors in the time values of routings also cause erroneous calculations in standard and actual costs.

4.1.3 Accounting

General ledger accounts and their balances are essential in terms of management accounting. The balance sheet and profit and loss are prepared with main account balances.

When creating a new account, choosing the correct cost element type is essential if the new account is a profit and loss account. New production overhead expense accounts must also be included in the distribution cycle and the splitting structure. Otherwise, they will not be included in the production costs, resulting in inaccurate actual costs.

Before Hana systems, the G&L account and cost element were defined from different transaction codes, but now the cost element category is also selected while creating the G&L account. Cost element category in G&L master data is shown in Figure 4.3.

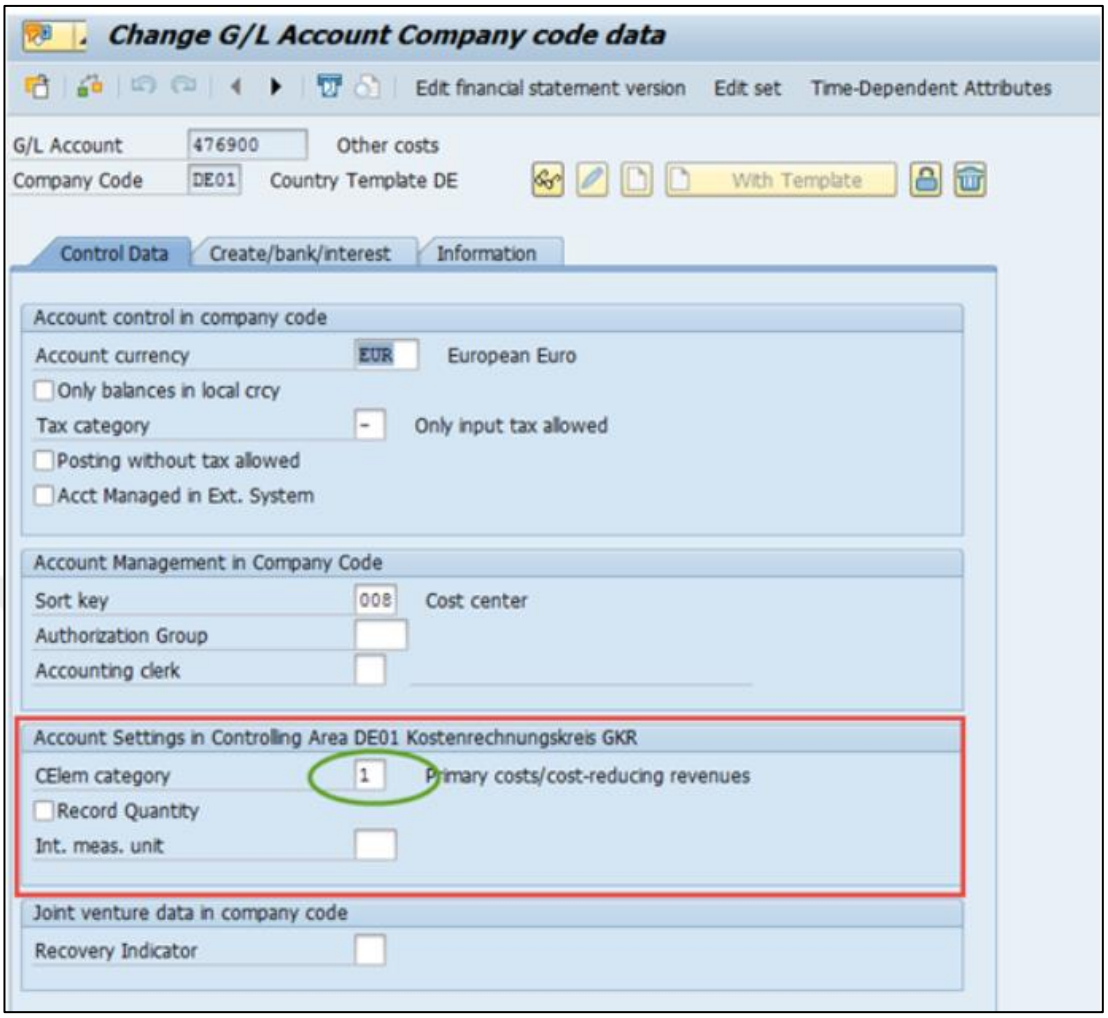


Figure 4.3 Cost element category in G&L master data (Leitner, 2016)

4.2 Transactional Data Related Errors

Transactional data is the data the business creates to track its processes in the system. For example, a purchase order created by the purchasing department, an expense posted by the accounting module, and a customer order created by the sales distribution module are transactional data.

Incorrect transactional data also causes inventory valuation to be inaccurate.

4.2.1 Material Management

Procurement-related transactions are under the responsibility of the material management module. Among these processes, the ones that affect the stock value can be listed, such as creating a purchase order, posting goods receipts, posting invoice receipts, and posting procurement side expenses.

The posting date is essential for periodization. The goods receipt and invoice receipt posting date period is critical since actual costing is done periodically, and these two documents should be posted in the same period.

Purchase order unit price is also should be entered correctly. If the costing variant is set as then, it may calculate the standard cost from the net price in the last purchase order.

For an accurate cost, stock value, and quantity to be calculated correctly, entered quantity and external amount in the material documents should be correct, and unit errors should be avoided.

4.2.2 Production Planning

Data such as production orders, order confirmations, and material requirement planning are production planning transactional data. Goods issue of components, activity consumption, and goods receipt against production orders are made in order confirmations. Inventory valuation and the actual cost of semi-finished and finished goods are directly related to order confirmations. Quantity, unit, or posting date errors in these documents cause the cost to be miscalculated.

Since actual costing is done periodically, consumptions and goods receipts from production must be in the same period. Suppose the component consumption is in the previous period, and the goods receipt is in the other period. In that case, the cost of

the previous period may not have an inventory for the material to which the consumption can be settled, causing an error.

Balances on production orders are settled within the process of period closing. After the settlement has been executed, no document should be posted to the production order. Otherwise, this balance will not be included in product costing.

4.2.3 Accounting

Many processes of accounting are directly related to product costing. Documents belonging to these processes must be posted with the correct posting dates and amounts. For example, expenses related to payroll processes, depreciation processes, and production-related expense postings should be posted to the correct cost centers.

While calculating the actual stock value, the calculation is made according to the postings entered in the system. If a missing entry is posted after the actual cost calculation, it cannot automatically be included in the product costing. Closing must be done again to include new entries.

4.3 Technical Errors

SAP implements new features through continuous improvement to meet the needs of businesses. New versions are being released to SAP ERP products, which may contain bugs. SAP publishes notes to fix errors in standard programs.

These errors can also cause errors related to stock value calculation. Bug fix notes have also been published for the programs in the period closing steps. The note we see in Figure 4.4, released in 2020, contains a bug fix for a transaction code used in actual costing processes.

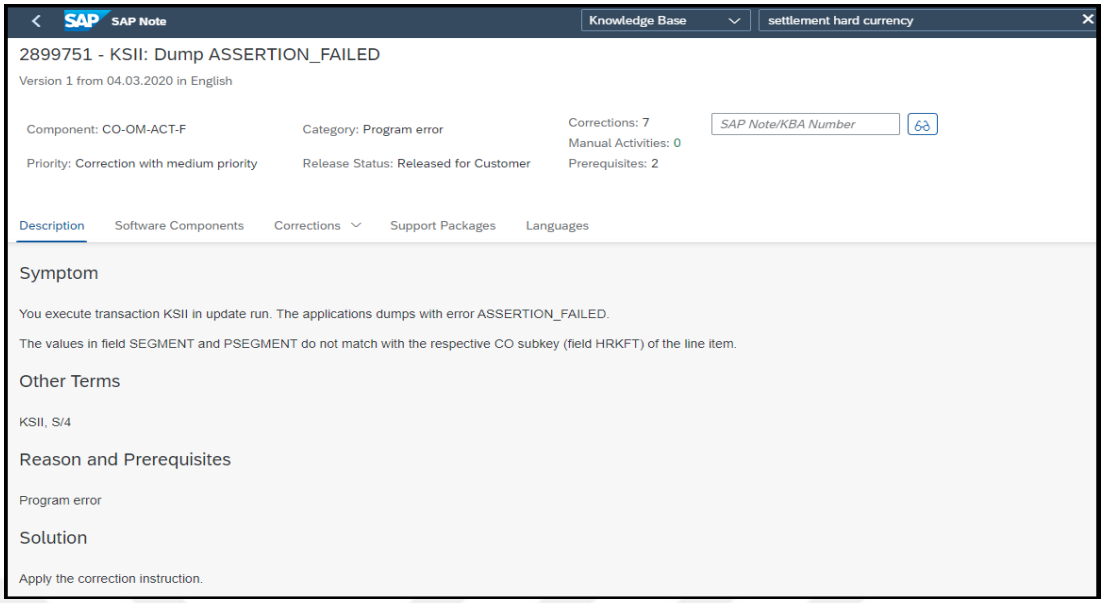


Figure 4.4 Sap corrective note for program error (Anonymous, 2020)

Database inconsistencies with various reasons or the cause of which cannot be determined can also occur in the system. In such cases, there are specific programs that correct material ledger tables and fix inconsistencies. Many of these programs are carefully executed by expert consultants or SAP support teams, and inconsistencies are resolved. In Figure 4.5, reports are categorized into groups like transactional, master data, cost component split, and so on.

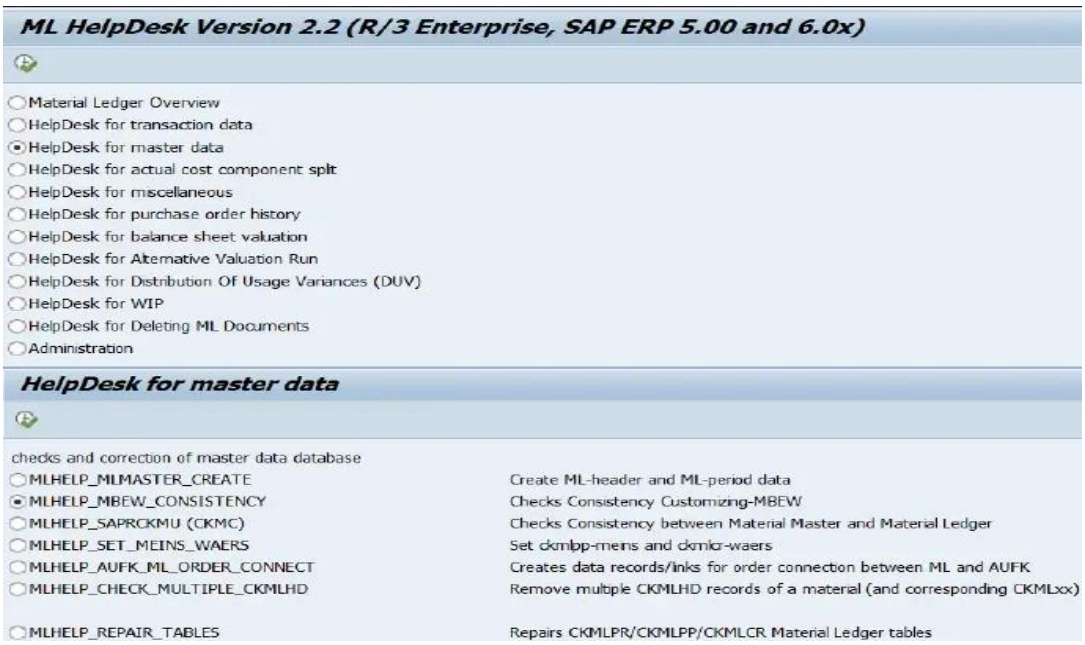


Figure 4.5 Corrective programs for inconsistent database

4.4 Process Documentation

Many documents are prepared during SAP implementations. The most common of these is the analysis document called the business blueprint. These documents, prepared separately for each module to be used, explain in detail the SAP architecture that will be built in the system at the end of the project.

Unfortunately, business blueprint documents and live systems are not always exactly the same. After the business blueprint phase, there can be changes in the system according to the needs of the customer.

Apart from the business blueprint, key-user documents and training sessions are also organized. SAP, like a business, is dynamic and constantly changing. In order for the processes to be carried out correctly in SAP, the correct master data must be defined, the correct process data entry must be made, in short, the system must be used correctly. To achieve this, proper document management of the system is required.

As time passes and employees change after SAP live migration, these documents may not be transferred to new people. Since SAP has a complex and integrated structure between departments, this cause inaccurate master and inaccurate transactional data and errors.

CHAPTER 5
CONCLUSION

ERP usage is a culture for businesses and requires a high level of collaboration as it affects how they do business since the modules are integrated. A properly executed ERP provides useful data, affects decisions, determines the business's future, and plays an active the performance of the enterprise, evaluating the outputs, and identifying the role in measuring problems. Product costing and actual costing use transactional and master data from logistic and financial modules. This study detailed the processes of associating purchase, production, and overhead expenses with product costing and examined the integration points of logistics-financial modules. To be able to achieve accurate outputs from ERP reports, it is stated that the structure of the business, the configurations in SAP, and the business processes should be known well by the ERP key users, and the processes should be managed in the system as an organized team.

Each SAP system is unique and is shaped according to the business processes, reporting needs of the enterprise, and the know-how of the company from which it receives consultancy services.

In this study, firstly, management accounting and ERP applications of management accounting were examined. After the literature review, the methods of product costing were examined with the SAP ERP software. Then, the complex structure of product costing and its interaction with other modules were revealed. Then, the difficulties faced by companies using SAP ERP while calculating product costs were investigated and categorized in the fourth chapter by interviewing SAP consultancy firms.

It was stated that master and transactional data for almost all modules impact product costing and actual costing. It has been discussed that an accurate periodic actual cost and stock valuation for each product is critical information for the business and can affect many decisions of the business This study stated that the actual stock value is the data source of decisions such as determining the sales price, whether to continue to produce a product and to determine the reason for the increase in its cost.

SAP develops new functions, structures, tables, and reporting tools in each version. This study showed that SAP could publish programs that contain bugs or malfunctions while introducing new products. It was stated that after noticing this malfunction and bugs, they published notes for correction.

Since SAP is constantly adding new functions and SAP is a living product, future studies can focus on new business processes in product costing and new needs in management accounting.

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