Korea Localization User Guide (Costing and Profitability)

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Contents

1. Business Requirements

Different perspective of "Cost"

Incoming materials may come in at different costs at different time. It may lead to a fluctuation of costing and inventory value and thus bias the overall picture of the business performance. This can be simply illustrated with the below example:

- Assuming there are 3 material receipts and 1 usage of an item during the month at below date, sequence, quantity and cost. Item costing is Actual and Weight Average.

Receipt Date	Quantity	Cost	Inventory Value	Inventory Quantity	Average Cost
1st Jan	+10	$2	$20	10	$2
5th Jan	+10	$4	$60	20	$3
10th Jan	-15		$15	5	$3
15th Jan	+10	$6	$75	15	$5

- Inventory Value at the end of the month is $75 with the Item Cost as $5/piece.
- Material Usage is $45 with 15 pieces consumed at $3 each.

In Korea, it is customary for companies to view the costing in a slightly different as below:

With 3 purchases of 10 pieces each at $2, $4 and $6. The average cost of the item should be $4. As such:

- Inventory Value at the end of the month is $60 with the Item Cost as $4/piece.
- Material Usage is $60 with 15 pieces consumed at $4 each.

The difference in result is due to a higher material cost towards the end of the month, and thus with the consumption taking place in the early part of the month, the usage cost is undervalued, or the ending inventory is over-valued.

The intent of one part of this localization enhancement is to calculate the adjusting figures to the Inventory and COGS accounts based on the Average Monthly Cost calculated below.

Calculation of the Average Monthly Cost

At the end of the month, or when the "month-end processing" is run, what the users would like to do is calculate the Average Monthly Cost for each item based on the below formula:

$$\frac{\text{((Last month Month-end Item Cost * Last month Month-end Item Quantity) + } \sum \text{(Incoming Inventory Transaction Quantity * Incoming Inventory Transaction Cost))}}{\text{(Last month Month-end Item Quantity + } \sum \text{ Incoming Inventory Transaction Quantity)}}$$

The calculation of the Average Monthly Cost is needed for the Level 0 Purchase Items only.

Cost Rollup

The Average Monthly Cost of the Purchase Items are then used in a cost rollup to re-calculate th e Average Monthly Cost of items that have any Purchase Items in the BOM

Month-end Cost Adjustment Report

A report is then needed to show the Beginning Inventory Balance, Ending Inventory Balance, Ite m Cost, Average Monthly Item Cost and the Variance.

Definitions, Acronyms & Abbreviations

- COGS: Cost of goods sold
- PA: Profitability Analysis
- SKF: Statistical Key Figures (It is used as an allocation rule)

2. Process

The below table gives the summary of the several new processes involved, their related input forms, transaction processing as well as related reports.

<Infor Costing/Profitability Development Lists >

Job	Master Enrollment	Job Run Form	Results Report
Department Cost Allocation	Account Group	Journal Data Gathering Job	
	Department Cost Allocation Cycle	Department Allocation Job	Journal Entries Report
	Department Group		Department Cost Balance Report
	Statistical Key Figures		Department Cost Report
	Monthly SKF Value Input		
Processing Cost Calculation	Processing Cost Mapping	Processing cost revaluation	Product Cost Report
Product Cost Calculation		Material Ledger Creation Job	Material Ledger Report
Profitability Analysis	Value Field	PA Allocation job	PA Analysis Report
	Account Value field		
	Customer Group		
	ITEM Group		
	PA Allocation Cycle		

Notes:

- “Job”: Key process to be added

- “Master Environment”: Maintenance forms

- “Job Run Form”: Activities and Processing Transactions

- “Result Reports”: Related reports to display the output and related data

- The "Job" column is a jobs group that has a specific target.

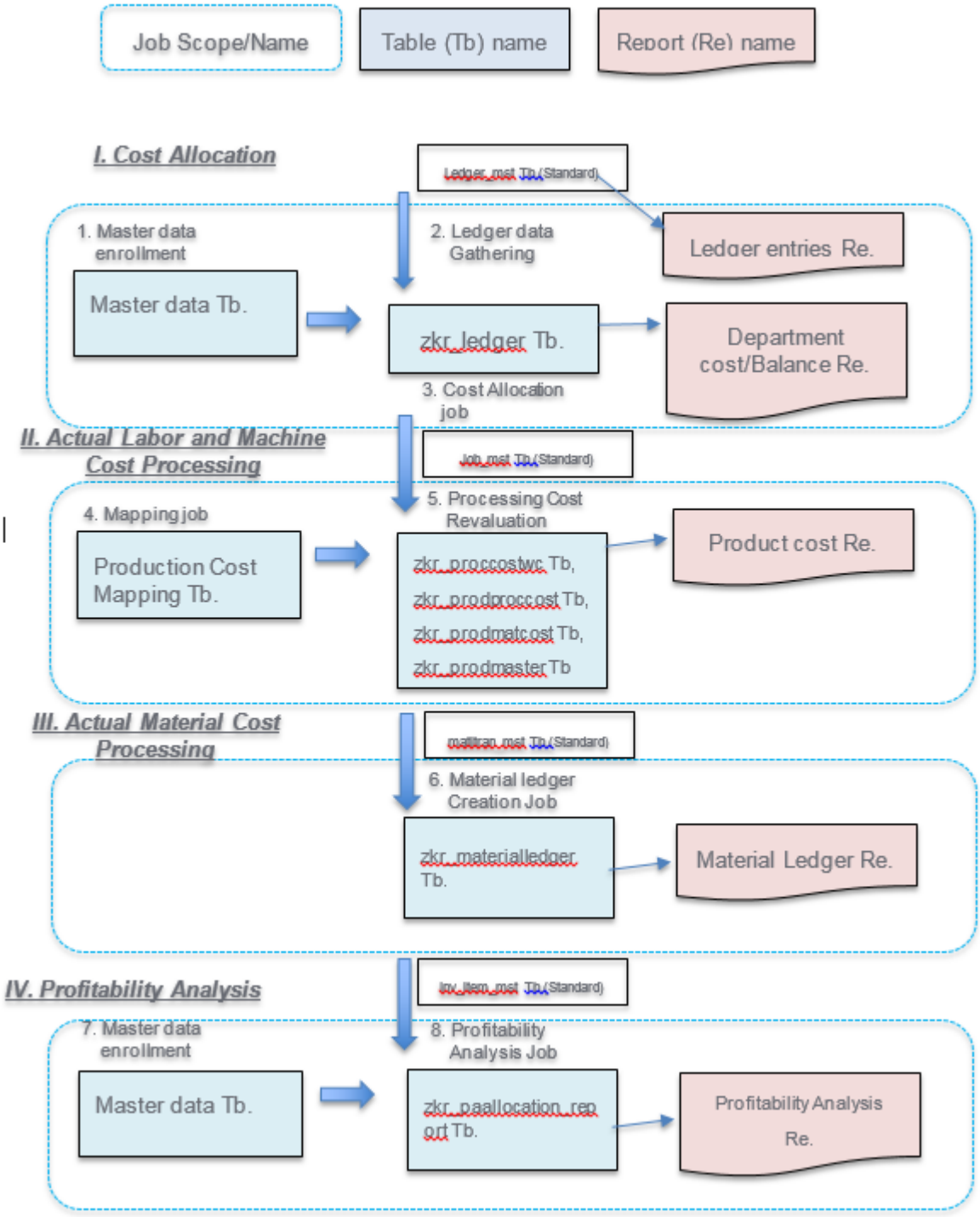
E.g., 5 master data enrollments are required to do the "Department Cost Allocation" Job. And then main jobs are to be done by the series of "Journal Data Gathering Job" and "Department Allocation Job".

The 4 Processes:

1. Cost Allocation – Copy the ledger to a new ledger table and create allocation transactions in the new table based on Cycles, Sender/Source group of transactions and Receiver/Target group of transactions and Statistical Key Figures (SKF).
2. Actual Labor and Machine Cost Processing - Calculation of the “Actual” Labor Cost and Machine Cost

3. Actual Material Cost Processing – Calculation of the actual material cost and produce the Material Ledger Report
4. Profitability Analysis – Based on the results from the above, this section aims to analyze a company's profitability from the 3 perspectives of sales department, customers and items with the capability of incorporating the allocation of sales related expenses in the analysis.

- Table Diagram (Legends)



2.1. Cost Allocation

The objective of this function is to use the standard financial transaction from the ledger table as the base, make a copy of that, then generate allocation transactions on top so as to provide a revised set of financial statements considering the allocation.

A specific allocation run may select specific pre-defined “cycles” which can include multiple sequences (Segment) of processing. That means, cycle is a master data for cost allocation.

Each cycle job will get the source of the values to allocate from the “Sender” group of financial transactions, and allocate into the “Receiver” group of transaction based on either financial related transaction (Allocation Account Group) or non-monetary related transactions (SKF, Statistical Key Figure).

2.1.1. Maintenance Form

2.1.1.1. Account Groups

It is flexibly to create an account group to use in the cost allocation cycle program and it is based on the hierarchy concept like the below example, that A0000 is a group by itself while A1000 is a group that includes a sub-group of A1100. In essence A1000 includes Account from 521001 to 524001 and the Account Group of A1100 (511001 to 513001).

Account Group ID	Account Group Name	Account From	Account To	Account Group
A0000	Expenses			A1000
A1000	HR Expenses	521001	524001	A1100
A1100	Wages Expenses	511001	513001	*

*This data is stored in a new table "zkr_accountgroup_mst" and accounts are from chart_mst table.

Account group ID = "Account from/to" + Account group

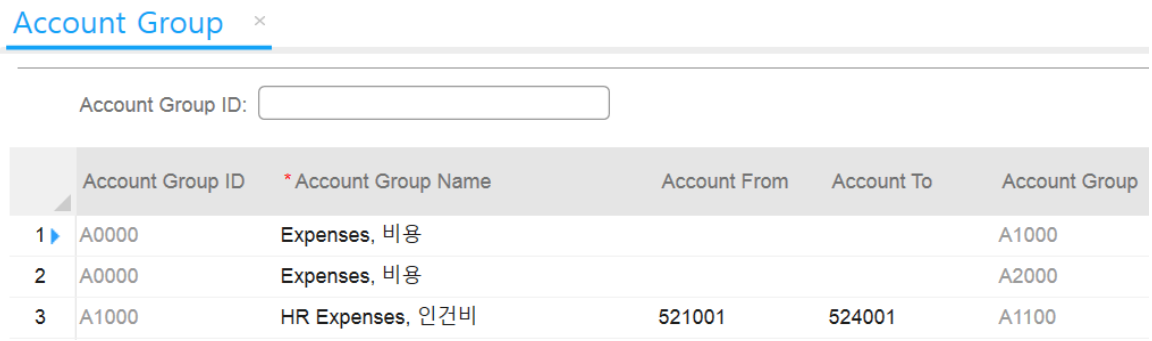
E.g. for Account Group ID “A1000”, it includes the range of Account from 521001-524001 + the accounts included in Account Group “A1100”; or

A1100 = 511001~513001.

A1000 = 511001~513001 + 521001~524001.

A0000 = 511001~513001 + 521001~524001.

The Account group form is below;

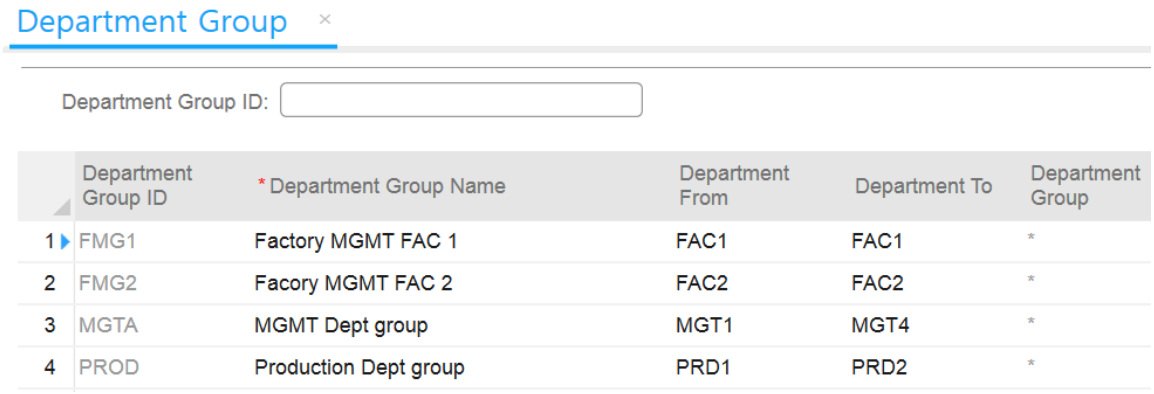


2.1.1.2. Department Groups

It is flexibly to create a department group to use in the cost allocation cycle program and it is based on the hierarchy concept similar to the Account Group above.

Department Group ID	Department Group Name	Department From	Department To	Department Group
FMGT	Factory Dept. Group	FAC1	FAC2	*
SUPP	Supporting Dept. Group	SUP1	SUP2	*
PROD	Production Dept. Group	PRD1	PRD2	*

The Department group form is below;

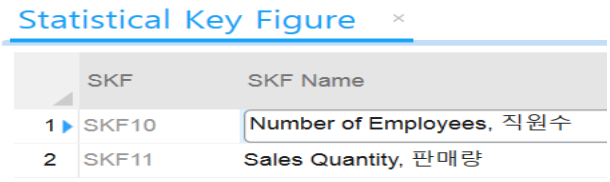


2.1.1.3. SKF (Statistic Key Figures)

It is flexibly to create SKF (Statistic Key Figure), the non-monetary data for organizational units, to use the cost allocation cycle program. It is simply a distribution rule like using the number of employees in departments for allocation purposes.

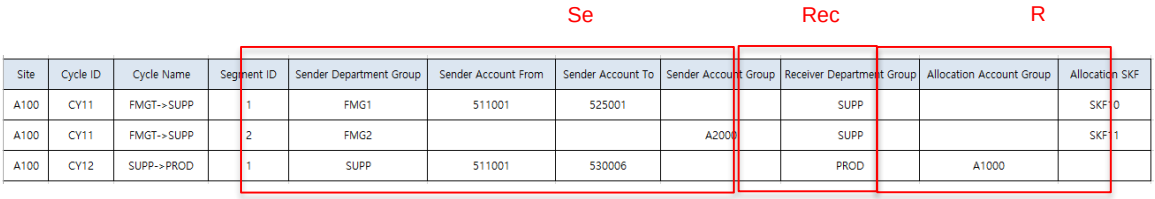
SKF	SKF Name
SKF10	Number of Employee
SKF11	Sales Quantity

* The SKF form is below;



2.1.1.4. Department Cost Allocation Cycle form

This maintains the Cost Allocation Cycles that defines the “sender” – Source of the Allocation; “Receiver” – the Receiving End of the Allocation and “Rule” – whether using Financial or Non-Financial Rules and Statistical Key Figures like the number of employee in different departments to allocate costs between departments.



Description of the fields:

- Cycle: Cost distribution master data
- Segments: A cycle is consisted with several segments and actually the distribution is done by segments.
- Sender Department group: It is department group that sends costs to the receiver department.
- Sender Account group/from/to: It is accounts that are sent to the receiver.

  * Sender account is same with receiver account.

- Receiver Department group: It is department group that receives costs from sender department.
- Allocation Account group/Allocation SKF: These are cost allocation rules.

For example, Cycle CY11 can have 2 segments and the 1st segment below consists of Sender Group of FMG1, Receiver Group of SUP1 and SUP2. With $5,000 in the Sender account, and allocation SKF SUP1 with value of 12 and SUP2 with value of 22, the distribution results are as follow:

- It will retrieve the $5,000 from the zkr_ledger_mst table that is copied from the ledger_mst table. The receiver values will be calculated and stored into the same zkr_ledger_mst table after the allocation run is completed.
- The transaction of the Sender will remain as it has a different department code as the transaction of the Receiver.

Cycle ID	Segment	Sender Dep.	Sender Account Value	Receiver Dep.	Allocation SKF	Receiver value
CY11	1	FMG1	$5,000.00	SUP1	12	$1,764.71
				SUP2	22	$3,235.29

The 3 main parts of a “Cycle” includes the Sender, Receiver, and Allocation Rule. Both Senders and Receivers refer to a group (Department); whereas the Allocation Rule also reference a group in the Account Group (Account) but Allocation SKF refers to the SKF table that maintain the allocation rules.

2.1.1.5. Monthly SKF Value Input

It is to maintain the monthly statistical key figures' value. The values are used together with the SFK Allocation Rules in the allocation process.

Since the allocation process should be done on a monthly basis, the Monthly SKF Value should also be maintained on the monthly basis.

The user may change the Monthly SKF Value any time which will then be utilized in the next allocation run.

For example, as the SKF data here is used to define the ratio of the receiving end. Say there is $100 dollar to be split amongst the 3 departments based on the ratio of the numbers defined for these departments, SUP1 will get $100 * $550 / ($550 + $430 + $800).

Input Month	SKF	Department	SKF Values	Results
2015-07	SKF10	SUP1	$550	$31
2015-07	SKF10	SUP2	$430	$24
2015-07	SKF10	PRD1	$800	$45

* The Monthly SKF Value Input form is below;

Monthly SKF Value Input

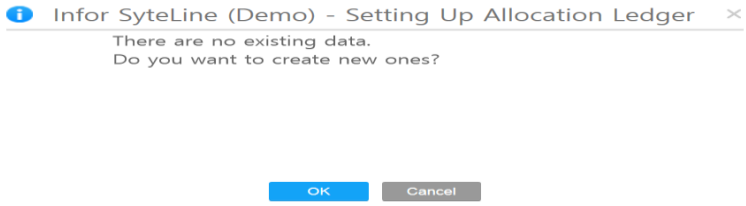
	Input Month	SKF	Dept	SKF Value
1	2016-06	SKF10	SUP1	550
2	2016-06	SKF10	SUP2	430
3	2016-06	SKF11	SUP1	30
4	2016-06	SKF11	SUP2	85

2.1.2. Activity

2.1.2.1. Setting Up Allocation Ledger

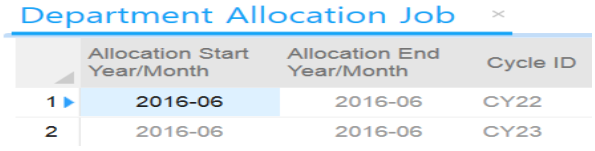
The purpose of this function, whose name is “ZKR_LedgerDataGatheringJob”, is to set up the base of the ledger transaction for allocation purposes. What this does is to copy the GL ledger transaction from the specified period. The original data and distributed data can be found in the reports.

Users can choose to copy the data again and the program will warn that there is existing data in the relevant month and seek confirmation from the users to confirm before proceed. If yes, this function will delete the existing data and make new data.



2.1.2.2. Department Allocation Job

This is the Cost Allocation process that creates the allocation transactions based on the selected period and Cycle ID and Allocation Rules to generate the data into the new zkr_ledger_mst table. This process should be run on a monthly basis.



	Allocation Start Year/Month	Allocation End Year/Month	Cycle ID
1 ▶	2016-06	2016-06	CY22
2	2016-06	2016-06	CY23

* The users would need to save these parameters first before they can run the processing.

** Technical processing details (Not required parts for general users)

(1) Get the amounts from sender department group and account group/from~to from "zkr_journal_mst table".

(2) Get the allocation rule, allocation account group "OR" SKF from .
- The rule is exclusive between account group and SKF.

(3) Allocate the sender amounts among the receiver using the allocation rule from "zkr_journal_mst table".
And commit it at the end of allocation segment job.
- First, make the oppsite value line in sender side.
- And then make the new allocated value line in receiver side.
ex) if SUP1 department's amounts are allocated to PRD1, new data will be saved like this order in the zkr_journal_mst table.

	department	account	amounts
existing row	SUP1	511001	8,855,000
new row 1	SUP1	511001	- 8,855,000
new row 2	PRD1	511001	8,855,000

(4) If the allocation results have an error, user can run the reverse job.
- Do the opposite job to the original allocation one.

Sample data

Cycle 11's allocation rule is SKF and cycle 12's is an account group.

Cycle ID	Cycle Name	Segment ID	Sender Department Group	Sender Account From	Sender Account To	Sender Account Group	Receiver Department Group	Allocation Account group	Allocation SKF
CY11	FMGT -> SUPP	1	FMG1	511001	525001		SUPP		SKF10
CY11	FMGT -> SUPP	2	FMG2			A2000	SUPP		SKF11
CY12	SUPP -> PROD	1	SUPP	511001	530006		PROD	A1000	

< Sample Allocation results >

Sender					Allocation Rule		Allocation Results			Already saved values			Final Results		
Cycle ID	Segment ID	Department	Account	Amounts	Department		Department	Account	Amounts	Department	Account	Amounts	Department	Account	Amounts
CY11	1	FAC1	511001	3,500,000	SUP1	550	SUP1	511001	1,964,286	SUP1	511001	3,500,000	SUP1	511001	5,464,286
CY11	1	FAC1	525001	4,500,000	SUP2	430	SUP2	511001	1,535,714	SUP2	511001	3,500,000	SUP2	511001	5,035,714
				8,000,000		980	SUP1	525001	2,525,510	SUP1	525001	4,500,000	SUP1	525001	7,025,510
							SUP2	525001	1,974,490	SUP2	525001	4,500,000	SUP2	525001	6,474,490
									8,000,000			16,000,000			24,000,000

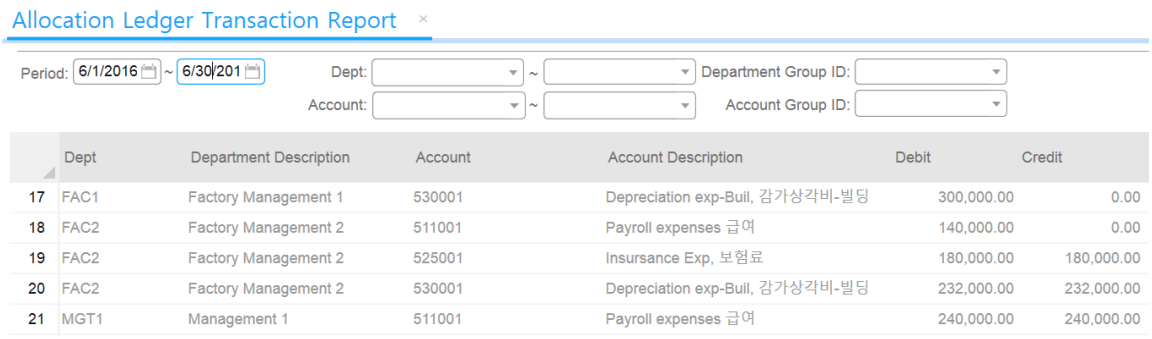
Sender					Allocation Rule		Allocation Results			Already saved values			Final Results		
Cycle ID	Segment ID	Department	Account	Amounts	Department		Department	Account	Amounts	Department	Account	Amounts	Department	Account	Amounts
CY11	2	FAC2	525001	4,500,000	SUP1	30	SUP1	525001	1,173,913	SUP1	525001	7,025,510	SUP1	525001	8,199,423
CY11	2	FAC2	530001	11,600,000	SUP2	85	SUP2	525001	3,326,087	SUP2	525001	6,474,490	SUP2	525001	9,800,577
				16,100,000		115	SUP1	530001	3,026,087	SUP1	530001	5,800,000	SUP1	530001	8,826,087
							SUP2	530001	8,573,913	SUP2	530001	7,500,000	SUP2	530001	16,073,913
									16,100,000			26,800,000			42,900,000

Sender					Allocation Rule		Allocation Results			Already saved values			Final Results		
Cycle ID	Segment ID	Department	Account	Amounts	Department		Department	Account	Amounts	Department	Account	Amounts	Department	Account	Amounts
CY12	1	SUP1	511001	5,464,286	PRD1	5,500,000	PRD1	511001	6,416,667	PRD1	511001	5,500,000.00	PRD1	511001	11,916,667
CY12	1	SUP1	525001	8,199,423	PRD2	3,500,000	PRD1	525001	11,000,000	PRD1	525001	4,500,000.00	PRD1	525001	15,500,000
CY12	1	SUP1	530001	8,826,087		9,000,000	PRD1	530001	15,216,667	PRD1	530001	5,800,000.00	PRD1	530001	21,016,667
CY12	1	SUP2	511001	5,035,714			PRD2	511001	4,083,333	PRD2	511001	3,500,000.00	PRD2	511001	7,583,333
CY12	1	SUP2	525001	9,800,577			PRD2	525001	7,000,000	PRD2	525001	4,500,000.00	PRD2	525001	11,500,000
CY12	1	SUP2	530001	16,073,913			PRD2	530001	9,683,333	PRD2	530001	7,500,000.00	PRD2	530001	17,183,333
				53,400,000					53,400,000			31,300,000			84,700,000

2.1.3. Reports

2.1.3.1. Allocation Ledger Transaction Report

Report format and selection criteria can be based on the standard GL Journal report. And users can find how the original data are.

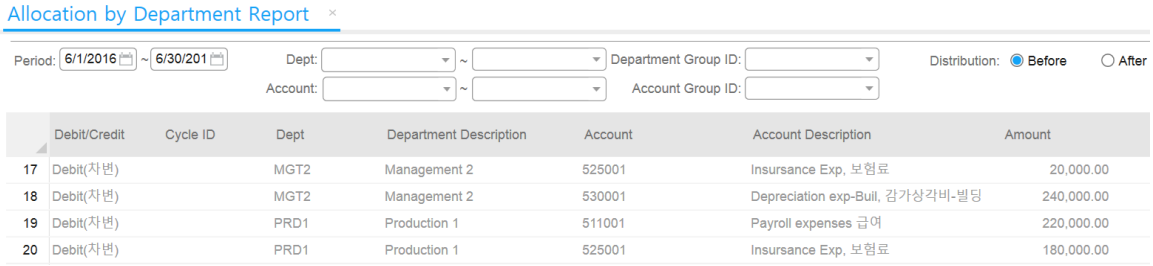


	Dept	Department Description	Account	Account Description	Debit	Credit
17	FAC1	Factory Management 1	530001	Depreciation exp-Buil, 감가상각비-빌딩	300,000.00	0.00
18	FAC2	Factory Management 2	511001	Payroll expenses 급여	140,000.00	0.00
19	FAC2	Factory Management 2	525001	Insursance Exp, 보험료	180,000.00	180,000.00
20	FAC2	Factory Management 2	530001	Depreciation exp-Buil, 감가상각비-빌딩	232,000.00	232,000.00
21	MGT1	Management 1	511001	Payroll expenses 급여	240,000.00	240,000.00

2.1.3.2. Allocation by Department Report

It is to review the allocation ledger information and shows the balance for the ledger transactions with the following combination:

- Department
- Account Code
- Debit/Credit amount
- Cycle ID



	Debit/Credit	Cycle ID	Dept	Department Description	Account	Account Description	Amount
17	Debit(차변)		MGT2	Management 2	525001	Insursance Exp, 보험료	20,000.00
18	Debit(차변)		MGT2	Management 2	530001	Depreciation exp-Buil, 감가상각비-빌딩	240,000.00
19	Debit(차변)		PRD1	Production 1	511001	Payroll expenses 급여	220,000.00
20	Debit(차변)		PRD1	Production 1	525001	Insursance Exp, 보험료	180,000.00

Thus it will separate the transactions that are copied from the standard ledger tables (blank Cycle ID) and the transactions created from subsequent allocation run (non-blank Cycle ID).

Debit/Credit	Cycle ID	Department	Account	Amounts
Debit		MGM1	500000	240
Debit		SAL1	550000	120
Debit	CY11	SAL1	500000	240
Debit Sum				600
Credit	CY11	MGM1	500000	240
Credit Sum				240
Balance				360

In the above example, the 2 highlighted lines are created after the allocation processing. The intent of this processing is to transfer the $240 from the Account “500000” / “Department “MGM1” to another department of “SAL1”; i.e. Credit the $240 from “MGM1” and Debit into “SAL1”.

1.before allocation

Debit/Credit	Cycle ID	Department	Account	Amounts
Debit		MGM1	500000	240
Debit		SAL1	550000	120
Debit Sum				360
Credit Sum				0
Balance				360

2.after allocation

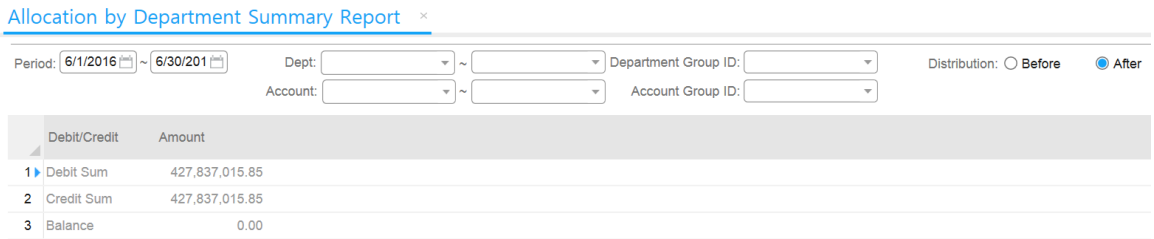
Debit/Credit	Cycle ID	Department	Account	Amounts
Debit		MGM1	500000	240
Debit		SAL1	550000	120
Debit	CY11	SAL1	500000	240
Debit Sum				600
Credit	CY11	MGM1	500000	240
Credit Sum				240
Balance				360

2.1.3.3. Allocation by Department Summary Report

It is to review the allocation ledger information and this will show the Debit and Credit summary for each Department / Account combination including the original ledger transaction and, additionally the reallocation transaction, if “Distribution : After” selected.

Selection Criteria:

- Period: Month and Year
- Department From/To
- Department Group
- Account From/To
- Account Group



2.2. Actual Labor and Machine Cost Processing

In many ERP applications, the processing costs (production cost) are typically using planned costs but not considering the overhead like salary expenses or other type of administrative expenses, thus not using the “Actual Cost” as such.

Production costs typically includes Material Cost, Labor Cost, Machine Cost and Outside Subcontract Cost.

The calculation of the “Actual” Labor Cost and Machine Cost will be considered in this section.

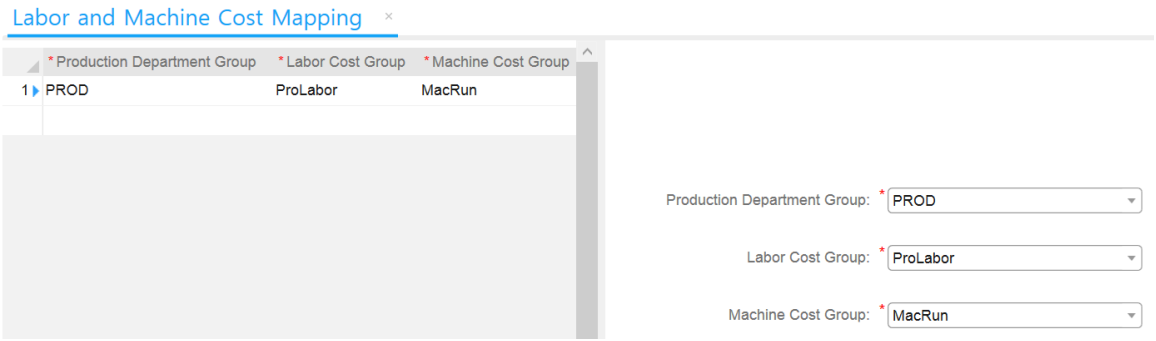
“Actual” Material Cost will be considered in the following section with the assumption made here that for customers using the Costing module. Manufactured Items’ cost will be recalculated based on actual material transactions that will be described in the following sections.

Outside Subcontract Cost is generated considered as purchased non-inventory item and not involved in this “actual” cost processing here.

2.2.1. Maintenance

2.2.1.1. Labor and Machine Cost Mapping

This form maintains the linkage between the 3 groups of data below. The objective is to allow the users to define which department group “Production Department Group” will have their expense captured and added to the existing Labor and Machine Account Group.



The relationship of these 3 sets of data groups will be used in the following “Processing Cost Revaluation” section.

Each site is expected to have only 1 such combination for processing.

Departmental expenses (defined via the “Production Department Group”) will be distributed into jobs through work center as described in the following process.

All these “Actual” costs including Labor Cost, Machine Cost and Material Cost will combine to give the revised “Actual” cost of a manufactured item for the purposes of re-calculating the generally needed “Average Monthly Material Cost” at the end of a period; which will subsequently be used in the Profitability Analysis as described in the last section.

2.2.2. Activity

2.2.2.1. Labor and Machine Cost Revaluation

The input processing form is like the above with the selection of the following criteria:

- Period: The period to run this processing

Example. Calculation logic and sequence

The following will explain the several stages of calculation. It is also based on an example of a company producing 5,000 units yo-yo. There are 2 work centers, KDHNGV / KDHWNG and they are mapped with the Production Department of “PRD1”.

Production Department Group	Production Department	Work Center
PROD	PRD1	KDHNGV
		KDHWNG
	PRD2	KDHNG2
		KDHWN2

The BOM structure is 1 item of KDH101 is made of 1 item of KDH102 and 4 items of KDH103.

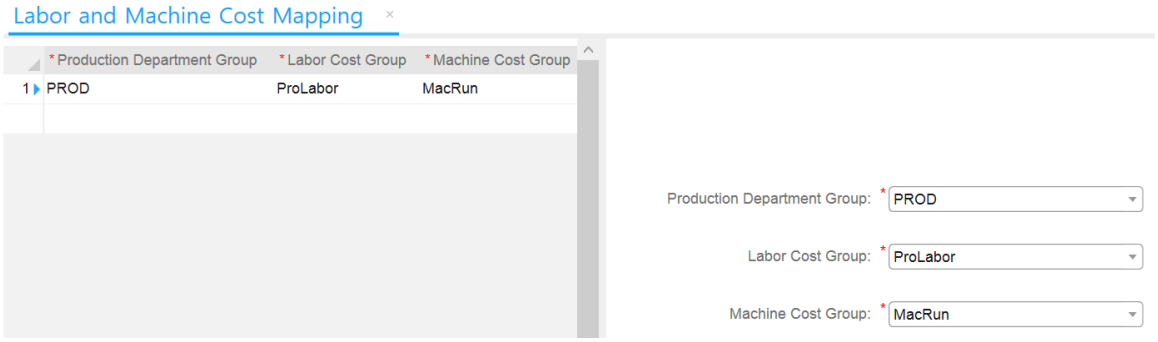
On June 2015, 150 hours of labor time are inputted in the 2 work centers individually and the department's labor cost was $27,416,667.

The several stages of calculation will create data into separate newly created tables for the subsequent processing stages.

Stage 1: Calculate the sourcing allocation amounts by Departments

An example using the below example is like gathering all the Employee or Insurance Expense from the “Prod” Department Group and the 2 Labor and Machine Account Group below, and allocate them into the Labor and Machine processing cost.

It will accumulate the total by Department based on the selected Production Department Group, Labor and Machine Account Group as defined in the below input form.



There will be 1 set of this combination per site.

The result of the processing can be like the table below:

Debit/Credit	Cycle ID	Department	Department Description	Account	Account Description	Amounts	Remarks
Debit		PRD1	Production Dept 1	511001	Salary	11,916,667	Related with Labor
Debit		PRD1	Production Dept 1	525001	Employee Insurance expense	15,500,000	Related with Labor
Debit		PRD1	Production Dept 1	530001	Machine Depreciation expense	21,016,665	Related with Machine
Debit		PRD2	Production Dept 2	511001	Salary	7,583,333	Related with Labor
Debit		PRD2	Production Dept 2	525001	Employee Insurance expense	11,500,000	Related with Labor
Debit		PRD2	Production Dept 2	530001	Machine Depreciation expense	17,183,335	Related with Machine
Debit Sum						84,700,000	
Credit Sum							
Balance							

The results of the above processing will provide the total Labor and Machine related cost per Department. E.g. For “PRD1”, the “Labor” related cost include the total of the first 2 lines of ($11,916,667 + $15,500,000) or $27,416,667; and a “Machine” related cost of $21,016,665.

Debit/Credit	Cycle ID	Department	Department Description	Account	Account Description	Amounts	Remarks
Debit		PRD1	Production Dept 1	511001	Salary	11,916,667	Related with Labor
Debit		PRD1	Production Dept 1	525001	Employee Insurance expense	15,500,000	Related with Labor
Debit		PRD1	Production Dept 1	530001	Machine Depreciation expense	21,016,665	Related with Machine
Debit		PRD2	Production Dept 2	511001	Salary	7,583,333	Related with Labor
Debit		PRD2	Production Dept 2	525001	Employee Insurance expense	11,500,000	Related with Labor
Debit		PRD2	Production Dept 2	530001	Machine Depreciation expense	17,183,335	Related with Machine
Debit Sum						84,700,000	
Credit Sum							
Balance							

Processing logic:

- Retrieve the processing cost data and allocate them into work center according to labor time and machine time. (It is to convert the department-based costs to the work center- based costs.)
    - Collect the processing costs like Labor Cost and Machine Cost.
    - Make a distribution ratio across work centers based on labor time and machine time. Job's labor time (trans_type=L) and machine time (trans_type_C) are in the time field

(a_hrs). The needed job should be completed and the job transactions are in the initial entry period.

- Distribute the aggregated amounts of departments into the work centers using the above hours.
- Save the calculated data.

Stage 2: Using the Department Labor and Machine cost from Stage 1 to calculate the Actual Labor and Machine Cost by Work Center

The below relationship is defined between Production Department Group and its related Product Department and Work Centers.

Production Department Group	Production Department	Work Center
PROD	PRD1	KDHNGV
		KDHWNG
	PRD2	KDHNG2
		KDHWN2

For example, the Production Department Group “PROD” has 2 related Departments; and “PRD1” is related to Work Centers of “KDHNGV” and “KDHWNG”.For example, the total Labor Related Cost of “PRD1” will be distributed to the 2 Work Centers “KDHNGV” and “KDHWNG”.

Processing logic:

#1. Accumulate Number of Labor/Machine Time by Work Center based on Completed Jobs

This process firstly retrieves all the “Completed” Jobs during the selected period and calculate the total of the Labor/Machine Time by Work Center.

E.g. the Completed Jobs in the selected period has a total of 68 hours of Labor Time and 97 hours of Machine time for the Work Center “KDHNGV”.

Work Center	Labor Time	Plan Labor Amount	Plan Labor Rate	Actual Labor Amount	Actual Labor Rate	Machine Time	Plan Machine Amount	Plan Machine Rate	Actual Machine Amount	Actual Machine Rate	Expense Total
KDHNGV	68	816	12	11,298,990	166,161.62	97	0	0	9,431,937	97,751.93	
KDHWNG	97	1,164	12	16,117,677	166,161.62	118	0	0	11,534,728	97,751.93	
KDHWN2	35	420	12	19,083,333	545,238.09	27	0	0	17,183,335	636,419.81	
Total	200	2,400		46,500,000		242	0		38,200,000		84,700,000

#2: Allocate the Labor and Machine related costs from Stage 1 into the Work Center above:

The Labor related cost of “PRD1” ($27,415,667) from Stage 1 will be distributed into the 2 Work Centers “KDHNGV” and “KDHWNG” in the ratio of the Labor Hour of (68:97); or $11,298,990 and $16,117,677.

Similarly the Machine related cost of “PRD1” ($21,016,665) from Stage 1 will be distributed into the 2 Work Centers “KDHNGV” and “KDHWNG” in the ratio of the Machine Hour of (97:118); or $9,481,937 and $11,534,728.

This establishes the Actual Labor and Machine Cost by Work Centers.

It also allows the Actual Labor Rate and Actual Machine Rate to be calculated which will be used in the following stage:

Actual Labor Rate = Actual Labor Amount / Labor Time; or $166,161.62

Actual Machine Rate = Actual Machine Amount / Machine Time

Stage 3: Calculate the Actual Labor and Machine Cost per Warehouse/Item/Work Center

There are also 2 separate process involved in Stage 3:

#1. Accumulate Number of Labor/Machine Time by Warehouse/Item/Work Center based on Completed Jobs

This process retrieve all the “Completed” Jobs during the selected period and calculate the total of the Labor/Machine Time by Warehouse/Item/Work Center and create into the “zkr_ prodproccost_mst” table.

#2. Use the “Actual Labor/Machine Rate” in Stage 2 to calculate the Actual Labor/Machine Amount

Taking the first line of data from the below example, as the Actual Labor Rate is $166,161.62 from Stage 2. Thus the Actual Labor Amount is $166,161.62 * 26; or $4,320,202

WareHouse	Item	Work Center	Labor Time	Plan Labor Amount	Actual Labor Amount	Machine Time	Plan Machine Amount	Actual Machine Amount	Expense total
MAIN	KDH 201	KDHWNG	26	312	4,320,202	26		2,541,551	
MAIN	KDH101	KDHNGV	53	636	8,806,567	80		7,820,155	
MAIN	KDH101	KDHWNG	59	708	9,803,535	80		7,820,154	
MAIN	KDH301	KDHWN2	35	420	19,083,333	27		17,183,335	
MAIN	KDH302	KDHNGV	9	108	1,495,454	8		782,015	
MAIN	KDH302	KDHWNG	7	84	1,163,131	9		879,767	
MAIN	KDH303	KDHNGV	6	72	996,970	9		879,767	
MAIN	KDH303	KDHWNG	5	60	830,808	3		293,256	
			200	2,400	46,500,000	242	-	38,200,000	84,700,000

Stage 4: Consolidate Actual Cost from Stage 3 by Warehouse/Item removing Work Center

Data from Stage 3 has the Actual Cost by Warehouse/Item/Work Center. Stage 4 involves combining all records with the same Warehouse and Item into 1 record and taking away the Work Center details.

This will form the basis of the Actual Product Cost table for the last 2 processes in this Module.

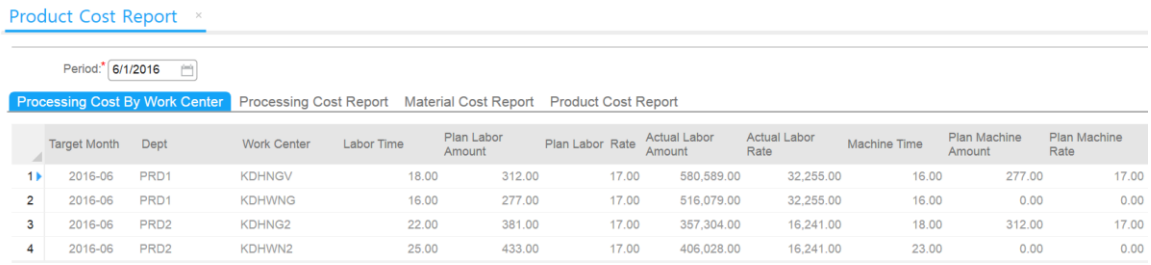
WareHouse	Item	Qty	Unit Of Measure	Plan Material Amount	Plan Labor Amount	Plan Machine Amount	Plan OutCost Amount	Actual Material Amount	Actual Labor Amount	Actual Machine Amount	Actual OutCost Amount
MAIN	KDH 201	3,000	EA	35,945	312	0	0	43,853.33	4,320,201	2,541,551	
MAIN	KDH101	6,000	EA	30,400	1,344	0	0	30,400	18,610,101	15,640,309	
MAIN	KDH301	600	EA	13,260	420	0	0	13,260	19,083,333	17,183,335	
MAIN	KDH302	200	EA	8,170.45	192	0	0	3,410	2,658,585	1,661,782	
MAIN	KDH303	200	EA	6,200	132	0	0	6,585	1,827,778	1,173,023	
Total				93,975	2,400	0	0	97,508	46,499,998	38,200,000	0

2.2.3. Reports

2.2.3.1. Product Cost Report

It is to review the product cost results using 4 tables. And for user's convenience this report is made as 4 tab screens.

First tab: Processing Cost by Work Center Report

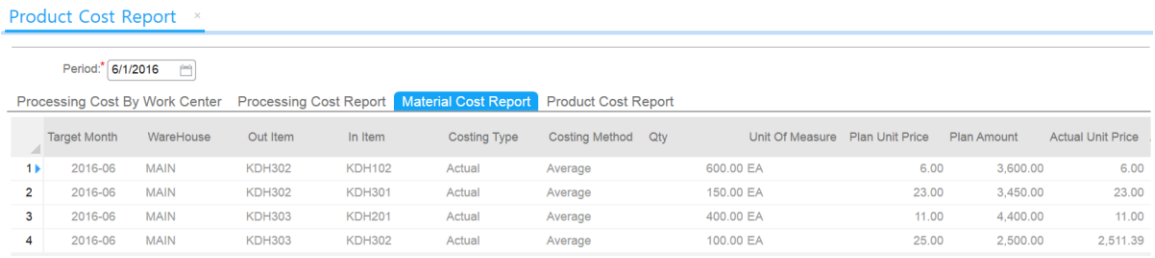


	Target Month	Dept	Work Center	Labor Time	Plan Labor Amount	Plan Labor Rate	Actual Labor Amount	Actual Labor Rate	Machine Time	Plan Machine Amount	Plan Machine Rate
1	2016-06	PRD1	KDHNGV	18.00	312.00	17.00	580,589.00	32,255.00	16.00	277.00	17.00
2	2016-06	PRD1	KDHWNG	16.00	277.00	17.00	516,079.00	32,255.00	16.00	0.00	0.00
3	2016-06	PRD2	KDHNG2	22.00	381.00	17.00	357,304.00	16,241.00	18.00	312.00	17.00
4	2016-06	PRD2	KDHWN2	25.00	433.00	17.00	406,028.00	16,241.00	23.00	0.00	0.00

Second tab: Processing Cost Report

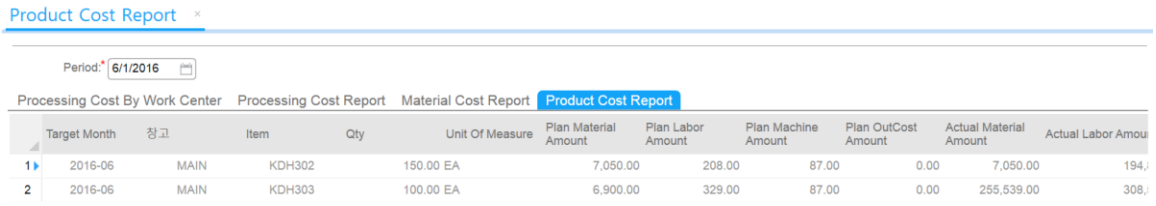
	Target Month	WareHouse	Item	Work Center	Labor Time	Plan Labor Amount	Actual Labor Amount	Machine Time	Plan Machine Amount	Actual Machine Amount
1	2016-06	MAIN	KDH302	KDHNG2	5.00	87.00	81,206.00	5.00	87.00	72,818.00
2	2016-06	MAIN	KDH302	KDHWN2	7.00	121.00	113,688.00	7.00	0.00	101,946.00
3	2016-06	MAIN	KDH303	KDHNG2	10.00	173.00	162,411.00	5.00	87.00	72,818.00
4	2016-06	MAIN	KDH303	KDHWN2	9.00	156.00	146,170.00	7.00	0.00	101,946.00

Third tab: Material Cost Report



	Target Month	WareHouse	Out Item	In Item	Costing Type	Costing Method	Qty	Unit Of Measure	Plan Unit Price	Plan Amount	Actual Unit Price
1	2016-06	MAIN	KDH302	KDH102	Actual	Average	600.00	EA	6.00	3,600.00	6.00
2	2016-06	MAIN	KDH302	KDH301	Actual	Average	150.00	EA	23.00	3,450.00	23.00
3	2016-06	MAIN	KDH303	KDH201	Actual	Average	400.00	EA	11.00	4,400.00	11.00
4	2016-06	MAIN	KDH303	KDH302	Actual	Average	100.00	EA	25.00	2,500.00	2,511.39

Fourth tab: Product Cost Report



	Target Month	창고	Item	Qty	Unit Of Measure	Plan Material Amount	Plan Labor Amount	Plan Machine Amount	Plan OutCost Amount	Actual Material Amount	Actual Labor Amou
1	2016-06	MAIN	KDH302	150.00	EA	7,050.00	208.00	87.00	0.00	7,050.00	194,
2	2016-06	MAIN	KDH303	100.00	EA	6,900.00	329.00	87.00	0.00	255,539.00	308,

2.3. Actual Material Cost Processing

There are some assumptions made related to the material cost calculation:

- Items will require the specific Cost Type/Method as described below

Classification	Source	Costing type / method
Raw/Subsidiary materials	Purchased	Costing type : Actual Costing method : Average
Commodities	Purchased	
Half finished Goods	Manufactured	Costing type : Standard Costing method : Average
Finished Goods	Manufactured	

  - Actual Weighted Average is the recommendable valuation method for Raw/ Subsidiary Materials and Commodities.
  - There is no limitation to the Cost Type and Method for manufactured items in this module. However for Korean company, it is typical for them to use Standard Average costing for manufactured item in this kind of analysis.

  - Items will require the specific Cost Type/Method as described below

- In order to capture all related costs with the completed jobs that happen during the selected period, all transactions whether material or job transactions to these completed jobs MUST happen during the same selected period. Otherwise it may not give a true monthly costing pictures.

2.3.1. Activity

2.3.1.1. Material Ledger Creation

There are also several stages of calculation to create data into separate newly created tables to come up with the final Material Ledger Report; or something similar to Infor CloudSuite industrial/Business Inventory Balance Report with the Beginning Balance, Input and Output Quantity/Amounts as well as Ending Balance for the selected period using the “Actual” cost calculated in the prior processing.

Stage 1: Calculate the Actual Material Cost

Processing Logic:

- Calculate material cost
  - Get the input item and output item.
  - Calculate the output material's cost using raw material and commodities's standard cost.

The creation of the above comes from scanning all the matltran that are related to completed jobs during the selected period.

The costing of the various related items, whether FG, sub-assemblies or materials are calculated with the below logic:

- “Purchased”: For the Purchased items issued to the jobs, it will use the purchase cost.
- “Last Month’s Cost”: For manufactured items that have no “F” or production or receipt back to inventory during the month, and only consumption or “I” of matltran found, it will use last month’s cost for this item in the above table creation.
- “In/Out at same time”: For manufactured items that have both “I” and “F”; or Issue into production and receipts back to inventory during the selected period, it will also use the cost inside matltran in the above table creation.
- “Simply-Add”: For manufactured items that all the materials are purchased items, it will simply add the cost from the related “Job Issue” matltran of those materials.
- “Need to be roll-uped”: This needs to be calculated in the following stage.

WareHouse	Out Item	In Item	Qty	Unit Of Measure	Plan Unit Price	Plan Amount	Actual Unit Price	Actual Amount
MAIN	KDH 201	KDH 202	12,000	LB	1	14,400	3	36,000
MAIN	KDH 201	KDH101	1,550	EA	14	21,545	5	7,853
MAIN	KDH101	KDH102	6,100	LB	4	24,400	4	24,400
MAIN	KDH101	KDH103	24,000	FT	0	6,000	0	6,000
MAIN	KDH301	KDH 201	300	EA	12	3,660	12	3,660
MAIN	KDH301	KDH102	2,400	LB	4	9,600	4	9,600
MAIN	KDH302	KDH102	300	LB	4	1,200	4	1,200
MAIN	KDH302	KDH301	100	EA	70	6,970	22	2,210
MAIN	KDH303	KDH 201	400	EA	12	4,880	12	4,880
MAIN	KDH303	KDH302	100	EA	13	1,320	17	1,705
Total					134	93,975	83	97,508

Stage 2: Repeated “Need to be roll-uped” calculation for remaining items with no cost

Firstly it will loop data to find items in there that has no cost. It will then do the “fill-up” of the costing data.

Take below example, “KDH201” has no cost. It will then retrieve the lines in the data to find the lines with “KDH201” in the “Out” (Out of production into inventory) transactions, and accumulate the costs related. As in the case, the cost is $36,000 + $7,853; or $43,853.

<zkr_prodmaster_mst table : Out(Issued) item's data >

Out Item	Quantity	Acutal unit Price	Actual Amounts
KDH101	6000	5.07	30,400
KDH201	3000	Need to be roll-uped	
KDH301	600	Need to be roll-uped	
KDH302	200	Need to be roll-uped	
KDH303	200	Need to be roll-uped	

Out Item	In Item	Qty	Unit Of Measure	Plan Unit Price	Plan Amount	Actual Unit Price	Actual Amount	Remarks
KDH 201	KDH 202	12,000	LB	1.2		3.00	36,000	Last month's cost
KDH 201	KDH101	1,550	EA	13.9		5.07	7,853	Simply added

Processing Logic:

- Aggregate the cost information and save them in zkr_prodmaster table
  * It is to sum the processing cost of zkr_proccostwc table and the material cost of zkr_prodmatcost_mst table

Stage 3: Create the Material Ledger Data

This involves the below steps:

#1: Create "BI" – Beginning Inventory records for the Material Ledger table "zkr_materialledger_mst"

- This first process with retrieve the last month's Material Ledger Ending Inventory (EI) and creates the corresponding Beginning Inventory (BI) data for this period

#2: Create "IN" – Receipts transactions for the Material Ledger table

- Accumulate all "matltran" by Period/Warehouse/Item and create 1 record into the "zkr_materialledger_mst" table with the total quantity ("Qty" field)
- "Monthly-Cost" is the Total Amount (not Unit Cost) of the related matltran transactions of the item with a "Receipt" Trans-Type; or
  - E.g. if there are 3 matltran of type "F" of that item with the below quantity:
    - Qty: 1, 2 and 3;
    - Cost; $2, 2 and 3;
    - Weighted Average cost is thus; (1 * 2 + 2 * 2 + 3 * 3) / 6; or $2.5;
    - Store $15 into "Cost" field
- This is stored into the "Cost" field of the "zkr_materialledger_mst" table

#2a: Update manufactured price difference

- For manufactured item only, only consider Trans-type "F"
- Actual Labor & Machine Cost Variance (L&M-Var):
  - "Plan material cost+ Actual labor cost + Actual machine cost + Actual outside cost" from zkr_prodmaster_mst table and then subtract " Monthly-Cost "

L&M-Var = Plan-M + Actual (M+L+O) – Monthly-Cost
L&M-Var – Plan M = Actual (M+L+O) – Monthly-Cost

- Actual Material Cost Variance (M-Var):
  - "Actual material cost+ Actual labor cost + Actual machine cost + Actual outside cost" from zkr_prodmaster_mst table and then subtract "Monthly Cost + L&M-Var"; or

M-Var = Actual M + "Actual (M+L+O) – Monthly-Cost" – L&M-Var
M-Var = Actual M + "L&M-Var – Plan M" – L&M-Var
M-Var = Actual M – Plan M; or simply the difference between actual and planned cost in the "zkr_prodmaster_mst" table

The "L&M-Var" or Labor and Material Variance as well as the "M-Var" Material Variance will update the "zkr_materialledger_mst" fields:

- L&M-Var: "Singlelevelpricediff"
- M-Var: "Multlevpricediff"
- These 2 amounts are the total amounts not the per unit cost of each Quantity

Inout_category: It can only be “BI”, “IN”, “OU” and “EI”

Inout_Type: This corresponds to matltran Trans-Type which can be shown as in the below table like “H”, “R”, “F” etc.

WareHouse	Item	Qty	Unit Of Measure	Plan Material Amount	Plan Labor Amount	Plan Machine Amount	Plan OutCost Amount	Actual Material Amount	Actual Labor Amount	Actual Machine Amount	Actual OutCost Amount
MAIN	KDH 201	3,000	EA	35,945	312	0	0	43,853.33	4,320,201	2,541,551	
MAIN	KDH101	6,000	EA	30,400	1,344	0	0	30,400	18,610,101	15,640,309	
MAIN	KDH301	600	EA	13,260	420	0	0	13,260	19,083,333	17,183,335	
MAIN	KDH302	200	EA	8,170.45	192	0	0	3,410	2,658,585	1,661,782	
MAIN	KDH303	200	EA	6,200	132	0	0	6,585	1,827,778	1,173,023	
Total				93,975	2,400	0	0	97,508	46,499,998	38,200,000	0

#2b: Calculate purchase price difference

- For Purchased items only consider the Purchase Receipt related Trans-type
- If there is a price difference between received amounts and vouchered amounts, create a “zkr_materialledger_mst” record for the Purchased Items and have the price difference stored into the “Singlelevelpricediff” field.

#3: Create the “AFS” – Available for Sales Material Ledger transaction

- This is based on the sum of the “BI” and “IN” records created above.

#4: Create the “OU” Material Ledger transaction

- This creates the “OU” transaction record by going through the “Issue” type of “matltran” table.
- Exceptions: There are 2 exceptions:
    - Special Usage:
        - There may be cases when the customers want to use the standard cost in an issue like internal consumption or sample usage instead of the actual cost.
        - A specific reason code is set up for Miscellaneous Issue like “STD” that allows the program to determine that the specific Material Transaction “matltran” will use the standard cost in the “OU” calculation and creation.
        - Should not “hard-code” “STD” into the code; but preferably create a user-defined lists of “Special Code” that the program will check against and use the Standard Cost accordingly.
    - In-Out items:
        - In the cases where a manufactured item is produced as well as consumed during the period, the users would like to use different cost method in the Receipts and Usage transaction
            - Receipts: Standard cost
            - Usage: Actual cost

#5: Creates the “EI” Material Ledger Transaction

- This is based on the sum of the “BI”, “IN” and “AFS” records and subtract the “OU” transactions created above.

Final Result as shown in below table:

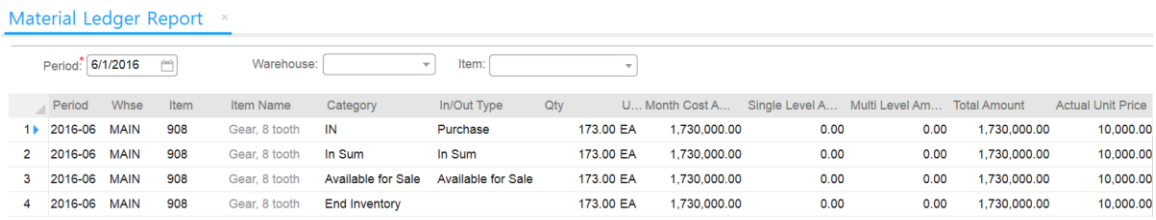
- All costs are distributed according to the quantity ratio between the Items Issued and Ending Inventory. E.g. 675 of monthly cost will be distributed between 10/13 and 3/13 and the monthly total average cost is 53, which will be shown in the Material Ledger report.

Site	Period	Warehouse	Item	input /output category	input /output type	quantity	unif of measure	Unit of plan cost	Monthly Cost	single level price difference	multi level price difference	Actual cost	Unit of actual cost
A100	2015.1	Main	A10000	BI		5	Each	55	275			275	55
A100	2015.1	Main	A10000	IN	R	8	Each	50	400	12	4	416	52
A100	2015.1	Main	A10000	Available for sale		13	Each	50	675	12	4	691	53
A100	2015.1	Main	A10000	OU	S	10	Each	50	519	9	3	532	53
A100	2015.1	Main	A10000	EI		3	Each	50	156	3	1	159	53

2.3.2. Report

2.3.2.1. Material Ledger Report

It is to review the material ledger results.



	Period	Whse	Item	Item Name	Category	In/Out Type	Qty	U...	Month Cost A...	Single Level A...	Multi Level Am...	Total Amount	Actual Unit Price
1	2016-06	MAIN	908	Gear, 8 tooth	IN	Purchase	173.00	EA	1,730,000.00	0.00	0.00	1,730,000.00	10,000.00
2	2016-06	MAIN	908	Gear, 8 tooth	In Sum	In Sum	173.00	EA	1,730,000.00	0.00	0.00	1,730,000.00	10,000.00
3	2016-06	MAIN	908	Gear, 8 tooth	Available for Sale	Available for Sale	173.00	EA	1,730,000.00	0.00	0.00	1,730,000.00	10,000.00
4	2016-06	MAIN	908	Gear, 8 tooth	End Inventory		173.00	EA	1,730,000.00	0.00	0.00	1,730,000.00	10,000.00

2.4. Profitability Analysis (PA)

Profitability Analysis is literally to analyze a company's sales activities in the view of profitability. That means it consists of the point of views and values. We set 3 point of views; sales department, customer, and items. And we think several values called value fields; sales amounts, cost of goods sold, and other expenses.

This allows a PA Allocation Cycle to be define for the purpose of like allocating Sales-Related Departments' General Costs to Direct Sales Department, Customers and Items at the same time.

2.4.1. Maintenance

2.4.1.1. Value Field

This defines the "Value Field", like Sales, COGS and Marketing and used in the following definition below.

Value Field

	Value Field	Value Field Name
1	01. Sales	Sales
2	02. COGS	Cost of Goods Sold
3	03. HR Exp	HR Expenses
4	04. OtherE	Other Expenses
5	05. FixedE	Fixed Expenses

2.4.1.2. Account-PA value field Mapping

To see the profitability we need accounts. But there are so many accounts in chart of accounts. So we made some aggregated accounts concepts like value fields.

- Value Fields: This defines the dimension required to analyze the profitability. E.g. Sales, COGS, Marketing etc
- Each Value Field relates to a group of accounts that may not be consecutive numbers; thus the need of the Account Group concept to allow multiple segments of Accounts Code to be included into a Value Field record.
- Account Group is the same as that defined in the prior chapters

Account Value Field

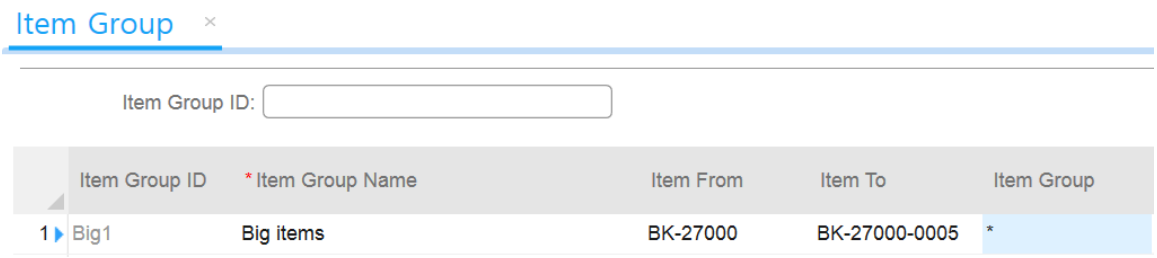
	Value Field	Account From	Account To	Account Group ID
1	01. Sales	40000	411001	*
2	02. COGS	43210	43218	*
3	03. HR Exp	511001	521001	*
4	04. OtherE	525001	529001	*

2.4.1.3. Customer Group

This defines the Customer Group for profitability analysis

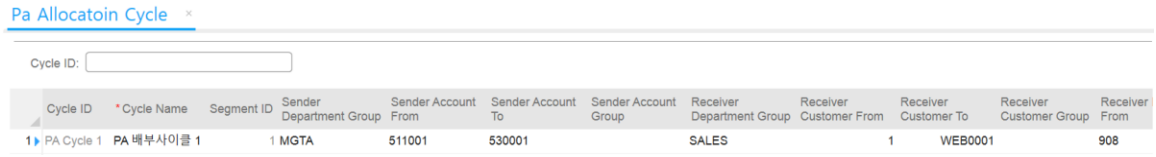
2.4.1.4. Item Group

This defines the Item Group for profitability analysis.



2.4.1.5. PA Allocation Cycle

This defines the detail for a PA Allocation Cycle that include the following information:



- Cycle ID:
- Cycle Name:
- Segment ID:
- Sender:
    - Department: Department Group
    - Account: Can enter either “From” / “To” Account or Account Group
- Receiver:
    - Department: Department Group
    - Customer: Can enter either “From” / “To” Customer or Customer Group
    - Item: Can enter either “From” / “To” Item or Item Group
- Allocation Rule:
    - Account: Can enter either “From” / “To” Account or Account Group

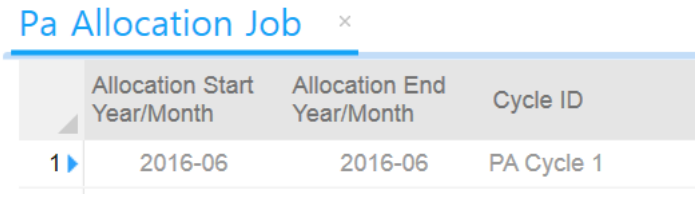
2.4.2. Activity

2.4.2.1. PA Allocation Job

This generates the PA allocation data.

It will get the PA cycle-defined cost from the zkr_ledger_mst table as the input, and then distribute the sender account amounts using the specified allocation rule and finally save the results.

Only management (sales) expense are distributed in this allocation. Sales/COGS should not be distributed.



2.4.3. Reports

2.4.3.1. PA Analysis Report

The PA Analysis report is below;