Seradex White Paper

A Discussion of Issues in the Manufacturing OrderStream

Lean Accounting

Lean Manufacturing and the General Ledger

Lean has been applied very successfully to the shop floor with admirable results. There has been some literature published on approaches to applying Lean principles to the accounting department but I found it somewhat vague and wanting.

Prior to automation the periodic inventory system was commonly used by manufacturing companies.

Income Statement

Sales Revenues		
Sales		**480,000**
Cost of Goods Sold		
Inventory, Beginning of Month	36,000	
Purchases	320,000	
Cost of goods available for sale	**356,000**	
Inventory, End of Month	40,000	
Cost of goods sold		**316,000**
Gross Profit		**144,000**
Operating Expenses		
Administration	20,000	
Sales and Marketing	60,000	
Research & Development	34,000	
Total Operating Expenses		**114,000**
Net Income		**30,000**

The cost of goods sold was a summary number for the entire month. The main drawback of the Periodic system was that there was no costing available by product or customer so profitability analysis was very limited.

The Ascendancy of the General Ledger

Once accounting software evolved more sophisticated capabilities became widely available to even the smallest of manufacturing companies. The accounting profession began to use the software for more operational analysis including cost breakdowns. Often the General Ledger was used to hold information at a very detailed level and became the data warehouse for the company.

Accounting Software began to expand where vendors could proudly claim that their GL Accounts could contain up to 45 digits and seven segments.

This was driven by the accounting professions. For example the Nokia GL Account structure is:

Nokia General Ledger Coding

Segment	1	2	3	4	5	6	7
Digits	4	4	4	4	4	4	4
	Company						
		Business Unit					
			Business Segment				
				Product Line			
					Department		
						Account	
							Sub Account

Example	Nokia USA	Cell Phone	Consumer	Value Priced	Sales & Marketing	Salaries	Graphic Arts
Code	1213	2000	1100	5000	6000	3000	7001

1213-2000-1100-5000-6000-3000-7001

So when payroll created pay check for a Graphic Designer the cost would be debited to GL Account 1213-2000-1100-5000-6000-3000-7001.

On the surface the system seems very logical. If you wanted to know how much Nokia spends worldwide on Graphic Design salaries you just create a report to total all amounts in segment 7 that match code 7001.

Of course there are a few downsides. Namely clerks are entering 28 digit codes for every journal entry which is a little unwieldy. Nokia is a large company there are:

65 Operating Companies
12 Divisions
4 Business Segments
125 Product Lines
65 Departments
400 Accounts
1800 Sub Accounts

This would require 65 * 12 * 4 * 125 * 65 * 400 * 1800 or over 1 trillion possible accounts to cover every combination. As not all divisions have the same segments or product lines only a sub set of all accounts applies to each company and division.

The maintenance of this system requires considerable effort and every merger or acquisition would dictate that thousands more accounts to be added.

Also if you have developed sales analysis reporting system any new acquisition or change to product groupings will break all exiting reports. Let's say you were interested in salaries paid to graphic designers and copywriters in North America. This type of query becomes very complex as well as difficult to verify the accuracy of the report.

When you are compiling budgets you need budgets for thousands of accounts by month. Isn't this unmanageable?

Is there a better way?

The fundamental difference is the double entry accounting system vs. the relational database system. It turns out that double entry accounting certainly has its purpose for financial statements it immediately runs into problems when detailed reporting is required.

The science used to successfully to tackle the most difficult detailed reporting is relational database design.

Back to Fundamentals – What is a General Ledger for?

The General Ledger is used for generating financial statements (balance sheets and profit and loss statements) to meet legal and regulatory requirements. It records transactions. The General Ledger is the central foundation of Financial Accounting. The G/L summarizes accounting transactions using sub-ledgers and direct account assignment.

The General Ledger's function is not to support business operating decisions regarding the purchasing cycle, sales, logistics, accounts receivable, accounts payable, etc. These are not General Ledger activities.

A Business Process is a set of activities that takes one or more inputs that creates an output that is more valuable to the customer – Hammer & Champy

The following comments may arouse a reaction from the accounting community but I believe that best practices for a general ledger are:

The primary function of the general ledger is not to support operations
The number of accounts should be minimal (below 100 in most cases) and use them only for the financial reporting.
It must conform to GAAP (Generally Accepted Accounting Principles).
It should have divisional and business unit segments so a P&L exists for each business unit
It should not have departments or cost centers
It will receive summary postings for all fiscal events in the business system
It should be architected so the postings are easily traceable back to the business system and followed by drill downs or reports. Full detailed audit trails must be kept.
One valid reason for sub accounts is currency, so several sub accounts with different currencies would roll into one master
Postings from sub ledgers are made in summary form to control accounts – all detail is kept in the sub ledger.
Sales and cost of sales can be grouped into a handful of product segments. These segments should each be addressed in the strategic plan and have focused sales and profit targets. The segments should isolate areas of the business where the there are the best opportunities for growth and profit.

Income Statement		YTD	Previous Year	Budget
Sales Revenues				
Consumer	300,000			
Industrial	120,000			
Service	80,000			
Sales		**500,000**		
Cost of Goods Sold				
Consumer	200,000			
Industrial	110,000			
Service	20,000			
Cost of goods sold		**330,000**		
Gross Profit		**170,000**		
Operating Expenses				
Administration	20,000			
Sales and Marketing	60,000			
Research & Development	34,000			
Total Operating Expenses		**114,000**		
Net Income		**56,000**		

By examining the product segments we can see that the Industrial segment is having profitability issues. It has $120,000 in sales and $110,000 in cost of sales. By comparing the sales and cost of sales with prior year and budgets we can get a quick indication of execution success.

What Should not be in the General Ledger?

Now that we have discussed what should be in the General Ledger let's look at what is missing.

Detailed Sales Analysis

One of the most valuable and easy to implement components of an ERP system is Sales Analysis. For each line item sold we would recommend tracking some basic attributes including;

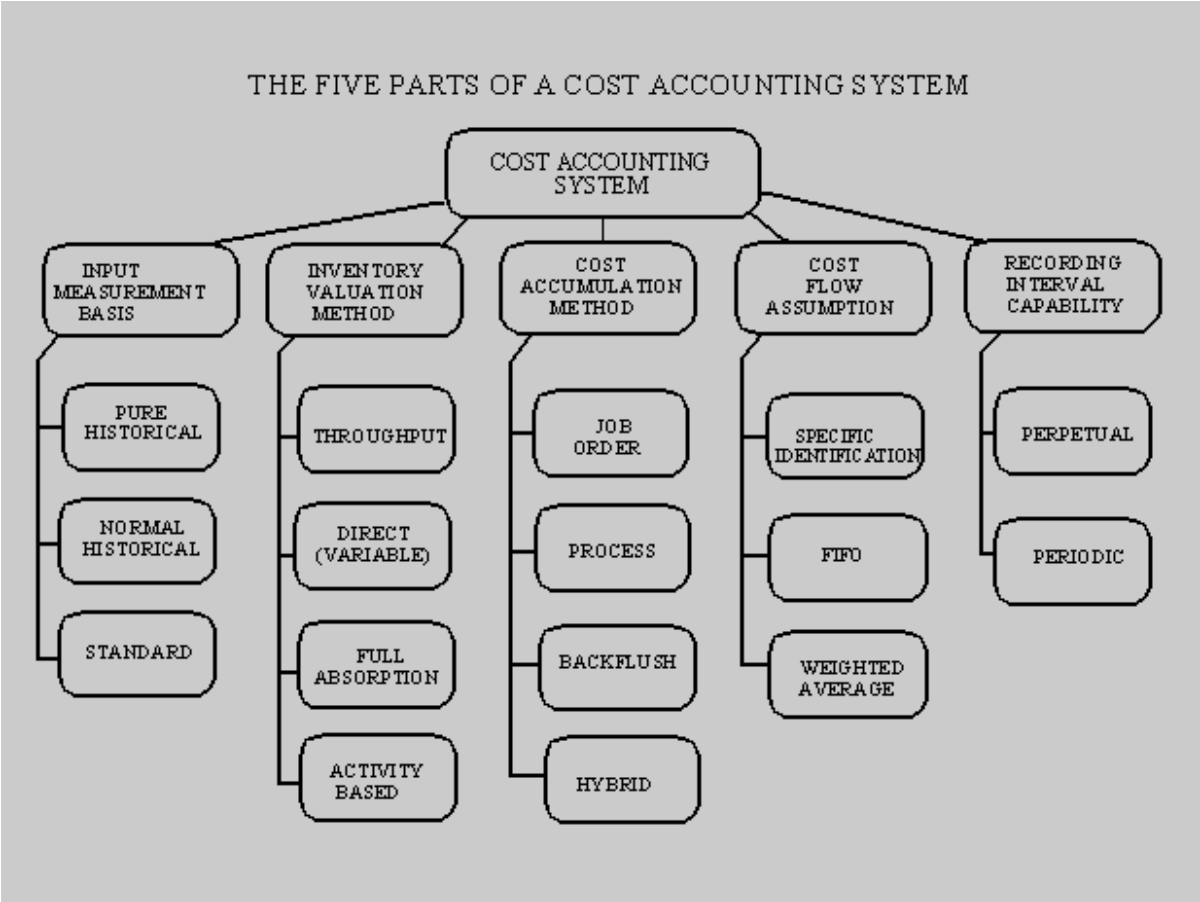
- Date - Year, Quarter, Month, Day
- Item
- Product Category
- Qty Sold
- Unit and Extended Price
- Discount
- Unit and Extended Cost
- Margin
- Currency
- Exchange Rate
- Customer
- Customer Group
- City
- State
- Territory
- Sales Rep
- Commission
- Sales Tax
- Bill of Material

The above details are summarized on periodic basis and posted to the general ledger. It now becomes very straightforward to use any common report writer or spreadsheet to analyze any selection, combination or variant. In addition most systems allow other user definable fields to be added.

The detailed sales analysis information should tie into actions identified in the annual strategic plan so progress can be reported on.

Cost of Sales Analysis

Cost of sales is more complex than pure sales analysis.



There are a wide variety of costing approaches. Here are some issues that must be decided on before architecting the cost reporting system.

Issue	Description	Advantage
Standard Costs	Will commonly purchased and manufactured items be assigned a frozen standard cost	Provides stable benchmarks to compare costs throughout the year
Actual Material Costs	Flow costs assigned at Purchase Order through manufacturing and into finished product on a FIFO basis	Ensures all items sold and kept in inventory include actual material costs. As costs increase accurate margins are available in real time for quick decision making
Actual Labor Costs	Requires shop floor labor to be recorded against work orders.	Ensures all items sold and kept in inventory include actual labor costs. As costs increase accurate margins are available in real time for quick decision making
Standard Labor Costs	Include a preset amount of labor in the manufactured cost of repetitive products.	No need for shop floor data labor collection but if standard hours are not accurate then product costs will also be inaccurate. However total standard labor absorbed can be compared to total labor paid for “ballpark” reviews

Hourly Labor Costs	Should these include only direct labor cost, labor plus direct machine costs, indirect supervision, factory charges and maintenance costs?	A clear understanding of what costs are included is required.
Estimated Material Costs	Compare the items transferred to production to the Estimate to identify material variances.	What level of variance is material?
Estimated Labor Costs	Compare the actual labor to the Estimated labor to identify labor variances.	Shop Floor data collection is required.
Overtime	Should actual overtime paid be assigned to the job.	Often the job worked on in overtime is the result of another rush job – should it be penalized? Recommendation is to include an average overtime amount in the standard labor rate so all jobs are treated equally.
Back flush	Will actual material be counted and issued to the shop floor or will production orders back flush material requirements?	Back flush results in inventory lags – items are actually picked before system inventory is updated but it does save one inventory posting.
Scrap & Rework	Will this be tracked and costed to the production order? Is the expected scrap built in to the bill of materials	Can lead to insight to improve operations
Overhead Absorption	Will any overhead be absorbed through labor hourly rates or material factors?	Will this include building costs, supervision, utilities, tooling, benefits, insurance?
Set up Times	Will actual setup times be collected from the shop floor	If setup is material this will provide more accurate schedules as well as costs.
Down Times	Will information and reason codes be collected on shop floor downtimes	Will the cost of down time be reflected in product costs?
Make to Order vs. Make to stock	Will the same costing logic apply? Are there standard run quantities on make to stock items? Is setup costs amortized over the size of the production batch?	

Other Analysis

There are other areas where management control and reporting can be an issue. This includes production scheduling, purchase and vendor analysis, after sales service and inventory control.

Conclusion

The General Ledger is to be utilized to record summarized fiscal transactions in accordance with GAAP. Detailed transactional information is kept in sub ledgers and operational analysis is done using an industry standard report writer. Detailed Sales Analysis is readily available but costing analysis requires an understanding of your requirements and system functionality.

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