

Development and Implementation of Value Stream Income Statements in Support of A Company's Lean Transformation

Chris Bain^{1*} and F. Frank Chen²

¹Lancer Corporation
San Antonio, Texas, 78232, USA

²Center for Advanced Manufacturing and Lean System
& Department of Mechanical Engineering,
University of Texas at San Antonio,
San Antonio, Texas, USA

ABSTRACT

The goal of this project was to provide lean income statements specific to Lancer corporation's 11 value streams. A Lean income statement, often referred to as a plain English Profit and Loss statement, is a very easy to read financial statement that does not include allocations or accruals. This format gives value stream managers a straight forward financial report specific to their value stream activities. Several criteria had to be met for the project to be successful. The main two goal s were to only charge the value stream for expenses that were both controllable and measurable, no indirect allocations would be used to assign cost. The second requirement was to not change the company's current accounting methodology. Lancer uses typical standard costing methodology to track and cost inventory within an ERP system. Ultimately the project was successful, real time income statements were made by carving out data from both operational and financial transactions. Aside from some initial organization of expenses and warehouses, no additional data collection was added to support these reports.

1. INTRODUCTION

A lean Income statement can be referred to as a "plain-English P&L", providing management an easy-to-understand income statement. While the benefits of a lean income statement are abundant, the legal requirements and general difficulty in converting income statements to this new format often prevent companies from keeping their official books in this format. The goal of this project was to provide all the benefits of lean value stream income statements without changing the company's official reporting methodology.

2. PAST CASE STUDIES AND RESEARCH

Cable [1] stated regarding Orest Fiume's experience "An informal survey of his workshop attendees several years ago revealed that while more than 80% of respondents had begun applying lean concepts (such as waste removal) to their accounting operations, fewer than 20% said they had switched from standard cost accounting to simpler lean-reflective accounting statements." Generally speaking, changing from a traditional inventory and production cost accounting methodology to a lean P&L to account for COGS is one of the last changes a company makes during a lean conversion. That being said, it is possible to keep the official reported books using a traditional costing system but also create a Lean P&L to be used to review performance. The common problem with this method is the two income statements can produce different results. The Lean income statement can look great while the traditional income statement won't be quite as favorable due to a drop in inventory. After the inventory has stabilized, the two income statements will begin to realign and produce similar bottom line results.

* Corresponding author: Tel.: (210) 535-3607; E-mail: Chrisb2215@yahoo.com

Kroll [2] posted the following tips for accountants in companies trying to transition their financial statements to Lean financials: “Because traditional accounting was designed to support mass production, many of its assumptions contradict lean manufacturing. As a result CPAs may want to recommend businesses with lean operations implement alternative accounting concepts to better capture their performance. Lean adherents suggest a new way of looking at the numbers: Rather than categorizing costs by department, CPAs can recommend companies organize them by value stream, which includes everything an entity does in creating value for a customer that it can reasonably associate with a product or product line. CPAs should encourage companies moving to lean accounting to resist the temptation to eliminate standard reporting entirely. Businesses should supplement their traditional financial statements with additional information that captures the improvements lean manufacturing brings. Instead of eliminating the standard reporting system overnight, companies should dismantle it piece by piece as their underlying operations change.”

3. COMPANY BACKGROUND

Lancer began its lean journey in 2007. Similar to most companies, they began by creating work cells, implementing lean material flow through a visual Kanban system, and focusing on implementing standard work throughout the production process. As the Lean culture developed and processes were put in-line the traditional manufacturing departments were replaced with product model-focused value streams. These value streams continually grew by absorbing the back shop work into their process. Items such as wiring harness and small sub-assemblies were built in-line with the finished good product. As this happened, the back shops that previously assembled these parts shrunk in size and in some cases were eliminated altogether. The Value stream managers were given several additional responsibilities in respect to their value stream. In addition to the production management they had design engineers, and material planers reporting to them.

For inventory tracking and financial reporting purposes the company has always used a standard costing system, allocating overhead by plant through the use of a fully burdened overhead rate. This methodology is fine to view the company’s financials as a whole and satisfy legal financial reporting requirements, but it does not provide any detail of value stream financial performance. The majority of lean improvements result in a favorable variance to standard cost which gets buried in the general COGS statements and cannot be tracked back to value stream performance.

4. PROBLEM STATEMENT

As management was restructured around the value streams, the traditional financial metrics were not sufficient because they did not provide a holistic view of the financial impacts of the value streams’ work and lean progress. All lean improvements were buried in the general overhead rates and then spread back over all production. The improvements were hitting the bottom line, but it was not evident why or where the improvements were coming from. As Lean thinking became the norm, a new metric was needed to display and measure the performance of these growing value streams.

5. SOLUTION:

The ideal solution was to create a unique value stream income statement for each value stream. These income statements would provide a lean financial measurement specific to the value streams and measure the actual dollar amounts for the following period costs.

1. Labor Costs (direct, indirect, benefits) for all personnel assigned to that value stream
2. Material Costs (value streams will be assigned unique warehouses to track material flowing in and out)
3. Expenses (cost of tooling, maintenance and repair etc....)
4. Sales- The finished good products that each value stream produces will be tagged with a unique identifier and actual sales dollars will be captured at time of invoice.

These income statements needed to meet the following requirements.

1. Display expenses specific and controllable by each value stream- no estimations or allocations for spending would be used.
2. Provide easy access- ideally managers would not need any assistance from accounting to view reports.
3. Use real time data directly from the Enterprise Resource Planning (ERP) system- no additional accounting corrections or monthly entries would be required to provide accurate reports.
4. Make detail available- each figure on the income statements would have drill-down capability that displayed the line item details. The details could be analyzed to create future cost down projects.

5.1. CHALLENGES

Although the company has come a long way in creating value streams that are focused on building product families from start to finish, the nature of certain processes and deep integration within the company require certain monumental processes that cannot be integrated into the value streams due to practical constraints, for example the foundry and plastic injection areas. These areas are still treated and managed like a true value stream following lean principles and making continuous improvement. The reporting difficulty with these monumental departments is that the majority of their “customers” are other value streams within the company. To create a balanced income statement for these monumental departments, a transfer price was used. We chose to use the cost accounting standard cost plus a fixed internal margin of 20%. The internal margin percentage was an arbitrary number. The importance is that it remains static so that it does not become a variable when trending the income statements. The fallacy in this is that the standard cost for any particular part is only updated annually per the current accounting procedures and is calculated using the fully burdened plant overhead rate. For a transfer price, this was the most accurate figure available.

Initially there was some cleanup that had to take place. To calculate an accurate material cost each value stream had to use its own unique inventory warehouse in the ERP system. Initially multiple value streams were utilizing the same locations to store and transfer materials in the system. Several onetime fixes had to take place to get this correct and provide accurate material figures. Over the course of three months this issue was corrected. Going forward, all new item setup will take into account the value stream locations and should not cause a problem.

6. EXAMPLES

As a theoretical example, a widget company produces and sells widget figurines. The widget company has three product lines and corresponding value streams—one for large, medium, and small widget production. The widget uses a traditional standard costing system to track inventory and COGS. This example will focus on the medium widget value stream.

The medium widget value stream builds medium widgets. This value stream takes the raw material through the entire manufacturing process, finishing with the packaging of the finished item to be sold to the customer. The one exception to this is that this value stream produces widget hair for all three value streams. The expensive machinery and skilled labor required to produce widget hair makes it financially impractical for all three value streams to own and operate a hair machine. Likewise the large widget value stream produces the widget bodies for all three value streams due to the same financial constraints.

Throughout the month the following activities took place for the medium widget value stream

1. Invoiced \$5000 worth of medium widgets to the customer
2. Received \$2000 of raw materials

3. Received \$200 worth of widget bodies from the large widget value stream
4. Paid \$750 in personnel related expenses (Salaries/Benefits)
5. Paid \$200 in other departmental expenses
6. Transferred \$400 worth of widget hair to the other two value streams

Given these transactions, table 2 below shows their monthly income statement. (Numbers in parenthesis correlate with list above.)

Table 1.

Medium Widget Income Statement	
External Sales	
Medium Widgets (1)	5,000
Internal Sales	
Widget Hair (6)	400
Total Sales	5,400
Costs	
Material Receipts (2)	2,000
Work order Receipts(3)	200
Dept Expenses (5)	200
Payroll (4)	750
Total Expenses	3,150
VS Profit	2,250
ROS	41.7%

6.1. PROJECT IMPLEMENTATION EXAMPLE

Table 3 below shows an example of one of the more complex value stream income statements that was created. The value stream in this example manufactures a common component for the company. Some are sold directly to external customers and some are delivered to other value streams for use in finished units. Because the same items can be used internally or externally the value stream has both internal and external sales.

Table 2.

Example Income Statement									
	Jun		Jul		Aug		Sep		
External Sales									
Item type 1	400,000		425,000		200,000		150,000		
Item type 2	500,000		325,000		400,000		600,000		
Item Type 3	200,000		-		150,000		250,000		
Item type 4	150,000		100,000		350,000		200,000		
Item type 5	50,000		50,000		100,000		-		
Total External Sales	1,300,000		900,000		1,200,000		1,200,000		
Internal Sales									
Work Order Deliveries	200,000		100,000		200,000		200,000		
Transfers	1,400,000		1,100,000		1,700,000		1,100,000		
External COGS	(800,000)		(725,000)		(1,100,000)		(900,000)		
Total Internal Sales	800,000		475,000		800,000		400,000		
Total Sales	2,100,000		1,375,000		2,000,000		1,600,000		
Cost		%		%		%		%	
		Sales		Sales		Sales		Sales	
Material Receipts	820,000	39%	900,000	65%	860,000	43%	1,000,000	63%	
Work Order Receipts	30,000	1%	5,000	0%	10,000	1%	20,000	1%	
Dept. Expenses	10,000	0%	15,000	1%	10,000	1%	10,000	1%	
Payroll	90,000	4%	110,000	8%	125,000	6%	100,000	6%	
Total Expenses	950,000		1,030,000		1,005,000		1,130,000		
VS Profit	1,150,000		345,000		995,000		470,000		
ROS	54.8%		25.1%		49.8%		29.4%		

*Values changed to protect proprietary information

Below is a brief description of each line

- **External Sales:** Actual invoiced amount to the customer for the value stream's items grouped by product family.
- **Internal Sales Work Order (WO) deliveries and Transfers:** These reflect material being delivered by the value stream to an internal customer.

- **Internal Sales External COGS:** As items are delivered to other value streams or shipping warehouses they are counted as an internal sale. If this same item gets sold to an external customer at a later date, it will also get counted as an external sale. In order to avoid counting the revenue twice, this line reverses the internal sale revenue that was originally reported.
- **Total Sales:** Sum of total internal and total external sales.
- **Material Receipts and WO Receipts:** This reflects material entering the VS. The WO receipt line accounts for direct production order deliveries from other value streams. The material receipts line reflects transfers of raw material or transfers from other value stream supermarkets.
- **Department Expenses:** This includes all non-personnel related expenses, such as IE depreciation, machine repair and maintenance, and expense tooling. This figure doesn't include any type of allocated expense. If the expense is not measurable and controllable by the value stream it is excluded.
- **Payroll:** This includes all payroll and benefit expenses for the value stream.
- **VS Profit:** Total sales less Total Expenses
- **ROS:** Profit / Total Sales

7. OUTCOME

In total, ten value stream income statements were created throughout the course of this project. They are currently being reported in a trended format and reviewed by the CEO of the company each month. The value stream managers are actively reviewing each month's outcome and presenting to the company's executive group. The presentation involves explaining any major increases and decreases, providing future state goals and reviewing the current planned improvements and kaizan events that will help to achieve these goals for a future state.

The value stream income statements were completely automated using a structured query language (SQL) based report writer. These reports were published to the Intranet and can be run at will for any time frame by the value stream managers. They have the ability to run the reports mid-month to check on their current financial progress. All the data is real-time, there is no delay for accounting to publish the official financial numbers, nor is there any additional non-value added time for accounting to produce these additional financial schedules. All the data needed for these income statements already existed in the ERP system so there were no additional data collection requirements to produce these reports.

Another positive effect that creation of the income statements had was it helped operations managers better understand the financial side of the company. They are able to associate the parts they bring in, money they spend, and operators they hire with their monthly income statement and then get an idea of how the decisions they make affect their profitability.

Because these value stream income statements only took revenue at the sale of a finished good, they clearly displayed the true volatility the company experiences on certain product lines. Unit sales and corresponding sales dollars can have 60% - 75% swings month to month. One of the keys to making lean manufacturing work is level pull. Before this volatility was hidden by the methods used to create the standard income statement.

7.1. FUTURE IMPROVEMENTS

As the company continues its lean journey it will continue to grow the product family based value streams, as more processes are moved in-line the value streams will continue to grow, slowly phasing out the monumental processes where feasible. These income statements will dynamically change with the shop floor's progress and clearly display the effect of improvements. Going forward the data that is generated for these income statements can be used to assist in planning or estimating forecast for longer lead time items consumed by the value stream.

7.2. CASE STUDY CONCLUSION

The Project Met the initial Goal of providing a meaningful lean income statement specific to the value stream without adding additional non value added data collection or modifying the companies official financial reporting methodology. For the first time, the value stream managers had a financial statement that was meaningful to them and more importantly they had direct control over the outcome of the statement. The company's 2012 incentive plan adopted the value stream performance as a metric and value streams can earn a bonus based on their performance. Since the implementation of these lean income statements the company's total on hand inventory value has dropped by over 20%. This drop in inventory can be attributed to several factors and lean initiatives by other departments but the lean income statements created a motive to reduce inventory.

7.3. SIGNIFICANCE

This project took traditional Lean income statement methodology and applied the basic principles to simulate multiple lean Value stream income statements within a company. The approach of using the already present ERP information and transactions to measure material cost and spending is the true significance of the project. No additional non value added data collection was required to support the income statements. The way in which Cost is calculated using the transactions within the company offers a truly dynamic income statement. As the value streams absorb more of the total overall process from the monuments throughout the company the income statements dynamically adjust to this because the raw materials used are now brought into the value stream, which is how the cost is collected. There are several formats for lean income statements but multiple value stream specific income statements within the same company are unique.

REFERENCES

- [1] Cable, J. (2009, September). *Lean Accounting's quest for acceptance*. *Industry Week/IW*, pp. 26–28.
- [2] Kroll, K. M. (2004, July). *The lowdown on Lean Accounting*. Retrieved October 4, 2012, from *journal of accountancy*: <http://www.journalofaccountancy.com/issues/2004/jul/thelowdownonleanaccounting.htm>