S&OP and the Financial Plan
Labour is a Fixed Cost!

By: Duncan McLeod

Published: September 3, 2019

The last article in this series dealt with the relationship between fixed and variable cost. Some of the key points from that article were:

- "**Contribution Margin**" is the difference between revenue and variable cost.
- The "**Contribution Margin**" should be managed at the "**Family**" level of the S&OP plan.
- Fixed costs do not change within their "**Relevant Range**"
- The "**Relevant Range**" is determined by the maximum output capability at a given fixed cost level.
- Fixed costs are variable at some time in the future. The key is the horizon.
- Fixed costs should be managed at the "**Site**" level of the S&OP plan.
- We can not project profit without combining fixed costs and volume.

Looking back, there was a lot in that article. Looking forward, I am going to look at some of the major cost elements and outline how I fit them into the model. In this article I am going to look at labour cost.

Let's start with some controversy. Labour is a fixed cost.

My industrial engineering training was based on the premise that direct labour was a variable cost. We focused on calculating and improving the time it took to make a unit and then multiplied that time by the labour rate to calculate the direct labour cost of the unit. The assumption was that this cost varied directly with output and when workers were not making units, they were not getting paid.

A long time ago, this approach may have had merit, and maybe there are some remote examples where it still does but I have not seen one for a long time. Let's look at why it does not make sense to treat labour as a variable cost:

- **Today's workforce is more skilled and there is a significant investment required to develop these skills.** Most organizations do not want to lose skilled workers when there is a short-term shortage of direct work to be done.
- **Adding new direct employees adds cost before they become productive.** This added cost does not fit the variable cost characteristics
- **In most economies there are significant costs associated with laying off or terminating workers.**
- **A large portion of the work done in today's factory is "Indirect".** Equipment maintenance, quality management, material handling, supervision, training, scheduling and planning are all Indirect. The ratio of indirect to direct labour has continued to increase reducing the importance of the pure "Direct" labour content. Many people in

todays factory will be doing both direct and indirect work, making it difficult and irrelevant to account for the direct time as the person will be paid either way.

- **Batch sizes are much smaller.** As a result, workers work on many different parts through the day. In many cases it just is not practical to track the actual labour by item.

In my experience, the factory head count does not change within a time horizon. This horizon is at least a month, and typically three or more months. Changes in the size of the workforce must be planned well in advance and this should be a function of the S&OP process.

When we look at this headcount, we don't need to distinguish between direct and indirect labour. The total head count of the site should be considered in this cost pool and the cost pool should be treated as a fixed cost.

Except there is a twist. Overtime is variable and can be added or subtracted with relatively short notice. I have wrestled with the overtime issue for a while now and I believe the best way to deal with it is to treat it as a fixed cost with a very short horizon for change. My reasons include:

- **It is difficult to account for the additional overtime at the "Family" level in S&OP.** While it may be possible to directly relate a portion of overtime to a specific family, we need to determine if that additional cost belongs to that family, or to another family produced on standard time. There is no good answer to this question, which I believe supports treating it as a fixed cost.
- **Many plants (sites) use overtime as part of their standard capability.** Using overtime as part of the standard output capability makes it easier to reduce the labour cost without reducing headcount. Eliminating the planned overtime reduces the period labour cost without impacting headcount.

My premise is that labour costs should be treated as a period cost and not based on the planned output of units. The planned output must fit within the capability, the "**Relevant Range**". Let's look at an example comparing the two approaches.

The following chart represents the capability calculation for a family/site in growth mode. To meet an unexpected increase in demand, the plant is adding headcount as fast as possible. The basic Head Count parameters for this organization are:
- Each Employee can produce 10 equivalent units per month.
- 10% upside flexibility in output is available using overtime.
- It takes 3 months to train a new employee. (no output for 3 months)
- The plant can absorb a maximum of 3 new employees per month.
- The starting headcount is 100 employees.

Let's look at the highlights of this plan:

- They are increasing their headcount at three people per month, the maximum number of new people the plant can absorb. This is shown in row 1 of the chart.
- The effective headcount is increasing at the same rate but with a three-month lag. Notice that the 3 people added in M2 are effective in M4. This is shown in row 2.
- In months M7 through M11 the capability is constrained by equipment. This constraint is removed (new equipment) in M12. As a result, they cannot use all the available overtime in M7 through M11.

- There scheduled production over the 12 months totals 13,550 vs. a planned capability of 14,245. There are several reasons why there is a 695-unit difference but all we need to know is that there is a difference.

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	Total
Direct Labour													
Head Count	100	103	106	109	112	115	118	121	124	127	130	133	
Effective Head Count	100	100	100	103	106	109	112	115	118	121	124	127	
Capability without OT	1000	1000	1000	1030	1060	1090	1120	1150	1180	1210	1240	1270	13350
OT Max to apply	10%	10%	10%	10%	10%	10%	8%	5%	3%	0%	0%	10%	
Capability with OT	1100	1100	1100	1133	1166	1199	1210	1210	1210	1210	1210	1397	14245
Scheduled Production	950	1050	950	1100	1050	1150	1200	1200	1200	1200	1200	1300	13550
Labour cost based on Standard Cost	$ 380,000	$420,000	$380,000	$440,000	$420,000	$460,000	$480,000	$480,000	$480,000	$480,000	$480,000	$520,000	$5,420,000
Base Labour cost based on Period	$ 400,000	$412,000	$424,000	$436,000	$448,000	$460,000	$472,000	$484,000	$496,000	$508,000	$520,000	$532,000	$5,592,000
Labour OT $ per period	$ 60,000	$ 61,800	$ 63,600	$ 65,400	$ 67,200	$ 69,000	$ 70,800	$ 72,600	$ 74,400	$ 76,200	$ 78,000	$ 79,800	$ 838,800
Total Period based Labour Cost	$ 460,000	$473,800	$487,600	$501,400	$515,200	$529,000	$542,800	$556,600	$570,400	$584,200	$598,000	$611,800	$6,430,800
Delta	$ 80,000	$ 53,800	$107,600	$ 61,400	$ 95,200	$ 69,000	$ 62,800	$ 76,600	$ 90,400	$104,200	$118,000	$ 91,800	$1,010,800
Labour OT % planned for period	-5%	5%	-5%	7%	-1%	6%	7%	4%	2%	-1%	-3%	2%	

Now let's compare the labour cost projections using variable standard cost data and fixed period cost data.

Treating labour as a variable cost:

- The standard cost is $400 per unit. Multiplying this by the scheduled production gives us the "Labour cost based on Standard Cost" row in the model. This totals to $5,420,000.

Treating labour as a fixed cost:

- The cost of a person is $4000 per period. Multiplying this by the headcount for the period gives us the base labour cost for the period. This totals to $5,592,000.
- The overtime headcount required to meet the plan must be added to the period cost. The overtime is at time and a half. The total of the Overtime cost for the 12 months is 838,800.
- The total period based fixed labour cost is the sum of these two values or $6,430,000.

The difference between the two approaches is $1,010,800 for the year. This is a substantial variance and the period-based cost is the right one. The main drivers for the difference include:

- The first three months of a new person are paid for but not productive.
- There are periods where the "Labour OT % planned for period" is negative. Negative overtime is impossible, but this number represents labour that will be paid but not be utilized in the period.
- The overtime rate is 50% higher than the standard rate and the standard cost does not account for this. This would show up as an unfavorable rate variance after the fact.

By treating labour as a **period (fixed)** cost we can address the issues related to the productivity lag after hiring, under-utilized labour and overtime rates. Unless you are able to directly flex your workforce with the planned activity, you should consider labour a fixed cost.