Essentials of Labor Forecasting

Avoid Common Pitfalls and Accurately Predict The Warehouse Labor You Need

Digital Era Makes Labor Forecasting an Essential Business Practice

The digital era has brought with it increasingly complex customer requirements and fulfillment variability. No longer predictable, static and flat, today's warehouse is a dynamic operation with a continually changing workload and product mix. The time of year, week, or even day of the week, dictates how much labor is needed in a facility, and exactly where labor is needed in that operation. Labor needs increase during specific times of the year, or "peak" weeks, where more product volume is coming inbound or heading outbound. Changes in product mix, where one type of product requires more labor than another, also changes the amount of labor required.

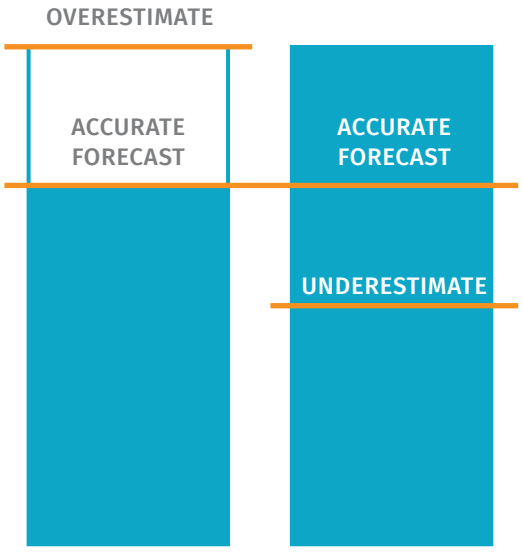
The Right Headcount is Critical To Meeting Customer Requirements

With all this complexity, it's difficult for warehouse operations to anticipate where and how much labor they need at any given time. Yet having the right headcount is critical to meet customer requirements. Getting your labor forecast wrong can start a domino effect of negative employee engagement, overspending, unmet customer expectations, and a stressful workplace.

Underestimating or Overestimating

In both scenarios, overestimating or underestimating cause labor costs to be higher than they need to be. When operations underestimate their labor requirements, they end up accruing overtime, which gets very expensive.

Operations can also end up with too many people, which is wasteful. It's common for this waste to go unnoticed, however. When too many people are staffed, productivity goes down, because the workforce will spread the amount of work to the hours they are getting paid for – even if that means going slower.



It's difficult to drive productivity up and unit costs down with too many people working. This is why overestimating your warehouse labor needs drives up per-unit costs.

It's human nature to strive to meet a goal, and if the goal is 10-12 hours for a project (including overtime), most people will get the work done in that "acceptable" goal time period of 10-12 hours, even if they could have finished in 8 hours. It's difficult to drive productivity up and unit costs down with too many people working. This is why overestimating your warehouse labor needs drives up per-unit costs.

Getting the right headcount at the facility to match the upcoming workload is the first step in effectively managing your labor force and driving down your costs.

Overtime: The Good and The Disastrous

Some overtime in a facility is not bad. In fact, a small amount of overtime is an optimal solution. 5-6% of overtime for an operation is acceptable. Any more than that, and it's a signal that something is wrong with your forecasting.

Excessive overtime is expensive, at the wage rate of time-and-a-half. But additionally, employees are going to get burned out and worn down as they work too much in a given time period. The risks of burned out and tired staff have been well documented and studied: increased likelihood of making mistakes, increase in occupational injuries, increased worker's compensation costs, increased stress, fatigue, absenteeism, and turnover.

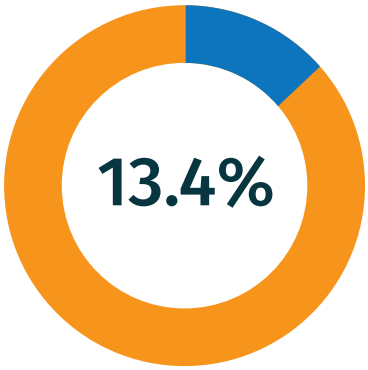
A little overtime during peak times, however, is a good thing. If you never have any overtime, this is a good indication that you are overstaffed. And overstaffed means you are paying too much for labor when you aren't at peak. When you are at peak, you should balance that workload across the optimal level of labor hours.

A Closer Look At Overtime

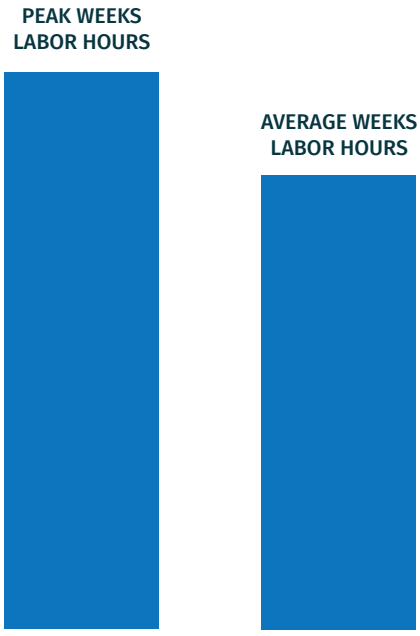
Easy Metrics studied its own customer's labor data at facilities that had peak weeks of activity where overtime spiked to meet workload demand, and compared facility productivity to weeks with more moderate labor hours and low overtime.

This analysis spanned over 5 million labor hours. Peak overtime weeks had, on average, 23% more labor hours than non-peak weeks at the same facility. And on average, 13.4% of labor hours were overtime hours during these peak periods. We found that labor productivity dropped 9% during peak overtime weeks.

Labor Productivity dropped 9% during peak overtime weeks.



Percent Overtime Hours During Peak Weeks



23% More Labor Hours During Peak Overtime Weeks

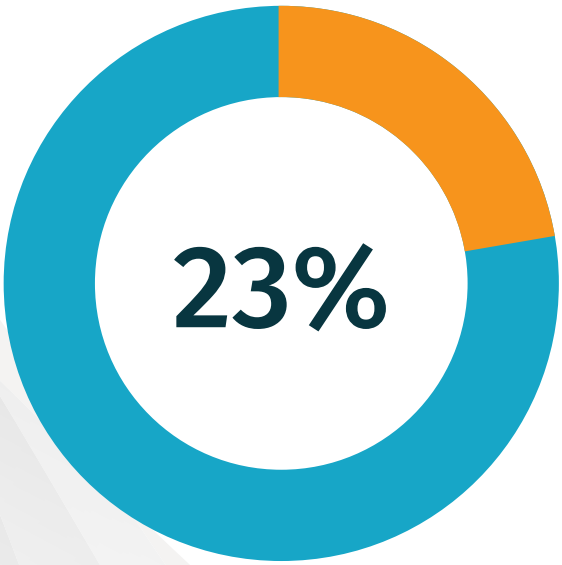
Underestimating Labor Hours And Its Effect On Unit Costs

Overtime + Lower productivity

An example of a facility that underestimates its labor forecast and, as a result, also underestimates its per-unit labor costs

Example: Per unit labor cost change due to underestimating labor hours

	Labor cost per unit	Total labor cost	Labor hours planned	Hours added due to productivity loss	Overtime hours due to under-estimate	Actual labor cost	Actual labor cost per unit
Under-estimated Forecast	$1.25	$50,000	2,941	291	559	$73,073	$1.83
Accurate Forecast	$1.49	$59,500	3,500	0	0	$59,500	$1.49



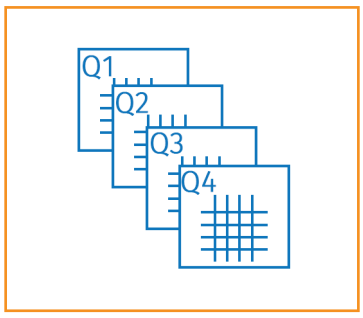
Increase in Per-Unit Costs

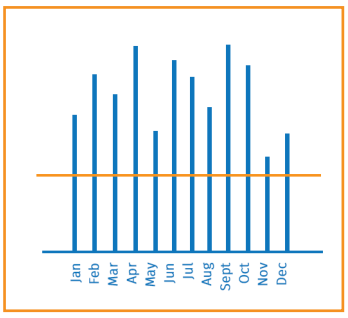
Underestimating your labor needs to the point that it causes you to ramp overtime will cost you even more than you think. Paying time-and-a-half wages, while your labor productivity is down, and therefore producing less in the same amount of time, and paying more for those hours simultaneously, drives up per-unit costs by 23%, as illustrated in this scenario.

Forecasting with Spreadsheets and Averages

What happens when operations leaders anticipate a time where they expect more product or a more complex product mix? The most common approach is to use spreadsheets to forecast the needed labor using these metrics: period of time, units, and labor hours. The problem with this approach is that it uses averages. If you use a year as a sample, your average is based on volume for the year.

But the volume over the year isn't static, it's dynamic. In the spring, for example, there might be more product coming inbound than outbound. And in the fall, there might be more product going outbound than coming inbound. If you average your volume across the year, you are going to be off during both of those times. Spreadsheets and averages don't take into consideration product mix, or spikes for seasonality.





Forecasting: Wrong and Right

This facility averages of 125,000 units per week over the course of a year. It takes 6250 man hours per week to process those units, which is 156.25 people (headcount) if they use averages for forecasting.

In this case, volume is going up by 10% for both weeks Feb 18-22 (Spring) and Oct 15-19 (Fall). A 10% volume increase, without department or process level detail, shows that if units/hour stays the same at 0.005 units/hour, 172 people (headcount) are needed for both those weeks, assuming a 40-hour work week.

The Wrong Way to Forecast - Using Historical Averages

Average weekly volume	125,000	units
Average weekly hours	6,250	hours
Average weekly headcount	156.25	people
Average hours/unit	0.05	hours/unit

Figure 1a

The Wrong Way to Forecast 10% Volume Increase

Forecast: Feb 18-22 week		
Target Volume @ 10% increase	137,500	units
Hours/unit	0.05	hours/unit
Headcount (volume x hours/unit/40)	171.88	people

Forecast: Oct 15-19 week		
Target Volume @ 10% increase	137,500	hours
Hours/unit	0.05	hours/unit
Headcount (volume x hours/unit/40)	171.88	people

Figure 1b

Building a budget or forecast based on volume rarely makes its way down to the shift, process, date, hours, and people level. A more granular view is essential to be able to run the operation efficiently and to rest easy knowing who, what, where, and when.

The Right Way to Forecast 10% Volume Increase

Week	Inbound units	Outbound units	Total units	Inbound hours	Outbound hours	Total hours	Inbound headcount	Outbound headcount	Total headcount
Feb 18-22	112,500	25,000	137,500	4,500	1,500	6,000	112.5	37.5	150
Oct 15-19	25,000	112,500	137,500	1,000	6,750	7,750	25	168.75	194

Figure 2

Here, two additional factors are exposed. First, the labor required on outbound processes are more complex and require more labor. Second, the additional 10% in volume is actually in Inbound in the Spring, and Outbound in the fall.

When process and department level detail is added to the forecast, we see that the Forecast average 171.9 people was off significantly in both scenarios, Spring week and Fall week.

Right Way Vs Wrong Way

The differences between Figure 1 and Figure 2 comes down to the addition of labor by process, labor by department, and where the volume increase is happening (Inbound department vs Outbound department).

Overestimating

In absence of this visibility, Figure 1 overestimates headcount for the week of Feb 18-22 by 21.9 people. In this case, that's over staffing by 14.6%. It's likely that it would go unnoticed if workers spread out their work to fill the hours, even though the process volume wouldn't support it.

Underestimating

Also, Figure 1 underestimates headcount for the week of Oct 15-19 by 21.9 people, or 11.3%. There would be fewer staff than necessary to handle the volume.

It's likely in this scenario that these workers would be working overtime to compensate for the under staffing due to poor forecasting. Meeting customer demands during Oct 15-19 would be stressful for operations leaders, and their teammates. Excessive overtime is costly to the business.

Forecasting with Big Data

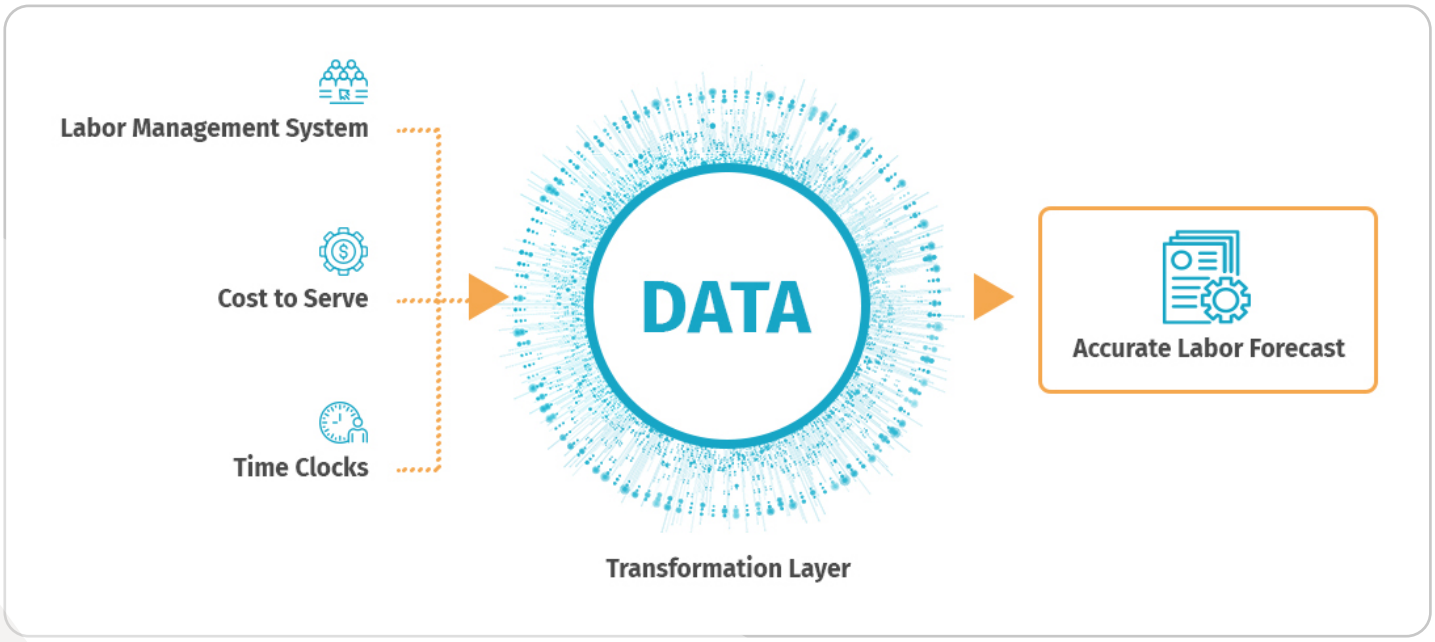
So how do operations get visibility into labor costs by process, product mix, and by department?

Spreadsheets would be massively complex at this level of detail, because you would need to understand Inbound volume and Inbound labor, and how that breaks down into unloading, receiving and putaway. Then you would need to do the same thing with picking, packing and shipping.

To truly know the labor hours for each one of those processes every day and the volume for those processes every day, it would be nearly impossible with spreadsheets.

The answer is to use multiple data sources, and merge them to get a clear picture into more granular labor data and labor cost details that spreadsheets lack. A labor management system, plus cost to serve and time clocks data, merged into one labor data environment is the answer.

With the merging and availability of data from multiple sources, you get the advantage of selecting a reference period on which to base your forecast. The reference period could be a similar week last year, yesterday, the first week of last month, or any other time period that is similar to the time period that you are anticipating.



Here's an example:

Let's say you want to pick 55,000 cases next week, and receive 2000 pallets. There was a similar week last year that you base your forecast on – the reference period.

This year, your anticipated volume is 5% higher than the reference period.

	Reference units	Reference hours	Forecast unit	Forecast hours
Inbound				
Receiving	3,727	71	4,017	75.4
Putaway	3,150	136.1	3,321	140.6
Total	**6,877**	**207.1**	**7,338**	**216**
Outbound				
Replenishment	1,233	77.1	1,275	79.6
Picking	63,885	345.3	66,642	354.7
Packing	1,062	55.9	1,119	57.8
Loading	3,571	73.6	4,356	91.2
Total	**69,751**	**551.9**	**73,392**	**583.3**
Indirect				
Meetings		100.5		100.5
Housekeeping		81.5		81.5
Breaks		109.7		109.7
Maintenance		122		122
Clerical/ Supervisor		178.3		178.3
Missing Time		219.1		219.1
Total		**811.1**		**811.1**

Forecast Summary			
	Hours	Units	People
Inbound	216	7,338	4.4
Outbound	583.3	73,392	11.7
Indirect	853.7		17
Total	**1,653**	**80,730**	**33.1**

Figure 3

Process and Department level detail is required to get an accurate forecast in today's complex operational environment. Here, we see a complete forecast based on a reference period, which takes a look at historical performance and volume. The forecast breaks down how much labor is needed for Inbound, Outbound, and Indirect, but also Non-Productive (or "Missing") time. This will give you a much more accurate forecast that doesn't rely on averages, or comparisons to time periods where the workload, volume, or product mix was vastly different from the week that you are forecasting.

Beware: Building Labor Budgets Based On Volume

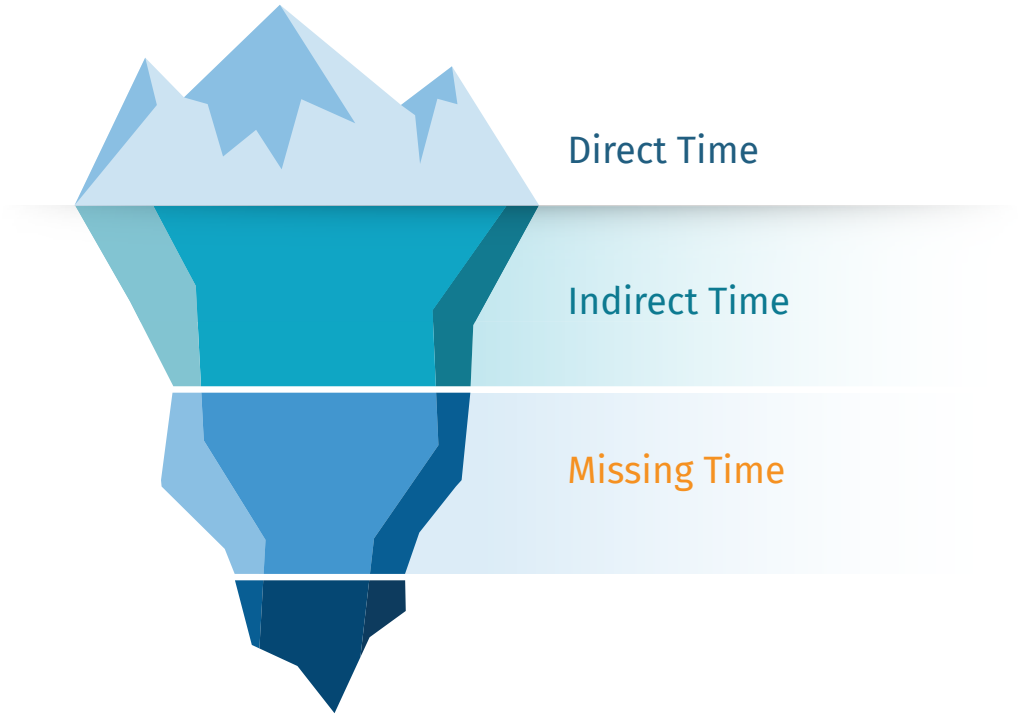
If you could take an accurate forecast and share them with finance and HR partners, that forecast could allow you to have a better budgeting cycle for everyone involved. More accuracy on the forecast would eliminate the need for padding, and also give your finance and sales teams the advantage of accurately costing the price of your labor into your products and services.

But most budgets are built on a macro level based on cost per unit or cost per order and directly tying the volume to labor. For example, you might think your orders are going from $5M to $5.5M, which is a 10% increase in volume. Almost always, operations assume that labor must also go up 10%.

But increasing labor by 10% doesn't tell you:

- How many people do I need on first shift?
- How many people do I need on Monday, when we get the most e-commerce orders?
- How many hours do I need on each process?
- How many headcount do I need per shift?
- How many headcount do I need for replen or other activities?

The Biggest Culprits of A Bad Forecast: Missing and Indirect Time



You want to meet your customer's expectations and win their business. It's easy to plan an ideal scenario without taking into consideration realities. For example, do you know how much missing time or wasted time you need to build into your forecast? An accurate labor forecast will build in missing time, which could run 10% on average. If your labor forecast doesn't account for this, you will end up absorbing that 10% in overtime.

What is missing time?

Any time that employees are paid for, but not doing any work. This could show up as time between a meeting and logging into an activity. It could be the time before or after lunch. Best in class operations run 4% missing time, but normal operations are 10-20%.

If you underestimate missing time you'll end up paying more in overtime to compensate. Here's a possible scenario: You forecast 1000 hours ($15,000) But you actually needed 1200 hours ($18,000). You end up with 200 hours of overtime ($4,500) for a total cost of $19,500.

If you also underestimate indirect tasks (maintenance, housekeeping, meetings, etc.) by 20% you double your loss: You forecast 1000 hours ($15,000) But you needed 1400 hours ($21,000) You end up with 400 hours of overtime ($9,000) for a total cost of $24,000.

The cost of this is twofold. First, you've gone over budget by 60%. Second, you've spent an extra 14% in overtime.

Highly Productive But Still Over Budget?

Not understanding and accounting for missing time and indirect time can challenge even the most seasoned operations leaders. This happened to one of our customers who ran a highly productive operation. Once they implemented our LMS, their productivity went even higher – but something was wrong. They were missing their budget, and their per unit costs were going down at the same time.

When we investigated their labor data with them, we found out that they had $25,000 of overtime that month, but were budgeted for $5,000 of overtime. That $20,000 miss on overtime was more than they missed their budget by. Their budget was missed because they were being productive but didn't account for indirect and missing hours, and as a result they didn't have enough people on the floor. So they were accumulating overtime. The 50% surcharge on overtime is what caused them to miss their budget.

Getting an Accurate Labor Forecast

The modern operations leader will be at a disadvantage without the tooling and ability to clearly and accurately predict how much labor is needed by: date, people, shift, process, and hours. The necessary ingredients are:

- A Labor Management System that pulls data from your time clocks and WMS
- Cost to serve data
- Multiple metrics that go beyond units/hour, into shift, process, facility, product type
- A comparable reference period, with historic data, on which to base the forecast

Ready to accurately forecast your headcount needs by date, shift, and process?

Easy Metrics has powerful Labor Forecasting functionality that will enable you to forecast your labor needs in minutes.

Sign up for a demo today

GET A DEMO

About Easy Metrics

Easy Metrics fuels operational excellence in distribution operations.

Operations and finance leaders use Easy Metrics' API integration platform and machine learning to analyze, plan, and forecast their labor spend so they can drive operational speed and efficiency, price their products and services profitably, and drive employee engagement.

With Easy Metrics, they translate raw operations data from multiple data sources into their costs by: activity, process, facility, people, and equipment. They use actionable reports across their network, to optimize labor spend, cut waste, plan facility investments, and drive labor strategies that ultimately fuel the growth of their business.

Learn how to optimize your labor forecasting
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