First, let's agree on what's wrong.

Supply chain workload, standard responsibilities and prioritization systems can vary considerably across organizations. There is not one standard, so the rest of this essay may not be exactly what your company or plant is experiencing, but it will be relevant to some extent in every company.

I arrived at work to find a note that says we are out of three parts. One part shut down four different assembly lines. The other two parts shut down one assembly line each. How should I prioritize my day? First, I feel that I need to address all three of these parts before starting my standard list of work. So, there are three items on my immediate "to do" list. Which one first? Obviously the one that shuts down the most assembly lines, right? Or, do I focus on the assembly line with the highest profit margin? Or, the one that is producing products for the most important customer? Or, do I simply work on the part that has the loudest spokesperson?

Given these choices, any individual might choose any of the parts to work on first. What if one of the parts comes from nearby in the same city and one part comes from around the globe (where they are sleeping)? What if one supplier is on the east coast while the other is on the west coast (and closed)? Makes it easier, but in the heat of the moment, these thought processes probably get confusing.

I'm choosing to start with a quick analysis of each part. On hand balance check, recent receipt check, recent transaction check (did we send some back to the supplier as rejected parts for sort). Maybe parts came in yesterday, but didn't get to the shelf yet. Maybe we have 10,000 but they've been misplaced. These are the easiest to fix and save me from having to get the supplier to provide me this information.

So, one problem is that I don't have a clear prioritization of actions. The second problem is that the situation got all the way to "Line Down" critical before the appropriate people were informed. And, the informing was done via note, usually unsigned and no time stamp, so it's unclear who is notifying me. This means that I have no way of knowing what checking has been done, so I have to start at the beginning.

One of my first tasks of the day is to place orders for the items on Kanban. I go through the task without too much thinking, except I sort the cards by part number. When I notice an unusual number of cards for the same part number, I wonder how that could happen, but I seldom have the time to investigate. While walking through the stockroom, I might notice too much or too little inventory, but again, I get distracted and fail to follow up.

So, problem number three is that I am not available to handle the problems I notice until it becomes an emergency. Then my availability choice is made for me.

Problem number four is illustrated by my push out and pull in reports. MRP tells me that I need to move orders closer or move orders out. Often, I move orders one way on Monday, the other way on Tuesday, back the first way on Wednesday, etc…. We call this system nervousness, but it is caused by inputs into the MRP system. Typo on the sales order, someone increased the safety stock number, lead time for

the finished good increased, order quantity was entered as 2000, should have been 200, then the customer changed their mind and it's now 350. And any number of other issues. Accuracy, attention to detail, verification of data entry and limited access to changes made are skillsets and rules that can help.

Problem number 5 is caused by us. The sales department notifies supply chain that the customer is desperate to have product in one week, so without waiting for the order to come in to sales, we purchase quantities of products to meet the demand. We even expedite and pay extra shipping fees. Then the customer replies that one week was a little optimistic and that three weeks would be fine for delivery. Order comes in with a three week lead time, well within our regular lead time. Or, in the worst case (but fairly common) scenario, the order never arrives.

Problem number six is illustrated by my order report which shows the parts that are triggered via MRP to be ordered. Several of them are telling me that I need to order them one to four weeks ago. Yesterday I didn't need them, but now I need to go back in time to order them. So, obviously I need to get them all on order, but then do I need to follow up with expedite requests on all of them? My report doesn't tell me why I need them urgently. It could be that safety stock was breached and that triggered the order. In that case, I can possibly let regular lead time take care of it. But tomorrow, those parts will be on my pull in report, so I guess I'll just expedite them today and get them off all lists if I can.

Recognizing that MRP isn't my best execution tool for some parts, I create a Kanban replenishment system for several parts. This works great, since I can ignore the system nervousness and just let the Kanban cards keep me in stock. But then, I find that there are things that Kanban can't handle well either. The obvious thing is variation in terms of spike orders. Planning for 50 per day and then having an order come through for 500, eats up 10 days worth of inventory in one or two days (depending on the type of order). The opposite is also true. If demand drops significantly or stops completely, as in obsolescence, and communication doesn't happen, then I have all my Kanban cards filled and will end up with high inventory. But the less obvious failure of Kanban occurs when production stops due to this or another part shortage. We are down for two weeks waiting for a machine repair or other disruption. Now, on week three, we are going to run three weeks of production in one or two days. Our orders have experienced disruption since no Kanban cards have been triggered, so to get back on a weekly schedule of 50 per week, we have a two week gap in our orders and may run out of parts during that period. We have also caused our supply chain a disruption by sending signals for 150 all in one week. Now, they are wondering if we are changing to 150 per week or if we will continue again at 50 per week.

Several problems have been created by this solution. Some problems are eliminated, and replaced with others. I've lost count, for those of you keeping score at home.

We have a system that calculates and recommends purchase orders. It could automatically place them, but we don't let them. Why not? Because we don't trust the data and need to personally check first to see if we really should order. It's not that we don't trust the math. It's that we don't trust the data being entered in the system. The sales orders or forecasts being entered, the safety stock being manipulated and the bill of materials that shows usage of the individual parts that go into the finished product.

Why don't we put in place a system to double check sales orders once they are put in? Instead we put the burden on Supply Chain to catch it when there is an anomaly in the requirements.

Our own tendency to over react plays a crucial role in the oscillation between too little and too much inventory. Many times I have been forced to add safety stock, add Kanban cards, expedite and otherwise inflate the requirements in some way to make sure we have parts. Others take a more verbal approach and beat up suppliers to get delivery quickly, usually delivery of way more parts than we actually need. This has some negative effects. One, it delays delivery while the supplier completes a larger batch, usually exacerbated by outside processing operations. Two, it disrupts the smooth flow of parts, while we now struggle to find places to put the extra product. And possibly three, it causes delays in other parts from the same supplier that run through the same processes (machines, outside supplier, etc…)

There are additional assumptions that upon review may prove to be false:

Assumption: We have enough time to do all the work during the day.

Truth: There is not enough time do to everything. We need a system to help clearly prioritize actions so that we are working first on the items that require attention first.

Assumption: Parts usage will be steady at a daily rate.

Truth: Usage will vary. Some variation can be accounted for with safety stock or kanban, but spikes in demand and the quick recovery of past due demand requires a better method.

Assumption: If more than one person looks at the same information, each will arrive at the same conclusion and same action plan.

Truth: Each of us will determine a different course of action for what we see. We need a method to drive the right course of action with the right sense of urgency.

Assumption: When someone is out sick or on vacation, someone else can fill the gap.

Truth: In our usual world, most of what we do is person dependent. But, even without that, if we assume that we all have close to a full day's workload, how can one or two people absorb another's workload without failing on some of their own workload.

There are four sources of variation: Supply variation, Demand variation, System variation and Management variation. The one we have the most control over is Management variation, because the culprit is us. We ask people to do something other than their standard work because we only need a minute of their time. We ask people to change over to another item because it seems more urgent, but we disrupt the flow and they have to go back to the first item (Two change-overs instead of one). We have meetings when it's convenient for management, not for workers. Some of these are necessary, but we should at least recognize that there are consequences to these actions.

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