Marshall Auto Body

An introduction to the Toyota Production System

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Lean thinking is about many things. Most of all, its about developing People.

Utilizing a framework for exposing, analyzing and solving problems …continuous exercises that build problem solving muscle within an organization. It is this strength that separates those who define the future from those who are just as good as the best.

TODAYS DISCUSSION WILL EXPLAIN HOW TOOLS AND CONCEPTS ORIGINALLY DEVELOPED TO IMPROVE HIGH VOLUME, LOW VARIABILITY MANUFACTURING, ARE JUST AS EFFECTIVE AT FACILITATING IMPROVEMENT IN THE *LOW VOLUME, HIGH VARIABILITY* WORLD OF AUTO COLLISION REPAIR.

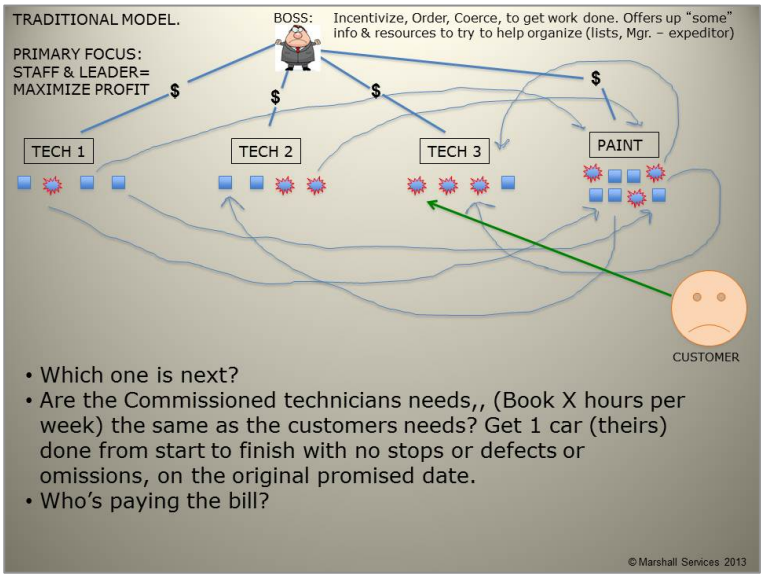
We'll look at the traditional body shop management model from a different perspective and see clearly why it has reached its limit to deliver on quality, time and cost. We will use Toyota's Socratic, problem solving, 5 question model as a framework to discover a better way of keeping up with the ever evolving demands of THE CUSTOMER - the sole determinant of value and waste, in our delivery systems.

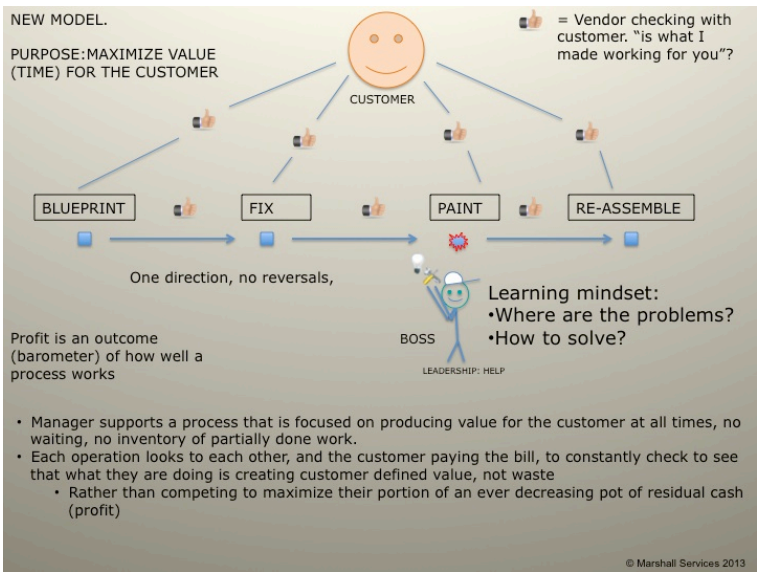
We'll talk through misconceptions about Lean tools, Lean Implementation, Lean leadership, Employee buy in, What lean DOES (expose problems clearly in real time and context) and what it DOES not do (eliminate the problems for you).

We'll explain how the Tools (Workflow leveling, Single piece Flow, Pull or JIT, 5S, value stream mapping, Visual management) are deployed within the Body shop Lean conversion and what role they play in learning to see waste.

Ask lots of questions this morning. The framework for the discussion is PowerPoint, which in the absence of class participation gets boring.

Watch the work through the glass door. "What do you see"? The really important part of your visit will be to constantly ask yourself "what is different about the people and how they are working (alone? Together? In one place? Moving around?) What looks different about the cars being repaired? Look for stuff that's weird. Ask "why", when you tour the shop. Our staff is proud of what they have built as a result of the learning our problem surfacing system has facilitated. Take the opportunity to ask them how things you see around the shop help make the work "*easier to use*".





None of the visual tools, the measurement tools or even how the cells are laid out, are the same as when we started. Dozens of changes (many very small) have in fact taken place just in the past 3 months.

Continuous improvement is different than Continuous "change". Improvement is incremental, each step building upon what was learned from taking the previous step. The whole system must measurably improve (quality, speed, cost) as waste is reduced. Sub-optimizing one area with no improvement to the system as a whole, is the result of insufficient understanding of the current state, and in itself, just waste. Lean continuous Improvement is structured around THE SCIENTIFIC METHOD. Observation, Hypothesis, experiment, analyze results, prove, or refute hypothesis, implement the improvement, or run the experiment again (if the outcome of the change was not what you expected).

Something like 95% of Lean initiatives fail to deliver Superior results (or maybe fail altogether). The reason is Leadership. The hard part is that we (our businesses) are NOT Toyota. We don't have a cascading supply of Sensei's (mentors) to ask us endless questions about "what we see" until we learn to ask the right questions ourselves, and then become the teachers that develop our staff in the same manner. We have to fill both roles (student and teacher) at the same time. Its humbling, and initially can be frustrating, as we go from "know it all", to knowing no more than our staff, about abnormalities.

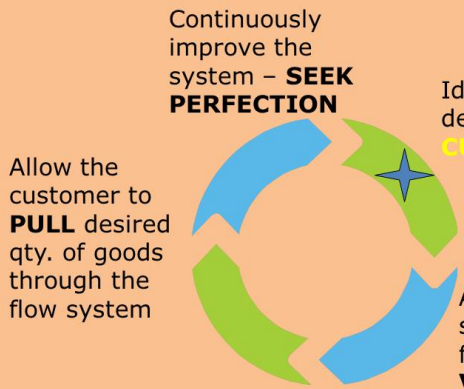
Physically implementing a linear, reduced waste, repair system can be done literally overnight once a couple of weeks of discovery is complete. One of the problems is that our roles as "The Boss" change literally overnight as well. Suddenly our routine behavior of collecting tidbits of information from others (usually opinions), mixing them with some computer data (reports), and issuing a directive (solution), not only doesn't work, it makes a mess! The new work is to spend 90% of our time where the work the customer is paying for, is being done; the production area, the estimating area, the parts area. We have to see the work happening in real time to capture the little problems in their infancy, to understand how they later roll up into the big problem that brings everything to a halt. We have to make the TIME to fill this new role, and we have to LOVE that kind of work (making our employees jobs' EASIER).

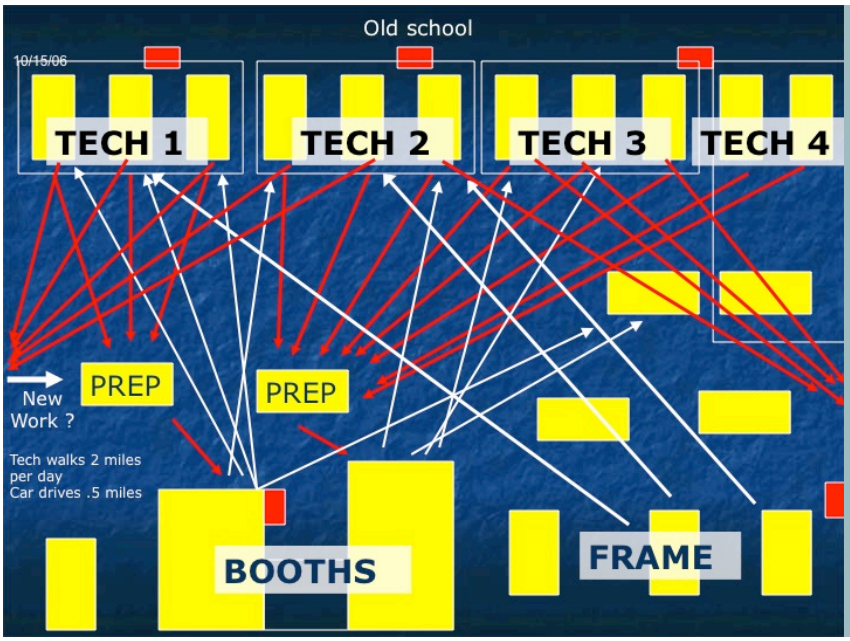
If these 2 conditions can't be met, then implementing *"Lean Tools"* will merely be another management fad annoying the already overburdened staff.

The five questions driving improvement:

1. What is the target condition? (the challenge)
2. What is the actual condition NOW?
3. What obstacles currently stand between current conditions and reaching the target condition?
4. What is the next step?
5. When can we go see what we have learned from taking that step, so we can see the Next step?

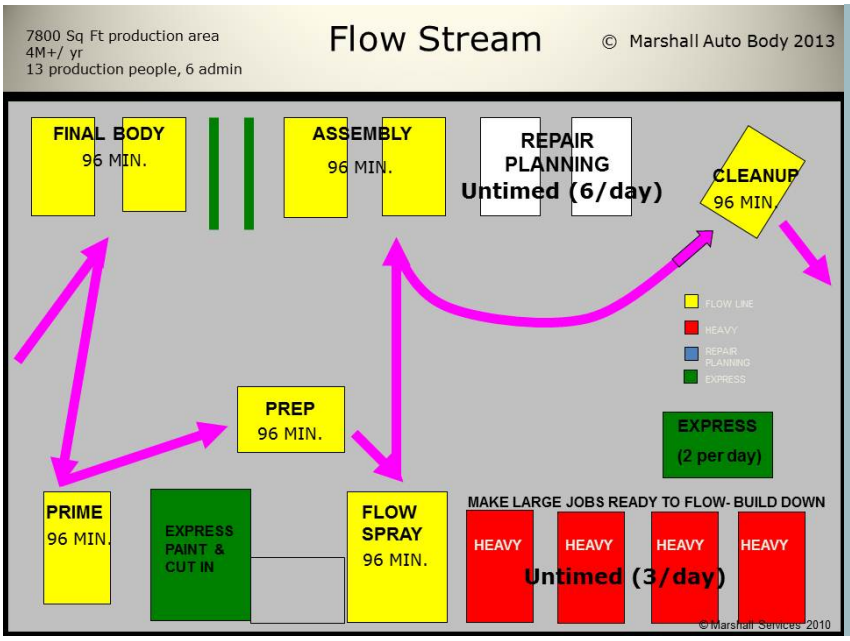
Utilizing Lean Principles To create a Learning system:





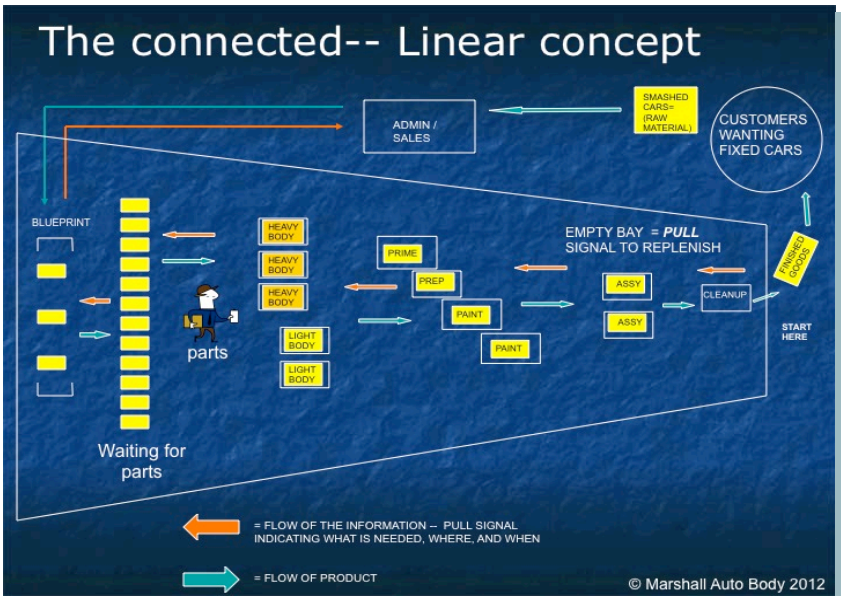
Traditional layout where Techs own the repairs. Each body tech manages approximately 3-4 stalls. Material stores (red boxes) are replicated, as every tech is his own shop, and requires a full compliment of materials, so as to be as "efficient" as possible.

Cars move inside and out numerous times as they progress through multiple supplements and parts waits. Due to uneven scheduling (everything in Monday, out Friday) a huge bottleneck develops midweek in the paint step. Quality varies by tech. No system. This method when managed properly, delivers lots of billable hours per day, but very low (2.5 on average) hours, PER CAR, per day (good for techs, bad for customer).



This model shows work flowing in one direction (in on the left, out on the right). No one owns a complete repair, the techs own a step within a linear, connected process. Scheduling is leveled, so every hour and every day are smooth. # of bays per operation is mathematically balanced to each other so each can index work forward at the same time.

The focus here is on keeping the car busy, as opposed to the above model that's centered on keeping the tech busy. If the car is busy (moving through the system without stops (supplements), the techs will be just as busy, but shop requires less inventory (and the costs of carrying). Car moves through system faster, quality is much more consistent, the customer is better served.



A conceptual model of what balanced, connected, PULL looks like, where the customer pulls value through the entire system. Very low inventory, visual. Problems very clear and apparent.

Tying everything as tightly as possible to the customer insures we are as close as possible, to he/she who pays the bill. If we perform activities that have no value to the customer because we don't actually know what they want, those activities are *waste*, at our cost. If we fail to perform necessary activities the customer expects, we have to do the work over, and that is also *waste*, AT OUR COST. So, the closer we are to *the customers definition of Perfect*, the lower or costs will be

CLARIFYING WHAT THE IMPLEMENTATION OF LEAN TOOLS DOES AND DOES NOT DO……

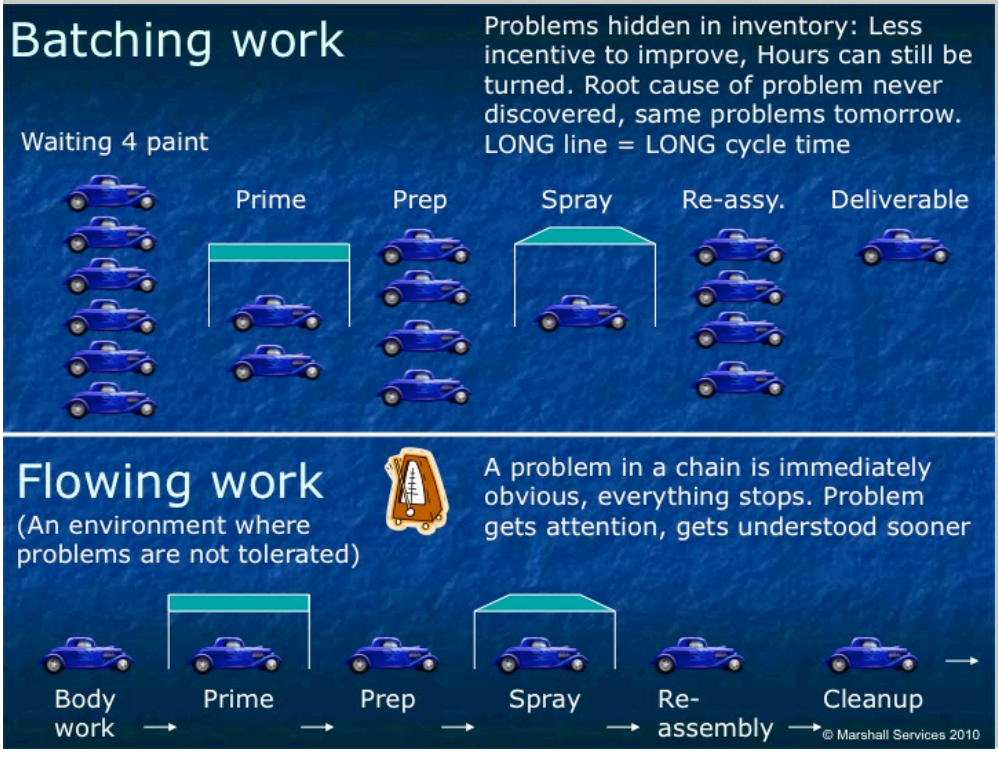
Conventional Wisdom out there says "Lining the work up in a sensible manner, instead of everyone running their own little body shop inside the building, Cleaning up and standardizing where tools and materials go, taking control of the schedule so everything doesn't arrive on Monday morning with the expectation that it all will be done Friday afternoon, Taking the time to disassemble more of the car to reduce supplements, actually dedicating a person to physically checking every part for accuracy, instituting a "takt time" as a [misused] tool dictating when work in each part of the "line" should be done… All will improve quality, productivity and of course profitability".

NOT EXACTLY

Some of those things will improve working conditions, [and maybe quality] such as 5S (cleaning the place up and having the right stuff where you need it). Sensible scheduling certainly can help a little bit with cycle time as you wont have cars dropping off until they actually are going to be worked on. More thorough dismantle and mirror matching parts will definitely reduce cycle time (only if its done100% however). But, if HOW we do the work doesn't appreciably change, then neither will the outcomes (quality, productivity and of course profitability)

Lining the work up in a sensible manner (creating visual work "flow") merely serves to show in a very clear, unarguable manner, where the problems are that need to be creatively solved, in order for it to flow *better*. So linear workflow is not itself the solution. Solutions to the problems linear workflow *exposes,* are what in fact yield improvements in the outcomes known as quality, productivity and of course profitability.

So when you adopt a lean manufacturing approach to your value delivery system, you are installing a bunch of tools designed to help you **see** what the problems are. You are also instituting a bunch of rules to preserve the system's ability to repeatedly surface those problems over and over, until they are solved. If these activities and standards are maintained, and improvement efforts take place, then we can say that instituting lean-manufacturing principles in fact, created "improvement" or a better outcome for the customer.



Recap of Key Points…….

What are we trying to do?.... Ask Everyday…. Make sure everyone in the organization can answer…..

- **Purpose:** Improve quality of the value delivery system, for the customer, by removing the non- value added activities (waste) -
- How?…. Define waste

There are 7 types – Overproduction is the worst!!

Customer decides What is value, what is waste, (its their $$)

- Show the waste - Need a system tailored to waste exposure

Flow

Tightly connected system of the interdependent activities that together make the service or product the customer is buying

Shows you very clearly where you cant [flow work] (where improvement activity is needed)

- Need **tools** to help make at least some "flow" [without inventory, without stopping] possible.

Leveling – subdivide work into similar categories with similar requirements (equipment and skill)

Standard work – consistent "way" of doing each activity so when one experimental change is made, all other activities remain constant, and data can accurately indicate the direct effect of that one change. No standards, no ability to methodically improve.

TWI – pictorial and descript training, documented method for how each step is done

5S – organizational activity REQUIRED to support the work within a system, right quantity of right stuff in right place, and SAFETY.

Pull – J.I.T. – Mathematically derived buffer inventory to minimize inventory but prevent running out between processes where single piece flow not possible.

Specific quantity is important or we have no baseline against which to apply reduction efforts over time (less inventory = improvement)

Visual Management – By depicting at the pulse points, the state of the work (quantity/quality to plan), the system (the people working within it) largely manage the process themselves (unless an abnormality outside of their ability to absorb, occurs).

Need a method for removing the waste (improvement method)

A3 – Clear Concise method of organizing improvement objectives, cause analysis, countermeasure deployment and Mentor consideration as opposed to shooting from the hip.

Standardized work critical to get clear data about the effects of deliberate changes on the system

- Need **Leadership** – MOST OF ALL

Person to translate the cascading objectives from above into tangible meaningful work and value in terms of the product or service.

A person embedded in the work place itself, with profound knowledge about the work, and how its done

No substitute for seeing for yourself. Much money and effort wasted on decisions made from Hearsay.

Person to enforce the discipline of the new way until it becomes habitual (30 days).

Deployment of improvement efforts learned from the flow system

Helping others to stay on the "learning" track, and not break the system, just to get work done the old way. No change in how we do the work, means no change in the outcomes of the work we do – quality, profit, job satisfaction, customer satisfaction, etc.