

A 5s Implementation Plan
For The Shipping Department at Helical Products Co.

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EXECUTIVE SUMMARY

Helical Products Company is a business that manufactures flexure products, such as couplings and u-joints. As part of a movement towards lean manufacturing, Helical Products Company of Santa Maria, California is in need of a principle that will help them continuously improve their shipping department. A study of 5S, a lean principle focused on waste reduction, will be done to investigate opportunity for implementation. A literature review takes a peek on research of lean manufacturing history, lean workbook/ tutorials and lastly case studies and journal articles. The output of research provides a design plan for Helical using 5S and other lean principles compatible with 5S, such as error proofing and Value Stream Mapping. A list of suggestions based on analysis and feedback from the Helical shipping department is provided. Lastly, a 5S manual catered for Helical Products Company is attached in the appendix.

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INTRODUCTION

Helical Products Company of Santa Maria, CA is relatively new to lean concepts. The company focuses on machined flexure products, such as u-joints and couplings, for various industries both domestically and internationally. A recent interest in these lean concepts has generated discussion on to where and exactly how the implementation of lean should begin. The location was decided on the shipping department. The concern in this particular department is reducing shipping errors, producing an efficient work environment, some small safety concerns and overall organization.

A diagnosis of the concerns proves that the shipping department is in need for 5S implementation and error proofing. Based on gathered and researched information from various cases studies, books, and journal entries on the topic a design will be created on how to implement 5S. The research begins with an overview of what lean is. Included, some of the researched information will feature a discussion on some success stories along with a discussion of why companies may fail at implementation of lean. The research will then pinpoint to the topic of 5S with particular supplementation of visual factory and error proofing concepts. The design will focus on molding these concepts, which typically applied to production at the manufacturing level, to a shipping environment. Many of these concepts were first introduced in IME 233 – Work Design and Measurement and theories were briefly revisited in IME 410 – Production Systems and Control.

The catered design will take into account the input of employees both directly and indirectly involved with the shipping department. A center of attention will be brought upon discovering areas that produce waste according to the “8 wastes” concept of TPS, Toyota Production System, and overall general Lean concepts. Safety although inherent to the 5S process will also be brought to attention, especially in regards to shipping department activities. Consideration of similar cases will provide a set

of countermeasures to predicted obstacles and issues that may occur. Overall the design will introduce a set of recommendations on how to implement the 5S process as described above.

The report is organized in the form of literature review, 5S implementation Plan Design, suggestions and recommendations, and lastly an appendix providing supplementary material. The literature review will provide the background as discussed above and attempt to set the stage for the ideas presented later in the report.

LITERATURE REVIEW

In today's manufacturing industry it is rare that a company has not heard of lean manufacturing principles or some derivative form of the term. Lean manufacturing provides the promise of becoming more competitive in the 21st century by decreasing lead time, increasing quality, reducing cost and increasing customer satisfaction. As a matter of fact, lean is becoming more prevalent and part of most manufacturing practices. "Besides total quality management, supply chain management, and innovation & technology management, lean manufacturing strategy has been recognized as one of the most efficient and effective global operation strategies" (1). The principles of Lean manufacturing have become visible in many industries ranging from auto makers, to hospitals to mom and pop shops. A 2010 *Compensation Data Manufacturing* survey revealed that 69.7 percent of manufacturing companies utilize lean in their manufacturing practices. Out of the practices used to implement lean 5S was the most prevalent at 69.2 percent (2). The 5S practice is a method that many companies begin to employ on their way towards creating a lean system is through implementing lean events.

The kaizen event serves as the main vehicle behind lean implementation and is fundamental to the ideals of lean. The Japanese word, Kaizen, translates to continuous improvement. Within Kaizen are three major principles, 5S, standardization and the elimination of waste (muda) that contribute to errors defects and injuries. (3). The 5S' stand for sort (seiri), straighten (seiton), shine (seiso), standardize (seiketsu) and sustain (shitsuke) with slight deviations in the names depending on the author and the translation. The 5S's characterize a continuous and never-ending methodology for creating and maintaining an organized, clean, and safe high-performance environment (4). 5S has the focus of waste reduction. The methodology is often characterized by a series of activities focused on making sources of errors, defects and injuries visible by the users of a particular work environment. The idea of the 5S is to run through each S in a systematic manner, spending a large portion of the time planning and noting

what is muda or waste. The 2nd principle of Kaizen also, the 4th S, standardization is the stabilization of a process so that it can be easily analyzed. It is not rigid standard to be held to, but rather a method to facilitate waste discovery (5). The 8 wastes according to Liker are listed below. See Table 1: The 8 Wastes according to Jeffery Liker (5).

Waste	Waste Description
1. Overproduction	Producing items for which there are no orders for resulting in wasted inventory space, overstaffing and excess transportation time.
2. Waiting (time in hand)	Workers wait for the next processing step due to not having tools, lot processing, equipment downtime, lack of space, bottlenecks, etc...
3. Unnecessary Transport	Carrying work in progress long distances, creating inefficient transport, or moving materials, parts, or finished goods into or out of storage or between processes.
4. Over processing or incorrect processing	Taking unneeded steps to process the parts. Inefficiently processing due to poor tool and product design, causing unnecessary motion and producing defects. Waste is generated when providing higher-quality products than is necessary.
5. Excess Inventory	Excess raw material, WIP, or finished goods causing longer lead times, obsolescence, damaged goods, transportation and storage costs, and delay. Also, extra inventory hides problems such as production imbalances, late deliveries from suppliers, defects, equipment downtime, and long setup times.
6. Unnecessary Movement	Any wasted motion employees have to perform during the course of their work, such as looking for, reaching for, or stacking parts, tools, etc. Also, walking is waste.
7. Defects	Production of defective parts or correction. Repair or rework, scrap, replacement production, and inspection mean wasteful handling, time, and effort.
8. Unused employee creativity	Losing time, ideas, skills, improvements, and learning opportunities by not engaging or listening to your employees.

TABLE 1: THE 8 WASTES ACCORDING TO JEFFERY LIKER

The first S, sort, is about removing items that do not belong or are not needed in the workplace. This is usually defined as something that is not needed to perform the work in an area. Straighten, the second S, focuses on having a place for everything in the best possible manner. For example, shadow boards are often employed to have tools visually obvious to a worker, and also serving the purpose of knowing when a tool is missing. Shine or sweep, the third S, sets the pace of the classical idea of housekeeping, inspection, and preventative maintenance by making sure everything is clean. The cleaner an area is, the easier it is to identify issues that may hurt quality. The fourth S, standardize, is what allows the recursive process of the first three S's to occur by creating standard procedures.

Standardize is what sets the pace for the fifth S, sustain, which keeps the lean implementations maintenance in the long-term and ideally part of the culture. Measurement of the 5S is often this is done with metrics, audits, maintenance and improvement on what has been put in place. The third principle, elimination of waste, represents reducing costs by reducing what is not needed and in is truly inherent to the 5S process (3). Safety also becomes a byproduct of the process; specifically by the shine step also know as sweep (6). The focus for this paper remains on the 5S process itself; however several pertinent topics will be reviewed in supplement to the 5S.

Historically, the roots of lean started with the Toyota Production System or TPS shortly after the WWII in Japan. The philosophies of the Ford Production System, as outlined by Henry Ford, were perfected and refined by Taiichi Ohno of Toyota. Ford’s “Can Do” philosophies marks a striking resemblance to the 5S that Taiichi is credited with, see Table 1 (7). In fact Ford’s FPS was one of his inspirations. Six Sigma later on in 1987, comes along as resultant of Motorola initiatives. It is compatible with lean and at times called Lean Sigma. Six Sigma also introduces a similar five step methodology also showcased in Table 2: Historical process improvement methodologies. However, Six Sigma is not the same and is based on reducing variation by using statistical control (8). It is included in Table 2 for demonstration purposes.

<i>Ford’s CANDO</i>	<i>Toyota’s 5S</i>	<i>Six Sigma DMAIC</i>
C – Cleaning Up	S –Sort	D – Define Phase
A – Arranging	S – Straighten	M – Measure Phase
N – Neatness	S – Sweep	A – Analyze Phase
D – Discipline	S – Standardize	I – Improve Phase
O – Ongoing Improvement	S – Sustain	C – Control Phase

TABLE 2: HISTORICAL PROCESS IMPROVEMENT METHODOLOGIES

In 1973 Taiichi Ohno published the TPS, allowing for transfer of these production methods to reach to the United States. By the early 1990’s lean had become coined as an American term for Toyota Production ideals and in some may describe lean as the Westernization of a Japanese concept. At this

point various companies began their lean initiatives (9). Jeffery K. Liker would define lean as “a manufacturing philosophy that shortens the time line between the customer order and shipment by eliminating waste”. Special attention must be brought to that of two key words in the sentence, *philosophy* and *waste*. Reducing waste must focus on reducing cost by removing whatever interrupts production flow or does not add value to the system (10). Philosophy is to be emphasized because true lean must be a change in company culture and thus must become a way of thinking for the company.

It is in this lean philosophy that anyone who implements lean must be careful. Many argue that so-called “event lean” is the reason that many companies fall short at creating a lean environment. Jamie Flinchbaugh argues that, “At least half of the companies have an inadequate approach to lean, implementing what we refer to as “event lean.” Train people in lean, begin some 5S application, do kaizen events. This strategy often leads to early results... genuine lean is built into the organization’s people, processes and way of performing work” (11). Jamie further argues that for true lean one must embrace the lean theories and shift company culture. The issue seems to not be the events themselves but in truly sustaining lean in the long run. Jeffery Liker’s seminal book The Toyota Way agrees, “...most attempts to implement lean have been fairly superficial. The reason is that most companies are focused on tools such as 5S and JIT, without understanding lean as an entire system that must permeate an organization’s culture.” (5). As with the fifth S, sustain, the focus must be on committing everyone involved in work environment to the 5S, everyone means all the people from the production floor to top management (12). Rarely is lean a grassroots effort. Senior management must be involved in the day to day operations and continuous improvement initiatives that are involved with Lean. Figure 1, next page, depicts this point.

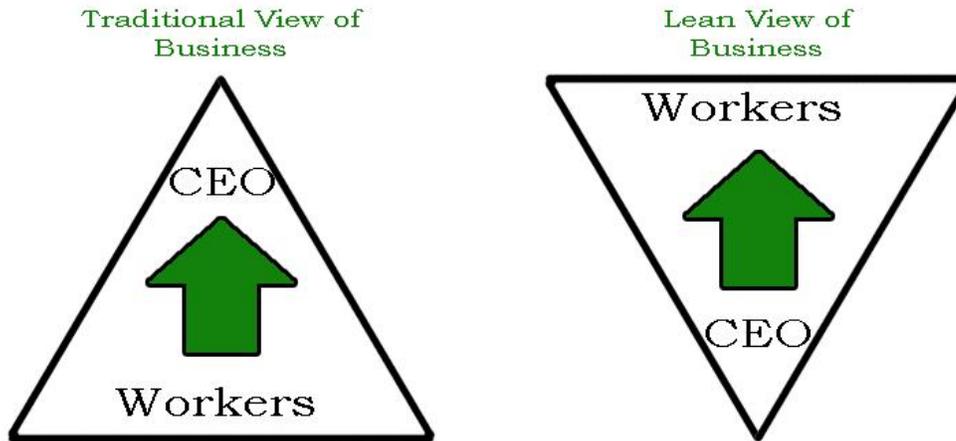


FIGURE 1: TRADITIONAL BUSINESS VIEW VS. LEAN BUSINESS VIEW

To reduce falling into the pitfalls described above, Michael Balle states that the lean implementation team must challenge anything that is done, use problem solving and simply be proactive (13). He states that we must question if enough was done, if more be done and if what was done can replicated. The problem solving portion must include the “5 whys” root cause analysis, another lean concept. The 5 whys question the symptom, excuse, blame, cause, and root cause. It is simply done by asking “why?” five times (4). Balle lastly suggests that being proactive means being able to resolve a problem and provide a solution as soon as it happens, he states his motto is to “Just Do It”. The road to implementation is “20% intellectual and 80% emotional” (13).

In order to sustain lean through the 5S one must have sufficient knowledge of barriers that may affect implementation. Countermeasures should then be developed in response to these barriers. Michael Boyer discusses five barriers that may exist. They are: executive issues, management issues, implementation issues, technical issues and cultural issues. No company is unique and thus any combinations of these issues may be present (14). Briefly stated, executive issues deal with poor leadership, cultural issues deal with not being able to translate lean to the workforce, management issues result from poor sustainability of the lean event/s and/or principles, implementation issues stem

poor process methodology and lack of infrastructure of a project and lastly technical issues are a result of not having the theory and principles understood. Countermeasures include leading by example, promoting inclusion, empowerment, leading by example and remaining true to what is being implemented (3). All the issues that may come up must be considered before going through with a lean event, in this case 5S doing will allow for a solid 5S implementation plan that will responsive to any issues that might come up.

The 5S is a tool for organizing and standardizing the workplace, in essence it's a sort of slightly more complex housekeeping procedure (15). In a case study by Rick Hubbard, he talks about the implementation of 5S system in small manufacturer in Nevada (16). For the first S, sort, items are red tagged by a cross-functional team from various departments including people from that area in question. They develop a policy for how long an item is tagged before it is removed. In some books it states using a "48 hour rule" (17) but in general these periods need to be adapted to the specific work environment (18). In the straighten stage, three types of waste are searched for and eliminated. The three types of waste are difficulty-of-use waste, searching waste, and waste of returning items to the proper place waste. A process map is drawn to find the flow of work and they analyze where motion is wasted. Visual controls are introduced to keep items in an indicated location. For the third S, sweep, employee involvement becomes a key part of the process, they develop a Total Productive Maintenance or TPM sheet to aid in continuous tracking of the cleanliness and thus begin part of the fourth S, standardize. Furthermore in the standardize phase the concept of hanging tools is introduced to aid in having tooling at the right place at the right time. Lastly, the fifth and most important S, sustain, the company promoted the initial 5S implementation area workers to become teachers of the 5S. They promoted employee innovation by having prizes for new ideas. They also created red tag committees to

further sustain the 5S. By the end of the case study they managed to recover 10 percent of the shop floor. The case study noted a particular successful event of 5S implementation.

In another case study a warehouse implements a similar plan with a slight deviation due to the different scenario. They wanted to error proof this particular process to make sure orders shipped out were correct. The implications for 5S were that if the workplace was not orderly then what was shipped would not be orderly, and thus the 5S event tried to change that. Some solutions to supplier error resulting from the 5S were pre-packing small parts and reviewing part identification schemes. They improved shipping bill documentation and consulted with customers for improvements to reduce shipping errors and enhance customer satisfaction (19).

Despite the simplicity of 5S in lean as a concept, the science, there is a specific art to tailoring it on a case-by-case basis depending on the scenario. Careful documentation, planning, implementation and management are needed for extracting the optimal usefulness of 5S. Implementing 5S is merely a step and only one tool in the gamut of lean tools. The true test of creating a lean system is in changing the culture, the way of thinking and ultimately sustaining the process. How can an implementation plan be drawn out for Helical Products Co. of Santa Maria.

5S IMPLEMENTATION PLAN DESIGN

CURRENT STATE

The scenario at this facility, specifically the shipping department, is as follows; Helical Products Co. at the beginning of this project had no substantial exposure to lean. Key ideals have been discussed but have not been implemented. The management in this facility is interested and the three workers in the shipping department seem open to lean and process improvement. In actuality, this offers an ideal environment to implement lean. As the company enters its lean journey it would like to use its shipping department as a test bed for lean implementation. The 5S as explained in the literature review serves merely as a tool in the gamut of other lean tools and will not make a company lean. It is however, an important step. In my opinion, Helical is ripe for lean implementation.

Evaluation was done in the shipping department to search areas where waste was present via Lean concepts. The area was evaluated via three different methods; process mapping, visual inspection and evaluating feedback from the Helical Shipping Department staff.

EVALUATION OF THE CURRENT STATE

Using Microsoft Visio, a current state process map was developed to reflect the various processes that currently happen in the shipping department. *See next page Figure 3 Current state Value Stream.* Time studies were done in the area. Due to time constraints, focusing on efficiency and max benefit to company, the value stream focuses on order with a quantity of 25 or less. These account for a large portion of orders in that area. Evaluating the process does not focus on working harder but instead working smarter (18). For this project it laid much of the foundation for developing an improvement plan. A value stream is all the activities, required to fulfill a customer request from order to delivery, in

this case it's all the activities within the shipping department. It gives the reader a chance to discover opportunities for improvement (3). To read Value Stream Maps or VSMs use the following chart. See

Value Stream Map Symbols

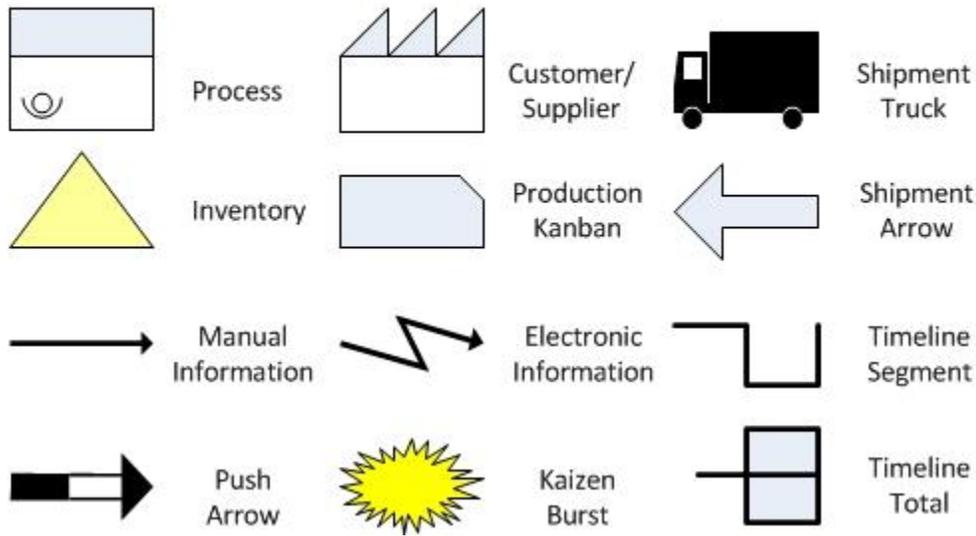


Figure 2: Value stream symbol explanation.

Value Stream Map Symbols

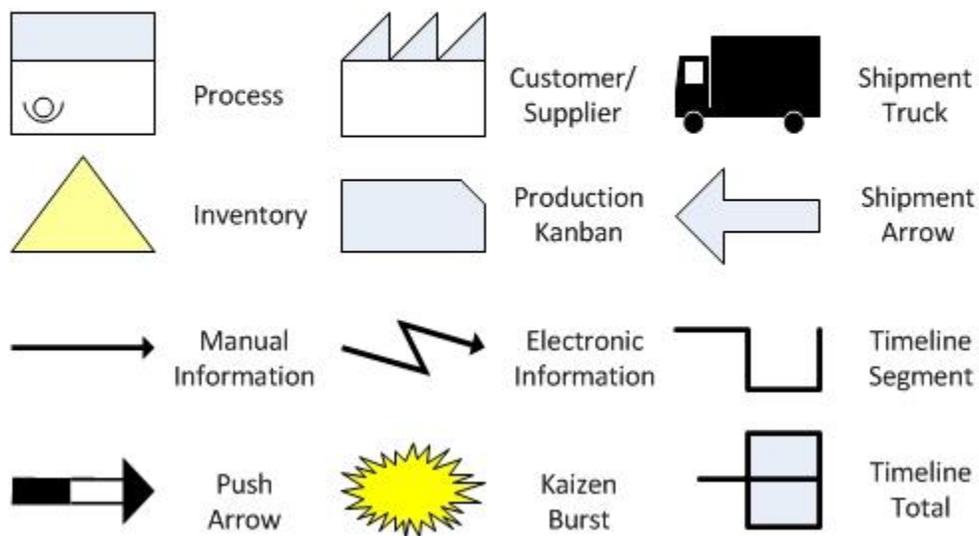


FIGURE 2: VALUE STREAM SYMBOL EXPLANATION

Shipping Department Current State Process Map

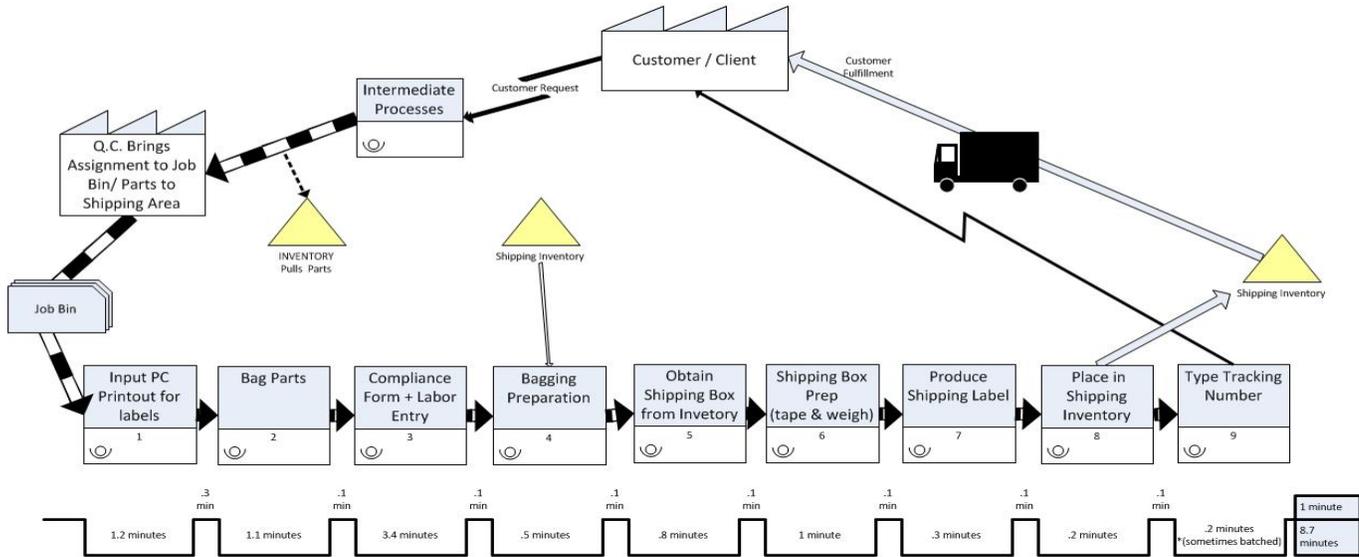


FIGURE 3 CURRENT STATE VALUE STREAM

The processes involved for shipping this type of order are listed above. We note the processes with the longest time allow the opportunity for the most improvement. Labor entry or step 3 has the longest process time at 3.4 minutes out of 8.7 minutes. These 3.4 minutes are spent manually filling out paperwork. The 8.7 minutes was measured using time studies carried out on two separate days for shipments 25 or less. The numbers collected represent what the company shipping department staff called a typical order. It is of note though that only bagging parts and bagging preparation would vary in time according to order sizes. The values of this chart were verified with the staff to ensure relative accuracy without the use of statistical sampling.

VISUAL INSPECTION OF SHIPPING DEPARTMENT

Evaluation was done in the shipping department using visual inspection. This involved being in the shipping department environment for a number of hours observing the overall process and visually

assessing what causes waste in the area. Initial room for improvement was seen the inventory for this shipping department.

If we refer to, Figure 4: Packing peanuts storage, the packing peanuts can be noted to taking up an unnecessary amount of space. Although the peanuts are donated and are relatively cheap otherwise, it features the second waste of unnecessary stock and would be addressed when 5S is implemented. Opportunities for switching out to new packing fillers were looked into however none had a better economic costs.



FIGURE 4: PACKING PEANUTS STORAGE

In addition to evaluating the process via VSM, a suggestion box was created to gather input from those who interacted with this department. The suggestion box was created using corrugated cardboard and included a brief description of 5S. The description can be seen in *Appendix A: 5S Suggestion Box Explanation*. The suggestion box, see Figure 5: Suggestion Box, received five suggestions over the course of two weeks. The box included a slot for inserting index cards, not seen. The suggestions are seen in Table 3: Suggestion box summary.

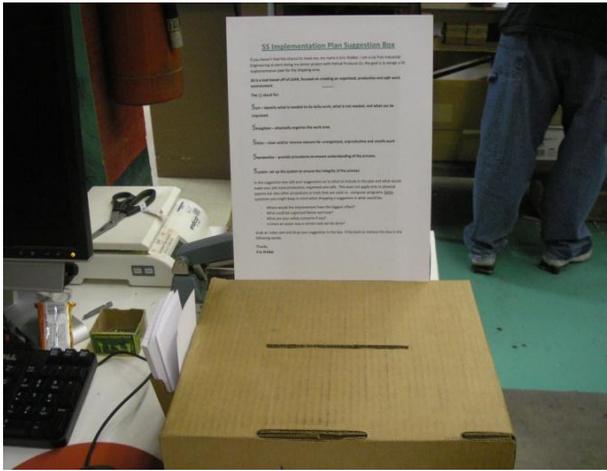


FIGURE 5: SUGGESTION BOX

Index card #	Suggestions
1	Glass Safe
2	Having a flat bed jack in shipping area for ease of movement for drivers.
3	Include customer shipping requests, shipping re in paperwork.
4	Find a better way to store shipping peanuts.
5	Shipments be no later than 2pm

TABLE 3: SUGGESTION BOX SUMMARY

Upon evaluation with the company contact and shipping leader, suggestion 1 and 4 were irrelevant, 2 and 4 are applicable, 3 was turned down because adding all the information adds to clutter on the paperwork and 5 did not include enough information. However, other suggestions provided outside of the suggestion box were helpful when talking to those involved in the department. Implementation of a peanut hopper, some sort of kanban system for inventory boxes, and implementing a barcode scanner were discussed.

5S STEPS FOR IMPLEMENTATION

Using the 5S steps described previously in the Literature Review, the design of the project took those ideals and catered them to this area. As with most lean concepts the steps are simple and easy to follow, however sustaining these ideals is the challenge. A training manual was developed as deliverable and attached in the appendix.

SUGGESTIONS AND RECOMMENDATIONS FOR FUTURE STATE

The scope of this project did not go past the planning stage; nevertheless room for improvement can be seen visually and was also throughout the project duration by the company contacts. Research was conducted using these suggestions. As a result economic and specification analysis was done to depict the feasibility of these suggestions. The suggestions, as featured in the following sections, vary in implementation complexity and in value. Value isn't always measured in monetary value and at times has benefits in other areas such as morale. The suggestion will aid in future lean initiatives.

FUTURE STATE VSM ANALYSIS

Reiterating what was said previously, the process step with the largest time has the largest room for improvement. The future state value stream map next page, see Figure 6: Future State VSM, represents what the future could look like if certain opportunities for improvement are capitalized on. The largest present opportunity is represented by step three, compliance form and labor entry. The kaizen burst represents that opportunity.

Shipping Department Future State Process Map

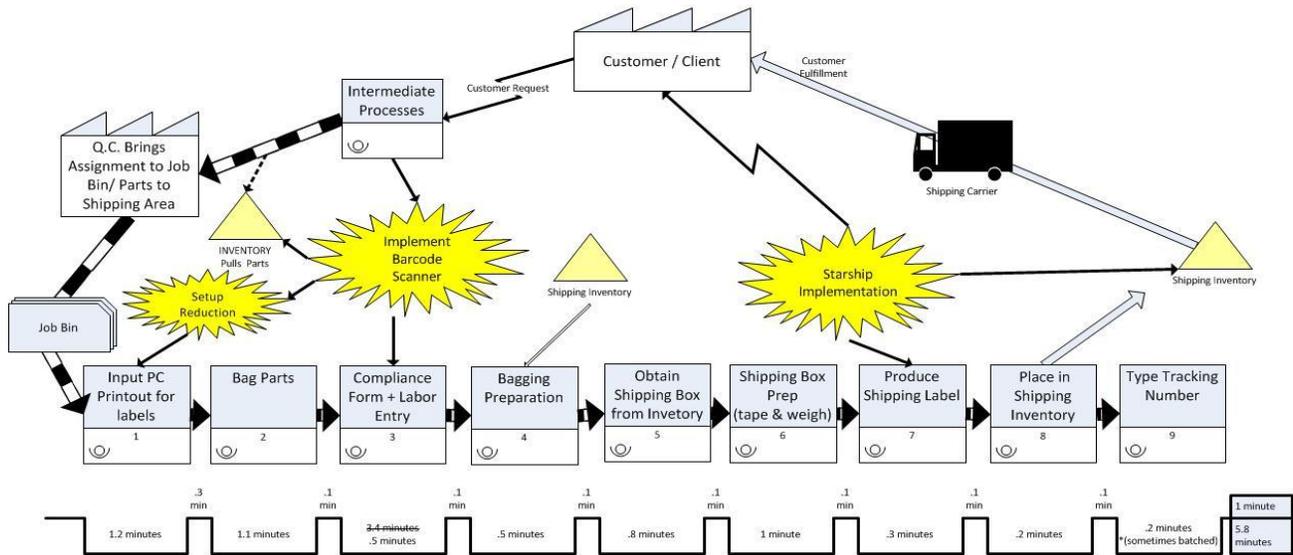


FIGURE 6: FUTURE STATE VSM

My suggestion would be to implement a barcode scanner add on for their ERP system. One click would eliminate manual form entry and would prompt the system to fill out the paperwork. The barcode scanner also has the ability to reduce the short process of the label maker data entry using by using the barcode to eliminate manually setting up the label maker. Another room for opportunity is located in the production of the shipping label. Despite the short time to process it is known to the shipping department that knowing how produce the shipping label requires knowledge of the various third party shipping companies, UPS, FedEx, etc... The training is extensive and what Starship, another ERP add-on, does is eliminate the need to know how to deal with third party shipping companies. This is an add-on that is slated to be implemented in the coming months and I decided to apply to the VSM to show that Helical's ideas already fit within the lean model.

BARCODE SCANNER FOR SAGE MAS-500 SYSTEM

Researching the barcode scanner required understanding of the ERP system that Helical currently uses. Upon research of the system and conversations with the contacts at Helical, it was discovered that talks of barcode implementation had already been discussed but a financial analysis had not been done. Several emails led to an eventual call with the barcode scanner company that offers the software and hardware for implementation. Supplementary specifics will be provided to the company in person but for proprietary reasons will not be included in this report. A cost analysis can be seen in the following table, see Table 4: Barcode Cost Benefit Analysis.

Name of Cost	Cost in \$	Qty if applicable	Notes	Total Cost
Barcode Estimated Costs				
Software	\$12,000.00	1	<i>per user</i>	\$12,000.00
Software License	\$1,000.00	2	<i>per user</i>	\$2,000.00
Hardware (Barcode Scanner)	\$3,000.00	2	<i>per user</i>	\$6,000.00
Implementation (5 days)	\$1,700.00	1	<i>1 work week</i>	\$1,700.00
Total Cost of Implementation	-	-	-	\$21,700.00
Shipping Department				
Cost of time	\$2.08	-	<i>per minute</i>	-
Number of Orders/day	-	80	-	-
Benefits from Cost				
	in \$	Qty if applicable	Notes	
Savings	\$482.00	per day	<i>per day Savings = 2.9 min from VSM * 80 orders/day = 232 min * cost of time</i>	
Payback Period				
	Units Time			
Days	46 days	-	-	
Weeks	9.2 weeks		5 Days/ work week	
Months	2.3 months	-	4 weeks/ month	

TABLE 4: BARCODE COST BENEFIT ANALYSIS

It is of note that the payback period of the cost analysis above is not a long time with the numbers given. It is also important to note that effects of the barcode scanner would not only be applied to the Shipping Department but the effects would be facility wide. Inventory can do picking, return form can be streamlined and material can be tracked via a barcode scanner in manner that is less manual. Ultimately, the help reduce errors that can occur with manual entry, such as having the incorrect information on packing list sent on an order.

PACKING PEANUT HOPPER (OVERHEAD DISPENSER)

The last suggestion would be a method to store the packing peanuts stored in the shipping department inventory department. U-line, which happens to be their shipping material supplier, offers a solution to storing and dispensing packing peanuts. See Figure 7: Uline packing Peanuts Dispenser. The cost would be \$159.00 (20). The benefits would reduce storage space by having peanuts overhang in the box assembly area. However, this hopper would store a max of 1.5 bags of shipping peanuts which does not eliminate all the waste cause by unnecessary stock.



FIGURE 7: ULINE PACKING PEANUTS DISPENSER

THE COST OF 5S

An evaluation of conducting and full 5S process would also cost the company money. This report only theorizes suggestions based on 5S but has not gone into the implementation phase. Financially, it would cost the company several hours spread across several weeks that would go into planning, training staff, and preparing to conduct a 5S. It would be recommended that this would kickoff the overall implementation of lean manufacturing into the company culture.

CONCLUSION

The suggestions provided in the report serve as what would be suggested if 5S was implemented. It is in the goal to merely facilitate the process. True 5S and ultimately lean must come from within the company. It is in that belief that this report took the opportunity to get that started, using most of the suggestions from the department staff. The idea behind this is that involvement is key driver to sustaining lean. Getting people to embrace change when it happens and want to influence it as it happens is a major challenge of lean and it seems as though Helical Products Company already has that philosophy. Although lean is mainly process focused, at the center everything is done with the customer in mind because they are truly what drives the company. As noted in the Helical mission statement (21) "Helical Products Company, Inc. has a unique product for controlling mechanical movement in the HELI-CAL Flexure Concept. Equally unique and important is the high level of service we at Helical provide to our customers." Helical already has a customer focus in mind and it is with that statement combined with the willingness of the staff noted in the report that Helical is ripe for the lean implementation that will give them a boosted competitive edge.

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APPENDIX 1: 5S SUGGESTION BOX EXPLANATION

5S Implementation Plan Suggestion Box

If you haven't had the chance to meet me, my name is Eric Walker. I am a Cal Poly Industrial Engineering student doing my senior project with Helical Products Co. My goal is to design a 5S implementation plan for the shipping area.

5S is a tool based off of LEAN, focused on creating an *organized, productive* and *safe* work environment.

The **5S** stand for:

Sort – identify what is needed to do daily work, what is not needed, and what can be improved.

Straighten – physically organize the work area

Shine – clean and/or remove reasons for unorganized, unproductive and unsafe work

Standardize – provide procedures to ensure understanding of the process.

Sustain- set up the system to ensure the integrity of the process

In the suggestion box add your suggestions as to what to include in the plan and what would make your job more productive, organized and safe. This does not apply only to physical aspects but also other procedures or tools that are used i.e. computer programs. Some questions you might keep in mind when dropping a suggestion is what would be:

- Where would the improvement have the biggest effect?
- What could be organized better and how?
- What are your safety concerns if any?
- Is there an easier way a certain task can be done?

Grab an index card and drop your suggestion in the box. I'll be back to retrieve this box in the following weeks.

Thanks,

Eric Walker

Box was placed in shipping department where I received feedback from employees involved in the department.

5S Training Manual For Helical Products Co. Shipping Department of Santa Maria, California

By: Eric William Walker

of Cal Poly, San Luis Obispo

Part of Senior Project

“A 5s Implementation Plan For The Shipping Department at Helical Products Co.”

WHAT ARE THE 5S?

5S is a lean methodology focused on waste removal. The methodology is recursive, never-ending and continuous. It is one of many principles in the philosophy of lean manufacturing and by no means does adopting one principle make a company lean, 5S is just a principle to make problems visible (5) (11). Lean is much bigger than 5S but the 5S is a sound foundation to begin full adoption. In adopting 5S make sure everyone is on the same page with what the 5S are defined as. The 5S are derived from 5 Japanese words that translate to sort, straighten, shine, standardize and sustain. They are described as follows (5) (17):

1. **Sort** – identify what is needed to do daily work, what is not needed, and what can be improved.
2. **Straighten/ Set in Order** – physically organize the work area with the best locations for the needed items.
3. **Shine** – clean and/or remove reasons for unorganized, unproductive and unsafe work. Create measures and preventative maintenance to ensure the Shine step.
4. **Standardize** – provide procedures to ensure understanding of the process. This S supports the first 3 S'. Keep using best practices.
5. **Sustain**- set up the system to ensure the integrity of the process and build it so it that improvement is continuous.

5S can ultimately be applied to any work area, in and outside manufacturing. The same techniques apply to any process including those in the office. Before beginning a further in-depth discussion of the 5S we will discuss some rules that the facilitator and those involved must be aware of before implementing the 5S.

BEFORE BEGINNING 5S

Involvement is key in implementing 5S, therefore there are some ground rules that are highly suggested to be followed during the process for all people involved. They have been compiled as follows (17) (22):

1. “Blame the process, not the person” (22). If there is an issue that is causing problems look into the scenario that allowed the problem to happen.
2. Allow people to offer suggestions; don’t shoot them down for it. Small ideas sometimes lead to bigger solutions.
3. 5S and ultimately lean should travel in all areas of a company. Allow 5S to happen on the production floor and office area. “Respect, challenge and help your people and teams” (3).
4. Involvement is key in the 5S, involve everyone who touches the process in every step of the 5S methodology.
5. “Grow leaders who live the philosophy” (6).

Benefits of 5S

- Pride is created in the workplace. If those who work in an area have input in decisions made, they are more likely to experience pride for their work. Employees become empowered.
- Stakeholders will see the difference. A clean, organized and safe work place is noticeable.
- A clean and organized workplace is safer. It decreases the possibility of injuries occurring.
- Increase product quality and process quality.

SORT

Sort is the first step of 5S. The purpose is to identify what is not needed in the work area and removing it from the work area. Sometimes this means disposing of it, keeping it in another area, selling it or donating it. Other items to include are items that may cause safety hazards and unused items that are in inventory for extended periods. A method of doing this is done by “red tagging” these unneeded items. Once red tagged, these items are evaluated before disposition is made. Evaluation should include decisions on how much is truly needed if there is surplus.

The Steps of Sorting

- Look at the ALL equipment, tools, paperwork, storage areas and supplies (17). Define what is needed.
- Define what is not needed. Evaluate all items in question and make of note, i.e. red tag. Decide on the disposition of the item at this time. When possible use hard data to decide on disposition with team.
- Dispose of items.

STRAIGHTEN/ SET IN ORDER

The motto for this step is “A place for everything and everything in its place.” (18). New locations for items should be easily accessible and reduce the motion and effort in obtaining them. Make it obvious where things belong. Examples of this include but are not limited to,

providing visual labels to show where things are, color coding items, creating easily accessible tool kits for commonly used tools, and creating divider lines for different types of work.

Take a look at the following items:

- Equipment: tools, machinery, cleaning equipment, etc...
- Furniture: cabinets, carts, desk space, etc...
- Overall Layout: aisle ways
- Material: Work in progress, parts, parts storage, raw material, etc...
- Other: paperwork, computer interfaces, digital storage labeling.

SHINE

Once you have kept what is needed, labeled them and organized them what follows is physically cleaning the area (6). This goes beyond the typical cleaning, replace worn out components to key equipment and ensure equipment is operating in safe manner. Create a checklist for periodical cleaning of equipment or an area with those who work in the area. Create pride for keeping the area clean.

Steps of Shine (17):

- Clean the workplace
- Maintain the appearance of the work place
- Use preventative measures to keep the workplace clean

STANDARDIZE

This step of 5S focuses on creating the systems and procedures to monitor the first 3 S's (10). Standardization allows for continuous improvement. Standardize the way you sort, straighten/ set in order, and shine. Standardize the training to ensure that everyone understand 5S as the same methodology. Attach clear responsibilities to tasks that need to be done. Create the pride and ownership as described in the shine step. As time passes, keep the best practices and part ways with those that don't add value to the process.

The managers of 5S must set the tone and lead by example (17). As leaders, managers need to be committed, have time to develop other leaders, provide guidance and support 5S changes. Standardization allows the process to be examined by allowing errors to be pinpointed to particular steps in the process.

Steps of Standardize:

1. Identify the tasks that have to be completed.
2. Name the individuals who have ownership of each task.
3. Identify the scheduled time during which the tasks will be completed.

If implemented correctly, standardization provides the reinforcement to facilitate a culture change, practice leads to habit.

SUSTAIN

This phase of the 5S is the most difficult. Engraining 5S into the culture and making sure it isn't a single time event is tough. In order to sustain you must have overall involvement, support, commitment, and good communication. Create the habit of auditing periodically and rewarding the best teams (5). Always keep an open forum of idea flowing on how to do 5S better because even the smallest of ideas can lead to bigger solutions. Lastly, make sure all problems are responded to promptly and pay special attention to what caused the problem. 5S does not only create a visual workplace but it should create quality in a process.



Credit: The Toyota Way by Jeffery Liker

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