Kaizen

15 Hour Basic Course

SESSION 1

Kaizen Course

Instructor's Guide

I. Opening the Meeting

Introduction and Greeting

- Opening remarks from Operations department, or area manager. Introduction of the instructor. Opening statement.

I am (*name*) of the (*depart*. or *area*) at (*location*). We will be studying the topics of Kaizen (or continuous improvement). These are important concepts that form a vital part of the Toyota Production System. I look forward to working with you the next few sessions.

This course is primarily designed for Team Leaders and other leadership positions in manufacturing, and consists of 5 three hour sessions. Today we will just cover session one and some of the most basic concepts of work kaizen. I'd appreciate it if you would please give me your full attention and cooperation. Feel free to ask questions when necessary. For some of you, parts of this will seem like review. For others, it may all be new. Let's work together to make this a worthwhile course and help each other understand the subject matter.

- Create an informal atmosphere. Try telling a joke. Put the trainees at ease.

- Note that attendance is recorded but no tests will be given. Point out the necessity of coming to class on time. Encourage participation.

- Self-introductions to include: 1) Name, 2) Workplace, 3) Type of work, 4) Number of team members*, 5) Familiarity with Kaizen*.

  *If applicable

- Introduce visiting attendees as necessary. Today we have (name) of the (area/dept.) at (location).

- Discretely inform visitors or non class participants that they are welcome to listen but to please refrain from comments or other actions that will disrupt the proceedings of the class.

II. Role Of A Leader & Shop Floor Problems

1. Definition of a Leader

QUESTION: What is the definition of a Leader?

During this course I will use the word “leader” frequently. I will use the traditional definition leader, which is:

- someone who looks after other people &
- someone who guides the work of others

Additionally, at Toyota, a leader has four main responsibilities as measured by the System 5 survey:

- guide your work team
- promote corporate goals
- develop people in your team
- build teamwork

This class is designed mainly for Team Leaders and other supervisors in manufacturing. However, everyone here whether you are a Team Leader, Engineer, Manager or Team Member has the opportunity to act as a leader in the company. Sometimes this can be as simple as leading by example.

KEY POINT: Make sure everyone in the room realizes they are a leader. If you are teaching a class of Team Members, this point is not as urgent.

2. Role Of Management and Team Leaders

I’d like you to think about what type of role leaders are expected to play by management of the company. We have to act on a daily basis in accordance with the responsibility and authority of our position.

QUESTION: What type of role do you (T/L’s) play in your area every day?

- Prompt the audience to debate their role and have them recognize the following items listed below. Mainly focus on the things that they are responsible for in manufacturing.

Show TP 1 - 1 "Role of a Team Leader"

1. Achieve production demand
2. Ensure quality
3. Reduce cost
4. Ensure safety
5. Develop team members
6. Maintain equipment
7. Adherence to policy
8. Work kaizen
9. Delivery of parts
10. Maintain team relations
11. Conduct MBP
12. Other

The point of this discussion is to highlight that the role of a Team Leader is very broad. The extent of our responsibility and authority may slightly differ by plant and area but we all have broad responsibilities and play an extremely important role in manufacturing.

Note: If your class is not comprised of T/L's this question will have to be altered to fit the make up of the class.

3. Problems in the Work Site

Fulfilling the role of Team Leader smoothly is not an easy one. As we pointed out there are many problems in the work site that make fulfilling the role of Team Leader very difficult.

No matter what area of the company we visit, the same types of problems such as achieving production demand, ensuring quality, reducing cost, improving safety and morale face all of us.

For this class I'm going to define these types events that disruptive our jobs as problems. It is these types of disruptions that we as Team Leaders have to be alert for, and ready to deal with.

Problems that we as supervisors face fall into many categories such as production problems, interpersonal relation problems, shop floor discipline problems, team member development problems etc. For this class we will mainly focus on problems related to either production, quality, cost, safety, material, or equipment.

Write On Flipchart: Problems For Kaizen

It is important to understand that we need leaders because there are always going to be problems. Thus as leaders we have to be ready to deal with them.

Question: What type of manufacturing problems do you have in your work site?

I'd like specific examples not just general statements. Order is not important please state them as they come to you.

Note: Listen to the problems as they are stated, and write 8 - 10 of them on the board. Avoid general expressions, steer them towards concrete examples. As necessary use prompting questions to generate a list that looks as follows.

(1) Quality related	Defects, repairs, scrap
(2) Cost related	Overtime, scrap, unbalanced work
(3) Safety related	Injuries
(4) Production related	Not producing to takt time & standardized work
(5) Delivery related	Short shipments
(6) Lead time related	Excess parts and materials
(7) Work method related	Difficult or unorganized work
(8) Process related	MRO items, equipment, tools, etc.
(9) Production system	Kanban, production schedule
(10) Parts & Materials	Storage, conveyance

As you have pointed out, there are many types of problems that occur in our work areas and exert a disruptive influence on our jobs. Some of these problems require that we as leaders take actions to drive improvement. How we go about tackling some of these problems is a primary topic for this course.

Before we begin learning how to approach some of these problems, I would like to spend some time reviewing the economic necessity for continuous improvement. We will next review the importance of cost reduction for any organization and highlight some of the key challenges facing Toyota in manufacturing.

III. Importance Of Cost Reduction

A. Circumstances Surrounding The Company

In order for Toyota to continue to obtain a profit in our current markets it is necessary for each of us to understand company policies and objectives while carrying out our responsibilities as Leaders. For this reason it is important for us to fully understand the circumstances and competitive reality that surrounds the company today.

Now I would like for us to take time now to recognize some of the circumstances surrounding the company and reinforce why we need to conduct TPS activities company wide.

Show TP 1 - 2a Net Sales & Gross Profit Level

Describe the recent trends of the company in terms of sales, profits and losses over a representative period of time.

Show TP 1 - 2b Total Company Quality Data

Describe the recent company trends in terms of customer defects, scrap or rework, warranty claims, or other quality related measures.


Write On Flipchart: if necessary

Show TP 1 - 2c Delivery & Lead-time

Describe the current situation with regards to on-time delivery, inventory, and lead-time from order to delivery.

Show TP 1 - 2d Price Downs From Customers

If applicable indicate the general price / cost squeeze pressure that the company is currently facing. Show the trend for the industry, market, or competitor products if applicable.

As the graphics show, the circumstances surrounding the company are quite difficult. The competitive realities of manufacturing are extremely harsh. In order for us to protect our jobs and livelihood it is necessary for us to continually focus on ways to improve quality, productivity, and delivery, while reducing costs.

B. Pursuit Of Profit

Next we are going to talk more about the pursuit of profit in manufacturing. It is vital for all leaders and employees in manufacturing to understand the importance of profit and structure of cost.

As we briefly touched on before it is vital for the company to balance the needs of its employees, the needs of its shareholders, and the needs of the customers, and suppliers. Obtaining a continued profit is of foremost importance to all the above stakeholders.

In order for the company to obtain a profit, equal effort is required from management of Toyota and production employees. Let's take a moment and think about how we secure a profit.

In particular, let's look at the components of profit: sales price and cost.

Write On Flipchart: Profit = (Sales Price - Cost) X # of units sold

Question: Given this equation, what are the ways to increase profits?

Write On Flipchart:

1) Increase Price
2) Increase # of Units Sold
3) Lower Cost

KEY POINT: After explaining the above 3 ways explain the following points.

Method 1: Raising Price

1) Explain that sales price is ultimately decided by the market place.

-Competition leads us to competitively set our prices.
-Hard to raise prices - Cost downs are the norm.

You can only raise price to increase profit when you are a monopoly, or have a unique, highly desired product or service that others can not easily duplicate.

Method 2: Increase the number of units sold

1) The automotive industry is a mature industry, there is a limit to the overall level of growth we can expect.

   -Limits on equipment capacity for us and customers.
   -Market demand changes gradually, not suddenly.

2) It is hard to just suddenly increase the sales of our product.

   -Without special distinguishing features it is hard to increase demand for our products.
   -We can't just make as many parts as we would like and sell them. Customer and the market determine demand.

Method 3: Reduction Of Cost

1) We can, however, alter our production method to lower costs.

   -Effectively use machines, equipment, material, parts and labor.
   -Only produce what is necessary.

2) Eliminate all elements related to production that do not add value

   -Reduce waste.
   -Increase the ratio of those items that add value to the customer

Show TP 1 - 3 "Cost Plus & Reduction Principles"
and explain the two ways of looking at cost.

Because we are in a commodity market where supply exceeds demand, it becomes apparent that it is nearly impossible for us to raise our prices, or unilaterally set our sales volume to try and increase profits.

As leaders directly involved in manufacturing, it is necessary for us to focus on cost reduction through activities involving all our employees.

C. Manufacturing And Cost

1) Now we will discuss the cost structure of manufacturing.

The percentage of cost that manufacturing occupies is only a part of the total cost of a finished good item, and it is not easy to calculate.

The total cost of an object is made up of various costs such as purchased parts costs, material costs, labor costs, energy costs, depreciation costs, overhead costs, etc.

Show TP 1 - 4 "Cost Structure (top half only)" and explain the contents of sales price.

Usually when asked about costs, materials, capital and labor usually come to mind. However, once we have purchased the equipment, capital costs are a fixed cost that manufacturing can not directly alter. Additionally, labor costs in manufacturing are generally less than 10% of the total cost of manufacturing a product.

So how does a company make more money in manufacturing? We've shown that we can't raise price, or alter the number of units sold. The only path available to us in manufacturing is to focus on the *way we manufacture*. We have to constantly focus on eliminating every little bit of waste in the entire system.

2) Now we will discuss some of the elements that make up cost

QUESTION: What actions lead to increased costs in your work areas?

After the audience is done answering you may want to cover some of the following examples as well.

Examples of answers:

-Overtime
-Scrap & rework
-Machine Downtime & Breakdowns
-Waiting, Walking, Or Other Non-Value Adding Motions
-Inventories Of Work In-Process & Finished Goods Inventories
-Part Shortages or expedited freight

3) Now we will discuss motions & activities that do not add value

As we just highlighted, there are many types of motions and activities that do not add value in manufacturing. In a later section we will cover work and waste, and the 7 specific types of waste. Every day examples of waste that we see are excess walking, waiting, double handling of parts, watching for machines to finish their cycle, etc.

If you look closely at the movement of machines and equipment there are many actions such as clamping, unclamping, air feeds, returning to home position etc., that do not add value to the product.

-Excessive Inventory or Stock

If you look around your work sites, you will notice many instances of final product, work in process, and spare parts for equipment. If you look closely at the necessity for these items you will find that there is rarely a need to hold as much inventory as we do.

Inventory stagnates our work sites. It is a leading contributor to increased manufacturing cost. Frequently work sites hold extra inventory to feel safer. However, too much safety stock can also weaken the performance of a company. For example excess inventory results in lack of space, risk of obsolete parts, increased carrying costs, material movements costs, and increased probability of defective parts.

-Material Yield

In molding operations you can notice how much material is thrown away or targeted for regrind. In painting and silvering operations the same is true, much material is actually wasted in the manufacturing process. In most types of manufacturing a whole lot of material is often used to make a small part. Compare the weight of a cast iron raw material item to the weight of a finished good. You will probably be surprised. If the use of material is poor in terms of yield, this will also contribute to increased cost.

-Defects & Rework

No matter what type of manufacturing you are in, it is difficult to get 100% quality products through the whole line all the time. In any process

there is typically some amount of rework or scrap that occurs. These defective and reworked items represent parts that should have been high quality and sent to the customer. However, we often have to throw away defects and rework others. Both of these actions are a type of waste that we want to minimize since they only add to the cost of manufacturing. These types of quality defects and rework items are among the most typical types of waste that add to cost. It is always important to increase awareness concerning quality defects and comprehend the need to put effective countermeasures in place to prevent recurrence.

-Early Production & Over Production

In the course of researching waste it has been observed that the waste of over production is among the worst types of waste.

Explain: How Over-Production creates waste by example from your areas or from home.

As you pointed out, one waste creates another set of wasteful actions. Thus it is important that we not produce too much or too early with respect to delivery. It is often hard to notice the waste of over production, but if you follow standardized work you can avoid this pitfall.

D. Importance Of Plant Floor Activities

Of course it is not possible for us as leaders in manufacturing to reduce all costs in the manufacturing system. Many things are out of our direct realm of control. Materials, and purchased components are specified and controlled by other departments. Supplier performance affects our areas daily. Initial product development and design often lock in 70% of the cost of an item before we even begin planning for launch in production.

Show TP 1 - 4 "Manufacturing Cost" (Bottom Half) and explain the common components of cost.

This graphic depicts the three major categories of costs in manufacturing.

It is important to notice that even though we as leaders in production can't directly control all these items, we can still accomplish substantial savings by using our human capacity for creativity, and common sense.

For leaders and employees in manufacturing it is vital for us to understand cost because it directly affects our profits and performance.

QUESTION: Why do some companies make more money than their competitors?

Ask 2 - 3 people the above question, then explain the following.

One reason is because of *superior product or technology*. All companies would like to be in the position where they are the sole producers of a high demand item. Quite often firms enjoy success because they are first to the market, or hold some type of legal patent protection.

Most companies have few products, however, that fall into the the category of superior product or technology that can command some type of high profit niche. The vast majority of companies have to rely upon being more *efficient* in order to make a profit. Unless you truly have a product that no one else can duplicate, eventually competitors enter the picture, patents expire, or other forms of protection expire.

Being more efficient in production means focusing on the way that we produce. Advantages can stem from labor efficiency, material efficiency, yield efficiency, and numerous other areas as well. The majority of our actions and motions do not add value to the final customer. Finding ways to eliminate these wastes, or non value added activities, is a key determinant in our success as a company.

As I have tried to explain, it is very important for us to obtain a profit as a company. In most areas we don't enjoy a monopoly position, so it is important for us to make a higher quality product than our competitors, at a lower cost, efficiently using what equipment, machines, materials, and people we have. Efficient combination of these items are what make up the heart of the Toyota Production System.

IV. HOW TO VIEW & THINK ABOUT KAIZEN

A. METHODS OF INCREASING PRODUCTION

Today we are going to get started by discussing ways of increasing production.

Question: How can we increase production?
What methods might we use to increase production?

- Listen to replies, then review typical responses.

Show TP 1 - 5 "Typical Responses"

- Increase the number of workers
- Increase equipment
- Work longer
- Work harder
- Eliminate waste and overburden from the work

These are the 5 most typical types of responses we get when considering how to achieve production and efficiency increases. Now I'd like to analyze these types of answers in a little more detail, and show the category that we want to focus on in the Toyota Production System and continuous improvement.

Show TP 1 - 6 Methods of Increasing Production (Top half only)

<u>Increase Production By Affecting Work Quantity</u>

Lets look a little more closely at the first three typical ways of increasing production.

1) Increasing the Number of Workers

Increasing the number of workers is normally the easiest way to increase production. Unfortunately this is usually not an effective way of generating profit. Randomly increasing the amount of labor in a work area will increase volume, but at a cost that frequently outweighs the benefits.

2) Increasing Equipment

Increasing equipment is another method of increasing production. Generally, however, increasing the amount of equipment also means adding people to operate it. Evaluated in terms of cost reduction, however, increasing equipment is by no means cost efficient. Unless program volumes are for example,

increasing by over 30%, adding machines is a very costly proposition and takes substantial time.

3) Working Longer

Another traditional way of increasing production is by working longer. Working longer typically means overtime and usually results in working weekends or holidays. This method of increasing production may be effective if done for relatively short periods of time, however, overtime as a long term solution can be counterproductive when we consider the impact it has on worker morale, workplace safety, as well as wear and tear on the equipment and machinery.

The problem with the above three methods of increasing production is that they are costly, and rest upon the premise that the output of labor, time, and machines are fixed and can not be changed. Hence the *quantity* of work being done being done must be altered to create a corresponding increase in production output.

Key Point: *Have the audience realize that this is a very static and traditional way of thinking about production. It implies that 1 person with 1 machine can make 100 parts in one hour, and that the only way to make more is by adding more people, machines, or working longer.*

<u>Increase Production By Improving Work Quality</u>

There is however, another way to think about methods for increasing production. This second way of thinking relies upon the practice of improving the *quality* of work performed instead of the *quantity*.

Show TP 1 - 6 Methods Of Increasing Production (Bottom Half Only)

1) Work Harder

One way of increasing production without adding machines, people, or work time is to just work harder. In certain situations, like for expedite orders or other emergency situations it may be possible to increase production by working harder. We have all faced this type of instance before. However, we all also know that this is a very poor long term solution. Working harder can only be sustained for short periods of time. Over the long term it can result in injury, frustration, and a decline in moral. For this reason we try to avoid it at all cost.

2) Eliminate Waste

Fortunately there is a another way to effectively and efficiently increase production without increasing the number of people, machines, working harder, or working longer. At Toyota, we do this by identifying elements of waste in the process and then taking steps to eliminate it. Elimination of non value adding activities in the process and product will lead to easier, more efficient work, that is less costly, and easier to maintain. For reasons of cost, productivity, and efficiency we should first consider elimination of waste before we resort to any other method of increasing production or efficiency.

Key Point:

Make sure that everybody understands that "working harder" and "eliminating waste" are both aimed at increasing production by affecting the quality (not quantity) of work performed. Specifically in TPS, however, we want to focus primarily on waste elimination. It is almost always possible to increase production by first changing the way in which we work. For example, by reducing walk or waiting time, changing job sequence or layout, we can enable an employee on one machine, in one hour, to produce 120 parts instead of 100.

B. WASTE RECOGNITION

Definition of Waste

Now I'd like to shift gears and try and define what we mean by waste. The intent of the Toyota Production System is to raise productivity and reduce costs by setting standards aimed at the elimination of waste. It is very important then to understand and be conscious of waste. Let's take a closer look at what we mean by "waste".

Question: How would you define waste?

Answer:

You have given some good answers. Ultimately, waste is anything that increases the cost of production. Any activities that does not increase value to the product is waste, and any methods that does not fit with our goals and objectives is waste.

Work and Waste

In the course of doing continuous improvement we aim to streamline the process by eliminating waste. In order to really understand what we mean by "waste" it is important to learn what we mean by "work". Useful work, or value added work, is defined as work which "advances the process". It refers to actions which raise or increase the value of the part produced. Conversely, behavior which does not add value is waste.

Show TP 1 - 7 "Work & Waste"

This overhead shows the relationship between work and waste. As you can see, any motion involved in manufacturing can be thought to consist of 1) waste, 2) accompanying work, and 3) value added work.

1) Waste

As we briefly discussed above, waste is any element of the operation that does not add value to the product. Later we will categorize waste into 7 specific types.

2) Accompanying Work

Another part of work is accompanying work. This type of work may be essential for executing tasks directly related to production, however, it adds no value to the product.

- Examples include: going to pick up parts, unpacking boxes of parts, removing small quantities of parts from large pallets, and so on.

3) Value Added Work

As its name implies value added work is that which actually adds value to the product. This includes processing, such as molding, painting, and assembling. The higher the proportion of work that adds value, the greater the efficiency of the operation.

If you critically observe work carried out at a manufacturing site, you'll notice that the proportion of value-added work (net work) is very small, and "work" which does not add value is large. Looking carefully at work methods, equipment, and materials, you can find waste everywhere.

Key Point: Even though the percentage of value added activities in any operation is extremely low, we do not mean to imply that people are not working hard. On the contrary, everybody in Toyota does work hard. Inherent in every job-- from the actions of the CEO to the actions of manufacturing employees, however, is some element of waste. It is these elements that are non value adding to our customers that we must seek to identify and eliminate.

C. TYPES OF WASTE

Next I'd like to introduce the 7 categories in which we typically divide waste.

Show TP 1 - 8 "Types of Waste". .

The seven classification of waste in TPS are:

(1) Waste of correction/repair
(2) Waste of over-production
(3) Waste of processing
(4) Waste of conveyance
(5) Waste of inventory
(6) Waste of motion
(7) Waste of waiting

- Describe each kind of waste as follows:

<u>Waste of Correction/Repair</u>

Waste of correction arises from having to correct defects. All material, time, and energy involved in repair is waste. Even if a defective part can be repaired, its quality is often inevitably impaired. In addition, time, materials, energy, and labor costs are required to make repairs. All repairs raise costs. Consequently, attention should be given to avoiding the waste of repair.

- Ask for examples of repair / correction from the audience, or provide some of your own.

Waste of Over-Production

The waste of over-production results from excessive production. This kind of waste can be further classified into two sub-categories.

1) Producing more parts than required;
2) Producing parts earlier than required (right part but wrong time)

Both forms of waste are undesirable, however, particular attention must be paid to the latter since parts should not be produced earlier than necessary. Quite often we make parts because that is what the schedule called for. However, if we are not making exactly what we are suppose to be shipping next, we have a major problem on our hands.

At Toyota, we focus on the concept of Just-In-Time. We try to make only what is needed, when it is needed, in the quantity needed. Making too much or too soon is waste.

Waste occurs when an operator uses a machine simply because it is big, expensive, and capable of making lots of parts. Ignoring the required production volume and producing too much is waste. Keep this in mind - producing things that don't sell is waste.

- Ask for examples of overproduction, or provide some of your own.

At Toyota, we consider the waste of over-production to be the most serious. This is because it can create other kinds of waste as a result. Producing more parts than required results in unnecessary use of labor-hours, equipment, electricity, oil, and other resources.

Producing more parts than needed and producing parts earlier than needed brings about an increase in the number of pallets and skids required to hold them. Extra storage space is required. Depending on the quantity produced and the types of parts, warehouse storage may even be required. Enhanced stock control, first-in-first-out, and re-handling parts becomes necessary. All of these activities increase work, yet add no value to the final product.

Finally, excess or buffer stock tends to hide the real causes of problems. As a result, the need to do continuous improvement or make repairs of machinery and equipment becomes less obvious.

Show TP 1 - 9 "Waste Of Over Production Invites Other Waste"

In this way, the waste of over-production precipitates other kinds of waste. Costs keep rising and quality may be adversely affected. Maximum attention must therefore be paid to controlling and eliminating the waste of over-production.

Return To TP 1 - 8 "Types Of Waste

Waste in Processing

The waste of processing refers to any unnecessary work done to the part. Anything which does not contribute to advancing the process, to the accuracy of the formed part, or exceeds specification, is a waste of processing. There are many instances of parts being processed excessively. For example, parts which only require rough surfaces (non critical surfaces not apparent to the customer) may be excessively finished. Redundant inspection or checking may also be thought of as an example of waste in processing.

- Ask for examples from the audience, or provide some of your own.

Waste of Conveyance

The waste of conveyance refers to waste incurred by unnecessarily transporting parts. Parts should be moved only to the extent required to meet JIT production.

Both the transport of parts and information is important. However, it must be minimized. Transportation itself adds no value to the product.

- Ask the audience for examples, or provide some of your own.

Waste of Inventory

The waste of inventory refers to holding excessive stock. The result of holding a greater amount of running inventory than necessary between processes, or from purchasing an excessive quantity of materials is waste.

- Ask the audience for examples or provide some of your own.

Stock is often a security measure taken in case an emergency situation arises. At the same time, however, stock increases waste. It tends to hide the real causes behind the emergency or breakdown. Serious or chronic problems go unnoticed. As a result, real causes are overlooked; improvements are not made and the recurrence of problems will not be prevented.

Waste of Motion

The waste of motion refers to actions of team members or machinery which do not add value during the work process. One example of the waste of motion is that of a team member searching for parts in a storage area because there are none nearby.

Waste of motion also occurs when machines are not laid out properly. When machines and floor team members are separated from each other, it becomes inconvenient and a lot of time and effort is wasted in walking.

Waste of Waiting

Waiting is a form of waste. One example is when--due to the poor combination of human and machine work-- individuals are forced to stand and wait while a machine performs a certain operation. Another instance may be when an entire assembly area is halted while a Team Leader or material handler searches for needed materials or supplies.

- Ask for examples or provide some of your own.

D. UNEVENNESS AND OVERBURDEN

Now we have thoroughly covered the concept and types of waste. Remember that eliminating waste is a goal of the Toyota Production System. It cannot be ignored when taking measures to reduce costs.

Now let's take a look at two other less famous, but equally important factors that relate to waste: unevenness and overburden. These are factors related to waste which cause variations in the process, output, quality, safety, and raise costs.

Show TP 1 - 10 "Waste, Unevenness, and Overburden".

Unevenness

Unevenness refers to the phenomena of process fluctuations that result when production schedules are not constant or reliable. Typically what happens is that out of our fear of shutting down the customer we keep enough parts, material, and people around to always be prepared for the maximum demand that can be placed upon us. Consequently, for normal or low periods of demand we have far too many items on hand compared to what we really need.

The effects of unevenness are manifested in many different ways. For example, if the quantity of parts used varies from day to day, inventory will fluctuate. No matter how good our computer systems are, inevitably errors will result that may create instances of temporary material shortages. Or, in a work area where manual work is performed, when the amount of work performed by each team member is different or uneven it is difficult to truly grasp where the waste, problems, or inefficiencies exist in a system.

Overburden

There are limits to the abilities of both machines and team members. If, for example, the fastest possible cycle time of a rotary press is 60 seconds, it will be difficult to perform work at a faster rate.

In the case of team members, individual differences result in differences in working speed. For example, if a new worker is made to do a job at a rate based on the speed of a more experienced worker, the newer worker will likely fall behind. Performing work under such conditions jeopardizes quality and safety. This is potentially a case of overburden in comparison to one's individual ability.

Overburden on team members can result in fatigue and constitute unsafe working practices. Overburden on machinery and equipment leads to breakdowns and defects. Understanding the concept of overburden does not mean jumping to the response of anyone who feels tired or overworked. As leaders however, we must pay attention to newer team members and see that they get adequate training through Job Instruction. Additionally we must be on the lookout for opportunities to have people rotate more in areas with strenuous processes, or make difficult jobs easier through continuous improvement.

Key Point: *Remember, by eliminating waste, unevenness and overburden, we can hold production costs down*, *and improve key measurements*.

E. UNDERSTANDING EFFICIENCY

Improvements in efficiency that ignore the production schedule or customer demand will result in the waste of overproduction and will not truly improve overall company efficiency. True improvements in efficiency display their value by lowering costs. When evaluating efficiency, a key factor to always consider is the necessary production quantity. We must analyze how the necessary items can be manufactured, at the right time, with the fewest labor-hours possible. Next I want to distinguish between two types of efficiency: Individual Efficiency and Total Efficiency.

Individual Efficiency and Total Efficiency

When considering how to raise company efficiency by elimination of waste, we must look at efficiency in terms of each process, the whole line encompassing those processes, and the whole plant which contains many lines. It is crucial to institute improvements in efficiency that affect the whole plant.

Individual efficiency refers to raising the efficiency of an individual process, line or machine. As leaders, we must focus on not only individual processes in our own area but also learn to think systematically on the whole value chain in the plant.

Total efficiency relates to improvements at the process and line level that equate to numerical benefits that can be observed throughout the whole plant. In leading continuous improvement, it is critical to learn to think in terms of total efficiency.

When we think only about individual efficiency it is easy to mistakenly drive improvements that are actually only apparent and not true.

True Efficiency & Apparent Efficiency

The next concept I want you to understand is that of True Efficiency vs. Apparent Efficiency. Apparent efficiency refers to raising efficiency by increasing production without regard for sales, and represents an “efficiency” only in terms of numbers. For example, if we increase production from 100 units to 120 units while keeping the number of workers constant, is this an improvement? It is not true efficiency when the production schedule only calls for 100 units.

True Efficiency is an increase in efficiency by producing customer demand with the fewest labor-hours and materials possible, and is an improvement in efficiency that results in reduction of cost. A true example of efficiency is to produce the same number of units with fewer labor hours, materials, or defects.

Show TP 1 - 11 "True vs. Apparent Efficiency"

When production demand increases, consider first if we can produce with the same number of manpower hours. Conversely, when the production volume declines, we must consider how to raise efficiency by using fewer manpower hours.

Efficiency is used in various ways as a standard for evaluating productivity in manufacturing. What we must always first consider, however, when discussing efficiency is "what is the customer demand?".

V. Kaizen Procedure

In this section we are next going to begin our investigation of the general procedure for conducting continuous improvement. When focusing on work related continuous improvement it is extremely important to have strong "kaizen awareness" and knowledge of the job.

In other words, if we as leaders just tell people to "Do Kaizen!", unless the individual or team has some notion or awareness of the need for continuous improvement efforts will usually go nowhere. Furthermore, unless the people involved in the kaizen really understand the job, it is hard to generate true results.

To avoid these potential problems it is important to follow a standardized continuous improvement process. The kaizen process we will be learning is like problem solving in that it is based upon the scientific method. Scientific method does not imply that we will be overly academic or complex – it means gathering facts and following certain steps to help ensure success.

Show TP 1 - 12 "Steps For Kaizen" and explain the following

On the overhead I just put up are the six steps for continuous that we will be learning. We will go into each of them in greater detail throughout the week. First, however, I want to point out the similarity to traditional problem solving. Listen while I read the basic steps involved in problem solving.

Step 1: Identify the Problem
- Clarify the goal
- Relate the importance of the problem
- Clarify the scope, and purpose of your effort

Step 2: Analyze the Cause
- Gather necessary facts & data
- Determine root cause

Step 3: Determine Countermeasures
- Generate ideas
- Evaluate and test ideas

Step 4: Develop Implementation plan

- Formulate detailed plan
- Communicate the plan

Step 5: Implement the plan

- Implement the action items for improvement

Step 6: Confirm Results

- Monitor progress and results of new method
- Evaluate results
- Standardized effective countermeasures / prevent recurrence

The basic pattern for continuous improvement is very similar to the problem solving steps I just read. When we begin kaizen, we usually are looking to eliminate some form of waste or make some type of improvement in the work site. Thus step one is usually identification or discovery of the need for continuous improvement. Problem solving starts with deviation from a known standard, and tries to close that gap. Let's briefly go through the basic steps involved in continuous improvement.

Basic Steps For Kaizen

Step 1: Clarify the Goal: Discover the necessity for continuous improvement

First we must establish what we will be trying to improve. Some times the need is already clear. Other times we have to look very carefully to identify waste. Targets for continuous improvement typically are related to cost reduction, quality improvement, safety improvement, work improvement, or reduction of lead time. Without a target to aim for, and a standard to compare against you can't measure true improvements.

Step 2: Analyze the Current Methods

In this step we generate a clear picture of the present situation. This means when the goals of kaizen have been identified, we must get an accurate grasp of the present situation and production methods being used. Don't overlook anything. In this way, we can study and adopt appropriate plans to achieve your goals.

An appropriate picture of the present situation should not be based upon conjecture. Search for the facts as they present themselves. There are various ways of doing based on your needs and objectives. Then, after assessing the present situation decide upon which of the following methods will help you to further understand the situation.

Step 3: Generate Original Ideas

At this stage in continuous improvement we try to come up with original ideas for dealing with the present situation. Try to base your thinking on the facts. Observe the facts from a broad perspective; then proceed the formulate original ideas.

It is a good idea to make judgments over time, not just based upon one sudden snap shot. Try not to restrict your thinking, and avoid jumping to conclusions. In this step will try to come up with as many original ideas as possible that might suit your particular goal.

Step 4: Make a Kaizen Plan

In this stage we attempt to outline a kaizen plan. Review, organize, and summarize your observations, facts, and ideas into a kaizen plan. Consider the likelihood of realizing your plan, estimated costs, difficulty of implementation, and extent to which your goals will be met. Remember that there are many ways of reaching the same goals. Draw up several proposals. Finally, select the best plan after considering the feasibility of it actually being successful. Give priority to work kaizen, and improving overall efficiency.

Step 5: Implement the Plan

In this stage we actually implement the new method. When doing this, it is necessary to involve and cooperate with related departments and teams. Results will often not achieve your expectations if you just focus on your area and ignore other areas that are impacted. The best of ideas can fail if they are not properly communicated to all parties involved.

It is most important to talk with you team members about why a change is being made. Obtain their understanding, request their input and cooperation, and then plan for any additional training that may become necessary. Involving team member is crucial for continuous improvement to succeed.

Step 6: Evaluate the New Method

In the last stage, after implementing a new method, follow up is necessary. Check the status of implementation daily and evaluate the difference between your anticipated results and the actual benefits of your efforts. Often there will be unexpected small problems that arise and you will need to devise countermeasures for them. Always remember that continuous improvement is concerned with obtain results.

In summary I want to re-emphasize the following:

1) The procedure for problem solving and kaizen is basically the same. Both are based upon the scientific method and follow a Plan-Do-Check-Action model.
2) Any continuous improvement activity needs to be based upon fact, not opinion. Use facts to objectively and accurately asses a problem.
3) Understand the importance of following all the steps in kaizen. Skipping one any one of them can undermine your efforts.

Introduction To Main Points Of Kaizen

Now we are going to study a little more about the content of kaizen.

Question: What is Kaizen?

Ask the participants what their definition of kaizen is. Positively encourage responses and draw opinions and comments from everyone.

I have heard many good points regarding what kaizen is. For the purpose of this class we will summarize and define kaizen as the following:

Definition of Kaizen

Kaizen is a process of discovering waste in man, machine, material or method using creative ideas and as little money and time as possible to save cost. It is not the work of only certain employees. Rather it is something that can be and should be carried out by all employees according to their respective areas.

Show TP 1 - 13 "What are the problems"

Give the class 5 minutes to write down as many problems as they can find. Positively judge all ideas and filter through all ideas to come up with the best. Try and get ideas from each person.

Kaizen means making small improvements as well as big improvements. Sometimes the progressive accumulation of even little things is important. One example of continuous improvement that we have adopted in Toyota is the use of Standardized Work. This document is not fixed or static; it is constantly being revised. When applied correctly, Standardized Work can identify waste that related to operations, and surface other problems that result from other un-standardized items.

Sometimes it helps to view things from a different angle. When on the plant floor, remembering the following concepts can help you identify improvement possibilities.

1. Only produce and deliver the right part, at the right time, in the right amount.

The philosophy of producing and delivering the right part, at the right time, in the right amount is a basic pillar of the Toyota Production System. To enable JIT various types of standardization are necessary.

2. Separation of man and machine

When observing a person operating a machine, you can often separate tasks into those that should be performed by a person and those that should be performed by a machine. It is vital in terms of raising efficiency to clearly distinguish between the two and separate those elements that machines should do from those that humans should do. To best grasp the situation it is often necessary to complete standardized work combination charts.

3. Production lead time.

The time from when we receive an order until the time we ship a part to the customer is called lead time. Lead time can be broken down into processing time and stagnant time. Stagnant time includes such items as inventory, work in process, waiting time, inspection time, conveyance time, etc. Stagnant time adds no value to the product and should be minimized whenever possible.

4. Visual control

To easily identify waste it is important for the Team Leader to strive to set up a work area that clearly shows when things are running normally versus when things are abnormal. Constantly challenge yourself to look for ways to set standards to show when something is normal versus abnormal.

5. Individual efficiency vs. Total efficiency

For organizations to make big improvements we must often get away from just looking at individual small items and look for total system efficiencies to improve. One method for determining what is really necessary in an area is to go back to customer demand and determine what is takt time, and what am I really suppose to be producing.

6. Respect for Humanity & Productivity

In any organization the basic question of how do you treat employees must be answered to achieve harmony between all parts of the company. In Toyota we believe in fully utilizing the capacity of our employees. Each person is the lead character in their job, and to improve the overall efficiency of the company mutual cooperation from all employees is necessary.

7. Countermeasures to prevent recurrence

In every shop there are small and large problems that occur. It is important to establish countermeasures for each and every one of these problems. Identifying problems that rarely occur is difficult. Often you are not around to see all the problems as they occur. As a leader we need to set up methods of detecting problems in our work area. Often we must investigate ways to display relevant information such as performance analysis boards, information & key measurement boards, etc.

VI. Kaizen Step 1: Clarify The Goal

For the remainder of this first session we will now concern ourselves with the all important first step in kaizen. The first step in any continuous improvement is to answer the question, “Where do we need to improve?”. In other words we have to discover the necessary point we are trying to improve.

Write On Flipchart: Step 1 Clarify the goal

Although this sounds easy it is often very difficult to identify where we really need to improve in an area. To be successful you need to be conscious of several items. We will now spend some time investigating what makes up process for best discovery of where to begin improvements.

A. Problem Awareness

One of the first things necessary for discovery of where to do kaizen is a train called problem awareness.

Write On Flipchart: Step 1 Clarify the goal
A. Problem Awareness

Problem awareness sounds easy, however, don’t most of you often feel a sense of relative peace of mind when you walk around your area of responsibility and observe your equipment, tools, and movement of team members? Usually we don’t sense a lot of problems in our day to day when we just go through our daily routines in life.

If we are content with production the way it is, or believe there are no problems, or that however we are doing things now is the best method, then we will not improve.

Another way of stating this is that without some type of problem awareness we won't be able to identify true opportunities for improvement. Complacency with the current state means that we are submerging our ability to detect improvement possibilities.

A famous story has Sir Isaac Newton discovering gravity when an apple fell upon his head while he was sitting under a tree. However, do you think he really discovered gravity just seeing an apple fall from a tree? I don't think so. To discover and prove a theory such as gravity he had to go though many sessions of observation and some trial and error. Seeing an apple fall from the tree was merely his first step in identifying the law of gravity. He saw an apple fall and was suddenly "aware" that this presented a problem to be understood.

Like this story, in order for us to discover the need for kaizen we have to possess a certain level of doubt about the way things currently are. For example;

"Couldn't this job be done easier?"
"Couldn't this job be done safer?"
"Why do defects occur?"
"Why do we have so much inventory?"

These statements are all examples of looking at things with problem awareness.

If we are satisfied with the current situation, and shut up in our own little world, then it is very hard for our problem awareness to come out.

For us to understand kaizen it is necessary to be dissatisfied with the current situation, to have the drive to want to change things, and to approach everything with the innocent curiosity of a child.

B. Problem Location Recognition

Write On Flipchart: Step 1 Clarify The Goal

A. Problem Awareness
B. Problem Location Recognition

Being able to discover problems also means that you are capable of knowing where such problems are located in your own work area. Important problems for manufacturing always exist in the areas of daily production, quality, cost, safety, etc. We as leaders of our areas need to be aware of our current company

management by plan targets, past results, etc. when we begin to identify the need for doing continuous improvement.

In the area of production we need to constantly be aware of production increases and decreases (i.e. changes in takt time) as this can determine how much man power and staffing we need. On the quality front we need to be aware of defect rates, scrap, and yield as all these affect cost. Other important areas of focus include lead time and inventory reduction.

In terms of problem location recognition there are various categories that we need to be conscious of as we go about our daily jobs.

1. Problems that are apparent from the onset

One kind of problem is that which is already apparent. Examples include both large and small problems such as those that have been diagnosed, but can not be resolved easily, or are a low priority.

2. Problems from related departments

Another category of problems includes those brought in from other departments, or outside sources such as suppliers. Most of these occur sporadically, you can't tell when they will be brought on. In such cases it is often necessary to take emergency measures quickly.

3. Hidden problems

This last category of problems are often what leaders are asked to be able to discover and solve. As leaders we must be on the look out for where these types of problems lie in our work areas. We need to uncover hidden problems and be able to identify those that are important and should be tackled first.

C. Methods for discovering waste

Write On Flipchart: Step 1 Clarify the goal

A. Problem Awareness
B. Problem Location Recognition
C. Methods for Discovering Waste

Often when looking for areas to improve in we have to dig up hidden problems that aren't so apparent. To help discover these types of problems we need to learn to use several methods.

1. Question The Purpose.

Write On Flipchart:

Step 1 Clarify The Goal
- A. Problem Awareness
- B. Problem Location Recognition
- C. Methods For Discovering Waste
  1. Question The Purpose

The first method for discovering problems deals with questioning purpose. First it is necessary to have a purpose. All of our actions in manufacturing should be driven by a goals. However, often in our daily lives we're doing something simply out of habit without being aware of the purpose of our actions.

- Give some example of actions we often do without aware of the purpose.

  -Brushing our teeth
  -Recording defect & yield data
  -Recording or cycle counting inventory

Like these above example, if we loose sight of why we are doing something, that action can turn into an institutionalized practice, or become a form of waste itself.

Thus it is necessary to have a concrete measurable goal in mind when doing kaizen. When you examine goals carefully you may find you are pursuing two or three goals at once. For example, when you brush your teeth in the morning, you are accomplishing several goals at once. One, you are removing particles. Two, you are preventing plaque build up. Three, you are strengthening your gums. And four, you are freshening your breath.

By pursuing a concrete goal with a clear purpose, you will be better able to discover real problems, i.e. points which require kaizen. In manufacturing, we often have to resort to use of the "five why's" to question the purpose. This is a method of pursuing a problem to the root cause by repeatedly asking the question "why?". In this way, we can dig to the root cause of a problem.

2. Discovering Waste

Write On Flipchart:

Step 1 Clarify The Goal
- A. Problem Awareness
- B. Problem Location Recognition
- C. Methods For Discovering Waste
  1. Question The Purpose
  2. Discover Waste

A second way of discovering points that need kaizen is to examine your work site in terms of “Muda” , “Mura” & “Muri” – The English equivalents of these three words are “Waste”, “Un-evenness”, & “Overburden”. Being able to identify waste is another way of discovering points that need kaizen. In particular there are seven types of waste that we need to be on the look our for in operations.

Show TP 1 - 14 “Types Of Waste”

- Explain the seven types of waste by question and answer.
- Have the students think about waste in their own areas.
- Distribute and give about 3 - 5 minutes to fill in the handout.
- After time is up, have class present answers.

Confirm that everyone understands that identifying the seven wastes is another good way to point out areas for improvement.

Note that by changing the phrasing of the seven wastes we can easily come up with problems in the traditional categories of Quality, Cost, Safety, Delivery, etc.

3. Production Lead Time

Write On Flipchart:

Step 1 Clarify The Goal
- A. Problem Awareness
- B. Problem Location Recognition
- C. Methods For Discovering Waste
  1. Question The Purpose
  2. Discover Waste
  3. Production Lead Time

All of you are aware that in manufacturing, quality, quantity, and cost are extremely important concepts. However, one viewpoint we frequently forget to consider is that of timing. No matter how well we produce something, if we do not make it at the right time, it is of little or no value to the customer.

Of course if we are too late in our production timing, the product may have no value to the customer. Or we may be forced to pay expensive premium freight to deliver it to them on time. On the other hand however, there is a danger of making things too early. Few people are likely to notice this type of danger and the problems it causes.

Over or early production can lead to waste that we forget about. Early or over production means that inventory is created. Once inventory is created the following non value added activities occur.

- A place to store the inventory is needed
- Conveyance of the inventory is needed.
- Tools are needed to move the inventory.
- Materials and parts are ordered and consumed earlier than needed.
- Manpower is needed to move, manage, and count the inventory.
- Electricity and other utilities are needed.
- Damage to inventory occurs.
- Inventory gets misplaced, or goes obsolete.
- Other.

Poor timing of production increases the cost of the manufacturing. Either case of parts not being at the line in time, or too many parts on the line are both problems that adversely affect cost.

Remember when looking for waste that manufacturing cost is a function of quality, quantity, and timing.

Typically we call the time from the start of manufacturing from raw material to the completion of finished goods “lead time”.

Write On Flipchart: Production Lead Time = Processing Time + Non Processing Time

1) Inventory
2) Inspection
3) Conveyance

Processing time refers to the time spent actually performing value added activities to the part such as cutting, bending, molding, machining, assembling, etc.

Non process time is the amount of time that product spends between processes waiting to be completed or shipped to the customer. Examples include waiting, conveyance, inspection, storage, etc. Of course some of these activities are important, but none of them truly add value to the customer.

Show TP 1 - 15 "Example of production lead time"

Lets take an example of a part that requires processing of raw material by forging, machining, heat treat, machining, and assembly that take one month. The actual amount of processing time is 5 minutes. The amount of non process time is 715 minutes. The ratio in this case is 1 : 143, (or 0.7%) of process time to non process time.

In any case a long lead time will drive up costs often without anyone noticing. In looking for opportunities for improvement never neglect to consider the timing aspect of manufacturing. We should always be on the lookout for ways to streamline operations and make material flow more smoothly.

- Explain the difference between processing time and non process time.
- Ask the class if they are aware of their productions lead time.
- Make them think about why it is as long as it is.
- Question what type of problem makes the stagnant time so long.
- Re-emphasize that reducing lead time is often a very good way of eliminating invisible costs.

4. Separation of man and machine

Write On Flipchart:

Step 1 Clarify The Goal
- A. Problem Awareness
- B. Problem Location Recognition
- C. Methods For Discovering Waste
  1. Question The Purpose
  2. Discover Waste
  3. Production Lead Time
  4. Separation Of Man & Machine

Another excellent way for identifying opportunity for improvement is to distinguish between man and machine work.

For example imagine a process where a person loads parts into the machine. Since this is done by hand we can consider this manual or "human work". Once the part is loaded a robot then applies butyl or some type of adhesive to the glass. Since this is done automatically we can consider this "machine work".

While the robot is cycling the operator is left standing watching until the cycle is complete. While the robot is cycling the operator is not adding value to the product. In a sense they are guarding the machine.

When you look at the production floor, most times you will see instances of one man one machine. If we could somehow take that time where the operator is guarding the machine and have them do some other value added work then we would unquestionably be more productive.

Sometimes the distinction between human work and machine work is not to easy to separate. Often the jobs blend together in continuous motion.

Show TP 1 - 16 "Human Work and Machine Work" Point out the differences.

Like in this example by separating the two types of work can lead us to identify motions that do not add value, or cause problems. Often improving combinations of man and machine can lead to increased production without having to increase the actual number of hours worked.

- Discuss combinations of man and machine work in the students work site.
- Emphasize that it is important to see both types of work in order to make improvements.

5. Performance Analysis Board

Write On Flipchart:

Step 1 Clarify The Goal
- A. Problem Awareness
- B. Problem Location Recognition
- C. Methods For Discovering Waste
  1. Question The Purpose
  2. Discover Waste
  3. Production Lead Time
  4. Separation Of Man & Machine
  5. Performance Analysis Board

Usually when discussing production capacity we talk in terms of days, or shifts, or hours. However it is almost impossible to catch the majority of problems in production when you analyze at this level of detail. One shift of production includes everything. For example getting started 5 minutes late, waiting for material handling, equipment breakdowns, and occasionally planned stoppages.

Any number you take at this level of analysis will incorrectly judge the actual capacity and become the norm. As a result the expectations placed upon equipment will always be lower than really possible. When a production increase become necessary, the plant will respond by scheduling additional shifts, additional manpower, or additional machines that may not be necessary.

In order to discover points that need kaizen it is frequently necessary to analyze production by hourly units. In other words we have to watch the actual production output by hour and compare that to the intended capacity. We call this watching plan versus actual production.

Doing this type of analysis makes it easy to judge planned versus actual performance and identify all the little problems that stop us from achieving rate. If there is a huge gap then obviously problems exist that need attention.

Show TP 1 - 17 "Performance Analysis Board"

- Explain how to fill in the chart
- Explain the columns for difference between plan and actual & reason.
- Explain an example using the plan versus actual analysis board.

For example, assume that for a planned production of 100 parts per hour 85 parts were produced during a given hour. Also assume that, however, that during the next hour 100 parts were produced. We know that the capacity of the line is 100 parts per hour. We therefore have to find out why only 85 parts were made during the first hour. In other words we have to find out the root cause.

If the problem is equipment breakdown then we try to find out why it broke down and take steps to prevent it from happening again.

Proper use of the performance analysis board is extremely useful for identifying opportunities for improvement.

6. Five S

Write On Flipchart:

Step 1 Clarify The Goal
- A. Problem Awareness
- B. Problem Location Recognition
- C. Methods For Discovering Waste
  1. Question The Purpose
  2. Discover Waste
  3. Production Lead Time
  4. Separation Of Man & Machine
  5. Performance Analysis Board
  6. Five S

Five S's refer to five words in Japanese that all begin with the letter S. In English they are best translated as: Organization, Orderliness, Cleanliness, Standardized Clean Up, & Discipline.

The Five S's are frequently used in context with safety and cleanliness, but they also have spill over benefits for manufacturing as well. Learning to apply the Five S's will help you in identifying opportunities to eliminate waste.

- Write the Five S's on the board and explain them.

1) Seiri / Organization
2) Seiton / Orderliness
3) Seiso / Cleanliness
4) Seiketsu / Standardized Clean Up
5) Shitsuke / Discipline

Show TP 1 - 18 "Summary Of Five S"

Seiri or Organization is the process of dividing items into those that are necessary and those that are not necessary. Unnecessary items should be disposed of immediately. If everything is absolutely necessary then there is no problem, but rarely is this the case. Extra items laying around are examples of problems or opportunities for improvement.

Seiton or Orderliness is the process of placing the above remaining items in such a way that they can be used easily. However, if you have the necessary parts but arrange them carelessly, they will be hard to locate and use. This means unnecessary time required to search for something and is an example of waste.

Seiso or Cleanliness refers to the regular cleaning of equipment. When equipment is covered in oil and dust it is difficult to manufacture quality products. Contaminants are frequently a cause of quality problems that should be easy to prevent. Preventing these types of simple problems through diligent cleaning is an example of kaizen.

Seiketsu / Standardized Clean Up refers to the process of keeping the first three S's in order. Maintaining the first three is never easy, but if we can't maintain it then that itself is a problem, and point needing kaizen.

Shitsuke or Discipline, the last S' refers to discipline or following the rules of the workplace. Discipline can be instilled by training and leadership and can become second nature over time. As leaders of an area we must all practice good examples of what we expect others to follow.

The five S' refer to more than just cleaning. It is an overall process of clarifying, improving, and installing visual control. Proper application of Five S to a work site will have many benefits for continuous improvement.

I have just finished covering 6 tools or methods that you can use to identify ways to improve. Remember that problem identification is only the first step of doing continuous improvement.

Company policy and objective will determine much of how we work in our daily lives. However, I hope that all of you will retain an enhanced sense of problem awareness as you go about your work. If you use these methods that I have outlined I promise you will find areas for improvement.

VI. Close The Session

No matter where you go in manufacturing there are always problems big and small that exist. Because there are problems there is a need for managers and Team Leaders.

In Toyota we are trying to improve the company for the sake of all the stakeholders, customers, employees, owners, community, and suppliers. However the environment we face is a tough one. In order to improve the performance of our company continuous improvement is necessary.

By the efforts of our improvements we can improve the standing of our company. Our basic method for pursing improvement is the framework of the Toyota Production System. We must strive to eliminate waste in our work sites and reduce all unnecessary costs from the system.

Today in Session one, we have covered the basic premise of continuous improvement and Step 1 of the Kaizen process.

Show TP 1 - 19 "Summary Of Session 1"

In future sessions and after this course the challenge for us is to use these tools to identify waste and eliminate it to improve quality, improve safety, delivery and other key measures.

Next in session two we will begin to study how to proceed with the remaining steps of continuous improvement. Today we only covered step one. The most important aspect of today was problem awareness. Improved awareness leads to discovery of many types of problems and opportunities. I ask that each of you work to increase your problem awareness in your daily activities.

Thank you for your participation. Please be on time tomorrow.