

# PRODUCING HIGH QUALITY IN JAPANESE MANAGEMENT

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## ABSTRACT

*In today's diverse processes which rely on the division of labor, quality is secured through standard operations, which are generally determined under the prevailing working conditions. In short, standard operations are determined in such a way as to secure the requisite quality. However, even with this, quality can vary widely, and visual inspection and checking with a gauge must be built in as processes within the standard operations.*

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In the past, the good sense and skill of experienced workers were determinant factors in product quality. In today's diverse processes which rely on the division of labor, quality is secured through standard operations, which are generally determined under the prevailing working conditions. In short, standard operations are determined in such a way as to secure the requisite quality. However, even with this, quality can vary widely, and visual inspection and checking with a gauge must be built in as processes within the standard operations.

If defectives are produced under these conditions, it can mean one of the following: that the workers are not following standard operations, or that there is a breakdown in any one of the machines, dies, jigs or tools. We shall discuss the first problem first.

Once in a while we hear that after implementing man-hour reduction activities, defectives actually increased, or that so many people were removed from the lines that its effect was felt as a reduction in quality. Neither of these should ever happen. According to the Toyota system, these are instances of putting the cart before the horse.

When we look at actual occurrences of defects in the workplace, they can be divided into the following two categories:

A. Within a fixed time period, a worker may feel that his work load has been unjustly increased, and he either omits the work he is supposed to do or forgets about it. In other words, instead of eliminating waste, he has been engaged in an act of omission.

B. Heretofore, it has been possible to store products in the intermediate storage area or to rework defective pieces, due to the excess in manpower. Poor quality which has not surfaced before suddenly becomes an issue because of the effectiveness of the man-hour reduction activities.

The first type of situation is often found in assembly lines that use a conveyor. This problem is caused by not stopping the line when work is delayed or when problems arise.

Omitting work because one cannot catch up with the work he is supposed to do represents a thinking that the line should not be stopped. It is far better to stop the line and

ship to the subsequent process a product without defect. This view must be inculcated in the minds of workers by their supervisors.

We do not have to worry about the line speed or the cycle time. Everyone must be familiar with the important concept that *the cycle time has nothing to do with the number of people at work*. Ask each of the workers to complete his work cycle. It means that he does his work at his own pace, but must do everything that is required. If the worker cannot finish his work within the cycle time, stop the line until his work is completed. A question may arise as to whether the time required must be added to the cycle time. The line need not be concerned with this issue, and that task is squarely on the shoulders of managers, supervisors and engineers.

For example, the cycle time is set at 60 seconds, but one worker goes through processes 1 to 5 in 70 seconds, or 10 seconds above normal. Do not discard the 10 seconds while the processes are progressing. The worker must work at his normal pace. The line is to stop for 10 seconds each time, in order to allow this worker to produce a quality product.

However, it is the responsibility of supervisors and engineers to find ways to ensure that the work can be completed within 60 seconds, and at a normal pace. They can remove waste from each process and shorten the distance walked. Only after appropriate action such as these are taken can there be an assurance that the line stop will cease to exist.

It is easy to order that no line be stopped. But if this is done without improvement in the operational processes, it invites unevenness in quality. Japanese Management does not allow that to happen under the Toyota system.

Defects that have not been apparent become visible in the second case when a reduction in manpower and inventory occurs. Previously, defective goods might have appeared with regularity, but were corrected internally without any steps being taken toward a fundamental solution. For example, the following can fall within this category: defective items produced by the preceding process are corrected by the present process, without providing any feedback to the preceding process; or tap holes do not fit because of design defects, but the present process simply taps them to correct them. The true cause is left undiscovered because of these makeshift corrections raise the cost.

The best opportunity for improvement is when defectives become clearly identifiable through man-hour reduction. Supervisors and engineers must return defective goods to each of the sections responsible for them and thoroughly investigate the cause or causes. If necessary, they must go to the preceding process to do the same. They must find fundamental solutions to the problems thus raised. A doctor cannot treat a chronic case of appendicitis by cooling off the affected area. Appendectomy is the only way to restore the person to complete health. In our factories, a similar approach is required.

Japanese thinking extends to the solution offer when defectives are caused by machines, equipment, dies, jigs and tools. For example, if defectives are caused by equipment, stop the line immediately and eliminate the cause.

Reworking defective items within the own process simply because those processes responsible for them do not respond easily it is not acceptable. Reworking, it becomes part of your regular process without your becoming conscious of it. Instead, ask the preceding process to correct them. The action does not end with a memorandum or a phone call. It is important to patiently seek corrective measures until a truly high-quality product is manufactured.

If the final assembly line allows defectives to go through, there is a greater possibility of defective goods reaching the hands of customers. Normally, defectives are discovered through the process of inspection and are reworked before reaching the hands of

customers. The stronger the desire not to ship defectives, the stricter the inspection. Reworking may also become more frequent. In this way, however, the cost also rises.

Inspection done by inspectors outside the regular process does not produce added value. Therefore, those who are actually engaged in manufacturing must be the ones responsible for full quality assurance. They must not allow defectives to be attached to their jigs, and they must always apply gauges to inspect. It is very important to do everything right the first time. In principle, reworking must be considered something that is not allowed to occur. Both reworking and inspection by outside inspectors add man-hours to the same products. The ratio of the factory's added value goes down while the cost rises.

Will the customer accept your contention that "this product has been inspected ten times, and that's why it is expensive?" Work that does not produce added value is a mere waste. One can eliminate waste in the actual processing and reduce man-hours. But if the end result is to produce defectives, it may simply mean the man-hour requirement for inspection and reworking is substantially increased. From the point of view of cost reduction, the net result may be a zero or even a negative one. It may stray far from the original goals.

This being so, Japanese management tries to eliminate as much as possible both inspection outside the regular process and reworking. They are actually a waste. Produce good products so that inspection and reworking become unnecessary. Man-hour reduction will follow naturally.

Previously the practice was to let inspectors inspect the parts produced and then let the subsequent process receive them. However, once these parts were manufactured, the act of passing judgement on them to say good or bad did not result in creating good-quality products.

An inspector may pronounce a product to be good after engaging in a sampling inspection. But if there is one defective product among many thousands, the customer who purchases it is not going to say, "This is one lemon among thousands of good cars. Too bad I'm the one stuck with it." For this reason, it is necessary to think in terms of inspecting everything in one form or another.

Hence, a view is born that full-time inspectors are to be eliminated, accompanied by the notion that quality must be built in by the process itself.

To build in quality means that each worker is responsible for each of the work processes he does, and must ascertain quality for each. Inspection must be brought within the process, and in order to send only good products to the subsequent process, defectives must be picked up on the spot. Japanese management slogan is: "Catch the defective in its act." It is imperative that workers check their own work and subject every piece to their own full inspection. The next process is their customer. Defective items are never to reach the subsequent process. This is the key to Japanese management approach that quality is built in by the process.

Of course, the methods of inspection must be carefully investigated. Along with visual inspection and use of gauges, foolproofing or "avoidance of unintentional mistakes" must also be considered. If work is done by lot on a high-speed automatic stamping machine, retain 50 or 100 pieces over the chute, and inspect the first and the last piece. If both of them are good, then the entire lot moves to the pallet. If the last piece is defective, the inspector must find out where the defect began and remove all the defectives. At the same time, he takes steps to avoid recurrence. This is, in a sense, an inspection system which calls for 100 percent inspection. Japanese management never thinks in terms of sampling inspection just because the machine is a high-speed one.

Even after this, if the subsequent process discovers a defective part, it must immediately, relay that message to the preceding process. The process that has received this information must stop its processing activities, probe into the cause and take action. Whenever a defective is discovered, it is necessary to communicate that fact immediately to those responsible for it. If this is not done, defectives will be produced continuously.

Reworking of the defective products must be done only by workers at the process responsible for them. Japanese manager Never says, "Oh, it's nothing," and quietly make the correction at the next process. That is one of the ways to perpetuate defectives. The division or process responsible for the defectives must be the one to correct them

Now let's consider the issue of inspection done by inspectors.

A common idea is that inspectors differentiate between good and bad products, add up the results and send a report to the preceding process. This is usually considered to be the end of inspection – but this perception is insufficient. Inspectors must consider themselves staff members who are given the responsibility to analyze the reasons for the occurrence of defectives, probe into the causes and let the practice end. They are not examiners whose only function is to assign passing and failing grades. They must be able to explain to the workers why mistakes took place and teach them not to make the same mistakes again. Their function is analogous to that of a private tutor.

When wrong assembly of parts occurs, often the inattentiveness of a worker is cited as the cause. But the matter may not be that simple. It may be that the parts were not properly lined up in the order they were to be assembled, or that the line stop button or the call button was too far way, or that the work directions bulletin was not easy to read. There are likely to be a number of causes. Only by knowing what the causes are and taking appropriate actions can one take a step toward reducing the number of defectives.

The goal that an inspector must set for himself is not to throw away defectives, but to eliminate totally their production. This must be established as the criterion for judging performance.

To have quality built in by the process, what must the workers do? What points do they check and which parts do they measure? When are the cutting tools to be exchanged?

Japanese management considers what roles the jigs, tools and mounting tools can perform in helping solve these problems. They can be made to inspect automatically the products received from the preceding process. You can foolproof your process and uncover defectives.

The process of fool proofing (*poka-yoke*) must be standardized to ensure that stable quality can be assured with a minimum number of man-hours, even when another shift comes in.

Without intending to, and no matter how careful he may be, a person can make mistakes when taking a measurement or checking products item by item. A way must be found to prevent the occurrence of disorders such as producing defectives, taking missteps in work processes and sustaining injuries. The fool proofing system it means to create devices that can discover disorders without the workers having to be attentive to minute details. Among the devices to be considered are the following:

- If there is a misstep, the device does not allow goods to be mounted to jigs
- If a disorder is found in the goods, the device is not allow the machine to start processing
- If there is a misstep, the device does not allow the machine to start processing
- If there is a misstep in work process or in motion, it is automatically adjusted, and the device will allow the processing to proceed

- The disorder that has occurred in the preceding process is examined at the next process, and the device will stop defectives
- If a certain operation is forgotten or skipped, the device does not allow the next process to begin.

Methods to be considered in fool proofing include the following:

1. **Display method:** Light a lamp, making it easier to recognize by color and the like. This is a visual control method that makes it easier to discover disorder with the eyes.
2. **Jig method:** Foreign matter cannot be mounted, or when a mounting miss occurs, nothing can be moved. In this method, jigs are adapted to the task of discovering disorders.
3. **Automatic method:** The machine stops if a disorder occurs while processing. Some people do not include this method as part of our foolproofing system.

Producing high quality is very important and has at the base the foolproofing system, but in the same time Japanese management considers the costs.

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