

Creating a Defect Elimination Program

By Jim Parrie, Ph.D.

In today's tough market, controlling costs and enhancing customer satisfaction are paramount for survival. Defects—which are another way of saying poor quality—are the cause of low profitability and poor customer satisfaction, which result in high product return rates and low customer retention. Leaders tend to blame people, equipment, and materials for these high defect rates. The answer, however, is much simpler.

A defect can be simply defined as a manufacturing variance from what the customer expects. You can also look at defects through the lens of lean manufacturing—defects are a form of waste. And all waste must be eliminated. You wouldn't tolerate employees throwing away moulding. Yet you watch people putty frames all day long. Or you watch them use bubble wrap to package soft mouldings, which can lead to damage.

Managers who realize the need to minimize defects generally create quality control (QC) stations. These are called for when the situation is:

1. Very bad
2. Fraught with low competency levels that take time to correct
3. Caused when there is no top-level ownership of standards.

A QC station should be set up with the goal of eliminating it when certain targets are met. (Some factories use QC stations for scanning items out of production and/or wrapping items for shipping. That is a different scenario.) The term “QC station” as used here refers to a system in which product quality is judged solely by QC personnel. Ideally, you want a system that places each person in charge of his/her own quality control. The idea is that each worker owns his own company and must provide the highest quality product

for the next company in the system. In other words, a saw operator will not give a bad cut to a joiner. A joiner will not give a bad join to a fitter. And so on. In-line quality control is the most efficient means of maintaining quality control.

A series of steps can be taken to reduce defects in your framing facility. The one critical element to remember is that defect reduction starts with you. If you are the owner, it is up to you to make it a priority to guarantee high customer satisfaction levels and profitability. If you are a production manager, it is up to you because you need to reduce customer service calls, increase production efficiency, and keep inventory levels down. If you are the team member, it is up to you to assure high quality levels so you can make bonuses, keep your salary increasing annually, and to assure that you have a job.

Human Error

Wherever you go in the world, the number one frustration of most owners/managers is their people. You constantly hear how many mistakes their people make, how slow their people are, how their people do not like change, and so on. The problem, however, is not with your people. As General Frank Savage said in the movie *Twelve O'Clock High*, “It's the leader; it is always the leader.”

If my people make mistakes, then it is my fault because:

- I have poor systems in place
- I have poor equipment/software/materials in place
- I have poor training systems
- I have poorly communicated the vision
- I have made bad hires.

In every case, the blame rests on me and not my

people. I am in charge, so it is up to me to make sure the job is done correctly.

People are going to make mistakes. If you expect perfection, then you are in for a long, stressful life. Everyone has a tendency to be quick to blame his or her people. Typically, the term used is “human error.” Managers tend to use the term out of ignorance or as an excuse for their own inadequacies. Generally, human error is not the root problem; it is a symptom of a deeper problem. Leaders tend to look for areas in which their people have made bad decisions. But what you should be looking at is why they make those decisions and what the circumstances were surrounding them. Once you have ascertained the “whys,” you can develop systems and training that will eliminate or minimize those mistakes.

A variety of reading materials related to business outside the framing industry provides some interesting insights. My personal experience is that about 80 percent of workplace accidents and product defects in the industry are related to human error. Only about 20 percent are related to equipment failure. Studies of the auto industry and nuclear power industry (they keep the most detailed records of anyone) show roughly the same ratio.

Of the 80 percent of human errors, about 70 percent are due to latent organizational weakness and only 30 percent are because of individuals. Yet everyone is quick to blame employees. Employees' performance is influenced by procedures and systems. Quality control legend W. Edwards Deming once said, “Your system is perfectly designed to give you the results that you get!”

Owner/managers must be ever vigilant in rooting out system weaknesses and flaws. For example, several years ago I visited a facility that had implemented an incentive plan to boost productivity and decrease turnaround time. The program was extremely successful. The company was able to reduce its turnaround time by 40 percent. However, the return rate due to shipping damage went up by 15 percent. There was a lot of finger pointing in the packaging and shipping departments. Bonuses were being taken away, people written up, and quite a bit of yelling.

After digging into the problem, we discovered the shipping department was not causing the damage. What happened was that the fitters were working much faster because of the increased motivation. There was a slight dip in quality due to increased line speed, which was a minimal tradeoff for the increased output. The problem was actually more basic. Because the fitters were working faster, the factory did not have enough carts to handle the higher volume of frames. Frames were piling up in the work area. So the fitters carried stacks by hand of six to eight 18”x24” framed pieces of art wrapped in brown paper about 40 feet and set them

on the ground next to the packaging table. Since the art was wrapped in brown paper, the packaging team could not see all the dings and damage that resulted from stacking and setting the frames on the ground.

The solution was simple: buy 12 padded carts for fitters to set their items on so they could roll them to a wrapping table. This turned out to be an example of an owner blaming “incompetent” packaging and shipping personnel while the real problem was a flaw in the system.

It is the job of leaders to provide the proper systems and procedures for their people to succeed. In some cases, employees figure out the problem and develop a solution; in other cases they will not. But the problem always starts and ends with owners and managers.

To minimize human error there are several measures you can take:

1. Track actual production with targeted production (record reasons for deviation)
2. Any incentive plans should account for defects, waste, and timeliness
3. Report, publicize, and discuss not only the number of units missed but also what that means in actual dollars
4. Report daily or weekly on lost production opportunities to senior management, which, once financial figures are included, will ensure their full attention to the issues at hand
5. Get input from the staff to analyze the events, determine the root causes, and recommend ways of preventing recurrence
6. Track recommendations versus events to record the potential income that has been saved.

Preventive Maintenance

Defects can occur in semi-processed materials or finished goods due to poorly performing equipment. Badly joined frame corners, hooked mat corners, and other problems can be an indication of poorly functioning equipment. To reduce maintenance costs and production downtime, it is necessary to reduce the causes of maintenance. This means buying good equipment and having a scheduled maintenance program. All too often, however, owners of production facilities view maintenance as something that must be done at the last possible moment for the least possible cost.

The standard cost for capital equipment maintenance is four to six percent of the new machine purchase price per year. For example, a saw that costs \$9,000 will have a maintenance cost of \$360 to \$540 per year. What some owner/managers do not realize is that this cost will be incurred whether or not preventive maintenance (PM) is done in a timely fashion because:

- Breakdowns are repaired at longer intervals and at higher cost

- Breakdowns cause downtime (this always seem to happen at the worst possible time)
- Personnel are injured (raising workman's comp and health insurance costs, lawsuits, and lost work time).

The cost of interruption and product quality cannot be accurately measured or anticipated in advance, but there is definitely an associated cost. On top of that, customer satisfaction levels will also go down.

In the wall art industry, equipment failure is reduced by nearly 90 percent through the use of PM. The most significant impact of regular PM is on machine life and downstream labor. Equipment does not last as long if it is not properly maintained. Yet there are many who see PM as a low priority that can be easily eliminated when costs must be cut. Saw blades do not last as long if they are not sharpened on a schedule instead of when "they look like they may need to be sharpened." And saws do not last as long if the bearings are not properly greased and maintained.

Many factories suffer from added labor caused by production equipment that is out of adjustment or malfunctioning but still runs "good enough." These same facilities spend a tremendous amount of time on quality control personnel and puttying. Why put up with this when blade sharpening and proper alignment could reduce puttying by 80 to 90 percent? Production staff will try to modify down-line processes that they can control to compensate for machinery deficiencies (which they can't fix). This can be costly and difficult to detect. It is also human nature to do what is easy, such as grabbing a brown marker to color a badly joined corner as opposed to re-cutting the frame or doing weekly maintenance on a saw.

Both maintenance and downtime are an effect—not a cause.

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The causes can be traced back to defects and errors from a variety of sources. Knowing that poorly maintained equipment will eventually lead to future equipment failures, production downtime, and lost profits, it is necessary to put strategies into place to prevent them from occurring in the first place and to eliminate them if they are present.

Do you have such a program? Ask your employees what their definition of PM is. Do they know:

- Who decides how and when to align equipment?
- Who decides the tolerances?
- Why the equipment and work area need to be cleaned on schedule or when it needs it?
- Why all of the critical points on your saws should be bolted to the floor?
- If the seals on your pneumatic joiners been serviced in the past year?

If you answered “No” or “I don't know” to any of these questions, you have a good place to start eliminating defects from your manufactured goods. Does your factory have a repair-focused, fire-drill atmosphere where breakdowns are seen as inevitable, where PM is essentially some guy constantly responding to equipment failures, and where reliability is the responsibility of an elite few? If so, isn't it time to move on and become a reliability-focused organization with a culture of failure elimination that permeates staff at all levels?

If you do not have a PM program in place, I strongly recommend contacting an outside firm to conduct a thorough PM program review of all your major equipment. People, procedures, and processes are the major root of failure—not equipment. Employees will blame the CMCs or the saw. Many owners can't accurately judge these things; so get a private company to do PM. That way, all excuses are off the table.

After an outside firm has gone through each piece and verified that each one is in good working order, then you can decide if you want to send one of your people to be factory-trained in maintenance or if you prefer to subcontract that chore. One good recommendation is to have a point person at your factory in charge of basic maintenance and troubleshooting. However, have an outside firm come in at least once a year and do a thorough PM of all major equipment. When an outside firm is conducting the PM, you should have your point person shadowing the outside person. That way your point person will learn more about the equipment and be able to handle more of the maintenance as time goes on.

Review Materials Before Bidding

Another method to reduce defects is to have samples of all new materials (materials your production department has never used before) sent to your factory prior to a job being bid or placed into production. All too often production teams spend a tremendous amount of time puttying corners, fixing scratches caused by dragging frames on fitting tables, difficult to join corners, mats that smudge, glass that will not clean, and more. It is better to find such handling problems before a job is even bid than to have 1,000 frames sitting in your putty area instead of boxed and shipped.

Here is a scenario I ran into. A firm had in-house designers who provided excellent designs, which were one of the reasons the company had stellar sales. Yet the company was operating with sub-par margins. After spending time in the production area, I discovered that the designers were specifying mouldings from random manufacturers. They were creating cutting-edge designs, but the mouldings were impossible to handle. They were either too hard or too soft, the finish would scratch easily, or the profiles would not fit properly in the computerized joiners.

The solution was to create a program that required all mouldings to be approved by manufacturing prior to bidding. The moulding factory had to provide 20' of sample product. This way, when manufacturing found that the moulding was hard to join or handle, they could work with the factory to see if the issue could be solved. This provided the manufacturing team with some breathing room and allowed for more economies

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of scale in production. Plus, the moulding factory was grateful for the information because it helped them understand why some mouldings sold well initially and then died off.

This system can really help reduce defects and increase productivity. If you cannot get a moulding manufacturer to fix the problem, you may have to switch manufacturers, switch mouldings, or add an additional labor charge to cover the costs. It is better to deal with these issues prior to bidding than when the job is due.

It is also important to remember that if you want to sell quality, you need to use quality raw materials. Many framers focus on how cheap they can buy moulding and other materials. Analyze the waste—not just the amount of moulding you throw away but also how much touch-up work is done, how much special handling is needed, and how much special packaging is required.

When analyzing the defect rate of a particular raw material like moulding, look at all the tangible and intangible costs. Assume you are paying \$1 per foot from a quality manufacturer and you can get a “good deal” from a cheaper importer at \$0.80 per foot. That is a 20 percent savings, and it sounds like a good deal.

But how much more of the cheap moulding are you throwing away due to manufacturer defects (even though they give you allowances, you still have to throw a bunch away), bad joins that cause re-cuts, and damage due to handling? Add all those costs in, and that 20 percent difference starts to disappear. Nor does this take into account all the wasted direct and indirect labor. It is always better to pay a little bit more and get good quality materials and tools.

Quality is a winning business strategy. Coupled with the lean manufacturing strategies of reducing waste, it can lead to greater profitability and a happier workforce. If you have a high defect and/or waste rate, you need to change the way you and your people think and value quality and

reliability. Remember: it is not your people who are the problem. Little or no capital expenditures are required for improving people, procedures, and processes, all of which can reduce failure. It can take time, but the investment in time will be well worth it. ■

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