

Stop Human Errors at the Source!

Mistake Proofing and Error Prevention was the focus of a recent CTPM Learning Group Meeting, held at Simplot Ulverstone and also at the TCCI Offices in Hobart. Representatives from Incat, Botanical Resources, Cement Australia, Department of Economic Development, Australian Industry Productivity Centres, and Equipment Management International all attended.

More than 12 delegates attended these two workshops which examined how simple devices, known as poka - yokes, can help to prevent errors at the source.

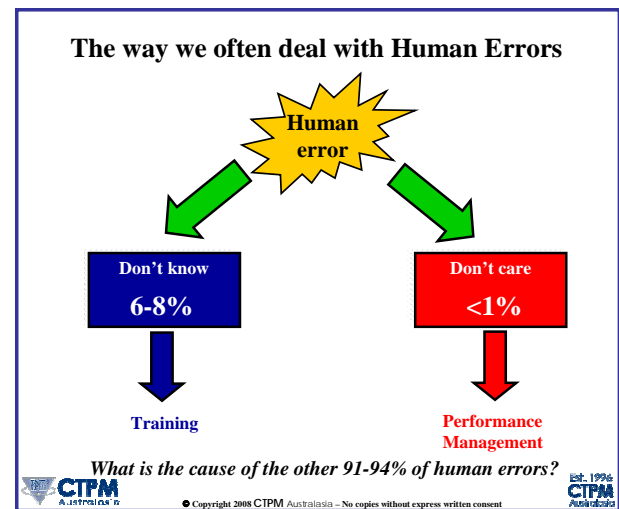


As manufacturing professionals, we are all striving to improve output quality. After all, fewer quality issues means more satisfied customers, reduced costs, reduced safety inventory, and less rework and rejected product. Manufacturing organisations have many processes and tools to help achieve these quality targets. We work tirelessly to reduce the impact of raw material variation and machinery wear on the product, and we document and standardise as much as possible to get consistency between operations.

But what about human error? At the end of the day, all of our efforts can be meaningless if we end up manufacturing a shift's worth of product without date codes on it because the date coder ran out of ink! All of our good efforts can be turned upside down! What about an adjustment that was incorrect which meant that the machining of the part was not quite right?



The outcome of these types of errors is usually two stage. First, we talk to the individual and provide information and training so that they know the right way to do the job. After that, if we still have the problem, then we follow the other option! The problem is that most human errors are not related to lack of training or malicious intent.




To demonstrate this, the attendees completed some simple simulations to demonstrate just how easy it can be to make an error, and how often we set up or change work to actually encourage errors to be made.

Our workplaces are filled with error prone situations. Some of these are listed in the slide below.

Making it easy to make errors

Are there work processes we have that make it easy to make errors? Do our training processes actually make it easier to make errors?

- Adjustments
- Tooling or tooling change
- Dimensionality / specifications / critical condition
- Many parts / mixed parts
- Multiple steps
- Infrequent production
- Lack of or ineffective standards
- Symmetry
- Asymmetry
- Rapid repetition
- High or extremely high volume
- Environmental conditions
 - housekeeping, material / process handling, lighting etc.



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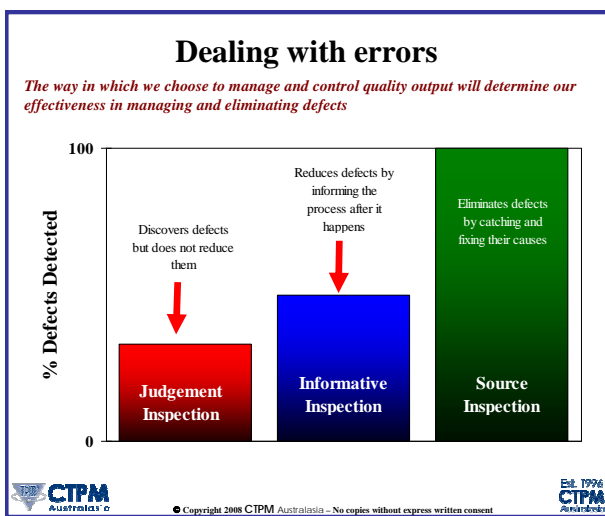
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But to achieve the goal of perfect quality, we need to have systems and processes in place that actually work to prevent errors from happening.

Six sigma will get you on the way – preventing errors is the real answer.

This is actually not as difficult as it may sound – you may be familiar with the work that has happened with safety systems to improve safety outcomes. By taking a similar approach to quality – assessing risks and opportunities for people to make mistakes and then taking positive action to make it difficult to make those mistakes – it is possible to achieve no quality defects. Similar to human errors that result in poor safety outcomes, human errors resulting in poor quality can also be categorised, analysed and eliminated to root cause.

A key part of ensuring perfect quality is the concept of source inspection.



Source inspection works on the principle of finding potential errors *prior to processing* thereby preventing the manufacture of defects. It is 100% inspection. To do this you need:

- Systems and tools to help identify potential errors – these are often known as poka - yoke devices.
- A method to rapidly feed back these issues to the operator so that corrective action can be taken prior to processing.



Poka - yoke devices and design can vary considerably depending upon the potential error that needs to be trapped. Poka - yoke devices are quite common.

You may have some poka - yoke devices in your factory you are not even aware of! Examples include:

- Simple interference pins that ensure that an object is in the correct orientation prior to processing.
- Limit switches and micro switches to detect that (eg) a screw has been put in fully.
- Counters on drills and other devices to ensure that the correct number of items have been fixed.
- Temperature limits that stop processing if the temperature is out of range.
- Part counters or automated dosing devices.
- Colour coding of parts, numbering of parts or sequences.

It's all about making it easy to do right and hard to do wrong!

Poka - yoke devices can also be found immediately after processing to help provide feedback to operators of problems. You won't stop the defect from being made in this instance, but at least you can stop it from being passed forward and immediate feedback means that prompt corrective action can be taken. Examples of this include go / no go gauges.

Much work can also be put into *design for manufacturability*. This involves designing the object in such a way that it minimises the opportunity for manufacturing errors. This could involve a detailed assessment similar to a HAZOP in the process industries.

Ultimately, we need to remember the 3 key rules of poka - yoke and poka - yoke design:

- Don't wait for the perfect poka - yoke – do it now
- If it has more than a 50% chance of success, then do it!
- Do it now, improve it later!

To find out more about poka - yoke, consider holding a one day in house workshop about Mistake Proofing and Error Prevention.

Thanks also to Simplot Ulverstone for hosting one of the Learning Group Meetings and providing a plant tour.



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