# MISTAKE PROOFING TECHNIQUES

01 LAYOUT & ARRANGEMENT

Layout refers to the relative position of an item, and arrangement refers to putting an item in a designated place. A good example of a mistake-proofing device for layout and arrangement comes from a delivery company. The company was having trouble with employees attaching labels at a specified distance from two sides of a container. The company introduced a simple template employees can place over the corner of the box, leaving a window where the label is to be attached. Also, the company sequences the arrangement of deliveries so that the last deliveries are loaded first.

02 PARCEL OUT

There are many simple dispensers that ensure only the correct amount is provided. A personal favorite is the french fry scooper: a funnel-shaped aluminum scoop. Fast-food restaurant employees can make two mistakes when filling a bag of fries. If they provide too little, the customer is unhappy, but if they provide too much, the company loses money. With the french-fry scooper, the employee first inserts the narrow end into the fry bag, and then digs into a pile of fries with the wide end of the scoop. Once the scoop is full of fries, the employee tilts it back and funnels the fries into the bag. Varying the width and length of the end adjusts the amount of fries gathered. This tool ensures the bags of fries are slightly overflowing without being too generous.
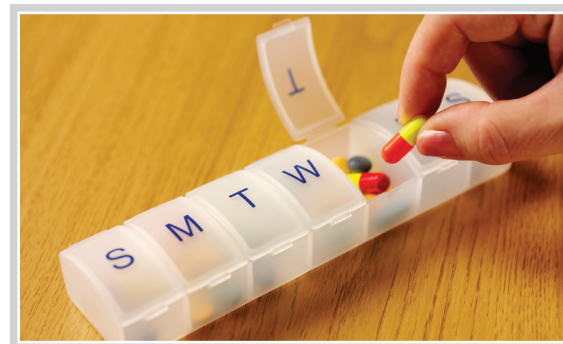
03 POSITIVE STOP

For safety reasons, you can't type in the GPS if the car is in movement. Another excellent example of a positive stop is on machinery that requires operators to perform a safety task before starting the machinery. For example, on the machine used to balance tires, a safety hood covers the tire while it spins at high speeds to determine the correct balance. To activate the power to the machine, the operator must first close the hood. Other examples include dishwashers, washers, dryers and microwaves that stop when their door is opened to prevent operator injury or damage to the equipment.

MISTAKE PROOFING TECHNIQUES

04 SPACE SEPARATION

Poka yokes that control physical space can help prevent common customer mistakes and ensure the proper movement of people. For example, the chains that configure waiting lines indicate where the lines should form and the number of lines to form. They also require customers to enter the end of the line to approach the serving area. Another example of this type of poka yoke is the common turnstile. Turnstiles prevent customers from entering through exits, leaving through the entrances or otherwisemoving against the flow.

05 CONFIRMATION OF EXISTENCE

Technology that knows when something exists and reacts to it is another poka yoke. A good example is a home alarm system that can be enabled to beep when a door or window is open, confirming that an action has happened. There is no alarm if all doors and windows stay closed. Another example is statistical software that detects the type of data in a column and limits the data format for subsequent inputs in that column.

06 ALTERNATIVE USE OF RESOURCES

In some instances you can use peculiar aspects or features of items, such as texture, mass or electrical properties as poka yokes. Some companies are now using gravity to make sure that customers get even the last drop of products, such as ketchup, shampoo and toothpaste by putting them in upside down bottles.

MISTAKE PROOFING TECHNIQUES

07 VISUAL MANAGEMENT

At a packaging company that makes food containers, they use pallets of ink to print graphics on the boxes. They set up the pallets of ink at the presses and place lines on the side of the machine at the correct minimum order quantity. As the pallets are consumed it becomes obvious to the operator when it is time to place an order for the warehouse to deliver another pallet of ink. This visual management mistake proofs downtime on the presses by providing a continuous supply of ink. Hotels also use visual cues. For the housekeeping staff, they wrap paper strips around the towels to separate the fresh towels from those that need replacement. If the paper strip is intact, that means that the towel has not been used and therefore doesn't need to be replaced.

08 GO/NO-GO

A device or instrument that detects the presence or magnitude of a characteristic and provides a "go/no-go" or "pass/fail" assessment is another good mistake-proofing technique. It prevents defects by determining if a feature is present or not. At airports customers often discover that their carry-on luggage is too large to fit in the overhead compartments or under the seat. This can delay the entire aircraft as the flight attendant searches for a suitable place to stow the oversized luggage. In many airports you find go/no-go gauges that are the same size and shape as the under-seat compartment placed near all check-in points.

09 TIME SEPARATION

In some cases, mistakes can be prevented by separating contradictory or opposing feature requirements in time. A traffic light is a good example of this type of poka yoke. The light indicates the allowed flow of traffic separating the flow by specific periods of time. Many stoplights are timed with a three-second delay to allow previous cars to exit the intersection before cross traffic is permitted to enter. Often many mistake proofing techniques are combined. A common example: The baggage claim carrier at airport terminals has a time delay between the visual and audio alarms and the movement of the belt to prevent travelers from being injured.

MISTAKE PROOFING TECHNIQUES

10 CONDITIONAL STOP

You cannot take your car out of the parking gear until the key is in the unlock position and the brakes are activated. This prevents the inadvertent error of allowing the car to roll unintentionally. Other safety examples include putting a lock on a circuit breaker to prevent electrical shocks while changing a light switch, and the safety beam light sensor on a garage door that senses an object and reverses operation of the door so it will not close.

11 ELIMINATE REPLACEMENT ALTERNATIVE (ERA)

If the task that is creating the error or defect is eliminated, replaced or substituted, then the error or defect will disappear too. To eliminate the error of people forgetting their passwords, an alternative method uses biometrics, such as fingerprints or retinal scans, as a replacement to verify their identity.

12 KITTING

An example of kitting is do-it-yourself furniture, for which buyers are given the appropriate number of screws, parts and even tools to assemble the furniture. A packaged kit of everything needed for your child's lunch is another example.

MISTAKE PROOFING TECHNIQUES

5S
13 5S
(SORT, STORE, SHINE, STANDARDIZE, SUSTAIN)

By applying the principles of 5S to an area, clutter and waste can be removed, leading to fewer mistakes. For example, in grocery stores, perishable products are constantly purged of old inventory, arranged by first in-first out, and kept fresh with sprinklers and chillers. Labels and bins prevent products from becoming disorganized.
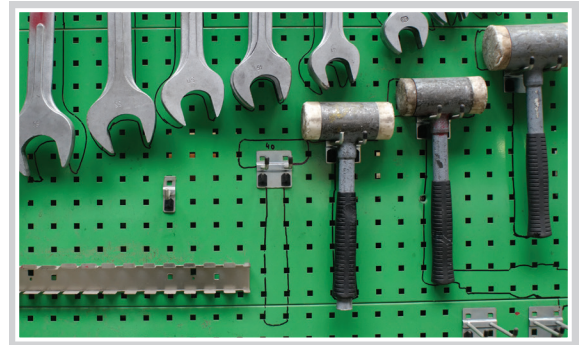

14 KANBAN

Arranging items, information and people according to a particular sequence, pattern or method is a good mistake proofing solution. Take-a-number systems not only help prevent mistakes in serving customers out of turn, but they also allow a count of how many customers are waiting. A car dealership places color-coded numbered markers on cars as they arrive at the service facility. The numbers assure that the customers are served in turn, and the colors signify which service advisor has responsibility for that car (an improved visibility poka yoke).

15 TEMPLATES

In a manufacturing department, technicians use templates in the form of the finished assembly to align orientation of brackets and rivets. This reduces the error of orientation and indicates when products are missing. Another example is paper templates that come along for installing door locks to ensure correct location of the jam, door and handles.
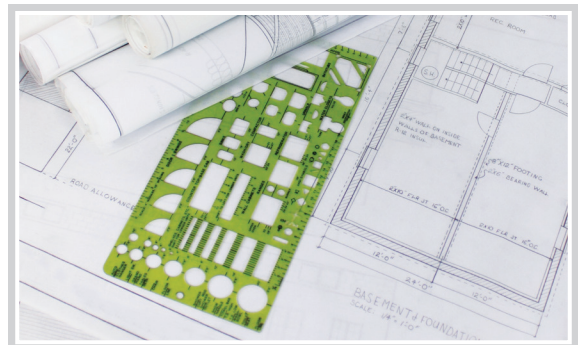
MISTAKE PROOFING TECHNIQUES

16 CHECKLISTS

Checklists are a type of mistake proofing to ensure that similar and repetitive tasks are verified prior to an activity starting. This also provides sequencing to make sure process steps are performed in order. The absence of checks on a checklist identify missing items quickly. A typical example is the review of a bill of material to ensure all components are provided to the department or customers. Checklists can take multiple forms from a papergenerated list to a complex automated test sequence in software. Many medical devices perform a calibration upon power up to ensure proper usage. A less technical example: To improve customer service, a large bank requires tellers to verify the eye color of each customer prior to providing service. This encourages eye-to-eye contact when the teller greets the customer.

17 HIGHLIGHT

The goal of this technique is to make something obvious so that it stands out and will be noticed. Some Web pages will highlight the information you have to enter before submitting a form. Or if you submit a form with missing data, then it will come back, highlighting what needs to be filled out. Multipage documents that require multiple signatures are usually highlighted with arrow-shaped sticky notes that say "sign here."

18 INFORMATION TRANSFER

Information transfer is the communication of critical information such that it is received and interpreted quickly and accurately. Road signs are one example. Examples in office locations could include color-coding files or records, indicating what type of information they contain or where it's at in the process. An example in a hospital is an audio alarm that transfers information from a critical test to the nurse responsible for reacting to the test. In one hospital, walking over to the equipment and verifying results on an as-available basis resulted in wasted trips and patient safety concerns when the nurse forgot to check on the test. Instead, an alarm was installed so that it is obvious when the nurse needs to go over to the equipment.

MISTAKE PROOFING TECHNIQUES

19 TREND PREDICTION

Trend analysis can be explained as the observation of history in order to predict the future. There are many examples of using statistical process control as a signal to predict potential problems with both attribute and variable data (defects, defectives and measurements). The use of trends can forecast failures before they happen. This is a control method called statistical process control. It is effective in anticipating errors before they occur by measuring observed variation versus expected variation in the process. This will alert individuals to take action when something unusual occurs. For example, a pharmaceutical company was measuring a critical reagent supplied by one of their vendors. A trend showed a degradation of a critical characteristic. This data allowed the company to address issues, working both on a robust problem and with the supplier, before they were passed on as a bad product to consumers.
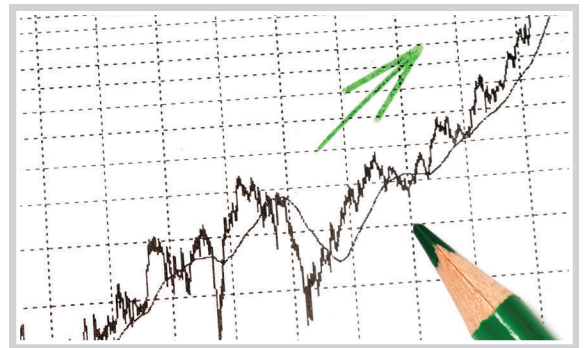
20 SIMPLIFY INFORMATION

Simplifying can be defined as the absence of non-valued information. Many companies have used this by developing a key indicator that can link to further information, requiring only a minimum of information to be transmitted or exchanged. Another example is to make information stand out with forms showing shadowed fields for completion. On cars, there is a gauge that measures when the engine is operating at a high speed, which could cause damage. The simple notice that the driver receives is an area of the dashboard highlighted as a different color (usually red), which notifies the driver of the extreme operating condition of the engine.

21 DOCUMENT CONTROL

Document control is critical to mistake proofing because similar to a checklist, it provides a procedure to follow. Often the absence of policy or procedure leads to variation and different customer experiences. For example, in a retail organization, customers were having variable experiences when dealing with the customer service department. To define standard work and a best customer experience, the best customer service person on the team wrote a procedure. Upon training and deployment of the new procedure, customer service scores rose. This is a mistakeproofing technique that ensures a repeatable process. Cookies of websites visited are stored in personal computers so that the next time the user visits, the experience is safer and faster. Information and preferences are already pre-loaded. If cookies are not enabled, many websites might not have full functionality. This relates to document control by the end user only having to enter their information once, which reduces error.