

# Implementation of Poka-Yoke and Safety Push-Button in Rubber Grommet and Sleeve Assembly Bracket Machine

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## ABSTRACT

Poka-yoke is a technique that is used for avoiding human error in the workplace. It is also known mistake-proof method and fails safety working methods poka-yoke is a system it is designed to prevent errors or mistakes made by the operator performing work or process. Today, this concept is used in current industries production system helped design, averages poka-yoke devices per machine in their manufacturing plants, thus validating the concept as beneficial to the industry in this article is used to reducing rejection and customer complaints, detect wrong punching bracket holes and only finish good material is supplied customer reduced wrong assembly bracket. An examination in Precision" list the potential benefits as:

- Detecting wrong hole punching.
- Simplified wrong bracket punching.
- Easily detect the problem.
- Poka-yoke implementation cost is very low.
- Lower skill worker is required.
- Increased production flexibility.
- Reducing customer complaints.
- Reducing rejection.
- Showing bracket punch defect.
- Easily detect without punching bracket.
- This poka-yoke is to implement proximity metal detector sensors.
- It's improved to product quality and reduced rejection of the bracket.

Also the implementation safety two push buttons in this machine to going on the safety press operation to avoiding the accident. It can develop by the new system of the press operation or press operation purposethis system's purpose is to avoid the accident and work done is going very safely. The first system is press paddle is implemented but they are the chance of accident and finally, an accident occurs at the machine and injured the hand fingers. After implementing the hand push button and to avoid the accident. Operator both hand are used to place the job in the fixture and both hands are used to push two buttons and after the machine are working and operation will be done safely. List the potential benefits as given below.

- Both hands are used to separate two push buttons and avoid the accident.
- Safety programs create productive work environment and to avoid the accident.
- There is no safety buttons are using, used press paddle are getting to the chance of (finger damage) accident.
- One single button is the press, not the working machine.

**KEYWORDS:** Implementation of poka yoke, Poka yoke, Assembly line Poka yoke

## I. INTRODUCTION

Poka yoke is a based on prediction and detection of the object. The control poka yoke does not allow a process to continue after an error has occurred. It takes the response to a specific type of error. The ABS mounting of this bracket the bracket is design is to specified design of surface and so many punch are created this surface and this punch are making press machine but the bracket is placing of the die is apposite also that time operator is place and punch the hole is opposite and after the black powder coating process of this bracket to coming the assembly operation that time the

punching holes are not the detect and assembly is making the wrong and going to customer end and defect will be produced and big concern are produced. But after the poka yoke are implemented after the wrong punch hole is detected by using poka yoke and to defect are not found the customer end. This does not prevent the error, but immediately stops the process when an error is detected. This poka-yoke is useful for mass production system. All that is needed is a way to ensure that the error is investigated and corrected in a timely manner.

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Poka yokes can be as simple as a metal detector sensors are keeps correctly placed parts from assembly properly, or they can be as complex as a fuzzy logic neural network used to automatically detect by producing the sound and signal and immediately stop the machine. And detect the problem surprisingly the simple low cost devices be the majority.

- Contact methods,
- Fixed-value methods.
- Motion-step methods.

**1.1. CONTACT METHODS:**

Contact method are based some of the sensing of the abnormality of the device in the product shape and dimensional and responds.

Interference pins, like to the limit type switches and proximity type switches are used to ensure part is positioned correctly before work occurs.

- Looking for where the product will fail if parts are assembled incorrectly.
- Looking for small features critical to proper assembly.
- If they found any mistake of the time of production then poka yoke are to detect the problem by using signal and sound

**1.2. Poka Yoke Applications:**

In sensing behavior of object shaping constraint as operational step to in correction operation. One of the most common is when an operator is operating a machine at the time of assembly. Electro hydraulic control unit (EHCU) bracket is used to locate in the left side engine compartment. The EHCU regulates hydraulic pressure energy in the brake system during an antilock stop. The EHCU system is mounting assembly of the bracket machine this bracket is called mounting bracket. This bracket is used to mounting the EHCU system unit as per designing of this bracket.

**1.3. Two-Hand Devices (Push Button):**

A push-button or simply switch mechanism to control some aspect of a machine or a process. This buttons are making usually plastic or metal. Buttons are most often switches, although many buttons still require a spring to return to their original state. The push of a button includes pressing, depressing, slapping, hitting, and punching each two hand device designed and constructed to protect each hand button control under operation. The two-hand device constructed operation of two hand controls to initiate the machine cycle.

**1.4. COMMON DEVICE USED IN POKA-YOKE SYSTEMS**

1. Solenoid valve
2. Light and Alarms
3. Push button switches
4. Proximity switches (sensor)
5. Relay box

**1. Solenoid valve:**

Solenoid valve function involves either open or close.

**2. Light and alarm:**

Modular is design for all internal and external working applications in tough conditions wherever problem status needs to be displayed and warning signals given.

**3. Push button switches:**

The push button switches consist mainly of two types momentary and non-momentary. These switches are ordinarily used in calculators, push-button telephones

mechanical and electronic devices used across homes or industries.

**4. Proximity switches (sensor):**

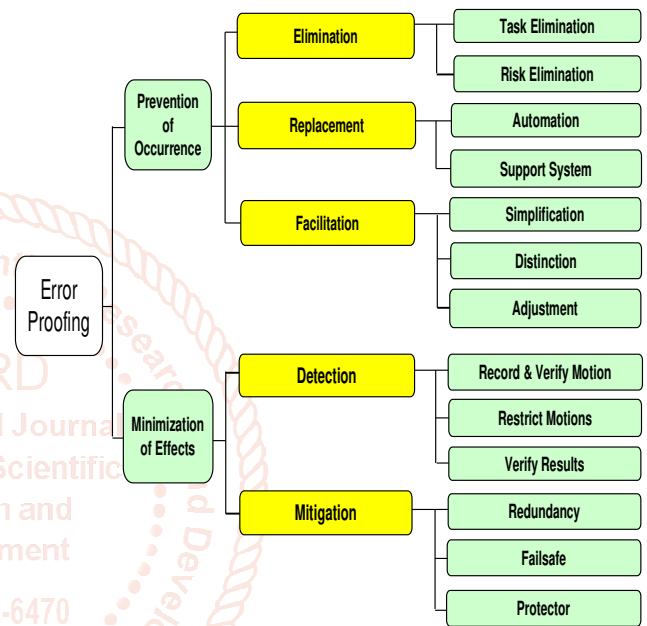
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**5. Relay switch box:**

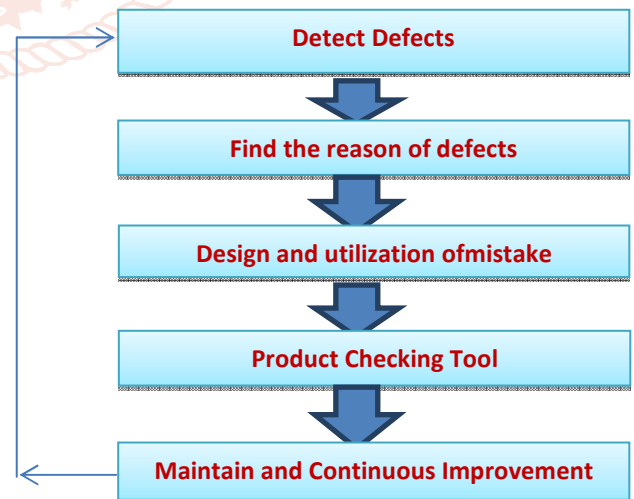
Relays are switches that open and close circuits electromechanically or electronically. Relays control opening and closing contacts in another circuit. As relay diagrams show, when a relay contact is normally open (NO), there is an open contact when the relay is not energized.

**II. IDEA GENERATED**

- Identify solutions using principles and Sub-principles:



**III. METHODOLOGY**



**FIG 1.1: Model of Poka Yoke**

**3.1. Detect Defects:**

The defect is identified at the first stage of the production. They cannot be finding and identified the intermediate operation because all the operation is done as to work flow after the problematic product is goes to the punching and powder coating operation then after the coming of the last stage of the product. Also poka yoke implemented the final

and first stage and comes to the last stage and also the not adding poka yoke and does not defined and the problematic pieces are found the customer end.

**3.2. Find the reason of defects:**

To find the defect to coming improper way of handle the machining, improper handling the processed and improper machining and improper knowledge of the production regarding Also the operator is not aware to the proper handling of the work also operator does not understand this type of the problem and not sure .

**3.3. Design and utilization of mistake**

**3.3.1. Two Hand Monitoring Safety Function**

Controlled the motion of operator’s hands during hazardous motion by requiring the continuous actuation of two buttons to enable power to the motor. Simultaneous operate both button after released the both button power is removed.

**3.3.2. Non-contact type of Poka yoke (Inductive Proximity Sensors)**

Proximity sensor including all non-contacting detection in comparison sensor that detect object by physical contact them .proximity sensors used convert information to present the electrical signal electrical sound system.

**3.3.3. Solenoid Connectors**

Solenoid contactor is electrical device and electrically active used to controlled the direction of the air in fluids or air system Solenoid valve are used both pneumatic device also hydraulic device in fluid or pneumatic systems. Solenoid used pneumatics well as hydraulic fluid power systems.

**3.3.4. Product Checking Tool**

A gauge, in device used to make measurements or in order to dimensional information. A verity of the tool are used to the survive of this type of the functioning samples can be measured to complex pieces of machinery. This is also not detected hole missing part of the final stage .Because not available the final checking gauge. And also the part of the not detected by the assembly stage. And this part is sending to the customer end. This givenbelow figure are final checking gauge is as shown.

**3.3.5. Methods of Obtaining Poka Yoke**

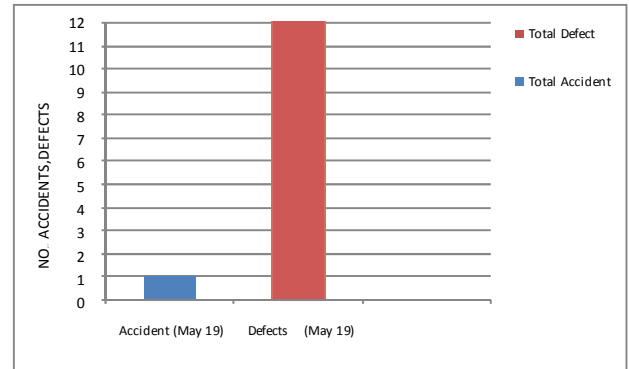
Poka yoke idea or concept is very creative. It being the defective product not produced bulk quantity also not created the mistakes of the production processed. Following are some of the simple ideas to avoid mistakes and accident:

- Add sensor at grommet press SPM machine to detect wrong assembly.
- Add pin forming die to detect wrong forming.
- New checking gauge to be made for detection of wrong hole position.
- Check point added in final check sheet.
- Defect decision matrix updated & displayed.
- 100 % white dot marking on bracket.
- Push button implementation.

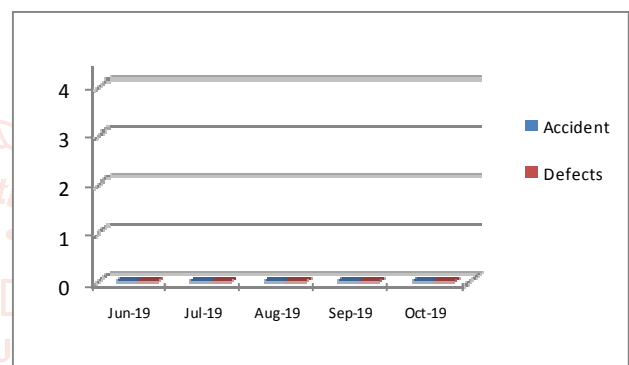
**IV. BEFORE AND AFTER IMPLIMENTATION OF POKAYOKE**

- Before wrong side hole punching bracket assembly possible on fixture also while operating of paddle finger accident is possible.

- Sensor type poka yoke install on machine to detect wrong hole punching bracket
- Now after providing pin sensor is used detect and hole position change and push button avoid chance for accident in assembly stage.



**Before Action Implementation**



**After Action Implementation no defects**

**V. CONCLUSION**

As a working for the big company vendor and so any defective product is going to customer end means MNCs that the loss to be incurred due to this mistake in production process they are going to is effect of the financially also the effect of the future biasness of the company . Therefore at the utmost need of applying Poka Yoke, at the different stage of defective production. We have to apply control mechanism by the help of signal and alarm system so that the further production not continued for that defective product.

By enormous effort and several trail taken and finally found the solution for this above prescribe problem which eliminated possibilities of errors. In addition to that loss of company due to job rejection was recovered. Before implementing Poka-Yoke lots of 100 jobs was rejected which lead to high percentage economical loss for the company. The hectic burden of reworking, changing the sequence of operation, manufacturing methods are eliminated. Along with that it saved the time which was the biggest benefit. The company’s demand of space utilization has been thoroughly justified in the project work. Greatly reduction in material handling time.

The utilize of poka yoka concept like to reducing the human error in manufacturing processes and management as a result physical human imperfections. It is important part of eliminate the independently human error. The main and important idea is preventing causes, which may result in errors systems determining compliance of the product by this project, in the company’s quality.

- Poka yoke is face of that definer. We can avoid the mistakes at the source itself by using above mentioned methodology.
  - It also allow user to function without mistake or prevent error that are about to occur.
  - Implement total quality management system is implement because poka yoke is a tool of total quality management.
  - Successful poka yoke is increase result productivity with minimum waste.
  - We have to overcome all that for achieving defect and zero waste and zero delays.
  - Poka yoke is launch preventive action for systematic moment of the QMS with higher performance of productivity of the system and to reduction loss of the production.
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