

POKA-YOKE

What is a Poka-Yoke ?

Poka-Yoke is a tool to have “zero-defects” and can even reduce / eliminate quality control.

Poka-Yoke is the Japanese name for “fool-proof”.

Poka-Yoke respects the intelligence of the operator by excluding repetitive actions that require a thinking process.

By this method is the operator more free for creative and “added-value” driven activities.

Type of Poka-Yoke's?

Poka-Yoke to detect faults at the base, ex the position of the filer neck into the down line.

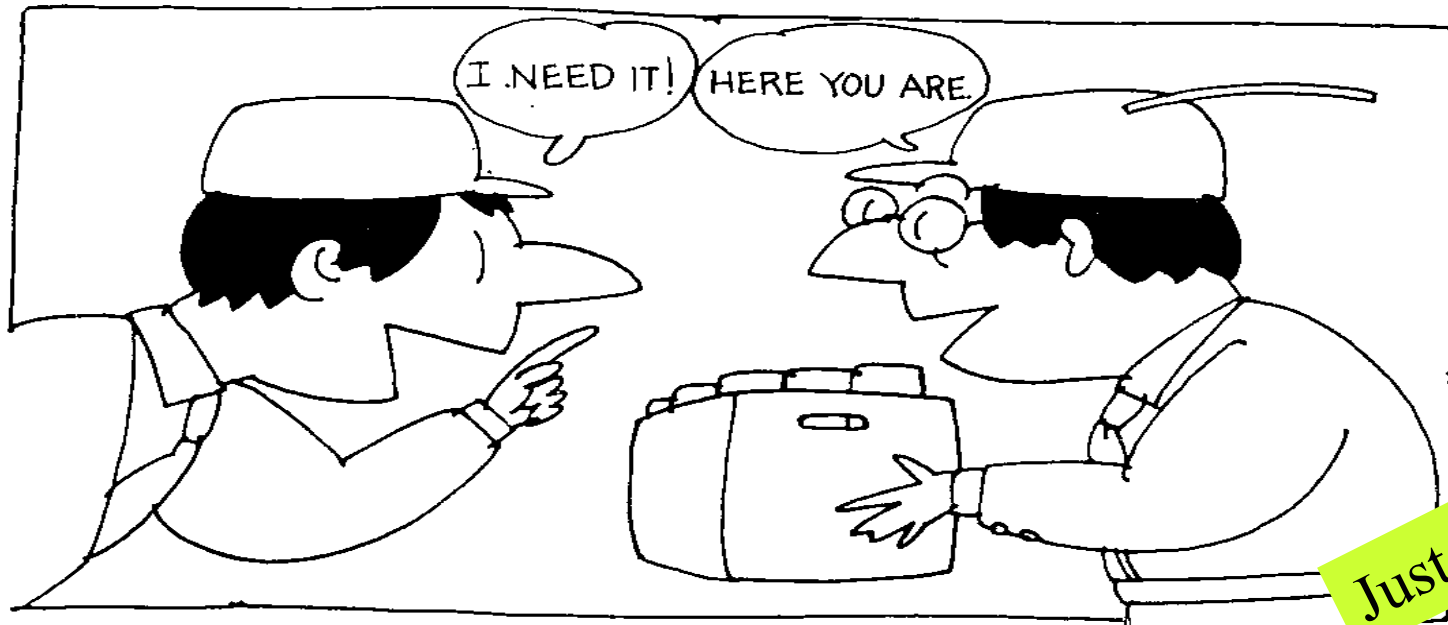
Poka-Yoke to detect faults after an operation,ex a sensor used to detect a metal part.

Poka-Yoke to stop the machine if an error occurs.

3 Strategies for Zero Defects

1. Only make the product when required!

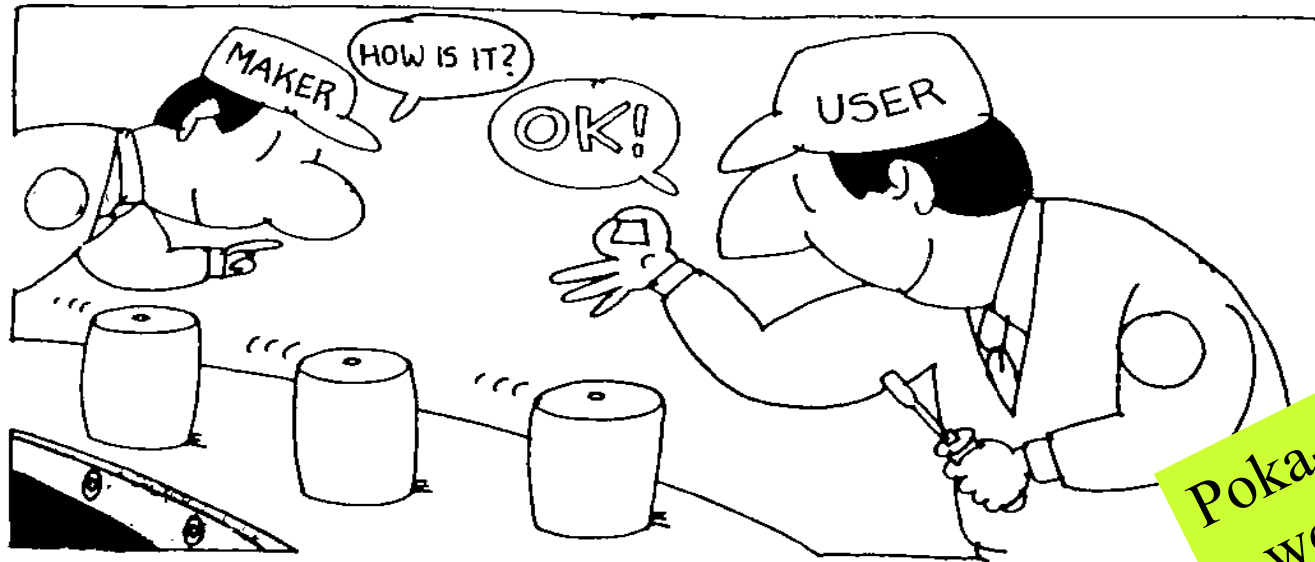
1. Don't make it!



3 Strategies for Zero Defects

2. Make the product so it can not be used for anything else.

2. Make it to withstand any use!

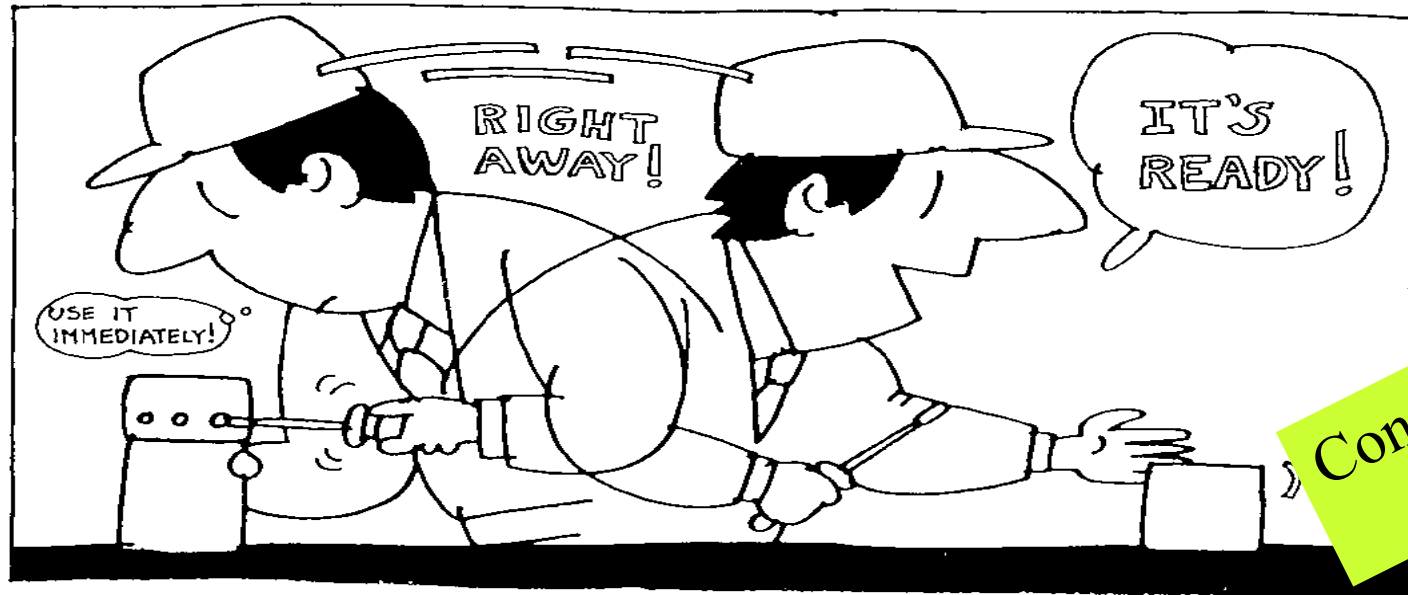


Poka-Yoke, automation,
work standardization

3 Strategies for Zero Defects

3. If the product is ready use it immediately.

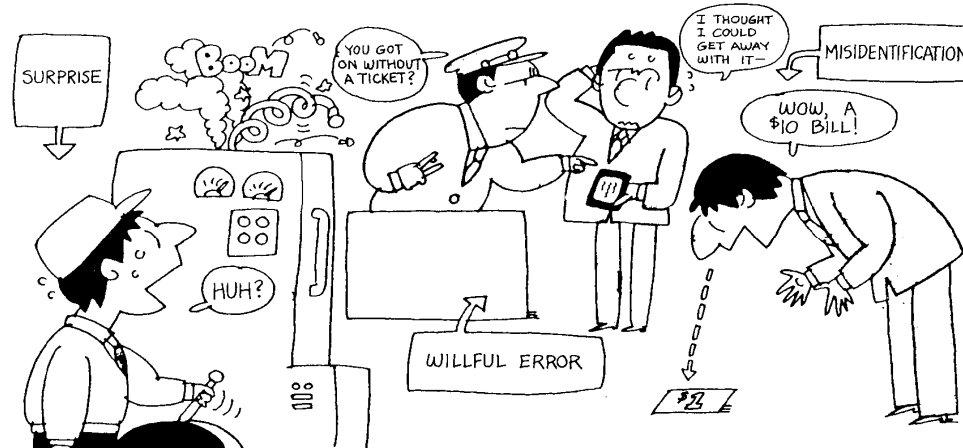
3. Once you've made it, use it right away!



Type of faults

1. Human faults
2. Machine faults
3. Process faults

Different causes

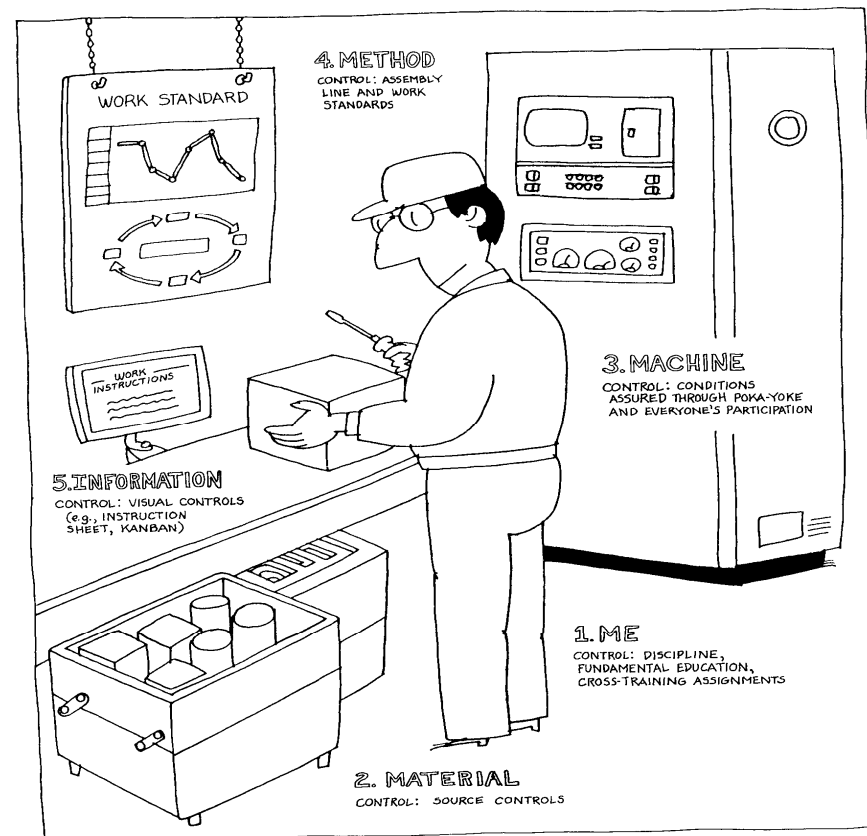


1. Forgotten....
2. Wrongly understood....
3. Wrong identification....
4. Insufficient experience.....
5. Discipline.....

6. Confused....
7. Too slow....
8. No system...
9. Unexpected.....
10. Sabotage....


5 Elements of Production

1. Man
2. Material
3. Machine
4. Method
5. Management



What are the causes of the faults and the link towards human errors ?

☆ CAUSAL CONNECTIONS BETWEEN DEFECTS AND HUMAN ERRORS



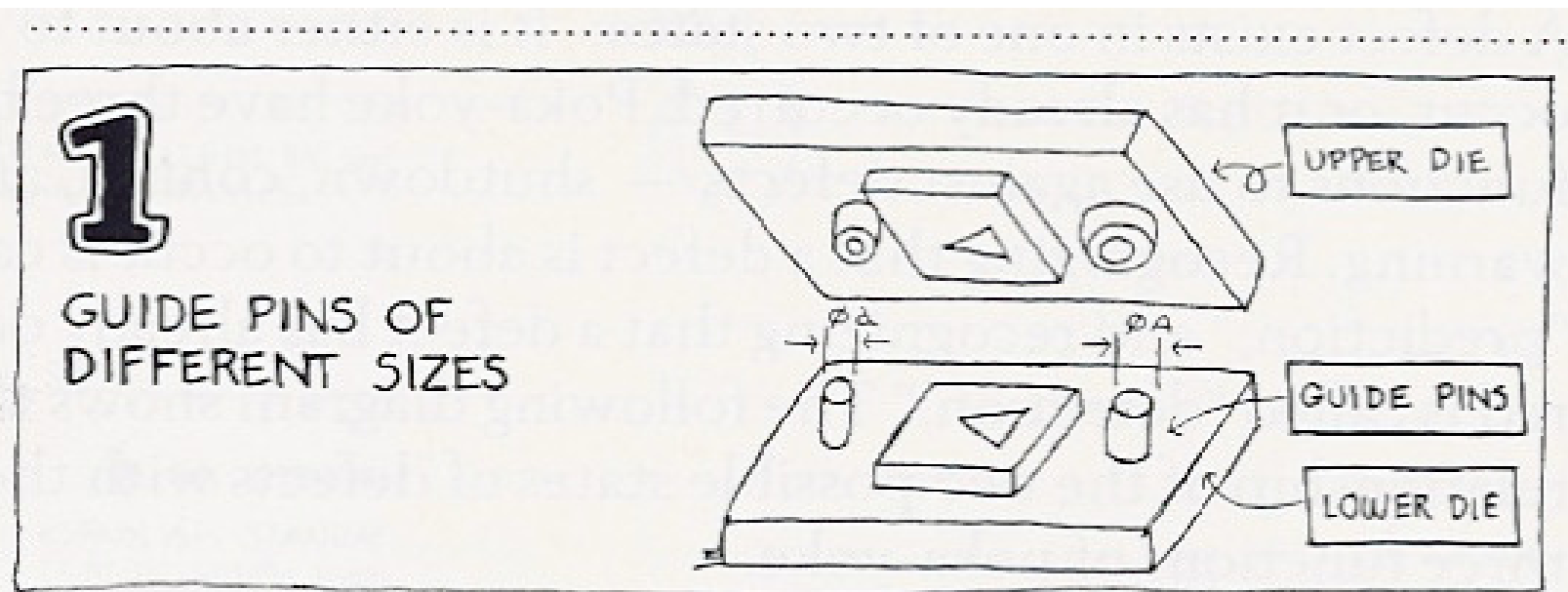
● STRONGLY CONNECTED ○ CONNECTED

CAUSES OF DEFECTS \ HUMAN ERRORS	INTENTIONAL	MISUNDERSTANDING	FORGETFUL	MISIDENTIFICATION	AMATEURS	WILLFUL	INADVERTENT	SLOWNESS	NON-SUPERVISION	SURPRISE
OMITTED PROCESSING	●	○	●	○	○	○	●	○	○	
PROCESSING ERRORS	●	●	○	○	●	●	●	●	●	
ERRORS SETTING UP WORKPIECES	○	○	●	○	○		●	○	○	
MISSING PARTS	●	○	○		○	○	●		○	
WRONG PARTS	●	●	●	●	●	●	●		●	
PROCESSING WRONG WORKPIECE	○	●	●	○	○	●	●		○	
MISOPERATION			○				○		○	●
ADJUSTMENT ERROR	○	○	○	●	○	●	○	○	○	○
IMPROPER EQUIPMENT SETUP			○				●			●
IMPROPER TOOLS AND JIGS			○				●			○

Automation Innovation Solution

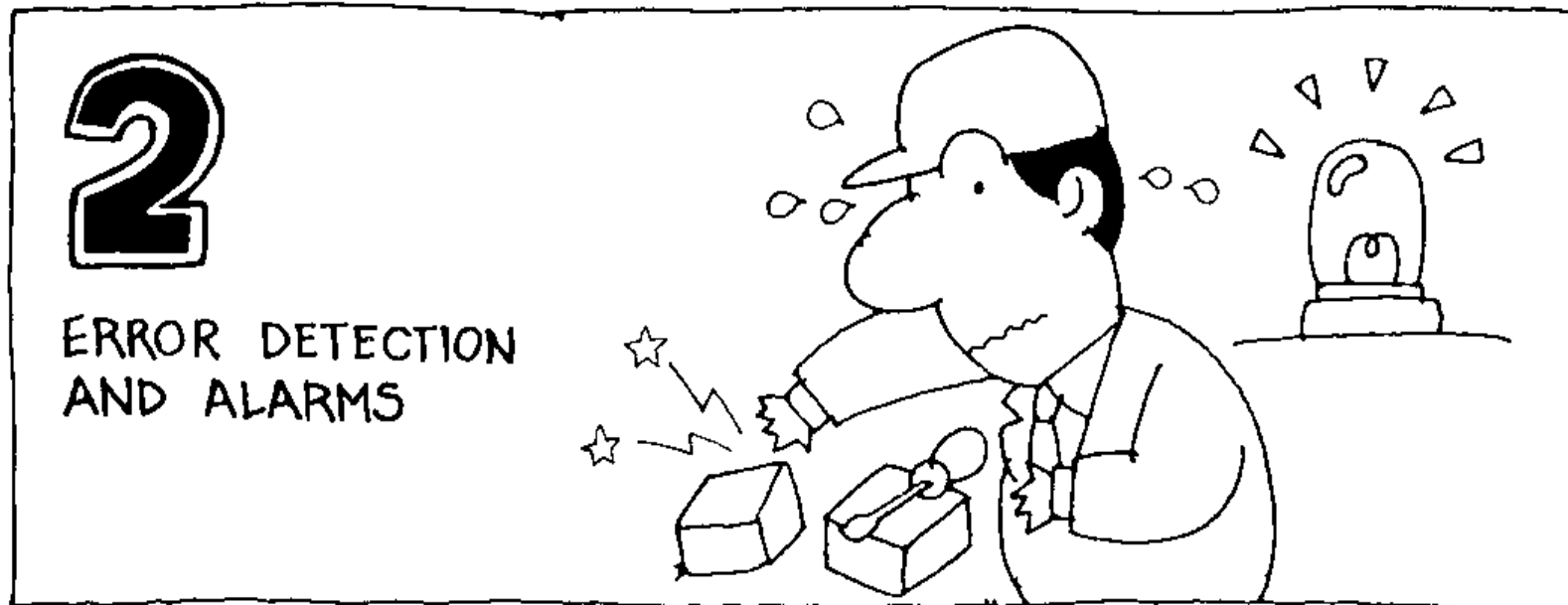
What are the 5 best Poka-Yoke's?

1. Parts with different dimensions



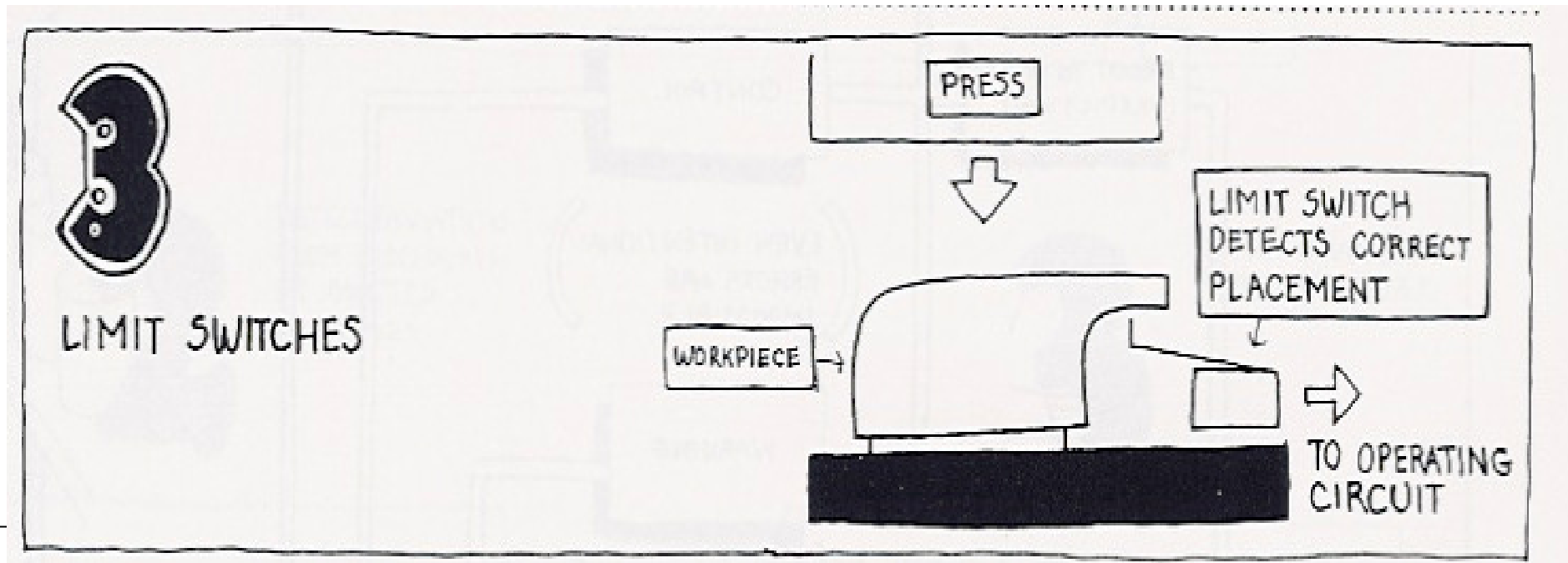
What are the 5 best Poka-Yoke's?

2. Fault detection with alarm



What are the 5 best Poka-Yoke's?

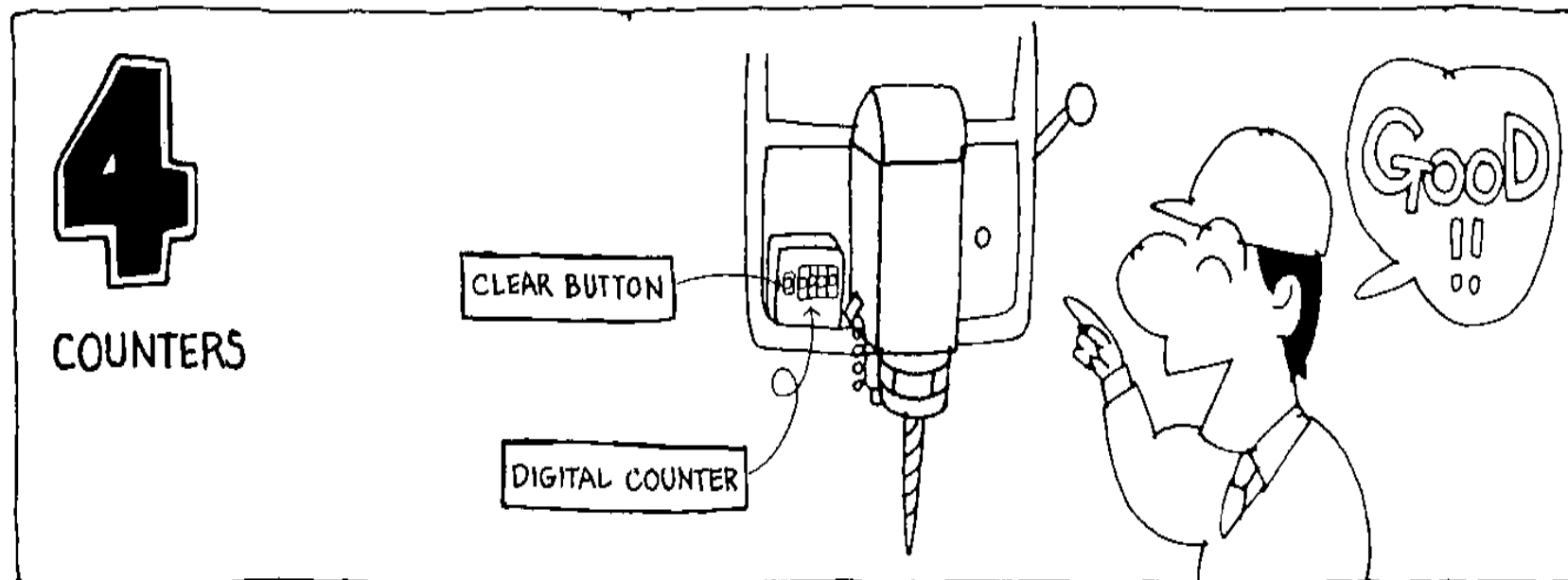
3. Limit sensors (position)



Automation Innovation Solution

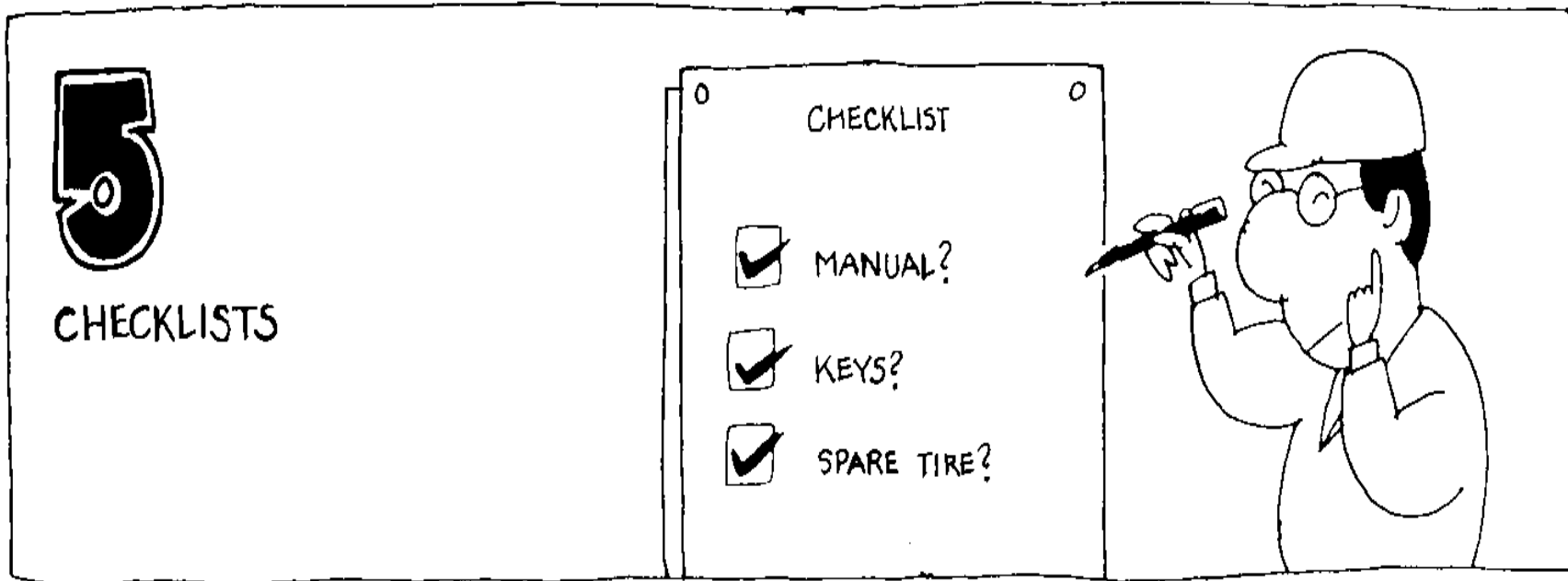
What are the 5 best Poka-Yoke's?

4. Counters



What are the 5 best Poka-Yoke's?

5. Checklist



Poka-Yoke has 2 status and 3 functions?

Status:

The fault will happen

or

The fault is happened

Poka-Yoke has 2 status and 3 functions?

Functions:

STOP or

Check or

ALARM

Poka-Yoke hints?

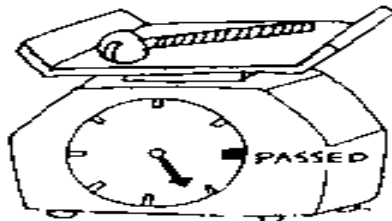
1. Identify the subject by its characteristic



IDENTIFY ITEMS BY THEIR CHARACTERISTIC

● BY WEIGHT:

ESTABLISH WEIGHT STANDARDS. USE A BALANCE OR SCALE TO IDENTIFY DEFECTIVE ITEMS.



● BY DIMENSION:

ESTABLISH STANDARDS FOR LENGTH, WIDTH, DIAMETER, ETC. IDENTIFY DIVERGENCE FROM STANDARDS BY USING STOPPERS IN JIGS, LIMIT SWITCHES, ETC.



● BY SHAPE:

ESTABLISH STANDARDS FOR SHAPE CHARACTERISTICS SUCH AS ANGLES, DEPRESSIONS, PROJECTIONS, CURVATURE, OR POSITION OF HOLES. IDENTIFY DIVERGENCE FROM STANDARDS WITH LIMIT SWITCH, CORRESPONDING LOCATOR PINS IN JIGS, INTERFERENCE FITS IN DELIVERY CHUTES, ETC.



Poka-Yoke hints?

2. Detect deviations towards procedures

2

DETECT DEVIATION
FROM PROCEDURES
OR OMITTED
PROCESSES

● PROCESS SEQUENCE METHOD:

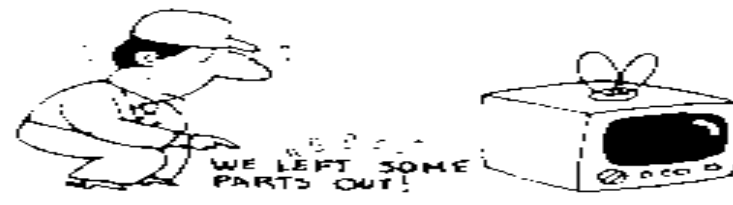
THE SUBSEQUENT WORK CANNOT BE PERFORMED IF THE WORKERS HAND OR MACHINE OPERATIONS DURING A PROCESS DO NOT FOLLOW THE STANDARD WORK PROCEDURES.

INCORRECT PROCEDURE



● PROCESS-TO-PROCESS SEQUENCE METHOD:

OPERATIONS CANNOT BE PERFORMED IF ONE OF A SERIES OF PROCESSES HAS BEEN OMITTED AND THE REGULAR PROCEDURES HAVE NOT BEEN FOLLOWED.



Poka-Yoke hints?

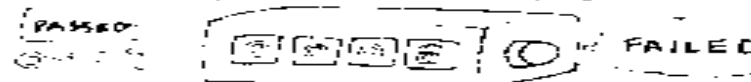
3. Detect deviations towards specs, limits

3

DETECT DEVIATIONS
FROM FIXED VALUES

● USING A COUNTER:

A FIXED NUMBER, SUCH AS THE NUMBER OF OPERATIONS OR PARTS, IS USED AS A REFERENCE. IF THE ACTUAL NUMBER DIFFERS FROM THE REFERENCE NUMBER, AN ALARM SOUNDS.



● ODD-PART-OUT METHOD:

WHEN A NUMBER OF PARTS ARE ASSEMBLED AS A LOT, THE EXACT NUMBER OF PARTS NEEDED IS PREPARED. WHEN THE LOT IS COMPLETED, LEFT-OVER PARTS SIGNAL THE OCCURRENCE OF ERRORS.




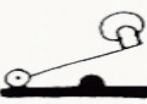




● CRITICAL CONDITION DETECTION:

A CRITICAL MANUFACTURING CONDITION SUCH AS PRESSURE, CURRENT, TEMPERATURE, OR TIME, IS MEASURED. WORK CANNOT PROCEED IF THE VALUE IS NOT WITHIN A PREDETERMINED RANGE.

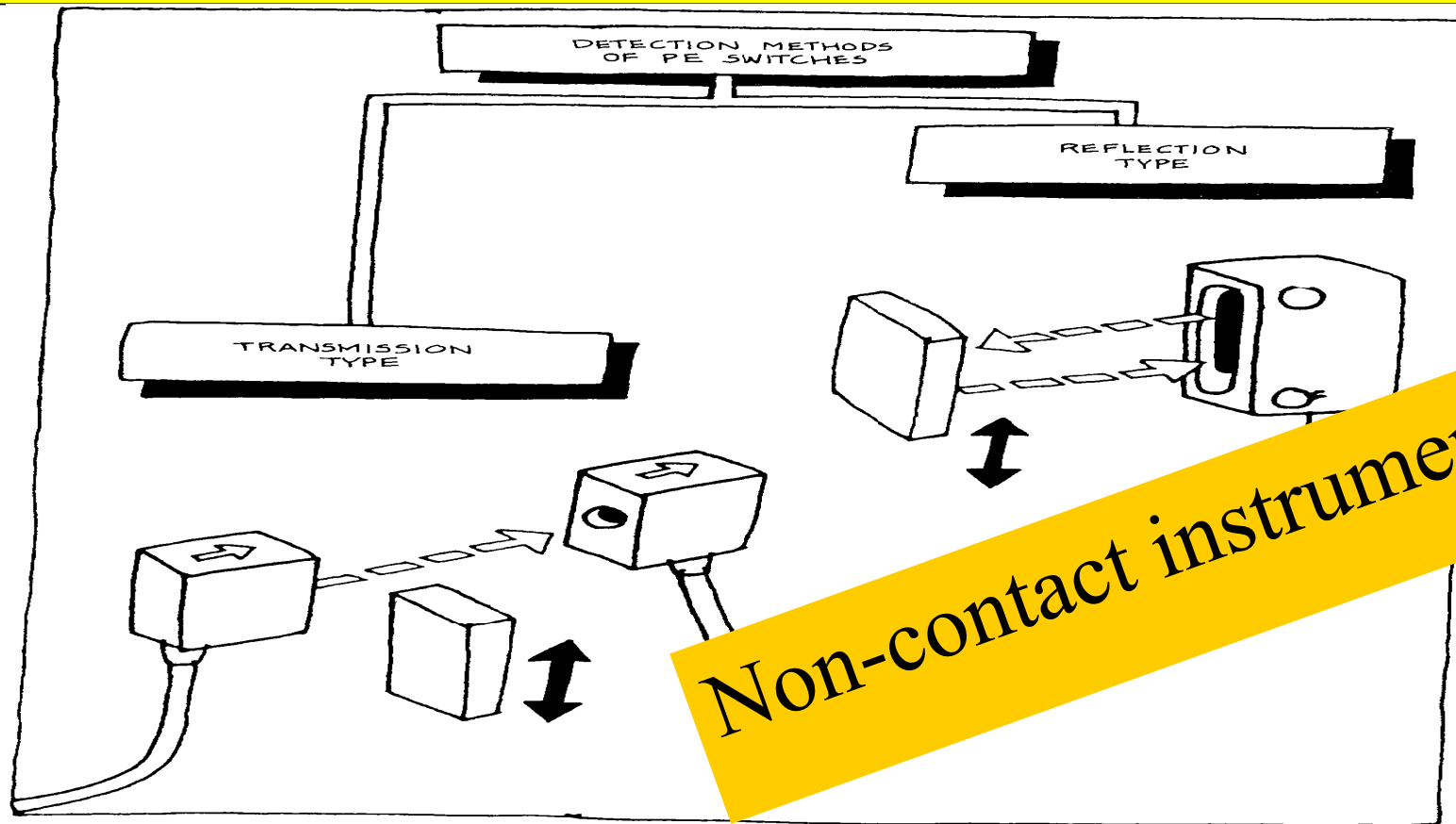


Poka-Yoke instruments

SHAPE	TYPE	MOTION BEFORE OPERATION	MOTION AFTER OPERATION	FORCE REQUIRED	VIBRATIONS/IMPACTS	CHARACTERISTICS
	PIN PUSH-BUTTON	SMALL	SMALL	LARGE	EXCELLENT	SUITABLE FOR LINEAR AND SHORT-STROKE OPERATIONS. DETECTS POSITIONS WITH THE HIGHEST PRECISION BECAUSE SNAP-ACTION MECHANISM IS ACTUATED DIRECTLY BY PIN PUSH-BUTTON. HOWEVER, IT HAS THE LEAST MOTION AFTER OPERATION, AND REQUIRES A RELIABLE STOPPER.
	PANEL-MOUNTED ROLLER PUSH-BUTTON	SMALL	LARGE	LARGE	ACCEPTABLE	SUITABLE FOR FAST-MOVING CAMS OR DOGS.
	HINGED LEVER	LARGE	MEDIUM	SMALL	ACCEPTABLE	OPERATES WITH LOW-SPEED CAMS OR DOGS. VARIATION IN DETECTION DEPENDS ON LEVER STROKE.
	HINGED LEVER-ROLLER	LARGE	MEDIUM	SMALL	ACCEPTABLE	SUITABLE FOR FAST-MOVING CAMS OR DOGS. FORCE REQUIRED FOR PIN PUSH-BUTTON DEPENDS ON LEVER STROKE.
	HINGED LEVER-ROLLER OPERATING IN ONE DIRECTION	MEDIUM	MEDIUM	MEDIUM	ACCEPTABLE	CAN BE OPERATED BY A BODY MOVING IN ONLY ONE DIRECTION. IF FORCE IS APPLIED IN THE OPPOSITE DIRECTION, THE ROLLER PART FOLDS AND BECOMES INOPERATIVE.
	ROLLER-LEAF SPRING	MEDIUM	MEDIUM	MEDIUM	GOOD	ALSO CAN BE USED WITH HIGH-SPEED CAMS.

Contact instruments

Poka-Yoke instruments



8 Improvement principles for Poka-Yoke and Zero Defect

1. Build quality in the process!
2. All faults and defects can be avoided.
3. Stop by doing wrong, do it right, NOW !
4. No excuses...
5. 60% success rate is enough to continue!
6. Teamwork .
7. Ten heads are better than one...
8. Why, Why, Why, Why, Why, How ??????

ZERO DEFECT strategy

Zero Defect Strategies for Factories

