

Mistake-Proofing/ Poka-Yoke Workshop

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What are you actively working on?

- Value stream mapping
- Rapid improvement events
- Setup reduction
- Worker attentiveness
- teamwork
- Stop-the-line
- Pull inventory systems
- Jidoka
- A3
- Andons
- Poka-yoke
- 5s

To err is human

Have you ever done the following:

- Driven to work and not remembered it?
- Driven from work to home when you meant to stop at a store?
- Walked out to the garage but forgot why?

Lather, Rinse, Repeat

Has there ever been a morning when you have lathered, rinsed and then struggled to remember whether you need to repeat or not?

What would you do if such a mistake were life-threatening?



What did you recommend?



A CHECKLIST FOR CHECKLISTS

Development

- Do you have clear, concise objectives for your checklist?
- Is each item:**
 - A critical safety step and in great danger of being missed?
 - Not adequately checked by other mechanisms?
 - Actionable, with a specific response required for each item?
 - Designed to be read aloud as a verbal check?
 - One that can be affected by the use of a checklist?

Have you considered:

- Adding items that will improve

Drafting

Does the Checklist:

- Utilize natural breaks in workflow (pause points)?
- Use simple sentence structure and basic language?
- Have a title that reflects its objectives?
- Have a simple, uncluttered, and logical format?
- Fit on one page?
- Minimize the use of color?

Is the font:

- Sans serif?
- Upper and lower case text?
- Large enough to be read easily?

Validation

Have you:

- Tried the checklist with front line users (either in a real or simulated situation)?
- Modified the checklist in response to repeated trials?

Does the checklist:

- Fit the flow of work?
- Detect errors at a time when they can still be corrected?
- Can the checklist be completed in a reasonably brief period of time?
- Have you made plans for future review and revision of the checklist?

Let's consider something gruesome!

- There is a table saw injury every 9 minutes
- Every year there are:
 - Over 60,000 injuries
 - Over 3000 amputations
 - \$2 billion in injury related costs
- Annual injury costs are double the annual sales volume



Let's consider something gruesome!

- When the hot dog contacts the blade (photo 2), the saw automatically stops and retracts under the table (photo 3) leaving just a minor cut (photo 4) instead of a severe injury.



Hot dogs are fine,
but I want to see a real finger!

The logo for the game 'Time Warp' features the text 'Time Warp' in a white, pixelated font. The text is centered within a circular, glowing purple and blue warp effect that has a grainy, digital texture. The background is solid black.

Time Warp

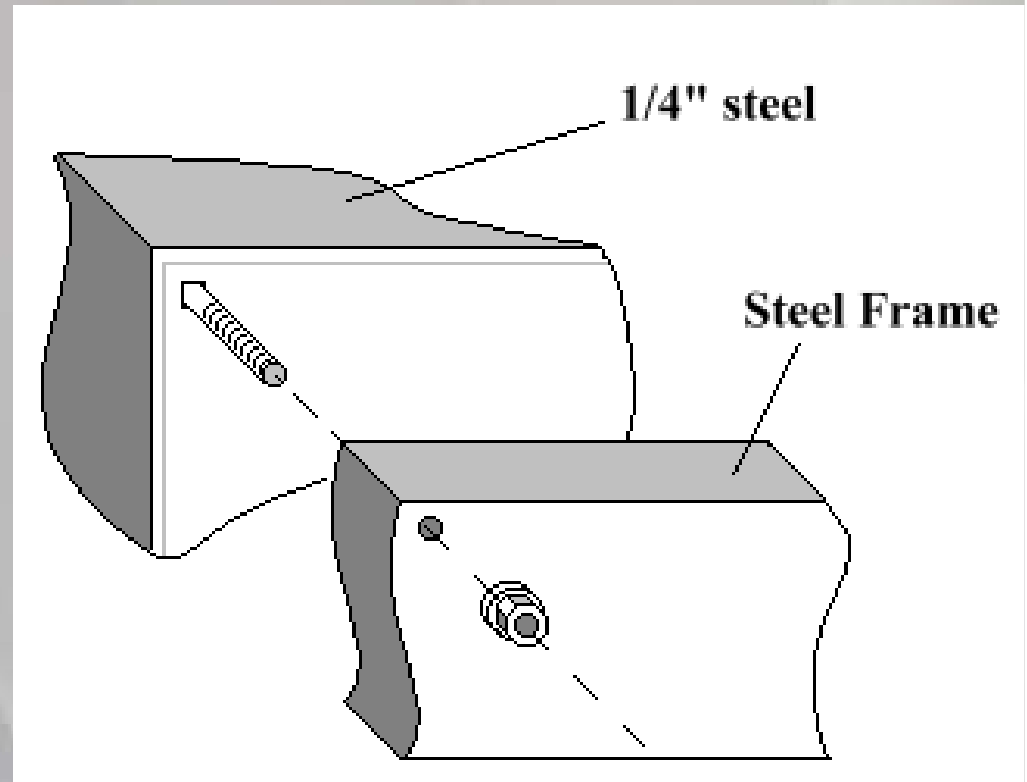
Pick-a-problem

Share-a-solution

- Form a group.
- Review the common errors you listed at the beginning of this session.
- Pick a problem to work on:
 - a common problem in your group or
 - one of the following 3 mini-cases
- brainstorm possible solutions
- Prepare to share a promising, plausible approach to solve the problem

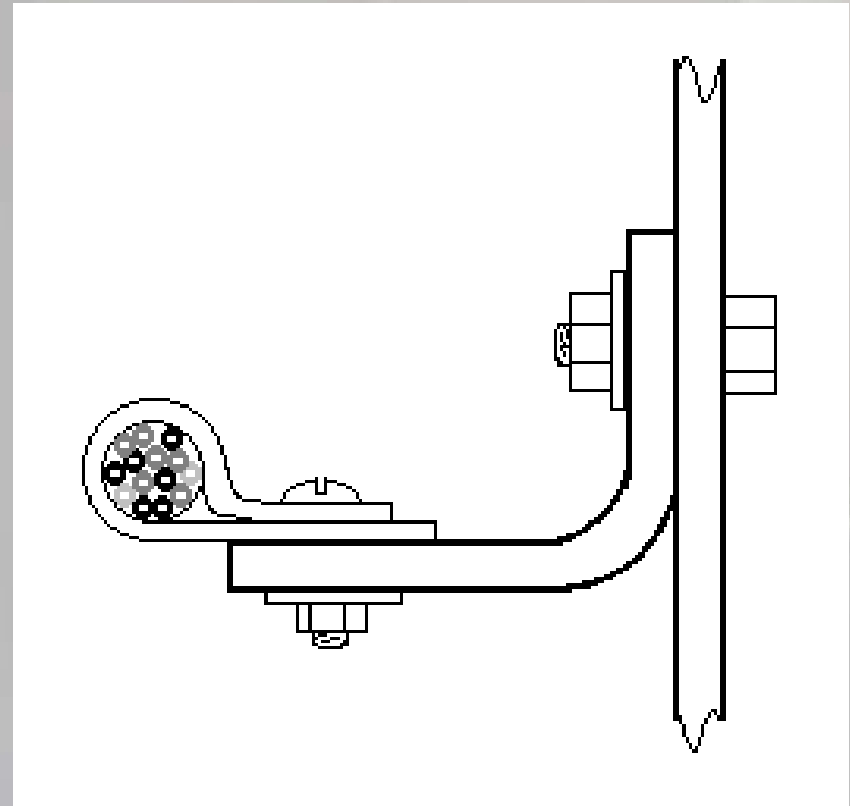
Mistake-Proof This

Tightening the Carriage bolt using a pneumatic socket wrench causes the square shank of the bolt to be pushed out of its hole. When the bolt is tightened the bolt sometimes fails to get properly seated. Product vibration in use causes the bolt to loosen rapidly.



Mistake-Proof This

An “L” shaped bracket holds electrical wires. The legs of the bracket are different lengths. If the wires are mounted on the short leg of the bracket, extra tension results. The wires will chaff and eventually short circuit.



Please propose more than one solution.

Mistake-Proof This

- A truck hits a low clearance bridge
- Police ticketed the driver for disobeying a traffic sign — the one that warns the bridge is a bit more than 11 feet above the pavement.
- Trucks hit the bridge almost once per month.
- A warning signs has already been installed
- What would you do to stop trucks from hitting this bridge?



A3 Anyone?

MISTAKE-PROOFING FOCUS: Concise statement of Error, Defect or Problem Statement.

BACKGROUND:

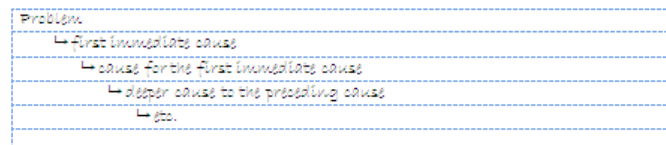
- Note any contextual or background information necessary to fully understand the issue.
- Used data to support the background, preferably in a graph
- Describe the current controls that are intended to assure quality
- Determine whether the error is Skill-, Rule-, or Knowledge-based

CURRENT CONDITION:

- Insert a simple map or the relevant process steps.
- Assess the initial frequency, severity and detectability in the current process. Calculate the RPN.
- Estimate annual cost of the error
- Use data to support the background, preferably in a graph that will show a trend when updated
- Describe the current state of what the operator does, level of training, standardized work, variation in results from different operators
- Include a before photo

ROOT CAUSE ANALYSIS:

- List the main problem(s)
- Use effective root cause analysis tools to determine the root cause. At a minimum ask "why?" questions until root cause is reached. Usually at least 5 whys.
- List the answers to each why question. Condense the causal tree suggested by Gano to only the most relevant sequence of questions



To: _____ From: _____ Date: _____

TARGET CONDITION:

- Describe the desired future state you would like to achieve from a business perspective
- Briefly describe the 7 solutions you considered to mistake-proof the process.
- Assess the estimated change to frequency, severity, and detectability of the proposed solutions
- Assess the effectiveness, cost and implementation difficulty of the proposed solutions

Idea #	Description	\$ Cost	S	F	D	RPN	E	C	I	SPN
1										
2										
3										
4										
5										
6										
7										

IMPLEMENTATION PLAN:

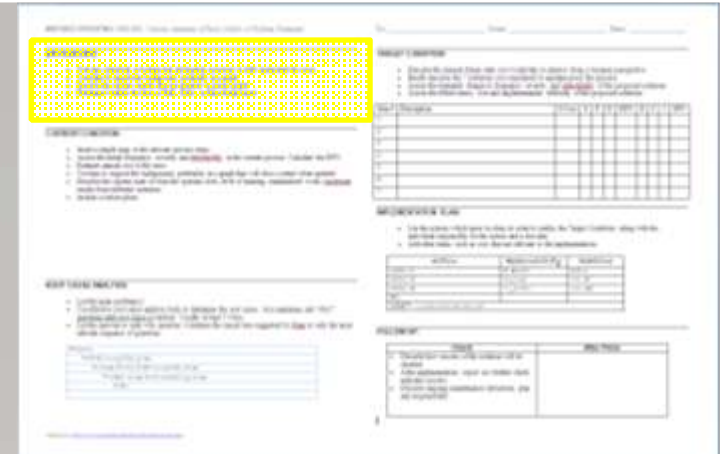
- List the actions which must be done in order to realize the Target Condition, along with the individual responsible for the action and a due date.
- Add other items, such as cost, that are relevant to the implementation.

Action	Responsibility	Deadline
Action 1	D. Smith	Oct. 1
Action 2	N. Jones	Nov. 5
Action 3	M. Jordan	Nov. 28
Etc.		
COST: no expenditures required		

FOLLOW-UP:

Check	After Photo
<ul style="list-style-type: none"> • Describe how success of the solution will be checked • After implementation: report on whether check indicates success. • Describe ongoing maintenance/calibration plan and responsibility 	

A3 for mistake-proofing

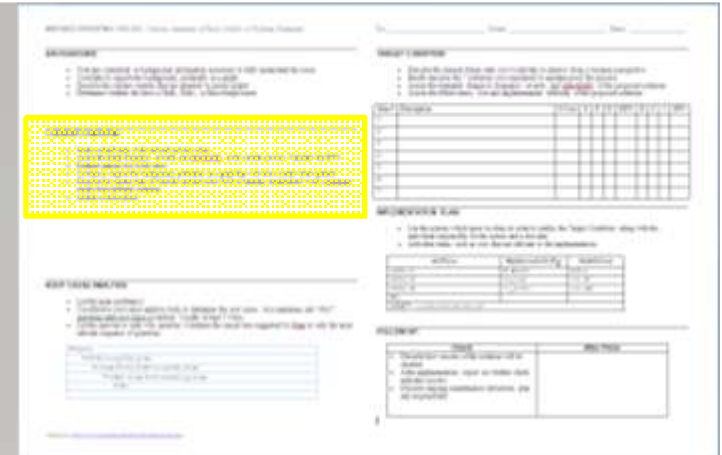


The image shows a standard A3 report form. The top section, 'PROBLEM STATEMENT', is highlighted in yellow. Below it are sections for 'CURRENT SITUATION', 'TARGET SITUATION', 'ANALYSIS', 'ACTION PLAN', and 'CONCLUSION'. The form includes various tables and checkboxes for data entry and tracking.

BACKGROUND:

- Note any contextual or background information necessary to fully understand the issue.
- Used data to support the background, preferably in a graph
- Describe the current controls that are intended to assure quality
- Determine whether the error is Skill-, Rule-, or Knowledge-based

A3 for mistake-proofing



The image shows a standard A3 report form. The top section is titled 'PROBLEM STATEMENT' and contains a list of bullet points. A yellow highlight covers a large portion of the text in this section. To the right of the text is a table with multiple columns and rows, likely for data collection or tracking. Below the table are several sections with headings like 'CURRENT STATE', 'ROOT CAUSE ANALYSIS', and 'ACTION PLAN', each followed by a list of bullet points and a small table.

CURRENT CONDITION:

- Insert a simple map or the relevant process steps.
- Assess the initial frequency, severity and detectability in the current process. Calculate the RPN.
- Estimate annual cost of the error
- Use data to support the background, preferably in a graph that will show a trend when updated
- Describe the current state of what the operator does, level of training, standardized work, variation in results from different operators
- Include a before photo

A3 for mistake-proofing

The image shows a standard A3 report form. The form is divided into several sections: 'PROBLEM STATEMENT', 'CURRENT SITUATION', 'TARGET STATEMENT', 'ROOT CAUSE ANALYSIS', 'ACTION PLAN', and 'FOLLOW-UP'. The 'ROOT CAUSE ANALYSIS' section is highlighted in yellow. This section contains a grid for recording the '5 Whys' analysis, with columns for 'WHY?', 'WHY?', 'WHY?', 'WHY?', and 'WHY?'. The grid is currently empty.

ROOT CAUSE ANALYSIS:

- List the main problem(s)
- Use effective root cause analysis tools to determine the root cause. At a minimum ask “why?” questions until root cause is reached. Usually at least 5 whys.
- List the answers to each why question. Condense the causal tree suggested by Gano to only the most relevant sequence of questions

- Problem
- ↳ first immediate cause
- ↳ cause for the first immediate cause
- ↳ deeper cause to the preceding cause
- ↳ etc.

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A3 for mistake-proofing



The image shows a template for an A3 report, which is a standard format for problem-solving in lean manufacturing. The template is divided into several sections:

- PROBLEM STATEMENT:** A section for describing the current state and the problem.
- ROOT CAUSE ANALYSIS:** A section for identifying the underlying causes of the problem, often using a fishbone diagram.
- SOLUTIONS:** A section for describing the proposed solutions to the problem.
- IMPLEMENTATION:** A section for describing the steps to be taken to implement the solutions.
- PREVENTION:** A section for describing the measures to be taken to prevent the problem from recurring.

A yellow box highlights a grid area in the top right corner of the template, which is typically used for tracking progress or data.

TARGET CONDITION:

- Describe the desired future state you would like to achieve from a business perspective
- Briefly describe the 7 solutions you considered to mistake-proof the process.
- Assess the estimated change to frequency, severity, and detectability of the proposed solutions
- Assess the effectiveness, cost and implementation difficulty of the proposed solutions

A3 for mistake-proofing



The image shows a standard A3 report form. It is divided into several sections: 'PROBLEM STATEMENT', 'CURRENT CONDITION', 'TARGET CONDITION', 'CAUSE ANALYSIS', 'ACTION PLAN', and 'EFFECTS'. A yellow dotted box highlights the 'ACTION PLAN' section, which contains a table with columns for 'Action', 'Responsible', and 'Due Date'. The table is currently empty.

IMPLEMENTATION PLAN:

- List the actions which must be done in order to realize the Target Condition, along with the individual responsible for the action and a due date.
- Add other items, such as cost, that are relevant to the implementation.

A3 reports are working documents...
Keep revising. Keep improving.

A3 for mistake-proofing

FOLLOW-UP:

- Check
 - Describe how success of the solution will be checked
 - After implementation: report on whether check indicates success.
 - Describe ongoing maintenance/calibration plan and responsibility
- After Photo

The image shows a portion of an A3 form used for mistake-proofing. It includes sections for 'PROBLEM STATEMENT', 'CURRENT STATE', and 'EFFECTIVE SOLUTION'. A table with multiple columns and rows is visible, and a specific area of the table is highlighted in yellow. The form is titled 'A3 Problem Solving Form' and includes a header with 'Date' and 'By' fields.

We are about to work on an A3. When you back to work, go to the gemba and refine each area of the A3.

Additional Information

- www.mistakeproofing.com
- mmpp.wikispaces.com
- pokayoke.wikispaces.com
- *The Design of Everyday Things*. Norman, D.A. 1989. New York: Doubleday.
- *Make No Mistake!: An Outcome-Based Approach to Mistake-Proofing*. Hinckley, C.M. 2001. Portland, Oregon: Productivity Press.
- *Poka-yoke: Improving product quality by preventing defects*. Nikkan Kogyo Shimbun/Factory Magazine, (Ed.). 1988. Portland, Oregon:Productivity Press.
- *Zero quality control: source inspection and the poka-yoke system*. Shingo, Shigeo. 1986. trans. A.P. Dillion. Portland, Oregon: Productivity Press.
- *Mistake-Proofing the Design of Healthcare Processes*, 2007. Rockvile, MD: Agency for Healthcare Research and Quality:
<http://www.ahrq.gov/qual/mistakeproof/mistakeproofing.pdf>

Thank You

