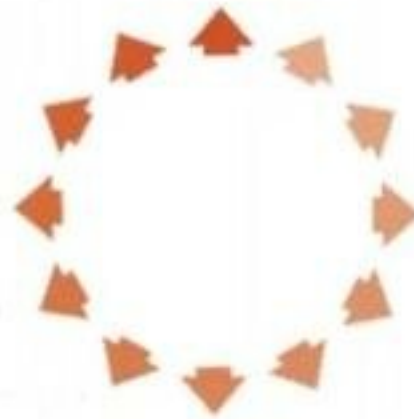


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NATIONAL POLLUTION
PREVENTION ROUNDTABLE





Metal
Manufacturers & Finishers
Green Certification



Part of a cooperative
Agreement
Form the U.S. EPA



Training and Technical
Assistance
By
Zero Waste Enterprise

Schedule - Wednesdays 9am-10:30am (PT)

Introduction to Metal Finishing Environmental Certification

Week 1: Introduction - "Finding the Hidden Profits in Environmental Stewardship"

Week 2: Success Stories - "Real World Examples from the Metal Manufacturing Industry"

Successful Metal Manufacturing Environmental Practices

Week 3: Best Management Practices for Metal Finishing

Week 4: Best Management Practices for Cutting Fluids and other issues - "Modeling Best Management Practices"

Lean and Environmental Training for Metal Finishing

Week 5: Solvent Issues - "Safer Alternatives in Solvent Applications for Metal Finishing"

Week 6: Lean Manufacturing Techniques - Using Lean Manufacturing to uncover environmental opportunities

Week 7: Lean Practices and Success Stories

Next course: October 6, 2021

- ▶ **Lean Practices and Success Stories**
- ▶ Building on Week 6, this talk will dive deeply into the processes businesses use to identify lean projects, prioritize their activities and build support within the company.
- ▶ We will also discuss what's next including elective courses.
- ▶ Presenter: Thomas Vinson, Zero Waste Enterprises



Introduce Yourself!

- ▶ Name
- ▶ Title
- ▶ Company
- ▶ Type of industry

Lean and Environment - Part 1

- ▶ Lean Techniques
- ▶ Building Blocks for Lean
- ▶ Success Stories

Over \$5

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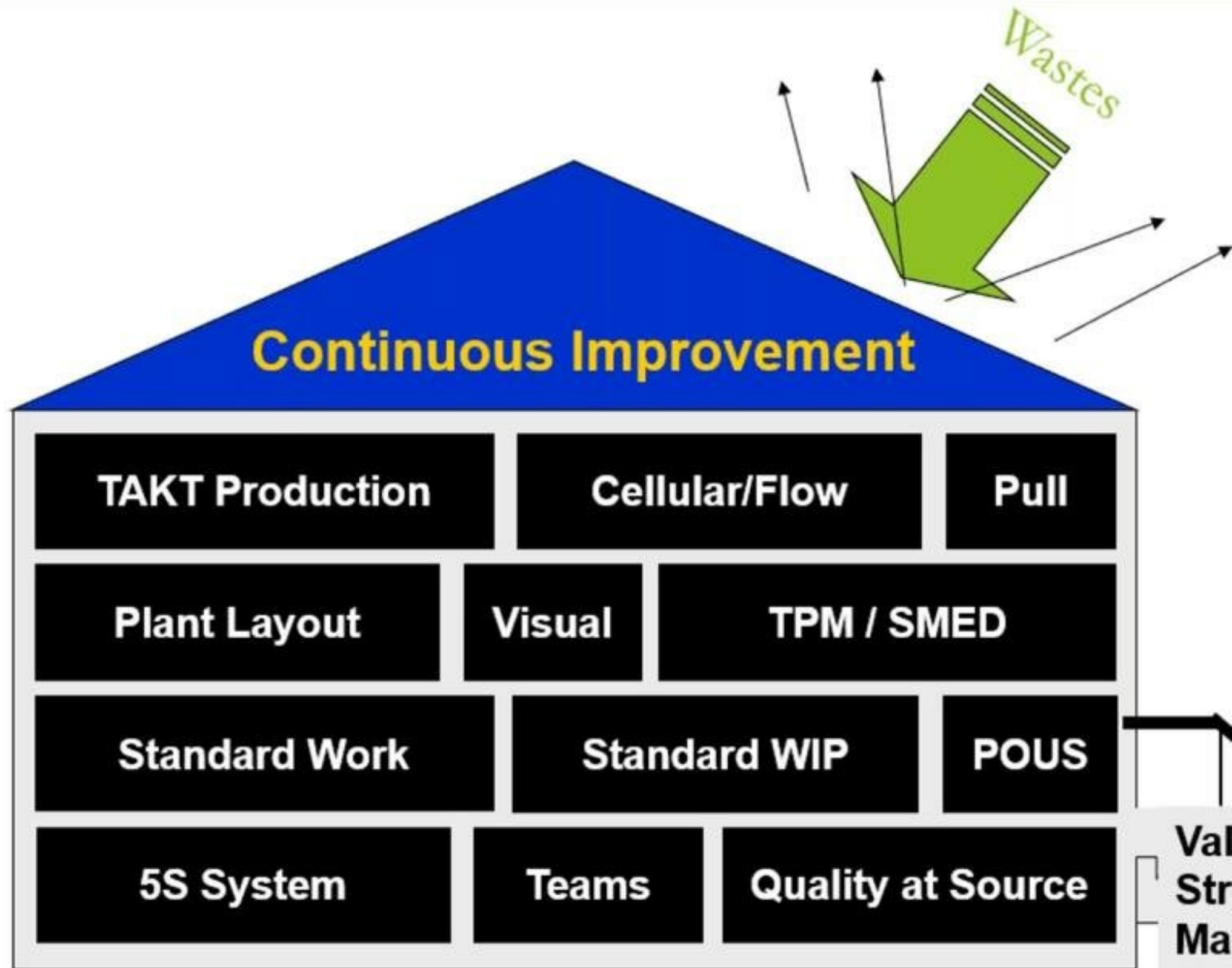


Lean Building Blocks

- Techniques used to get to lean
- Don't confuse with “being lean” – lean is **process**
- No technique is a fix all



"I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail." - Maslow



Lean Manufacturing and Environment

Lean Manufacturing and Environment

Basic Information

Lean Thinking and Methods

Case Studies and Best Practices

Toolkits

Publications

Related Links

You are here: EPA Home » Lean Manufacturing and Environment » Toolkits » The Lean and Environment Toolkit

Toolkits

Introduction Environment Energy and Climate Chemicals Water Enviro. Professional's Guide

The Lean and Environment Toolkit

Purpose of This Toolkit

*The **Lean and Environment Toolkit** offers practical techniques and strategies that can help lean, environmental, and other specialists at your shopfloor to deliver environmentally protective lean decisions as a routine task of your lean driven business operations.* In fact, this toolkit draws heavily from the experience of the U.S. Environmental Protection Agency's (EPA's) partners and organizations who have pioneered integrated approaches to lean and environmental decision making while at the same time delivering world class performance, exerting market leadership, and achieving bottom line results. Also, the toolkit builds on work conducted and research sponsored by EPA's Lean Manufacturing and Environment Initiative.

This toolkit is written for lean operational managers, environmental practitioners, and lean practitioners who work towards organizational efforts to identify and eliminate environmental wastes. As a result, the toolkit may help align your environmental management system's goals and objectives as a routine task of your lean initiatives and business decisions.

Download the Toolkit



The Lean and Environment Toolkit



Download the Toolkit (PDF)
96 pages, 3.9MB, About PDF

epa.gov/sustainability/lean-environment-toolkit

Process that Favor Lean and Environment

- Metal casting
- Chemical and heat treatment of materials
- **Metal fabrication and machining**
- Cleaning and surface preparation
- Bonding and sealing
- Welding
- Metal finishing and
- Painting and coating
- Waste management
- Chemical and hazardous materials management



I. Implement the 6 S's

1. **Sort**
2. **Set in Order**
3. **Shine**
4. **Standardize**
5. **Sustain**
6. **Safety**



Some organizations like to do “6 S”

- **Looking at Safety as a stand alone “S” is a good way to systematically analyze a workflow**

Some Organizations like “5 S”

- **Thinking safety will occur naturally as an outcome of 5S**

Remember Lean Is a System

- ▶ Whether it is 5 S or Six S is a cultural decision. Lean should align with the existing company culture.



5 S Success Story

117th Air Refueling Wing, USAF



“ Storing the equipment in the proper manner allows you to find it when you need it. It eliminates the need to order new equipment because you can't find something. One cabinet worth \$150,000 worth of equipment could save a high price tag”

- Tech. Sgt. Jennifer Lowery, 117th Air Refueling Wing,



Use a System

- ▶ “Clean up your room” is ineffective



S1. Sort

- Perform “Sort Through and Sort Out,”
 - ▶ red (yellow) tag on all unneeded items
 - ▶ move them to a temporary holding area.



Red Tag

- Set a time limit
 - are dispose, sell, move or give away.
 - “When in doubt, throw it out!”



Yellow Tag Environmental Issues

▶ *Supplement Red Tagging with Yellow Tagging*

- ▶ Identify environmental wastes and hazards
- ▶ Evaluate the need for these items
- ▶ Evaluate potential alternatives for these items
- ▶ Address them appropriately



Yellow-Tag Targets and Criteria

- ▶ **EHS hazards in the workplace**
- ▶ **Chemicals and other hazardous materials**
- ▶ **Environmental wastes**

Example Yellow Tag

| | | | |
|-------------------------------------|---|-------|--|
| Category (circle one) | 1. Health or safety concern 2. Environmental concern | | |
| Item Name and Number | | | |
| Description of Issue or Question | | | |
| Division Responsible: | | Date: | |

You can download templates from EPA

Yellow Tag

- ▶ **Fix any immediate hazards, then ask:**
 - ▶ **Is there a less harmful alternative for this item?**
 - ▶ **Can environmental wastes be reduced?**

S2. Set in order

- ▶ **Visual Controls**
- ▶ **Everything has a place**
- ▶ **Shadow boards**



Chemicals

- ▶ Chemicals need designated storage areas
- ▶ RCRA standards require marking and storage



Lean Toolkit Template for Auditing

| | | | |
|--------------------------|--------------|-------|--------|
| Document Title: | Document No. | | |
| 6S AUDIT RECORD (SAFETY) | Revision No. | Page: | 1 of 4 |
| Required by: | | | |

Audit Type: ☐ Initial Certification
☐ Sustaining

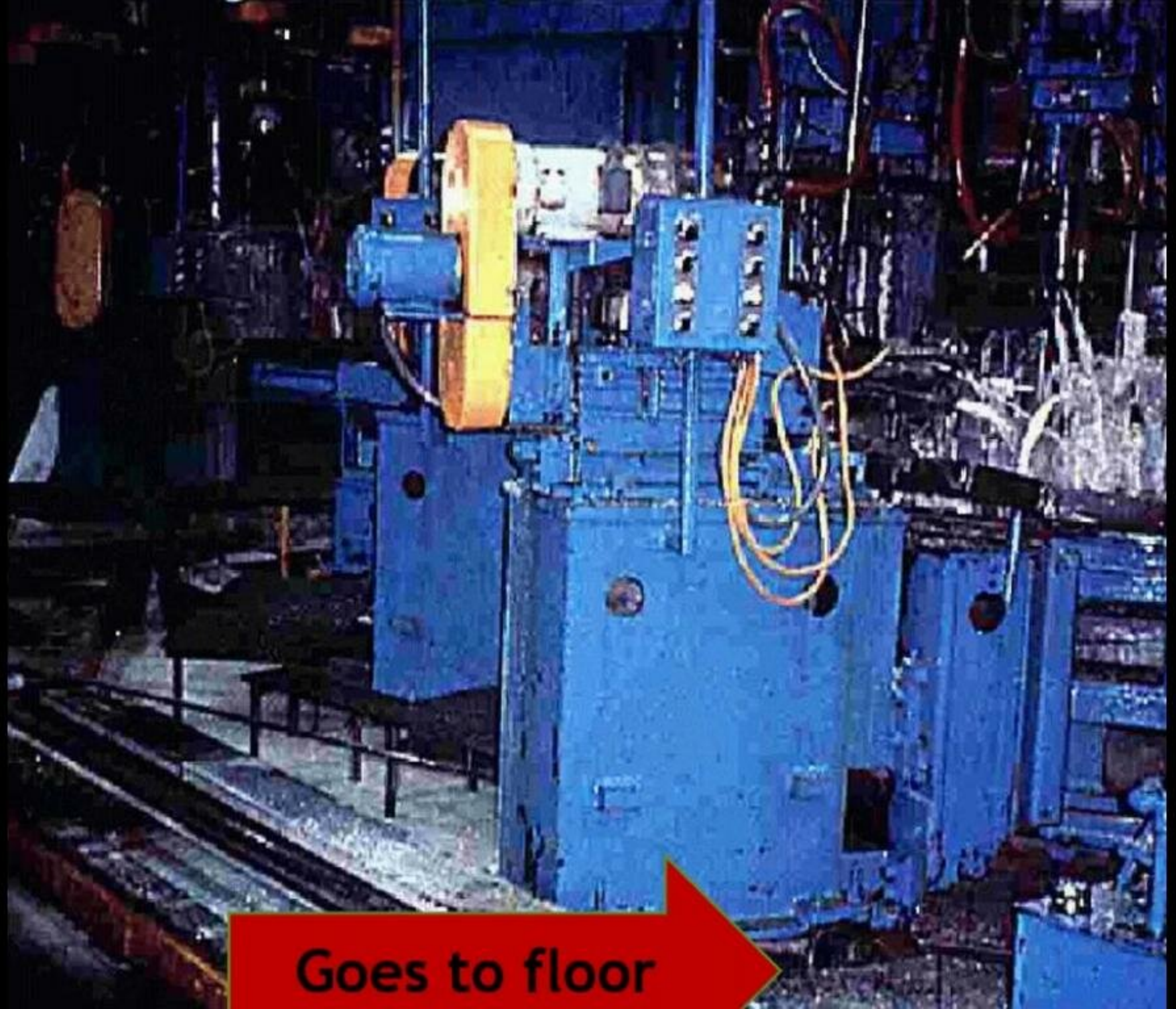
Auditors: _____ Date: _____
 Name: _____ Name: _____
 Name: _____
 Workplace Representatives: _____
 Name: _____ Name: _____

| Subject | Questions | Yes | No |
|------------------|--|-----|----|
| 1. Aisles | A. Are aisles marked? 29 CFR 1910.22(b)(2) | | |
| | B. Are aisle widths maintained? 29 CFR 1910.22(b)(1) | | |
| | C. Are aisles in good condition? 29 CFR 1910.22(b)(1) | | |
| | D. Are aisles and passageways properly illuminated? | | |
| | E. Are aisles kept clean and free of obstruction? 29 CFR 1910.22(b)(1) | | |
| | F. Are fire aisles, access stairways, and fire equipment kept clear? 29 CFR 1910.178(m)(14) | | |
| | G. Is there a safe clearance for equipment through aisles and doorways? 29 CFR 1910.176(a) | | |



► S3. Shine

Clean everything, inside and out, to inspect items by cleaning them to prevent dirt, grime, and contamination from occurring.

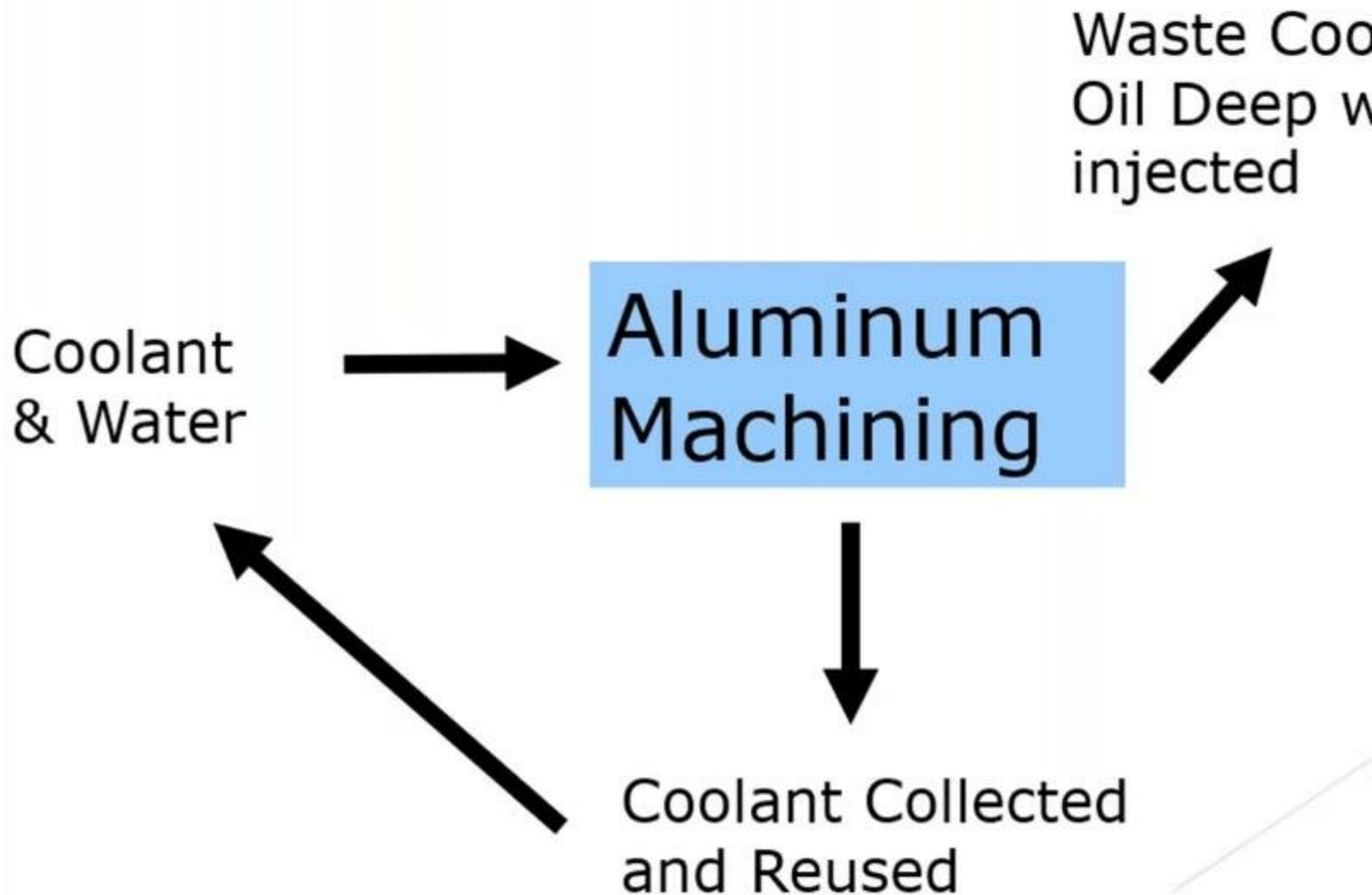


Goes to floor

Draft



Process Map Developed

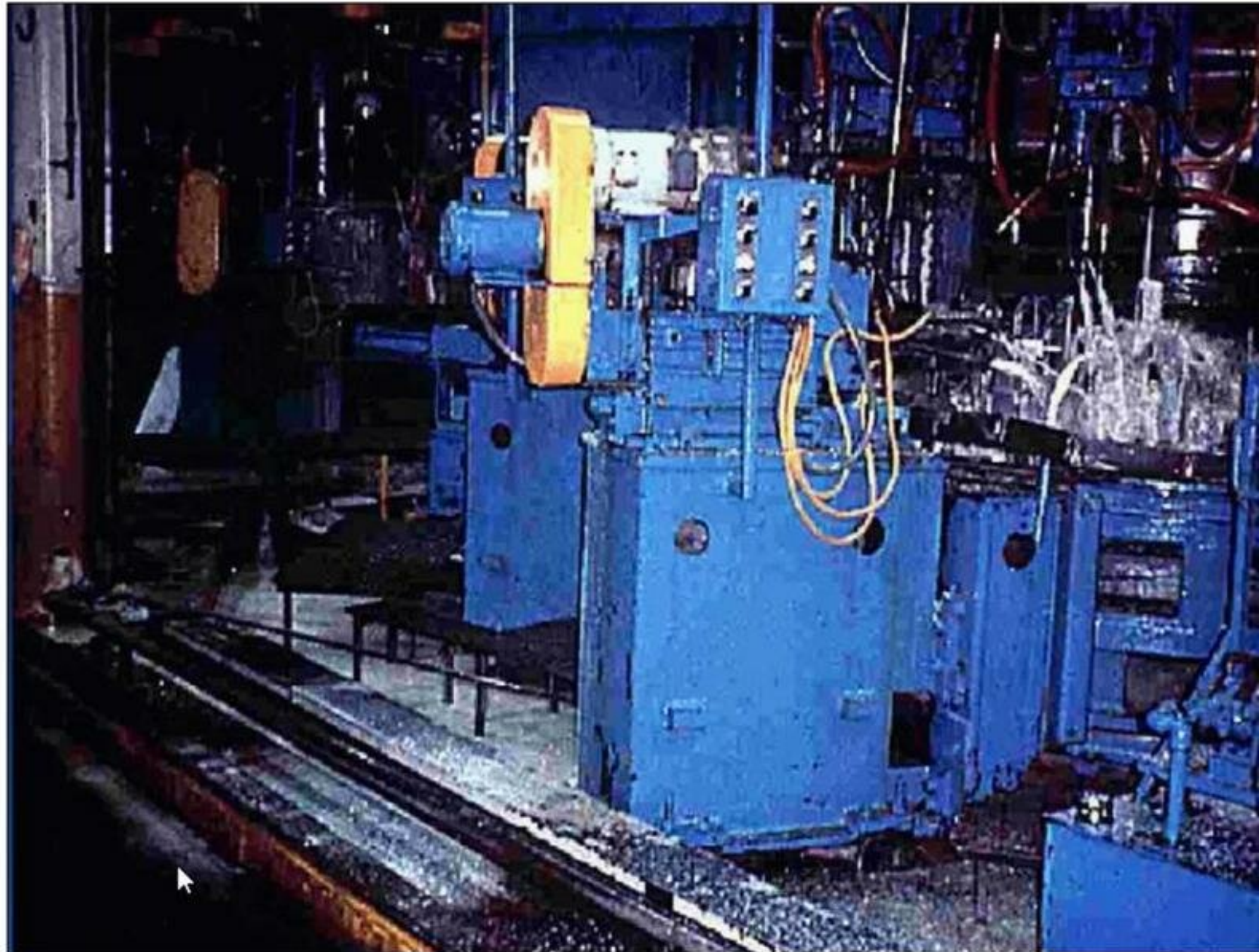


Case Study: Coolant Degradation

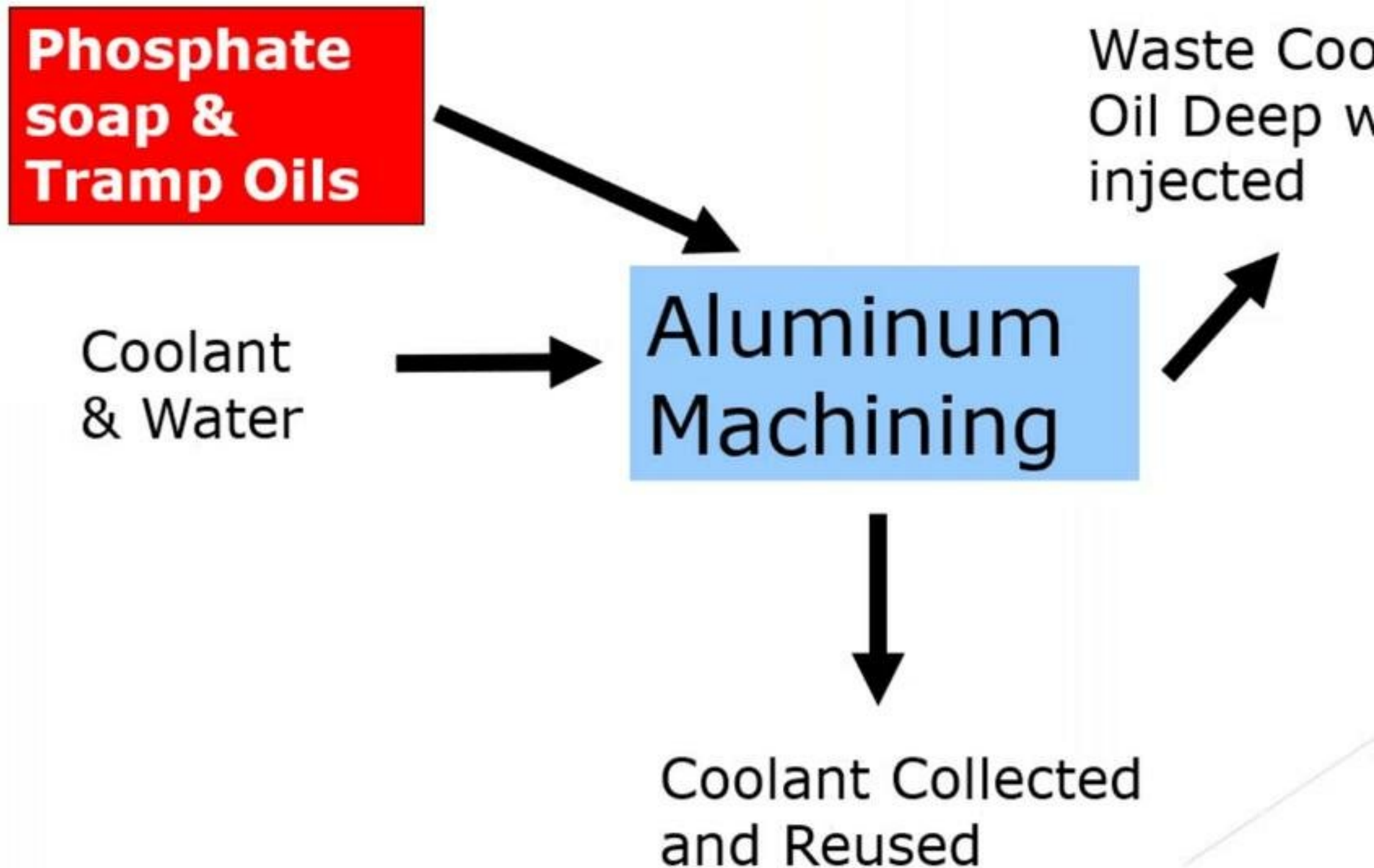
The coolant was collected and reused, but it would begin to degrade. Over time it became rancid and the bore head melted.

WHY?

P2 Is About Observation



The Unexpected Input



CMI Success

Machine Parts Manufacturing

- Coolant reuse
- Change floor cleaning soap
- Eliminated major coolant problem
- Reduced oily wastewater by 80,000 gallons/year
- Saves CMI **\$300,000/year**

S4. Standardize

Create the rules for
maintaining and
controlling the first
3 S's and use visual
controls.



Everything
Everything
Everything
Everything

In its right place
In its right place
In its right place
In its right place

- Radiohead



- ▶ What is the context of this?
- ▶ What are the implications?

Example:

- ▶ A business has a series of fasteners kept in boxes. They are looking to recycle cardboard waste, but the bailer was expensive.





Benefits

- No cardboard, no recycler needed
- Identification of inventory
 - ▶ Just in time ordering
 - ▶ Kanban

What is the Hidden Benefit?



Workman Compensation Claims Decrease

Shadow Boards



S5. Sustain

**LINE 11 – 6 S DAILY CHECKLIST
MATERIAL HANDLER**

| | YES | NO |
|--|-----|----|
| 1. All loader tools are in their proper place. | | |
| 2. All GMP tools in proper place. | | |
| 3. All damaged trucks moved to damaged truck staging area. | | |
| 4. All safety guards in place. | | |
| 5. Any personal articles on line. | | |
| 6. Floor clean of debris. | | |
| 7. Are there any visible oil leaks? | | |
| 8. All GMP Regulations followed (no make-up, gum, etc). | | |
| SCORE: | | |

North Cove

31 Years of Life-Saving Solutions

Lean Requires Involvement



6 Rules for 6 S

6 Rules for 6 S

1. Don't 6 S your spouses' kitchen
2. Don't 6 S your spouses' kitchen
3. Don't 6 S your spouses' kitchen
4. Don't 6 S your spouses' kitchen
5. Don't 6 S your spouses' kitchen
6. Don't 6 S your spouses kitchen

Order is Relative

- ▶ Lean is about enlisting the skills of the people who do the work.
- ▶ If you are going to fix the process, you need to ask the processors.



The Sixth S - “Safety”

- ▶ **Is safety a result of 5 S's**
- ▶ **When does making safety lead to efficiency?**
 - ▶ **Not counting shutdowns for injury**



Example: Pressurized Cylinders

- ▶ <https://www.youtube.com/watch?v=5TONnPbRc1k&list=P L3NU8thUkBNHiElVasqD-lTR8jW1392EC>

hazardex Delivering improved compliance

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Like 0 Tweet

OSHA fines NY fire extinguisher service company after tank explosion

18 SEPTEMBER 2016

Two employees of Oprandy's Fire & Safety Equipment were severely injured on February 12, 2016, when a compressed gas cylinder designed for a fire-suppression system exploded while they were attempting to fill it with compressed air from a high-pressure source.

The US Occupational Safety and Health Administration (OSHA) found that the company, based in Middletown, New York, failed to train the employees on the procedures needed to fill the cylinder properly and that the air device's pressure exceeded the cylinder's listed pressure limit.

Additional hazards involved the company failing to:

- Equip the tank and valve assembly with a pressure relief device.
- Assess the workplace for hazards requiring the use of personal protective equipment.

Devices not used for use not listed



Summary: 6 S

- Six S is a culture shift
- Six S can be used to improve EHS
- Like all lean tools
 - ▶ You must enlist the skills and knowledge of people who work in the area.
 - ▶ It is systematic



II. Point of Use Storage

- **Raw material is stored at workstation where used**
- **Works best if vendor relationship permits frequent, on-time, small shipments**
- **Simplifies physical inventory tracking, storage, and handling**

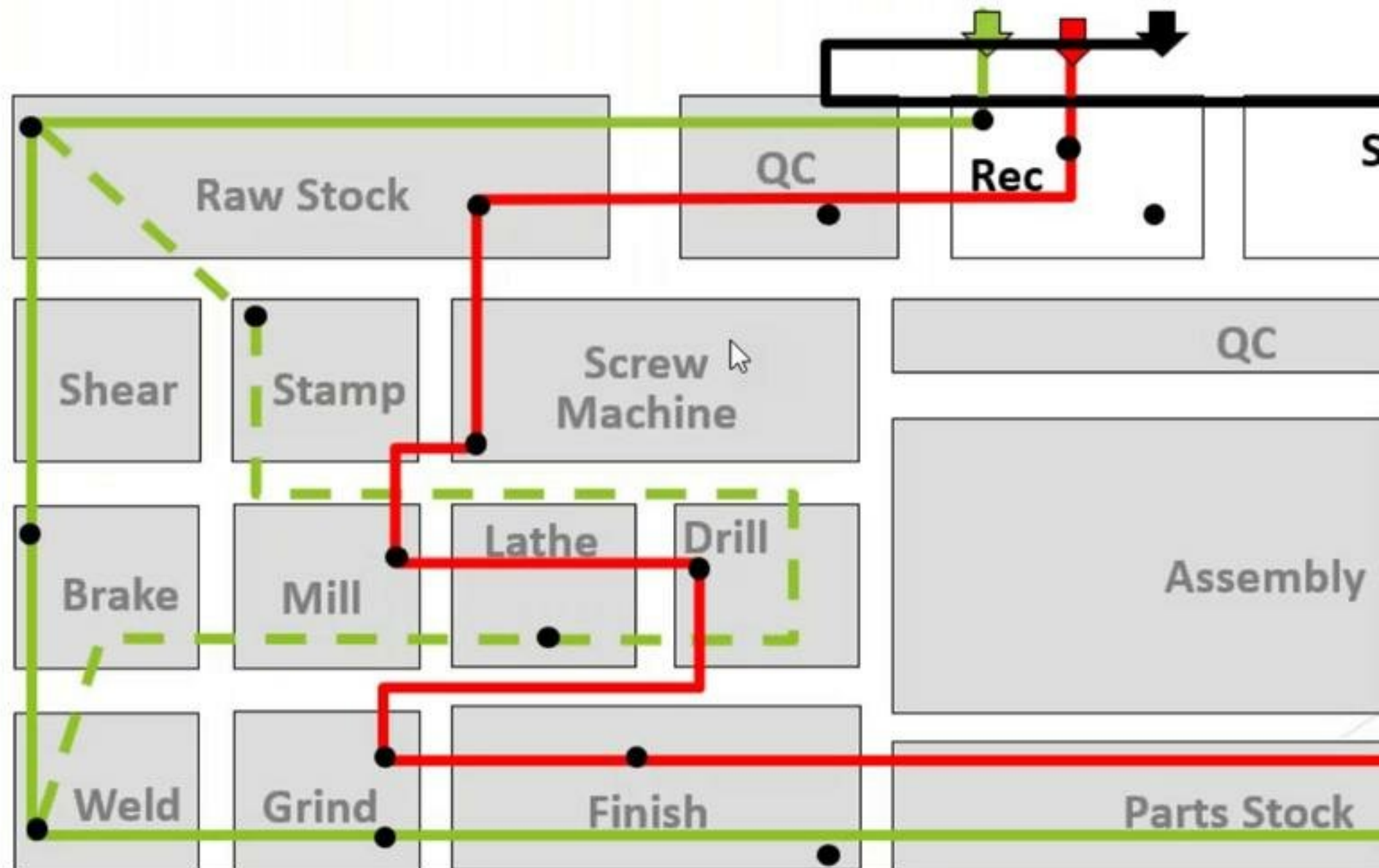
Canyon Creek Case Study

**Work
far from
Materials**



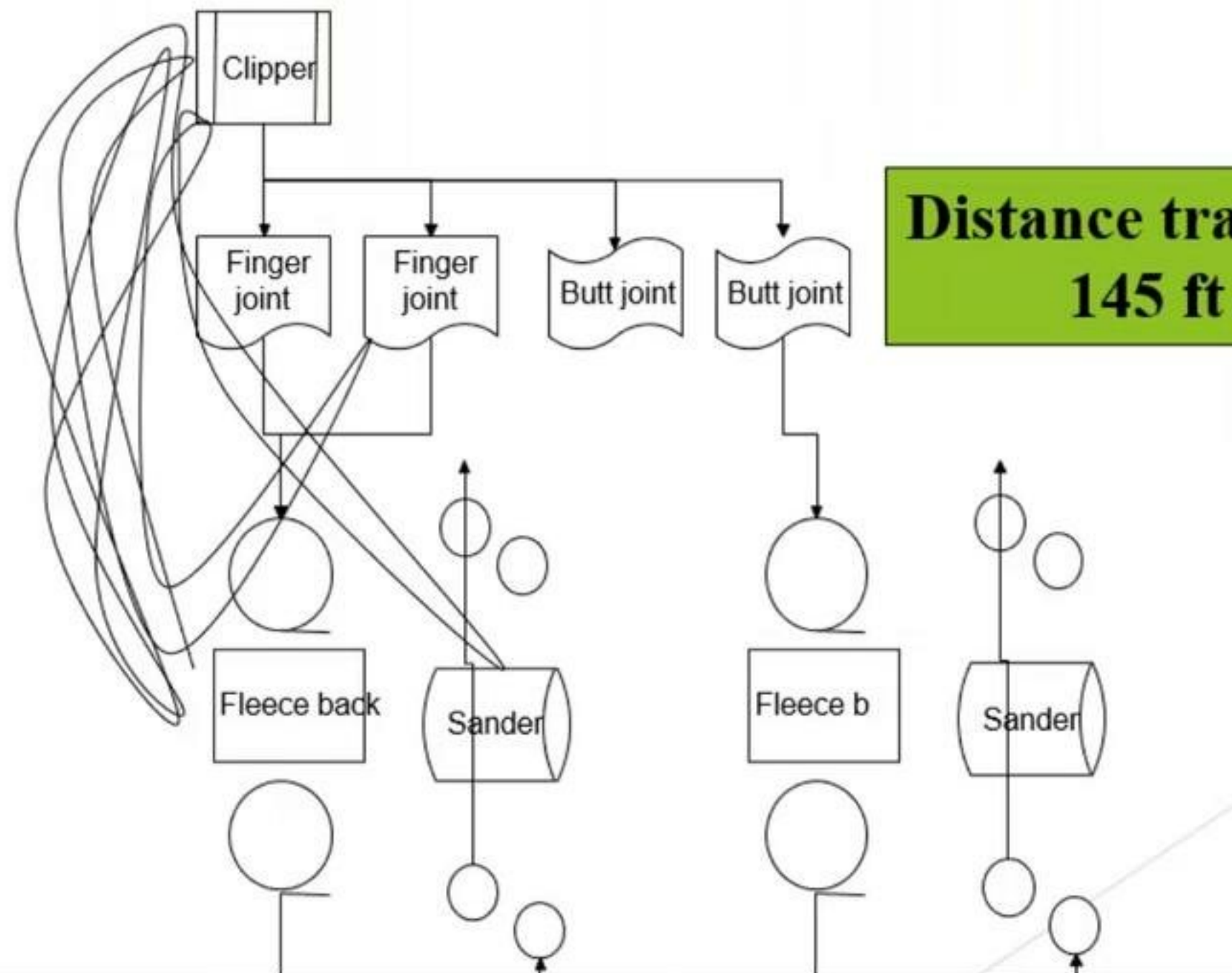


III. Plant Layout

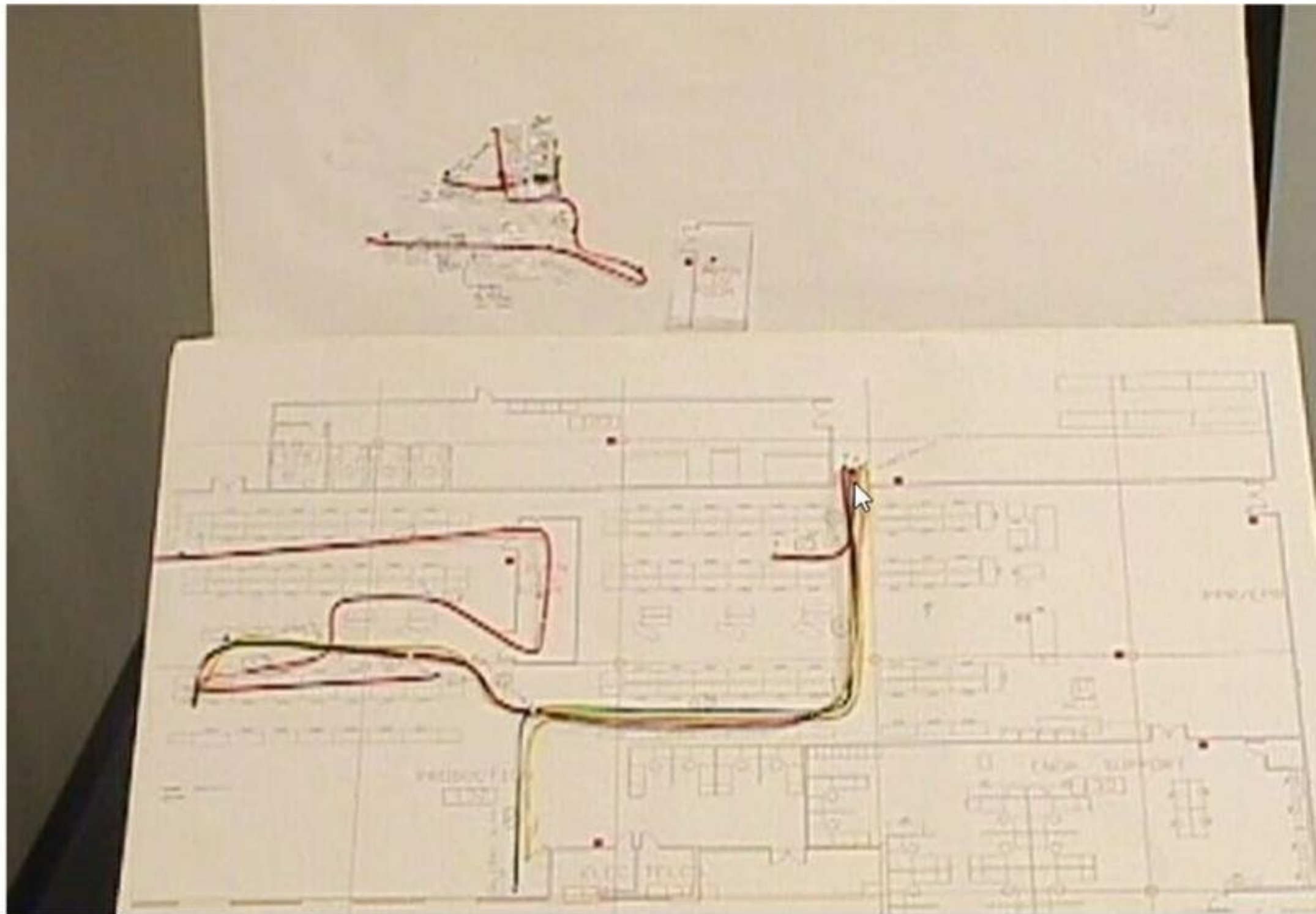


Lean Plant Layout Tool

Noodle Diagram



Old School: Strings on Paper



Don't Accept Face Value





IV. Standardized Work

▶ Standardized Work

- ▶ A repeatable way of doing a task or job that every person can follow
- ▶ Document it for future employee training

▶ People

▶ Materials

▶ Methods

▶ Machines

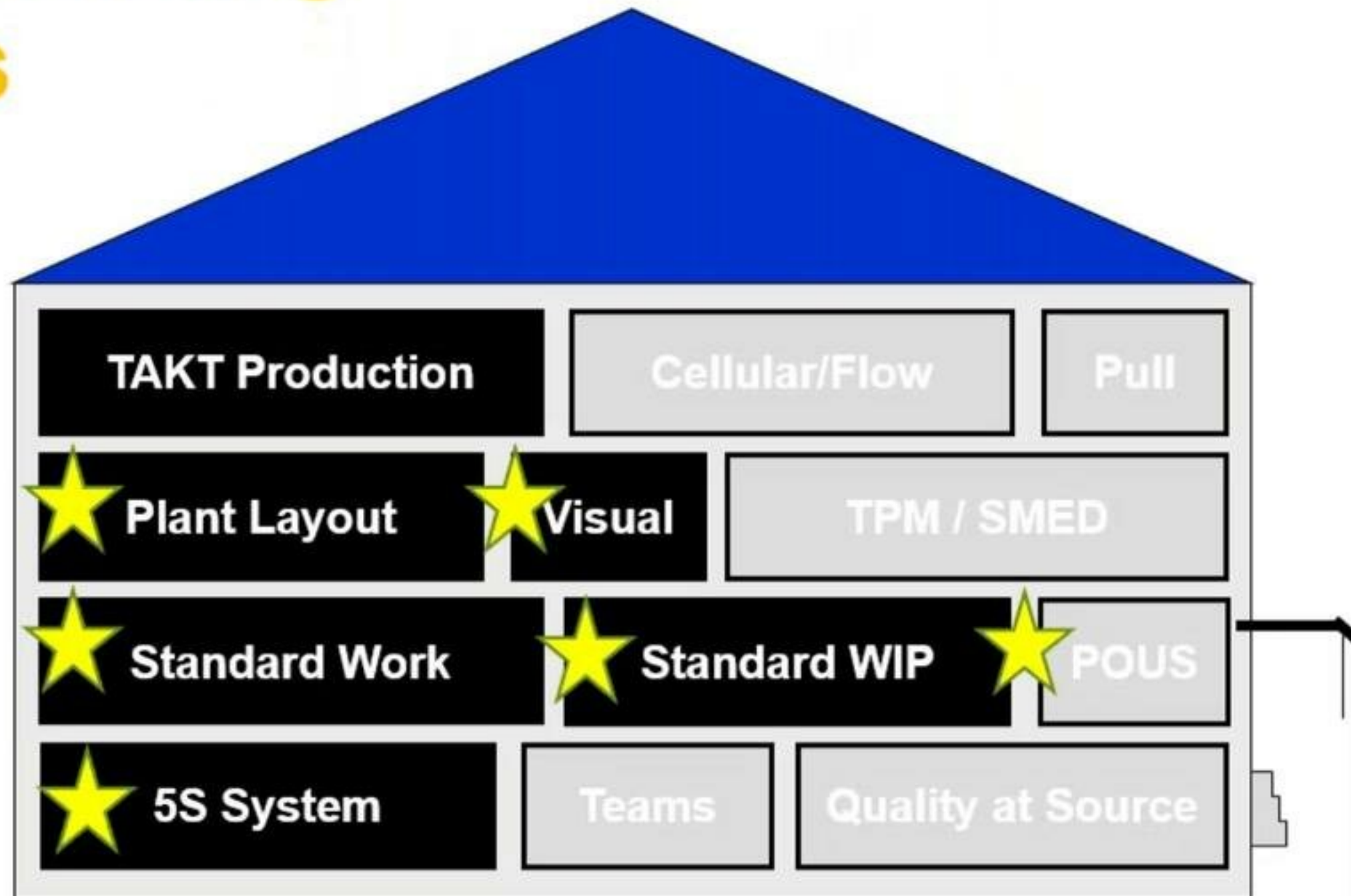


V. Visual Controls

- ▶ **Visual Controls**
 - ▶ Pictures that show what is right
 - ▶ Maximize picture, minimize text



Lean Building Blocks



greenUP Lean Practic...

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Thomas VinsonTV

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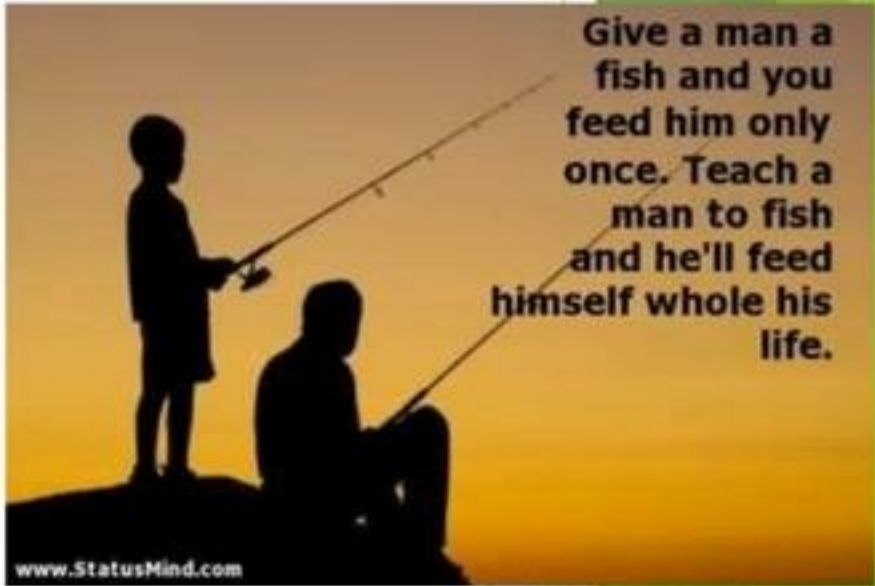
Editing

Voice

Designer

Next course: October 6, 2021

- ▶ **Lean Practices and Success Stories**
- ▶ Building on Week 6, this talk will dive deeply into the processes businesses use to identify lean projects, prioritize their activities and build support within the company.
- ▶ We will also discuss what's next including elective courses.
- ▶ Presenter: Thomas Vinson, Zero Waste Enterprises



Give a man a fish and you feed him only once. Teach a man to fish and he'll feed himself whole his life.

www.StatusMind.com

Click to add notes

Notes50%



Font



Paragraph



Drawing



Editing



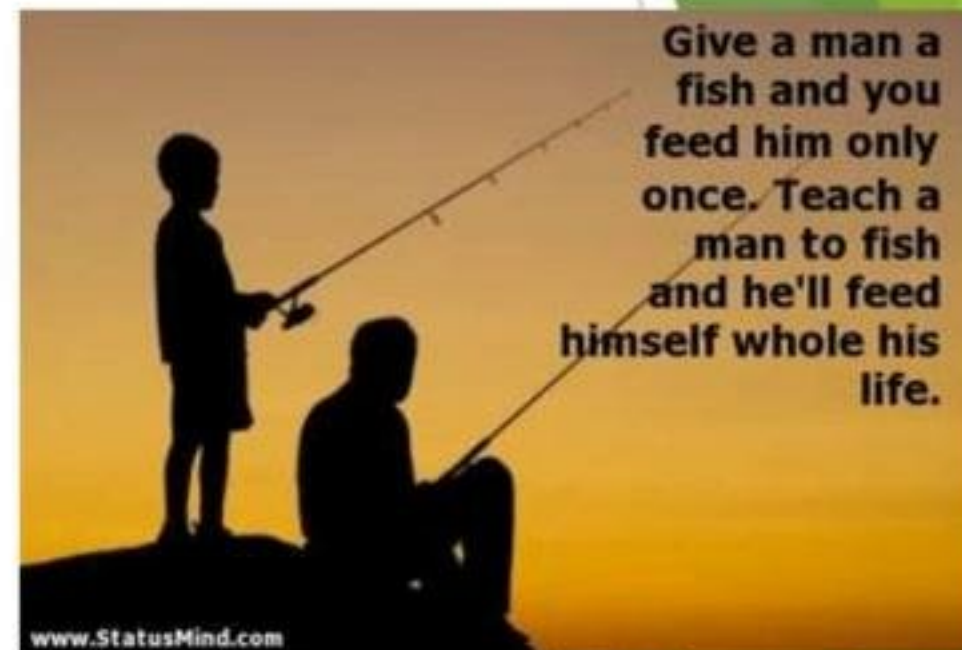
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Animations

Slide Show

Review

View

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Voice



Designer

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Week 6: Lean Manufacturing Techniques - Using Lean Manufacturing to uncover opportunities.

Week 7: Lean Practices and Success Stories

e will speak about using Lean Manufacturing to uncover opportunities. (Thomas please elaborate)

etting to the end of our initial seven (7) training [series](#) and I want to thank those of you who have participated in several of the trainings. We will also discuss some follow-on trainings we are happy to



Font



Paragraph



Drawing



Editing



Voice



Designer

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