23RD ANNUAL

23RD LCI CONGRESS
OCTOBER 19-22

Improve Safety through Lean

Nick Masci, Lean Black Belt, Haley & Aldrich

LEARN BY DOING FROM THOSE WHO DO

October 20, 2021

Health precautions to keep everyone as safe as possible at Congress:

- Wear masks at all times in indoor events.
- Complete your daily health screening on your phone and bring it with you when you enter the center each day.
- Practice social distancing to the extent possible. Seating at plenary sessions is being structured to help with this.
- If you feel ill at any time, please leave the conference and return to your room/consult a physician as necessary.
- Ultimately, our collective health and safety at Congress is up to all of us. Thanks for your support!

Problem Statement #1

Many people at this conference equate Lean with Last Planner System and Target Value Delivery. These are great tools – BUT – are we missing a chance to apply Lean as a management system and operating system to advance Safety?

Problem Statement #2

"Though Safety is a (stated) priority, operational systems do not exist to be safe. They exist to provide a service… to achieve economic gain…"

Sidney Dekker

Agenda Overview – Improve Safety through Lean

Lean as a Management System

Tools!

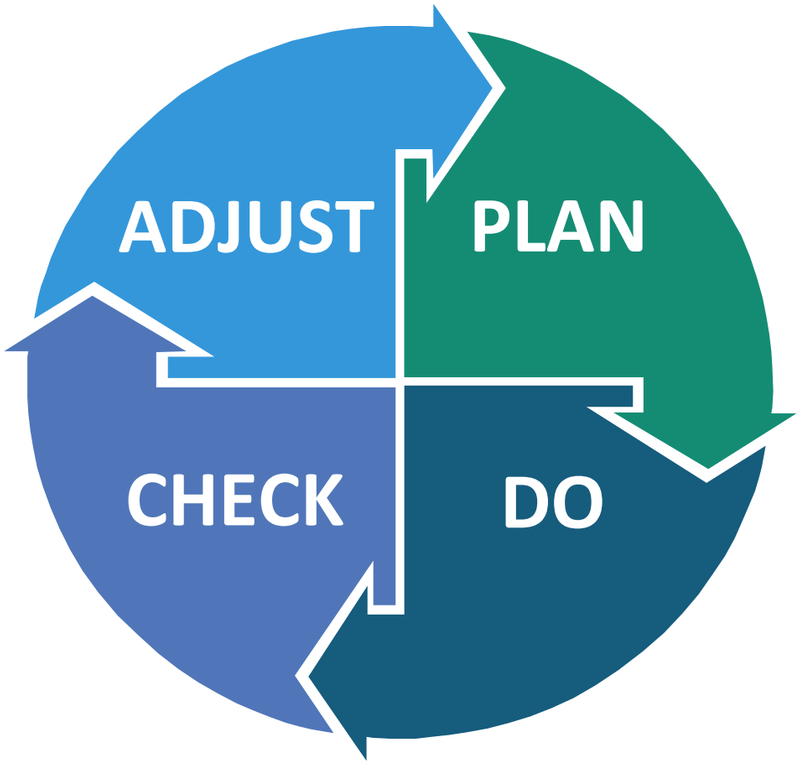
Lean as Your Management System

What is Lean?

Increase **Value**

Reduce **Waste**

Respect **People**



The Science of Making Things Better

Lean Management

Hard on process…easy on people

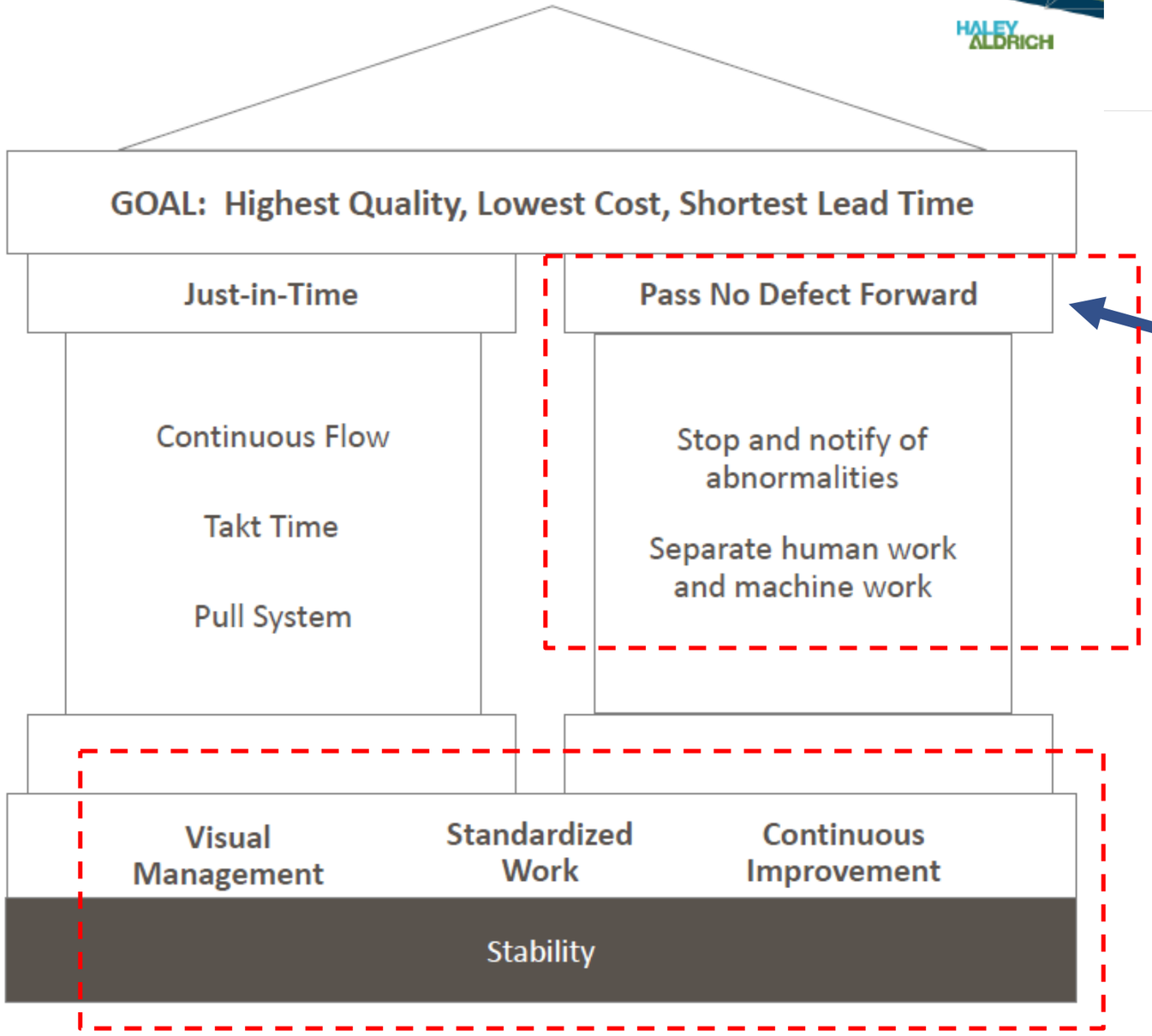
Why Safety when discussing Lean?

85% of Lean Journeys Fail

Opportunity

Safety is a great place to start change, or anchor your Lean Transformation

Areas of focus today



Jidoka

aka…"pass no defect forward" by providing machines and workers the ability to detect when an abnormal condition has occurred and immediately stop the work

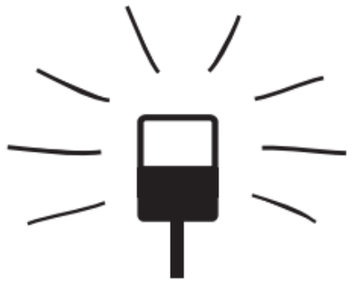
Visual Management

The placement in plain view of all tools, parts, production activities, and indicators of production systems performance so the status of the system can be understood by everyone involved.

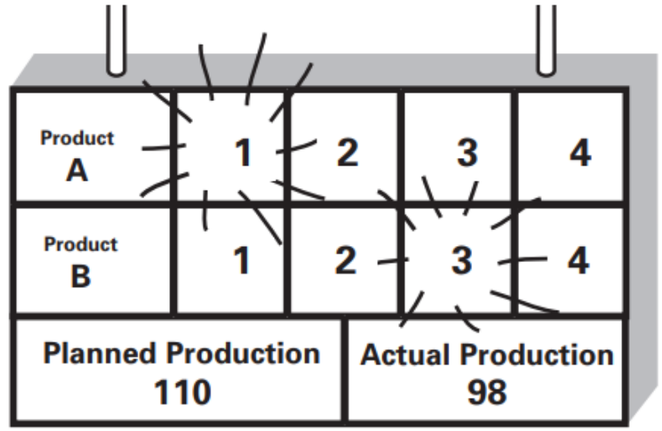
Andon (a method of acting on Jidoka)

A visual management tool that highlights the status of operations in an area at a single glance and that signals whenever an abnormality occurs.

Andon (Japanese term for “lamp”) is an overhead signal. The light signals a quick response from a team leader



Simple andon.

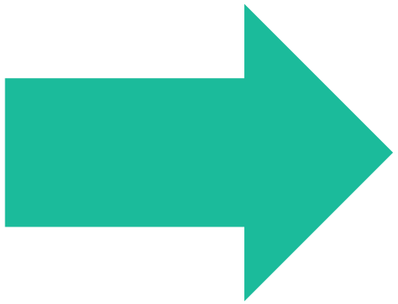


Complex andon.

So what should be different?

From:

- Compliance-based
- Do after an accident or a near-miss
- Push from above
- Leader responsibility



To:

- Behavior-based
- Part of every-day work
- Pull on safety
- Everyone responsible

Force Field Exercise

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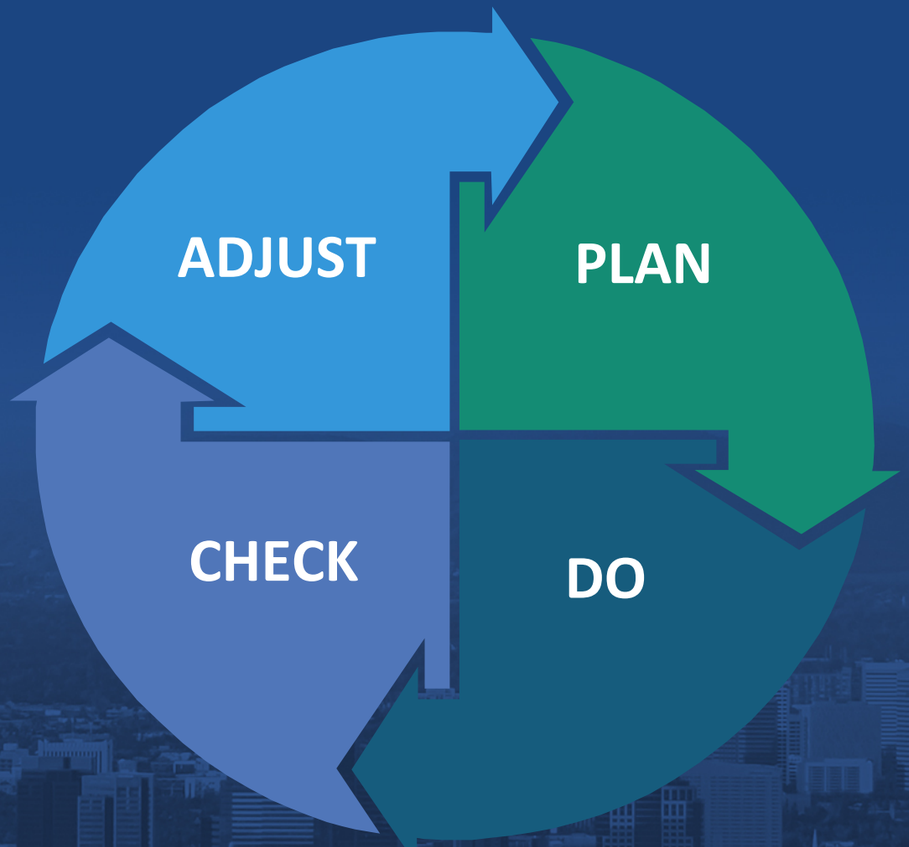
A3 Thinking



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COVE

Center of Visual Expertise

Introduction to Visual Literacy

Visual Literacy and EHS

V.1.2

COVE

Center of Visual Expertise

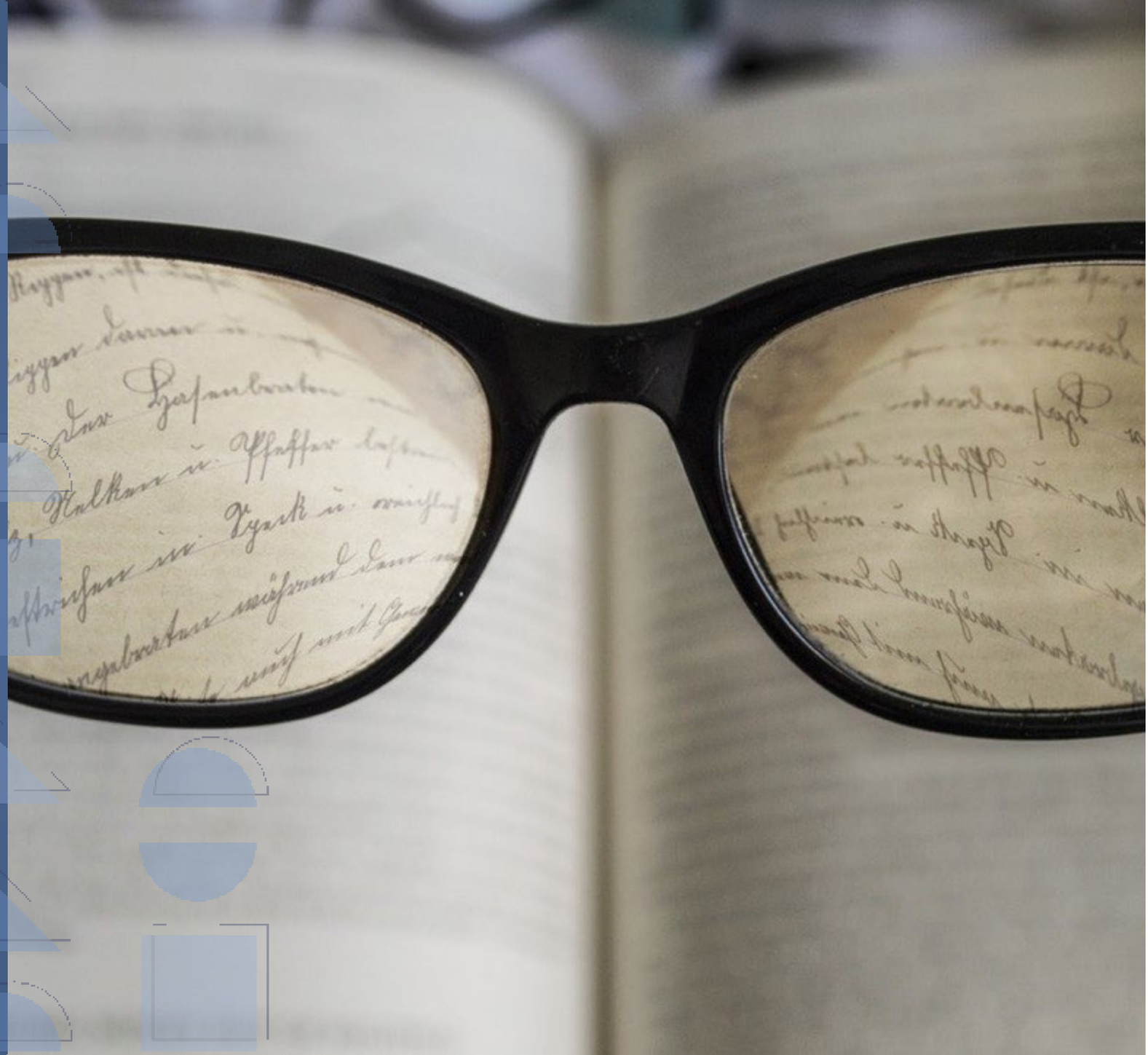
A recent study indicates that as many as 24% of safety incidents attribute “not seeing” or visual inattentiveness as a major factor in the incident.

Every day…

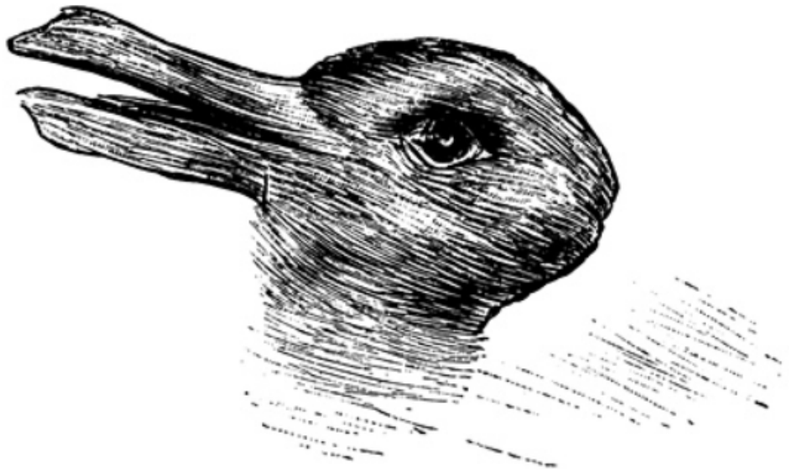
We ask people to perform tasks that require **seeing.**

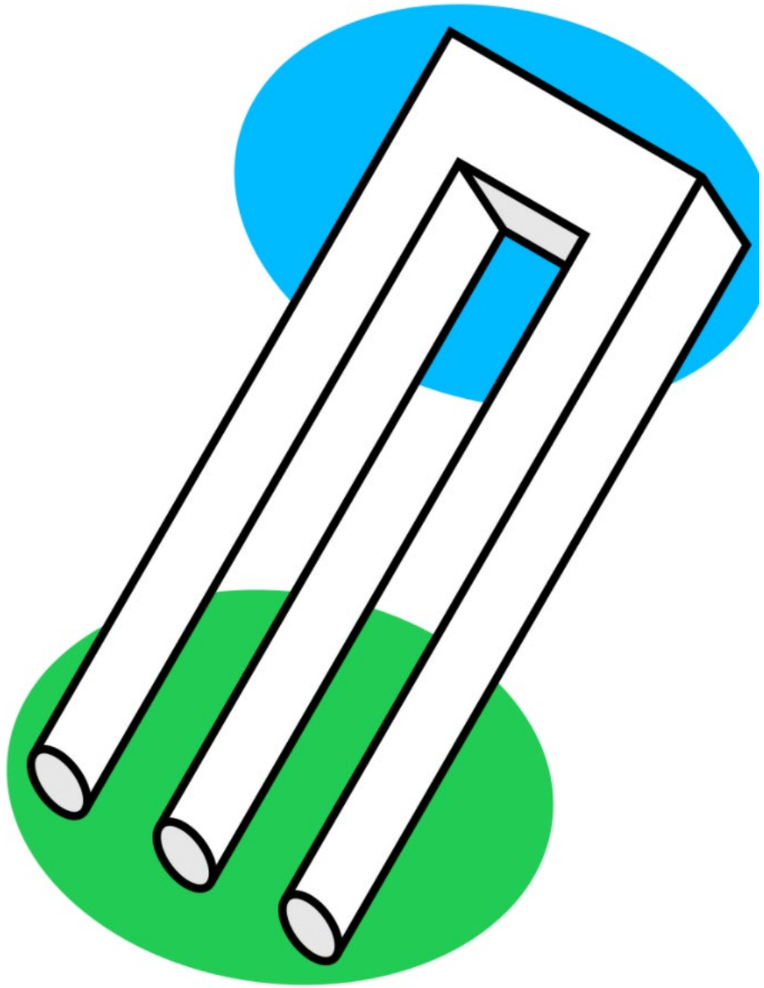
BUT…

Do we train people **how to see**?



WE ALL SEE THINGS A BIT DIFFERENTLY





WE SEE ONLY 10%

Source: Science Daily - https://www.sciencedaily.com/releases/2016/04/160419130010.htm

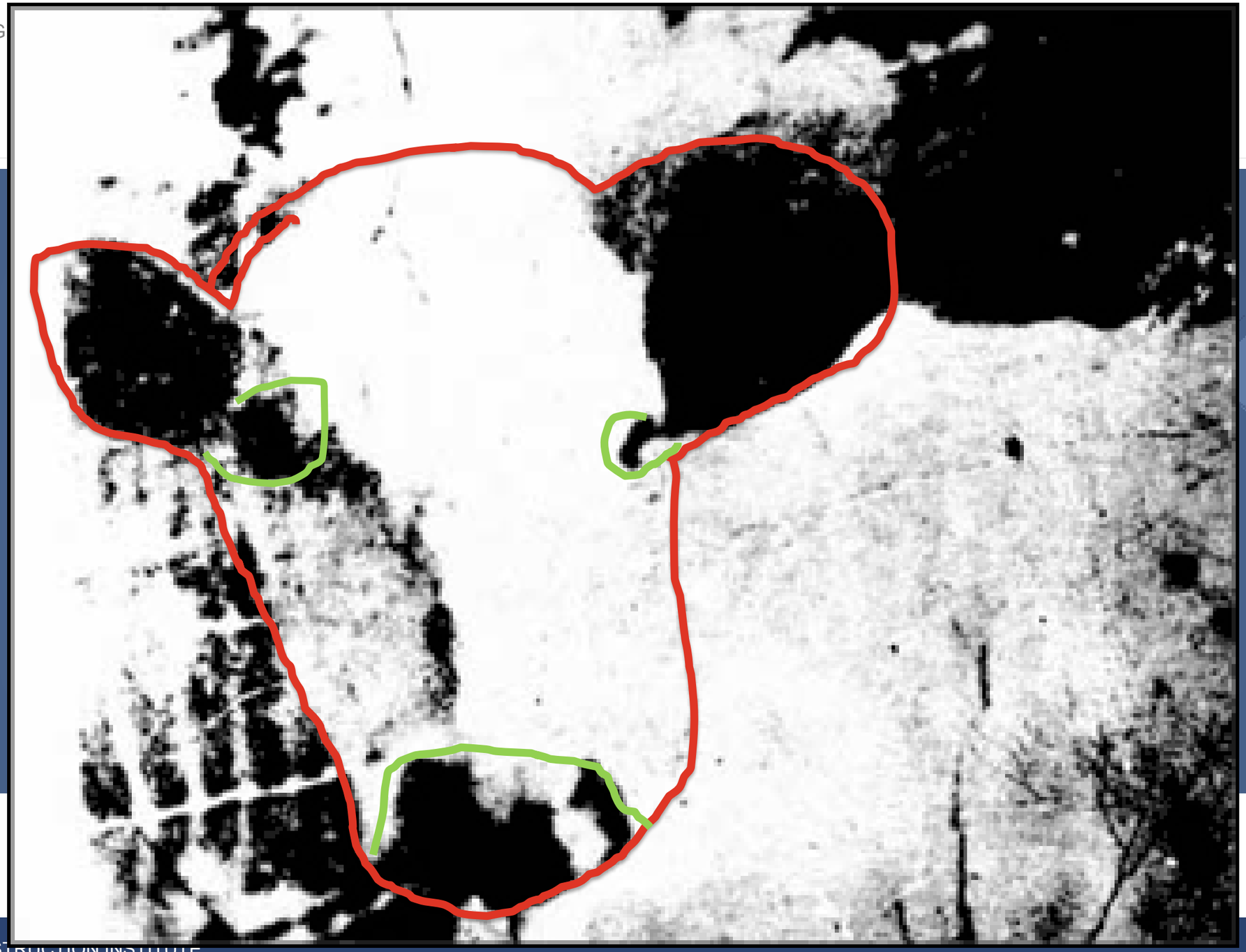
Source: The Architects Dream, Thomas Cole

COVE
Center of Visual Expertise

Adapting the Elements of Art

- Line
- Shape
- Color
- Texture
- Space

Source: Renshaw's Cow.



Source: Renshaw's Cow.

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VISUAL LITERACY: MAKING THE UNFAMILIAR FAMILIAR

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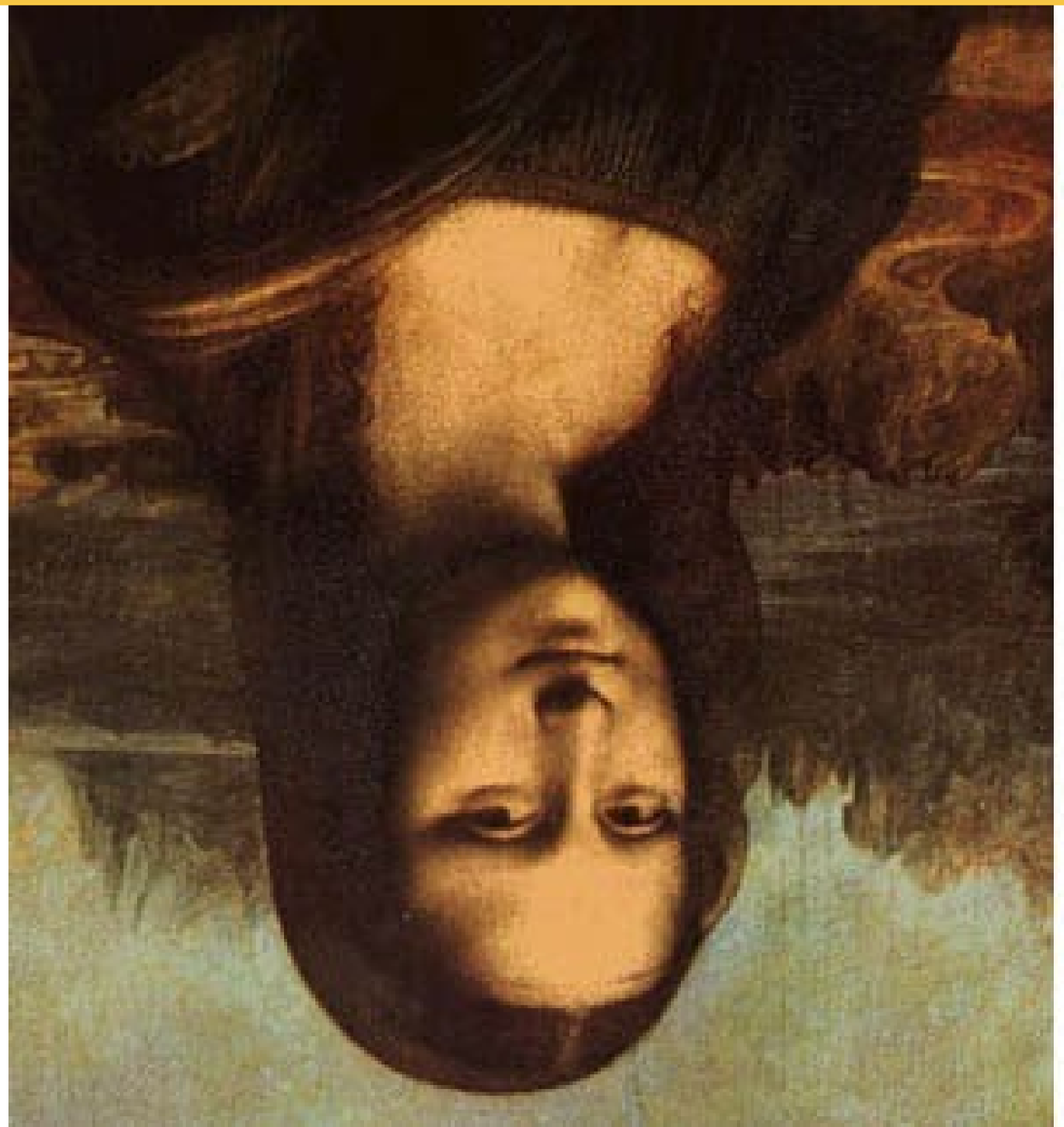
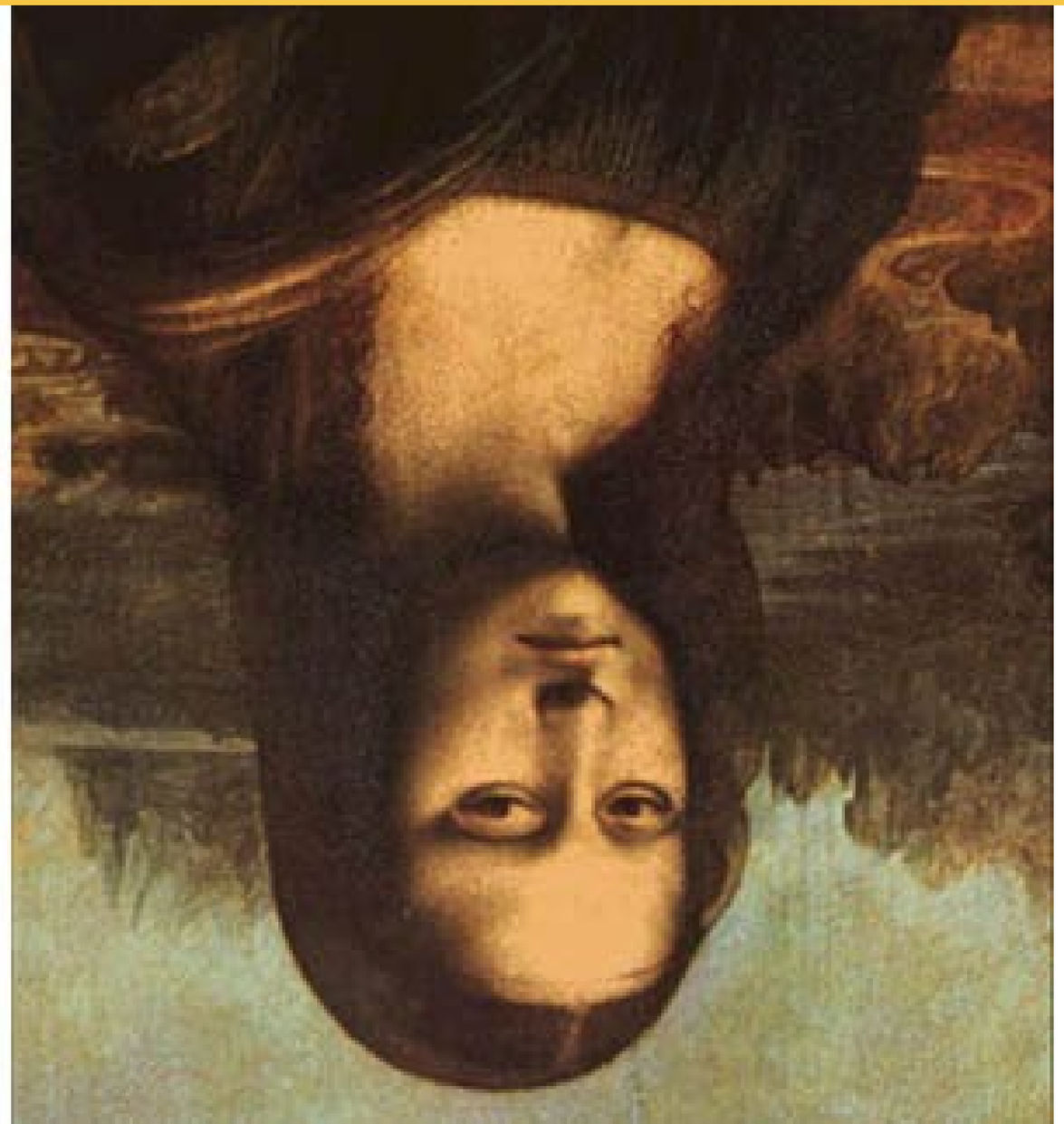
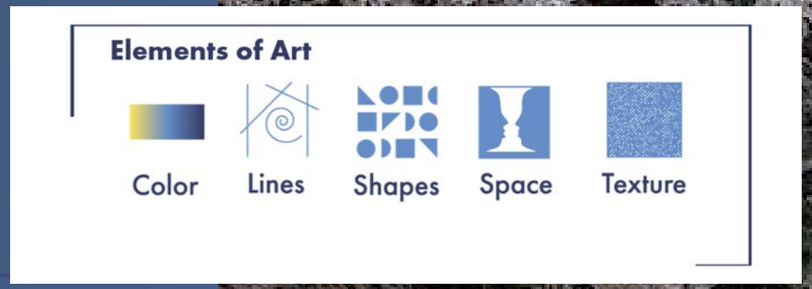




VISUAL LITERACY: MAKING THE UNFAMILIAR FAMILIAR


Elements of Art
Color
Lines
Shapes
Space
Texture

OUR WORLD IS CHANGING

Notice the key difference?

Metrics

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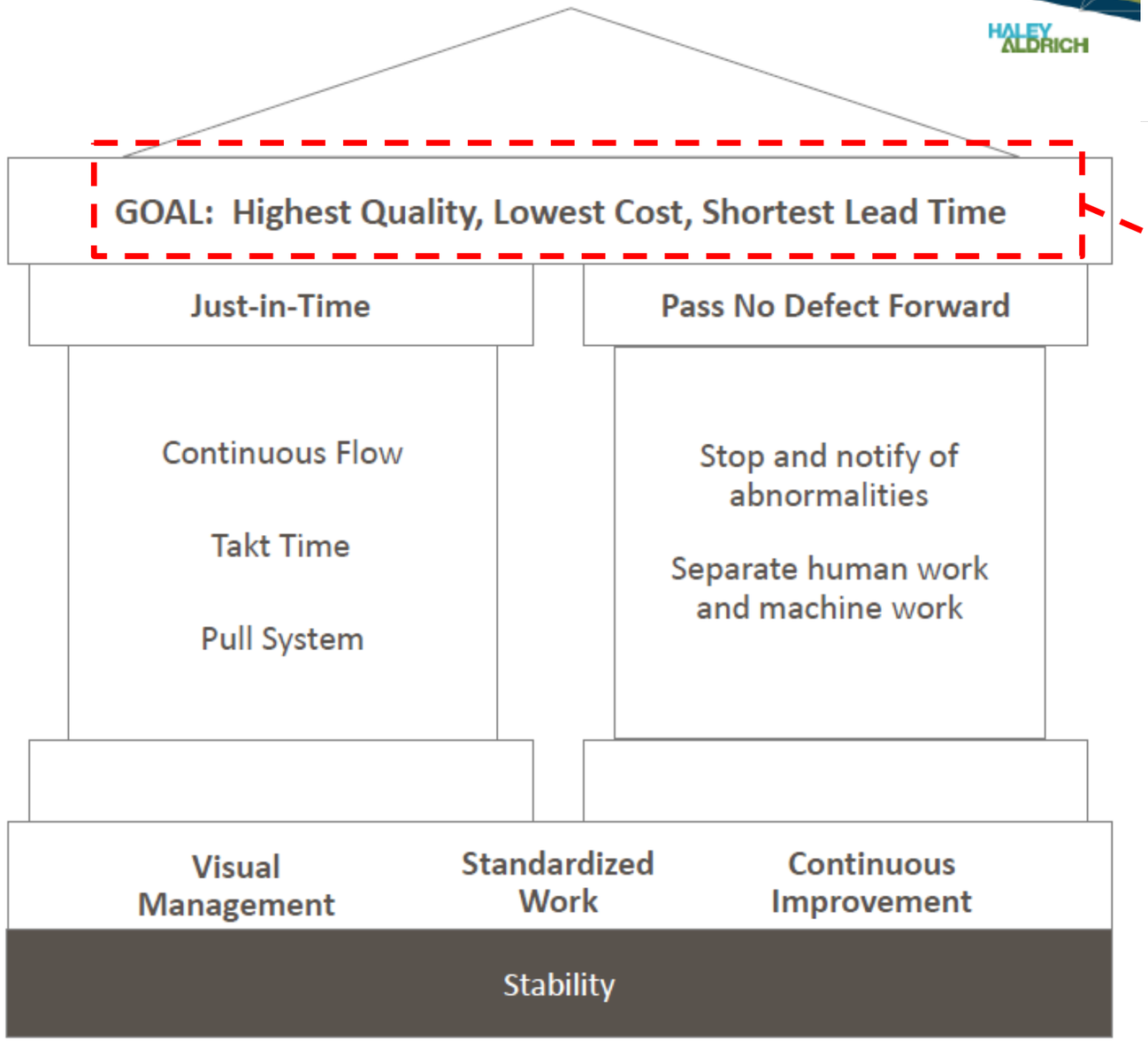
SQCD



Consistent Dashboards on Every Project, and Every Office

Types of Metrics

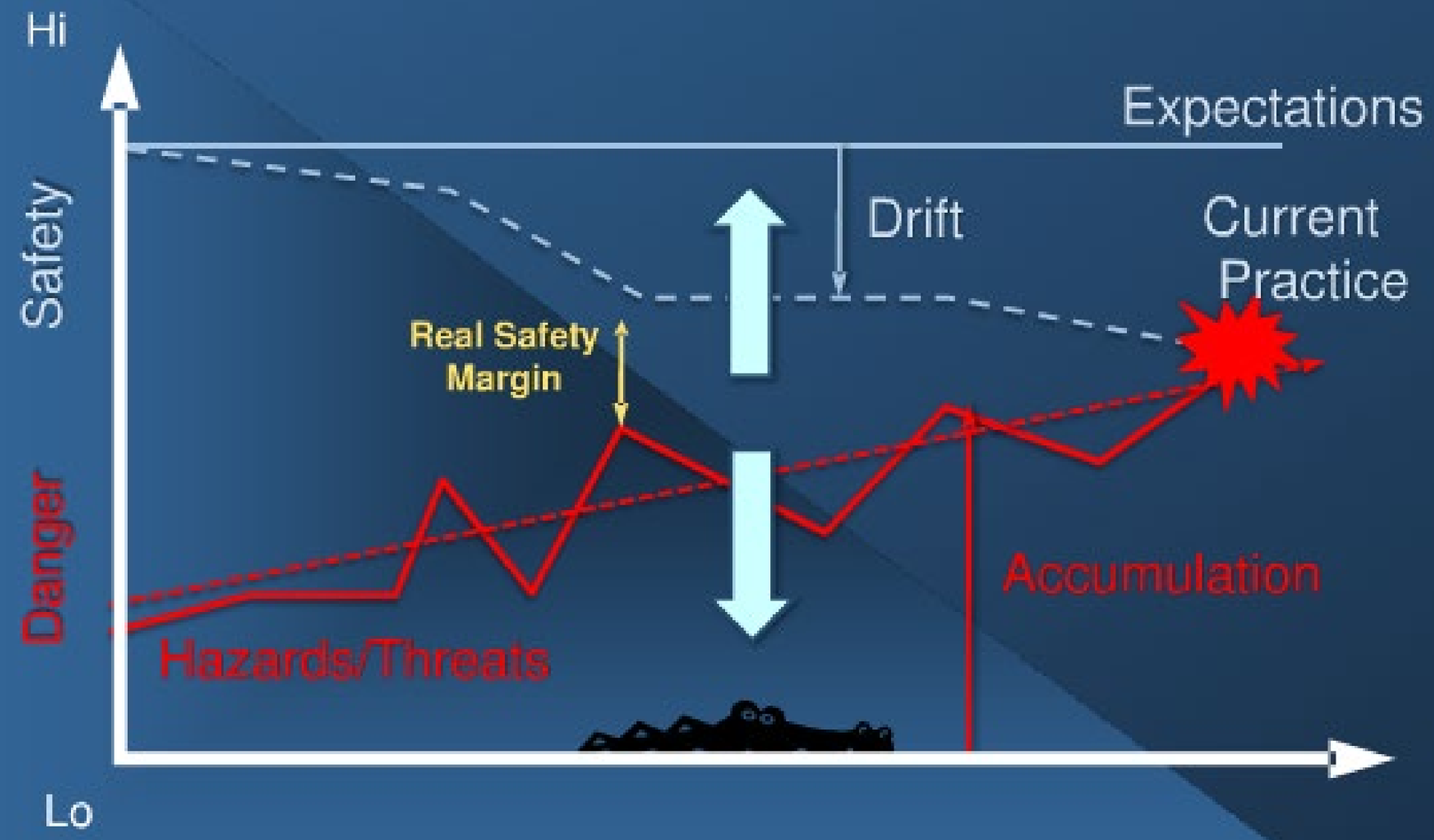
Leading Indicators

- Predictive of future results
- Influenceable: You can make a difference… it's within your power

Lagging Indicators

- Reliable: Tells you if you have achieved a tangible objective
- In the past: Result that you measure ***after*** it has happened

Drift and Accumulation*



* Adapted from Dekker, S. (2007), *The Field Guide to Understanding Human Error*

Metrics Exercise

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Visual Management

Part of 5S and a Lean Cornerstone

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5S: What is it?

Relentless workplace organization that rewards the user with Safety, Inventory Control, and radically improved Workflow

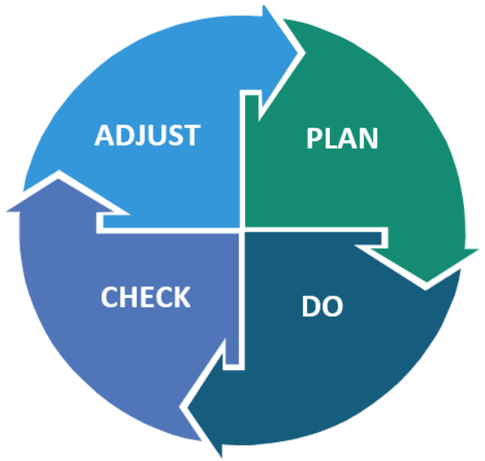
Sort

Set in Order

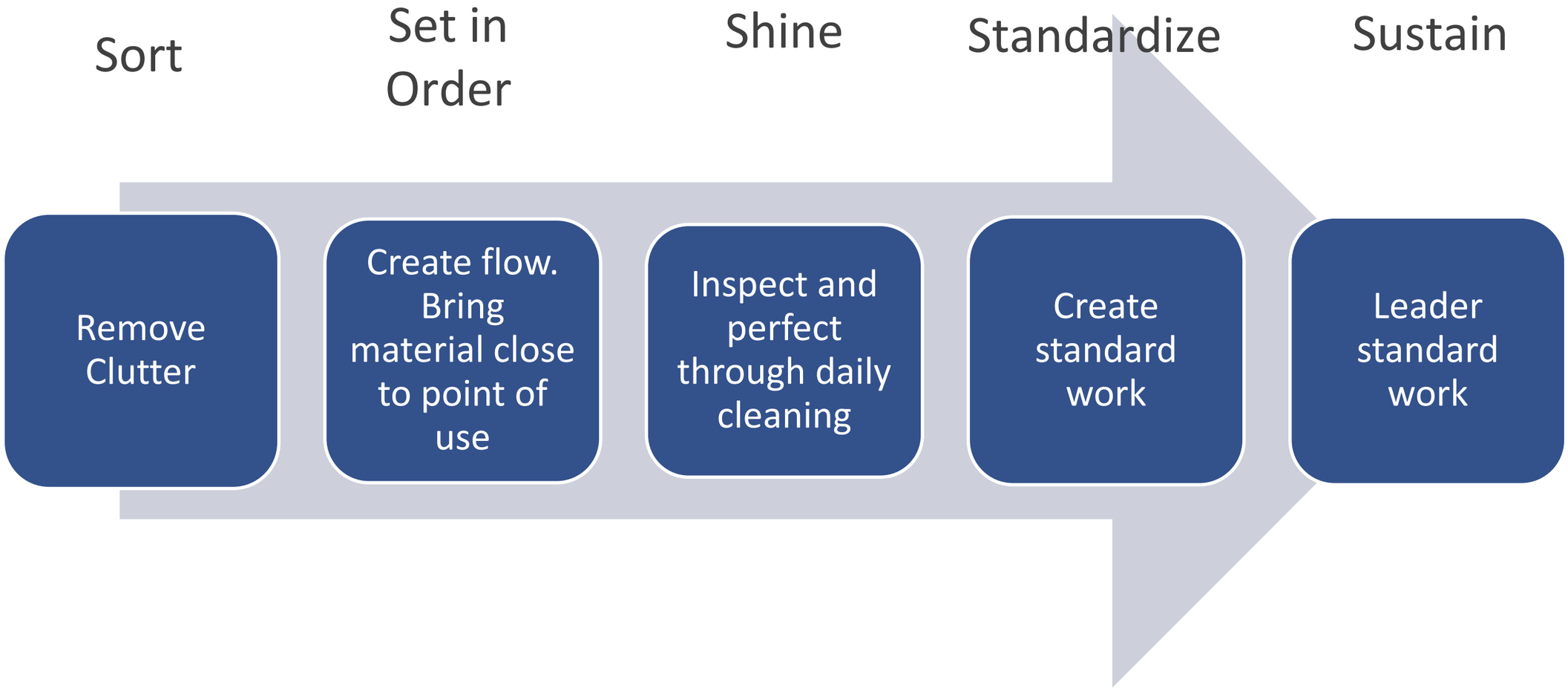
Shine

Standardize

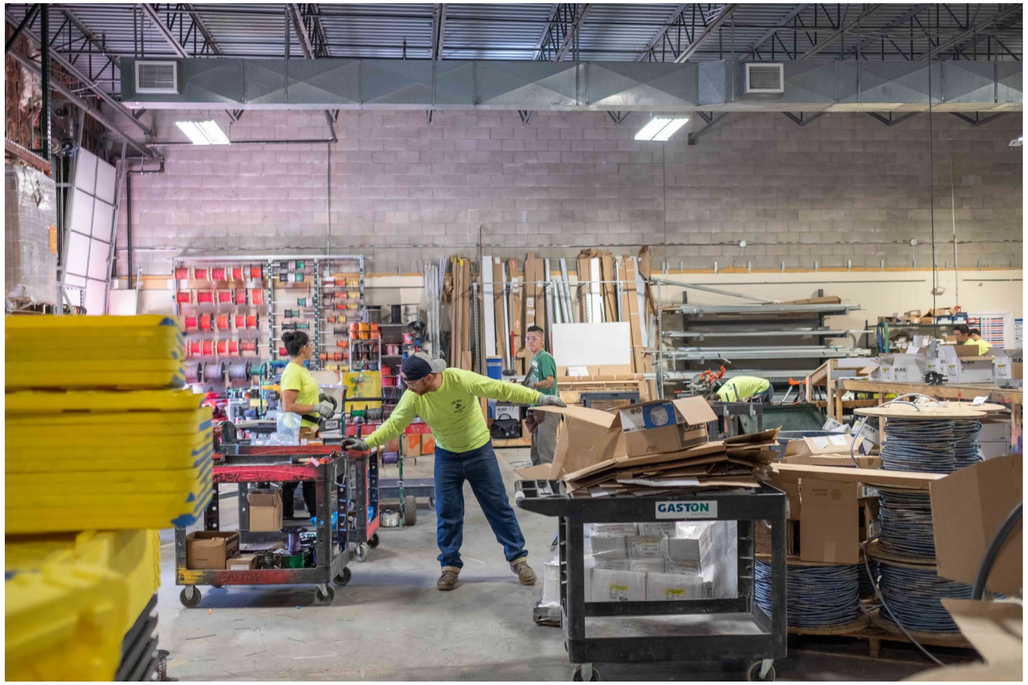
Sustain



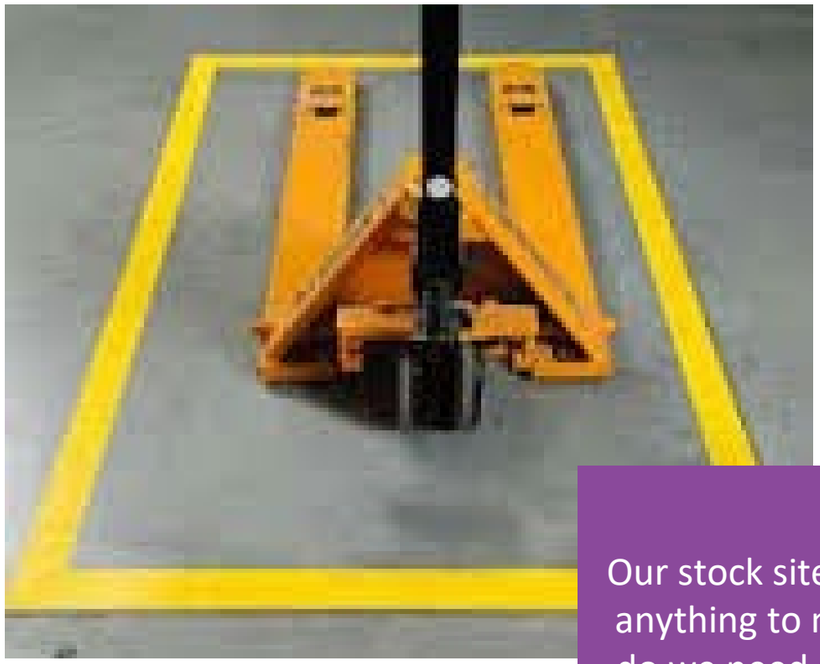
5S: What is it?



Safety in fab shop



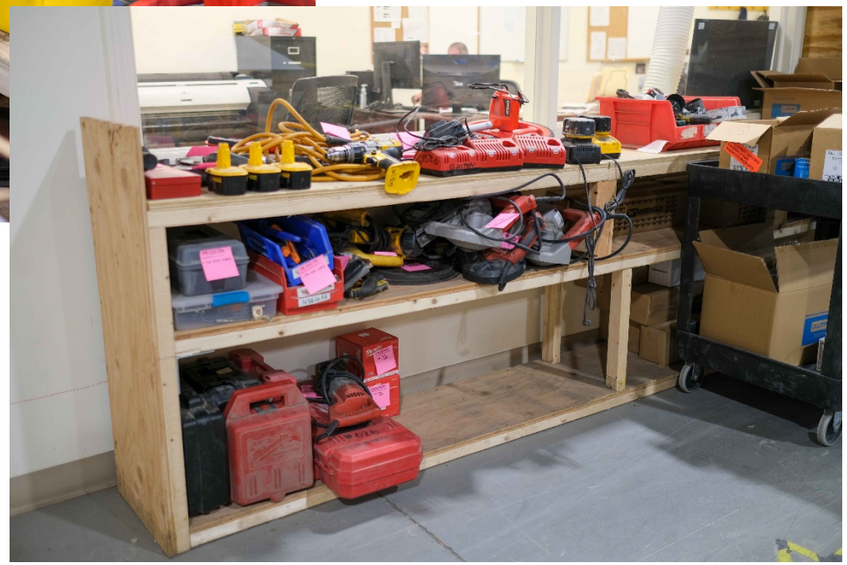
Set in order: Lined storage or replenishment areas



Our stock site doesn’t have anything to match these – do we need permission to use them?

5S Example Tool Crib - SORT

200 SF Tool Crib



5S Example Tool Crib

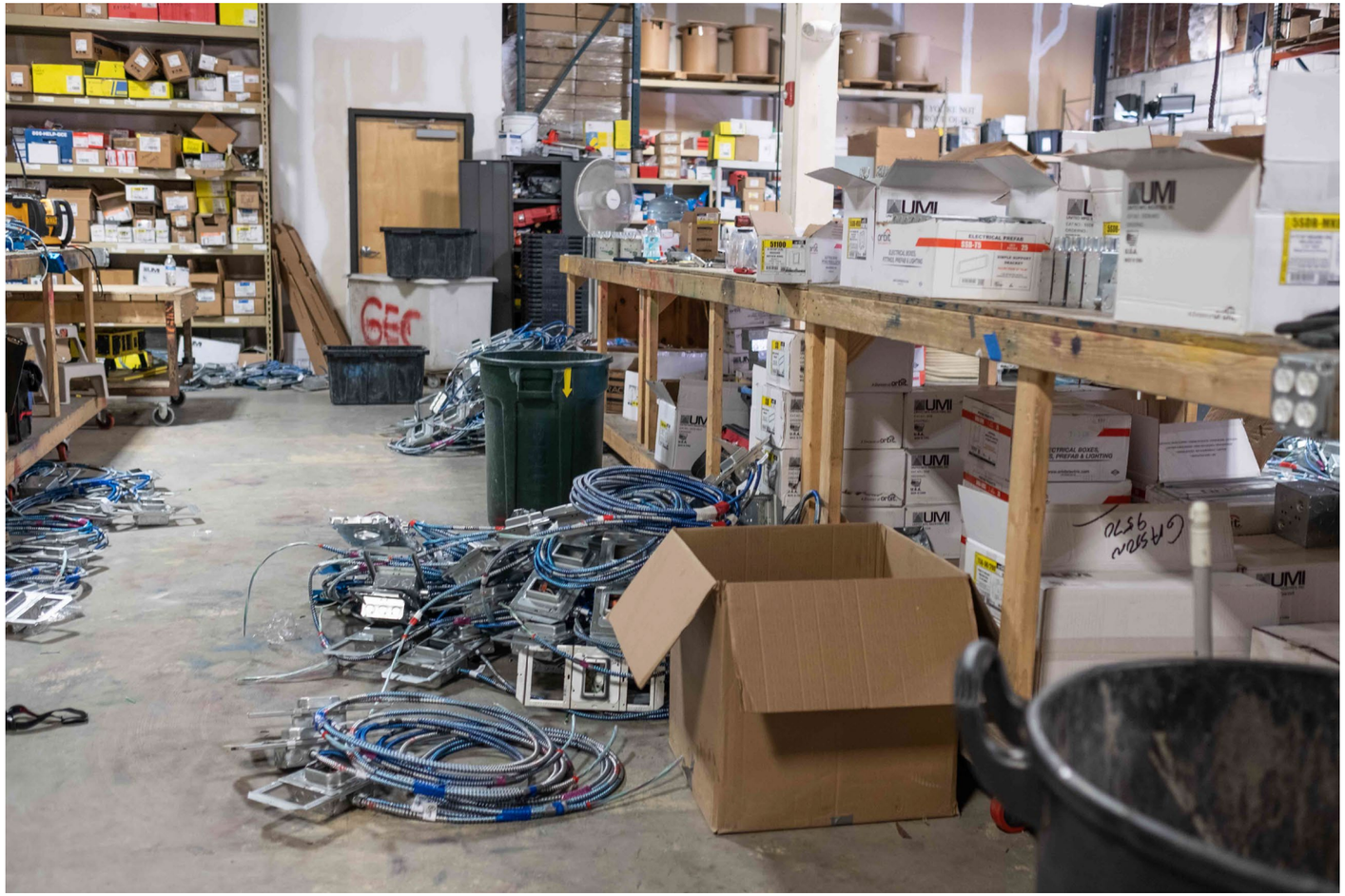
4th “S” Standardize

3rd “S” Shine

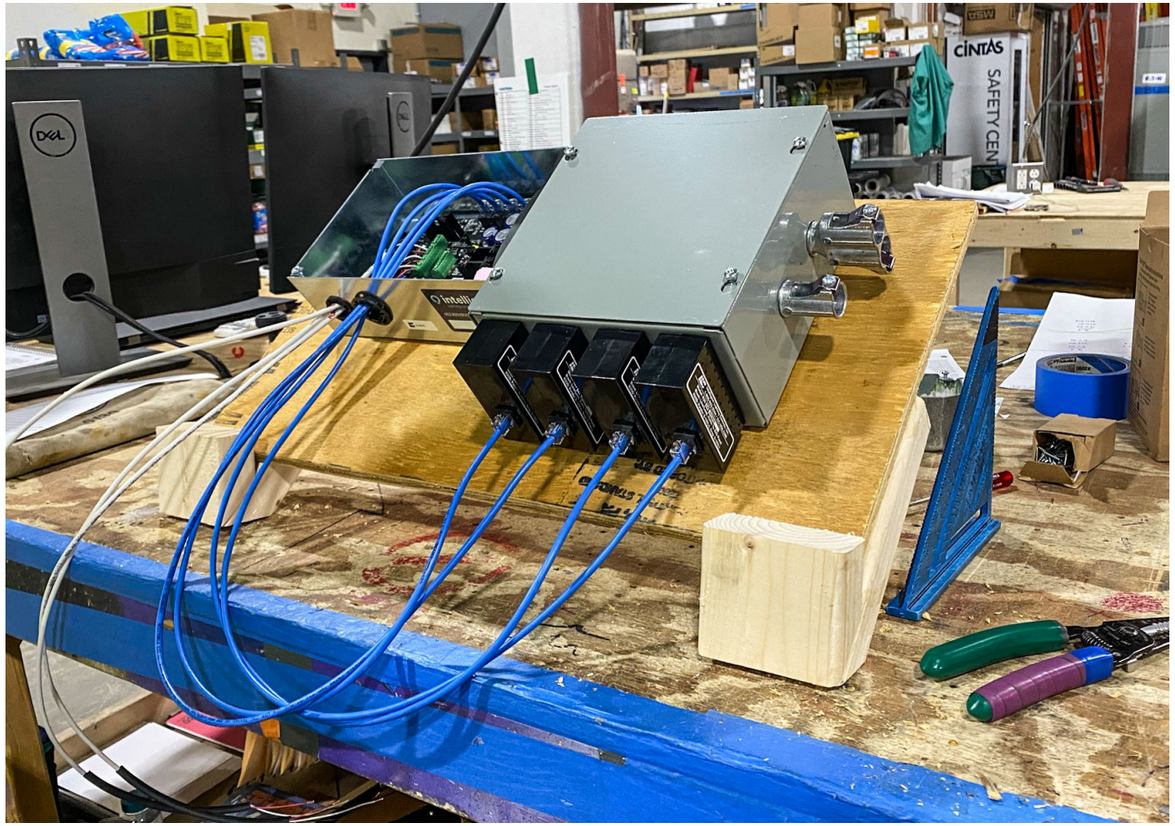
5S Results

Deadly Waste Removed	Impact to Safety	Impact to Production
Motion	Less Walking in Aisle Ways	25% More Wrench Time
Transportation	Reduced Strain	Operator Stays on Task
Human Engagement	Vastly Improved Sightlines	Defects are Easy to See
Inventory	Less Motion, Strain, Trips	56% More Floorspace for Production
Human Engagement	“Chief Improvement Officer”	From 2 ideas per worker – to – 25 ideas per worker

Before 5S



Present the Work to the Operator



Setting in order and sustaining 5S: Shadow Boards

Lean Management

Does the space visualize what must be controlled?

Visual Management

- ✓ Easy to understand
- ✓ See at a glance

- ✓ Planning
- ✓ Check & control
- ✓ Adjustment

The individual comprehends and change behaviors

Types of Visual Systems

Visual Guarantee

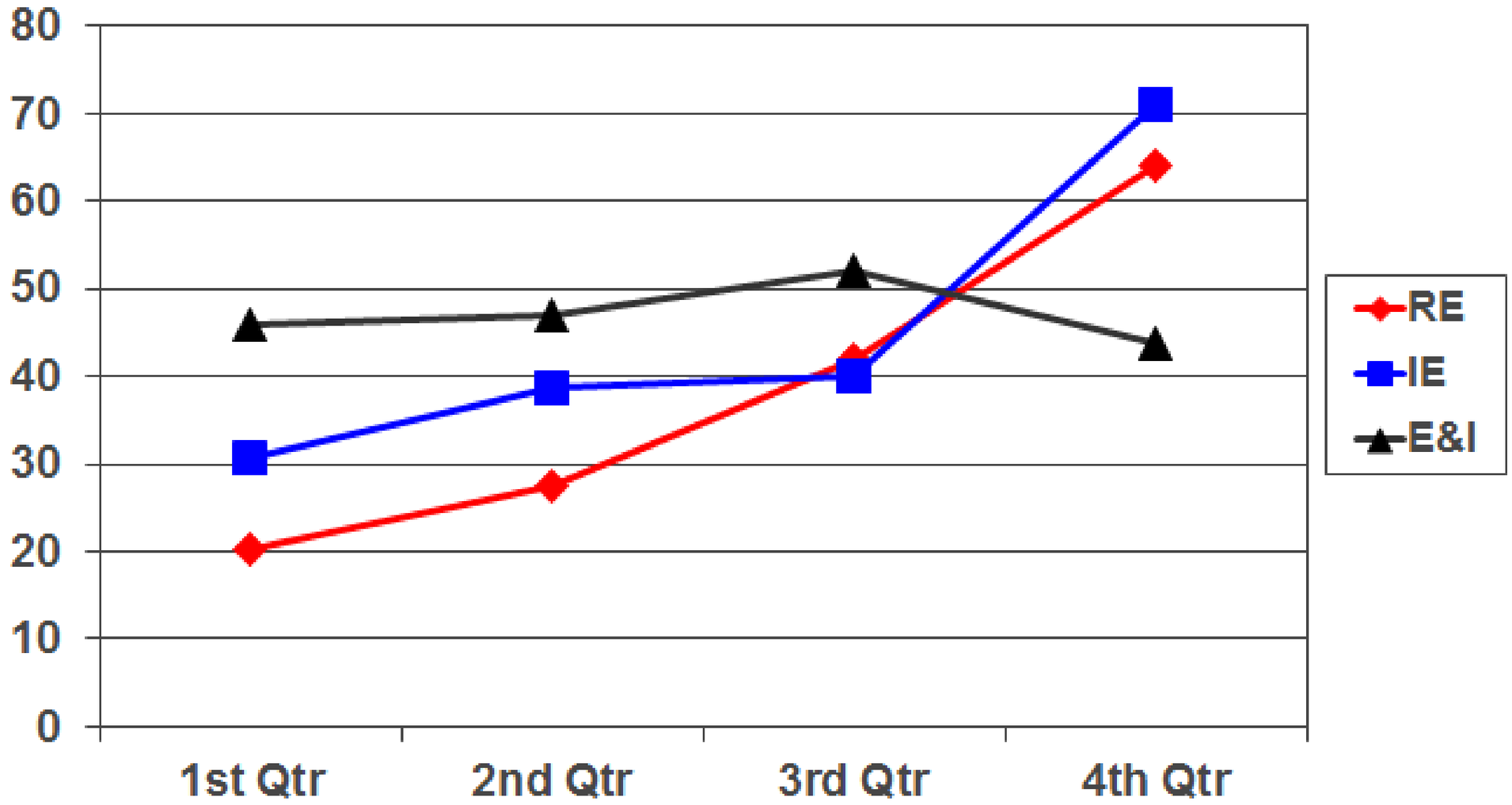
Visual Control

Visual Signal

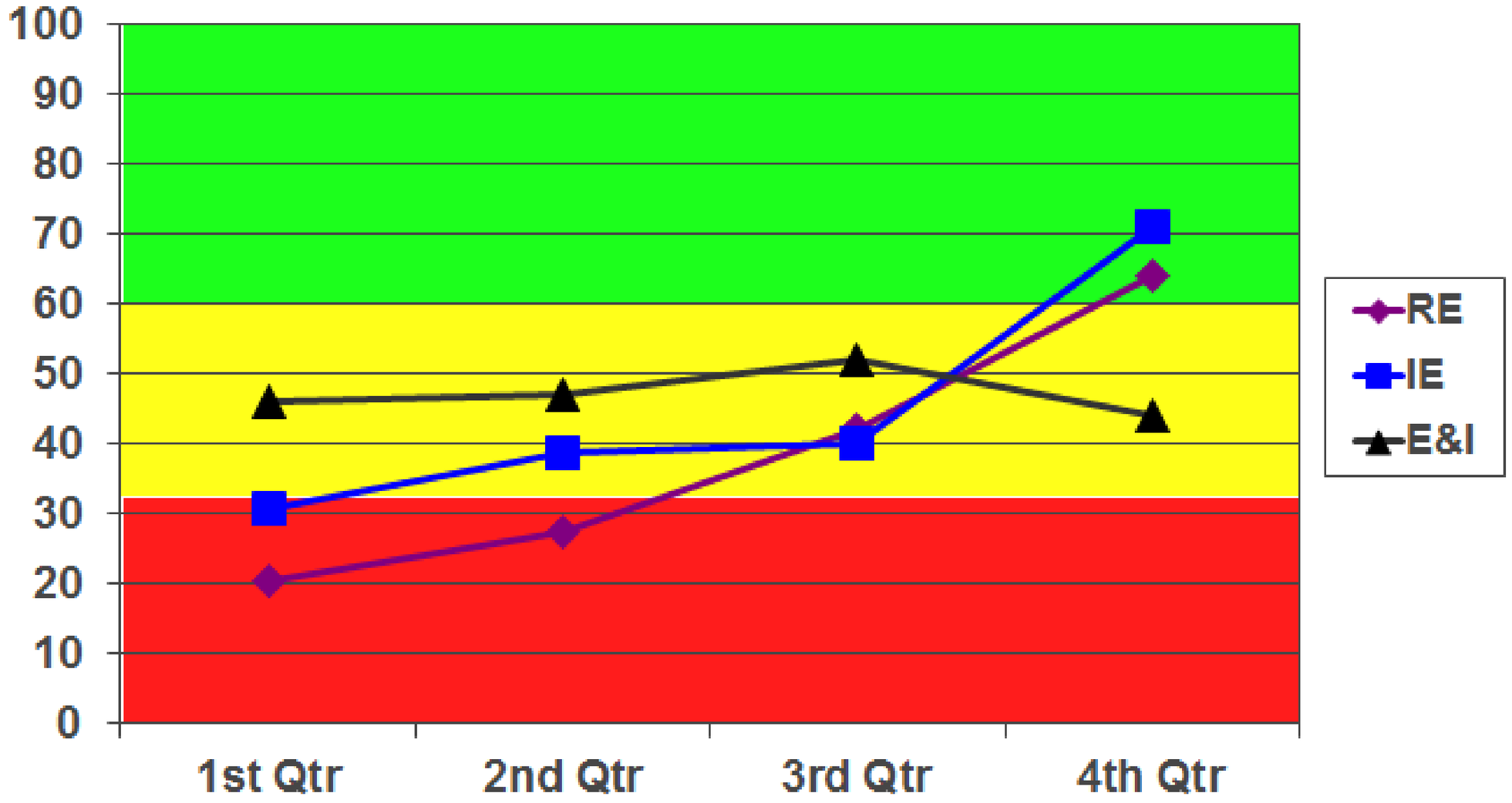
Visual Indicator

Effectiveness

Example: How are we doing? Can you tell?



Example: Now how are we doing?



Value of Gemba in Safety Proactivity

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What is the Gemba? Gemba vs. Genchi Genbutsu

Gemba, the place where work is done

Genchi genbutsu is "going to the source to check facts for yourself so you can be sure you have the right information you need to make a good decision." One is a place, the other is an act.

★ As Lean Practitioners we insist on Direct Observation

GOING TO GEMBA®

HALEY ALDRICH

V2 July 2017

Going to Gemba is the practice of going to where the work happens

What is it and Why do we use it?

Going to Gemba is an opportunity to see what's happening, ask why, and show respect. It emphasizes listening and learning so that we can understand and act appropriately. The word "Gemba" in Japanese means "the real place" where work is done. An associated term, "Genchi genbutsu" means "actual place, actual thing" and means we should each go to the gemba and see for ourselves.

We Go to the Gemba to Understand: What? How? Who? When? Why?

It's an opportunity to find and collect meaningful data on waste: TIM-U-WOOD. It's a way to learn together and find ways to improve.

STOP You must be familiar with Lean Fundamentals before proceeding with this playbook

HOW – PROCESS STEPS AT DIFFERENT LEVELS OF QUALITY:

Plan: Train & Prepare	Do: Perform Gemba	Summarize, Analyze & Report Out	Implement Findings
Send email invitation Client invite, Internal invite) requesting and describing gemba visit	Define your problem statement and desired outcomes (Use an A3 or Force Field at a minimum)	Organize and Analyze Data Update A3 based on Findings	Immediately integrate what you learned into your work or help your teams or client do so
Basic Gemba training: • H&A Recorded WebEx • Online Video-'Gemba Walking Done Right' • Gemba Article • Gemba Training Slides • Practicing Gemba Video	Collect Materials Needed: • Going to Gemba Guidance • Gemba Observation Template (Beginners) (Advanced) • Gemba Wallet Card • Gemba kit (optional) (Gemba Kit Contents Tab)	Identify Themes and Observations (by role/ department)	Implement 'Just do it' countermeasures or Perform Kaizen (Flow, Process, Point)
Getting Ready For Gemba: • Going to Gemba Guidance • Gemba Action Plan Worksheet • Gemba Role Play Video	Do Gemba Walk: • Gemba Observation Template (Beginners) (Advanced) • Mostly silent, but some questions	Analyze data and prioritize actions (FMEA, Root causes analysis, Process Priorities, Impact Difficulty, Quantify waste observed Muda (resource waste), Mura (overburden), Muri (unevenness)	Build expectations of ongoing Gemba walks into roles/responsibilities/ performance goals (especially by leaders). Identify cadence, topics, etc.)
Pre-Gemba data collection ideas: • conversations • pre site visits • collect existing company information • staff surveys	Perform Additional Gemba Walks, More In-Depth Conversations, Root Causes Analyses (to dig deeper)	Look at Gemba data together with other data gathered previously	
Gemba for Construction (LCI Training)	Observe: Muda (resource waste), Mura (overburden), Muri (unevenness)	Create Causal Loop Diagrams (Guidelines for Drawing Causal Loop Diagrams, Fifth Discipline book and Field book (chapters 17-23), photos, State of H&A Slide 11)	
Train Client Staff about Gemba basics so they can do it themselves See above references Basic Gemba Training	Go to Gemba with Client's customers and/or stakeholders Conduct Client Feedback Interviews (e.g., Expedited Value Assessments (EVAs))		

Lessons Learned & Tips:

- Listen twice as much as you speak
- Show respect
- Go to Gemba often
- Take notes by hand
- Find BOTH problems AND what works well

Score Keeping/Metrics (What to Measure)

Metric	Type	What to look for	Timeframe

Estimate of Effort to Obtain Critical Knowledge/ Customer Cost Estimate (Hours)

	Pre-Work	Virtual Training	OJT	Workshop Plan/ Execute	Follow-up
SME		2.5	2.0 or 8.0		
Staff	1.5	2.5	2.0		
Lean Practitioner	1.5	2.5	8.0	6-10	8-24
Office Support					
Project Manager					

Playbook Improvement Ideas

- Wallet sized card version of 'Going to Gemba Guidance'
- Develop client-specific templates (perhaps for market areas)
- Improve organize and analyze data section – add more details
- Develop videos of H&A staff going to gemba
- Develop video of client testimonial "why gemba is important'

Please notify Gidget Rochefort with feedback and/or suggested changes to this playbook

Levels of Quality

Baseline

Client or Project Specific

Exceptional

For questions on this playbook contact SME below:

Sue Boyle

Kelly Meade

Gemba Playbook

Think about how these statements related to the Gemba

Taiichi Ohno (architect of TPS)	**Albert Einstein**	**Shingo** (a student of Ohno):	**Fujio Cho** (former Toyota Chairman)	**Sidney Dekker** (Safety Expert)
• Called for a revolution of awareness	• “Problems cannot be solved at the same level of awareness that created them.”	• “The greatest waste is the waste we do not see.”	• “Go see, ask why, show respect”	• “Don’t ask questions about safety, ask questions about their work. Teach me how this is done. What concerns you about this?”

Root Cause Exercise

5 Whys & 5 Ideas

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Failure-Mode-Effects-Analysis
Root Cause Analysis

Pre-Mortem vs. Post-Mortem

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FMEA in the News

- SpaceX has faced scrutiny for decisions like planning for the crew to be onboard while the rocket is fueled. In the past, NASA has considered that too risky, but SpaceX prefers to use supercooled liquid oxygen and kerosene, which are more efficient but cannot remain at those temperatures for very long. Fueling begins just 35 minutes before liftoff.

- The space agency has tentatively approved SpaceX's approach, known as "load and go." "We came to the conclusion that this was an acceptable risk that we were willing to take," said Patrick G. Forrester, chief of NASA's astronaut office.

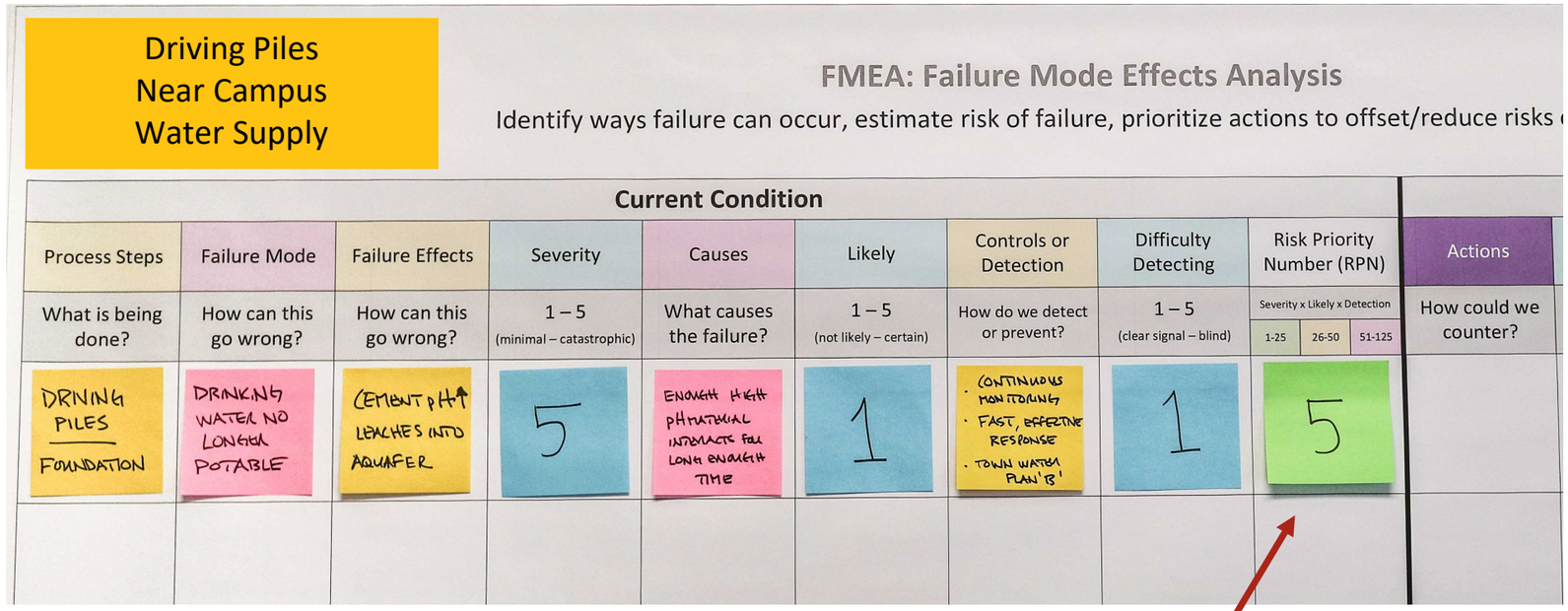
Nick, do we have the legal rights to use this? Do we have to attribute it?

See Risk and Ability to Prioritize

A campus team had a bias to manage to SEVERITY. This led them to activate a $$$$$ mitigation strategy, that was not necessary.

TIP:

Be sure to have a diverse group of stakeholders and expertise on hand



This tool, and the associated thinking, helped them see the path to managing risk.

FMEA vs JHA

HALEY ALDRICH	JOB HAZARD ANALYSIS		
	Job/Operation Title:	JHA No.:	Date:
Project:	Location(s):	Job Start Date:	Analysis Developed By:
Person(s) Performing This Job:	SSO:	Duration:	Analysis Reviewed By:

Task/Step	Potential Hazards	Consequence	Recommended Safe Job Procedures
			-

A few (Lean) tools for analyzing root causes

- **5 Why's**: method of inquiry that deepens understanding
- Fishbone (Ishikawa): helps a team identify and **explore groups of causes in increasing detail**
- **Value Stream Mapping**: makes visible the relationship of a set of processes, people, outcomes and problems

Share Key Learnings

Personal Commitment

Plus/Delta

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Improvements will be achieved by all of us

Track client direction that we understand & review with WC & design team

Make sure any change the documents have a formal approval

Ask more questions

Help WC coordinate internal submittals & comments

Connect with Tim more

Visit the construction site with greater frequency

Find & flag problems at the source

Transparency in decision-making process

Engage with students more to get them engaged

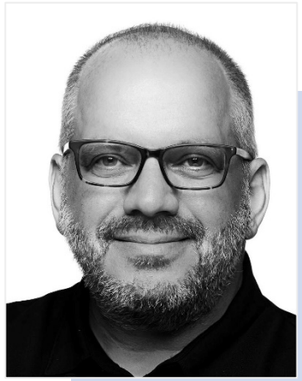
Document meetings – content, cadence, quality – assess need for change

Ask more questions & think further. Produce more communicative medias to help different audiences to visually see space

Simplify meetings & coordination to be made efficient

Create regular meeting to review final 3-D model of SCN design

Thank You!



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How can you apply this tomorrow?

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In the spirit of continuous improvement, we would like to remind you to complete this session's survey! We look forward to receiving your feedback.

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Thank you for attending this presentation. Enjoy the rest of the 23rd Annual LCI Congress!