IEEE East Coast Conference 2022

Using Technology for Environmental Compliance Accountability

Presented by Daniel Locke
October 21st, 2022

mapistry

So, who is **responsible** for compliance?

EHS Teams

- ❑ Results
- ❑ Reporting
- ❑ Audit Readiness

Operations

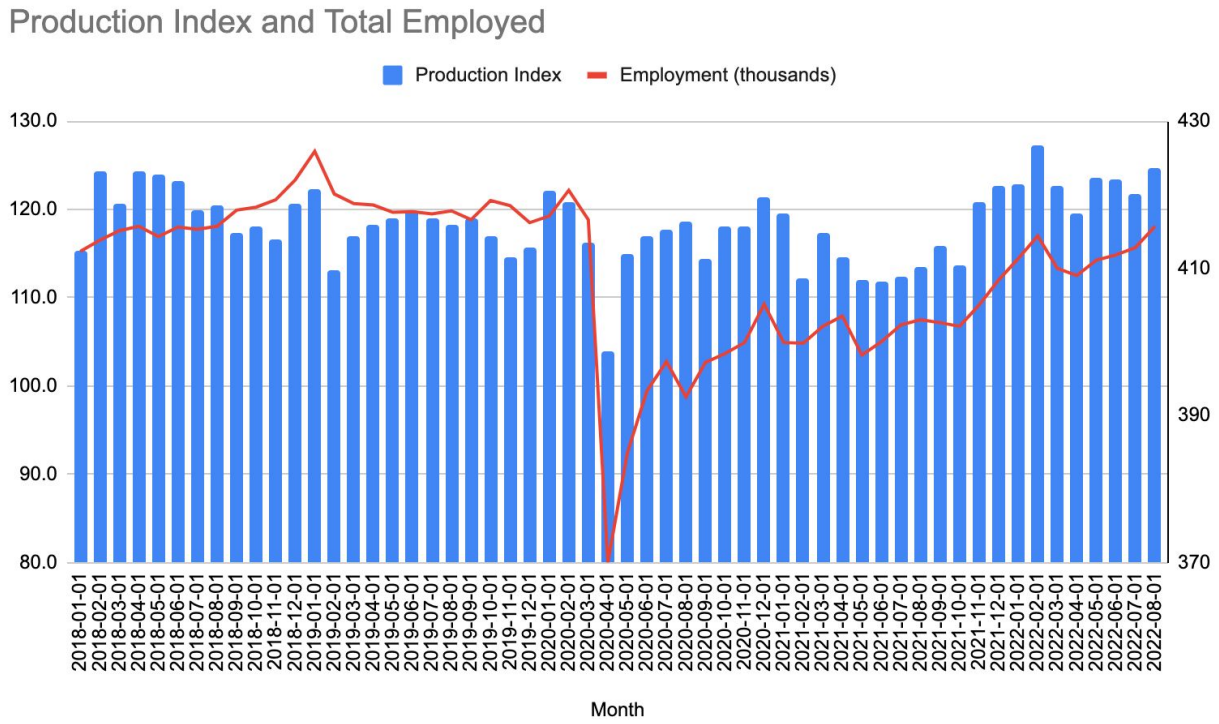
- ❑ Inspections
- ❑ Tasks
- ❑ Corrective Actions

A typical cement plant completes

10,000-15,000 inspections per year

Media	Inspection Type	Frequency	Discrete Inspection Points
Air	Quarry Property Line Visible Emissions	Daily	1
Air	Opacity Observations (Plant-wide)	Daily	35
Air	Twin Peaks Property Line Visible Emissions	Daily	1
Waste	Drum Storage Building	Weekly	1
Air	Diesel-fired Emergency Engine	Monthly	1
Oil Storage	SPCC Inspection	Monthly	25
Air	Twin Peaks Visible Emissions Survey	Monthly	27
Air	Portable Grizzly Screen Observations	Monthly	1
Air	Visible Emissions Observation Procedure (VEOP)	Monthly	19
Air	Dust Collector/Baghouse Manometer Inspections	Quarterly	178
Stormwater	Routine Inspections	Quarterly	17
Air	Annual Opacity Observations	Annually	122
Oil Storage	SPCC Comprehensive Inspection	Annually	33
Air	Clinker Bypass Bin Opacity Observations	As needed	1
Air	Method 9 Observations	As needed	1

Post Covid Employment



Unemployment Rate

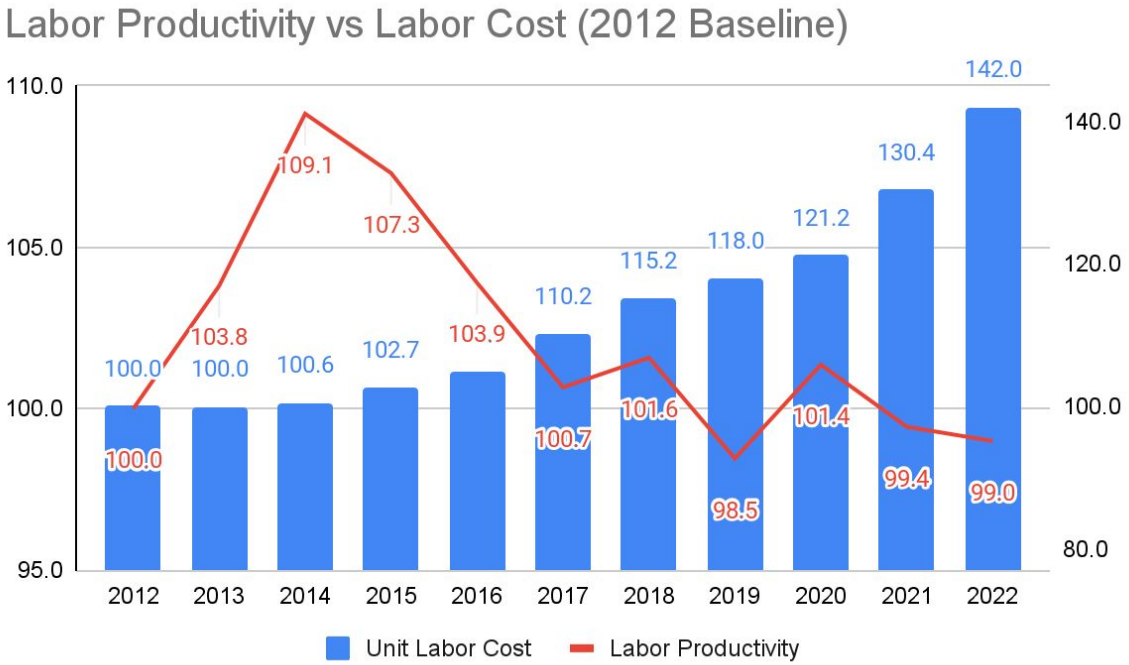
National = 3.5%

Cement = 2.8%

Cement industry has struggled to hire post-pandemic

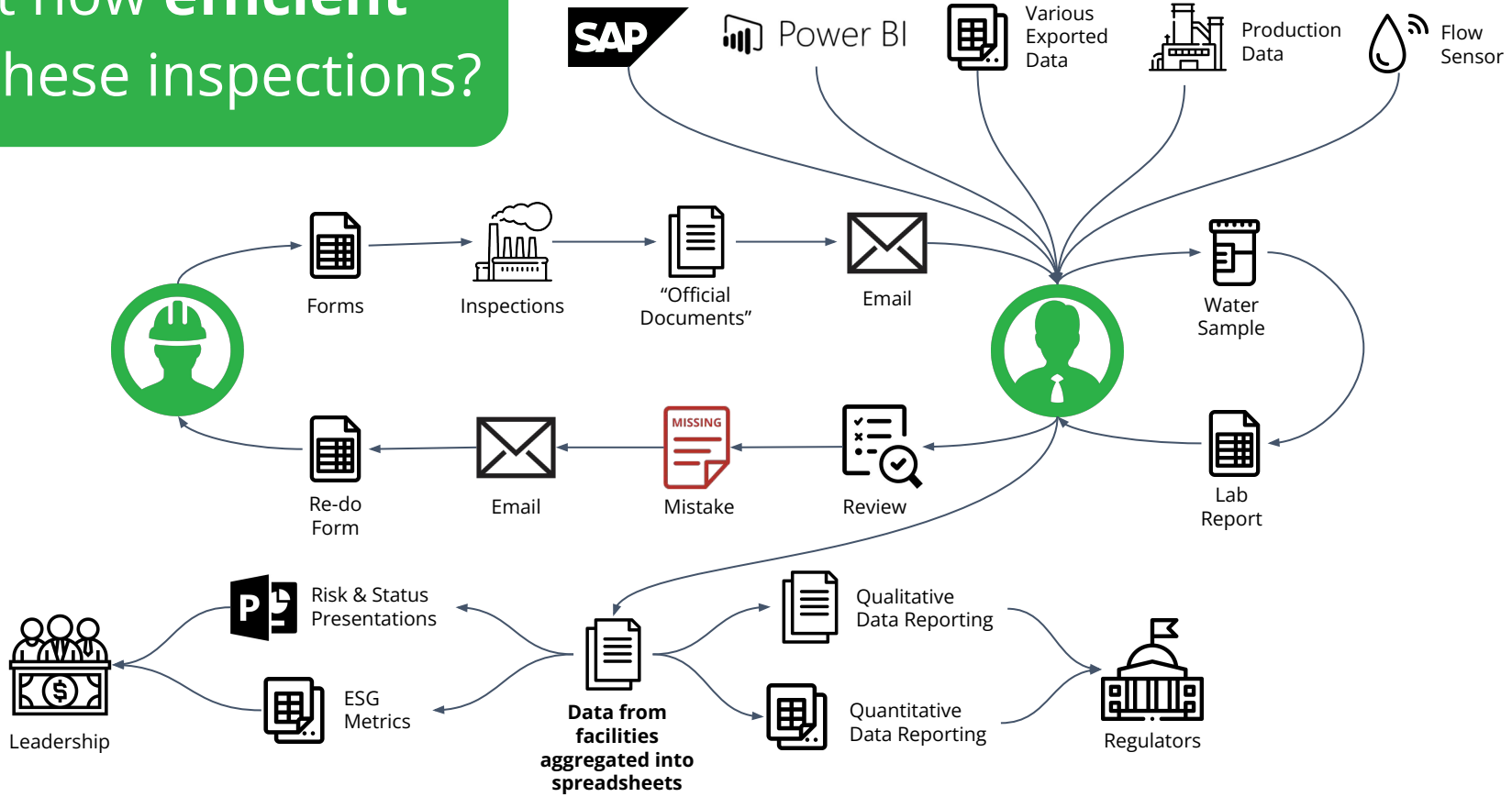
https://fred.stlouisfed.org/graph/?g=UtGC
https://www.bls.gov/iag/tgs/iag327.htm

People Efficiency in Cement



https://data.bls.gov/timeseries/IPUEN327___U100000000?amp%253bdata_tool=XGtable&output_view=data&include_graphs=true
https://data.bls.gov/timeseries/IPUEN327___L000000000?amp%253bdata_tool=XGtable&output_view=data&include_graphs=true

...But how **efficient** are these inspections?



The solution?

Digital
Transformation

How does **Digital Transformation** help?

Increase

Reliability of data

Accountability of assignments

Reaction **Speed**

Ability to **proactively manage**

Decrease

Double-handling data

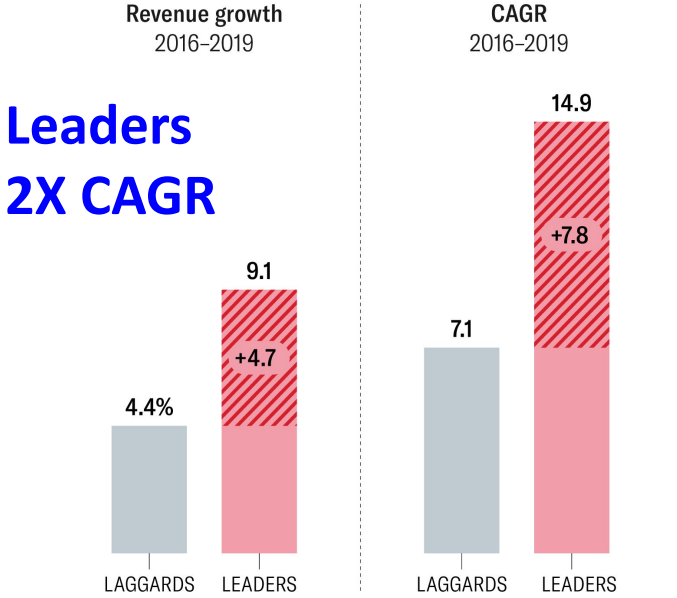
Incomplete data

Pencil Whipping

Lag time between data and decision to act

Digital Transformation Pays Off

We studied 150 companies in a range of industries and found that revenue growth and compound annual growth rate among the leaders (the top quartile) in tech intensity were more than double that of the laggards (the bottom quartile).



Source: Keystone

HBR

TITAN AMERICA

For more information contact:
Jennifer Aylor
Corporate Communications Manager
Titan America LLC
jaylor@titanamerica.com
www.titanamerica.com

FOR IMMEDIATE RELEASE

October 13, 2022

Titan America Attains State-of-the-Art End-to-End Digitalization of its Cement Plants

Results

Maximizing throughput

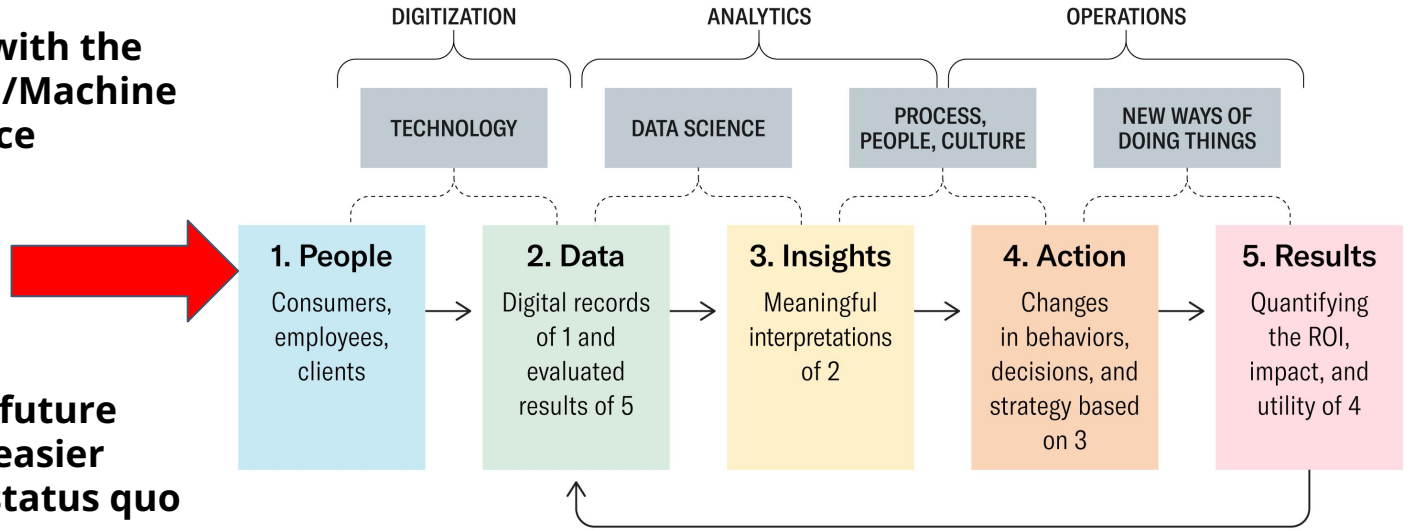
Decreasing energy consumption

Elevated reliability

The 5 Essential Components of a Digital Transformation

Mapping the journey to becoming a data-centric organization.

Starts with the Human/Machine Interface



Make future state easier than status quo

HBR

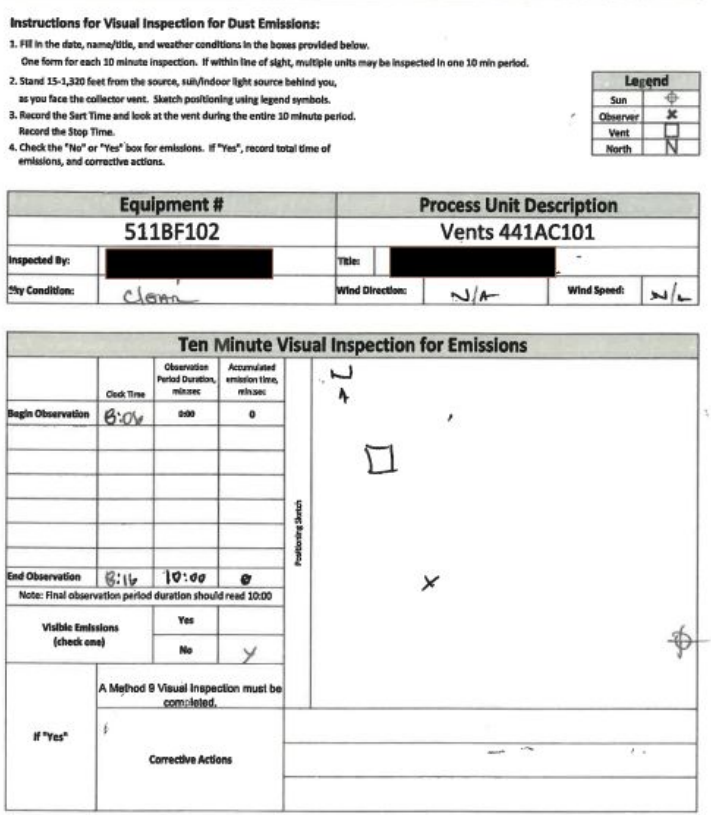
Examples of Improving Data Capture

Paper Method 22's

Daily 10 minute, Method 22 Inspections (8x)

- **Print** 8 forms
- **Carry** 8 forms & 2 stopwatches to field
- **Perform** test & **write** results on each form
- **Take** completed forms to a binder in an office
- If problem is found, **type** email and/or work order
- Environmental person to review and/or **submit**

Avg time to complete ~ 150 minutes



Instructions for Visual Inspection for Dust Emissions:

1. Fill in the date, name/title, and weather conditions in the boxes provided below.
   One form for each 10 minute inspection. If within line of sight, multiple units may be inspected in one 10 min period.
2. Stand 15-1,320 feet from the source, sun/indoor light source behind you, as you face the collector vent. Sketch positioning using legend symbols.
3. Record the Sart Time and look at the vent during the entire 10 minute period. Record the Stop Time.
4. Check the "No" or "Yes" box for emissions. If "Yes", record total time of emissions, and corrective actions.

Legend	
Sun	
Observer	X
Vent	
North	N

Equipment #		Process Unit Description		
511BF102		Vents 441AC101		
Inspected By:	[redacted]	Title:	[redacted]	
Sky Condition:	clear	Wind Direction:	N/A	Wind Speed: N/A

Ten Minute Visual Inspection for Emissions

	Clock Time	Observation Period Duration, min:sec	Accumulated emission time, min:sec
Begin Observation	8:00	0:00	0
End Observation	8:16	10:00	0

Note: Final observation period duration should read 10:00

Visible Emissions (check one)		
	Yes	
	No	X

If "Yes": A Method 9 Visual Inspection must be completed.

Corrective Actions

Positioning Sketch

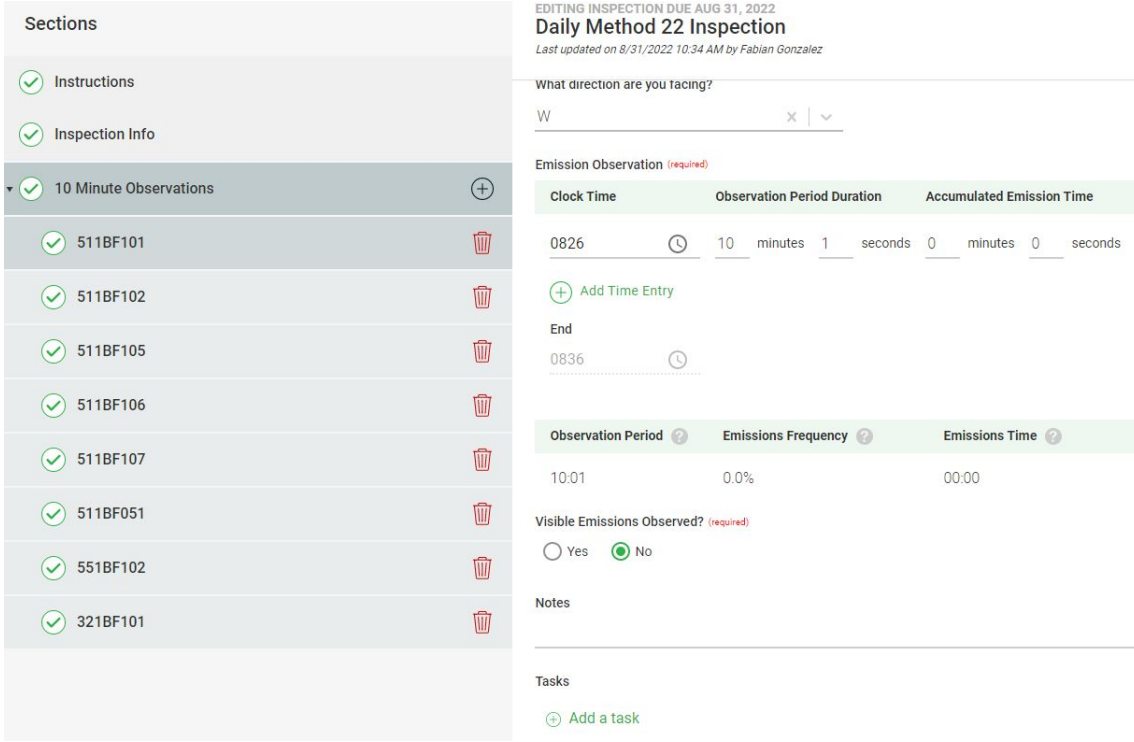
Digital Method 22's

Daily 10 minute, Method 22 Inspections (8x)

- **Carry** phone or tablet to field
- **Perform** inspections from the app
- If problems found, upload photo and **assign** corrective action from inspection
- Corrective actions are automatically documented & notified

Avg time to complete ~ <u>100 minutes</u>

↓ 33% per day



Annual Well Valve Inspection

Missing Dates

Corrective Action Needed

Missing Data

Minor Mistakes can cause confusion

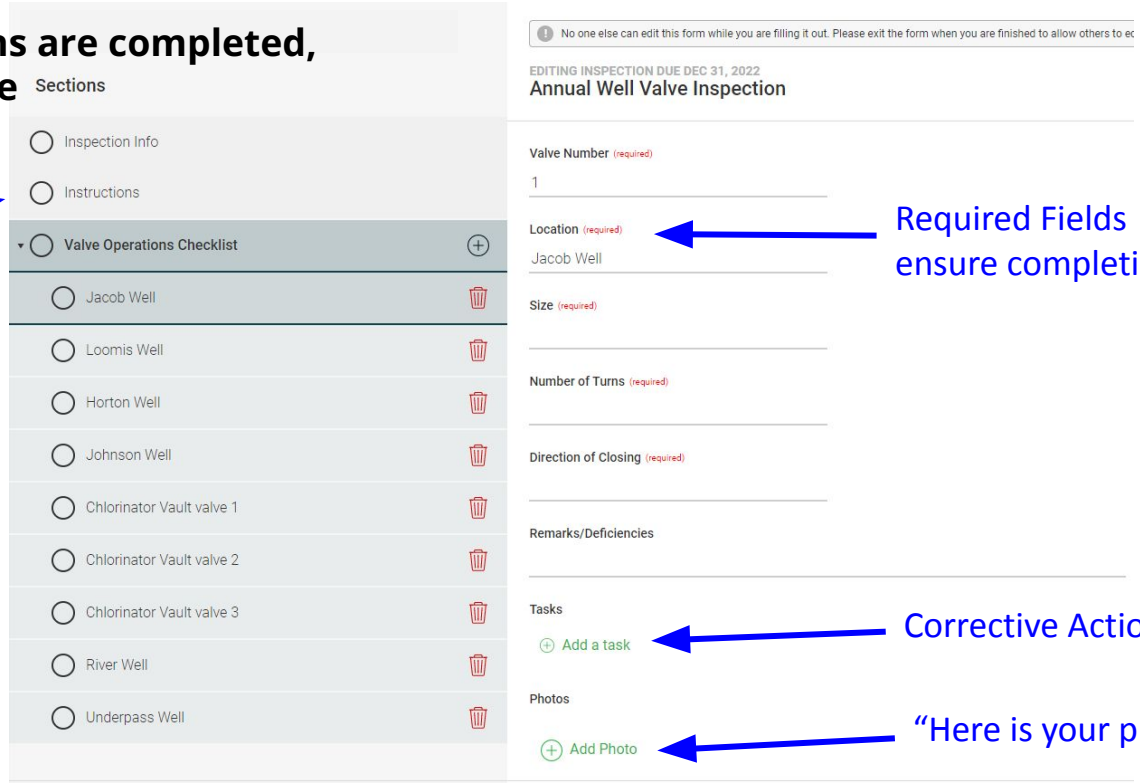
VALVE OPERATION CHECKLIST

DATE	VALVE #	LOCATION	SIZE	# OF TURNS	DIRECTION OF CLOSING	REMARKS/DEFICIENCIES
	1	JACOBS WELL	10"	33	TO THE LEFT	could use some weed Removal around Room Area
	1	LOOMIS WELL	8"	16	TO THE RIGHT	HAS 2 Valves
	1	HORTON WELL	8"	40	TO THE Right	needs handle 2 Valves in Room
	1	JOHNSON WELL	8"	25	TO THE Right	WEEDS BAD
	1	MONTGOMERY WELL	8"		TO THE Right	There are 2 Valves IN Vault
	1	CHLORINATOR VAULT	16"	52	TO THE LEFT	
	2	CHLORINATOR VAULT	16"		TO THE LEFT	WOULD NOT TURN
	3	CHLORINATOR VAULT	8"		TO THE RIGHT	STARTED LEAKING AT STEM STOPPED
	1	UNDER PASS ~~RIVER WELL~~	4"	22	TO THE RIGHT	AREA NEEDS WEEDED AND TUMBLE WEEDS
	1	River ~~UNDERPASS~~ WELL	6	"	"	SOMEONE STOLE HANDLE

Montgomery well has 2 valves need to ADD TO LIST
Loomis well has 2 Valves need to ADD TO LIST
Horton well has 2 Valves Valve 2 = 27 TURNS TO THE Right

Annual Well Valve Inspection

Ensure inspections are completed, in full and on time



SOP's

Required Fields ensure completion

Corrective Actions

"Here is your proof"

Digital forms are not enough

There are plenty of ways to inexpensively digitize forms but,

- Do they **reduce time** required to complete all steps?
- Can you **assign** inspections and tasks to qualified persons?
- Do the corrective actions **tie back to the original inspection**?
- Can you verify the forms were completed **on time**?
- Do you they provide the analytics that enable **proactive management**?
- Does the form create a **culture of accountability**?

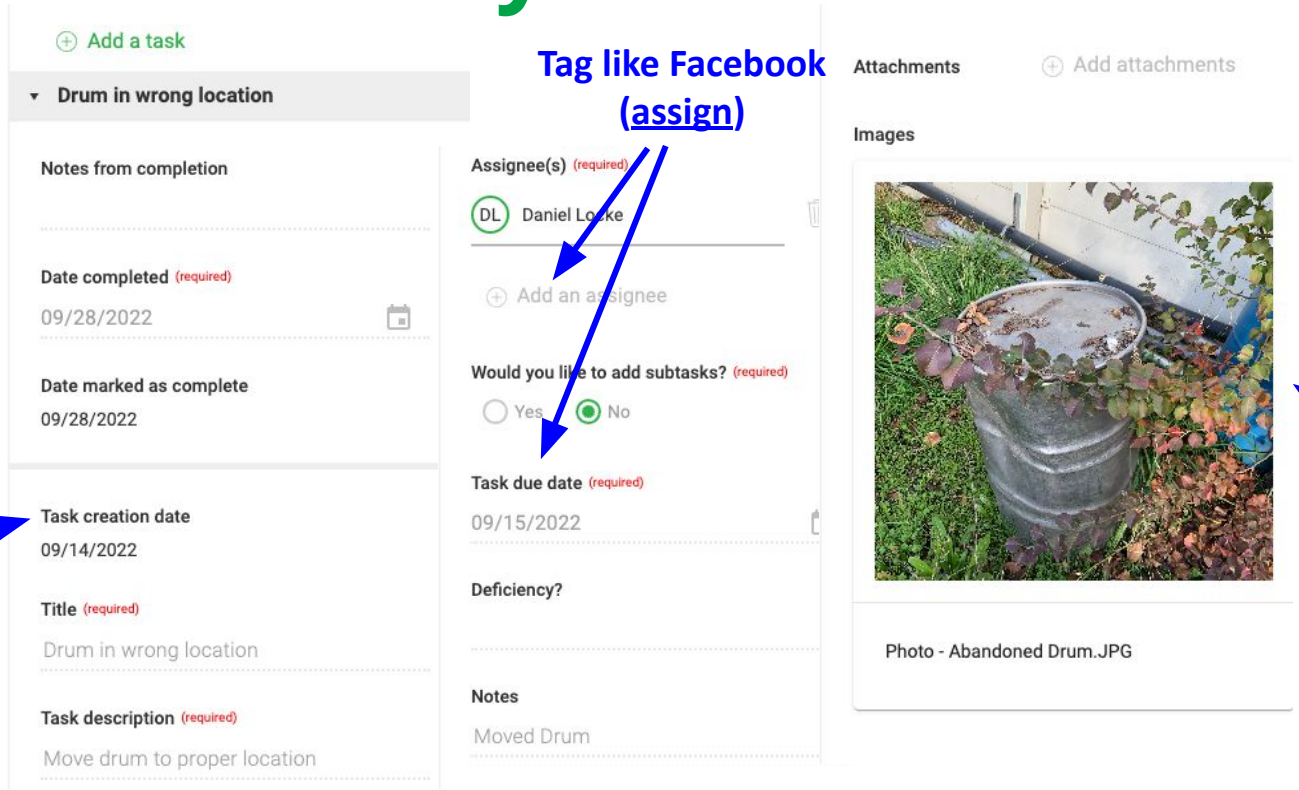
Connect & Clarify

Single Interface (time)

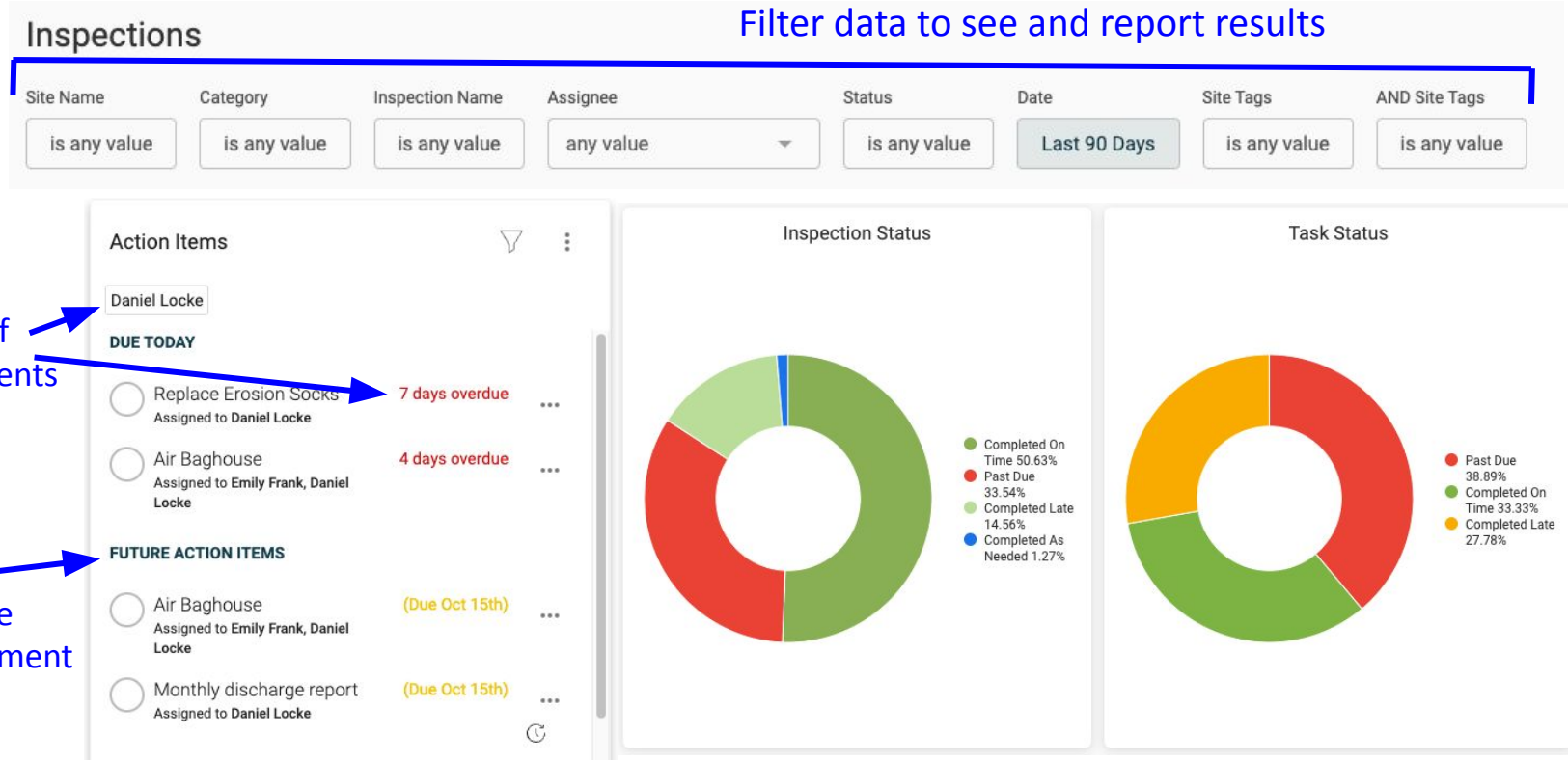
Task created from inspection (tie back to inspection)

Tag like Facebook (assign)

Use photos to reduce confusion (time)



Accountability



Clarity of assignments

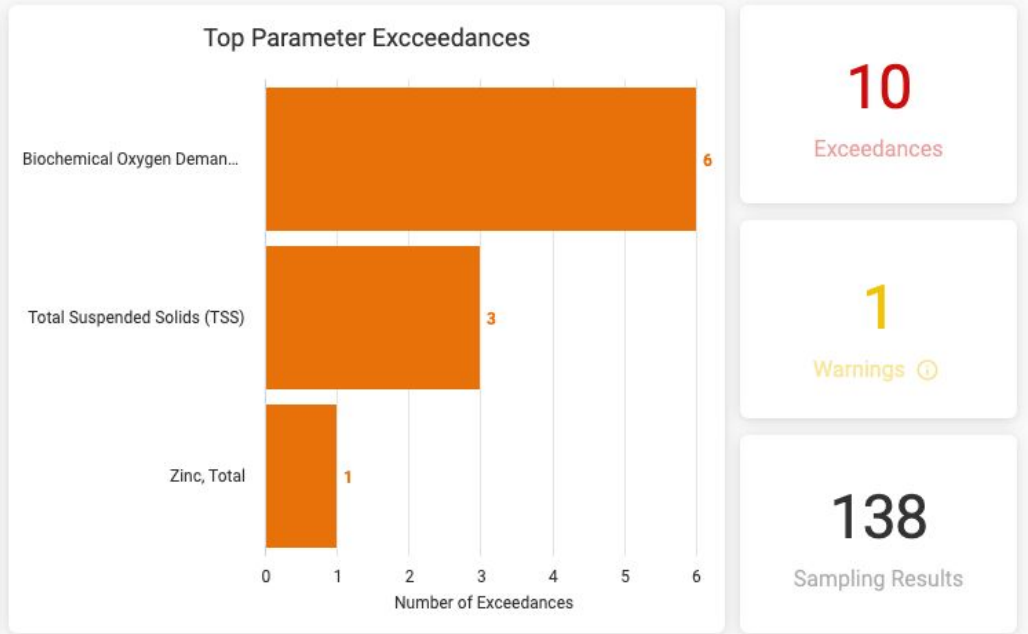
Proactive Management

Capture Quantitative Data

Automate numerical data into dashboards

Examples:

- Water Samples
- Production
- Bag Leak Detectors
- GHG
- Electrical usage
- Water consumption



Is managing spreadsheets proactive management?

Visibility Drives Accountability & Retention

Deploy tools that make data capture easier

- New way must be better than old way
- Automate routine data entry
- Standardize procedures to reduce tacit knowledge
- Design so your grandma can do the job

Create a Culture of Accountability

- Make the information visible
- Set clear expectations
- Manage the results
- ↓ the lag time between reporting and action
- Demonstrate proactive compliance