

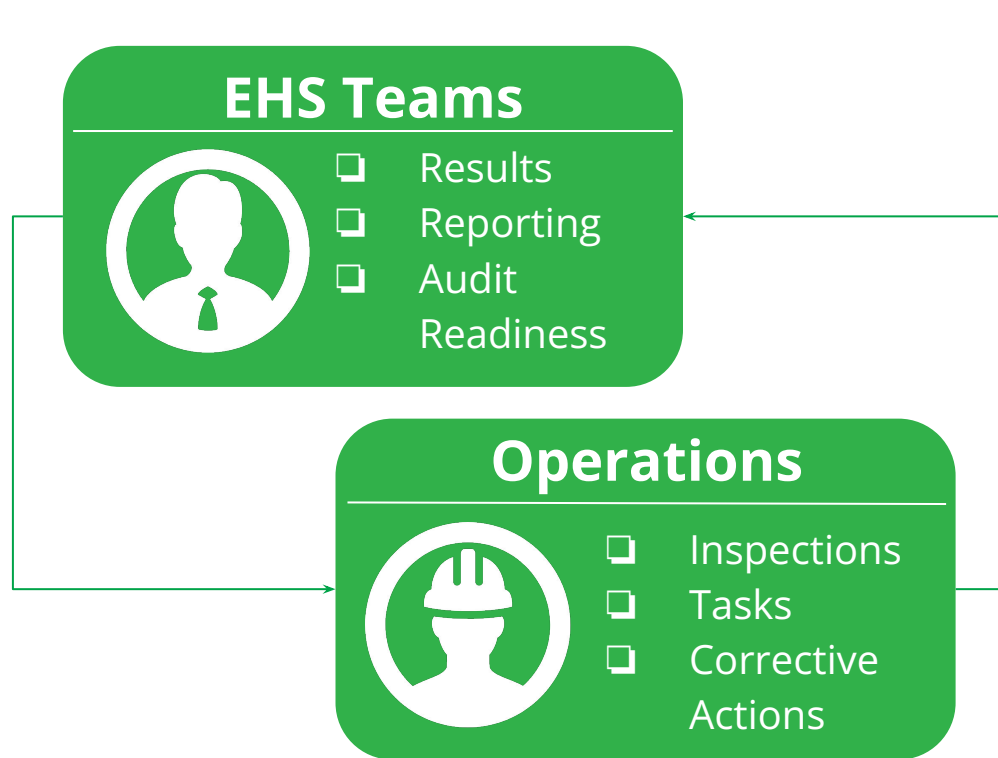
IEEE East Coast Conference 2022

Using Technology for Environmental Compliance Accountability

Presented by Daniel Locke
October 21st, 2022



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



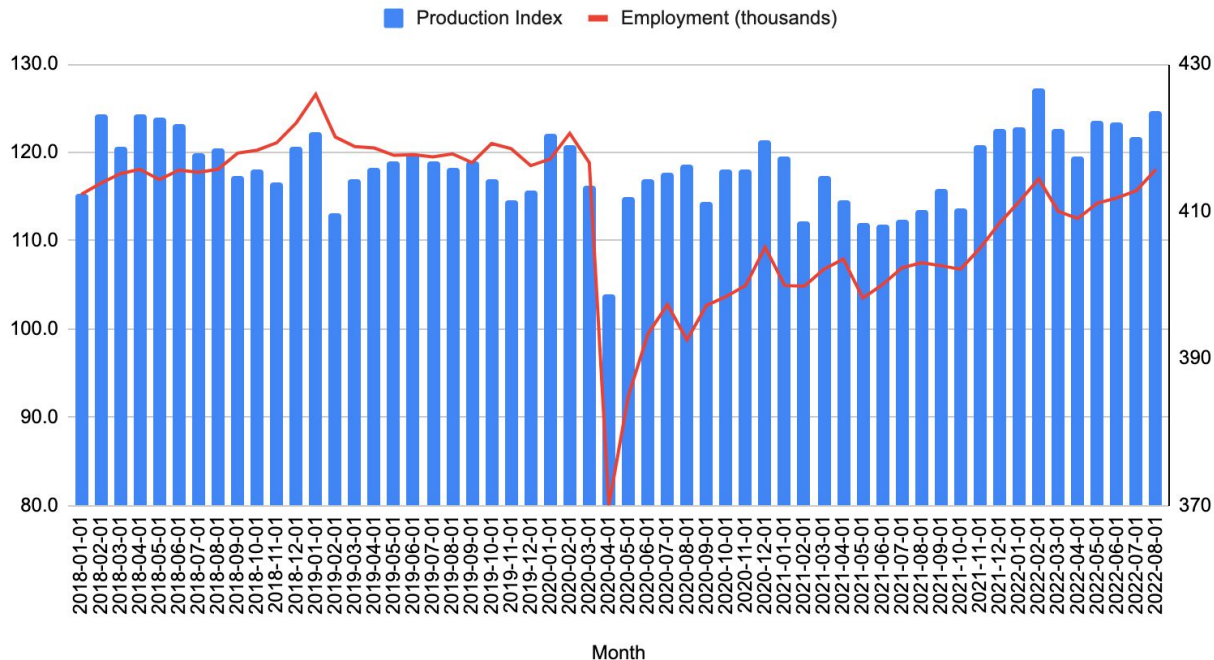
-
- A hand holding a blue pen is positioned over a clipboard. The clipboard contains a list of compliance items, each preceded by a checkbox. The list includes:
- ☐ Title V Air Permits
 - ☐ Local Air Permits
 - ☐ NPDES Stormwater
 - ☐ WDR
 - ☐ Wastewater
 - ☐ Drinking water
 - ☐ Hazwaste
 - ☐ Hazmat
 - ☐ Landfill permits
 - ☐ SMARA/Reclamation
 - ☐ SPCC
 - ☐ Greenhouse Gas/AB32
 - ☐ NESHAPS/PC MACT
 - ☐ Solid Waste Facility Permit
 - ☐ CEMS/Emissions Monitoring
 - ☐ TRI
 - ☐ CDR
 - ☐ Groundwater management

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

Production Index and Total Employed



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>

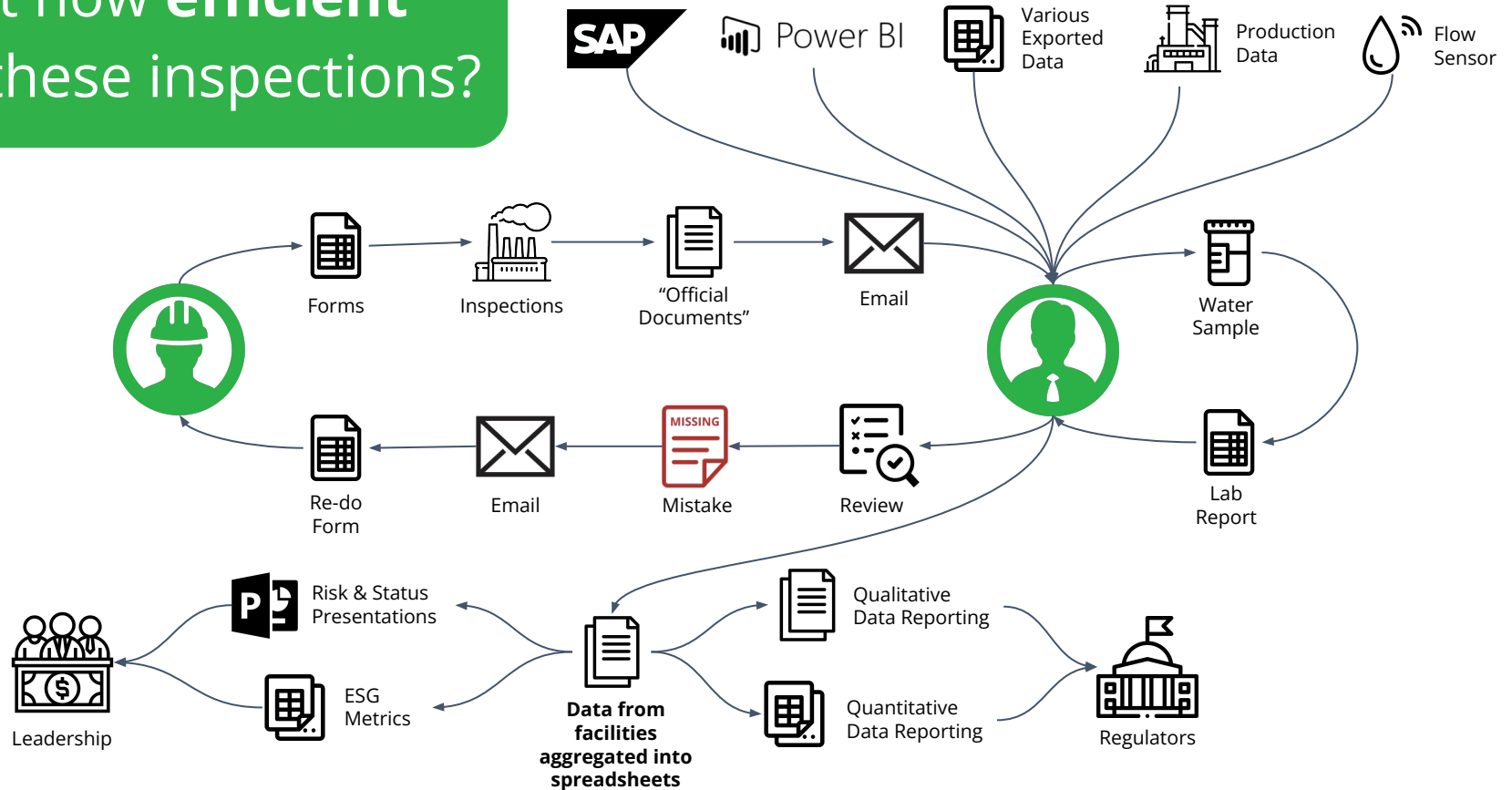
People Efficiency in Cement

Labor Productivity vs Labor Cost (2012 Baseline)



https://data.bls.gov/timeseries/IPUEN327_U1000000000?amp%253bdata_tool=XGtable&output_view=data&include_graphs=true
https://data.bls.gov/timeseries/IPUEN327_L0000000000?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

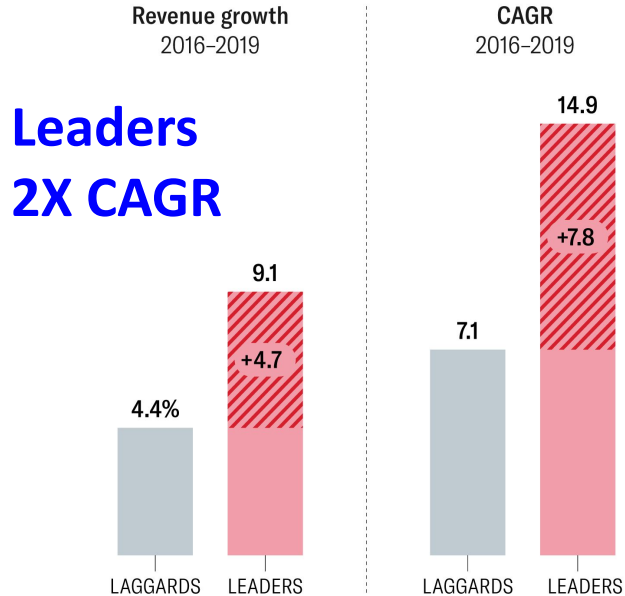
Incomplete data

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



FOR IMMEDIATE RELEASE

October 13, 2022

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Corporate Communications Manager
Titan America LLC
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www.titanamerica.com

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

Results

Maximizing throughput

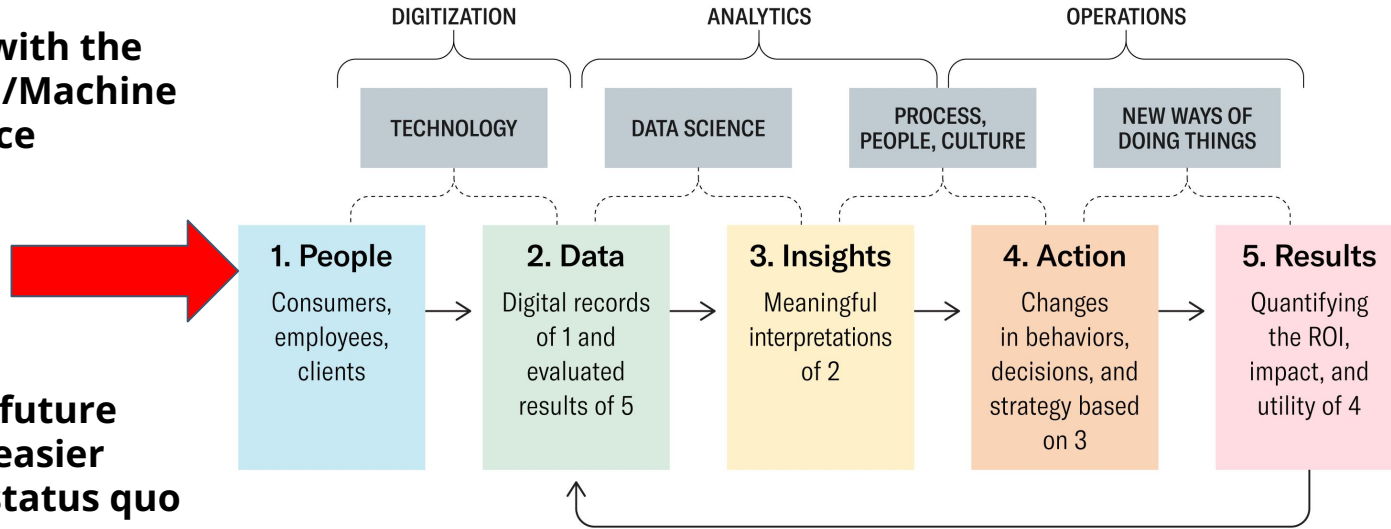
Decreasing energy consumption

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**



HBR

Examples of Improving Data Capture

Paper Method 22's





Daily 10 minute, Method 22 Inspections (8x)

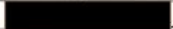
- **Print** 8 forms
- **Carry** 8 forms & 2 stopwatches to field
- **Perform** test & **write** results on each form
- **Take** completed forms to a binder in an office
- If problem is found, **type** email and/or work order
- Environmental person to review and/or **submit**

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 Start 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	
Vent	
North	

Equipment #		Process Unit Description	
511BF102		Vents 441AC101	
Inspected By:		Title:	
Site Condition:	Clear	Wind Direction:	N/A
		Wind Speed:	N/A

Ten Minute Visual Inspection for Emissions			
	Clock Time	Observation Period Duration, minutes	Accumulated emission time, minutes
Begin Observation	8:05	0:00	0
End Observation	8:15	10:00	0
Note: Final observation period duration should read 10:00			
Visible Emissions (check one)	Yes		
	No		<input checked="" type="checkbox"/>
If "Yes"	A Method 9 Visual Inspection must be completed.		
	Corrective Actions		

Sketch area with symbols: Sun, Observer, Vent, North arrow, and a crosshair.

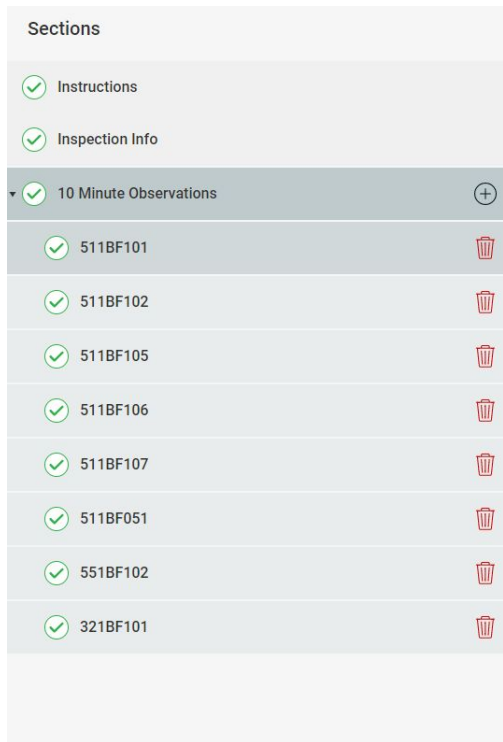
Digital Method 22's

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

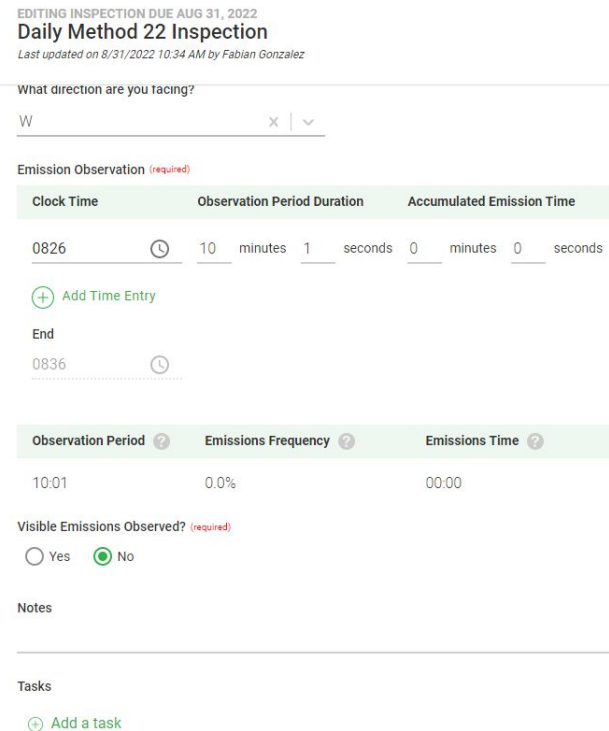
Avg time to complete ~ 100 minutes

↓ **33% per day**



Sections

- ✓ Instructions
- ✓ Inspection Info
- ✓ 10 Minute Observations (+)
 - ✓ 511BF101
 - ✓ 511BF102
 - ✓ 511BF105
 - ✓ 511BF106
 - ✓ 511BF107
 - ✓ 511BF051
 - ✓ 551BF102
 - ✓ 321BF101



EDITING INSPECTION DUE AUG 31, 2022
Daily Method 22 Inspection
Last updated on 8/31/2022 10:34 AM by Fabian Gonzalez

What direction are you facing?
W

Emission Observation (required)

Clock Time	Observation Period Duration	Accumulated Emission Time
0826	10 minutes 1 seconds	0 minutes 0 seconds
+ Add Time Entry		
End		
0836		

Observation Period	Emissions Frequency	Emissions Time
10:01	0.0%	00:00

Visible Emissions Observed? (required)
☐ Yes ☒ No

Notes

Tasks
+ Add a task

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 wear Remove / around Room Area
	1	LOOMIS WELL	8"	16	TO THE RIGHT	HAS 2 Valves
	1	HORTON WELL	8"	40	TO THE RIGHT	needs handily 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 SPEN STANDARD
	1	UNDER PASS RIVER WELL	4"	22	TO THE RIGHT	AREA NEEDS WEEDS R/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 Value 2 = 27 TURNS TO THE RIGHT

Annual Well Valve Inspection

Ensure inspections are completed,
in full and on time

SOP's

Sections

- ☐ Inspection Info
- ☐ Instructions
- ☒ Valve Operations Checklist +

<input type="radio"/> Jacob Well	
<input type="radio"/> Loomis Well	
<input type="radio"/> Horton Well	
<input type="radio"/> Johnson Well	
<input type="radio"/> Chlorinator Vault valve 1	
<input type="radio"/> Chlorinator Vault valve 2	
<input type="radio"/> Chlorinator Vault valve 3	
<input type="radio"/> River Well	
<input type="radio"/> Underpass Well	

! No one else can edit this form while you are filling it out. Please exit the form when you are finished to allow others to edit.

EDITING INSPECTION DUE DEC 31, 2022
Annual Well Valve Inspection

Valve Number (required)

1

Location (required)

Jacob Well

Size (required)

Number of Turns (required)

Direction of Closing (required)

Remarks/Deficiencies

Tasks

+ Add a task

Photos

+ Add Photo

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)

⊕ Add a task

▼ Drum in wrong location

Notes from completion

.....

Date completed (required)

09/28/2022

.....

Date marked as complete

09/28/2022

.....

Task creation date

09/14/2022

.....

Title (required)

Drum in wrong location

.....

Task description (required)

Move drum to proper location

.....

Assignee(s) (required)

DL Daniel Locke

.....

⊕ Add an assignee

.....

Would you like to add subtasks? (required)

☐ Yes ☒ No

.....

Task due date (required)

09/15/2022

.....

Deficiency?

.....

Notes

Moved Drum

.....

Tag like Facebook
(assign)

Attachments

⊕ Add attachments

Images



Photo - Abandoned Drum.JPG

Use photos to
reduce
confusion
(time)

Accountability

Filter data to see and report results

Inspections

Site Name	Category	Inspection Name	Assignee	Status	Date	Site Tags	AND Site Tags
is any value	is any value	is any value	any value	is any value	Last 90 Days	is any value	is any value

Action Items

Daniel Locke

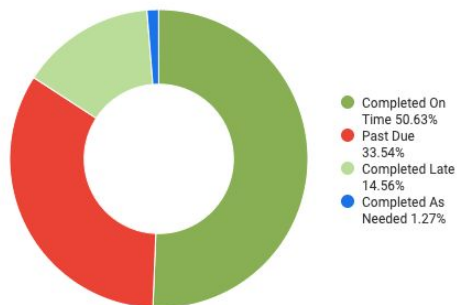
DUE TODAY

- ☐ Replace Erosion Socks 7 days overdue ...
Assigned to Daniel Locke
- ☐ Air Baghouse 4 days overdue ...
Assigned to Emily Frank, Daniel Locke

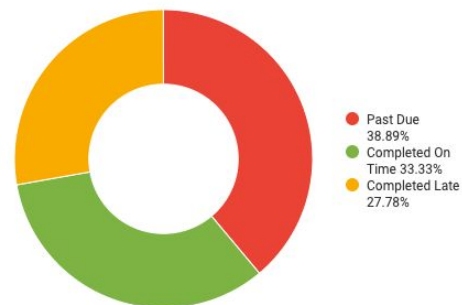
FUTURE ACTION ITEMS

- ☐ Air Baghouse (Due Oct 15th) ...
Assigned to Emily Frank, Daniel Locke
- ☐ Monthly discharge report (Due Oct 15th) ...
Assigned to Daniel Locke

Inspection Status



Task Status



Clarity of assignments

Proactive Management

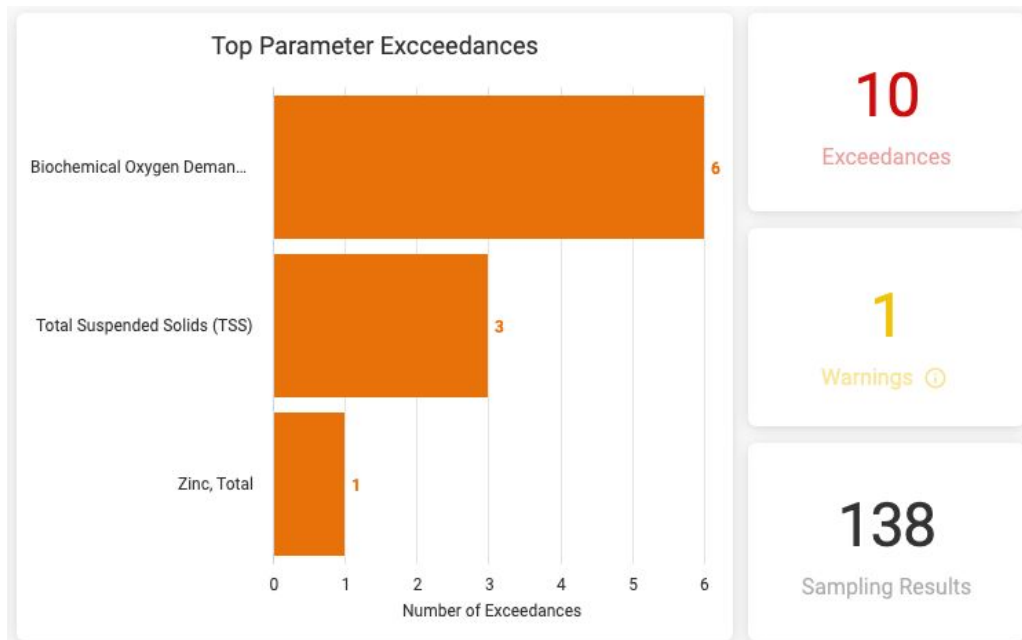
Capture Quantitative Data

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