

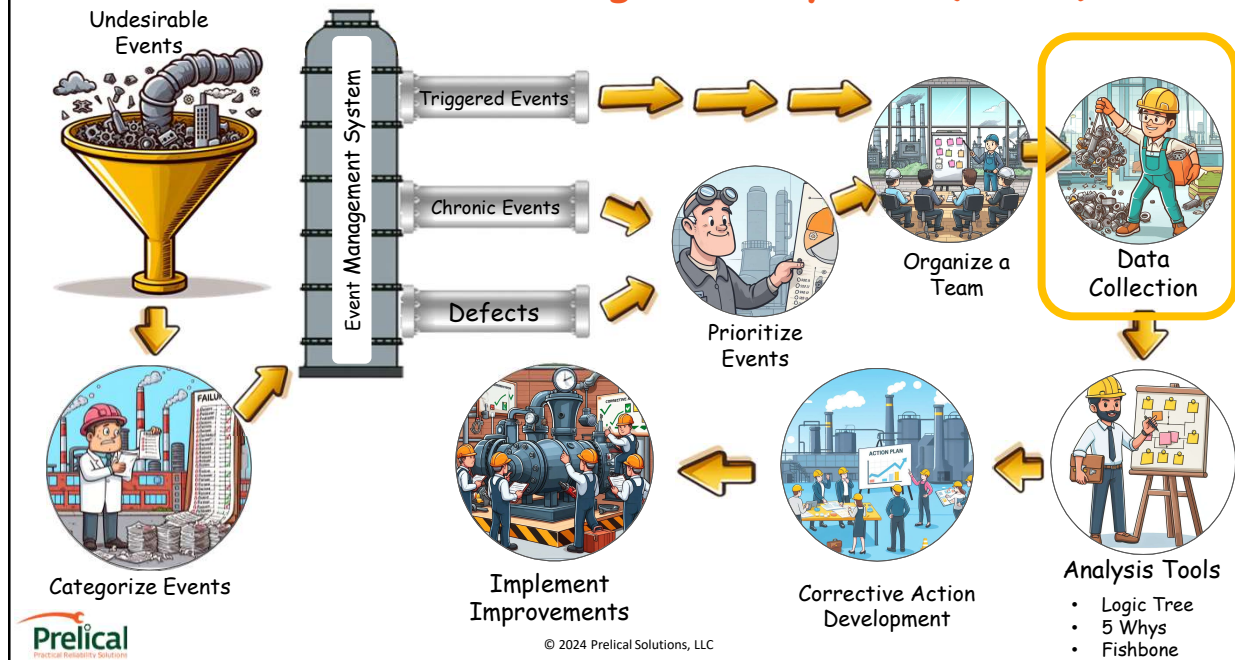
Data Collection



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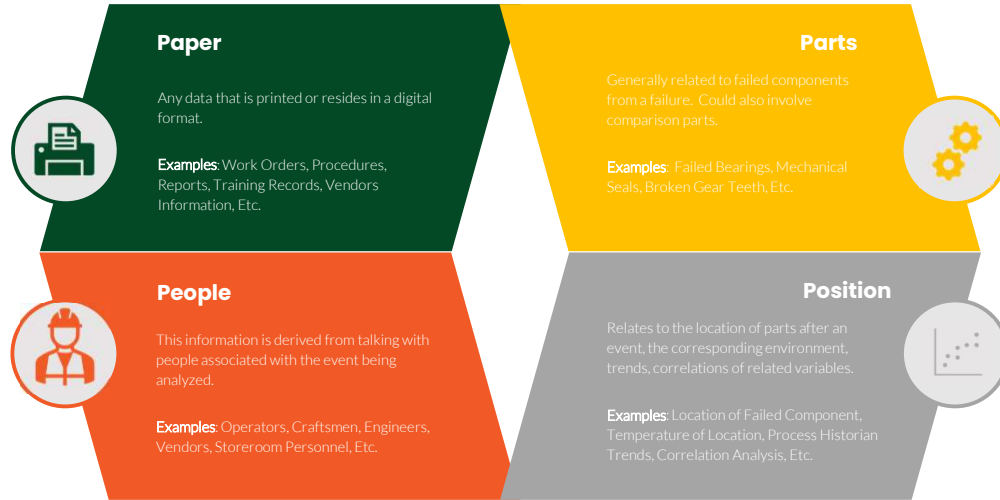
Prelical Event Management System (PEMS)



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4Ps - Data Collection Categories



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Become an Industrial Detective



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What Typically Happens After a Failure

- Parts are discarded
- Area of failure is cleaned
- Poor job closure in the maintenance system
- No interviews take place
- Equipment is put back into service as fast as possible



The Problem is:

**Root Causes
cannot be
identified
without
supporting data!**



Why is Data Not Collected?

- I might be blamed for the failure
- Production comes first
- Not seen as important
- Management does not value data analysis



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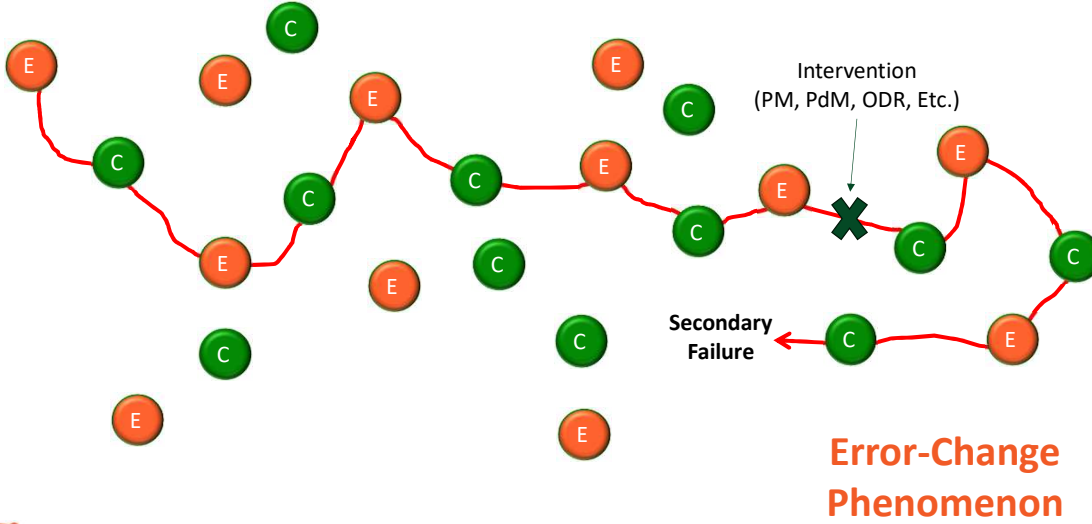
Why Blame Does Not Work

It takes multiple errors in a sequence to cause a failure



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Why Blame Does Not Work

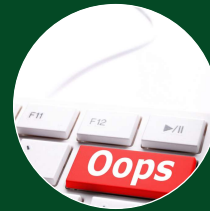


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What is an Error?



An error is a mistake or deviation from what is accurate, correct, or expected. It represents a departure from a desired or intended outcome



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Common Causes of Human Error



Overconfidence

Excessive self-assuredness can lead to errors, as individuals might not double-check their work or may underestimate the complexity of a task.



Time Pressure

Working under tight deadlines or time constraints can lead to hurried decision-making and an increased risk of errors.



Distraction

Distractions, such as smartphones, noise, or multitasking, can divert attention away from the task at hand, causing errors.



Miscommunication

Misunderstandings or unclear communication can result in errors. Whether written or verbal, miscommunication can lead to misinterpretation and incorrect actions.



Fatigue

Mental or physical exhaustion can impair decision-making and reaction times, increasing the likelihood of errors.



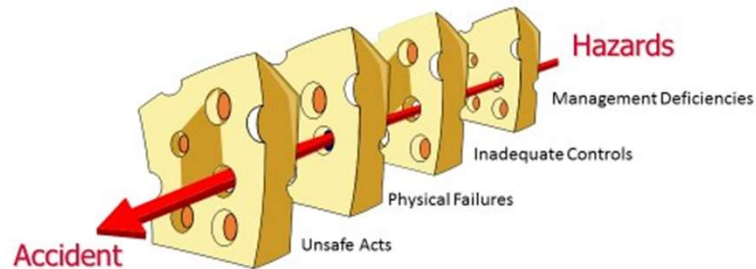
Environmental Factors

Factors like poor lighting, extreme temperatures, or uncomfortable working conditions can lead to errors.



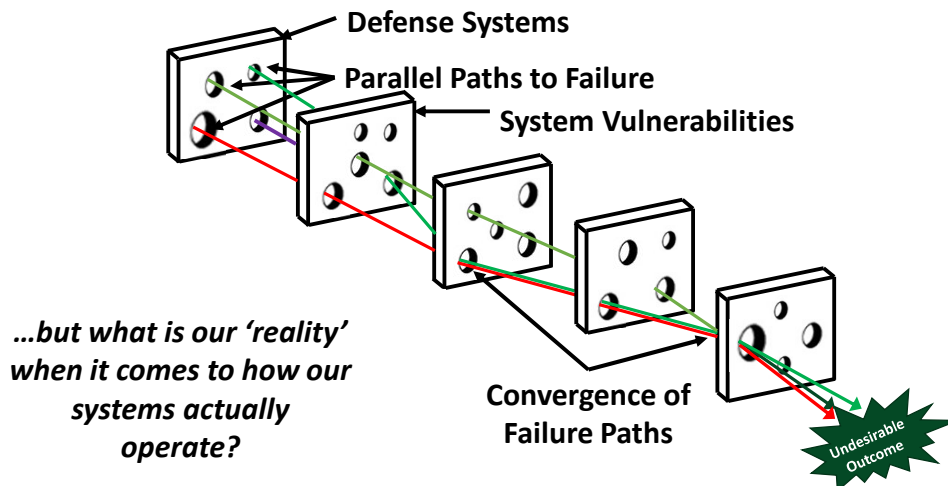
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James Reason's "Swiss Cheese" Model of Accident Causation (1990)



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The Bob Latino Interpretation of Reason's SCM



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What Do Detectives Do?

Evidence

Rope of area



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Data Collection Strategies



- Triggered Events
 - Collect Physical Data
 - Immediate Interviews
 - Document Surroundings



- Chronic Events
 - Develop a Data Collection Plan
 - Have Data Collect Tools Ready
 - Execute Plan on Next Event

Create a “Go Bag”



- High Resolution Camera w/Video Capability
- Flashlight
- Tags and Sharpie
- Safety Equipment (e.g., gloves)
- Tape
- Sample Containers and Baggies
- Basic Tools (hammer, wrench, screwdriver, pliers, etc.)

Provide a Designated Location for Failed Components



Equipment #:
Work Order Number:
Repair Date:
Craftsman:
Comments:



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Parts



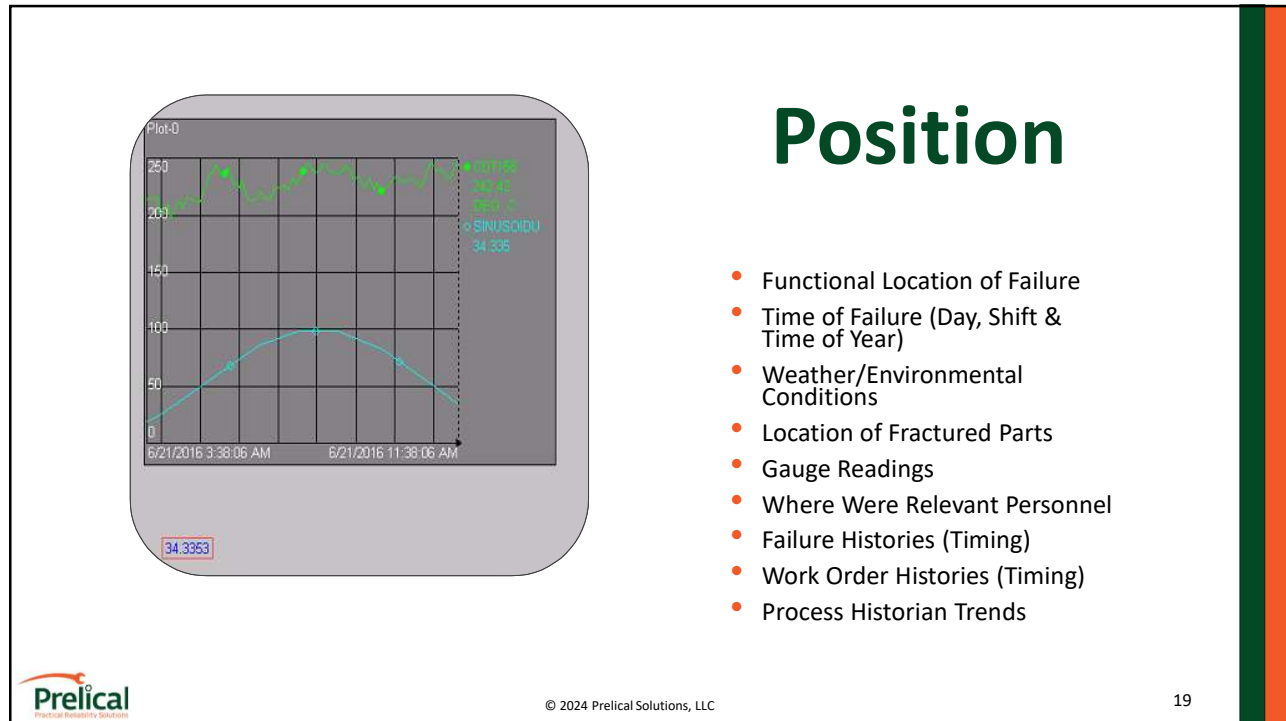
- Material Samples
- Review of Old vs New Parts
- Residue Samples
- Lubricant Samples
- Failed Parts (i.e. - Bearings, Gears)
- Calibration of Instruments/Gauges
- Leaking Fluids
- Water Samples
- Raw Materials



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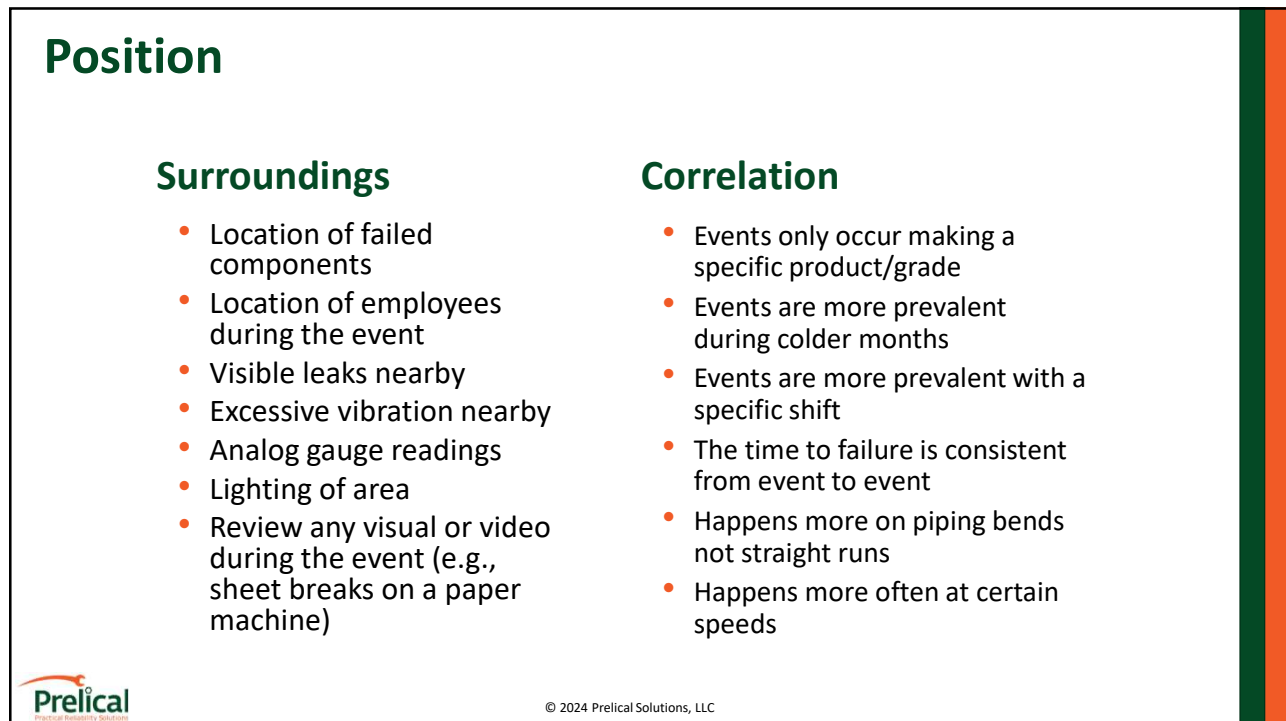
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Position

- Functional Location of Failure
- Time of Failure (Day, Shift & Time of Year)
- Weather/Environmental Conditions
- Location of Fractured Parts
- Gauge Readings
- Where Were Relevant Personnel
- Failure Histories (Timing)
- Work Order Histories (Timing)
- Process Historian Trends

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Position

Surroundings

- Location of failed components
- Location of employees during the event
- Visible leaks nearby
- Excessive vibration nearby
- Analog gauge readings
- Lighting of area
- Review any visual or video during the event (e.g., sheet breaks on a paper machine)

Correlation

- Events only occur making a specific product/grade
- Events are more prevalent during colder months
- Events are more prevalent with a specific shift
- The time to failure is consistent from event to event
- Happens more on piping bends not straight runs
- Happens more often at certain speeds

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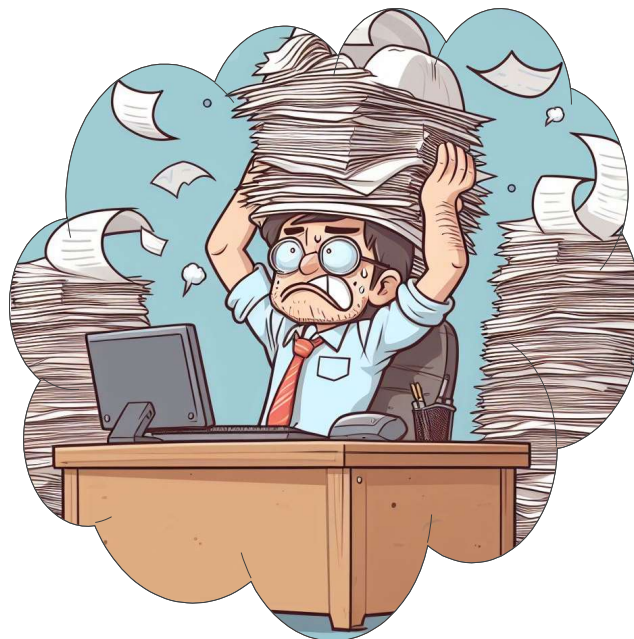
Paper



- Procedures
- Training Records
- Procurement Documentation
- Shift Logs
- Maintenance Plans (e.g., PMs)
- Maintenance Histories (e.g., Work Orders)
- Inspection Results (Visual, Predictive, PM)
- Chem & Metallurgical Lab Test Results
- P&IDs / Drawings
- HR Records
- Recent Process Changes
- Recent Storeroom Material Changes
- Recent Changes to Lubrication Suppliers

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Be Careful of Documentation Overload



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People

- Witnesses
- Maintenance Personnel
- Operations Personnel
- Quality Personnel
- Reliability Technicians
- E & I Personnel
- Mechanics
- Storeroom/Warehouse Personnel
- EH&S Personnel
- Purchasing/Accounting Personnel
- Chem/Metallurgical Lab Personnel
- Leadership/Sponsors/Mgmt
- Vendors/Suppliers

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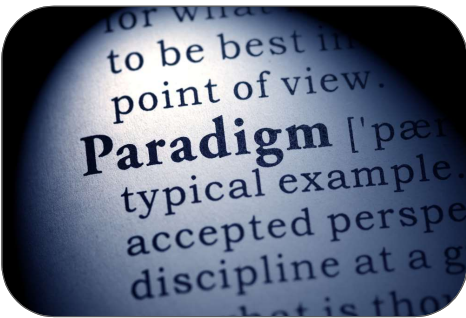
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People

- Management does not care about safety
- We always do it that way
- Maintenance does not know what they are doing
- Operators do not know how to operate the equipment
- Those alarms are okay to bypass
- We were never trained to do that task



for what
to be best in
point of view.
Paradigm ['pær
typical example
accepted perspe
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hat is the

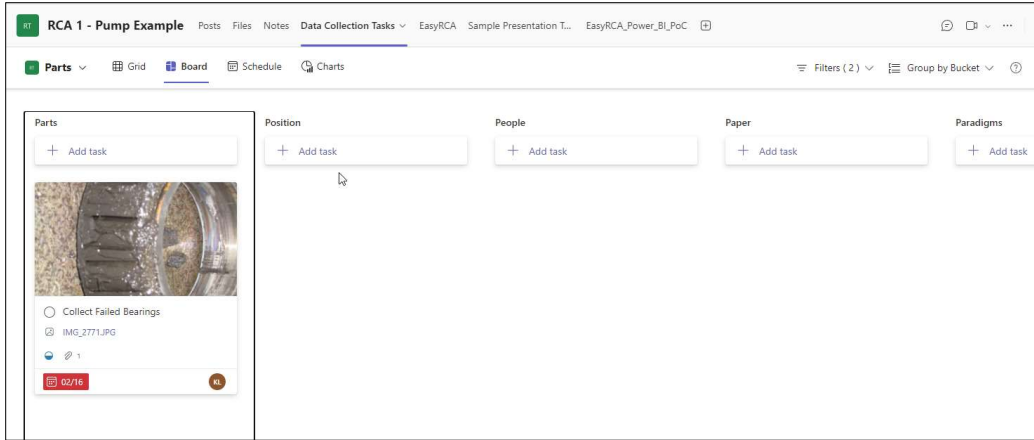
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Process Integrity Solutions

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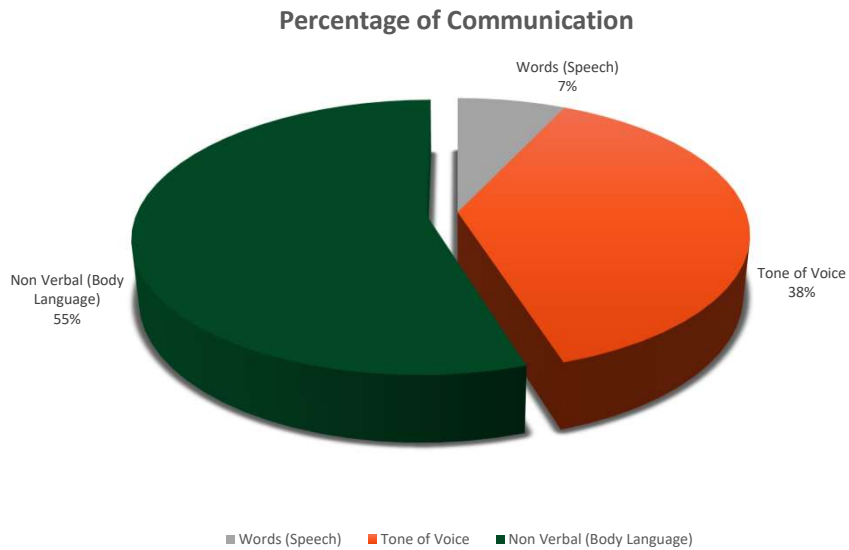
Utilize MS Teams for Data Collection



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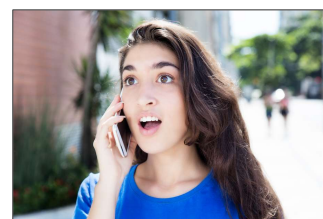
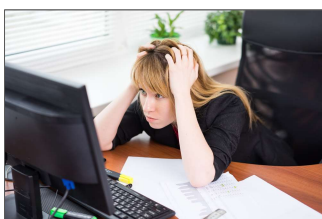
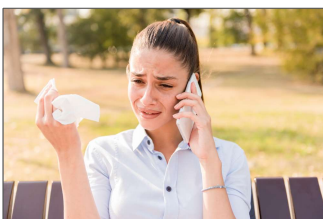
The Way We Communicate



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What is Their Body Language Saying?



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Body Language Examples

Signal	Meaning
Arms Crossed	Uncomfortable
Head Tilt	Paying Attention / Trying to Understand
Eye Roll	Defensive
Biting Nails	Nervous
Rapid Eye Movements	Lying or Discomfort
Open Palms	Demonstrates Sincerity and Openness
Hands on Head	Frustration



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Body Language – Crossed Arms




How Therapy Works...

- Therapy is, in part, an ongoing interview...**NOT AN INTERROGATION**
- An interview is essentially a structured conversation where **one participant asks questions** and the other provides answers.
- Indeed, therapists regularly use interview techniques to gather useful information that will, in turn, help them better understand the client's difficulties, implement proper interventions, assess progress, and overcome obstacles in therapy




Source for the following slides: Spencer Ph.D., Noam. How Therapy Works: The Role of Basic Interview Techniques. Psychology Today Online. Accessed on 7.6.22.

#	Interviewing Technique	Description
1	Reflection	'Verbal mirroring' of the client's communications, by which the therapist restates what the client has said (usually in a summarized, paraphrased form)
2	Pinpointing	Clarify or 'pin down' the client's specific meaning regarding some event or interaction
3	Open-Ended Questions	An open-ended question is one that cannot be answered with a simple yes or no or another short reply
4	Confrontation	Used to point out discrepancies between what the client states and what is being observed
5	Self-Disclosure	Disclosing an aspect and show <u>empathy</u> of the therapist's experience is another technique that may be used to establish rapport, support the client emotionally,
6	Silence	Pauses in conversation may create a space for self-reflection, in which thoughts and emotions may become clearer and reach awareness
7	Reframing	Seeing old problems or events with new eyes
8	Focusing	Ensure that the therapeutic encounter remains just that—focused on the work of therapy


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#	Interviewing Technique	Therapeutic Examples
1	Reflection	Client says, "I can't seem to get anywhere in life". Reflective Response: "So, you feel like you're not achieving your life goals?"
2	Pinpointing	Client says, "I was abused as a child". Pinpoint Response: "What do you mean by abused?"
3	Open-Ended Questions	Therapist says, "Did you enjoy dinner with your mother?" vs. Open-Ended question: "Tell me how dinner was with your mother?"
4	Confrontation	Client says, "I drink socially". Confrontation Response: "You've had 3 DUIs in the recent past and you said you drink in the morning to steady your nerves. Tell me what social drinking means to you."


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#	Interviewing Technique	Therapeutic Examples
5	Self-Disclosure	Client says, "People think I'm a troublemaker because I get bored quickly in school and then get in trouble." Self-Disclosure Response: "I can relate, as I had ADHD in school and did the same thing."
6	Silence	Client says, "I get so mad at my spouse I feel like hitting them". Silence then Client Responds: "Then I immediately feel guilty for being a lousy spouse myself".
7	Reframing	Client says, "I'm nervous about my job interview". Reframing Response: "That's a good thing, it means you care".
8	Focusing	Client goes off on tangent about child's accomplishments. Focusing Response: "Your child sounds amazing, and you should be proud. Now let's pick up where we left off talking about your mother-in-law"


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Application to RCFA Interviewing...

#	Interviewing Technique	RCA Facilitation Examples
1	Reflection	Interviewee says, "I took a shortcut to ensure there was no production loss". Reflective Response: "As you know, this is very common. When one feels time pressured, they often take short-cuts in order to maximize production"
2	Pinpointing	Interviewee says, "We always take that short cut". Pinpoint Response: "Tell me more details about how often 'always' is, and specifically this short cut"
3	Open-Ended Questions	RCA Facilitator says, "Did you follow the procedure?" vs. Open-Ended question: "What led you to believe that was the correct choice (Sense-making), at that time?"
4	Confrontation	Interviewee says, "All those bolts were tightened when I did the inspection yesterday". Confrontation Response: "2 of the 8 coupling bolts were missing and the remaining ones had oxidation about ¼" from the head, indicating they were loose for some time. How do we reconcile these two accounts?"


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Application to RCFA Interviewing...

#	Interviewing Technique	RCA Facilitation Examples
5	Self-Disclosure	Interviewee says, ‘People think I’m a troublemaker because I’m opinionated.’ Self-Disclosure Response: “I can relate, as I was just like that. Then I got into the investigation business and learned I needed evidence to support my claims...it really works”
6	Silence	Interviewee says, “I get so mad when my boss doesn’t listen to me”. Silence then Client Responds: “Then I just give up and stop telling him about the safety hazards I see”.
7	Reframing	Interviewee says, “They say Safety is #1, but their actions say differently”. Reframing Response: “Why do you feel Safety is just a slogan?”.
8	Focusing	Interviewee goes off on tangent about being reprimanded in the past. Focusing Response: “I’m sorry you had this impactful event, when did this happen [usually it's been years, and they still carry the burden]”

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Handout Available

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Data Collection Strategy for Chronic Events

Develop a Collection Strategy

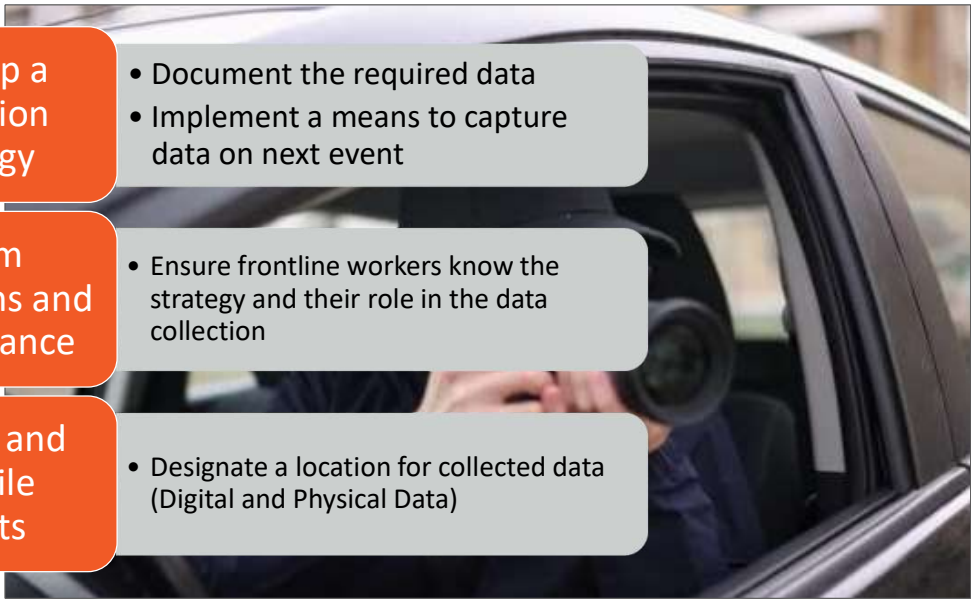
- Document the required data
- Implement a means to capture data on next event

Inform Operations and Maintenance

- Ensure frontline workers know the strategy and their role in the data collection

Execute and Compile Results

- Designate a location for collected data (Digital and Physical Data)



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Data Collection Form

Data Category	Item	Collection Strategy	Assigned To	Target Completion Date
Documentation	2 Years of Work Order History	Get records from maintenance management system	Bill Smith	10/31/2023
Interviews	Operator on Duty	Setup with Operations Supervisor	John Doe	11/3/2023



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Exercise – Data Collection

Develop a data collect strategy for the chronic failure that was used in the Problem Statement exercise. Utilize the data collection worksheets that were distributed to document the strategy. Be prepared to share your results with the other teams.



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