Investigating for Performance Improvement

Causal Reasoning

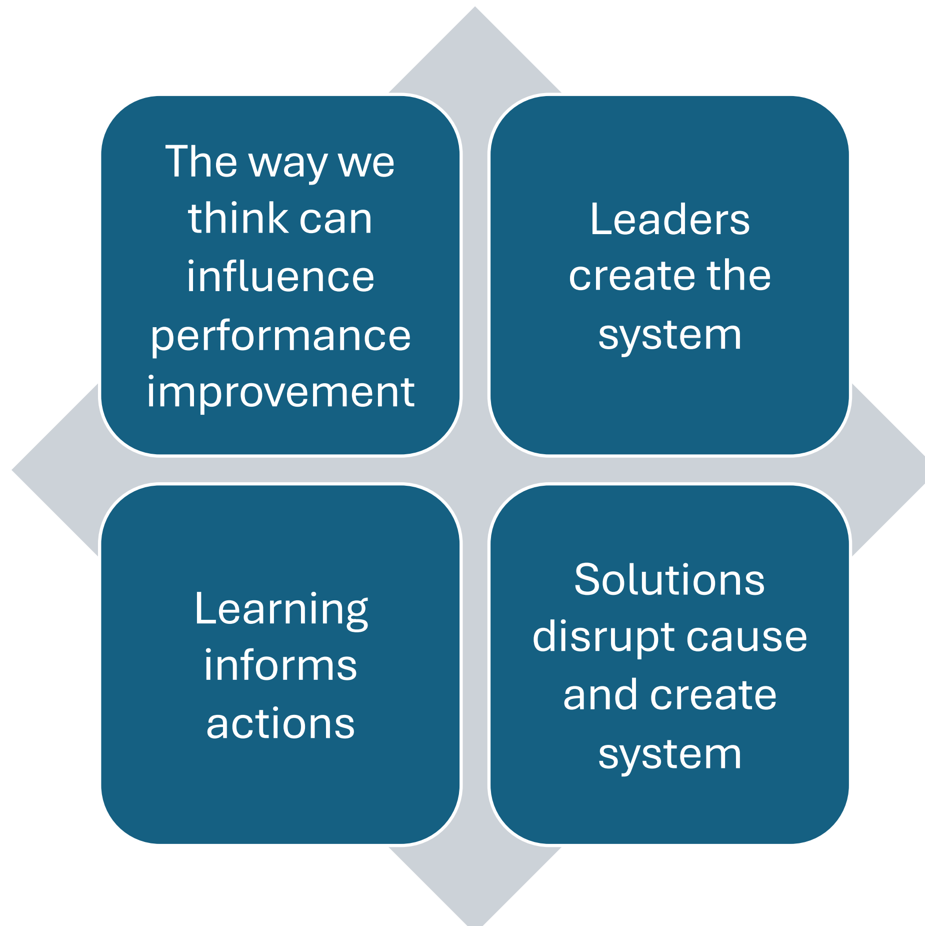
Problem Statement

Conventional investigation analysis approaches problems through hindsight, which limits the ability to improve performance

Agenda

- Reasoning challenge
- Negatively reasoned investigation assessment
- Causally reasoned investigation assessment
- Discussion

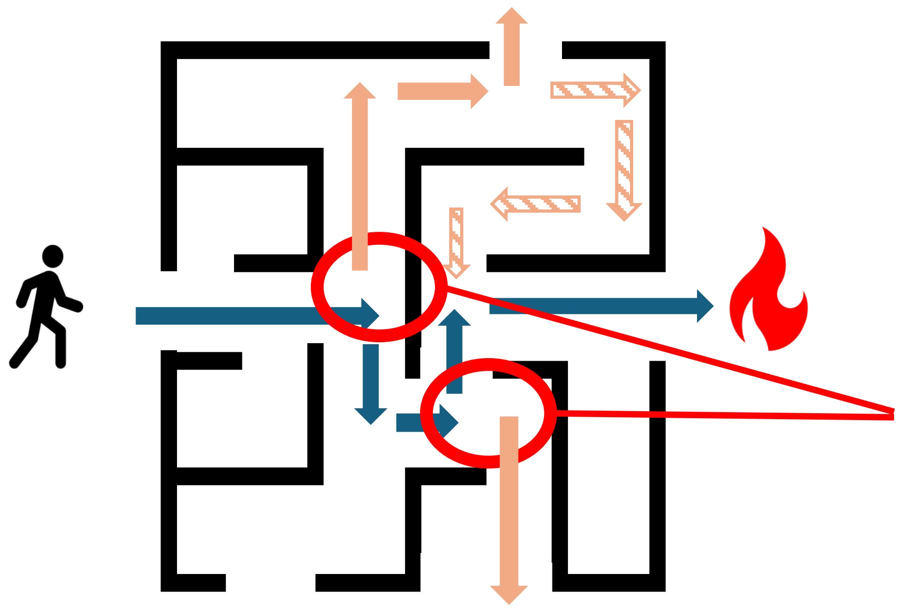
Key Principles to Improve Performance



Hindsight Bias

Hindsight bias is one of the most challenging biases to overcome when setting out to investigate problems. This bias underpins all other biases and removes the objectivity from the work.

In foresight, the individuals make decisions and take actions they believe will lead to success



Hindsight enables us to examine the information through the lens of the outcome

Limits objectivity as we now can see the better choices

Reasoning Orientations

Negative

- Explains effects from what did not occur or was missing
- It comes from our ‘should-be’ models, based on hindsight
- Are not causal because they do not exist in the first place

Solution

- Are actions that we perceive will fix the problem
- Are often based on experience or negative reasoning
- Sets up the investigation to support the actions

Causal

- Are based on what’s present
- Allows organizations to understand how and why we got into the problem in the first place
- Reveals a hidden system
- Is an abnormal way of thinking

Tow Truck Rigging Example

- A tow truck operator was contracted to move a seacan off site after construction was finished
- The seacan was rigged with a choke hook on the passenger side of the tow truck
- The winch was used to hoist the seacan onto the tilt bed truck
- The seacan snagged on the bottom of the bed
- The choke hook broke and released the rigging chains that swung toward the operator

Reasoning Exercise

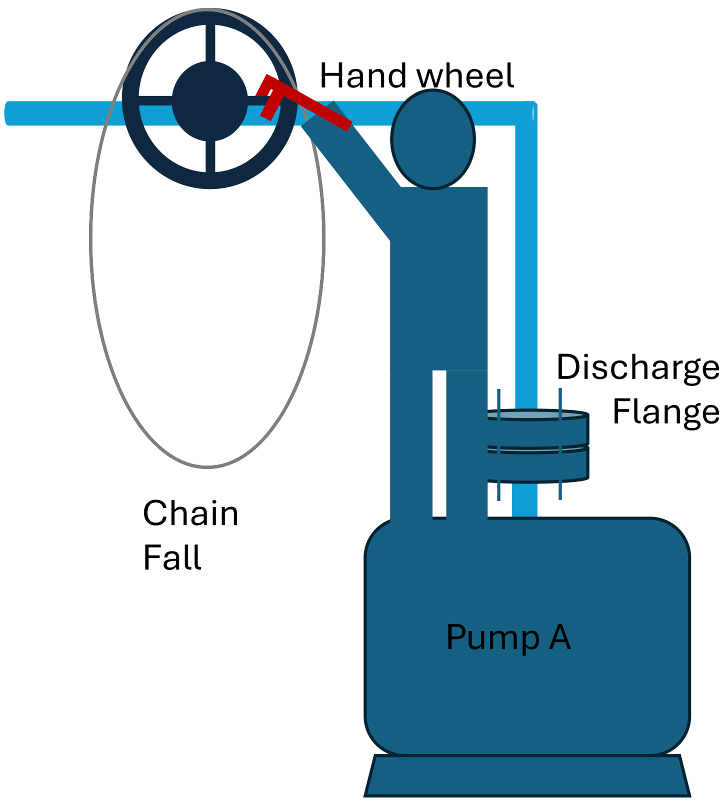
Negative	Solution	Causal
The contracting supervisor didn’t stay to observe the work	Review lifting practices with tow truck operators before work	The operator was standing between the winch and the seacan
Contractors should use a crane to lift seacans	Contractors should use a crane to lift seacans	The winch force was high enough to break the choke hook
The tow truck operator didn’t recognize the hazards	Create an exclusion zone around tow trucks with lifting	The seacan snagged on the bottom of the tow truck bed
The tow truck operator was in the line of fire	Operate winch controls from inside the truck cab	The J hooks came out of the seacan connector holes

What reasoning orientation do you see the most in your analysis?

Where would each reasoning orientation be most appropriate?

What reasoning orientation did you find easiest?

Incident Case Study: Broken Wrist



At approximately 10 am, a significant amount of propane solvent was released from an open flange in a hydrocarbon refinery. During the emergency response by an operator, the operator sustained an injury to his hand resulting in a broken wrist.

- A propane pump was prepared, locked and tagged and permitted as per isolation procedure on the night shift the day before for maintenance.
- At approximately 10 am, the board operator directed the field operator to investigate the alarm.
- The field operator used an 18” pipe wrench to attempt to close the valve.
- On the second attempt to close the valve further, the wrench slipped off the valve wheel and the field operator’s hand struck the pipe assembly behind him, resulting in a broken hand.

Incident Case Study: Broken Wrist

Negative	Causal
Operator used an improper tool	Operator was using an 18” pipe wrench as that was the tool endorsed by leaders to deal with sticky valves
Operator didn’t recognize the hazard	Operator believed that a release of propane for a few more minutes would result in a detonation or a plant shutdown / evacuation
Operator didn’t learn from past failures	Leaders had decided to leave the valve in place after being informed it was sticky as they believed the operators could figure out how to deal with it
The valve was faulty	The valve was passing when maintenance removed it because the night shift operator believed the the system was isolated after checking to see if the open drain port was releasing any propane (later discovered it was blocked)

The Outcome

The learning

- The leaders realized they helped set up the operators to fail
- They had accepted that the process was deteriorating over time, and they were relying on operators to fix it for them however they could
- They realized that their isolation procedures can create illusions as well as successful outcomes

The Consequence

- The operator's job was saved but they chose to leave anyway

The Change

- The started working on how to create more reliable and safe processes rather than fire the 'bad operator' or provide mitigations (like valve wrenches that keep breaking) that don't work for the operators

Problem Resolution

Causal reasoning improves understanding and actions

How can you use this going forward in your role?

How can you help your organization improve?

Thank you! For More Information:

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