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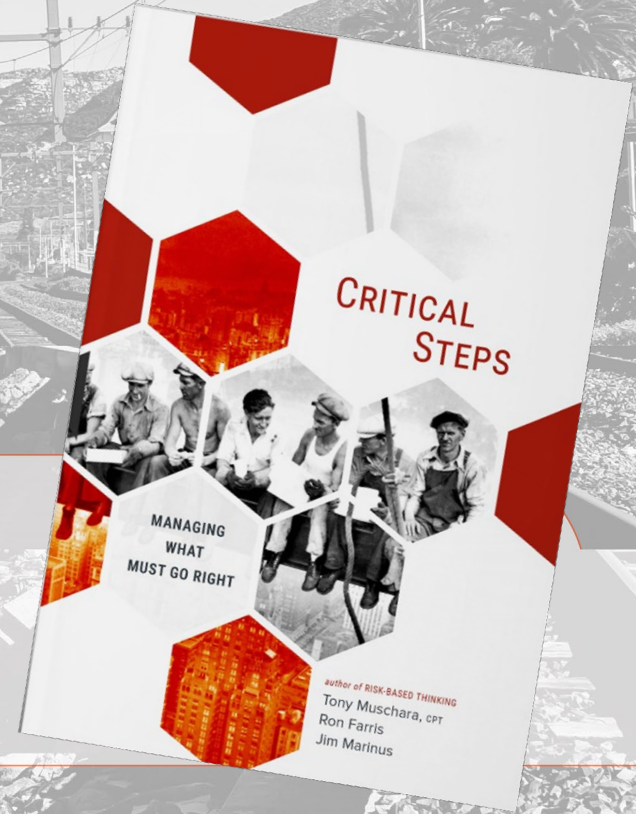
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CAPE TOWN, O

Ron Farris
Chief Operations Officer
High Reliability Partners

Risk Management in a Dynamic Work Environment





If everything is important, then everything is equally unimportant.



- For any high-hazard activity if you asked everyone involved, *“What are the most important actions?”* How many answers would you get?
- That’s why it’s so important to single out the most important human actions that pose the greatest risk and make sure they go right.
- Change the language people use, to change the way people think. Thinking differently will change the way people approach and perform work.



Safety is often Misunderstood*



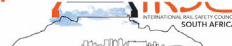
Safety is **NOT** the absence of events (harm to assets).

Safety **is** what you **DO** to protect your assets using a variety of defenses (controls, barriers, and safeguards).^{**}

Safety **is** typically conceived in the mind of the performer before work starts by knowing “*what must go right*” and “*what can wrong and when (not if) it does, who will do what*”.

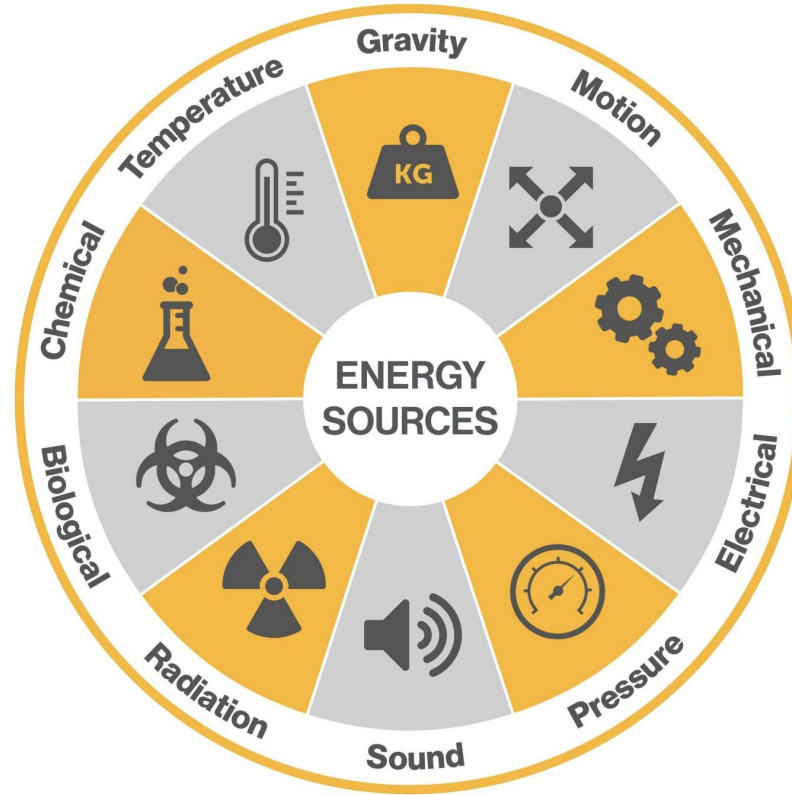
Safety **is** what you do in response to the unexpected, and to protect assets (*adaptive capacity*).

* Woods, D. et al. (2010), *Behind Human Error*, 2nd ed. (pp. 12-13, 38-39), **Hollnagel, E. (2018). *Safety-II in Practice*. (p.107).



Sources of Energy

Dr. William Haddon pioneered the idea that every illness or injury results from unwanted contact with some source of energy.



The Energy Wheel is a tool that helps workers recognize sources of energy (built-in hazards) on job sites that pose risk to assets.

Work = Risk



Work is energy directed by human beings to create value.



Humans are the greatest source of **variability** in the workplace.



Therefore, work is the use of force under some **uncertainty**.

“If an operation has the capacity to do **work** (force x distance), then it has the capacity to do **harm**.”

—Dorian Conger
MORT cause analysis expert



Risk Revisited

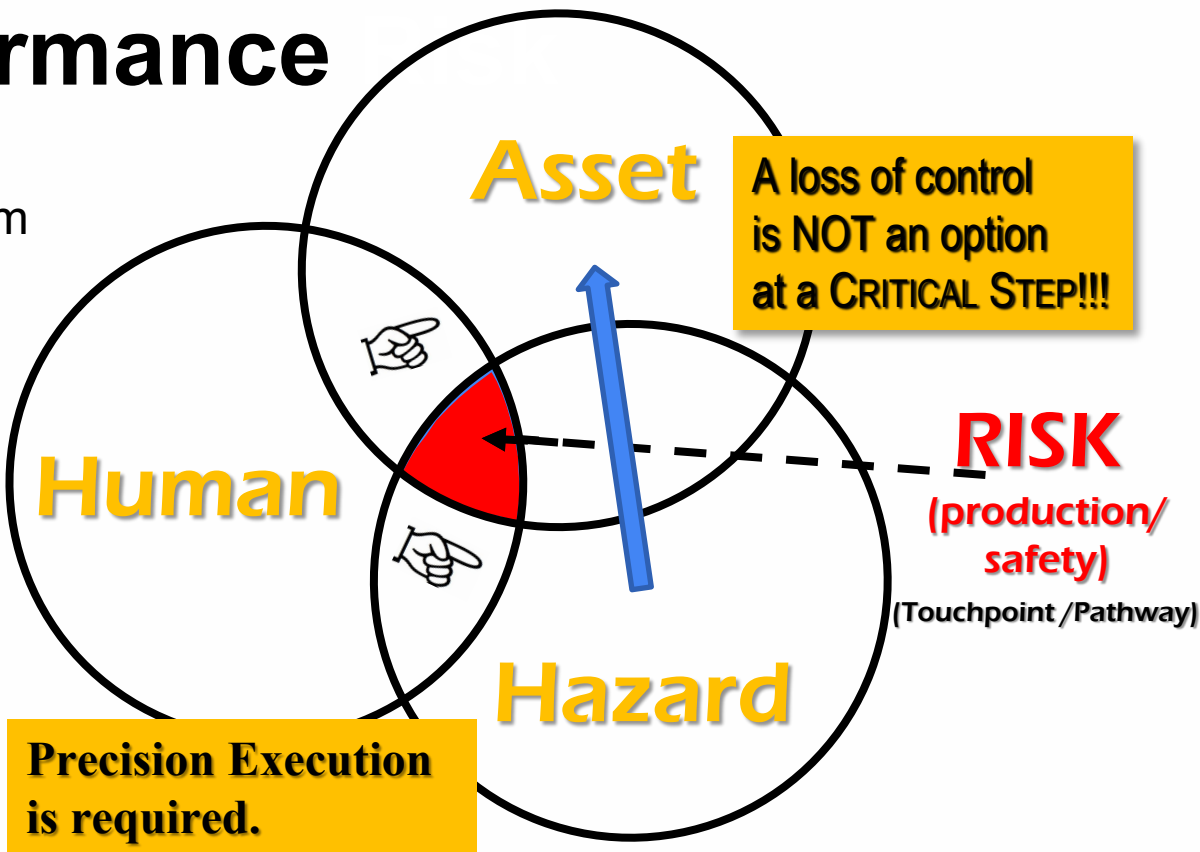


- **Work = Risk**
- **Risk is** a permanent daily attribute of work.
- **Risk is dynamic**; pathways for harm (work) from built-in hazards that come and go.
- **Risk of harm** to assets emerges when people do work with built-in hazards, without which nothing of value is created.

Human Performance

Pathways. Exposure of an asset to the potential for harm for which only one action (equipment or human) is needed to alter the asset's state

Touchpoints. Interactions between people and assets, between people and hazards that changes the state of that object through work



CRITICAL STEP*

– Point of No Return | What **MUST** Go Right

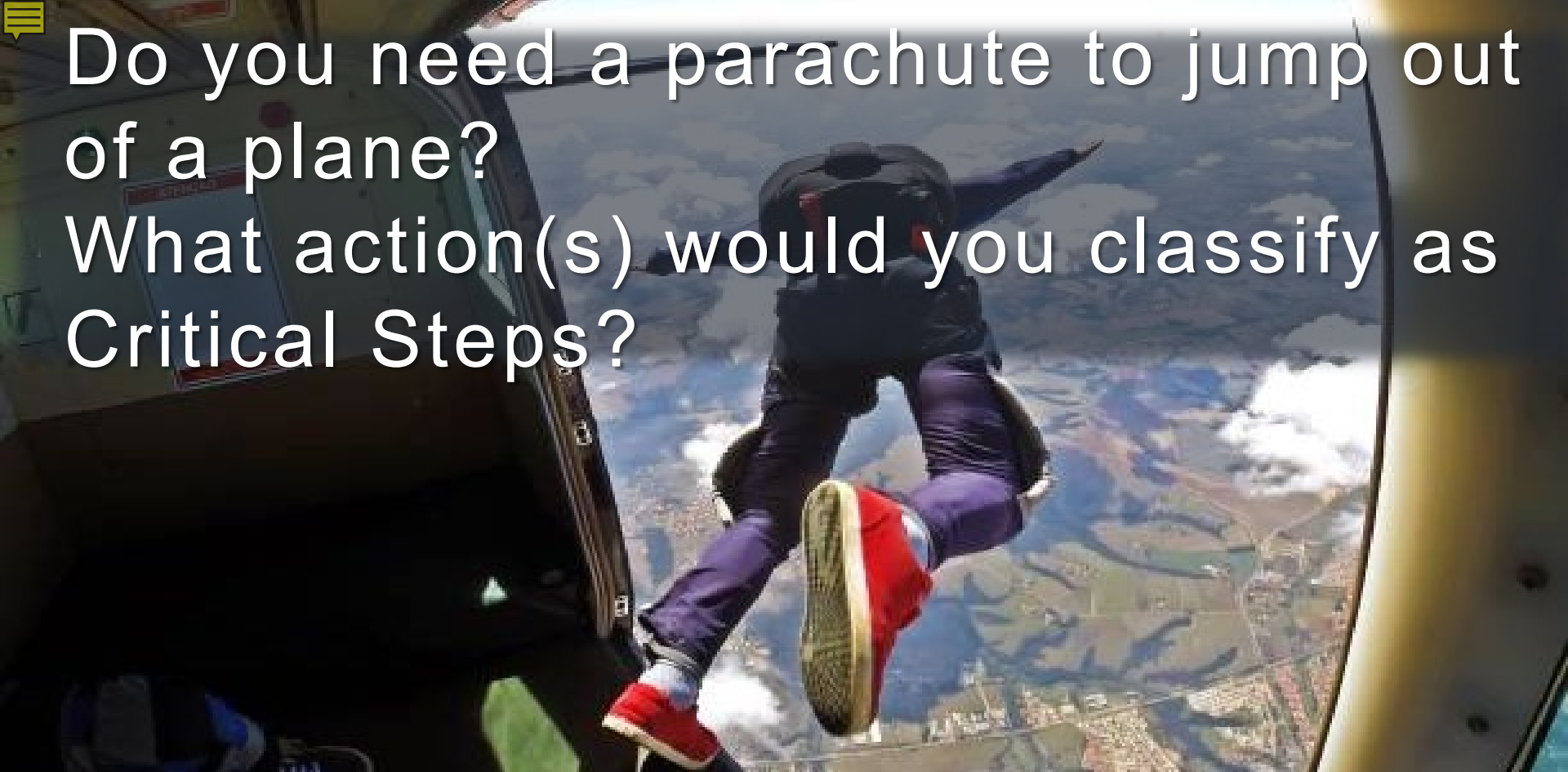


A human action that will trigger *immediate, irreversible, intolerable harm* to an asset, if that action or a preceding action is performed improperly.



Precision execution is the **ONLY** acceptable standard of performance at a **CRITICAL STEP**!

* Muschara, T. (2018). *Risk-Based Thinking: Managing the Uncertainty of Human Error in Operations*. New York: Routledge.



Do you need a parachute to jump out of a plane?
What action(s) would you classify as Critical Steps?

Is this a CRITICAL STEP?



Risk Management in a Dynamic Work Environment



Reframing 'Human Error'

Human fallibility is an inherent characteristic of the human condition.

Error – (*a loss of control in an operational setting*): An uncontrolled transfer of energy, movement of matter, transmission of information.

Managing CRITICAL STEPS is:

- A risk management process, not a human performance problem, per se.
- The **goal** is not so much focused on preventing **human error** as it is on *making sure the right things go right*.
- Is a profit multiplier.





Risk Important Actions Create Safety and Danger

A reversible human action that:

- Precede all Critical Steps,
- Create safety or danger,
- Always creates safety when done correctly, danger if not,
- There are always at least two RIAs prior to a Critical Step.
 - One that creates a pathway for work and
 - 2nd that protects the asset during work,
- Influence the ability to maintain positive control of the of built-in hazards at Critical Steps.

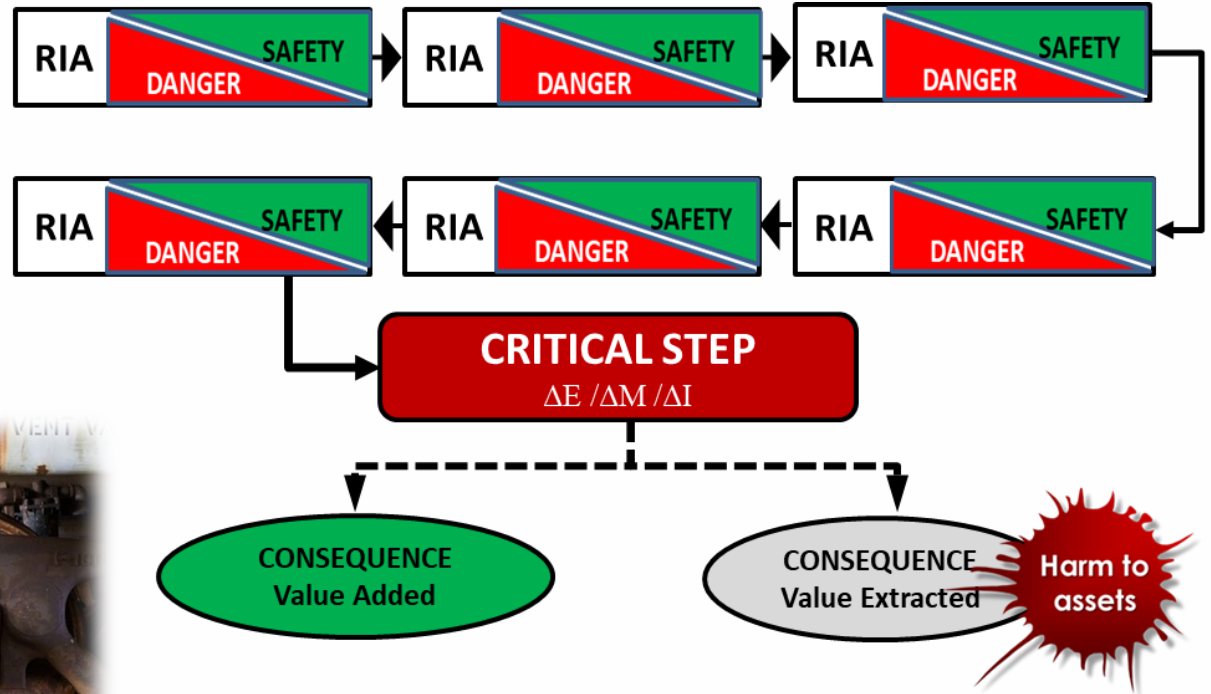


Binary Nature of RIAs

RIAs can add danger or safety:

As part of the activity or

RIAs can add danger:
Due to human error
(landmine)





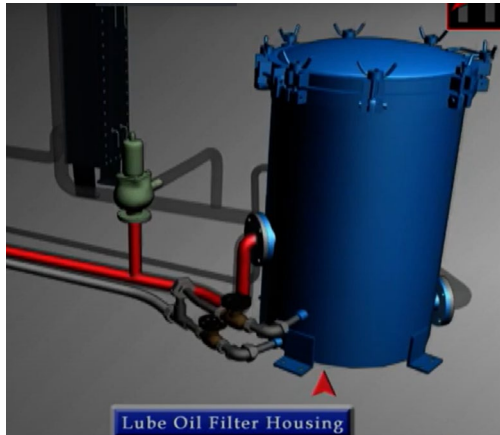
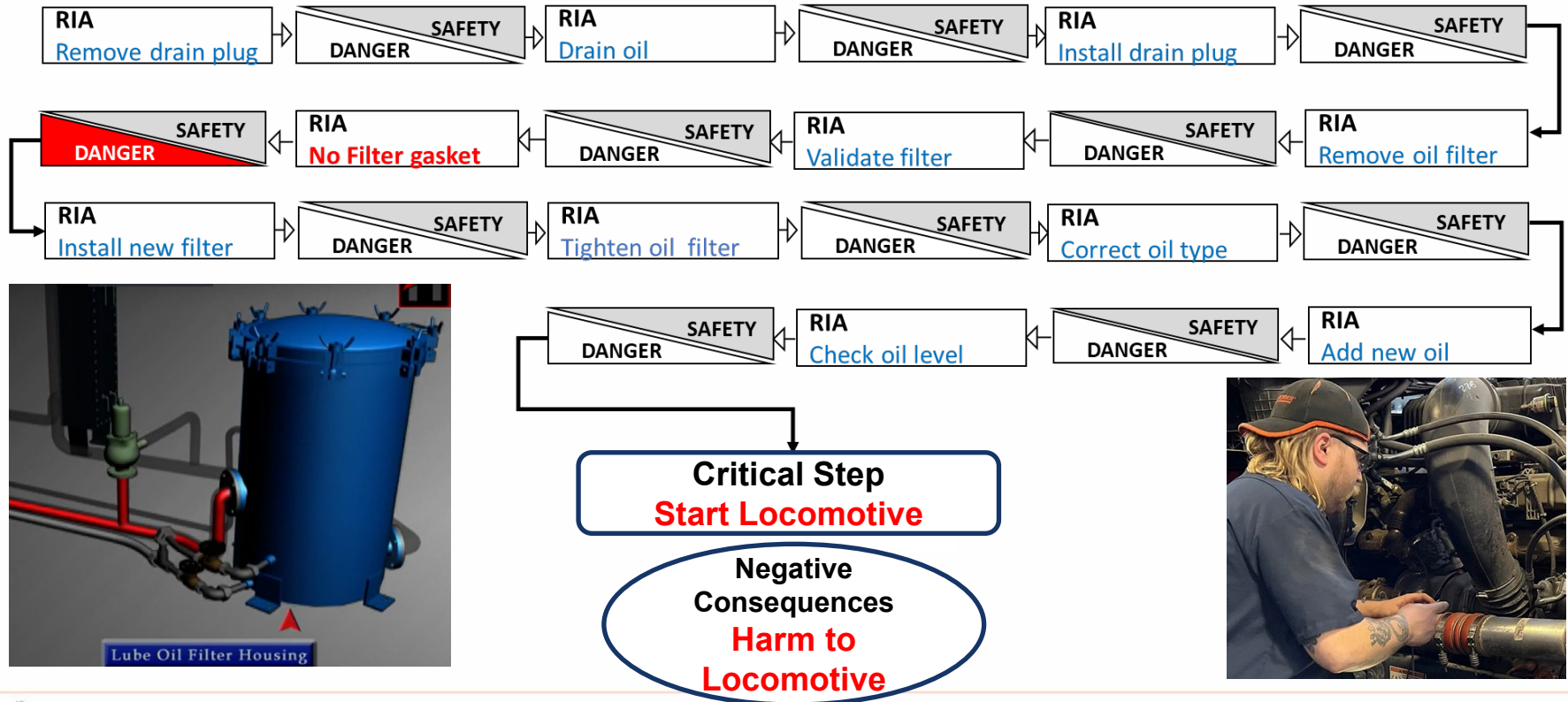
Changing Locomotive Engine Oil Filter

Do these RIAs add safety or danger?

1. Remove oil pan drain plug (Drain the oil)
2. Reinstall oil pan drain plug and tighten
3. Remove used oil filter
4. Validate new filter is correct filter
5. Check new oil filter for gasket and lubricate it
6. Install new oil filter with gasket
7. Tighten the oil filter (hand tight)
8. Validate correct oil type for the locomotive engine
9. Add new oil
10. Check oil level and reinsert dip stick
11. Start the locomotive (Critical Step)



RIA – Checking Oil Filter Gasket





Critical Step Hold Point



- Just prior to performing a *Critical Step*, one has opportunity and time to review the outcomes of previously performed *Risk Important Actions (RIAs)* to verify (prove) that conditions are safe for assets to proceed with the *Critical Step*.
- High reliability organizations do it with regularity, formality, and rigor, every time!



Performing a Critical Step



Before, the execution of a Critical Step, the performer considers:

- the asset and its key critical parameters,
- the intended outcome (expected change in asset's critical parameters),
- built-in hazard used to change the state of the asset and its related *controls*,
- the preconditions (Risk Important Conditions) for safety to protect the asset (including *barriers* and *safeguards*), and
- the action to achieve the outcome (positive control). Once the performer is confident, only then is the action performed (precision execution).



What you can do tomorrow:

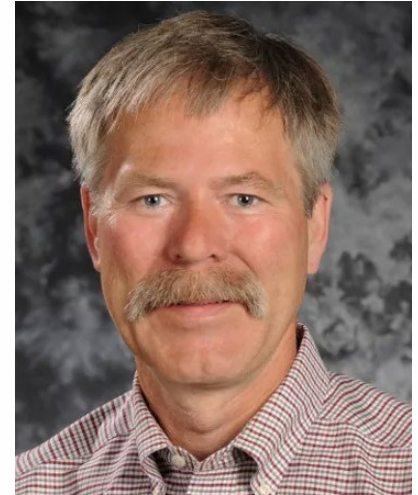
1. Identify key processes that **cannot** fail.
2. Identify assets to be protected from (all) hazards.
3. Pinpoint **CRITICAL STEPS** and associated **RIAs** for these processes.
4. Create hold points at CRITICAL STEPS and **verify Risk Important Conditions** established by associated upstream RIAs.
5. Identify **means to avoid** loss of control (e.g. error prevention tools/techniques).



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References

- T. Muschara, R. Farris, J. Marinus. (2022) Critical Steps: Managing What Must Go Right. CRC Press. <https://www.criticalstep.com/>
- Muschara, T. (2018). Risk-Based Thinking: Managing the Uncertainty of Human Error in Operations. New York: Routledge.
- Hollnagel, E. (2004). Barriers and Accident Prevention. Burlington, VT: Ashgate.
- Weick, K., and Sutcliffe, K. (2007). Managing the Unexpected: Resilient Performance in an Age of Uncertainty (2nd ed.). San Francisco, USA: Jossey-Bass.

Terms

Human Error - An error that refers to the slips, lapses, fumbles, and mistakes of humankind, regardless of whether one's goal is accomplished or not—not all human errors have bad outcomes.

Active Error - An error (action) that unintentionally triggers a loss of control of a hazard, altering the state of an asset and resulting in its immediate harm.

Latent Error - An error that creates a potentially unsafe condition, unnoticed at the time, causing no immediate, apparent harm to an asset, but that could combine with other errors, occurrences, or conditions at a later time to realize the harm.

Terms (cont.)

Assets – things important, of high value, to an organization to be protected from harm (people, products, property, environment, reputation, software, intellectual property).

Adaptive capacity -The ability to change when circumstances change; readiness to adjust to challenges to make things go right.

Hazards – A source of energy, matter, or information that could harm an asset or cause its loss—usually built into a facility for operational and business purposes. Any condition in the workplace that could harm or trigger harm to an asset.

Landmine - A workplace condition that increases the potential for an uncontrolled transfer of energy, matter, or information with one action—an unexpected source of harm.



Terms (cont.)

Defense-in-Depth - The overlapping capacity of redundant defenses (e.g., controls, barriers, safeguards) to protect an asset from danger, such that a failure of one defense is compensated for by other defenses, thereby avoiding harm.

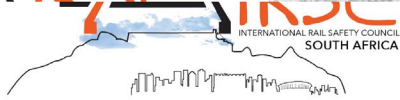
Control - Means that guide, coordinate, or regulate behavior, promoting desired action and outcome while improving the chances of error-free performance.

Barrier - Means used to protect an object (or asset) from harm by limiting or impeding uncontrolled transfers of energy (e.g., gravity, electrical, chemical), movements of objects or substances (e.g., loads, shipments, product, fluids), or transmissions of information (e.g., as signals, digital records, software).

Safeguard - Means of mitigating or minimizing the harm done to an asset after the onset of injury, damage, or loss.



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