SAFETY INSIGHTS
BRINGING GOOD SENSE TO SAFETY

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INSIGHTS ON THE ISOLATION OF HAZARDOUS ENERGY

- Most heavy industry operations have detailed procedures for the isolation of hazardous energies for maintenance i.e. Lock Out – Tag Out or LOTO procedures and well designed equipment, but incidents involving the sudden uncontrolled release of hazardous energy, some resulting in permanent or fatal injuries, still occur.
- Several of my clients have needed assistance with recurring incidents, fortunately no injuries. The incidents are often more complex than they appear and investigations can mis-direct findings at people, when other equipment, process and organisational factors exist.
- I have not covered the basics of what the isolation process is or how it is done. The intent here is to present a body of knowledge, based on recent work and hopefully some valuable insights to help frame thinking to better understand any problems you may have.

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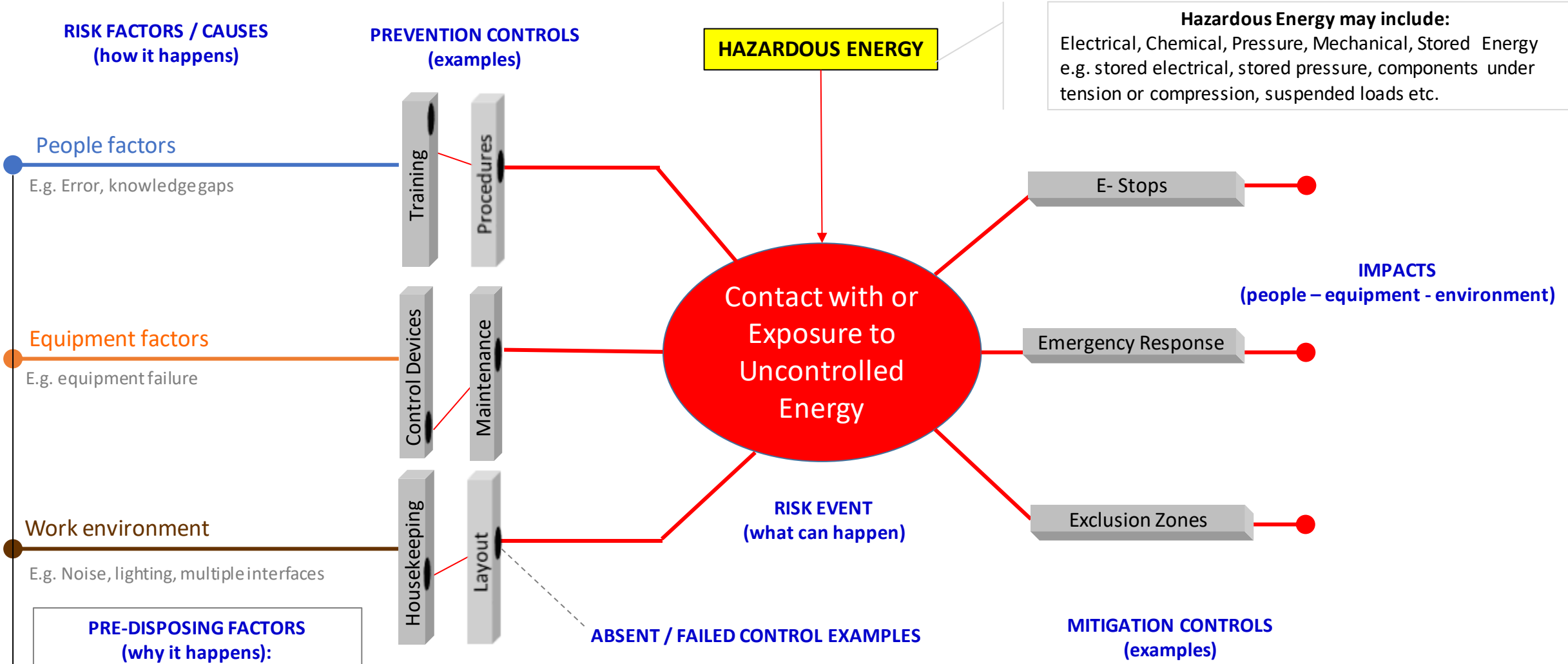
THE BIG PICTURE OF AN ISOLATION INCIDENT (BASIC BOW-TIE)



COMMON ISOLATION FAILURES – BASIC FAULT TREE

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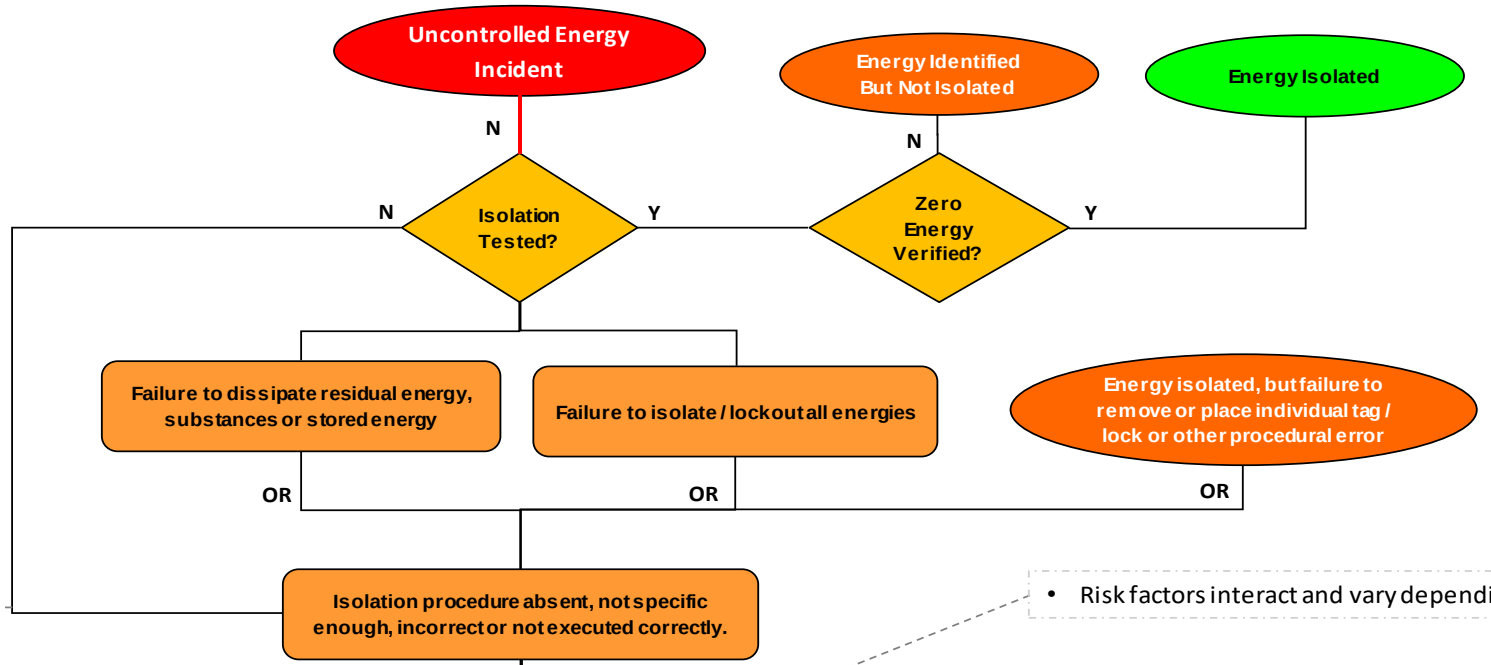

A specific isolation procedure with a test / verify step is essential.

- Risk factors interact and vary depending on the workplace.

Common People Factors

1. Unauthorized task or energization.
2. Errors or mistakes from lack of knowledge.
3. Wrong equipment worked on or isolated.
4. Willful / Reckless Act.

Dig deeper you may find:

- Generic, ambiguous or incorrect procedures;
- Information, training or instructions deficiencies;
- Task authorization (permit to work) process failures;
- Poor operating discipline / leadership; and / or
- Communication breakdowns.

Common Equipment Factors

1. Isolation points not clearly identified.
2. Wiring or piping schematics incorrect / unclear.
3. Change to equipment configuration / control.
4. Isolating device failure.

Dig deeper you may find:

- Isolation points were never labeled;
- Isolation devices not maintained;
- Unmanaged change to equipment; and / or
- Documents not updated after change.

Common Work Environment / Task Factors

1. Many people / tasks interfacing.
2. Isolation points difficult to access / apply correctly.
3. Low lighting, noise, poor housekeeping.

Dig deeper you may find:

- Work area / task set-up inadequate;
- Poor design / installation of isolation devices; and / or
- Poor housekeeping.

ANALYSIS FROM 100 SIGNIFICANT ISOLATION INCIDENTS (FROM A PREVIOUS ROLE)

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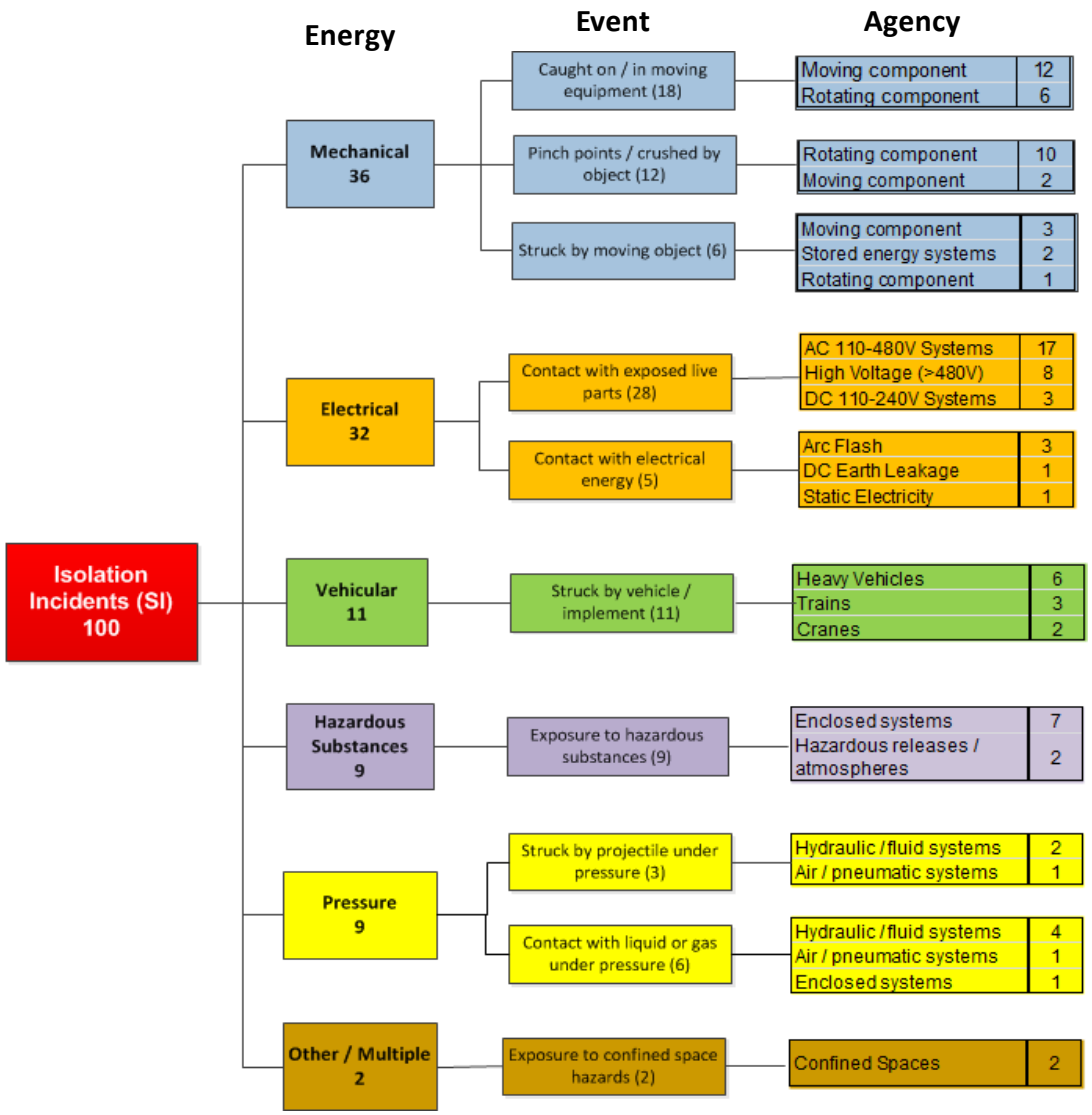
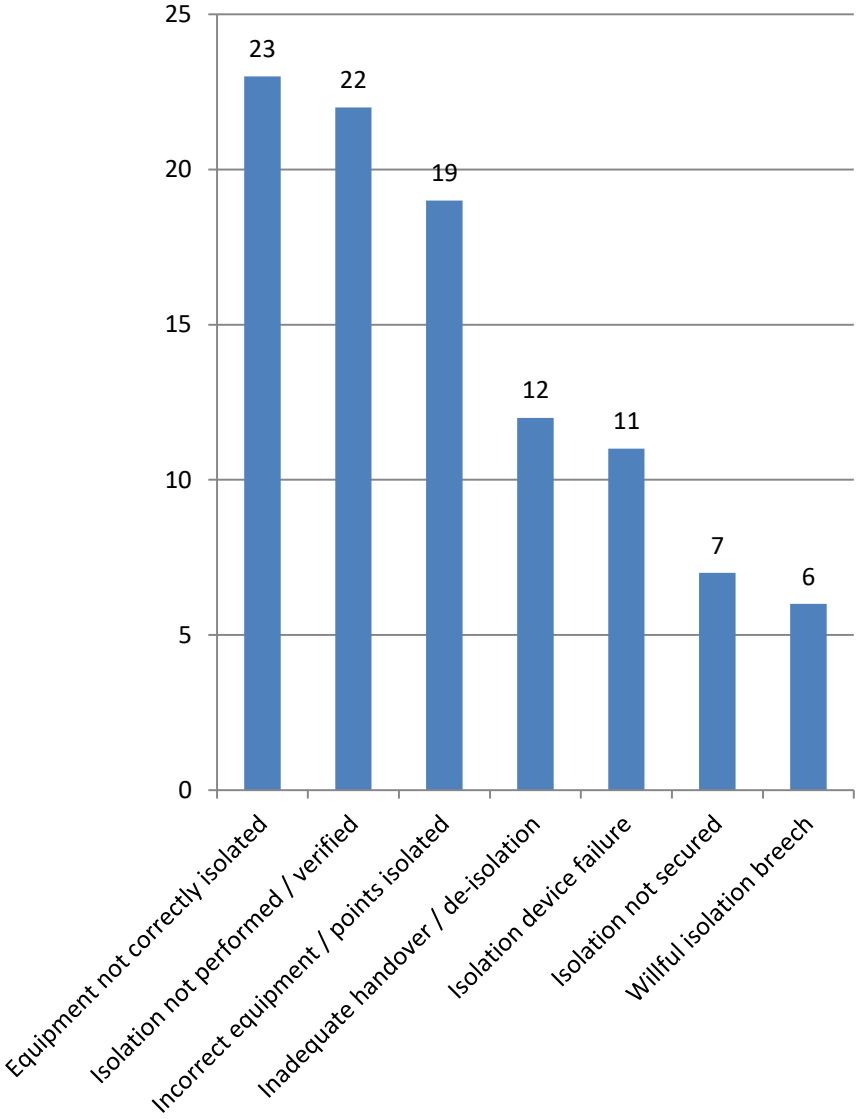
Global Recourses Company, 2002-2012.

Basic incident taxonomy (100)



Factors identified by investigations (100)



PROBLEMS INVESTIGATIONS HAVE MISSED

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1. Testing / verifying isolation from a control room, may not always provide physical verification, there can be miscommunications.
2. Testing for zero energy on programable logic controlled (PLC) equipment needs to account for all permissible signals (Go or No-Go).
3. Procedures written by people who don't understand the circuit, piping, or equipment operation are often incorrect or increase errors.
4. Isolation points or devices that are not easy to access / use, increase mistakes / failures, but investigations rarely find this.
5. If people don't know how they are protected, it can lead to more errors / unwanted interactions.
6. Live test or adjustment, needs a procedure to de-isolate, handover and exclude people from the area leads to unwanted interactions.
7. If residual substances, upstream / downstream energy are not properly understood, eventually conditions for an incident will exist.
8. People cleaning / clearing blockages, need simple, accessible, identifiable isolators, otherwise short-cuts will be taken.
9. Individual isolations (every person for themselves) does not work where many people are working on equipment, they will interrace, by accident not by design. Isolations are rarely effective If everyone is responsible, chances are no one will be.
10. If authorisation / permit to work, lacks rigour, it can lead to unauthorised energisation of systems and unwanted interactions.
11. Changes to equipment, wiring, piping or control logic must be managed, and documentation updated, the isolation can be incorrect.

GUIDING PRINCIPLES

1. Every isolation process must:
   - ❑ Identify all sources of Energy
   - ❑ Remove energy or Isolate the energy at the source
   - ❑ Lock and Tag all Isolations
   - ❑ Clear all residual energy, substances, hazards and personnel from area.
   - ❑ Test and verify the isolation to confirm zero energy, e.g. try to energise / operate.

2. People must be competent and authorised (permit) to work on, in or around any equipment where the normal operating controls are not all in place (protected persons).

3. Only competent authorised people (Isolation Officers), perform isolations in accordance with a procedure. Isolation officers locks must be first on, last off.

4. Work on live equipment for the purposes of moving, testing, adjusting the equipment etc. is only performed in accordance with a written procedure specifying local hazard controls with an isolation officer to de-isolate and re-isolate equipment and act as a spotter.

5. All isolation devices and equipment are fit for purpose, maintained, readily identifiable. Any changes to the equipment should be managed and documented and all relevant documentation updated as part of the process.