MESA

MINE ELECTRICAL
SAFETY ASSOCIATION INC.

MINING ELECTRICAL SAFETY 2017 CONFERENCE

10 – 12 JULY 2017

PULLMAN KING GEORGE SQUARE HOTEL,
BRISBANE

mesaqld.com.au

The Evolution of Isolation

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The Evolution of Isolation

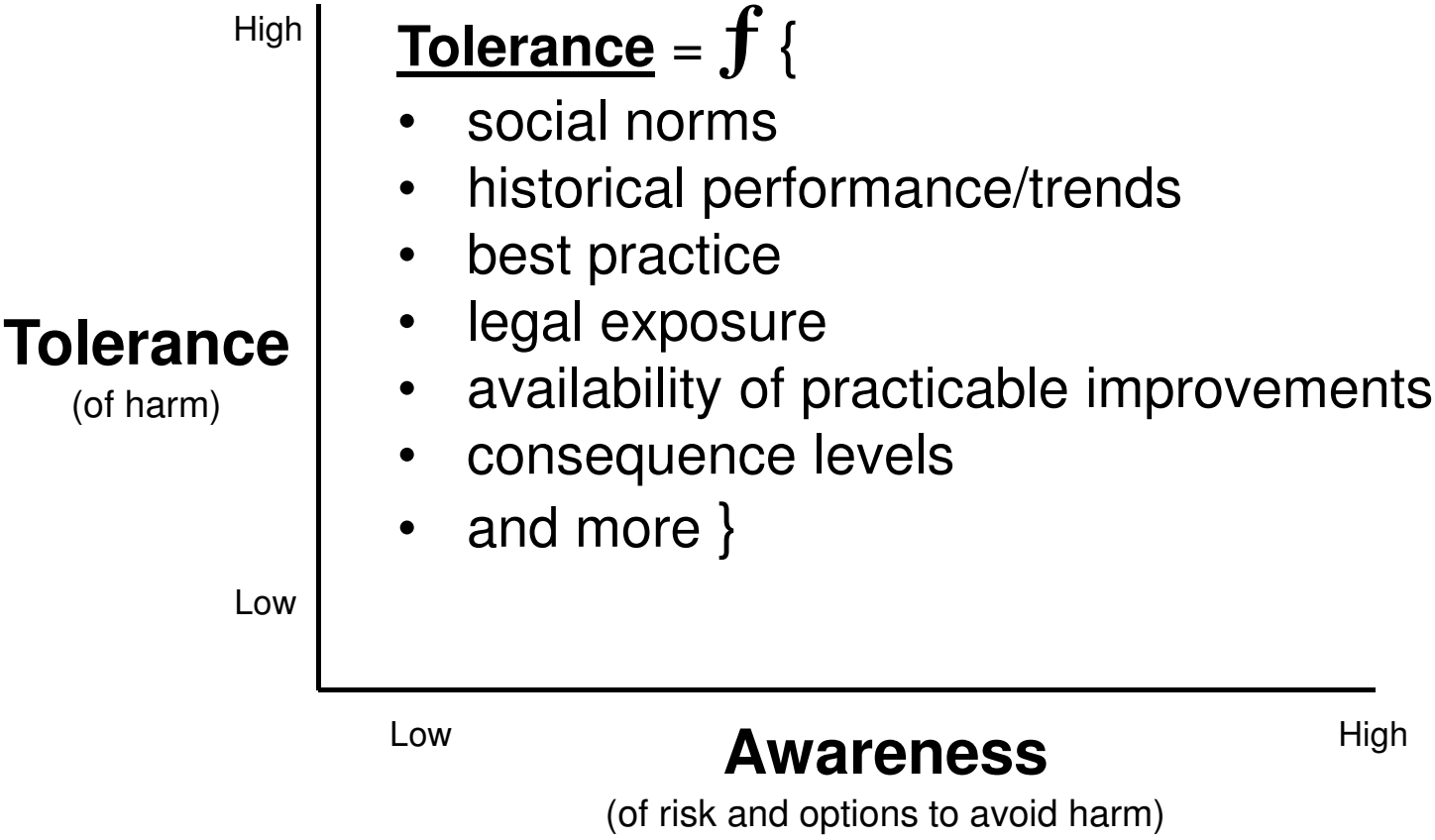
"***Evolution***":

- The gradual development of something *(Oxford)*
- A process of change in a certain direction *(Merriam Webster)*
- A process of continuous change from a lower, simpler, or worse to a higher, more complex, or better state *(Merriam Webster)*

Q: Is there some underlying force driving the evolution of isolation practices?

The Evolution of Isolation

Evolving Attitudes



Tolerance = f {

- social norms
- historical performance/trends
- best practice
- legal exposure
- availability of practicable improvements
- consequence levels
- and more }

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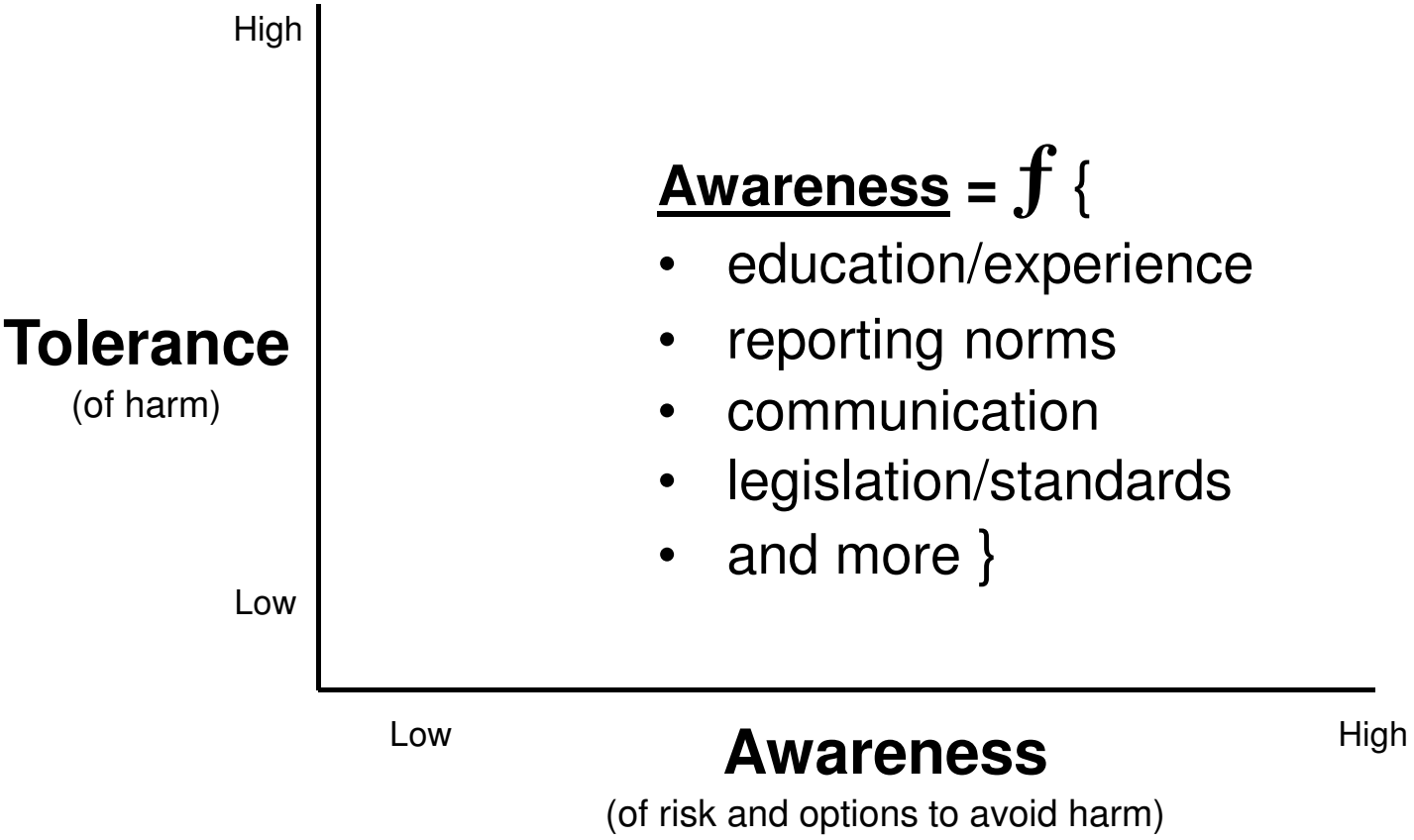
Evolving Attitudes



Awareness = f {

- education/experience
- reporting norms
- communication
- legislation/standards
- and more }

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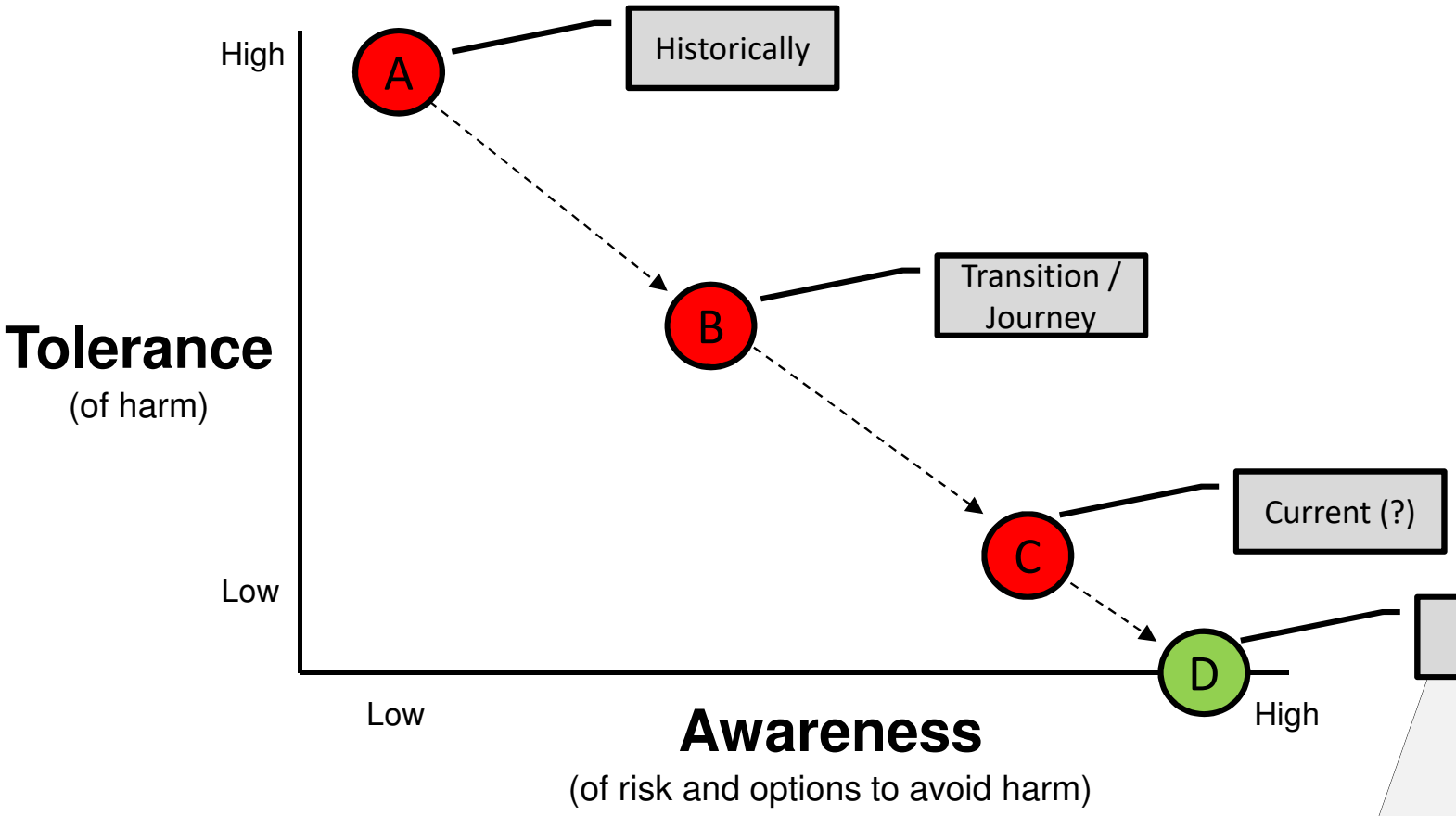
Evolving Attitudes



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Comparison to working at heights

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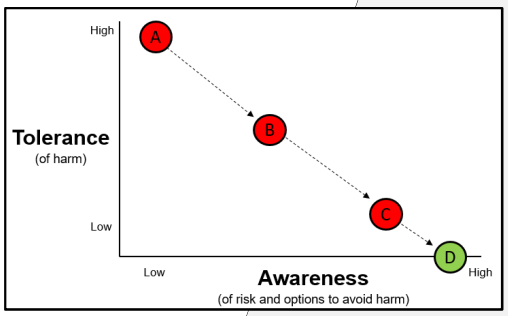

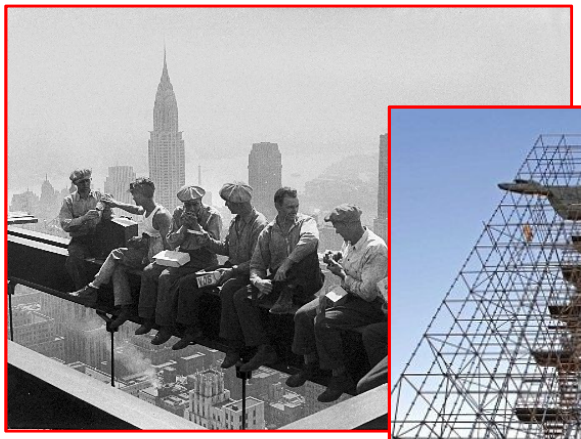

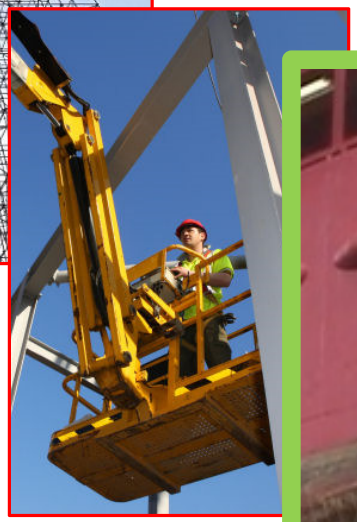

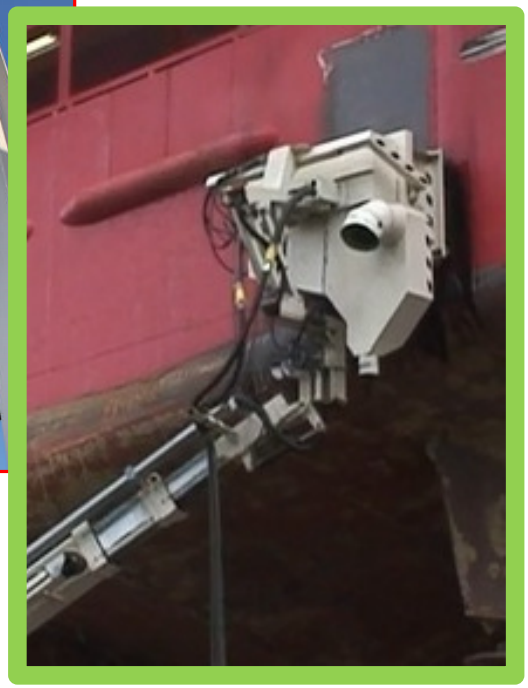

From the early days:

- **Scaffolding** – clearly now aware of the risk and of ways to manage.
- **EWP** – technology is providing even greater levels of risk reduction.
- **Remote control** / autonomous sandblasting – an example of risk elimination and a very powerful way of mitigating working at heights risks.

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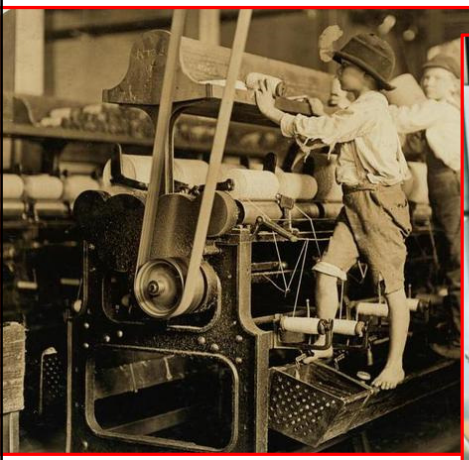
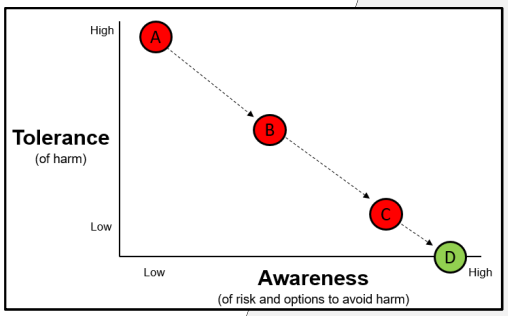
The journey so far…



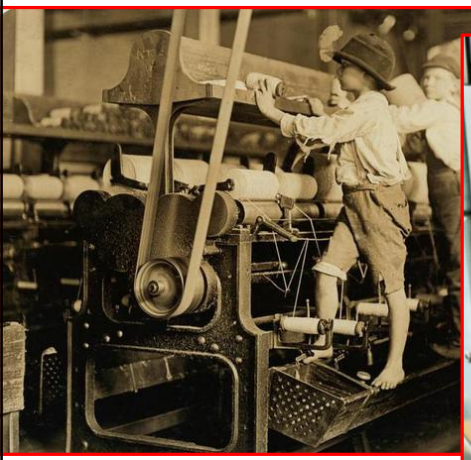


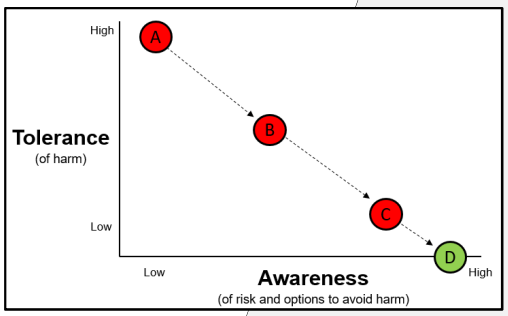
From the early days:

- **Tag out** – now aware of the risk and starting to take some measures to mitigate
- **Lock out** – now more secure isolations, however still prone to several forms of human error. Verification methods also improved around this time.
- **Single Point Isolators** – reduce the likelihood of human error and making isolations quick and easy motivates personnel to do the right thing.
- **Remote Isolation Systems** – Takes the concept of a single point isolator and adds intelligence. This provides much greater flexibility (eg being able to perform isolations at a distance) and introduces incredibly robust failsafes (eg continuous monitoring of isolation status with action taken if required).
- **Later generation remote isolation** – very elegant / foolproof design. Unable to lock-on without a verified isolation in place. Also reduced cost.

The Evolution of Isolation

The journey so far…





Q: What might be next?

Q: Do we actually need to do more?

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Do we need to improve?

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"Sadly, I have to report that there was one fatality for the year. That fatality occurred at a central Queensland quarry where a young man was killed when he came into contact with a conveyor system. Over the years there have been several injuries and fatal accidents associated with this type of equipment, yet ***the standard isolation procedure is still being ignored****."*

Stewart Bell
Deputy Director-General—Safety and Health
Commissioner for Mine Safety and Health
Qld Mines and Quarries Safety Performance and Health report
June 2012

The Evolution of Isolation

Review of recent trends

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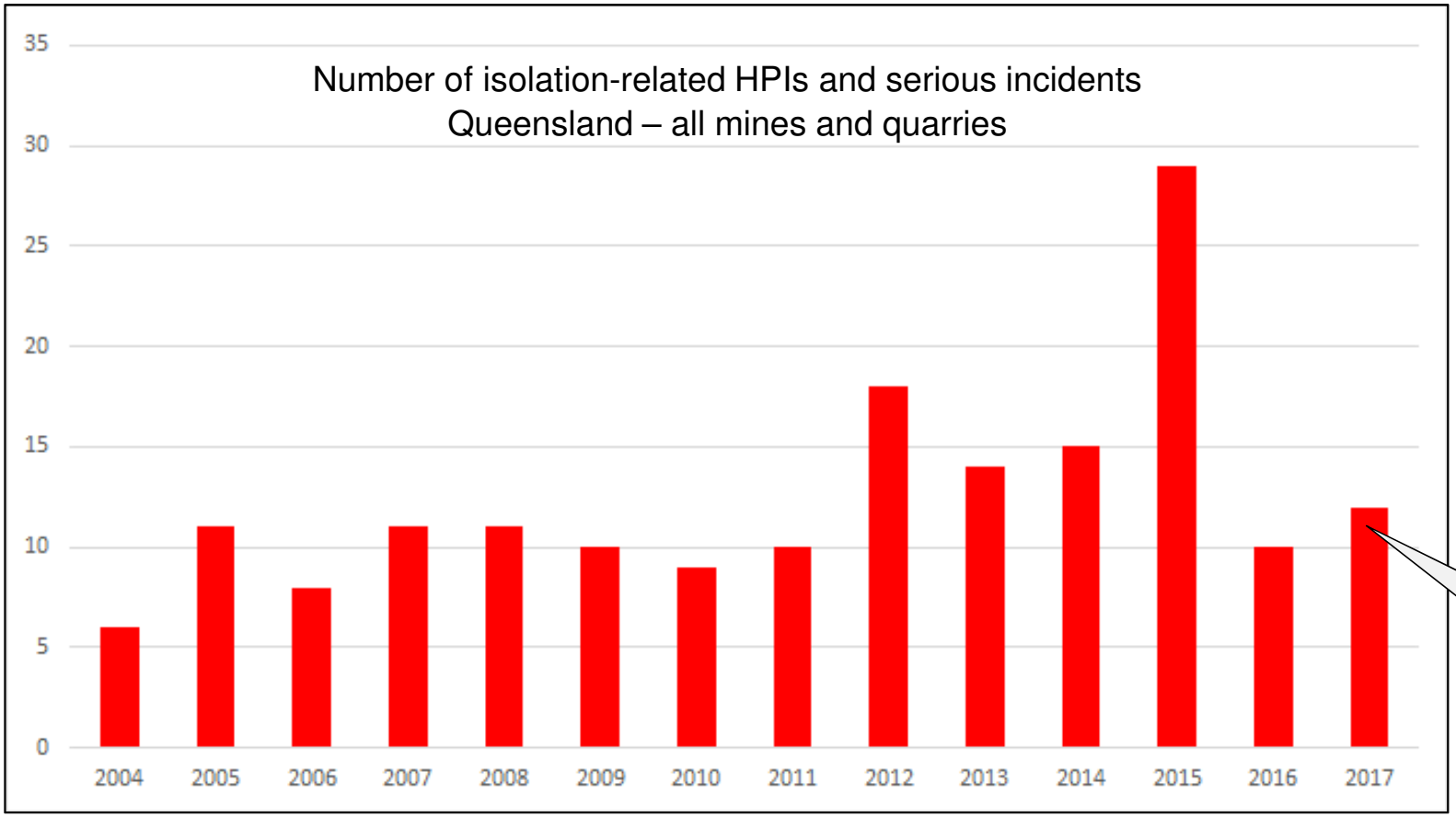
Q: How have things changed since 2012?



(Forecast based on 2017 YTD)

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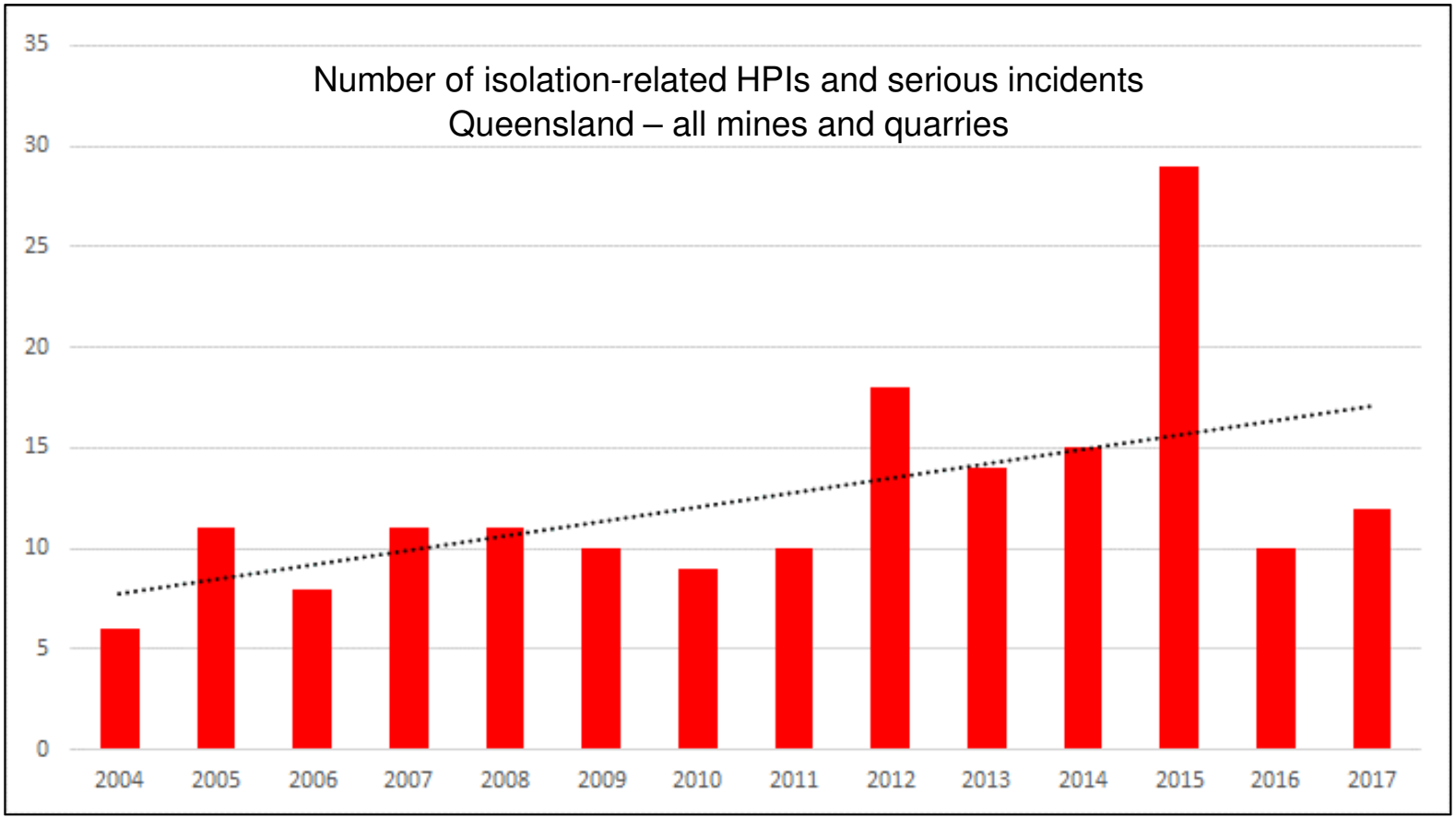
Review of recent trends



A concerning trend

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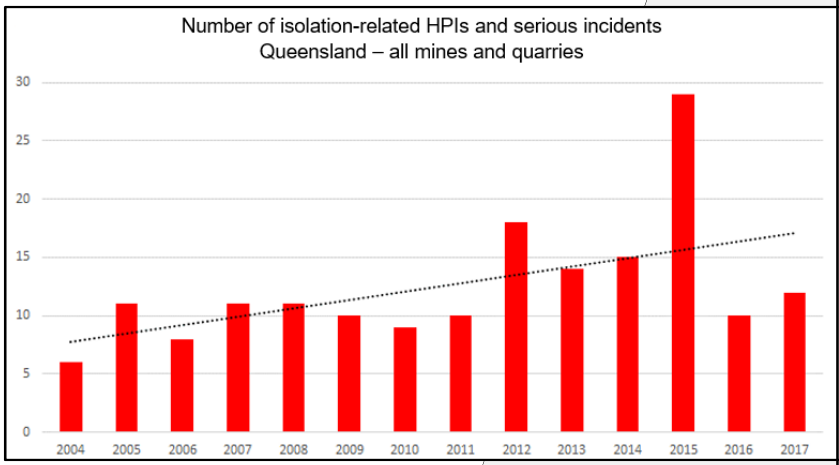
Review of recent trends

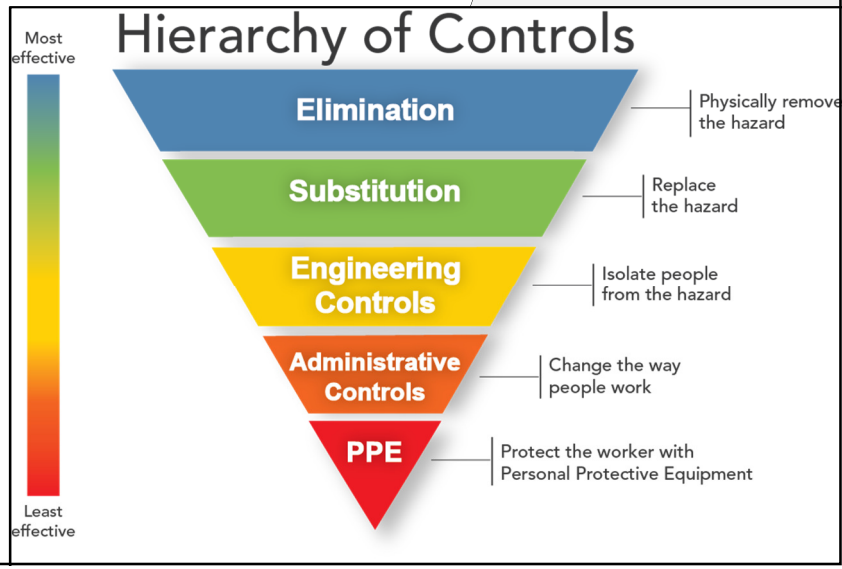
- Recent trends of isolation-related incidents have *at best* plateaued.

> Q: Will maintaining the status quo turn this around?

> Q: Do you have more time or resources to closely supervise isolations?

- In line with the H.O.C., a review of several incidents suggests that additional supervision would not have been effective in preventing many of the reported incidents.
- How can we fix this then?
- Let's look at some more specific information about what often goes wrong with isolations.





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Common factors reported

- Failure to isolate at all
- Missed an isolation point
- Isolation point locked in ‘on’ position
- Isolated at the wrong point(s)
- Failure to discharge, or return of energy during isolation (eg leaking valve)
- Failure to test-for-dead / verify
- Confined space isolation breaches

Q: Is there a common thread here?

A: Human error

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Human Error
(James Reason)

Remote isolation completely engineers-out, or greatly reduces the prevalence of all forms of human error.

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Might remote isolation have prevented these incidents?

Yes:

- Workers were working inside a flotation cell when it was discovered that the group isolation had been mistakenly applied to another line of cells.
- Worker's arm pulled into a conveyor between the top centre idler and belt. Had reached in between the top and bottom belt to tap a seized idler with a hammer.
- Conveyor isolation handle locked in the energised position and scissor and personnel locks applied and personnel carried out work under that isolation.
- Breach of isolation procedures. Isolation officer has failed to apply 4 group isolation locks out of 44.
- Isolator failed to isolate when in the isolate position due to internal failure.
- Many more…

No:

- Maintainer isolated to inspect faulty 12 volt flashing light and received an 80V DC shock from connections. It is noted that the capacitor in light circuit delivers 450V DC when battery is not isolated.
- Isolation breach near miss when auto electrician failed to isolate rear dump truck when working on it
- An electrician received an electric shock (110vac) while rewiring a pressure switch
- Many more…

Q: What impact would remote isolation have had on the incident data?

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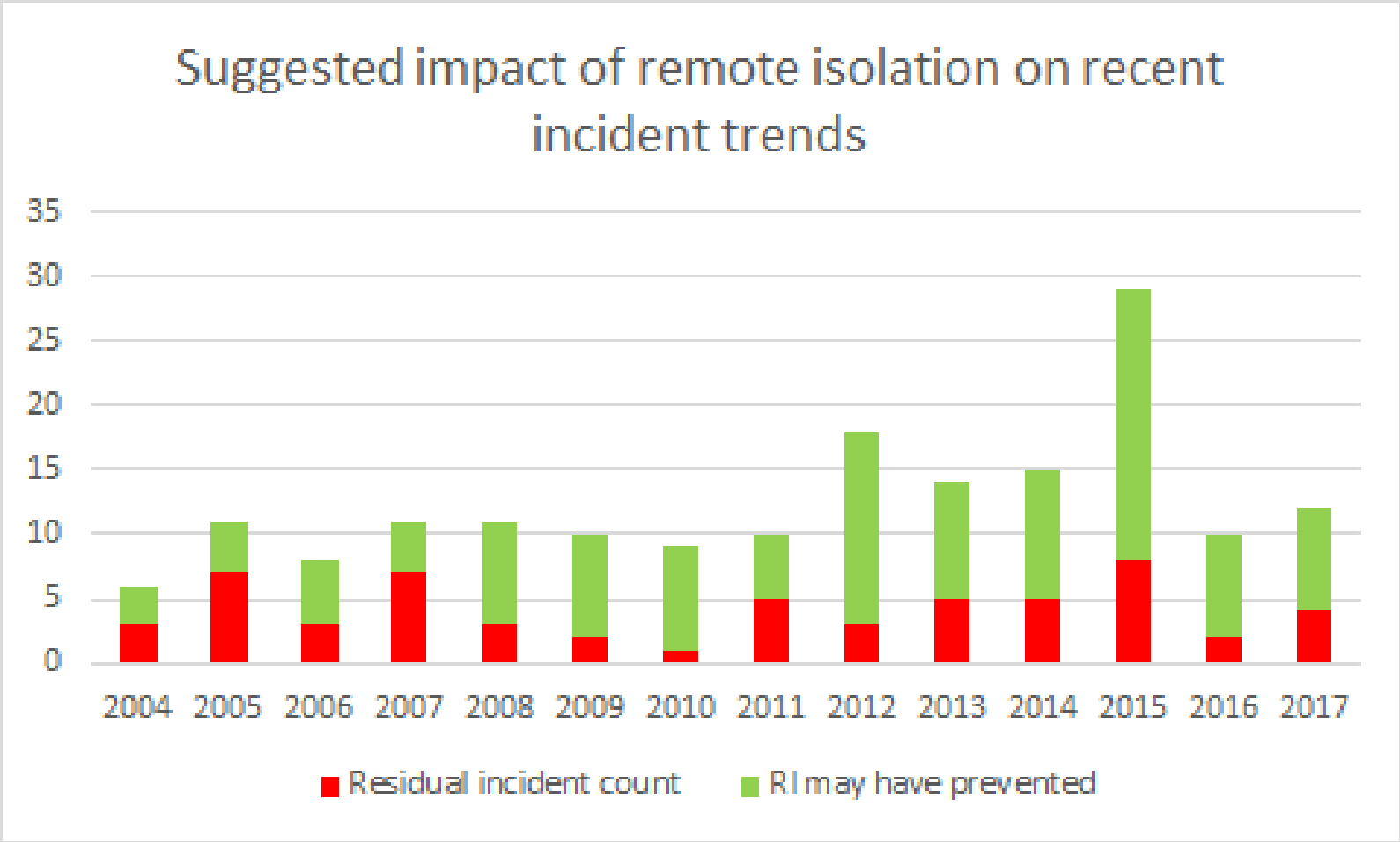
Review of recent trends



Q: So why wouldn't we install remote isolation *everywhere*?

A: Cost vs benefit (reality)

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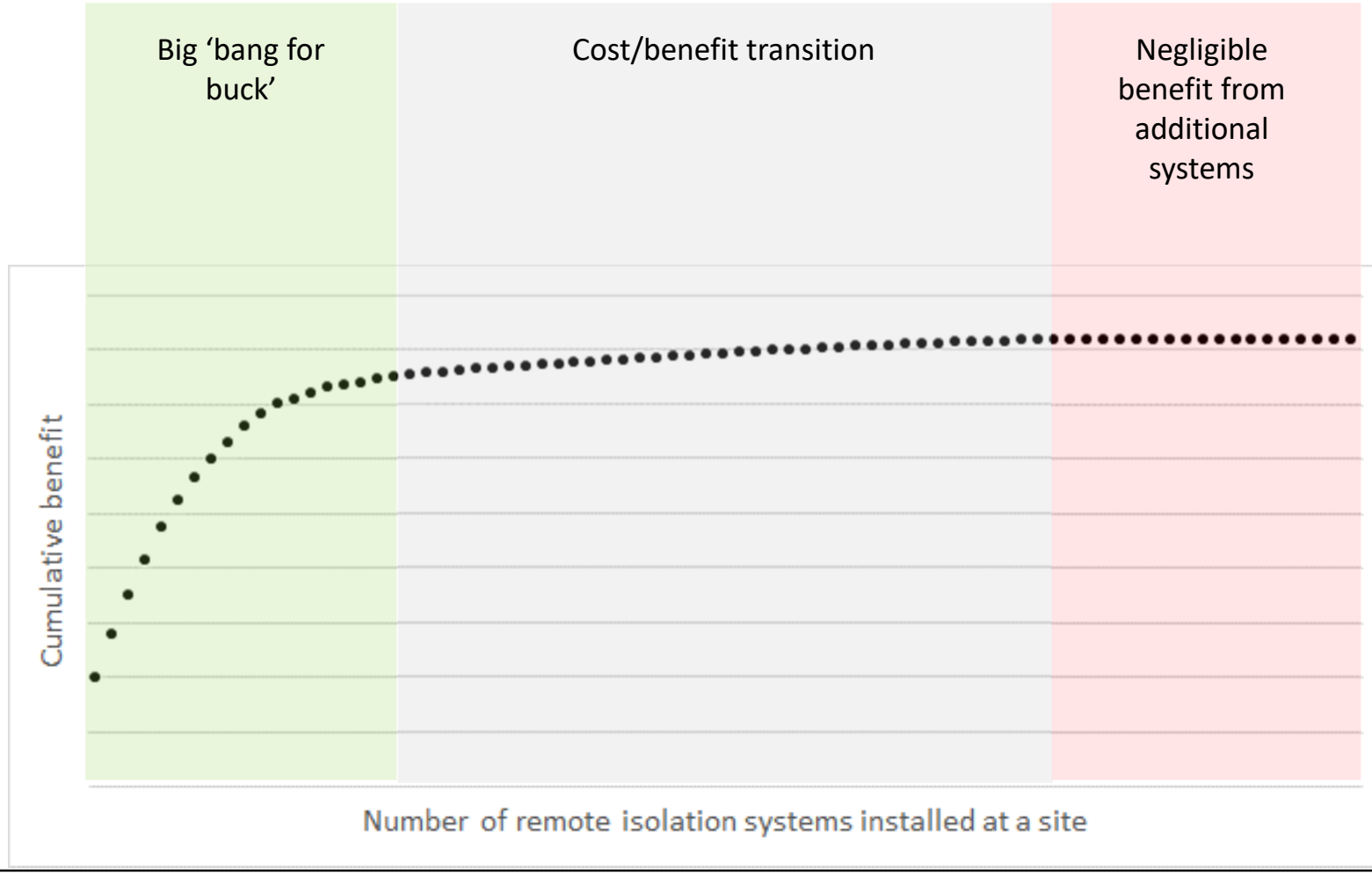
Cost / benefit



Most if not all sites will have some number of practicable applications for remote isolation

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Where does financial benefit come from?

- Typical (total) isolation time, including verification = **30 secs** (or up to 3 mins when HV is involved).
- Breakeven time often well within 12 months.
- In constrained (bottleneck) processes, payback can occur within weeks.

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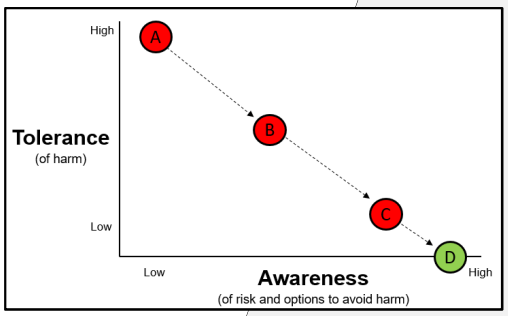
Standards



- Technology can support improvement, but it must be done well.
- Thankfully for remote isolation systems, there is a clear and well established framework available, in **Functional Safety Standards**.
- Insist on a system that is '**SIL-Rated**' or equivalent, *not* "*capable of achieving…",* or just a collection of SIL-rated components.

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Where to from here?

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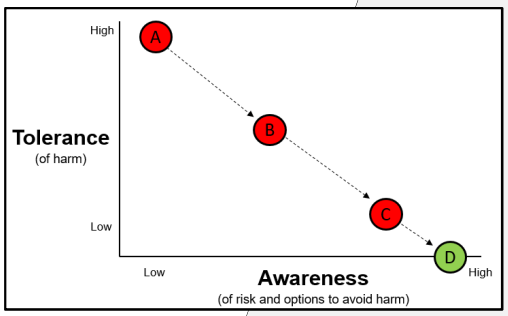

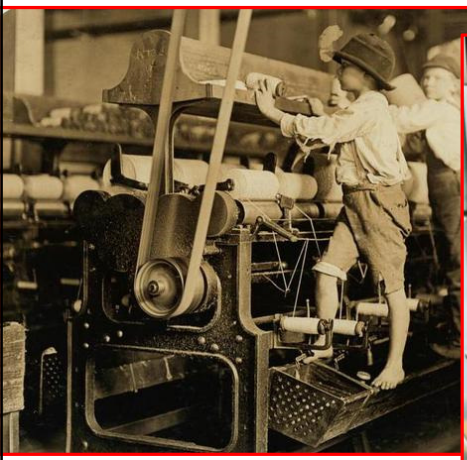

- Remote isolation is incredibly effective in many applications.
- In some applications (eg confined space entry) all forms of human error have been engineered out (as it is impossible to enter the area without a verified isolation in place).
- In other applications (eg overland conveyors) it is impracticable to enclose/guard the equipment under control in its entirety. In these instances, it is important to make the isolation station as convenient/close as possible to the work location.
- REMSAFE now offers as an option, a wireless isolation station, which performs SIL-Rated isolations as quickly and reliably as a fixed station.

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SIL-rated, wireless Isolation – how will it help?

- Failure to isolate at all
  - *No excuses when it's this quick and easy.*
  - *Can also prevent access in many instances.*
- Missed an isolation point
  - *Engineered-out*
- Isolation point locked in 'on' position
  - *Engineered-out*
- Isolated at the wrong point(s)
  - *Engineered-out*
- Failure to discharge, or return of energy during isolation (eg leaking valve)
  - *Engineered-out (continuous monitoring and system will take action if required).*
- Failure to test-for-dead / verify
  - *Engineered-out (cannot apply your lock until the system has verified the isolation)*
- Confined space isolation breaches
  - *Engineered-out (can prevent access until isolation is effected)*

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Summary

- Isolation practices have changed (for the better) over the years, and will continue to do so.
- Technology will support improvement toward zero harm, when done well.
- Let's continue to challenge the status-quo.