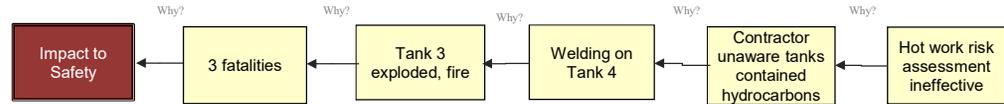


Mississippi Oilfield Explosion & Fatalities

On June 5, 2006, three oilfield workers were killed after they were blown off of two storage tanks. Four contract workers arrived at a well pad to weld a new pipe connection between two storage tanks. As the welder began welding, vapors from a third storage tank that contained hydrocarbon liquids ignited causing an explosion.

5-Why Cause Map



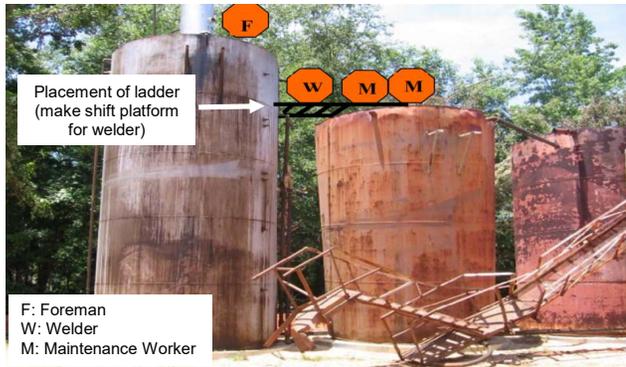
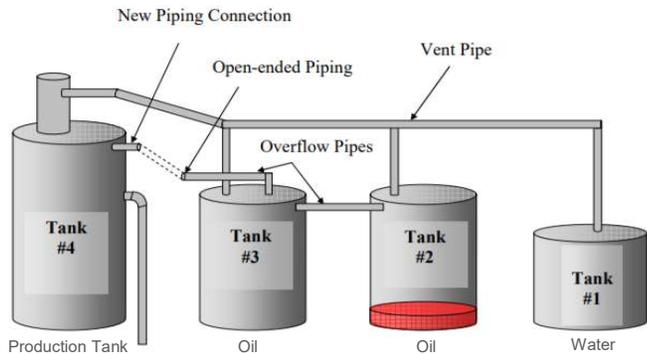
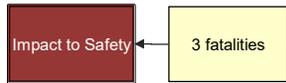
Start Simple

An analysis breaks a problem down into basic cause-and-effect relationships. The 5-Why Cause Map (above) is a simple and quick way to start an investigation. Adding more causes naturally leads to a wider range of solutions being considered. A quick 5-why may focus on the lack of hot work safety

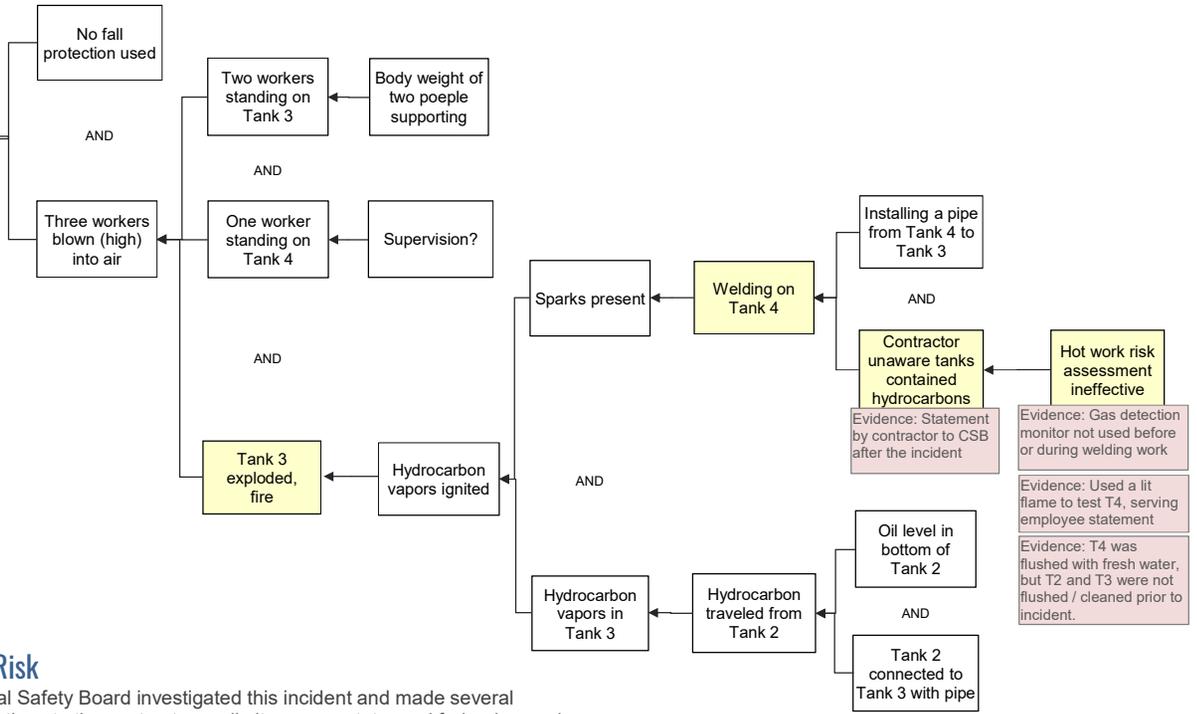
Expand as Needed

As more details become clear, your Cause Map expands. The severity of this incident was made worse because the 3 workers killed were not using fall protection, which is not captured in the 5-why. Fall protection, a form of personal protection equipment would not have prevented the explosion, but the use of a gas monitor, also considered personal protection equipment may have.

18-Why Cause Map



Images and diagrams from Chemical Safety Board

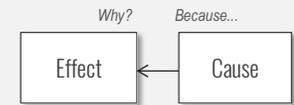


Lowering Risk

The Chemical Safety Board investigated this incident and made several recommendations to the contractor, well site owner, state, and federal agencies.

- Contractor - Develop and implement written procedures to ensure safe work practices during hot work, tank cleaning, and work at elevated locations
- Well Site Owner - Establish written health and safety performance standards and performance metrics such as those found in Recommended Practice for Occupational Safety for Onshore Oil and Gas Production Operations, API RP-74
- State Oil & Gas Board - Establish a program to identify and refer to the federal OSHA potentially unsafe health and safety conditions observed during g board field inspections of well sites and drilling operations. Ensure that the program includes:
 - Written procedures that define how the referrals will be implemented
 - Training of field inspectors so that they are able to recognize the potentially unsafe health and safety conditions that should be referred to OSHA
- OSHA - Implement a Local Emphasis Program (LEP) to inspect companies in the oil

Cause Mapping®



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