ENERGY SAFETY CANADA

A HOP PERSPECTIVE ON SILICA EXPOSURES

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AGENDA

- What is Human and Organizational Performance (HOP)
- Four Case Studies
- How to use HOP to improve?

SCENARIO #1 – BUCKET

Photo provided by NIOSH

POLL QUESTION #1

» Which statement best describes this photo?

- Another worker taking shortcuts
- A worker at risk for a slip, trip or fall who obviously does not take safety seriously
- An unsafe behavior
- A worker deviating from procedures
- A worker solving a problem

WHAT IS HOP?

- A philosophy about the interaction of equipment, people, work systems and environments.

- HOP focuses on human and organizational weaknesses that can lead to errors.

- It is about making it easier to be safe and harder to be unsafe.

FIVE PRINCIPLES OF HOP

- Error is normal.
- Blame fixes nothing.
- Learning and improving are vital. Learning is deliberate.
- Context influence behaviors. Systems drive outcomes.
- How you respond to failure matters. How leaders act and respond counts.

Conklin, Todd E, PhD. The 5 Principles of Human Performance: A Contemporary Update of the Building Blocks of Human Performance for the New View of Safety. Santa Fe, NM, PreAccident Media, 2019.

A FEW ADDITIONAL TERMS

- Capacity - HOP strives to design work so that there is capacity to safely handle a human error.
- Context - The backstory of an incident that explains how it occurred.
- Work as done verses work as imaged
- Workers are not the problem, but the source of solutions
- Successful work involves workers adapting to complexity and uncertainty

SCENARIO #1 – WHAT CAN WE LEARN?

The flow of sand on the conveyor is controlled to match the auger in the hopper. This requires the ability to see inside the hopper, the edge of the hopper is located about 6 feet high.

Photo provided by NIOSH

POLL QUESTION #2

» How should this problem be fixed?

- Remove buckets
- Discipline workers
- Install cameras
- Hire taller workers
- Provide a platform to stand on near hopper
- Re-think design of equipment in relation to equipment/human interface

SCENARIO #2 – VENTILATION FAILURE

A service company is conducting a frack on a large multi-well pad. They are using ventilation to control exposure during pneumatic in-loading (<14 psi) of proppant (sand). An OH&S inspector is coming to the site and significant dust clouds are present. Site personnel produce a last-minute solution that results in the worker at the hopper being significantly overexposed.

Photo provided by NIOSH

SCENARIO #2 – HOW DID THIS OCCUR?

The ventilation fan suffers a critical drive shaft failure and stops operating. The fan cannot be fixed for several days. With the fan running, workers use ½ facemask respirators equipped with P100 filters. Without the fan running they will need full-face respirators and others on site may need half-face respirators. The workers secure bricks to the underside of the hatches to keep them from opening during pneumatic in-loading.

- No good choices!
- Plan for failure
- Manage change

Photo provided by NIOSH

SCENARIO #3 – RESPIRATOR USE

A variety of controls are in place; however, exposure at the hopper is still a concern. The health and safety professional wants the business to direct more effort towards this vulnerability citing respiratory equipment not being worn consistently.

Office personnel challenge this assertion, as all data in the H&S system indicates no issues with the use of respiratory equipment and no specific hazard IDs on silica have been reported…

Photo provided by NIOSH

POLL QUESTION #3

» What approximate amount of time (percent of full shift) can a worker not use a half-face respirator and not exceed the full-shift exposure limit when in an environment at 5X the exposure limit?

- 5%
- 10%
- 15%
- 20%

SCENARIO #3 – WHAT'S GOING ON?

Health and safety on-site personnel frequently remind workers to mask up as their half-masks are sometimes hanging around their necks. Workers remove respirators so that they can be heard on the radio.

The respirator use issues are not put into the H&S system as these issues are corrected at the time of observation. Workers are reluctant to put in hazard identifications on silica as it will just result in them wearing more PPE.

Photo provided by NIOSH

SCENARIO #4 – QUALITY SAND

The producer uses sand that is dustier than normal. The plan called for API-certified sand and sampling identified many workers over the protection factor of the half-face respirators being worn. The work is shutdown due to a limited supply of sand. Office personnel are angry at site personnel and send an e-mail to everyone telling them that they must follow the plan.

Photo provided by NIOSH

SCENARIO #4 – HOW DID THIS OCCUR?

A road is washed out from the spring thaw that disrupts the flow of API-certified sand. As a result, non-API certified sand is used from another sand provider. The trucking crew went to this new sand storage area and the wrong mesh-size was loaded because of a communication issue with the order from head office. The mesh size is not ideal, but a decision is made to use it at site and the sand generates significantly higher exposures.

- Error is normal
- Context influences behaviors
- How you respond to failure matters. Blame fixes nothing
- Learning and improving are vital

USING HOP TO IMPROVE

- Engage workers in planning
- Build in capacity
- Conduct after-action reviews
- Learn from successful work – 99%
- Remember how you respond to failure matters

QUESTIONS