# Fatality Prevention / Risk Management

*Projected Implementation Date: December 2012*

**This module includes:**

- Identifying and reviewing all safety and health hazards.

- Assessing and prioritizing risks associated with those hazards, emphasizing risks that could have catastrophic, including fatal, consequences.

- Applying controls systematically.

- Verifying controls remain effective over time.

**Risk management is the process of:**

- Identifying safety and health hazards

- Evaluating the associated risk and consequences

- Developing controls to eliminate or minimize negative outcomes to an acceptable level

**The goal:** Eliminate the risk or reduce it to the lowest practical level

The **CORE**Safety Safety and Health Management System (SHMS) is a systematic approach to risk management that calls for:

- Reviewing *all* safety and health hazards

- Assessing and prioritizing risk

- Applying controls systematically

- Verifying that controls remain effective over time

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### Defining Work for High Risk Procedures

Within the process of mining-related risk management, there are two general classes of work activities that should be clearly understood, but differentiated:

- High frequency, low severity/consequence work

- Low frequency, high severity work

Both classes require effective risk assessment and controls.

Identification of work activities and situations that should be subject to a heightened examination should not be limited to those activities for which companies have had prior incidents. The presence or use of the activity, even very infrequently, is adequate justification for inclusion.

High risk work requires a greater emphasis on the application of effective controls to minimize the risk of negative outcomes, including fatalities. Each company should define those high risk activities that are most relevant to their operations and develop a fatality prevention/high risk guideline or use the sample in the **CORE**Safety resources section.

For high risk work, the application of the "hierarchy of controls" should be strongly based on the use of elimination, substitution, modification or confinement over administrative practices and personal protective equipment.

The **CORE**Safety approach necessitates different ways to proactively identify hazards in the planning, engineering, development, operations, maintenance and reclamation phases, as appropriate to the operations.

### How it Works

Risk management starts with operation planning; it is conducted on an ongoing basis and is carried through to closure.

Risk assessment can involve technical staff (engineers) managers and workers with appropriate knowledge and experience.

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Companies should use all three categories of risk assessment tools as circumstances dictate.

**The three categories of risk assessment processes are:**

- Personal and pre-task (PPT)

- Systematic job and task (SJT)

- Formal, process and equipment (FPE).

Acceptable risk should be defined by management; however, risk-based decisions can and should be made by workers when they have the knowledge, training and experience.

Management should make all decisions associated with work that exceeds acceptable risk as defined by the company. Each company should define at what level controls should be prioritized based on a "hierarchy of controls" that recognizes the general effectiveness of controls and are, in descending order:

1. Elimination

2. Substitution

3. Modification

4. Confinement

5. Capture (ventilation)

6. Administrative practices

7. Personal protective equipment

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### Expectations:

4.1    Develop and maintain an up-to-date registry of site-specific high risk activities.

4.2    Assess high risk work activities using risk assessment tools including systematic job and task, process and equipment and personal.

4.3    Develop and/or adopt site-level high risk procedures to maintain risk at as low a level as practicable.

4.4    Maintain effective informal and formal hazard identification procedures, e.g., inspections, worker feedback, task observations, pre-task assessments, etc.

4.5    Regularly audit high risk procedures to ensure full compliance and effectiveness.

4.6    Ensure internal reporting of all high risk procedure-activity near miss and injury incidents and conduct incident investigation and root cause analysis, as appropriate.

4.7    Develop or adopt a personal and pre-task (PPT) risk assessment tool [Level 1] and require workers who are at-risk in their job duties to utilize the tool before job tasks. [1]

4.8    Verify that all affected employees are educated, trained and competent relative to the high risk procedures.

4.9    Develop or adopt systematic job and task (SJT) risk assessment tools [Level 2] for routine and repeatable non-routine work. Develop documentation and train accordingly. [2]

4.10    Apply formal, process and equipment (FPE) risk assessment tools [Level 3] to the mining process, equipment, development, operations, maintenance and reclamation. [3]

4.11    Define and document the acceptable level of risk through a risk matrix (likelihood and consequences), or adopt the CORESafety generic risk matrix as a minimum guideline.

4.12    Ensure risks are evaluated by the appropriate level of management, consistent with the significance of the risk.  Senior management should be included when assessing major risks and variances.

4.13    Document the company's risk management approach for all high-risk (low likelihood, high consequence) work activities and ensure consistent application of those protocols. [4]

4.14    Establish a management policy that applies the "hierarchy of controls" to hazard control opportunities and obligations.  The policy should include specific criteria for variances.

4.15    Where PPE is permitted to be used in lieu of more comprehensive controls, wearers

should be trained on specific uses, proper usage and protection limitations.

**4.16** Verify that controls maintain their effectiveness or are modified should circumstances change over time. Include control verification in safety and health audit criteria.

**4.17** Document risk management decisions for tracking and verification purposes, and for future reference.

**4.18** Ensure there is full integration of Module 4 expectations and expectations from Modules 2, 5, 11, 12 and 14.

*Footnotes*

[1] For example: 'Take 5', MSHA's 'SLAM', etc. See the NMA Risk Management White Paper for more information.

[2] For example: Job hazard analysis (JHA, aka, job safety analysis), standard operating procedures (SOP), etc. See the NMA Risk Management White Paper for more details.

[3] For example: Preliminary Hazard Analysis (PHA), Process Hazard Analysis (PHA) Failure Modes, Effects and Analysis (FMEA), Fault Tree Analysis (FTA), Logic Tree Analysis (LTA), Hazard and Operability Studies (HAZOPS), Bow Tie Analysis (Bow Tie), Layers of Protection Analysis (LOPA), among others.

[4] Hot work in proximity to flammables/combustibles, confined space entry, high voltage electrical work, lifting and rigging, energy isolation, working at heights, surface trenching, handling explosives and shot-firing, simultaneous operations, mobile equipment operation, mobile equipment maintenance, haulage design, ground control, methane-rich environments, mining in seismically-unstable areas, etc.

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### Regulation

Partial or full MSHA and/or OSHA regulatory requirement:  ✓ Yes  ☐ No

### Metrics

To be determined

### Resources

**CORE**Safety resources can be found with the latest updates at:
coresafety.org/resources/module4

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**Notes**