Health and Safety Executive - HM Mines Inspectorate

Major Hazard Topic Inspection Guide

GROUND CONTROL AT MINES

1. Purpose

This document sets out how inspectors will assess operators' compliance with the relevant statutory provisions in respect of ground control.

Any significant ground movement such as rock or roof falls are a major hazard and can be a reportable dangerous occurrence under RIDDOR.

Falls of ground incidents frequently result in low numbers being killed but over the years have caused the greatest loss of life at mines.

- Bilsthorpe – 3 killed in 1993 when a large area of roadway roof collapsed
- Eckington – 2 killed in 1998 when the roof collapsed
- Stoke Hill – 1 killed in 2006 by a fall of roof
- Boulby – 1 killed in 2007 when the side of a roadway collapsed
- Kellingley - 1 killed in 2011 by a fall of roof on a coal face

2. Scope

The inspection will focus on the key hazards above and the associated safety management systems for managing the risks. The format of the inspection will follow the established Plan, Do, Check, Act structure, as defined in HS(G) 65 and summarised in HSE leaflet INDG 275.

The inspection will be undertaken in line with the HID Regulatory Model and will explore the following elements:

- has the mine operator completed suitable and sufficient ground control assessments?
- has the mine operator identified the hazards from falls of ground from roof or side?
- has the mine operator implemented suitable ground control measures
- have roles and responsibilities been allocated for the control measures identified?
- is there a suitable competency management system in place?
- are the measures to control the major hazards being monitored?

3. The intervention

The intervention team can if necessary ask the mine operator to provide copies of documentation in advance of the site visit. The on-site part of this stage of the intervention could take a day or more depending on the scope. Once the documentation has been re viewed the intervention team will select a part of the mine to inspect and evaluate the effectiveness of the safety management arrangements and risk control systems.

Inspectors should determine how well the mine operator is controlling the risk from falls of ground by assessing:

- the adequacy of the information that the mine operator has obtained to determine the properties of the strata and the effects of mining

- the adequacy of the assessment of this information by the mine operator to identify the measures needed to control any ground movement

- the adequacy of the control measures to ensure that a fall of ground does not occur. This should describe the method of work, the equipment to be used and the rules to be applied

- how well the procedures required have been implemented i.e. the arrangements in place (management, inspection, monitoring) to ensure that the rules are applied and enforced

- the effectiveness of the monitoring arrangements to ensure that the ground control measures are adequate

- that if the monitoring indicates that the ground control is inadequate a system is in place to implement remedial action and review the original design.

4. Reporting findings and conclusions

Inspectors will summarise the outcome of the inspection with the operator, management team and the safety representatives at the mine whilst on site.

This summary will include the team's assessment on how the operator is complying with the relevant provisions, priorities for any further action and the operators' performance score in accordance with the **Performance Assessment Table** shown below.

Where further action is required to achieve compliance this will be taken in accordance with HSE's Enforcement Policy Statement.

5. Key legislative requirements for mines

Health & Safety at Work etc Act 1974

Section 2(1), 3(1)

The Mines Regulations 2014

Regulation 7 General duties of the mine operator

Regulation 8 Co-operation

Regulation 9 Health and Safety document

Regulation 10 Management structure

Regulation 11 Competence

Regulation 12 Instructions, rules and schemes

Regulation 14 Inspection of the mine

Regulation 15 Maintenance and inspection of equipment

Regulation 32 Duty to take ground control measures

Regulation 54 Escape and rescue plan

Management of Health & Safety at Work Regulations 1999

Regulation 3 Risk assessment

Regulation 5 Health and safety arrangements

Provision and Use of Work Equipment 1998

Regulation 4 Suitability of work equipment

Regulation 5 Maintenance

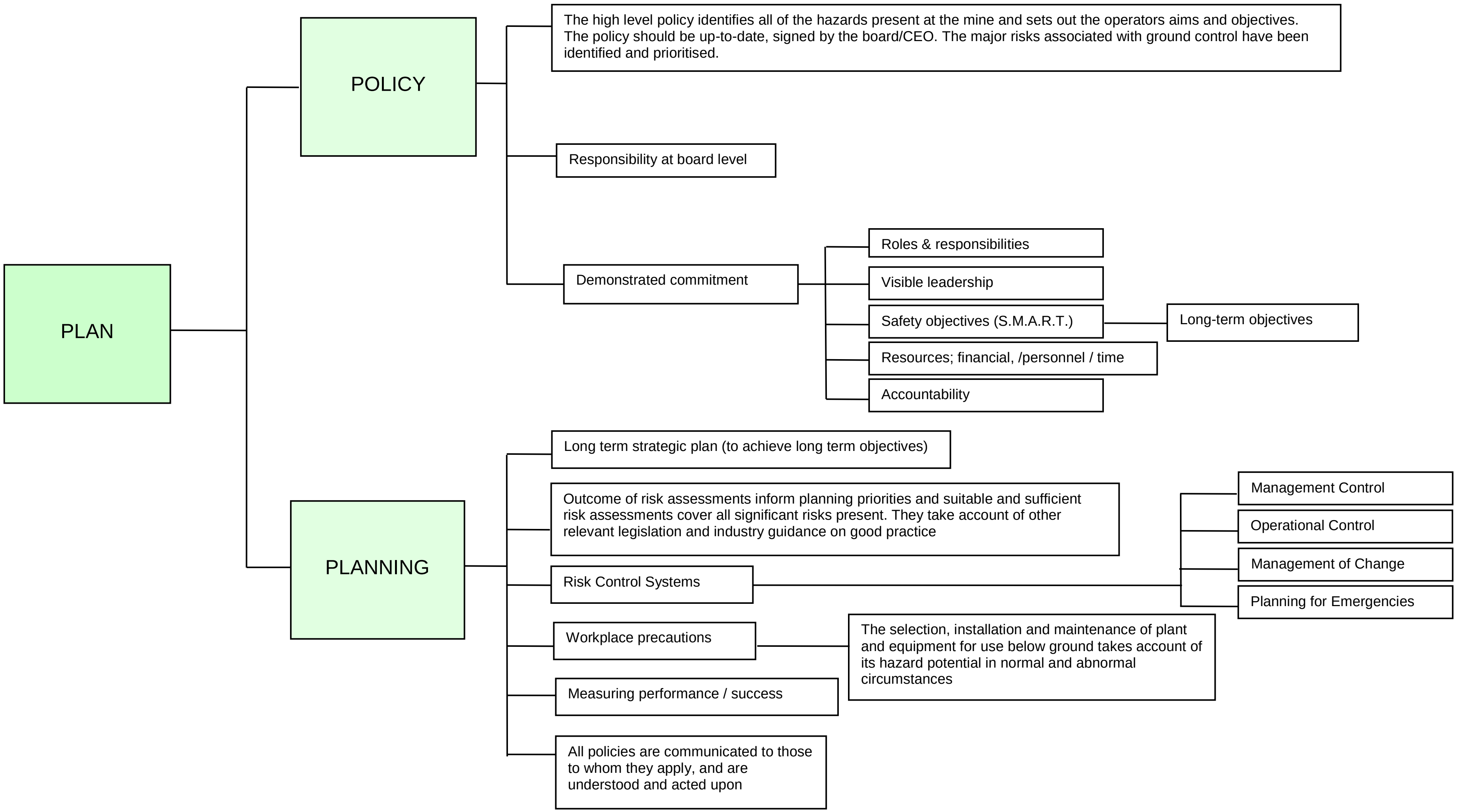
Performance scores

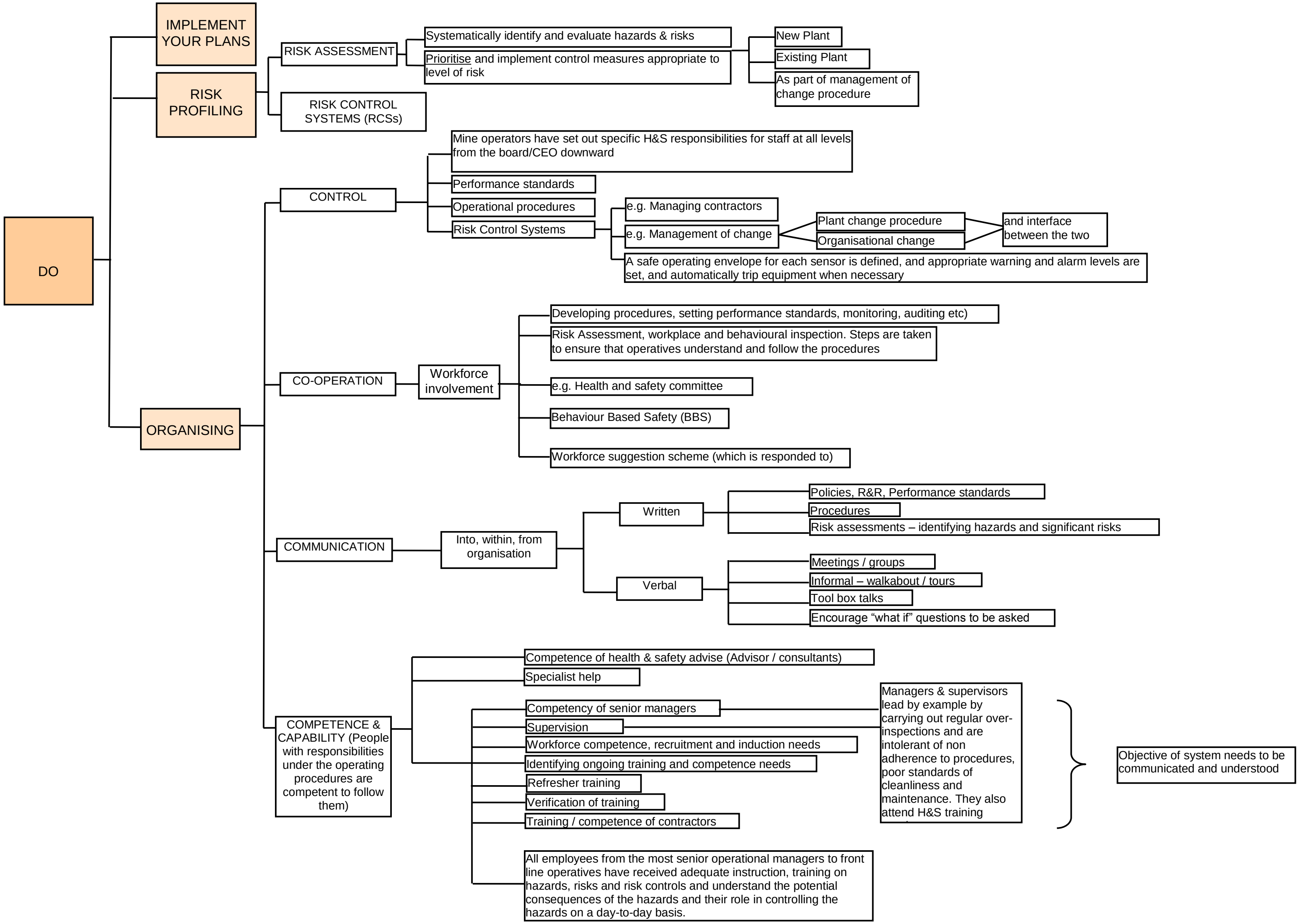
Following the intervention, Inspectors should performance score the mine operator's degree of compliance in accordance with the Table below.

EMM RISK GAP					
EXTREME	**SUBSTANTIAL**	**MODERATE**	**NOMINAL**	**NONE**	**NONE**
TOPIC PERFORMANCE SCORE					
60	**50**	**40**	**30**	**20**	**10**
Unacceptable	**Very Poor**	**Poor**	**Broadly Compliant**	**Fully Compliant**	**Exemplary**
Far below relevant minimum legal requirements. Degree of non-compliance extreme and widespread. Failure to recognise issues, their significance, and to demonstrate adequate commitment to take remedial action.	Substantially below the relevant minimum legal requirements. Degree of non-compliance substantial. Failures not recognised, with limited commitment to take remedial action.	Significantly below the relevant minimum legal requirements. Degree of non-compliance significant. Limited recognition of the essential relevant components of effective health and safety management, but demonstrate commitment to take remedial action	Meets most of the relevant minimum legal requirements. Degree of non-compliance minor and easily remedied. Management recognise essential relevant components of effective health and safety management, and commitment to improve standards.	Meets the relevant minimum legal requirements. Management able to demonstrate adequate identification of the principal risks, implementation of the necessary control measures, confirmation that these are used effectively and subject to review.	Exceeds the relevant minimal legal requirements. Management committed and proactive in devising and implementing an effective safety management system to achieve 'best practice' and beyond legal requirements. Actively seeks to further improve standards.
EMM INITIAL ENFORCEMENT EXPECTATION					
Prosecution / Enforcement Notice.	Enforcement Notice / Letter.	Enforcement Notice / Letter.	Letter / Verbal warning.	None.	None.

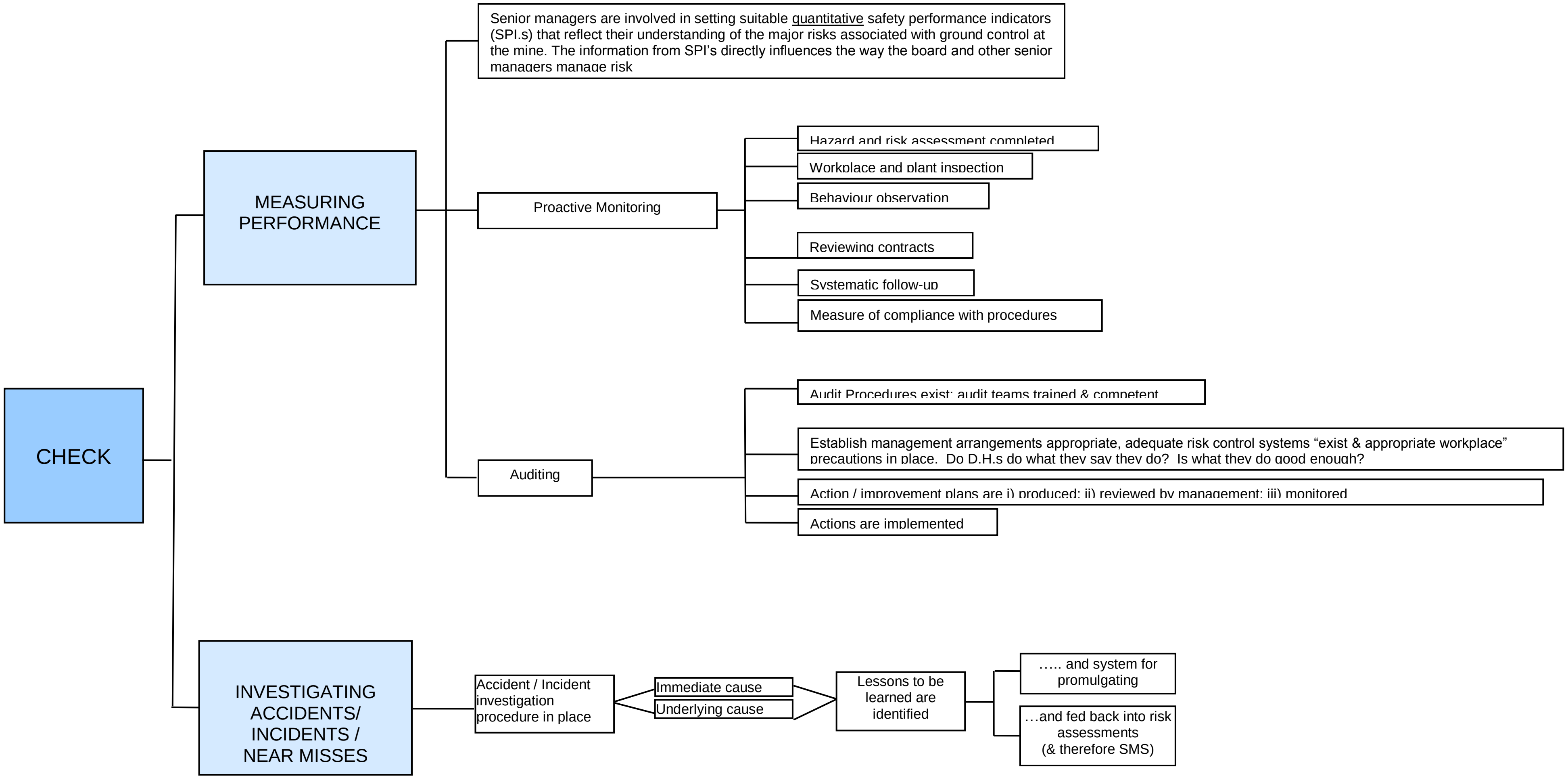
Plan	1. There is a health and safety policy that is dated and signed that identifies major hazards, including ground control, and sets out the mine operator's aims and objectives. 2. The mine operator has put in place a suitable management structure and set out specific H&S responsibilities for staff at all levels to control the risk of the major hazards present, including ground control. 3. The mine operator and those appointed to the management structure understand ground control principles. 4. The arrangements include clear procedures for those with H&S roles or responsibilities in relation to: • how ground control risk assessments, and any rules, will be produced, implemented and reviewed? • who is responsible for the selection of suitable plant and equipment required? • who is responsible for determining the optimum location of any monitoring? • sufficient resources for implementation? • staff competency to deliver their responsibilities? • any periodic independent oversight applied? 5. Managers and supervisors at all levels accept their responsibilities in relation to ground control risks and lead by example in ensuring that risk control measures are properly maintained. 6. All employees from the most senior operational managers to front line operatives have received adequate instruction and training on ground control hazards, risks and risk control measures and understand: • the importance of ensuring that ground control measures are properly followed • the function of consultation between managers and workers in the drawing up the method of work • the role of monitoring in identifying the adequacy of ground control measures • the potential consequences of any ground control system failure. 7. The mine operator has in place a written escape and rescue plan in the event of an emergency situation below ground. 8. Adequate arrangements are in place for informing and consulting staff (Safety Reps + Safety Committees Regs 1977).

Do	1. The mine operator has put in place a suitable management structure and set out specific H&S responsibilities for staff at all levels: • how ground control assessments will be completed, implemented and reviewed? • who is responsible for the selection of suitable plant and equipment? • who is responsible for determining the optimum location of any monitoring device? • who is responsible for determining the action levels of any monitoring device? • who defines the frequency of the inspection and monitoring regimes? • do managers and supervisors have sufficient resources to implement the plan? • are staff competent to deliver their responsibilities? 2. How is the workforce involved in the design and construction of ground control rules? 3. Are all procedures and any changes communicated to those to whom they apply? 4. The control measures required by the risk assessment have been implemented? 5. Is there an effective system for reporting of deficiencies in risk assessments and operating procedures? 6. There is an effective system for upwards reporting of deficiencies in assessments, design documents and control measures?
Check	1. Are there monitoring systems for: • inspection of the mine, its plant and equipment? • checking management arrangements for preventing a fall of ground are implemented and effective? • ensuring staff understand and follow the procedures that are in place to control the risk from a fall of ground? 2. Complaints and incidents are investigated? 3. Is there an effective reporting system for any fall of ground? 4. Is there sufficient monitoring of information that could indicate that the likelihood of a fall of ground has increased? 5. Are there any arrangements for independent third-party audit? 6. Are structured periodic audit arrangements are in place to ensure arrangements are monitored to measure their performance? 7. Is the audit programme risk-based and targeted at major hazard risk control and safety management systems?
Act	1. Are there effective arrangements for reviewing performance? 2. Has an improvement plan been established? 3. Have procedures been reviewed and amended as a result of accident/incident outcomes? 4. Has remedial action addressed deficiencies identified? 5. What safety performance indicators are in place?


PLAN
POLICY
The high level policy identifies all of the hazards present at the mine and sets out the operators aims and objectives. The policy should be up-to-date, signed by the board/CEO. The major risks associated with ground control have been identified and prioritised.
Responsibility at board level
Demonstrated commitment
Roles & responsibilities
Visible leadership
Safety objectives (S.M.A.R.T.)
Long-term objectives
Resources; financial, /personnel / time
Accountability
PLANNING
Long term strategic plan (to achieve long term objectives)
Outcome of risk assessments inform planning priorities and suitable and sufficient risk assessments cover all significant risks present. They take account of other relevant legislation and industry guidance on good practice
Risk Control Systems
Management Control
Operational Control
Management of Change
Planning for Emergencies
Workplace precautions
The selection, installation and maintenance of plant and equipment for use below ground takes account of its hazard potential in normal and abnormal circumstances
Measuring performance / success
All policies are communicated to those to whom they apply, and are understood and acted upon



DO
IMPLEMENT YOUR PLANS
RISK PROFILING
RISK ASSESSMENT
Systematically identify and evaluate hazards & risks
Prioritise and implement control measures appropriate to level of risk
New Plant
Existing Plant
As part of management of change procedure
RISK CONTROL SYSTEMS (RCSs)
ORGANISING
CONTROL
Mine operators have set out specific H&S responsibilities for staff at all levels from the board/CEO downward
Performance standards
Operational procedures
Risk Control Systems
e.g. Managing contractors
e.g. Management of change
Plant change procedure
Organisational change
and interface between the two
A safe operating envelope for each sensor is defined, and appropriate warning and alarm levels are set, and automatically trip equipment when necessary
CO-OPERATION
Workforce involvement
Developing procedures, setting performance standards, monitoring, auditing etc)
Risk Assessment, workplace and behavioural inspection. Steps are taken to ensure that operatives understand and follow the procedures
e.g. Health and safety committee
Behaviour Based Safety (BBS)
Workforce suggestion scheme (which is responded to)
COMMUNICATION
Into, within, from organisation
Written
Policies, R&R, Performance standards
Procedures
Risk assessments – identifying hazards and significant risks
Verbal
Meetings / groups
Informal – walkabout / tours
Tool box talks
Encourage "what if" questions to be asked
COMPETENCE & CAPABILITY (People with responsibilities under the operating procedures are competent to follow them)
Competence of health & safety advise (Advisor / consultants)
Specialist help
Competency of senior managers
Supervision
Workforce competence, recruitment and induction needs
Identifying ongoing training and competence needs
Refresher training
Verification of training
Training / competence of contractors
All employees from the most senior operational managers to front line operatives have received adequate instruction, training on hazards, risks and risk controls and understand the potential consequences of the hazards and their role in controlling the hazards on a day-to-day basis.
Managers & supervisors lead by example by carrying out regular over-inspections and are intolerant of non adherence to procedures, poor standards of cleanliness and maintenance. They also attend H&S training
Objective of system needs to be communicated and understood


CHECK
MEASURING PERFORMANCE
Senior managers are involved in setting suitable quantitative safety performance indicators (SPI.s) that reflect their understanding of the major risks associated with ground control at the mine. The information from SPI's directly influences the way the board and other senior managers manage risk
Proactive Monitoring
Hazard and risk assessment completed
Workplace and plant inspection
Behaviour observation
Reviewing contracts
Systematic follow-up
Measure of compliance with procedures
Auditing
Audit Procedures exist: audit teams trained & competent
Establish management arrangements appropriate, adequate risk control systems "exist & appropriate workplace" precautions in place. Do D.H.s do what they say they do? Is what they do good enough?
Action / improvement plans are i) produced; ii) reviewed by management; iii) monitored
Actions are implemented
INVESTIGATING ACCIDENTS/ INCIDENTS / NEAR MISSES
Accident / Incident investigation procedure in place
Immediate cause
Underlying cause
Lessons to be learned are identified
….. and system for promulgating
…and fed back into risk assessments (& therefore SMS)

- ACT
  - REVIEWING PERFORMANCE
    - Review plans
      - Reports (→ Senior mgmt)
    - Identify remedial actions
      - Implement
    - Continuous reviews at different levels within the organisation to learn from experience, improve performance, develop the SMS and respond to change. Sources of information include measuring performance data (e.g. S.P.I.'s), audits (both internal and external), outside influences (e.g. new legislation) and benchmarking
    - Public reporting
    - Benchmark / S.P.I.'s
  - LEARNING LESSONS
    - There is an effective system for upwards reporting of deficiencies in risk assessments and operating procedures etc
    - Use near misses as learning opportunities
    - Results of audits, reviews & incident investigations and audits fed into risk assessments
    - Consider incidents that have occurred in similar organisations
    - Complaints are routinely investigated