



DMPR MANDATORY CODE OF PRACTICE GUIDELINE:

**MINIMUM STANDARDS FOR MINIMUM
STANDARDS ON GROUND VIBRATIONS,
NOISE, AIR-BLAST AND FLYROCK NEAR
SURFACE STRUCTURES AND COMMUNITIES
TO BE PROTECTED**

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INTRODUCTION



INTRODUCTION TO THE MCOP GUIDELINE



- In **August 2024**, the Department of Mineral Resources and Energy published a guideline for a Mandatory Code of Practice (MCOP) for Minimum Standards on Ground Vibrations, Noise, Air-blast and Flyrock near Surface Structures and Communities to be Protected.
- This guideline provides a framework for managing ground vibration, noise, airblast, and flyrock risks during blasting in South African surface mines.
- In response to community concerns and the absence of local standards.
- By establishing clear regulations, this guideline helps balance mining activities with environmental and social responsibility. It provides a standardised approach for assessing and mitigating blasting impacts, ensuring consistency across the industry.
- Additionally, it encourages the adoption of advanced monitoring technologies to improve safety and compliance. These measures contribute to a more sustainable and accountable mining sector in South Africa.

BACKGROUND AND LEGAL CONTEXT

- Relate to Mine Health and Safety Act (MHSA); sections 9(2), 9(3), and relevant Regulation 17.
- The lack of prior SA standards, reliance on USBM criteria, community complaints and building damage are some of the key drivers to generating this MCOP guideline for South African mines.
- **CSIR research:** Council for Scientific and Industrial Research completed a research project: SIM14-09-01 in 2016. The findings and recommendations from this project contributed significantly to the development and specification of the standards prescribed in the MCOP guideline.
- Section 9(2) of the MHSA requires employers to **develop and implement a COP** addressing health and safety risks related to mining operations.
- The COP must be drafted per the guidelines issued by the Chief Inspector of Mines and revised regularly to ensure it remains effective.
- *Failure to comply with mining regulations or the COP can result in legal consequences, including fines and the potential closure of mining operations.*
- Employers are responsible for ensuring that their blasting operations do not pose a risk to nearby communities, and adherence to ground vibration and flyrock regulations is a key part of that responsibility.

SOUTH AFRICAN LIMITS - GROUND VIBRATION

STRUCTURE DESCRIPTION	PEAK PARTICLE VELOCITY (mm/s)
National roads / tar roads	150
Electrical lines (pylons)	75
Railway	150
Transformers	25
Waters wells	50
Telecoms tower	50
General houses of proper construction	USBM criteria or 25 mm/s
Houses of lesser proper construction	12.5
Rural building – mud houses	6

SOUTH AFRICAN LIMITS - NOISE & AIRBLAST

DECIBELS (dB)		EFFECT
100	(2 Pa)*	Barely noticeable
110	(6.325 Pa) *	Readily noticeable
120	(20 Pa) *	Currently accepted by the South African authorities as being a reasonable level for public concern (not more than 10% of the measurement should exceed this value)
134	(100.24 Pa) *	Currently accepted by the South African authorities that damage will not occur below this level (no measurement should exceed this value outside of the mine boundaries)
164	(3.17 kPa) *	Window break
176	(12.62 kPa) *	Plaster cracks
180	(20 kPa) *	Structural damage

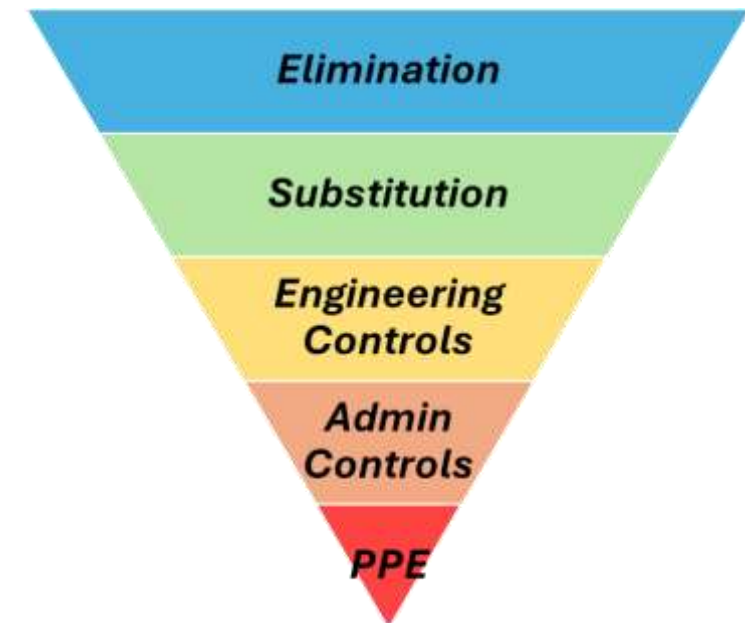
*Equivalent Air Overpressure – Conversion Calculator available at: ERGIndustrial.com

KEY ASPECTS OF THE MCOP GUIDELINE

KEY ASPECT OF DMPPR MCOP GUIDELINE

1. **Hazard Identification and Risk Assessment** per blast needs to consider any risk that may harm the Health and Safety of mine employees and non-employees.
 - **Mitigation measures and controls** need to be included and applied in practice:
 - **Eliminate** - the complete elimination of the hazard.
 - **Substitute** - replacing the material or process with a less hazardous one.
 - **Redesign** - redesigning the equipment or work processes.
 - **Separate** - isolate the hazard by guarding or enclosing.
 - **Administrative** - providing controls such as training, procedures, etc.
 - **Personal Protective Equipment** - using properly fitted PPE where other controls are not practicable.

		Consequence Type				
		Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Likelihood (Severity and Probability)	Almost Certain 5	11 (Medium)	16 (Significant)	20 (Significant)	23 (High)	25 (High)
	Likely 4	7 (Medium)	12 (Medium)	17 (Significant)	21 (High)	24 (High)
	Possible 3	4 (Low)	8 (Medium)	13 (Significant)	18 (Significant)	22 (High)
	Unlikely 2	2 (Low)	5 (Low)	9 (Medium)	14 (Significant)	19 (Significant)
	Rare 1	1 (Low)	3 (Low)	6 (Medium)	10 (Medium)	15 (Significant)

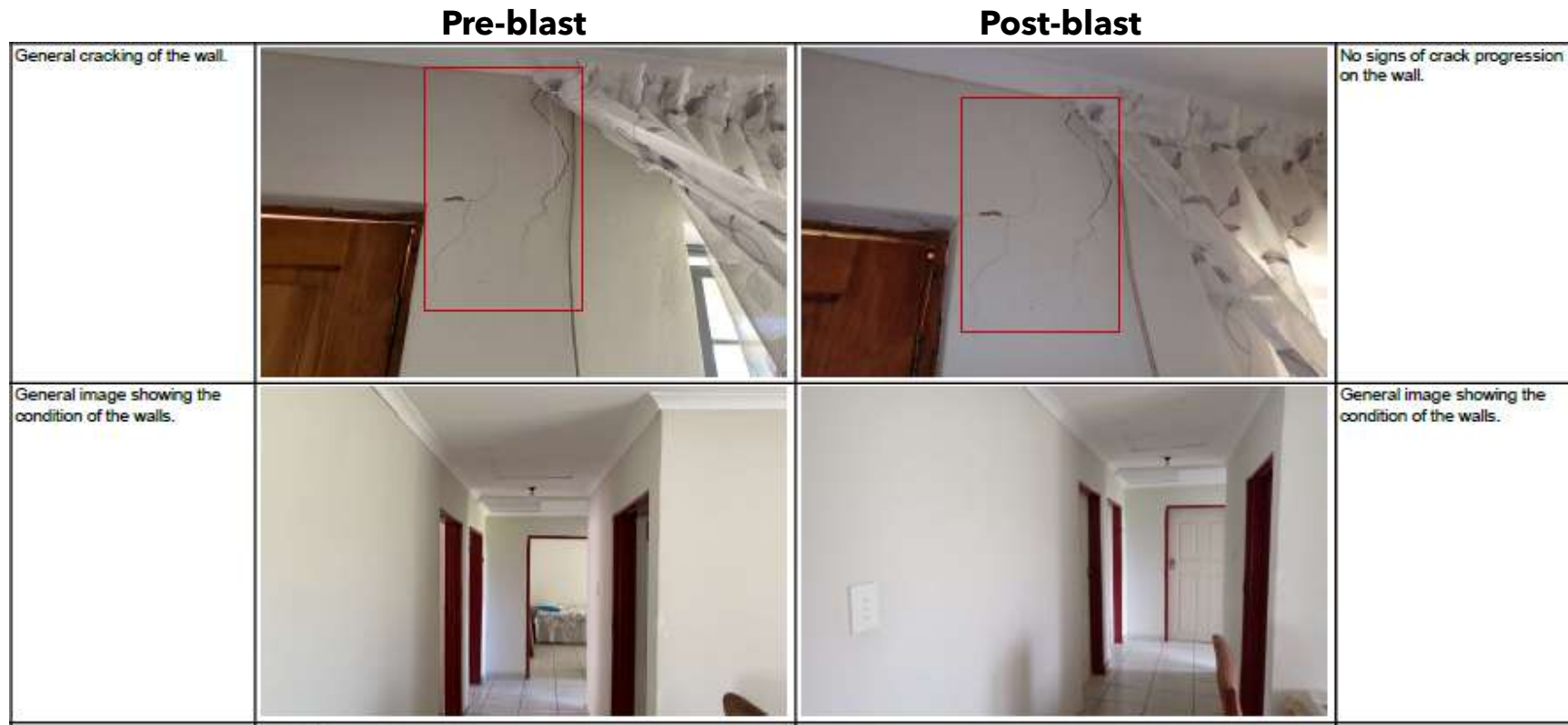


KEY ASPECT OF DMPR MCOP GUIDELINE

2. A **pre-survey** must be completed of the structures in the vicinity of the mine and within the blast area – used to define site-specific limits.

The information that must be included in this survey is:

- The ID structure.
- Determine the integrity and condition of the structure.
- Distance from blast.
- Done before blasting – if no pre-survey has been done (existing mines), must be done ASAP.



KEY ASPECT OF DMPR MCOP GUIDELINE

3. The '**Who came first**' principle:

- Existing structures (before blasting started at the mine) must be protected from damage due to blasting.
- New structures must be designed that can withstand the prescribed/defined safety limits. (Employer to communicate safety limits to the community).
- Define and determine the need and frequency of follow-up surveys of surrounding structures.

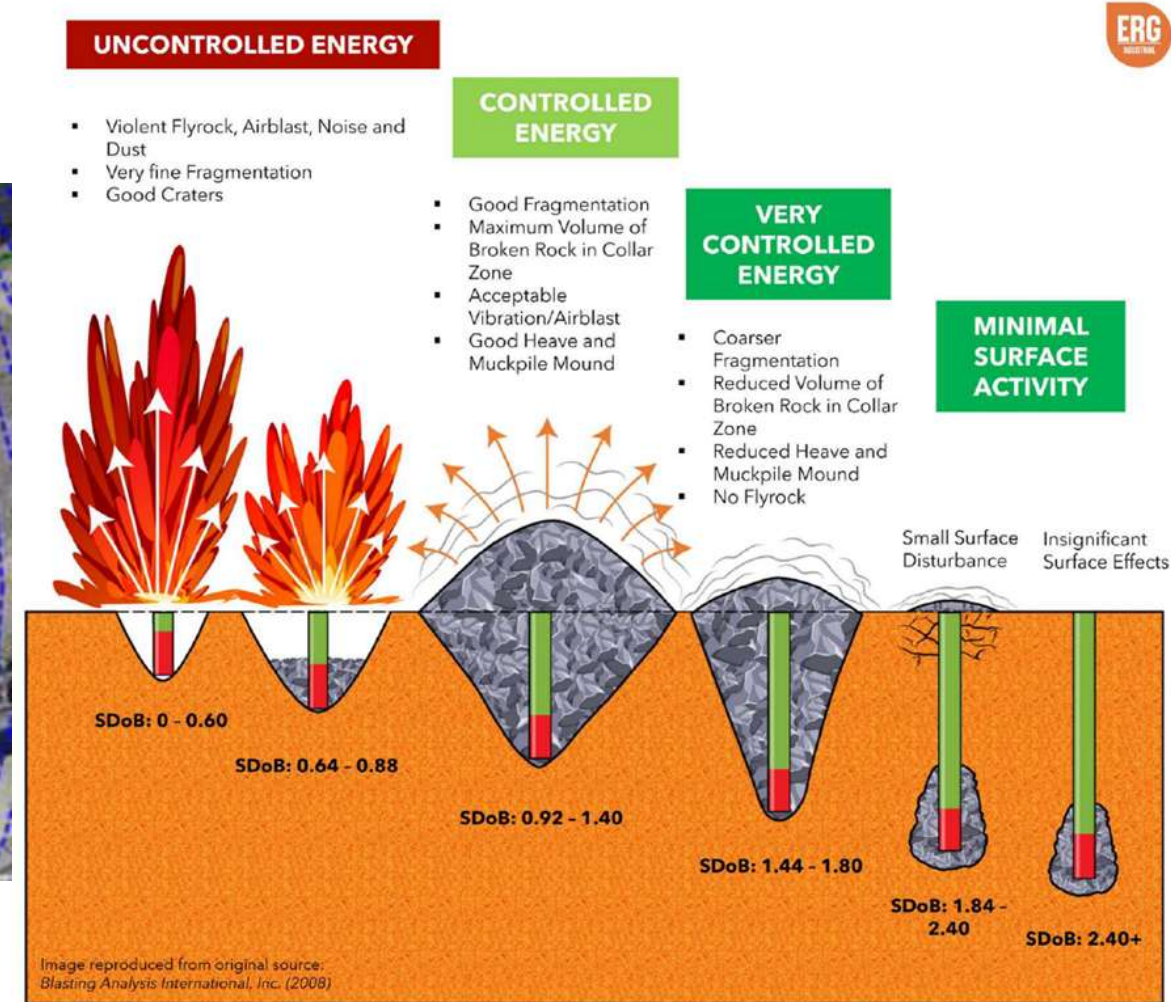
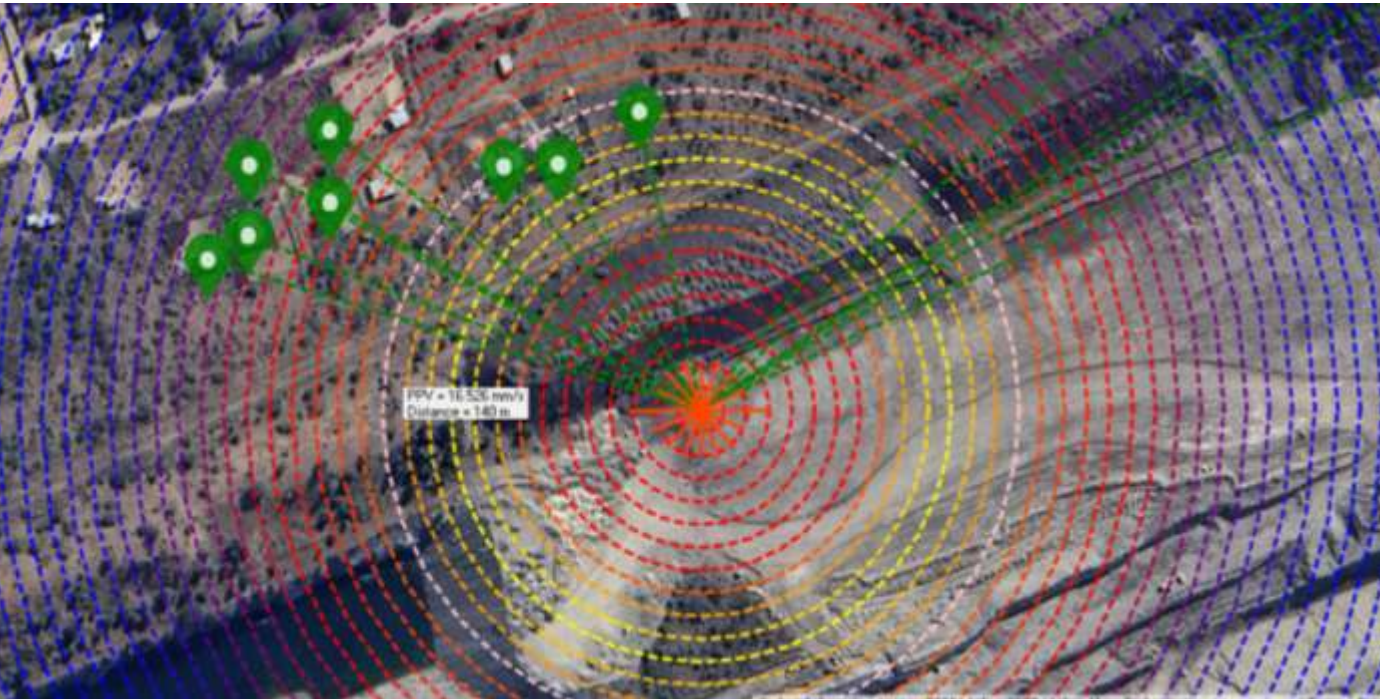


KEY ASPECT OF DMPR MCOP GUIDELINE

4. **Drill and Blast designs** must be developed considering the potential Ground Vibration (PPV), Noise and Airblast and Flyrock that can result from the blast and the potential damage to nearby structures.
- **Should a significant risk exist**, a multi-disciplinary team need to be involved in the development of the drill and blast design, including:
 - A **qualified blasting expert**;
 - The relevant explosive manufacturer or supplier;
 - The geologist;
 - The rock engineer or geotechnical expert with the appropriate certificate;
 - An employee representative; and,
 - An affected community representative.
 - This team must determine the drill and blast design according to **limit ground vibration, noise, air-blast** and **flyrock**
 - **No** acceptable levels of flyrock beyond the exclusion radius. If the risk exists, recalculate the exclusion zone.
 - The predicted values for ground vibration, air-blast and flyrock **must be calculated as part of the drill and blast design**.

KEY ASPECT OF DMPR MCOP GUIDELINE

▪ Predictive Models



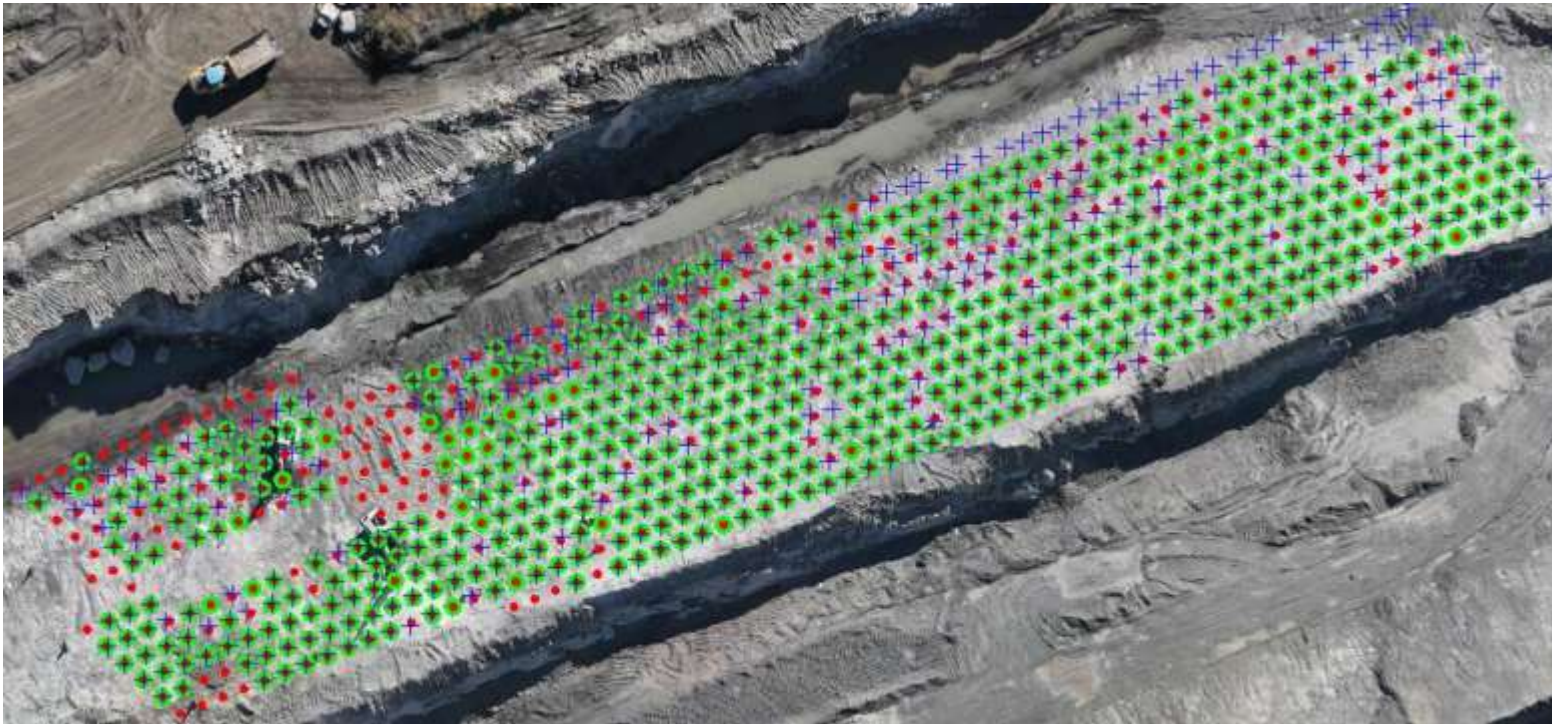
KEY ASPECT OF DMPR MCOP GUIDELINE

- 5. Quality Assurance Quality Control:** Develop and implement measures and procedures to attain practical and reasonable quality assurance and quality control systems



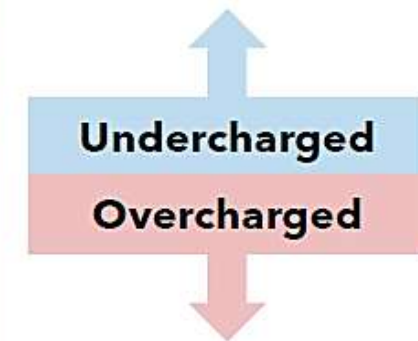
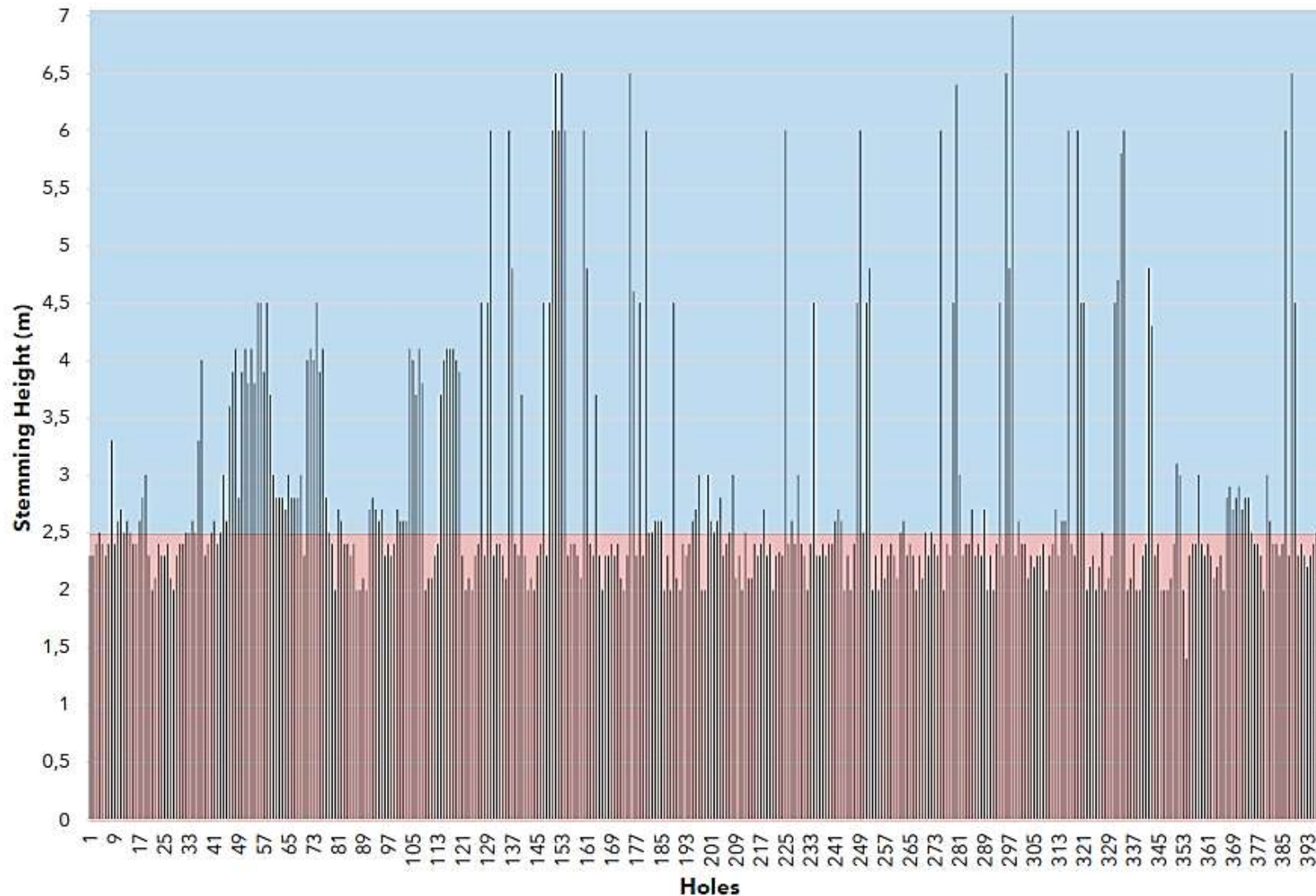
KEY ASPECT OF DMPR MCOP GUIDELINE

5. **Quality Assurance Quality Control:** Drilled hole positions



KEY ASPECT OF DMPR MCOP GUIDELINE

5. **Quality Assurance Quality Control:** Charging of holes and Stemming Lengths



KEY ASPECT OF DMPR MCOP GUIDELINE

- 6. Monitoring** of blasts in terms of ground vibration, noise/airblast and flyrock - must implement an effective system to monitor the intensity of every blast and record the actual data - include locations of monitoring devices, and **data must be analysed and compared to predictions.**



KEY ASPECT OF DMPR MCOP GUIDELINE

7. Measures to **register and handle complaints**, including increasing awareness amongst community members through posters, consultations with the community committees, etc. and implementing an **effective warning system** at the mine to notify and alert the surrounding communities of every planned blasting activity

LATEST REVISIONS ON THE GUIDELINE





THANK YOU

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