



Strategy towards a mining industry-wide Buy-and-Maintain Quiet initiative to reduce noise induced hearing loss

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Synopsis

The challenges of noise emission in the mining industry are well known. These challenges are exacerbated by the increasing trend towards mechanized mining, and there is general consensus that an effective industry-wide Buy Quiet initiative (BQI) will significantly assist in reducing noise-induced hearing loss by minimizing noise at its source.

In its endeavours to improve the health of workers, the MOSH Noise Team has facilitated development of a proposed strategy and structure for a BQI. Extensive consultation with stakeholders resulted in support for the initiative. The MOSH Noise Team was advised to solicit the contributions of consulting mechanical and electrical engineers (CM&EEs), whose support is viewed as critical for realization of the initiative, since elimination of noise at source is an engineering challenge, and most procurement standards and specifications are set and managed by engineers.

A workshop with CM&EEs and their representatives, as well as group environmental engineers (GEEs), confirmed the urgent need for the initiative and provided valuable insights. The workshop used obstacle-based planning techniques to identify the factors on which the success of this BQI will depend.

Most potential obstacles to the implementation revolved around proper scoping, leadership commitment, and companies' adherence to the initiative. Lack of involvement by the relevant stakeholders and economic issues were also identified as potential obstacles.

Delegates at the workshop felt that the successful implementation of the industry-wide BQI, will depend on the mining industry addressing the specific obstacles. The most critical and urgent issue was identified as the formation of a properly constituted industry-wide BQI task team that includes representatives from critical stakeholder groups and which is mandated and empowered to drive the initiative.

Keywords

occupational safety and health, noise-induced hearing loss, noise reduction, Buy Quiet initiative.

Introduction

The mining industry's zero harm vision and 2013 health and safety milestones demonstrate the commitment that mining companies have made towards elimination of noise hazards in the workplace. There is a general consensus that the challenge requires more than a willing and able occupational health practitioner supported by personalized PPE, and that the industry will have to focus most of its energies on the elimination of noise at source. This is no simple and easy task, and will require leadership involvement across the industry in addressing noise hazards.

The CoM MOSH Learning Hub Noise Team has been promoting an industry-wide Buy Quiet initiative (BQI). In the last decade, individual mining companies have established Buy Quiet policies, albeit with limited success. Unless industry partners with and motivates suppliers to invest specifically in the development of quieter equipment, efforts to eliminate noise hazards will remain reactive. It has now become imperative for the mining industry to embrace the challenge and develop an industry-wide BQI that will create a 'step change' in noise management and reduction.

Various critical stakeholders, including the Learning Hub, group environmental engineers (GEEs), the MOSH Task Team, mine professional associations (MPAs), independent consultants, the MOSH Noise Team sponsor, and consulting mechanical and electrical engineers (CM&EEs) have been consulted regarding this initiative, and all confirmed the need for it and pledged support. It is widely believed that the CM&EEs is the critical industry group in this initiative, because noise elimination at source is largely an engineering function and most procurement standards fall under the responsibilities of engineers.

An industry-wide Buy Quiet commitment is required, and for it to succeed a firm decision from mining companies to procure only equipment and machinery that complies with specific noise emission standards is essential. The motivation for an industry-wide Buy Quiet commitment is based on the following factors:

- In the last decade, individual mining companies that have established Buy Quiet policies have met with limited success
- While individual Buy Quiet policies from mining companies do help, it is only

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through the collective demand of the mining industry that suppliers will be motivated to focus on noise reduction as a critical part of their product development and performance

- ▶ In order for industry to be sustainable in future, and owing to the effects of globalization, the mining industry is going to become even more mechanized. Therefore it is imperative to manage noise at the design stage of the machinery/equipment. With equipment life of 5 to 10 years or longer, industry must become proactive and play a collective facilitative role towards 'real innovation' that can significantly lower noise at source. Industry-wide cooperation with suppliers will create a win-win result for both parties, as suppliers that already meet the legal requirements will have the potential to offset their development costs against a potential increase in market share
- ▶ Industry has spent a substantial amount of money over the last decade in compensation for the hearing loss induced by high noise levels emitted by machinery. Profitability and sustainability challenges make this scenario going forward very expensive. The financial impact could be even greater if companies are faced with class actions for compensation by former mining employees
- ▶ It is substantially cheaper and more effective for mining companies to embark on an industry-wide BQI as opposed to individual companies undertaking reactive developments in engineering and PPE.

Practical path towards a mining industry-wide Buy Quiet initiative

To effectively setup an industry-wide BQI, the mining industry must meet the following strategic objectives:

- a. Identify and rank noise sources throughout the industry. Mining companies have done remarkably well in this regard and this information is readily available. However, it needs to be collated and normalized
- b. Establish 'stretched' noise emission targets per machine or type of equipment based on the noise source and noise level
- c. Determine the approximate aggregate demand for specific machinery/equipment that mining companies use currently and will use over the next 10 years, as well as the demand for specific spares equipment
- d. Engage with a wide spectrum of suppliers at executive level to communicate and obtain commitment milestones for the first two points above.

There might be a need to classify equipment that is specific to South Africa so that noise hazard for global equipment can be addressed by global initiatives such as Earth Moving Equipment Safety Round Table (EMERST) and the coordination of noise-related research and development.

Key steps towards the achievement of these strategic objectives are:

- i. Establish a mining industry Buy Quiet task team with sub-teams as required, with the sole mandate of executing the above objectives. The team establishment to be facilitated by the MOSH Learning Hub

- ii. Set up round-table discussions at the executive level with the supplier groups to facilitate the BQI at the highest level
- iii. Establish specific standards based on equipment/machinery *life-cycle cost* as opposed to *purchase cost*. Develop standards for noise emission levels at the start-of-use (new equipment), mid-life use, and end-of-life use. Requirements must also include maintenance requirements for maintaining low noise emission during the operating life of equipment
- iv. Establish realistic and equipment-specific noise reduction targets and milestones with the task teams and suppliers
- v. Monitor and manage progress towards the milestones.

It is important that an industry-wide BQI is developed with the active participation of mining industry executives. This on its own will constitute a step change, because noise hazard is currently the responsibility of occupational health departments, and there is no effective involvement of executives nor the integration of engineering and procurement departments.

Challenges in executing a mining industry-wide Buy Quiet initiative

As mentioned, initiatives to date have had limited success and it is important to learn from the potential pitfalls that have been identified:

- ▶ Inability of the industry to collaborate on this initiative
- ▶ A fixation on purchase cost as opposed to life-cycle cost
- ▶ Inability of mining companies to sell this strategy to their individual operations
- ▶ Supplier resistance based on international product specifications and requirements
- ▶ Suppliers resistance due mainly to upfront investment that might be required in some research and development initiatives and the targets set by task teams
- ▶ Potential reduction of competition and monopoly issues
- ▶ Potential intellectual property issues.

The above challenges require specific mitigation and action, but they are surmountable.

Industry consultations

The establishment of a BQI for the mining industry is an ambitious goal and requires wide consultation.

After extensive consultation with the MOSH Task Force, MPAS, and key executives the initiative was presented to the CM&EEs, since they are seen as the potential custodians of the initiative. The CM&EEs agreed to the initiative in principle and requested that a work session be organized to define the details.

The MOSH Noise Team facilitated the majority of the consultative workshops and used obstacle-based planning techniques and systems approach principles for scoping the challenges. Briefly, the process applies the following logic:

- a) Soliciting obstacles (from the delegates) that will cause the failure of BQI. This step was inclusive and all obstacles were considered and extensively discussed

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- b) Deriving intermediate objectives to mitigate and eliminate the obstacles identified
- c) Verbalizing the obstacles and intermediate objectives
- d) Classification and correlation of the obstacles
- e) Deriving an intermediate objectives map.

The obstacles, together with the accompanying intermediate objectives, are shown in Table I. The obstacles were classified into the following five categories:

- a) *Leadership commitment* – issues relating to commitment by the mining industry leadership to adhere to and implement the BQI
- b) *Scoping issues* – issues relating to the scoping, planning, scheduling, and execution of the BQI with the main aim of maintaining a focused approach to the initiative. They also included issues around the creation of verifiable but generic standards; the creation of standardized equipment noise databases; accompanying change management processes; explicit terms of reference; and measurable outputs. Precursors such as the formation and composition of

- the task teams were also grouped under the scoping issues. The scoping of this initiative should seriously consider and include an industry-wide Buy and Maintain Quiet initiative, as opposed to the BQI only
 - c) *Stakeholder management* – how and when to involve all relevant stakeholders such as OEMs, labour unions, other engineering stakeholders, and State departments
 - d) *Economic viability issues* – related to the balance between economic realities, technological limitations, and management of the noise hazard, and included the feasibility of some endeavours
 - e) *Others* – mostly operational concerns that can be overcome by implementing effective HCPs, COPs, and operational discipline procedures. Most of these concerns are generally not part of the BQI scope.
- In summary, the obstacles showed that:
- a) About half of the identified obstacles to implementing the BQI are related to scoping issues
 - b) The most urgent and pertinent issue regarding

No.	Identified obstacles	Intermediate objectives
1	Non-adoption of the industry-wide Buy Quiet Initiative (BQI). Not adhering to the agreed BQI	- Mining industry CEOs and leadership to sign off, commit and adhere to the BQI
2	Lack of management commitment	- Mining industry CEOs and leadership to sign off, commit, and adhere to the BQI - Mining industry CEOs to provide effective leadership - Chamber of Mines (CoM) to lobby non-affiliated organizations to sign off and adhere to the initiative
3	Inadequate involvement of engineers	- CM&EEs to take the responsibility of involving other engineering stakeholders (e.g. AMRE, SAIMEchE, SAIMM) - Task team nominations should include representatives from other engineering stakeholders (e.g. AMRE, SAIMEchE)
4	Absence of a clear strategy that deals with existing equipment	- BQI to incorporate new and existing machine components - A clear strategy from the industry to replace existing non-compliant machinery - Scoping and terms of reference from task teams should be explicit on this strategy
5	Absence of a proper framework during design (goals/objectives/vision, structures)	- Proper scoping and definition of generic standards, including the verification of these standards for the industry
6	Expense involved in designing quieter equipment (normally at the expense of productivity)	- Identify, prioritize, and rank noise sources throughout the mining industry - Creation of machinery noise database - Mining companies to set long-term noise reduction/tolerance targets
7	Stakeholders not having a common interpretation and understanding of the new requirements	- Proper scoping and definition of generic standards, including the verification of these standards - Terms of reference of the task team should prioritize and deliver the proper scope and standards for the entire initiative
8	Absence of a proper change management procedure for this initiative	- Terms of reference of the task team should prioritize this - Use of MOSH change management initiative
9	Unrealistic expectations	- Clear measurable framework - Establish and set noise emission targets per machine/equipment (ALARP) - Obtain extensive involvement of relevant experts
10	Not involving OEMs	- OEMs should be part of task teams - Establish a list of OEMs, who will nominate representatives to this initiative - Mining industry to stipulate the parameters of OEMs' involvement
11	Companies continuing to purchase from existing suppliers (OEMs) that do not conform to the BQI	- Firm commitment from mining companies to procure from BQI-compliant suppliers - Mining industry CEOs and leadership to sign off, commit, and adhere to the BQI
12	Not implementing penalties for non-compliance	- Explicitly include this during scoping and on the terms of reference for the task teams - Firm commitment from mining companies to procure from BQI-compliant suppliers
13	Failure to address the total cost of ownership and economic viability	- Value each case per equipment/ machinery - Identify, prioritize, and rank noise sources throughout the industry - Creation of noisy machinery database (part of identification) - Mining companies should set long-term noise reduction/tolerance targets
14	Being overwhelmed by the BQI challenge	- Positive mindset and realistic plan - Proper prioritization (part of scoping by the task team)
15	R&D teams not focusing on common noise -reduction techniques and possibilities (including funding)	- Common approach by and funding to the R&D teams

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Table I (continued)

Obstacles and intermediate objectives

No.	Identified obstacles	Intermediate objectives
16	Non-accountability of line management	- Change management process for implementing the BQI to include mitigation of this obstacle
17	Lack of an industry-wide, verifiable equipment noise database	- Build and improve on existing database
18	Absence of a common approach for the whole industry	- Emphasis that occupational health and safety is for sharing, not competition - Proper scoping and definition of generic standards, including verification of these standard
19	Not developing realistic targets that all stakeholders agree on, commit to, and sign off	- Proper scoping and definition of generic standards, including verification of these standards - Terms of reference of the task team should prioritize and deliver the proper scope and generic standards for the entire initiative
20	Lack of buy-in to the initiative	- Change management process for implementing the BQI to involve all stakeholders - Use of MOSH change management initiative
21	Current lack of technologies to address the noise hazard in some equipment	- Effective use of hearing conservation programmes (HCPs) - Firm commitment from mining companies to procure from BQI-compliant suppliers
22	Non-involvement of procurement departments	- Change management process to involve procurement departments
23	Poor maintenance and scoping	- Scoping should include Maintain Quiet as opposed to Buy Quiet only
24	Inadequate monitoring	- Scoping should include Maintain Quiet as opposed to Buy Quiet only - Documentation of the work for referencing
25	Inability to identify suitable OEMs	- OEMs/suppliers should be part of task teams - Establish a list of OEMs, who will nominate representatives to this initiative - Mining industry to stipulate the parameters of OEMs/supplier involvement
26	Lack of standards to verify noise levels claimed by OEMs	- Proper scoping and definition of generic standards, including verification of these standards - Terms of reference of the task team should prioritize and deliver the proper scope and generic standards for the entire initiative
27	Lack of a weighted and signed-off industry noise database	- Identify, prioritize, and rank noise sources throughout the mining industry - Creation of machinery noise database - part of identification Mining companies should set long-term noise reduction/tolerance targets
28	Trying to address all the problems within this BQI, including scope creep	- Proper scoping and definition of generic standards, including verification of these standards - Terms of reference of the task team should prioritize and deliver the proper scope and generic standards for the entire initiative
29	Lack of incentive for coming up with correct solution	- Terms of reference of the task team should prioritize and deliver on this - Firm commitment from the mining companies to procure from BQI-compliant suppliers
30	Absence of involvement and acknowledgement of the noise challenge by the State	- Detailed strategy to involve the State
31	Poor communication – sharing and combining noise reduction initiatives	- To be achieved through MOSH Leading Practice Initiative
32	Poor business cases/solutions that do not make economic sense	- Value case per equipment/ machinery - Identify, prioritize, and rank noise sources throughout the mining industry - Creation of machinery noise database (part of identification) - Mining companies should set long-term noise reduction/tolerance targets - Terms of reference of the task team should prioritize and deliver on this - Firm commitment from mining companies to procure from BQI-compliant suppliers
33	Poor composition of task teams – appointment/ secondment of wrong people to task teams	- Mining leadership and all stakeholders to appoint / second right task team members
34	Consolidation of previous investigations on noise reduction	- Consolidate previous work (especially since 2002) - Part of MOSH responsibility
35	Lack of manufacturer and supplier liability	- Proper and explicit scoping and terms of reference of the task team should prioritize and deliver on this
36	Industry and suppliers not understanding and implementing Section 21 of the MSHA 29/1996	- Proper and explicit scoping and terms of reference of the task team should prioritize and deliver on this
37	Scops of the BQI too limited	- Proper scoping should be along the lines of Buy and Maintain Quiet as opposed to Buy Quiet only
38	Incorporating the agreement to SABS standards	- Proper and explicit scoping and terms of reference of the task team should prioritize and deliver on this
39	Not learning from past failures in noise control	- Need for a forum to close the loop – feedback from different initiatives - MOSH process can be that forum
40	Accepting and implementing easier solutions in noise control, such as HPDs	- Effective HCPs and COPs should address this - Proper leadership on the BQI
41	Actions in case of emergencies and equipment availability	- Keep record of un-silenced equipment - Critical spares and equipment should have the same standards as other equipment
42	Not educating and demystifying the scientific silencing of equipment	- MOSH process can assist with this - Understand what is required on silencing of equipment as part of scoping
43	Not marketing the BQI to suppliers	- OEMs/suppliers should be part of task teams - Establish a list of OEMs, who will nominate representatives to this initiative - Mining industry to stipulate parameters of OEMs/supplier involvement
44	Non-involvement of research institutions	- Involve through MOSH

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Table I (continued)

Obstacles and intermediate objectives		
No.	Identified obstacles	Intermediate objectives
45	Non-availability of generic measurement standards	<ul style="list-style-type: none"> - Proper scoping and definition of generic standards, including verification of these standards - Proper and explicit scoping and terms of reference of the task team should prioritize and deliver on this
46	Alignment with the other State departments e.g. labour	<ul style="list-style-type: none"> - Detailed strategy to involve relevant State departments
47	Involvement of organized labour	<ul style="list-style-type: none"> - Unions should be part of the task teams - Detailed strategy to involve unions
48	Unethical tendencies by mining companies	<ul style="list-style-type: none"> - Mining industry CEOs and leadership to sign off, commit, and adhere to the BQI - Firm commitment from mining companies to procure from BQI-compliant suppliers
49	Lack of a holistic approach to noise management e.g. not removing workers from high-risk areas	<ul style="list-style-type: none"> - Effective HCPs and COPs should be able to address this
50	Not involving service providers and the SME portion of the market	<ul style="list-style-type: none"> - Task teams should include representatives from SMEs
51	Absence of clear and unambiguous definitions	<ul style="list-style-type: none"> - Proper scoping and definition of generic standards, including verification of these standards - Proper and explicit scoping and terms of reference of the task team should prioritize and deliver on this
52	Not addressing and implementing any of the above	<ul style="list-style-type: none"> - Mining industry CEOs and leadership to sign off, commit, and adhere to the BQI - Mining industry CEOs to provide effective leadership

scoping is the nomination and creation of properly constituted task teams. The governance structure and terms of reference of the teams must be clarified up-front, although the teams should establish their own execution strategies and plans. Once the task teams have been formed, they should expedite the following:

- Explicit project scoping to avoid scope creep
 - Serious consideration of, and include in the scoping, an industry-wide *Buy and Maintain Quiet* initiative as opposed to BQI only
 - Identification and prioritizing of noise sources throughout the mining industry
 - Creation of a noisy machinery/equipment database
 - Creation of an equipment supplier/OEM database
 - Setting of long-term noise reduction/tolerance targets
- c) The scoping should be explicit on the change management that is required for this initiative and should use the MOSH methodology
- d) There was general consensus on the need for mining leaders to provide effective leadership by signing off, committing, and adhering to the BQI
- e) The mining industry must involve all relevant stakeholders (*e.g.* OEMs, labour unions, State, and research institutions). These stakeholders should have representatives on the task teams. However, the mining industry has to be very tactful in the stipulation of the parameters for stakeholder involvement. The task teams are expected to provide leadership in this regard
- f) Task teams should take into consideration economic viability issues during target setting. Some of the activities that are critical in achieving this include:
- i. Value case per equipment
 - ii. Identify, prioritize, and rank noise sources throughout the mining industry

- iii. Creation of a noisy machinery database
- iv. Setting of long-term noise reduction /tolerance targets.

Conclusion and recommendations

Extensive consultations have indicated that the mining industry believes that the industry-wide Buy Quiet initiative is a proactive endeavour that will greatly assist in combating noise-induced hearing loss and the management of noise at the 'real' source. Although the Buy Quiet policies of individual mining companies do help in this regard, it is only through the collective focus and commitment of the mining industry, backed up by aggregate equipment spend, that suppliers will be motivated to focus on noise reduction as a key issue in product development and performance.

To institute the industry-wide Buy Quiet initiative, the mining industry has to effectively address the identified obstacles. The most critical and urgent issue is the formation of a properly constituted industry-wide task team, which must include representatives from key industry stakeholders. However, great tact should be exercised in stipulating the parameters of general stakeholder involvement. Properly constituted, this initiative has the potential to be the pathfinder and a benchmark for other challenges that require extensive cooperation within the mining industry.

Acknowledgements

The authors thank the following organizations for their advice and cooperation:

- The Chamber of Mines of South Africa and the MOSH Learning Hub structures
- Consulting mechanical and electrical engineers
- Group environmental engineers
- All other individuals and organizations that were involved in this consultative exercise
- The Theory of Constraint (TOC) body of knowledge.

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Glossary of terms

ALARP	As low as reasonably practicable	Leadership	Applies to leadership in different levels and roles
AMRE	Association of Mine Resident Engineers – Association responsible for originating and promoting the general advancement of all matters appertaining to the work of engineers in the mining industry	MOSH	Mining Occupational Safety and Health leading practice adoption system
BQI	Buy Quiet initiative	MOSH Noise Team	A MOSH Team - responsible for facilitating the adoption of noise prevention leading practices
CEO	Chief Executive Officer	MPAs	Mining professional associations
CoM	Chamber of Mines of South Africa	OH	Occupational health
COP	Code of Practice	OEMs	Original equipment manufacturers (<i>in this report, is used interchangeable with suppliers and service providers</i>)
CM& EEs	Consulting Mechanical and Electrical Engineers - Technical Committee within the CoM	NIHL	Noise-induced hearing loss
GEEs	Group Environmental Engineers – Technical Committee within the CoM	R&D	Research and development
HCP	Hearing conservation programme	SAIMM	Southern African Institute of Mining and Metallurgy
HPD	Hearing protection device	SAIMechE	South African Institute of Mechanical Engineering
HPD TAS	Hearing protection device, training awareness and selection	SMEs	Small and medium enterprises
		State	South African Government. ♦

SAFETY AND PRODUCTIVITY



Safety Access Systems

- Complies with MDG15 standards
- Safe easy access
- Robust, able to withstand vibration
- Interlock Protection
- Emergency egress



Collision Avoidance Systems

- Asset Protection for vehicles, infrastructure and personnel
- Risk Mitigation aid that delivers improved safety and productivity performance
- Real-time risk monitoring and reporting of "High Potential Interactions"
- Improved "situational awareness" reduces operator stress

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