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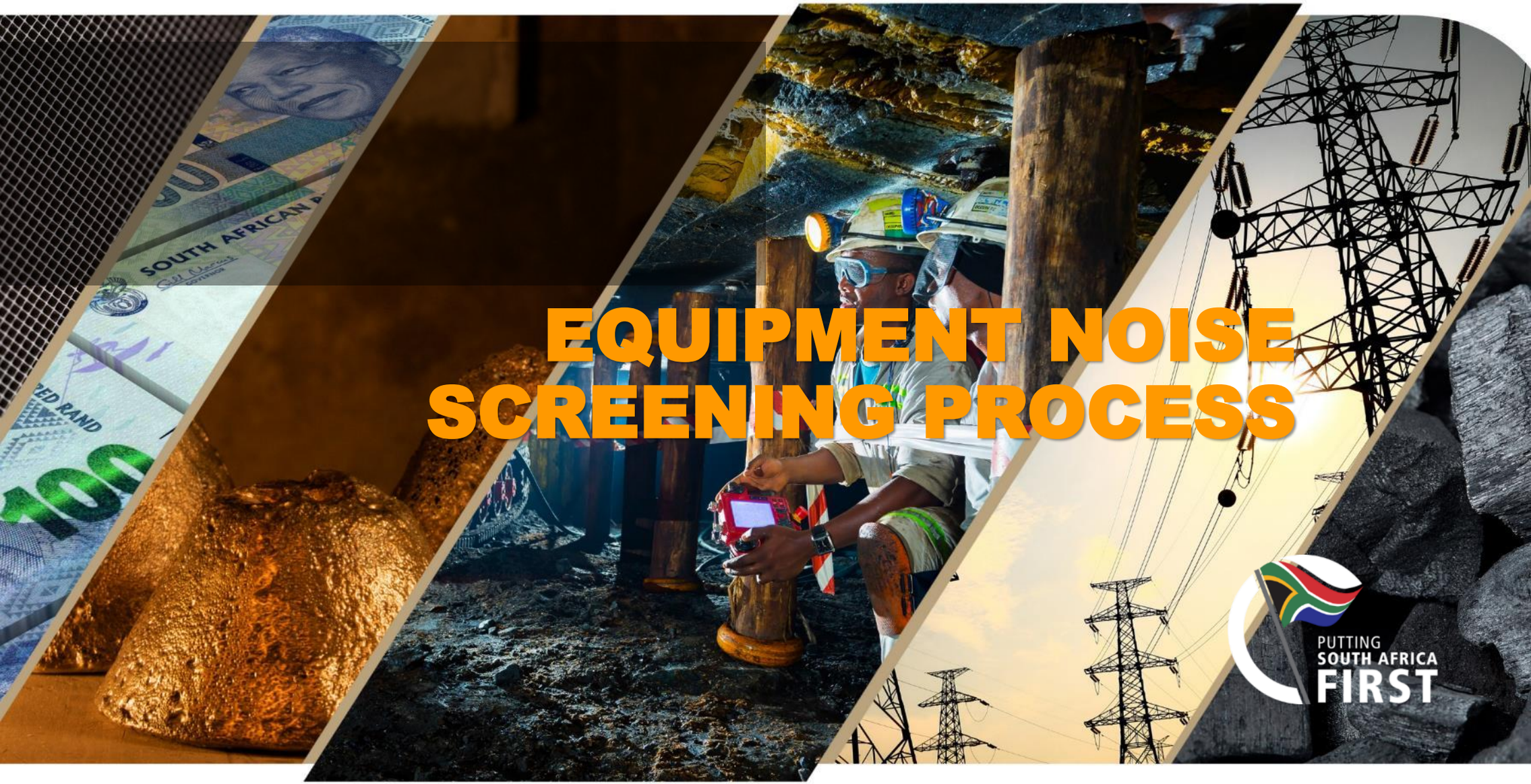
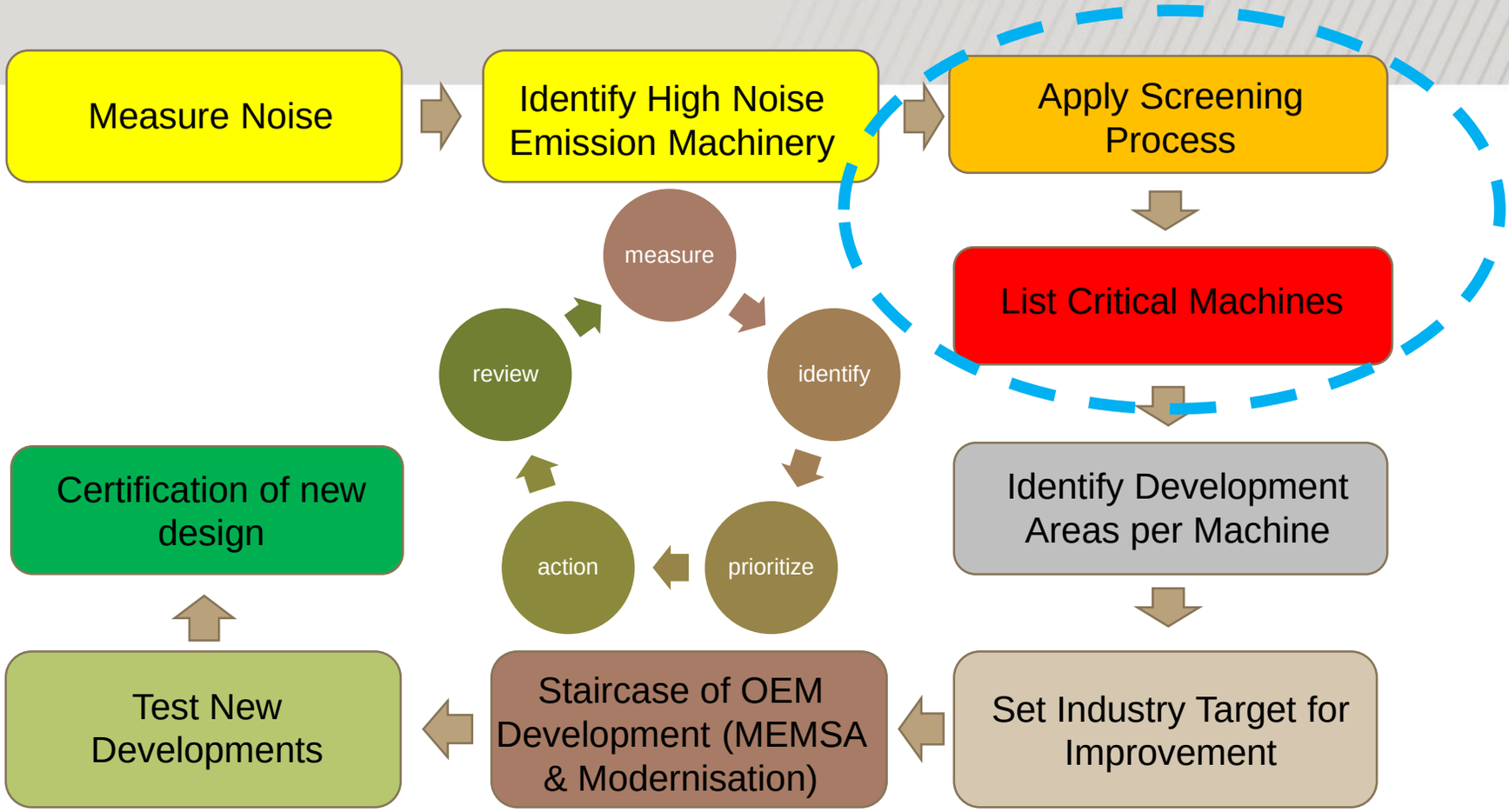
MOSH Noise Adoption Team
Northern Cape Planning Workshop
17 May 2017



EQUIPMENT NOISE SCREENING PROCESS

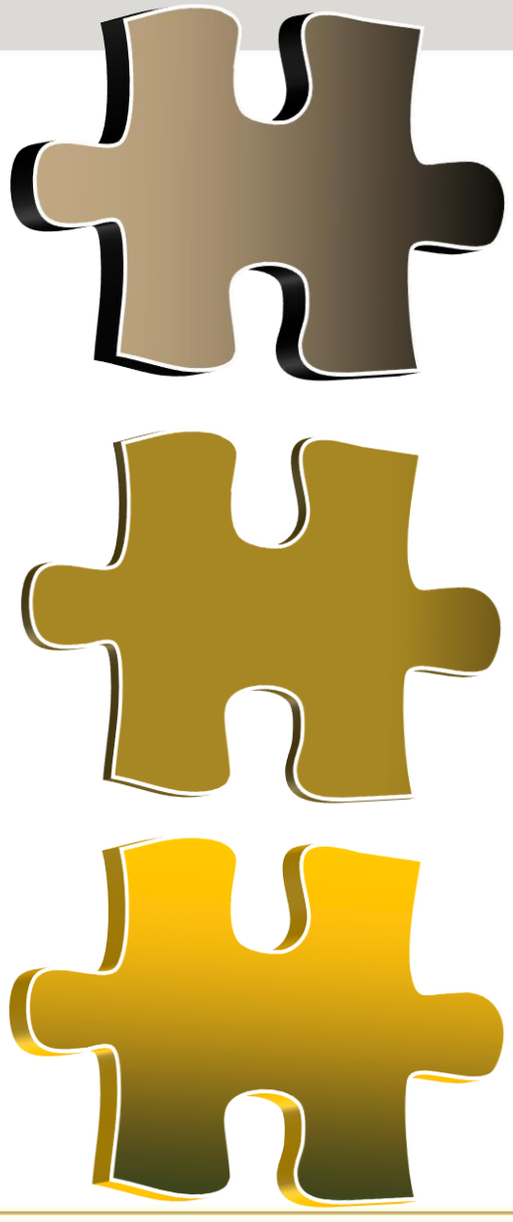
Contents

Noise Reduction Process



- ✓ Screening process should now highlight '*Critical Equipment*'
- ✓ Discussions can now be had between *Engineer / Health Practitioner / Commodity Expert* and the *OEM*
- ✓ Identifying an improvement programme for respective equipment
- ✓ Target setting and a staircase to develop and/or improve product
- ✓ Testing and Certification of new developments

Progress



OEM Interaction

- Mining Equipment Manufacturers of South Africa (MEMSA):
  - Introduce the IBMQI to the office bearers.
  - Align the MEMSA members with the IBMQI Process.

Screening of Critical Noise Equipment

- Analysis of Equipment Noise Screening results:
  - 8 Mining Companies submitted Screening results
  - Screening Parameters:
    - Noise Level
    - Number of persons exposed
    - Number of machines at work environment
    - Duration of exposure
    - Confined space
    - Machine vibration
    - Wear parameters
    - Previous improvement ideas
    - Effective hearing protection
  - 90 Equipment Categories Screened
  - Top 10 Critical Noise Equipment identified per Commodity

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EQUIPMENT NOISE SCREENING




2015 Noise Repository

Commodity	Mining Company	Mine / Shaft / Operation	Type of Mining	Activity of Workplace (use SAMOHP Code e.g. stoping, dev etc.	Equipment / Process Category	Equipment and/or Process Measured (*Different types of equipment*)	Power source (Pneumatic/Electric/electro hydraulic/hydro power)	Model	Manufacturer/ Supplier	Silenced / not silenced	Number of pieces of equipment per shaft / Are	Noise Level (dBA) - process noise (log average to be recorde	Noise Level (dBA) (maximum to be recorde
Platinum	Lonmin	West 1	UG Conventional	Development (single	Rock Drill	S25 Rockdrill	Pneumatic	S25	Victoria	Silenced	4	104.3	105.3
Platinum	Lonmin	Karee 3	UG Conventional	Development (single	Rock Drill	Kempe S36 Diamond Drill	Pneumatic	U36B / U2	Kempe	Silenced	5	104.8	106.8
Platinum	Lonmin	Karee 3	UG Conventional	Development (single	Rock Drill	Rockdrill Tranter	Pneumatic	215	Victoria	Silenced	1790	104.5	105.8
Platinum	Lonmin	Karee 3	UG Conventional	Development (single	Rock Drill	S36(Drop Raise)	Pneumatic	U368/U2	Board	Silenced	11	104.4	105
Platinum	Lonmin	Karee 3	UG Conventional	Development (single	Fan	Fan 45 Kw	Electric	45 kW	Axial	Silenced	65	98.6	100
Platinum	Lonmin	Karee 3	UG Conventional	Development (single	Fan	75 Kw	Electric	75kW	Axial	Silenced	18	102.5	104.6
Platinum	Lonmin	Karee 3	UG Conventional	Stoping	Winch	Pullman /Sullivan	Electric	75kW / 37	Exdin /	Not Silenced	442	98.8	101.9
Platinum	Lonmin	Karee 4B	UG Conventional	Development (single	Rock Drill	Kempe S36 Diamond Drill	Pneumatic	U36B / U2	Kempe	Silenced	2	104	104
Platinum	Lonmin	Karee 4B	UG Conventional	Development (single	Rock Drill	Rockdrill Tranter	Pneumatic	215	Victoria	Silenced	821	103.8	105.1
Platinum	Lonmin	Karee 4B	UG Conventional	Development (single	Rock Drill	Rockdrill	Pneumatic	S25	Victoria	Silenced	32	101.4	101.4
Platinum	Lonmin	Karee 4B	UG Conventional	Development (single	Rock Drill	S36(Drop Raise)	Pneumatic	U368/U2	Board	Silenced	3	102.6	103.6
Platinum	Lonmin	Karee 3	UG Conventional	Development (single	Fan	75 Kw	Electric	75kW	Axial	Silenced	7	102.2	104.2
Platinum	Lonmin	Karee 1B	UG Mechanized	Development (single	Rock Drill	Roofbolt Drill Rig	Electro hydraulic	DD210L	Sandvic	Silenced	2	100.7	103.3
Platinum	Lonmin	Karee 1B	UG Mechanized	Development (single	Rock Drill	Drill Rig Sandvik	Electro hydraulic	DD210L	Sandvic	Silenced	5	101.8	101.9
Platinum	Lonmin	Karee 1B	UG Mechanized	Ground Handling	Loader	LHD	Electro hydraulic	EJC 777	Sandvic	Silenced	10	100.6	101
Platinum	Lonmin	Karee 4	UG Conventional	Development (single	Rock Drill	Rockdrill Tranter	Pneumatic	215	Victoria	Silenced	126	105.8	105.8
Platinum	Lonmin	Saffy	UG Conventional	Stoping	Rock Drill	Rock Drill Tranter	Pneumatic	215	Victoria	Silenced	1349	103.8	105.5
Platinum	Lonmin	Saffy	UG Conventional		Rock Drill	Rock Drill S25	Pneumatic	S25	Victoria	Silenced	579	105.6	106.4
Platinum	Lonmin	Saffy	UG Conventional	Development (single	Rock Drill	Kempe S36 Diamond Drill	Pneumatic	U368/U2	Kempe	Silenced	3	104.5	105.4
Platinum	Lonmin	Saffy	UG Conventional	Surface Workshops	Compressor	Compressor House				Silenced	1	98.7	101.3
Platinum	Lonmin	Saffy	UG Conventional	Development (single	Quimpy Pump	Puma	Pneumatic	Puma	Dosan	Silenced	70	99.7	100.5
Platinum	Lonmin	Saffy	UG Conventional	Development (single	Rock Drill	S36 Drop Raise Machine	Pneumatic	U368/U2	Bord	Silenced	10	102.9	105
Platinum	Lonmin	East1	UG Conventional	Stoping	Rock Drill	S215	Pneumatic	215	Victoria	Silenced	206	104	105
Platinum	Lonmin	East1	UG Conventional	Development (single	Rock Drill	Rock DrillS25	Pneumatic	S25	Victoria	Silenced	35	106	106.6
Platinum	Lonmin	East1	UG Conventional	Development (single	Circular Saw	Sample Cutter	Pneumatic	Diamond	Atlas	Not silenced	2	99	100.7
Platinum	Lonmin	East1	UG Conventional	Stoping	Winnches	Pullman	Electric	75KW/37K	Pullman	Not silenced	100	99.8	100.7

Equipment Noise Screening Tool

Screening Process	Weight	Individual Score	Rock Drills - SC215	Trackless mining Equipment	Winch 37 / 55 kW	Fans	Main Pumps	Kempe S36 Diamond Drill Development	Compressor	Equipment	Pumps	Crushers	Sludge pump
dBA Measurement	35		8	8	7	7	7	8	8	6	7	7	7
Noise >107dBA		10											
Noise >104 <107 dBA		9											
Noise >101 <104 dBA		8	x	x				x	x				
Noise >98 <101 dBA		7			x	x	x				x	x	x
Noise >95 <98 dBA		6								x			
Noise >92 <95dBA		5											
Noise >89 <92dBA		4											
Noise >85 <89dBA		2											
No. of Persons	10		10	10	9	10	9	8	8	9	8	9	8
Exposed persons >10		10	x	x		x							
Exposed persons > 5		9			x		x			x		x	
Exposed persons > 2		8						x	x		x		x
Exposed person		7											
No. of Machines	9		10	4	8	8	4	10	4	4	4	4	4
Number of machines >100		10	x					x					
Number of machines >30<100		8			x	x							
Number of machines >10<30		6											
Number of machines >10		4		x			x		x	x	x	x	x
Time of Exposure	9		8	10	8	8	8	8	8	8	4	8	4
Exposure > 4hours		10		x									
Exposure > 1hour < 4 Hours		8	x		x	x	x	x	x	x		x	
Exposure < 1hour		4									x		x
Exposure < 10 min		2											
Exposure < 1 min		1											
Confined Work Space	8		10	10	8	8	8	10	8	10	8	8	8
Multiple sources in confined space		10	x	x				x		x			
Single source in confined space		8			x	x	x		x		x	x	x
Multiple sources inside plant building		6											
Single source inside plant building		4											
Source in open areas		2											
Source in open-pit		1											

Equipment Noise Screening Tool (Continued)

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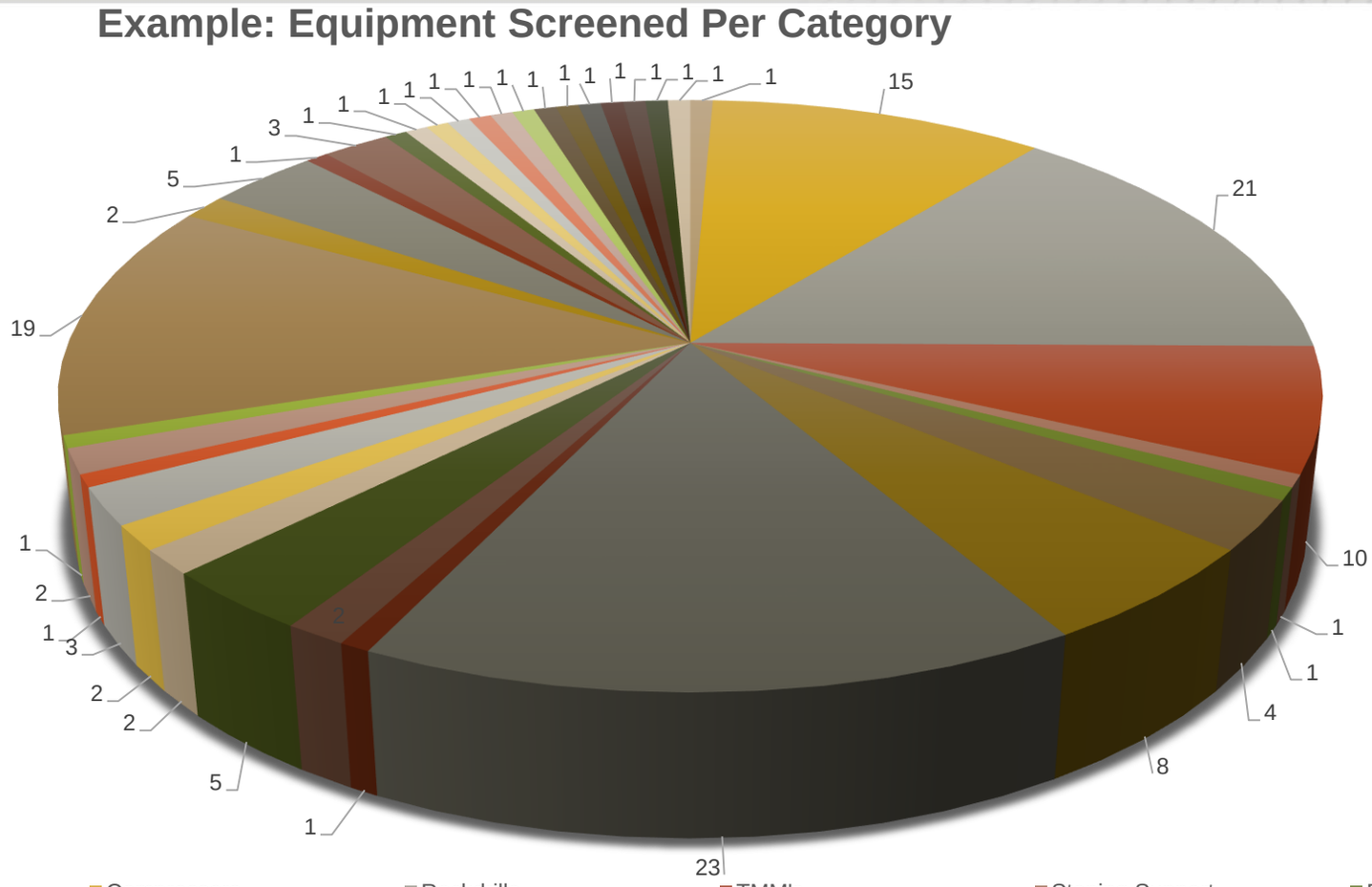
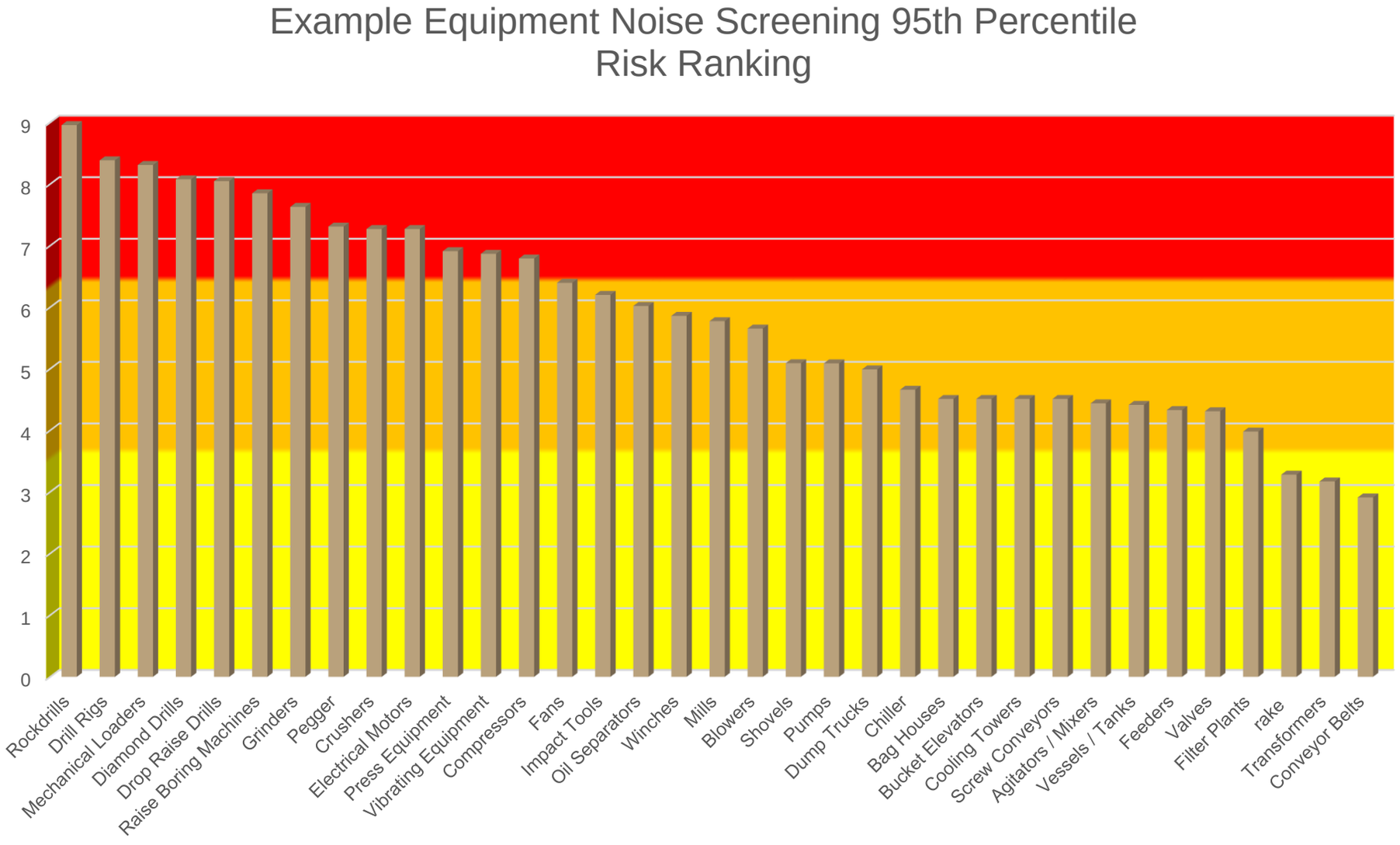
Screening Process	Weight	Individual Score	Rock Drills - SC215	Trackless mining Equipment	Winch 37 / 55 kW	Fans	Main Pumps	Kempe S36 Diamond Drill Development	Compressor	Equipment	Pumps	Crushers	Sludge pump
Machine Vibration	7		10	10	0	0	0	8	0	8	0	0	0
Operator directly exposed to noticable machine vibration		10	x	x									
Operator directly exposed to some machine vibration		8						x		x			
Operator indirectly exposed to machine vibration		4											
Little noticable machine vibration		2											
No exposure to machine vibration		0			x	x	x		x		x	x	x
Maintenance	7		3	3	3	3	3	3	6	6	6	6	6
Noise levels increase significantly as condition deteriorates		10											
Noise levels increase noticeable as condition deteriorates		6							x	x	x	x	x
Noise levels increase marginally as condition deteriorates		3	x	x	x	x	x	x					
No noise variance due to condition		0											
Equipment Improvements & Solutions	6		10	0	10	10	0	10	0	10	0	0	0
Significant effort has been done to reduce noise		10	x		x	x		x		x			
More than two modifications were done previously		7											
One modification done to improve noise level		3											
No action taken		0		x			x		x		x	x	x
Hearing Protection	5		2	2	2	2	2	2	2	2	2	2	2
Hearing protection ineffective		10											
Hearing protection reasonably effective		8											
Require special hearing protection devices		6											
Conventional hearing protection devices effective		2	x	x	x	x	x	x	x	x	x	x	x
No hearing protection required		0											
Critical Frequency Range	4		10	10	10	3	10	10	10	10	10	10	10
Frequency causes increased fatigue		10	x	x	x		x	x	x	x	x	x	x
Excessive resonanse with frequent spikes		9											
Critical 1kHz frequency noise		8											
Less critical noise band frequencies		3				x							
Non desturbing noise		0											
Critical Equipment Risk Ranking	100		8.23	6.57	6.74	6.56	5.78	7.89	6.24	6.96	5.53	5.99	5.53

Equipment Noise Screening Outcomes

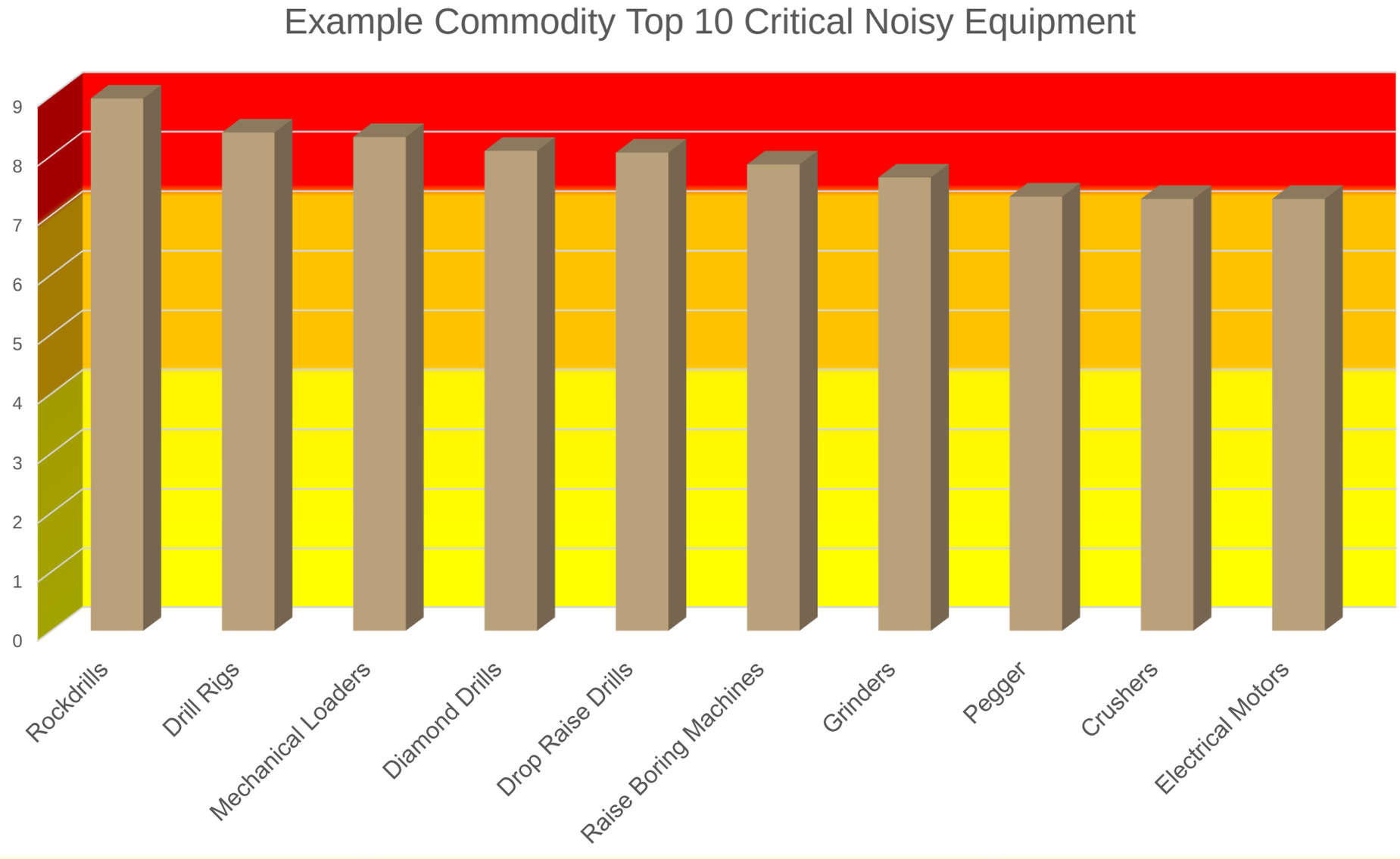
Number of Equipment Screened per Category



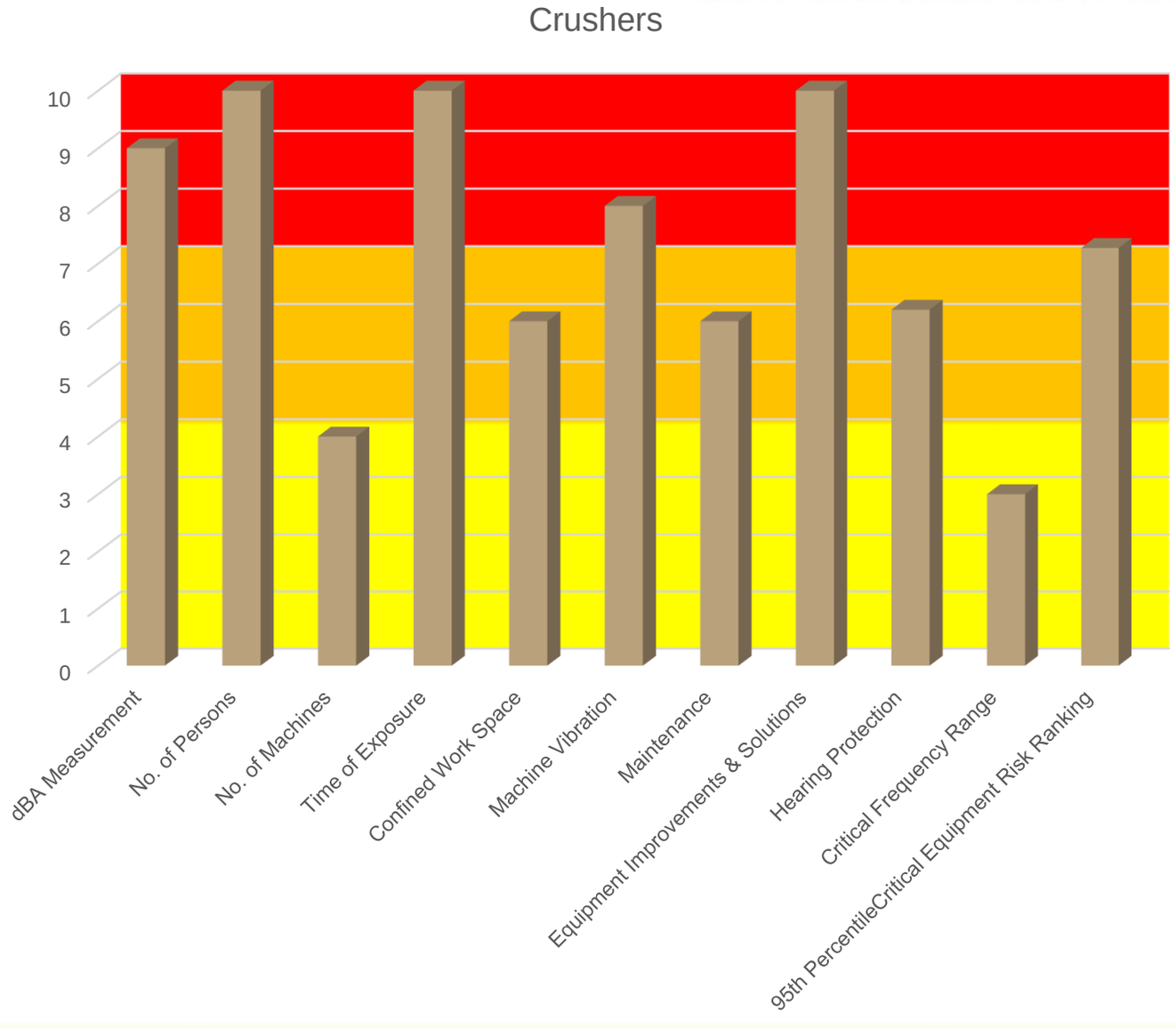
Prioritisation of Critical Noise Equipment



Top 10 Critical Noise Equipment



Developmental Target Setting



Equipment Screening Tool

Screening Tool Evaluation Challenges

- Limitations of the Screening process:
  - 2015 Noise repository used
  - Limited Access to Mining Companies Noise Repositories
  - Correct understanding and use of the screening tool
  - No Standardised Naming of Equipment
  - Multi-disciplinary input required

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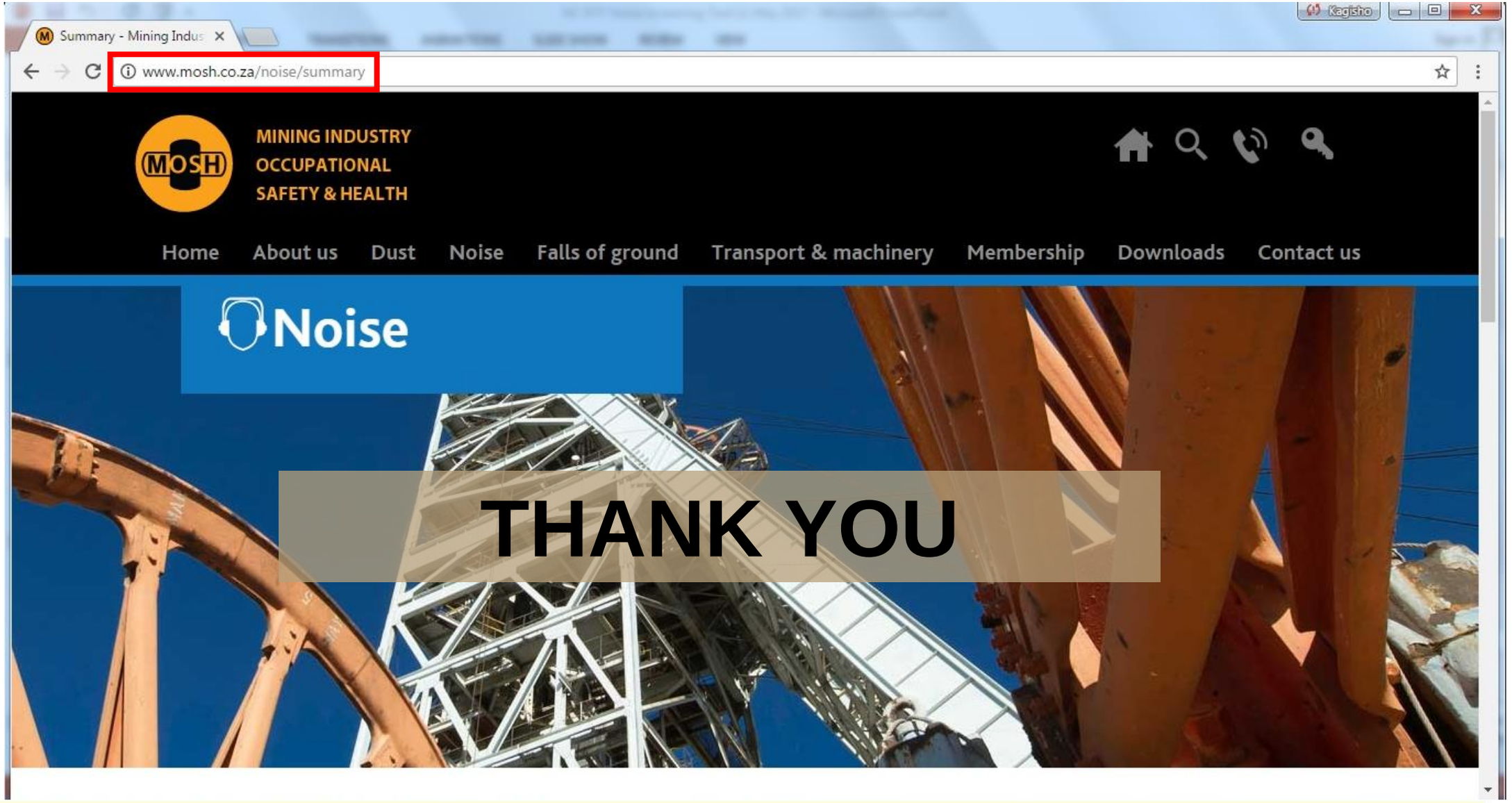
CONCLUSION

Conclusions

- ✓ We can measure NOISE consistently across the mining industry – Understanding the Risk
- ✓ Value of the Screening Tool:
  - Lead us to an industry (commodity) specific requirement (Best Achievable Requirement)
  - Risk based approach
  - Identification and information on our problematic equipment
  - Avoid ‘Blanket’ approach on noise management initiatives - Prioritization
  - Unlock “cheap” Innovation
  - Assist in maintenance plans – prioritization of critical Noise equipment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