MOSH NOISE

CASE STUDY: HPD_TAS

Compiled and Drafted by VC Bisschoff

WE DO IT BETTER

Prologue:

General:

Number of Permanent Employees: 2377
Number of Contractors: 935

Summary																		
Airborne Particulates		No of persons per category			Gases & Vapours		No of persons per category		Noise	No of persons per category			Thermal Stress	No of persons per category			
Substance	Code	A	B	C	Substance	Code	A	B		A	B	C		A	B	C	D
PNOC	459	0	1153	2159	Carbon Monoxide		0	0		0	2130	1182		0	0	0	3312

Two Rivers Platinum (TRP) is owned and under the Management of African Rainbow Minerals (ARM) and Impala (Joint Venture). TRP is classified as a B and C category mine with respect to the measured noise levels and zones. There are no noise levels from any machinery and equipment above the Mine Health and Safety Council milestone limit of 110dB (A) in all working places.

TRP is located in the magisterial district of Steelpoort, Limpopo and is situated approximately 64 kilometres Northwest of Lydenburg, Mpumalanga. The decline shafts will produce approximately 260 ktpm of PGM ore.

The underground trackless mining of PGM ore is carried out using Board and Pillar mining methods for the purpose of mining the UG2 and the Merensky Reef (Chromitite) for the eventual extraction of Platinum and other PGM's. Mechanisation includes trackless mobile machinery, conveyor belts, underground scalping, crushing, screening and process plant on surface.

Occupational Hygiene Department:

TRP's Occupational Hygiene Department, though small, is very effective, well organised and responsible for the Legal and Occupational Hygiene Requirements throughout the mine, which includes, two decline shafts, three plants and all surface offices and working areas.

TRP is very proud of the fact that no Section 54's or Section 55's were received in the past 6 years due to our commitment to excellence in following C.O.P's, S.O.P'S, procedures and standards. TRP embarked on the development and implementation of H&S systems to ensure continuous improvement to achieve our milestones. TRP systems allows for the collection of data that is used for analysis, investigations, fault finding and corrective actions etc.

TRP is a high volume production mine, which has increased the efforts to reduce NIHL amongst all workers. In relation to the amount of NIHL cases experienced and the tons (as depicted below) mined indicates that TRP's Hearing Conservation Program have paid off.

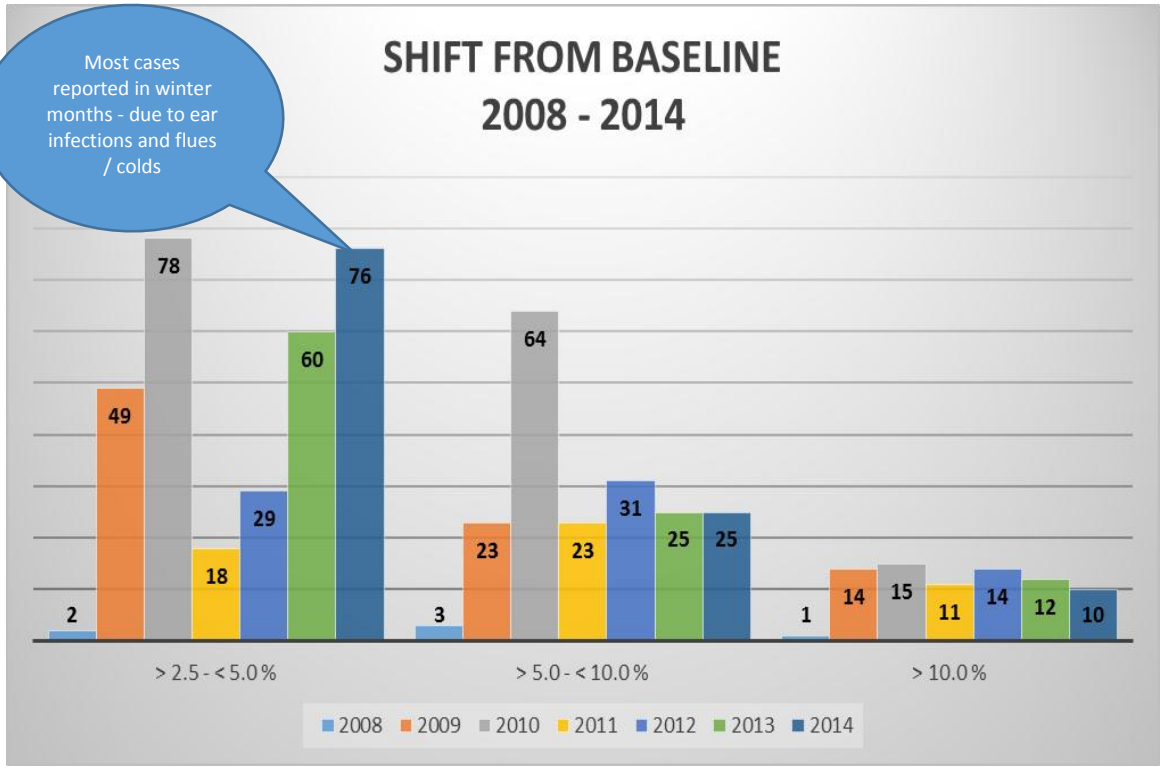

Fig. 1: Shifts from Baseline as reported to DMR

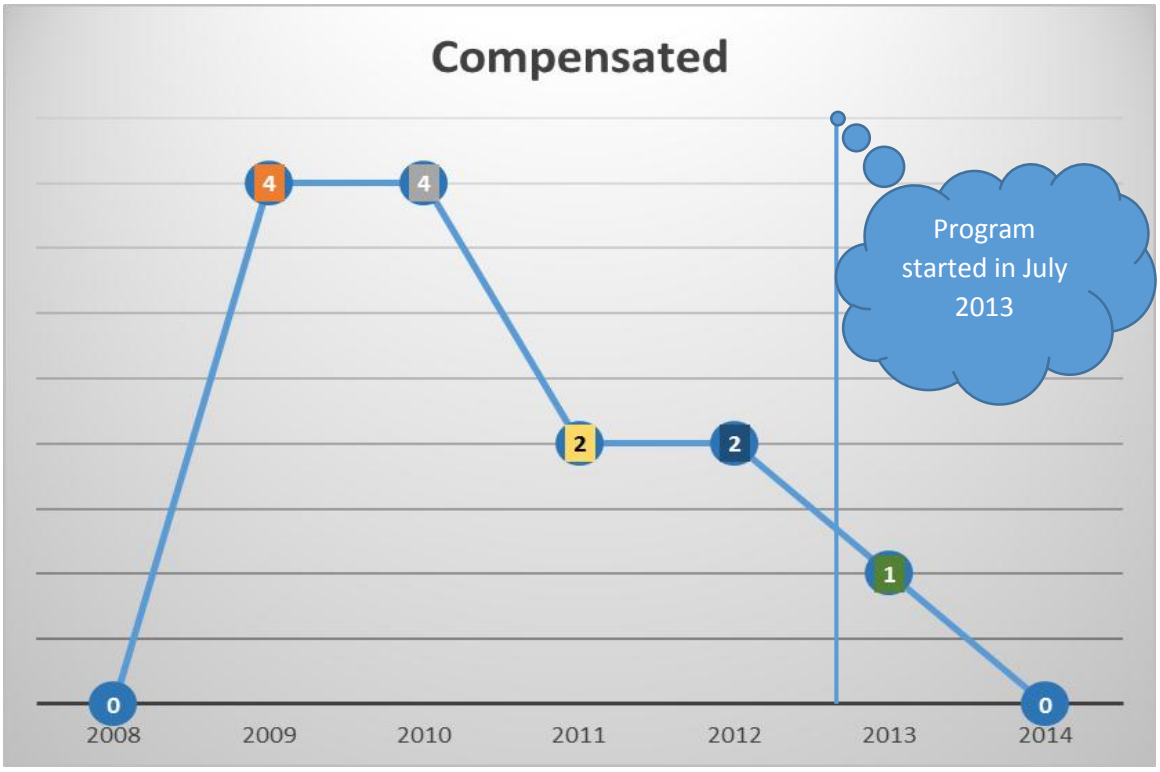

Fig. 2: NIHL Cases Reported vs. Compensated

SHAFT	TONES MINED (YTD)	REEF MINED (YTD)
MAIN DECLINE	1 058 750	1 022 044
NORTH DECLINE	591 433	508 442

Fig. 3: Tones mined per year

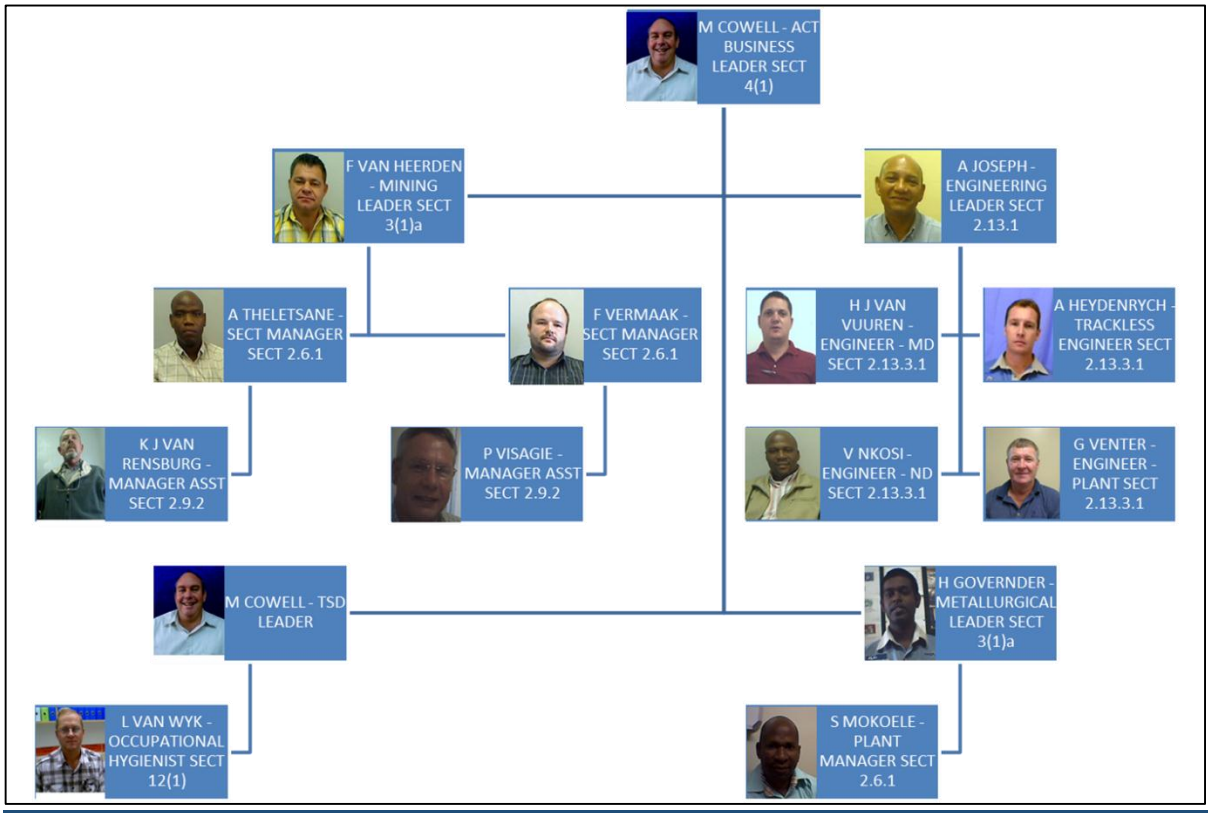

Fig. 4: TRP Organogram

Case Study: MOSH Noise HPD Adoption System

During the 2010/2011 financial year a major rise in NIHL cases were identified (See Fig. 1 and Fig. 2). Most of these cases were related to the huge influx of contractors. TRP was operated by Grinaker. All cases were investigated and reported to the DMR.

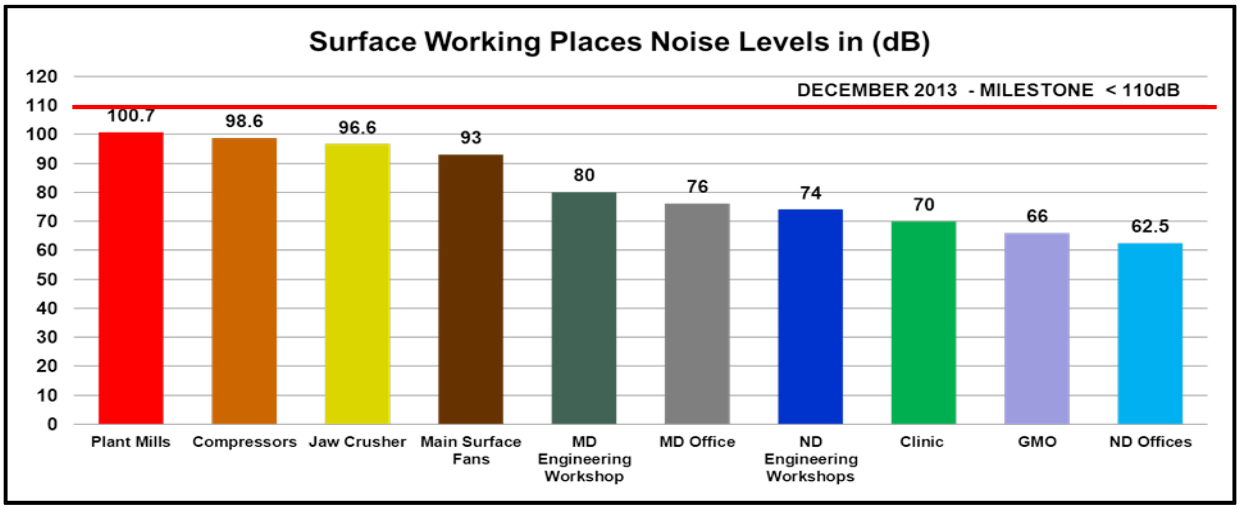

Fig. 5: Measured Noise Sources - Surface Working Places

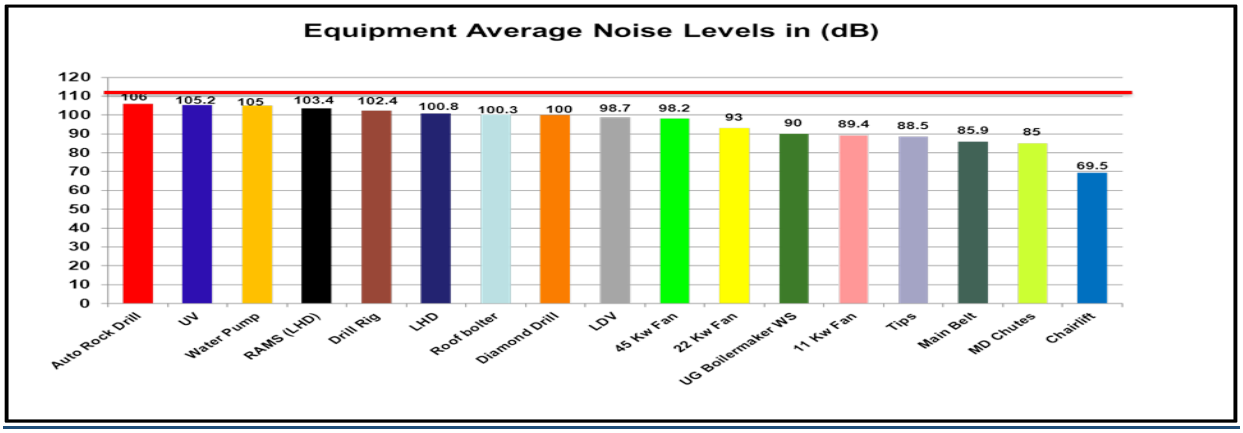

Fig. 6: Measured Noise Sources - Underground Working Places

TRP conducted a re-assessment of the previous risk assessments conducted on NIHL sources and contributors including, personal exposure, source measurements, zoning and Occupational Exposure HEG's (Fig. 5 and 6).

- All noise sources were re-examined as per current Noise Source Register. Noise sources above the 110 dB_A benchmark were highlighted.
- Along with the Engineering Departments, we came up with engineering solutions that resulted in the reduction of all machinery and equipment noise sources to below 110 dB_A.
- As a result of this, we implemented our "Buy-quiet" Procedure, which states that all equipment required on TRP will have a noise level report before being approved by the Occupational Hygienist.
- When this equipment is delivered a Noise Zoning Survey is done by TRP's Occupational Hygiene Department, to ensure legal compliance.

During the risk assessment, high noise levels were identified on LHD RHAM machines. Engineering revision resulted in changing the John Deere machines to the Dutch 3 Tier engines with lower Noise levels (See Fig. 7). These conversions were done at the mine's costs.

TYPE OF MACHINE	ASSET CODE	Noise (dB_a) Before Conversion	Noise (dB_a) After Conversion	Percentage Improvement
LHD -RHAM	TR038	112.5	98.6	463.33
LHD -RHAM	TR043	110.1	99.8	343.33
LHD -RHAM	T035	110.7	92.5	606.67
LHD -RHAM	T017	109.3	103.4	196.67
LHD -RHAM	T044	110.5	100.4	336.67
LHD -RHAM	TR042	109.3	101.6	256.67
LHD -RHAM	TR032	105.4	97.5	263.33
LHD -RHAM	TR028	108.0	102.0	200.00
LHD -RHAM	TR046	110.3	98.8	383.33
LHD -RHAM	TR016	113.9	95.1	626.67
LHD -RHAM	TR016	111.0	99.2	393.33
LHD -RHAM	TR045	107.7	98.8	296.67

Fig. 7: Improved measurements on Rham LHD's (All measurements were taken in various sections were these machines operated.)

All efforts to reduce the noise sources paid off and a drastic reduction in the overall noise exposure (Fig. 8 and 9) as well as the NIHL cases (Fig.2) were observed.

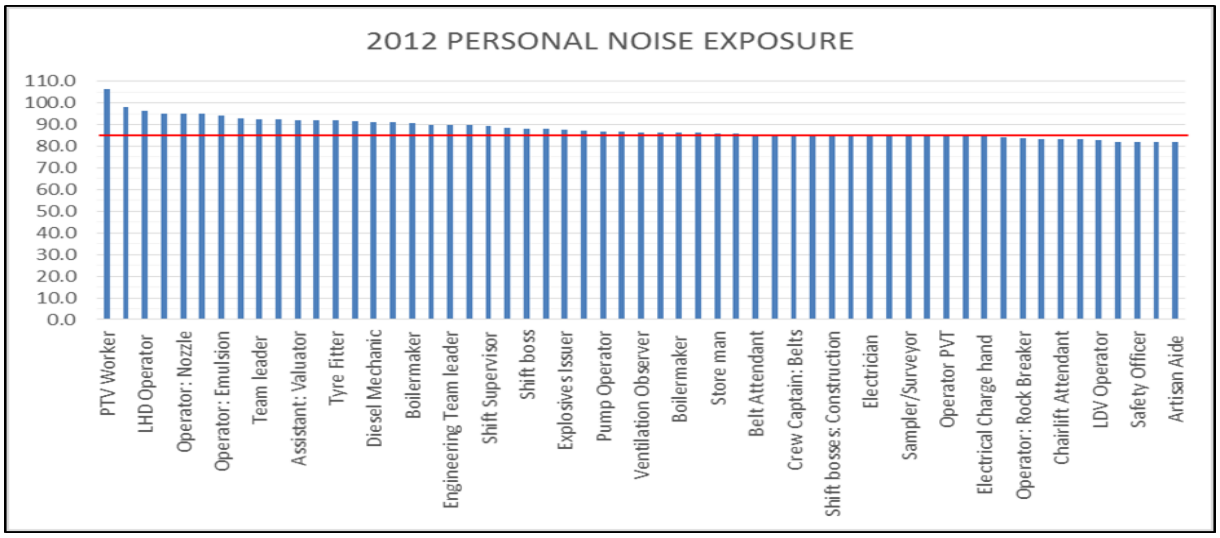

Fig. 8: Personal Noise 2012

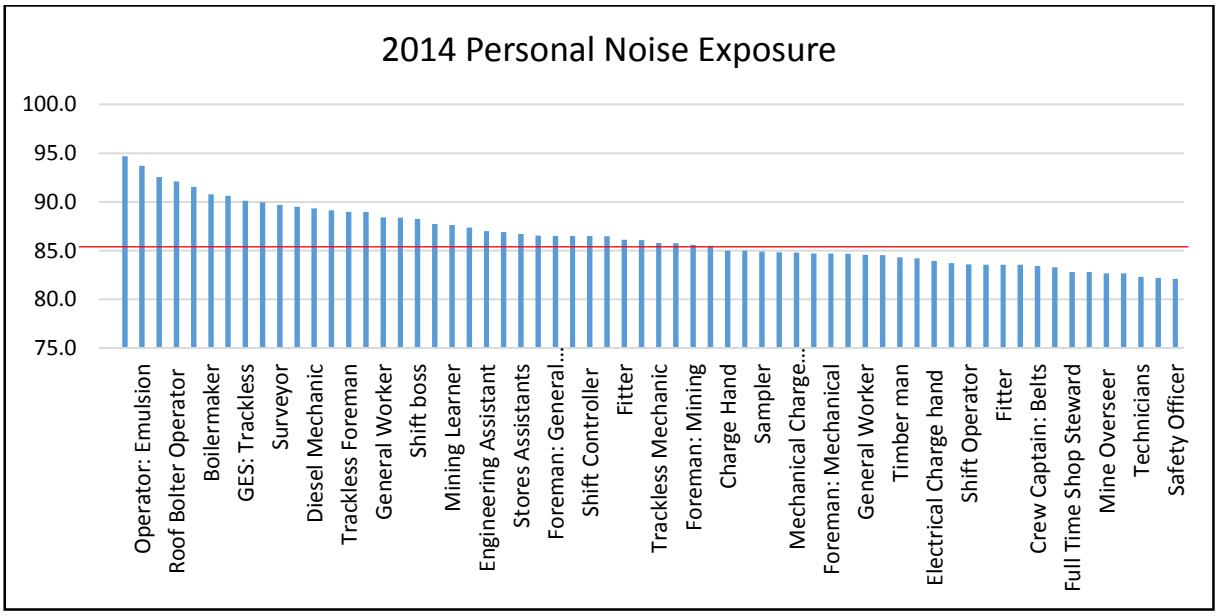

Fig. 9 Personal Noise 2014

A significant success has been achieved in our Hearing Conservation Program and the NIHL Cases reported reduced significantly, because of our ownership of the investigation process as well as our unwavering commitment (as per statistical data provided).

During 2012 TRP decided to adopt the MOSH Noise Leading Practice System. What at first seemed to be a huge effort, is paying off in the long-term. Adoption has proven to be more insightful and helpful to the company including management and the workforce as a whole.

As per the MOSH Noise Leading Practice System we started off with the 59-Step program, which governs the process of leading practice adoption. The initial buy-in started, from Management, Unions, SHE Committee Members and employee representatives, by means of proper communication and meetings held.

Stakeholder engagement was rather easy as all involved could see the major long term benefit of the MOSH Noise Leading Practice Adoption System.

- A TRP MOSH Noise Committee was established and appointed to oversee the Initiative Program and Training was done based on the MOSH Noise Guidelines to achieve the set 2013 Milestones.
- Mental model interviews of the workforce were conducted starting at the bottom of the hierarchy moving up to Supervisory and Management Levels.
- Regular MOSH Noise Committee Meetings were held and the results of the interviews were discussed.
- It became clear that the workforce had a misinterpretation of the reason to wear HPD (Hearing Protection Devices) or even what impact NIHL could have.
- Following this exercise the TRP Leadership Behaviour and Behaviour Communication Plans were established and rolled out.
- The Portfolio of Evidence (PoE) is a file required, demonstrating compliance of the MOSH Noise Leading Practice Adoption System.

TRP adopted some aspects of the MOSH Noise Adoption Training Program and filtered it into our own training program. Coaching is a continuous process during workplace visits. Interaction with the employees takes place on a 1:1 basis and is done in different languages, in an informal, relaxed atmosphere. (Fig. 10)

Fig. 10: Coaching

One on one Communication (Fig. 10) opportunities are used to discuss the social effect of noise, which includes the impact and affects a person's hobbies or after hour activities.

NIHL Coaching:

Different communication methods are used with regards to Noise and NIHL to ensure employee awareness are increased. weekly talks, safety meetings, wellness days, posters, talk topics, surveillance programs, risk assessments, wellness programs, induction training and competency test are a few contributing factors to TRP NIHL success.

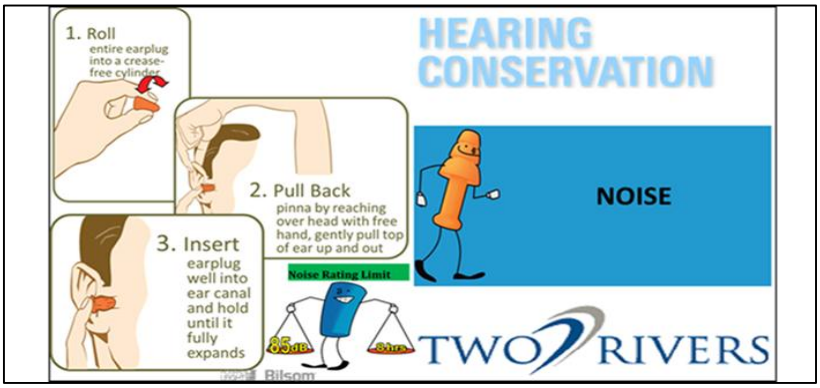

Fig. 11: Training and Awareness

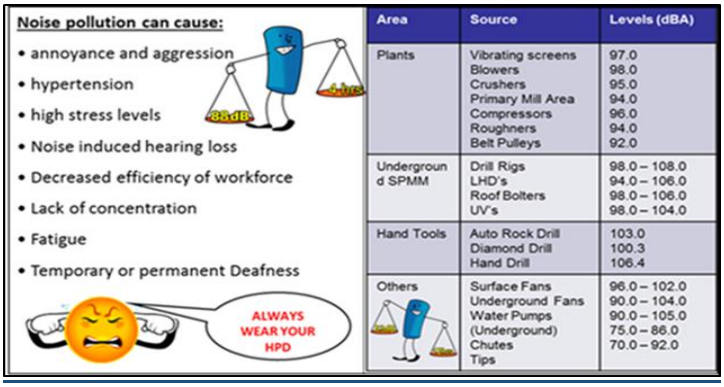

Fig. 12: Training and Awareness

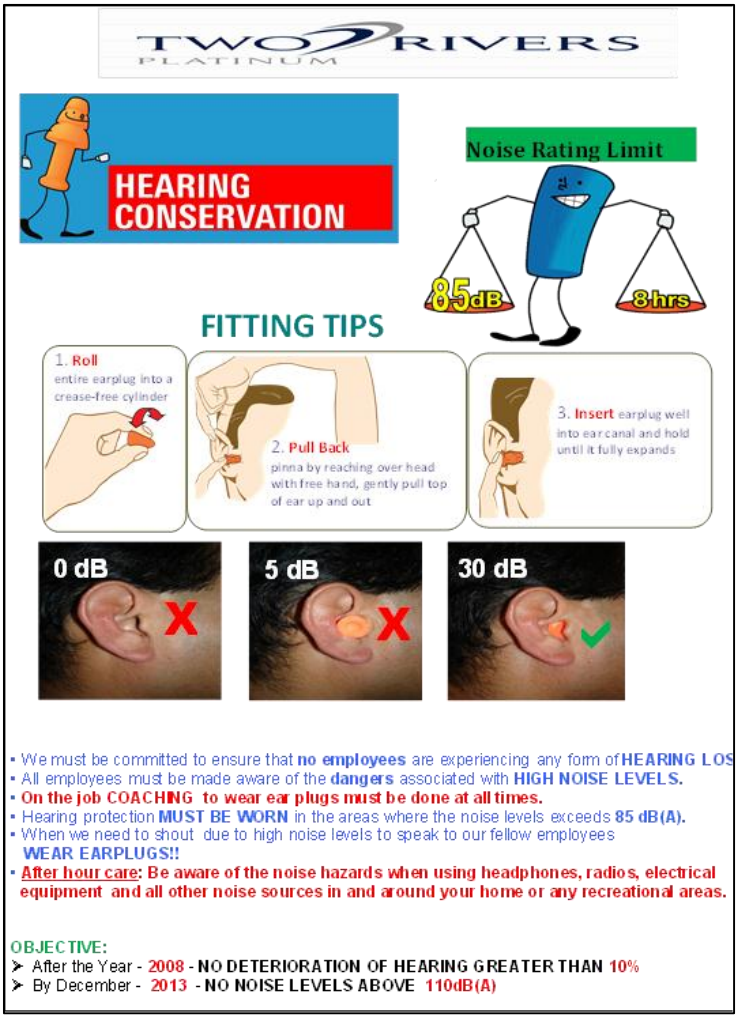

Fig. 13: Training and Awareness

A decision was made to launch a Custom Made Hearing Protection Program. TRP has a workforce of almost 3000 people, making a once off fitment procedure very difficult and expensive. A decision was made to include the contractors who are operators, but due to the fact that there is a large turn-over rate amongst contractors, the rest of the contractors will only use disposable HPD (unless their companies decide otherwise). The roll-out process was done over a 3-year cycle, starting with our highest exposed employees, the Underground SPMM operators (As in Fig. 8 and 9).

TRP involved and communicated to the workforce the custom made fitment process. This was well received by all stakeholders and they understood the benefits of the project and that they are not simply forced into a decision made by management.

Fig. 14: Moulding Process

Challenges Experienced:

With all projects teething problems were experienced, such as:

- Absenteeism as per the scheduled fitment times
- Buying-in to the process – unwilling to wear the Customised HPD
- Personal care and maintenance (Broken and Lost Sets)
- Scheduling set-backs – Limited availability of technicians, CANOP's Shift Cycles etc.
- Employees (other than the scheduled employees) demanding to be fitted as well.
- HPD Issuing and control

Solutions found:

Having the support and commitment from all the stakeholders with regards to:

- The parading of employees and contractors on correct shifts and times.
- Improved training with regards to NIHL – regular coaching
- Better communication to all employees (bilingual communication)
- Training on the care and maintenance is given when mouldings are done as well as when the sets are fitted, calibrated and handed to employee.
- Better control over the moulds, calibrations and hand-outs
- Training of a Noise Attenuation Technician (A person from the community) that deals only with the scheduling, moulding, calibrations and hand-outs of the sets.
- Information sharing with supervisors and management on the progress of moulds
- Compliance and calibration checks on a daily basis
- System was designed to control issuing of HPD's (Fig. 15).

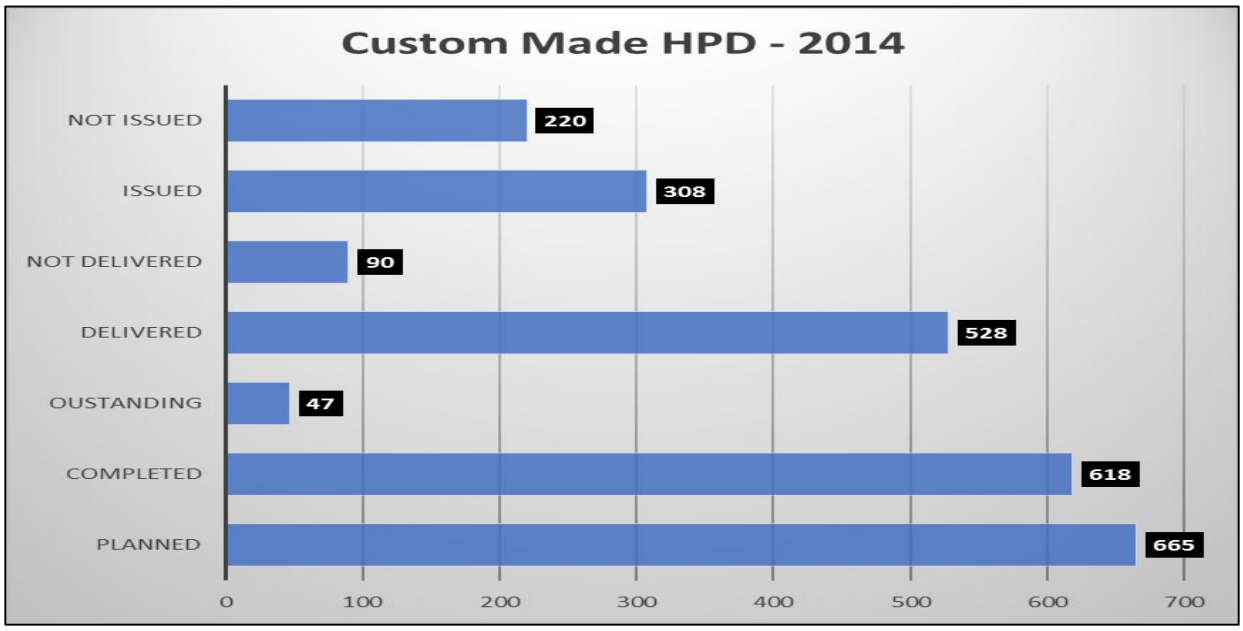

Fig. 15: Data Collection

Cost Saving:

As with all projects cost saving is one of the most important driving factors to be kept in mind. The following will demonstrate the cost saving benefits TRP has experienced:

Cost of Disposable HPD:

A total of 2929 people must be issued with HPD at a cost of R 3.58 / set.
If a minimum of two sets per person per week is used the cost will be **R 20 971.64 per week**. As we all know, mining employees will use a set a day. In which case, if a maximum of 5 sets per person per week is used the cost will be **R 52 429.10 per week**

This cost will eventually be calculated to **R 1 006 782.72 – R 2 516 596.80** per year without escalation.

Thus comparing it to Option One over a 3 year period, at total savings of ***R 488 382.72 – R 1 998 196.80*** will be recorded

Fig. 16: Disposable HPD Costs

OPTION ONE:			
Comodoty	Amount	Price	Total
Instrumentation	2	R 5,000.00	R 10,000.00
Training	2	R 1,000.00	R 2,000.00
Salary of Technician	3 years	R 6,000.00	R 78,000.00
Filter Repairs	23 x 6 x 3	R 200.00	R 82,800.00
			R 172,800.00

Fig. 17: Option One – Involving the community by employing and training from within.

OPTION TWO:			
Comodoty	Amount	Price	Total
OEM Calibrations Year 1	700	R 200.00	R 140,000.00
OEM Calibrations Year 2	1313	R 200.00	R 262,600.00
OEM Calibrations Year 3	2221	R 200.00	R 444,200.00
			R 846,800.00

Fig. 18: Option Two – Using only the OEM

TOTAL SAVINGS = R 674 000.00 during the first 3 years of this program

Fig. 19: Total Cost Saving

For quality assurance and traceability, a SANS filter certification and calibration letter is received from our supplier to confirm filter settings of each individual custom made HPD .

Fitment of moulded sets is done by TRP's Noise Attenuation Technician (Trained by the OEM). During fitment, training on the proper use, care and maintenance is done and proper records are kept. Lost or damaged sets are reported to the Noise Attenuation Technician. The technician ensures that alternative Hearing Protection Device is issued in the short term. After an investigation, appropriate steps are taken to ensure a person is re-issued with a new Custom Made HPD set.

The MHSA, Act No. 29 of 1996, stipulates that no person is to be financially responsible for Personal Protective Equipment. In an event where it was found that the employee was neglegent, disciplinary action is taken. Excercisng discipline has proven to be the most effective route of action resulted in a reduction of lost and damaged HPD's.

Personal PLH Baseline Shifts of more than 5% are investigated. Different options and HPD's are investigated to prevent futher damage or loss of hearing. TRP has a wide variety of HPD's available, ensuring all employee protection needs are covered

In the event of shifts of more than 10% PLH from the baseline, the person is temporarily removed from his/her current working area. ENT Specialists are involved to assist with

professional assistance on each and every case. If the shift has been confirmed, the person will be permanently transferred to another occupation. If there is no vacancy for this person he/she will have to follow the Incapacitation Procedure. To assist the employee with issues such as the financial and emotional burden due to the changing of occupations or loss of work, the employee is placed and registred with the TRP Employee Wellness Program.

TRP & MOSH

Training on all Noise matters are done on an annual basis during Induction Training. Videos regarding Health and Safety (Noise Exposure included) are run on a daily basis on television sets in the "crush"-areas, where all employees gather before moving to the underground sections. Training material received from the MOSH Learning Hub are included in the TRP Training Centre Department. This training material includes DVD's, hand-outs, a noise simulator and HPD selection tool. The TRP NIHL focus point is currently on the "Social Effect of Noise" and include "Off the Job Safety". Employee activities are also NIHL contributors outside the working environment that has a great impact on quality of hearing and quality of life.

Conclusion:

We are proud to say that TRP's Hearing Conservation Program is effective as shown with the reduction in claims – only one NIHL Claim since the program has started. This is demonstrated by stakeholder commitment, engagement, Leadership Communication & Behaviour. To this extend, employees know the effect of noise and the impact it could have on their health and future.

TRP has the interest of the workforces' health and safety at heart, and for this reason we have utilized the MOSH Noise Adoption Process. The information and statistical data provided demonstrates that over the past 4 years, NIHL cases and claims has been reduced significantly, and shows the huge return on employee investment.

With TRP's dedication, we will continue to achieve numerous health, safety and production milestones, as the trendsetters in the industry. Mines which haven't adopted the MOSH Leading Practise System, must really reconsider the benefits and impacts regarding NIHL and quality of life.

For more Information on TRP's Hearing Conservation Program, please feel free to contact us via the MOSH Noise Team or alternatively as indicated below:

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Assistant Occupational Hygienist

Carmen Bisschoff
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Yours in Health and Hygiene,

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VOHE Manager Date

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Business Leader Date