The Mine Ventilation Society of South Africa

NEWSLETTER

Colliery Branch

Mid Year 2015,

Volume 10, Issue 1

Inside this issue

Greetings from Incoming Chairman

First I want to thank the members for electing me as the MVS Colliery Branch Chairperson for 2015/16.

I look forward to the coming year with excitement and hope that I could ignite the same passion in each and every Colliery member.

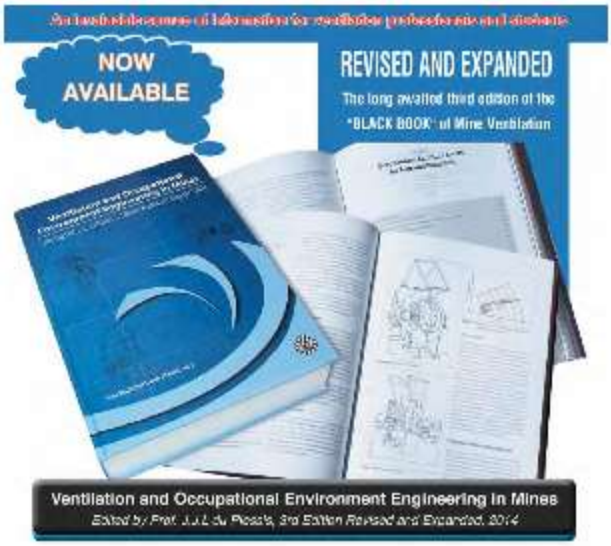
Hard work, dedication and commitment will be required to live up to the standards that was set by the previous Chairman.

I am proud and honored to be part of an excellent committee that has always been there to support and assist. We as a committee look forward to serve our members and make 2015/16 an exiting year!!

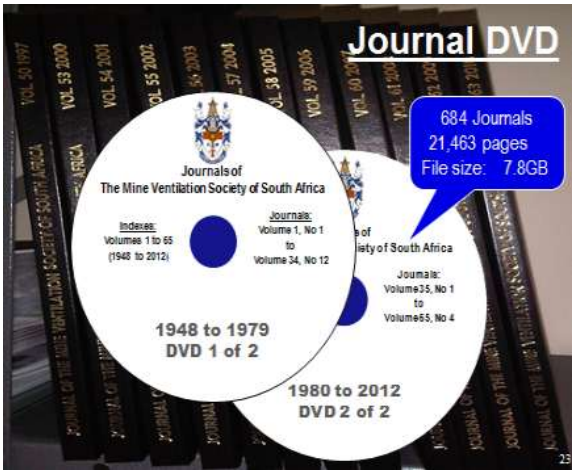
Regards,

Julize van Niekerk

New Handbook Launched!



Old Journals available on CD/DVD!



For more information please contact the MVS Secretary:

Marie Ackermann
secretary@mvssa.co.za
Telephone +27 11 482 7957
National fax 086 660 7171or International
+27 11 482 7959

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Committee 2015:

The committee member for 2015/2016 are as follows:

- **Julize van Niekerk** – Chairperson

- **Gerrie Erasmus** – Immediate Past Chairman

- **Liska Cronje** – Newsletter Co-Editor

- **Marijke Bamford** – Newsletter Editor

- **Jan Combrink** – Visits & Conference

- **Neil McPherson** – Vice Chairman

- **Oliver Nelson** – Treasurer

- **Tshidiso Matshidiso** – Constitution

- **Derick Bezuidenhout** – Visits & Conference

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MVS Colliery Diary

Monthly: MVS Colliery Branch Committee Meetings
23 April 2015: MVS Colliery Branch AGM 2015
04 September 2015: MVS Ladies Tea
10 – 11 September 2015: Refrigeration Plant Visit
29 October 2015: MVS Colliery Branch Conference 2015

MVS AGM 2015:

The Mine Ventilation Society of South Africa's Colliery Branch Annual General Meeting was held on 23 April 2015 at Tweefontein Colliery. The Meeting was followed with the members networking whilst playing golf. The committee would like to thank all present for supporting the Colliery Branch at this AGM.

MVS Colliery Chairman 2013-2014:
Gerrie Erasmus

MVS Colliery Incoming Chairman 2015-2016:
Julize van Niekerk

MVS Colliery AGM 2015

MVS Colliery Committee 2015 - 2016

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Suppliers Support To MVS Colliery Branch Conference

The MVS Colliery Branch Committee would like to give special thank you to the following suppliers who contributed at the MVS Colliery Branch AGM on 23 April 2015:

AMS HADEN

NOISE CLIPPER HEARING CONSERVATION

BN BARNEL

Ningi Services

SCHAUENBURG

envirocon instrumentation
environmental and occupational hygiene instruments

BOOYCO ELECTRONICS

AGM Networking

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Ten Worst Coal Mining Disasters:

Remembering some of the big Disasters in the Coal Industry:

Most Coal Mine Disasters around the World were caused by Gas & Coal Dust Explosion

No. 1: Benxihu Colliery Disaster (1942) - China

The disaster in China *cost 1,549 lives and is believed to be the worst coal mining disaster ever*. The tragedy occurred on 26 April 1942 in the Honkeiko coal mine, located near Benxi in the Liaoning province of China. The fatal explosion of the underground coal mine was caused by a mixture of gas and coal dust. The underground fire exploded out of the mine shaft entrance. The ventilation system was shut off and the pit head was sealed by the mine operator to deprive the underground of oxygen. An electric fence was erected around the pit to obstruct the entry of miner's relatives. The coal mine was forcefully operated by the Japanese until the end of World War II in 1945. The Soviet Union conducted an investigation of the mine accident, following the liberation of Liaoning province from the Japanese Army's control. Carbon monoxide poisoning due to the closure of the ventilation system was reported to have caused most of the deaths.

No. 2: Mitsubishi Hojyo Coal Mine Disaster (1914) - Japan

Mitsubishi Hojyo coal mine disaster, the deadliest mining accident in Japan, caused 687 deaths. It was caused by a gas explosion at the Mitsubishi Hojyo coal mine located in the Kyushu Island of Japan. The disaster took place on 15 December 1914. The gas explosion, which occurred underground, caused thick black smoke to come gushing out of the air vents before it finally blew the elevator cage 15m up into the air with a massive blast. People within a 200m radius of the mine entrance were also impacted by the explosion.

No. 3: Laobaidong Colliery Disaster (1960) - China

Laobaidong coal mine disaster, the second deadliest in China after the Benxihu colliery disaster, killed 684 people. The disaster occurred on 9 May 1960 in the Laobaidong coal mine, located near Datong in the Shanxi province of China. The accident was caused by methane explosion. The information about the Laobaidong catastrophe was suppressed by the Chinese Government for more than three decades until it was revealed in 1992. Laobaidong disaster is the most fatal coal mine disaster since the inception of People's Republic of China (PRC) in 1949.

No. 4: Mitsui Miike Coal Mine Disaster (1963) - Japan

The Mitsui Miike coal mine explosion on 9 November 1963, was the second deadliest coal mining disaster in Japan after the Mitsubishi Hojyo Coal Mine Disaster in 1914. 458 miners were killed in the accident and 833 were injured. It was a coal dust explosion around 500m below the mine's ground level entrance. The explosion led to a massive blast which collapsed the tunnel roof at multiple locations. Most of the deaths were due to carbon monoxide poisoning. Most of the poisoned survivors suffered severe brain damage. Miike was one of the oldest and largest coal mines in Japan. It was taken over by Mitsui in 1899. The coal mine ceased its operations in 1997.

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Ten Worst Coal Mining Disasters: Continue

No. 5: Courrieres Coal Mine Disaster (1906) - France

The mine disaster in France, with a total death toll of 1,099, is *the second deadliest coal mining disaster in history*. The coal mining catastrophe occurred on 10 March 1906 due to a massive explosion sparked by an underground fire in one of the pits of the Courrieres Colliery. The fire was detected around 270m underground in the Cecil pit in afternoon the day before the explosion. The outlets of the pit were closed to starve the fire of oxygen. The next morning a huge explosion emanated from the still-smouldering fire at the pit and caused a blast on the surface. Workers inside the mine's deep tunnels, as well as people on the surface, were killed in the disaster. The fissures in the pit's walls were believed to have allowed the flammable gases to cause a coal dust explosion underground. The cause of the initial fire was suspected to be either because of the mishandling of mining explosives or due to the ignition of methane by the flame from a miner's lamp.

No. 6: Senghenydd Colliery Disaster (1913) - United Kingdom

The Senghenydd Colliery disaster is the worst ever mining tragedy in the United Kingdom. The disaster, also known as the Senghenydd Explosion, occurred at the Universal Colliery in Senghenydd near Caerphilly, Glamorgan, Wales, on 14 October 1913. The fatal disaster was a result of a coal dust explosion in the underground mine. 439 miners were killed in the accident. Most of the miners who survived the fire and explosion were killed due to carbon monoxide poisoning. Firedamp ignition, caused by electric sparking possibly from equipment such as electric bell signalling gear, was suspected to have started the explosion. The initial fire ignited the coal dust present on the floor and the explosion travelled through most of the underground workings.

No. 7: Coalbrook mine disaster (1960) - South Africa

Coalbrook mine disaster with 435 deaths is the *worst ever disaster in South Africa's mining history*. The disaster took place on 21 January 1960 at the Coalbrook North Mine of the Clydesdale Colliery near Sasolburg, Orange Free State, South Africa. The collapse of around 3km² of underground mine area caused the disaster. The underground collapse was caused by the disintegration of around 900 underground pillars supporting the tunnel roofs. Around 1,000 miners were at work underground at the time of collapse. Half of them could survive by escaping via an incline shaft. Few rescue workers also died getting trapped with collapsed ground and methane gas.

No. 8: Wankie Colliery Disaster (1972) - Rhodesia (Zimbabwe)

Wankie Colliery Disaster in Rhodesia (now Zimbabwe) killed 426 people. The disaster occurred on 6 June 1972 at the No. 2 mine shaft of the Wankie Colliery, in north-western Rhodesia. The disaster was caused by multiple explosions in the underground coal mine. The explosion turned into a blast which devastated the main shaft. Four men were killed instantly near the surface. More than 400 mine workers trapped amid rock and deadly methane and carbon monoxide fumes died in the underground. Coal disaster victims included 36 Europeans and 390 Africans. The initial explosion was suspected to have emanated from a dynamite magazine. There were also two new explosions on the next day that filled the underground tunnels with clouds of poisonous gas making the rescue attempts impossible.

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Ten Worst Coal Mining Disasters: Continue

No. 9: Oaks Colliery Explosion (1866) - United Kingdom

Oaks Colliery explosion is the second deadliest coal mine disaster in the United Kingdom after the disaster at Senghenydd Colliery. The disaster took place on 12 December 1866 at the Oaks Colliery, near Stairfoot, Barnsley, in South Yorkshire. The death toll of this major nineteenth century coal mine disaster is reported to be 388. It was a firedamp and coal dust explosion suspected to have been ignited by the digging of new workings at the underground mine. The mine was known for containing firedamp since its first disaster in 1847 that killed 73 people. There were two more explosions on 13 December 1866, which killed 27 rescue workers. The Oak Colliery, one of the largest coal mines in England, experienced 17 further explosions until it ceased operations in the 1960s.

No. 10: Dhanbad Coal Mine Disasters (1965 and1975) - India

The Dhanbad coal mine disaster occurred on the night between 27th and 28th May. The disaster was caused by an explosion in Dhori colliery near Dhanbad, the major coal mining town in India. 375 miners were killed in the disaster. It was a firedamp and coal dust explosion. The initial ignition was suspected to have come from the hurricane lantern of a person who entered the underground gallery. The mine's management alleged it to be an intentional act of ignition. Ten years later on 27 December 1975, another disaster struck the Chasnala colliery, near Dhanbad. The Chasnala mining disaster killed 372 people. The coal dust explosion in the deep mine led to a blast that damaged the roof barrier with a huge water body sitting above it. Most of the deaths were because of the formidable flooding of water into the mine.

Bonus: Monongah Coal Mine Disaster (1907) - United States of America

Monongah Coal Mine Disaster is the largest mining catastrophe in the US. The disaster occurred on 6 December 1907 at two mines of the Monogah mine facility in West Virginia. The number of fatalities in the disaster is recorded as 362. Italian immigrants were the majority of the victims. The disaster was caused by firedamp and coal dust explosion in mines six and seven of the Monogah mine facility operated by Fairmont Coal Company. The explosion devastated the ventilation system, boiler-house, fan and the openings of the mine number eight. Rescue workers could hardly work for 15 minutes due to the lack of breathing equipment. Few of them also succumbed to death because of suffocation. The source of initial ignition for the explosion was attributed to either electric arcs or open lights.

No room for COMPLACENCY!

YOU can make a difference.

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Exam Question and Answer

EXAMINATION FOR THE CERTIFICATE IN MINE ENVIRONMENTAL CONTROL

PAPER 2
[10 Marks]

A clerk in a metallurgical plant complains that the office in which she works is hot. One wall in particular appears to radiate heat into this office, this wall separates the office from an adjoining furnace room. The wall adjoining with the furnace room measures 4m (W) x 2m (H). This wall comprises of a 200mm thick, double-brick wall with a 15mm thick layer of plaster on either side of the wall. The surface temperature of this wall is measured to be 115ºC (on the furnace side of the wall and 55ºC (on the office side of the wall). An air conditioner maintains the air temperature inside the office at a constant 26.5ºC.
Given that:

- **The thermal conductivity of brick is 0.7 W/mºC.**
- **The thermal conductivity of plaster is 0.93 W/mºC.**
- **The surface (skin and clothes) temperature of the clerk averages 28ºC.**
- **That side of the clerk's body facing the "hot" wall has a surface area of 0.8m².**
- **That side of the clerk's body facing the "hot" wall has an emissivity and view factor with the wall of 0.95.**

Determine:

1. **At what rate does heat pass through the wall by means of conduction?**
2. **The convective heat transfer co-efficient for the wall.**
3. **How much radiated heat is received by the clerk.**

1. At what rate does heat pass through the wall by means of conduction? (3)
Heat passes through the wall by means of conduction.
Q = kA(t1 – t2)/B (1)
where;
Q = conductive heat transfer rate through the wall (W).
k = conductivity of wall (W/mºC).
A = cross-sectional area of the wall (m²).
t1 = temperature of the wall on furnace side (ºC).
t2 = temperature of the wall on office side (ºC).
B = thickness of the wall (m).

1st determine conductivity value for the wall;

$$k = \frac{(0.2\times0.7)+(2\times0.015\times0.93)}{0.015+0.2+0.015} W/m^oC.$$

$$k = \frac{(0.14)+(0.0279)}{0.23} W/m^oC.$$

conductivity of wall (k) = 0.73 W/mºC. (1)
Q = (0.73 x (4 x 2) x (115 – 55))/0.23
Q = (0.73 x 8 x 60) / 0.23
rate of heat conducted through wall (Q) = 1523.5 W (1)

2. The convective heat transfer co-efficient for the wall. (4)
q = hcA(t1 – t2). (1)
where;
q = convective heat transfer rate (W).
hc = convective heat transfer coefficient (W/m²).
A = contact surface area (m²).
t1 = temperature of hotter body (ºC).
t2 = temperature of hotter body (ºC).
Assume all heat conducted through wall is convected into adjacent air.
q = Q (a – above) = 1523.5 W. (1)
hc = q / A(t1 – t2).
hc = 1523.5 / (4 x 2)x(55 – 26.5). (1)
hc = 1523.5 / (8 x 28.5).
convective heat transfer coefficient (hc) = 6.682 W/m². (1)

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Exam Question and Answer

3. How much radiated heat is received by the clerk. (3)

q = 5,67 x 10-8 A1Fev(T14 - T24) (1)
where;
q = radiative heat transfer rate (W).
A1 = exposed area of smaller body (m^2).
Fev = emissivity and view factor.
T1 = absolute temperature of hotter body (K).
T1 = (273.15 + 55) = 328.15 K. (½)
T2 = absolute temperature of cooler body (K).
T1 = (273.15 + 28) = 301.15 K. (½)
q = 5,67 x 10-8 x 0.8 x 0.95 x (328.154 – 301.154).
q = 5,67 x 10-8 x 0.8 x 0.95 x 3.371 x 109.
radiated heat received by clerk (q) = 145 W. (1)

Briefly discuss factors which can contribute towards heat intolerance in an underground (6) worker.

a. Physiological work capacity: (½) *This is determined by physiological, biochemical and anatomical factors of each individual and cannot be changed significantly, Energy consumed by the metabolism is a function of oxygen consumption, and an energy* (½) *inefficient metabolism will produce relatively more heat in these individuals – as the work rate of these individuals increases, so does their heat production rate.*

b. Dehydration: (½) *Prolonged periods of heat exposure can lead to excessive loss of water through perspiration. Consumption of diuretics such as alcohol and certain medications can also lead to dehydration. Dehydration compromises* (½) *physiological response to heat stress. Dehydration also causes elevated heart rate, headaches, loss of appetite, headaches, behavioral changes and loss of morale.*

c. Body size: (½) *Body size (height and mass) determines the amount of surface area of the skin. Smaller persons are more likely to be heat intolerant.* (½)

d. Age: (½) Historic data indicates that heat tolerance decreases with age. Oxygen uptake (½) as well as sweat production decrease with age.

e. Illness: (½) *Persons who are ill usually have an elevated body temperature before being exposed to heat stress. Such persons are usually heat intolerant. Once* (½) *recovered these persons usually regain their heat tolerance.*

f. Nutrition: (½) Poor nutrition can contribute to the development of heat intolerance. (½)

g. Inadequate thermoregulatory response: (½) If the conductance of heat from the person's core or the rate of sweat (½) production is reduced then that person is at risk of being heat intolerant.

Exam Dates 2015

EXAMINATION PROGRAMME 2015

COST: R1000 PER PAPER

Papers	EXAMINATION DATES	
	MAY	OCTOBER
Survey Draught Theory	11 May 2015	12 October 2015
MEC Paper 1	11 May 2015	12 October 2015
Elem. Survey	12 May 2015	13 October 2015
Adv Survey Theory	12 May 2015	13 October 2015
Adv Survey Law	12 May 2015	13 October 2015
Strata Control Met	12 May 2015	13 October 2015
Strata Control Coal	12 May 2015	13 October 2015
RMC Paper 1	12 May 2015	13 October 2015
Elem Sampling	13 May 2015	14 October 2015
Adv Valuation	13 May 2015	14 October 2015
Survey Draught Practical	13 May 2015	14 October 2015
MEC Paper 2	13 May 2015	14 October 2015
RMC Paper 2	13 May 2015	14 October 2015
MEC Paper 3	14 May 2015	15 October 2015
RMC Paper 3.1	14 May 2015	15 October 2015
RMC Paper 3.2	14 May 2015	15 October 2015
RMC Paper 3.3	14 May 2015	15 October 2015
RMC Paper 3.4	14 May 2015	15 October 2015
MEC Int Paper 1	15 May 2015	16 October 2015
MEC Paper 4	15 May 2015	16 October 2015
MEC Int Paper 2	18 May 2015	19 October 2015
MEC Paper 5	18 May 2015	19 October 2015
MEC Paper 6	19 May 2015	20 October 2015

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Invitations: Book the date!

High Tea
Ventilation & Occupational Hygiene Professionals

04 September 2015

And we will do it again! For one day only, leave the black dirt behind, dress up and embrace in your femininity!

We would like to invite all our female colleagues to join us for a morning filled with fun & laughter.

Wear something Flowery as entry fee!

Annual Colliery Branch Conference

29 October 2015

We would like to invite all members to attend the Annual Conference this year. The topic for 2015 will be Emergency Preparedness and Response.

It will be informative with relevant topics being presented. The formal proceedings will be finalized by lunchtime and thereafter you are welcome to join us for a round of golf.

Kloppersbos Visit

February 2016

If you haven't been to the CSIR facility to witness a Methane Explosion, and you are working on a Coal Mine, make sure you don't miss this opportunity! We have space for 10 delegates.

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Achievements

Congratulations to
Chris KoiKoi
on obtaining his
Certificate in Mine Environmental Control/Occupational Hygiene".

Juniors, Hurry!
Last intake for Intermediate Candidates this October!
Ensure you are Registered by August 2015 for your Intermediate.
Three years left for obtaining the current MEC Certificate.
New Qualification starts 2019!

Contact us with news and views – anything you might find of interest or want to share – we are waiting

Phone: Marijke (Editor) 084 585 2543

Liska (Co-Editor) 082 777 4324

E-Mail: marijke.bamford@angloamerican.com

liska@ventgiene.co.za

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