



E-mail Message

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MINE VENTILATION AND ENVIRONMENTAL ENGINEERING COURSES – FEBRUARY/NOVEMBER 2009

Mike Howes (RHP) is pleased to announce the 34th and 35th mine ventilation and environmental engineering courses to be held at the Hilton Hotel Brisbane in February and the Hilton Hotel Perth in November 2009. If you have already attended a course or know of someone else who may be interested, it would be appreciated if you could forward this on to them. This year in addition to the core/planning and heat/refrigeration sections and to reflect the removal of some restrictions on Uranium mining, an ionising radiations in mines section is also offered.

Mike started running these courses in Australia 28 years ago in 1981 and since then has responded to the demand within the mining industry for them. The ventilation training courses have become benchmarks in practical mine ventilation education and over 450 personnel from mines, consulting companies and State Mining Inspectorates have attended. The courses started at Mount Isa in 1981 and the early courses were held in Adelaide, the Goldcoast and Townsville. Hobart, Cairns and Brisbane have been added to the list of venues.

The first Perth course was held in 1995 and has become the main venue for the courses with the bulk of the attendees from Western Australia. Participation on the courses is not limited to Australia and personnel from New Zealand, Saudi Arabia, Indonesia and Ghana have also attended.

Mike resides in England visiting Australia three or four times a year and those wishing to attend should contact Mike Howes at RHP directly (mjhowes@tiscali.co.uk) and an invoice will be issued giving alternative methods of payment.

To ensure that participants can obtain maximum benefit from the workshop style of presentation, the numbers on a course are limited so the earliest response is suggested. The limit on numbers also ensures that any specific problems that a participant may have can be included and dealt with either on an individual or group basis depending on the generality of the problem.

Because Mike Howes is non-resident and not carrying on an enterprise in Australia, he does not have an Australian Business Number (ABN) and GST is not applicable. A copy of a signed statement to this effect will be issued with the invoice to allow full payment and to comply with the Australian Taxation Office.

To participate, it will be necessary to complete payment in advance of the course or to provide a purchase order indicating that payment will be made.



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The courses are designed for both practicing mine ventilation personnel and for those with either a planning or a statutory responsibility involving mine ventilation and environmental engineering. To obtain maximum advantage, background experience in mine ventilation is desirable but not essential. The courses follow workshop formats with information followed by application where participation results in the maximum benefit. To ensure that individual needs are satisfactorily addressed, the number of participants is normally limited.

The Course

The main part of the course is a six day **Core and planning section** and two day extension topics may be taken with it or separately depending on the specific interests and background of participants. The extension topics include **Heat and refrigeration**, and **Radiation**.

Details of the courses day by day are given below. The extension topics are independent of the core and planning section and held depending on the interest expressed.

The six day core sessions will be held from February 22nd to 27th and November 22nd to 27th 2009. These provide both the fundamentals/background to ventilation design and application to ventilation planning with examples.

With the increasing use of uranium to generate power and the removal of some restrictions on mining, a two day radiation section will be held on November 19th and 20th 2009. The implications of ionising radiations on both health and mine ventilation design are assessed in detail.

A heat/refrigeration section will be held on November 30th and December 1st 2009. The approach necessary to establish heat loads and the refrigeration requirements are covered as well as methods and strategies for managing a potential heat stress problem and applying mine cooling.

Throughout the course, the development of numerical methods are emphasised that allow alternate systems to be evaluated from an effectiveness and financial standpoint. Actual mine examples are used where applicable to illustrate both methods and derivation of cost effective solutions. To obtain maximum benefit, participants will be supplied with calculators and plenty of paper.

Course leader

The courses are led by Dr. M J Howes who has been in mine ventilation and refrigeration for over 40 years. His experience includes 15 years in Canada and South African mines, 10 years lecturing and 30 years ventilation and refrigeration consultancy worldwide. This includes Australia where he has been involved with all the major mining companies and projects over the last 28 years.

He is active in the professional associations involved with mine ventilation and refrigeration and has over 35 papers and publications. He has given similar courses in Canada, England, Australia, Ghana and New Zealand.

Course venues, dates and cost

February venue is the Hilton Hotel Brisbane:

Core and planning - February 22nd to 27th (6 days)

November venue is the Parmelia Hilton Perth:

Radiation – November 19th and 20th (2 days)

Core and planning – November 22nd to 27th (6 days)

Heat/refrigeration – Nov 30th and Dec 1st (2 days)

The course fees are: 6-day core section \$ 6000 and 2-day heat/refrigeration or radiation \$ 2000 each. Costs include lunch, morning and afternoon tea/coffee, full set of notes, calculators and Environmental Engineering text book.

Payment Details

Payment or a purchase order in advance is necessary to secure participation on the courses. An invoice will be provided when the booking is acknowledged.

Session Details

Each day has four 90 minute sessions starting at 08h30, finishing at 16h30 with 30 minute coffee/tea breaks at 10h00 and 14h30 and a 60 minute lunch break at 12h00.

Core and planning sessions

Day 1

1. Background/historical perspective leading to current state of technology. Introduction to fluid mechanics, fluid properties, manometry, pressure measurement.
2. Laminar and turbulent flow, dimensional analysis, steady flow energy equation and flow measurement using orifice plates, venturies and pitot static tubes.
3. Internal flow, Atkinson, Darcy-Weisbach, roughness, Colebrooke & White, application to mine airways.
4. Fluid flow over objects, drag force, pressure loss and application to mine shafts, escapeways and declines.

Day 2

1. Flow through airway discontinuities, shock losses, equivalent length, bends, inlets, contractions etc.
2. Biological effects and sources of gases including strata gases, blasting, mine fires and explosions.
3. Operation of diesel powered equipment, application of simple and time modified gas dilution formulae.
4. Control of gases by dilution ventilation, re-entry time after blasting and gas detection.

Day 3

1. Biological effects of dust, silicosis, mass/surface area, dust deposition and the respiratory system.
2. Sources of dust, ore passes, dust extraction system capture velocities, hood design, extraction systems. Dust collectors, dust measurement and assessment.
3. The solution of simple networks, series and parallel airways, introduction to compound networks.
4. Application of Kirchoffs' laws, Atkinson problem, Hardy Cross solution. Computer network simulations in general, the use of skeleton and detailed networks.

Day 4

1. Gas laws, psychrometry, pressure surveys, analysis of pressure surveys, measured airway resistances.
2. Axial and centrifugal fans, design principles, fan construction and fan performance curves.
3. Fan pressures, operating point, fan laws for speed and air density changes, series and parallel fan operation.
4. Fan applications, development, booster and main fans, flow measurement, monitoring, jet thrust fans.

Day 5

1. General mine design air quantities and introduce mine ventilation design example. Design criteria, statutory limits and future changes.
2. Ventilation design criteria: velocity, quantity, gases, dust, diesel exhaust, heat stress, radon and noise.
3. Ventilation standards to meet the design criteria for mining and development activities.
4. Long and short development. Leakage in auxiliary systems, derive ventilation design.

Day 6

1. Airflow and dust control in the rock handling system including induced airflows, draw points, ore passes, tips, crushers, loading stations, conveyors.
2. Airway optimisations, cost functions, general results, outline of the required ventilation system.
3. Use of a skeleton network, determination of fan duties and the main fan operating envelope. Fan selection, effect and design of fan diffuser, fan bend and water drop out if required.
4. Ventilation controls: doors, bulk heads, regulators, booster fans etc. Conclude design.

Heat Sessions

Day 1

1. Fundamentals of heat & mass transfer, conduction, radiation, convection, evaporation/condensation.
2. Effect of heat on personnel: productivity, heat stress control strategy, acclimatisation, heat stroke and other heat related illnesses.
3. Sources of heat in mines, auto-compression of intake air, heat flow from the surrounding rock surfaces, broken rock and fissure water.
4. Diesel and electrical equipment and other sources of heat. Use increased mine depth in mine ventilation design example to provide numerical values and also identify the heat problems in development.

Day 2

1. Determination of the mine cooling load, climatic profile and ventilation/cooling optimisations.
2. Basics of refrigeration, pressure-enthalpy diagrams, vapour-compression refrigeration cycle compressor types and performance.
3. Heat transfer equipment, condensers, evaporators, cooling towers and the dominant effect of fouling on equipment performance.
4. Refrigeration system modelling, spot cooler design, refrigerants and equipment selection.

Radiation Sessions

Day 1

1. Radioactive decay, activity, decay series, growth in activity and Bateman equations for radon daughters.
2. Biological effects, external and internal radiation, dose equivalent and radon daughter concentrations.
3. Epidemiology, uranium and non-uranium mines, allowable limits, Lubin relationships and relative risk.
4. Gamma radiation and radioactive dust contributions to the overall dose.

Day 2

1. Radon emanation, source strength, emanation rates, growth in radon daughter concentrations
2. Source control, isolation, dilution, radon and radon daughter growth in ventilated and unventilated spaces
3. Filtration and radon daughter measurement methods.
4. Radon & radon daughter dosimetry, exposure control, controlled and supervised areas.