

OCCUPATIONAL HEALTH AND SAFETY CONSIDERATIONS FOR THE EMPLOYMENT OF FEMALE WORKERS IN HARD ROCK MINES

C J Badenhorst
Anglo Platinum

Abstract

Until very recently Mining were male dominated industries and hostile to women's participation in work. Women were rarely employed in mining as it was considered to be highly male dominated activities and women were considered unfit for the hard labour of working in the mines and heavy industries. In addition until the new Constitution and the MHSA, employment of females underground was prohibited through an ILO convention. Historically most of the jobs of women on mines related to either administrative or to menial lower rank activities like sweepers, cleaners or attendants in the offices. The personal protective equipment available was unsuitable for women posing significant risk of workplace injuries to women

There is a duty of care to provide a safe system of work to women of reproductive age, their unborn children and all working mothers who are breastfeeding. At the same time the right to equal opportunities and fairness must be recognised. Employment of woman in their productive years requires specific action to ensure that there is no significant risk of exposure that may effect reproduction, health and safety before and during pregnancy, the unborn child as well as mother and child during breast feeding.

1 INTRODUCTION

1.1 Background

Until very recently Mining were a male dominated industry and hostile to women's participation in work. Women were rarely employed in mining as it was considered to be a highly male dominated activity and women were considered unfit for the hard labour of working in the mines. Historically most of the jobs of women on mines and heavy industries related to either administrative or to menial lower rank activities like sweepers, cleaners or attendants in the administration offices. The personal protective equipment available was unsuitable for women posing significant risk of workplace injuries to women. Women's workplace health problems are frequently compounded by getting more of the same at home - the "double jeopardy" of domestic work, which can mean a second shift of lifting, responsibility and chemicals on top of those experienced all day at work.

There is a significant Industry concern about the potential effects of occupational exposure to chemical substances, physical, ergonomic and biological hazards on reproductive outcomes. Besides the obvious physical and ergonomic risks of underground work and work in heavy industries, many chemical substances with reported reproductive and development effects are in regular use and thus present potential exposure to workers. In addition physical, ergonomic and biological hazards with reported reproductive and development effects are present in a number of workplaces and thus present potential exposure to workers.

Examples of these include heavy metals (lead), organic solvents, noise, vibration, radiation, etc. Absence of sufficient research data, including toxicological and epidemiologic data, lends a degree of uncertainty to the estimated magnitude of risk that a specific chemical substance or hazard presents.

Nationally and internationally, progress has been limited in identifying hazards and quantifying their potencies and in separating the contribution of these hazards from other etiologic factors. The pace of laboratory studies to identify hazards and to underpin the biological plausibility of effects in humans has not matched the pace at which new chemicals are introduced into commerce. In addition, the number of female workers of reproductive age potentially exposed to occupational chemical and physical agents has grown.

1.2 Men are different from women

Men are different from women. That would seem to be self-evident. They are different in aptitude, skill and behavior, but then, so is every individual person. So why do we make such a fuss about it? Simply because of the fact that women are very different from men physically and biologically, and pertinently in one specific aspect - namely that they can fall pregnant and thus become two people that must be considered, the mother and the baby with very specific risk factors

2 LEGAL IMPLICATIONS

When employing female employees in any work environment, there are a number of South African laws that do apply and that need to be considered by Employers. These include, but are not limited, to the following key pieces of national legislation:

2.1 Constitution

“9(4) No person may unfairly discriminate directly or indirectly against anyone on one or more grounds, including race, gender, sex, pregnancy, marital status, ethnic and social origin, colour, sexual orientation, age, disability, religion, conscience, belief, culture, language and birth”

“22 Every citizen has the right to choose their trade, occupation or profession freely. The practice of a trade, occupation or profession may be regulated by law.”

“23 (1) Everyone has the right to fair labour practices.”

2.2 Employment Equity Act (EEA)

Section 6 of the EEA prohibits unfair discrimination as follow:

“No person may unfairly discriminate, directly or indirectly, against an employee, in any employment policy or practice, on one or more grounds including race, gender, sex, pregnancy, marital status, family responsibility, ethnic or social origin, colour, sexual orientation, age, disability, religion, HIV status, conscience, belief, political opinion, culture, language and birth”.

Section 6(2) of the EEA provides a defense to a claim of unfair discrimination, namely:

“ the distinction, exclusion or preference of any person on the basis of an inherent requirement of the job ”.

2.3 Basic Conditions of Employment Act 75 of 1997 (BCEA)

Section 25 provides that a pregnant employee is entitled to at least four (4) months' consecutive maternity leave.

Section 26(1) - *“No employer may require or permit a pregnant employee or an employee who is nursing her child to perform work that is hazardous to her health or the health of her child.”*

Section 26(2) - *“During an employee's pregnancy, and for a period of six months after the birth of her child, her employer must offer her suitable, alternative employment on terms and conditions that are no less favourable than her ordinary terms and conditions of employment, if:*

(a)the employee is required to perform night work, as defined in section 17(1) or her work poses a danger to her health or safety or that of her child; and

(b)It is practicable for the employer to do so.”

BCEA - Code of Good Practice on the Protection of Employees during Pregnancy and after the Birth of a Child.

2.3.1 Section 5. Protecting the Health of Pregnant and Breastfeeding Employees

5.1 *Section 26(1) of the BCEA prohibits employers from requiring or permitting a pregnant employee or an employee who is breast-feeding to perform work that is hazardous to the health of the employee or the health of her child. This requires employers who employ women of childbearing age to assess and control risks to the health of pregnant or breast-feeding employees and that of the foetus or child.*

5.2 *Employers should identify, record and regularly review -*

5.2.1 *potential risks to pregnant or breast-feeding employees within the workplace;*

5.2.2 *protective measures and adjustments to working arrangements for pregnant or breast-feeding employees.*

5.3 *Where appropriate, employers should also maintain a list of employment positions not involving risk to which pregnant or breast-feeding employees could be transferred.*

5.4 *Employers should inform employees about hazards to pregnant and breast feeding employees and of the importance of immediate notification of pregnancy.*

- 5.5 *Workplace policies should encourage women employees to inform employers of their pregnancy as early as possible to ensure that the employer is able to identify and assess risks and take appropriate preventive measures.*
- 5.6 *The employer should keep a record of every notification of pregnancy.*
- 5.7 *When an employee notifies an employer that she is pregnant her situation in the workplace should be evaluated. The evaluation should include -*
 - 5.7.1 *an examination of the employee's physical condition by a qualified medical professional;*
 - 5.7.2 *the employee's job;*
 - 5.7.3 *workplace practices and potential workplace exposures that may affect the employee.*
- 5.8 *If the evaluation reveals that there is a risk to the health or safety of the pregnant employee or the foetus, the employer must -*
 - 5.8.1 *inform the employee of the risk;*
 - 5.8.2 *after consulting the employee and her representative, if any, determine what steps should be taken to prevent the exposure of the employee to the risk by adjusting the employee's working conditions.*
- 5.9 *The employee should be given appropriate training in the hazards and the preventive measures taken.*
- 5.10 *If there is any uncertainty or concern about whether an employee's workstation or working conditions should be adjusted, it may be appropriate in certain circumstances to consult an occupational health practitioner. If appropriate adjustments cannot be made, the employee should be transferred to an alternative position in accordance with section 26(2) of the BCEA.*
- 5.11 *Employers must keep the risk assessment for expectant or new mothers under regular review. The possibility of damage to the health of the foetus may vary during the different stages of pregnancy. There are also different risks to consider for workers who are breast-feeding.*
- 5.12 *Arrangements should be made for pregnant and breast-feeding employees to be able to attend antenatal and postnatal clinics as required during pregnancy and after birth.*
- 5.13 *Arrangements should be made for employees who are breast-feeding to have breaks of 30 minutes twice per day for breast-feeding or expressing milk each working day for the first six months of the child's life.*

- 5.14 *Where there is an occupational health service at a workplace, appropriate records should be kept of pregnancies and the outcome of pregnancies, including any complications in the condition of the employee or child.*

2.4 Mine Health and Safety Act 27 of 1996 (MHSA) and the Occupational Health and Safety Act 85 of 1993

Key aspects of these Acts are -

- employers must conduct a risk assessment, which involves identifying hazards, assessing the risk that they pose to the health and safety of employees, and recording the results of the risk assessment; e
- employers must implement appropriate measures to eliminate or control hazards identified in the risk assessment; e
- employers must supply employees with information about and train them in the risks to their health and safety and the measures taken to eliminate or minimise them; e
- elected worker health and safety representatives and committees are entitled to participate in the risk assessment and control of hazards; and e
- employees have a duty to take reasonable steps to protect their own health and safety and that of other employees. e

3 THREE KEY PRINCIPLES

The consideration for the employment of female employees in the underground mining and heavy industries can be divided into three key principles:

Principle 1 – Health and safety will not be compromised

Principle 2 – Safe placement of female employees prior to and during pregnancy

Principle 3 – Supportive infrastructure

3.1 Health and safety will not be compromised

A female employee can do any job that she is qualified to do, subject to her fulfilling the physical and functional requirements, i.e. the inherent requirements for that specific job. The health and safety of an employee or other employees working with her cannot be compromised by appointing the female employee in a job or requiring her to conduct tasks for which the employee is not medical fit or doesn't have the physical or functional capabilities to do the job or complete the tasks without endangering the health and safety of herself or her co-workers

3.2 Safe placement of female employees prior to and during pregnancy

Risk assessment is fundamental to the safe placement of female employees prior to or during pregnancy. The diagram below outlines the risk assessment flow to ensure that pregnant and/or breastfeeding female employees are not exposed to significant risk.

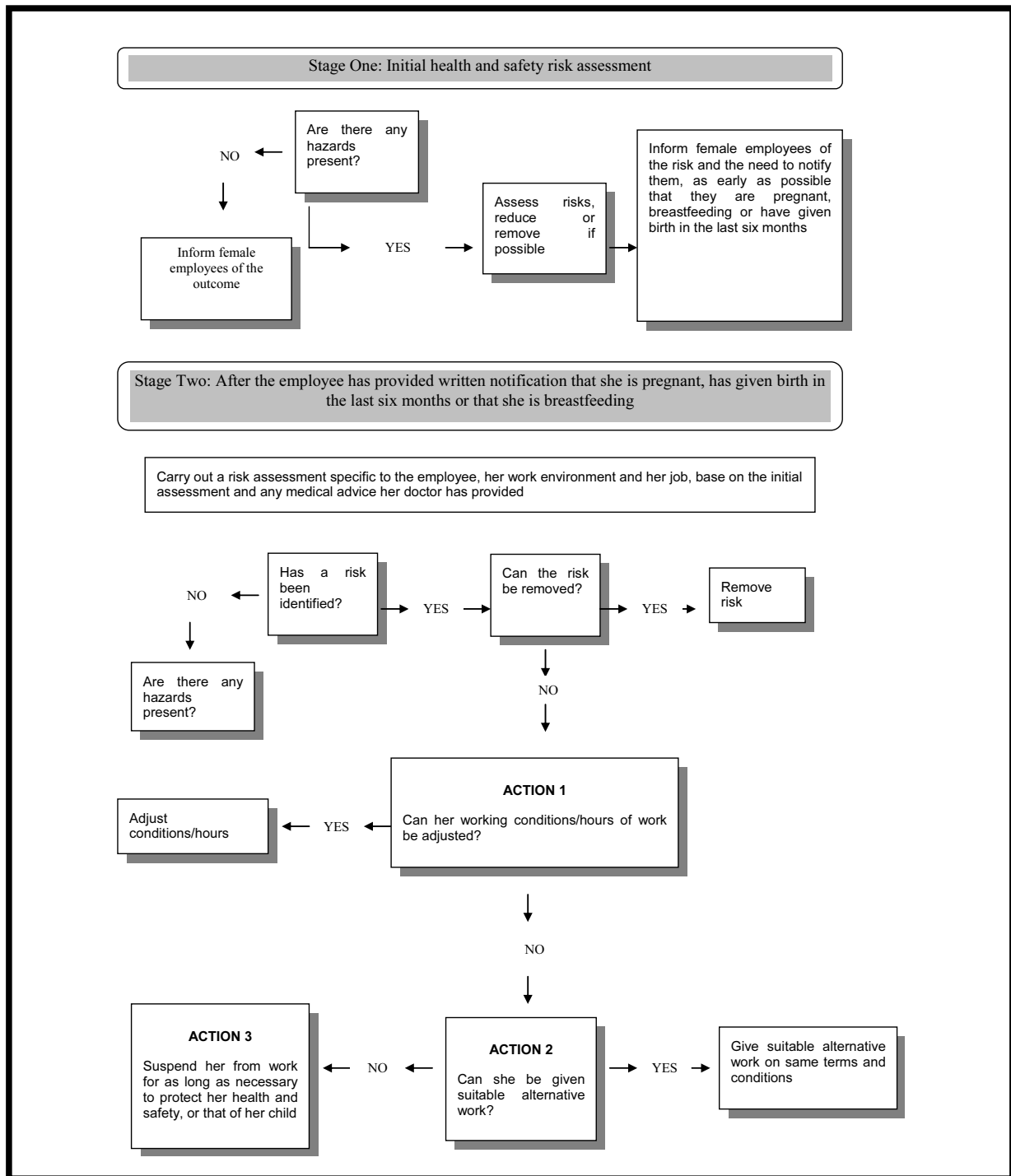


Figure 1: Risk assessment process for pregnancy and/or breastfeeding

3.3 Supportive infrastructure

The BCEA requires the employer to accommodate the employee as far as is reasonable practicable when unable to meet the inherent requirements of the job. These can obviously move beyond the direct duty of care and provide support through issues considered to be best practise such as:-

a) Ablution facilities and change houses

One of the problems faced by women working underground and heavy industries is the lack of facilities. Because the mining and other heavy industry previously excluded women, facilities were only provided for men. In order for women to work in these environments, a number of practical changes need to take place. Ablution facilities and changing rooms have needed to be created for women, and even though these do not need to be separate, proper ablution facilities and private change houses are a necessity when female employees are engaged for reasons of privacy, protection and dignity.

b) Work-life balance

Work-life balance has become a major factor in the new world of work and the one area where this is difficult to achieve is in the case of working mothers. Today, dual career families are the norm, and females are under a great deal of pressure to earn a good income while supporting the growth of children and taking care of other responsibilities, such as elderly parents. This increased pressure is costing business in terms of attracting high level recruits, staff retention, efficiency on the job (distractions), employee commitment, morale and absenteeism (either stress related due to work/life conflict or sick leave taken to fulfill family responsibilities). Reasonable accommodation of the additional burden that life places on females is recommended, as failing to recognise these will not only lead to over exertion by the employee but could also compromise health and safety.

c) Childcare

Children are typically the responsibility of their mothers. Access to childcare, particularly facilities that cater for shift work and long rosters for women in residential mining and industrial towns could prove almost impossible. Like other working women – and unlike most of the men women work with, women are forced to balance their paid work with unpaid labour at home. Trying to balance an eight hour work day with their responsibilities for keeping up a household and raising children calls for long hours. Shift work becomes a major problem especially for women with family responsibilities; securing childcare proves to be an on-going problem. Most of the women rely on informal supports through family members, but arranging childcare could be difficult, especially for single mothers.

For most women, the problem goes beyond the provision of alternative care. Shift work means that they are missing out on an important part of their family's, and in particular, their children's lives.

Employees need to have the assurance that their children are safe in order to work in a focused and dedicated way. As an additional measure, especially in the South African social and security environment, involvement in ensuring safe childcare availability is recommended.

d) Personal safety and security

For all women working underground and in heavy industries, issues that can cause them to leave include the social environment of these workplaces, which is very macho (which is not the same thing as masculine), and so hostile to women; fear, or experience of, sexual harassment and/or sexual intimidation or assault; the inability to cope with the physical challenges of working underground; and, even if they can cope, finding the physical working environment just too unpleasant. In some mining communities discrimination is made towards employing mostly unmarried women, the rational being, they are healthier, stronger and do not have much of family burden. The women for fear of further harassment and loss of employment rarely report sexual exploitation. Serious health problems such as AIDS and other communicable diseases which are uncommon among the tribal communities are becoming rampant in mining towns both among women mine labourers and among women in the communities to whom these diseases are transmitted from the men.

Females are more vulnerable, and in a society with the current levels of violence and sexual assaults, it is an issue that cannot be ignored and prevention is key. Safety and security measures should be in place and revisited, enhanced and scrutinised as to whether sufficient to provide the necessary safety.

e) Personal protective equipment

Personal protective equipment is considered to be the last line of defense against hazards in the workplace. The limited availability of personal protective equipment (PPE) for women is a critical workplace health and safety issue. In addition to undermining efforts to protect worker health and safety, lack of adequate PPE can be a barrier to equality of employment opportunity for women. In many cases, women requiring personal protective equipment are forced to 'make-do' and wear equipment designed for men. Ill-fitting protective clothing and equipment could also mean that women entering certain 'non-traditional' fields will be unable to perform efficiently the given tasks of the job.

Women differ from men in size and shape and so should the dimensions of their PPE. Some areas of protective equipment need to be specifically designed for the female worker to ensure proper fit, comfort and protection. Manufacturers play a crucial role in the provision of PPE. The range (or lack) of sizes and designs can affect, not only how women are protected, but how well they are able to do their jobs.

When it comes to PPE for women, change is occurring slowly. The seriousness of the health and safety issues, resulting from the lack of adequate or appropriate PPE for female workers, is an increasing source of concern. The question to be asked is who will make this change happen? Government, PPE suppliers, standards-setting groups, employers, unions, joint health and safety committees, and workers themselves all have a role to play; and all stand to benefit from greater access to proper- fitting PPE.

f) Mining equipment

There are work tasks that females generally find more difficult to complete due to physiological differences to males. Mining equipment such as drills and front-end loaders were only designed to fit men. When mines started to recruit females, facilities were still only suitable for men, as changes could not occur rapidly enough, resulting in both men and women having to share such equipment.

Manual handling injuries represent one of the main sources of back injury and musculoskeletal disorders for workers. Mechanical equipment injuries account for a high proportion of all work-related injuries in all occupations. The design of machinery and equipment has demonstrated to be a major cause of injury when not conceived or not used properly. Most of the personal protective equipment and tools used are designed based on male populations. Women workers who are not in the upper levels of height and weight are therefore not properly equipped for their protection. For this reason, the concept of maximum weight to be manually handled by women need to be revised in the context of current technical knowledge and socio-medical trends. Intra-sex variations need to be taken into account. National standards for manual handling should move away from regulating weight limits which differ between women and men workers and adopt a non discriminatory approach based on individual risk assessment and control anthropometric standards need to be based on human variability more than on "model" populations.

4 PREGNANCY AND BREASTFEEDING

Most females can continue working during pregnancy. For how long depends on the nature of the job, the risks associated with the job and personal risk for medical or obstetric problems. Occupational health and safety concerns are about biological and physiological issues arising out of pregnancy and interacting with workplace hazards and risks. The female body is very different from the male body, physically and biologically and pertinently in one specific aspect – the female body can fall pregnant and thus become two persons that must be considered, the mother and the baby with very specific risk factors.

4.1 Reproductive toxicity

Reproductive and development toxicity refers to the continuum of adverse health effects that may befall an exposed child, parent or pregnant women and her offspring exposed in utero. Reproduction results from a complex series of events involving both parents. It begins with each parent's genetic contribution (chromosome) and ends with expression of the genes acquired by the off-spring. Every step in the reproductive process is vulnerable to effects from external physical and chemical agents. Chromosomal replication, sexual function, ovulation, conception/fertilization, embryo implantation, placental function, fetal development, labour, delivery, and even child development are components of the reproductive process. Reproductive abnormalities include changes in sperm count, sperm motility, libido, menstruation and cycle length, and fertility rate; these and other changes can result in miscarriage, embryo toxicity, development defects and still birth.

Teratogenesis (congenital malformation) results from interference with normal embryonic development by a biological, chemical, or physical agent. Exposure of a pregnant female may, under certain conditions, produce malformations of the foetus without inducing damage to the mother or killing the foetus. Such malformations are not hereditary. In contrast, congenital malformations resulting from changes in the genetic material are mutations and are hereditary.

Typical teratogens

Agents currently identified as human teratogens include infections such as rubella, metals such as lead and mercury, chemicals including PCBs, and ionizing radiation.

Pregnant women in the workplace

A teratogen, by definition, is different from a mutagen in that it must affect a developing fetus. It is extremely important today because of the very considerable pressure to address the topic of pregnant women in the workplace.

The foetus is protected from some toxic chemicals because the placenta prevents them from entering the fetal bloodstream; however, many toxic substances, such as lead, easily cross the placenta. Damage to the foetus (embryo) is most likely to occur in early pregnancy, particularly during the first 8-10 weeks. During much of this critical period, many women are not even aware that they are pregnant.

It can be extremely difficult to establish specific cause-and-effect relationship between a teratogen and the birth defect it can produce. Animal studies must be supplemented with epidemiological data and it may be decades before researchers know with certainty what substances hold how much risk for which unborn infants.

Progress has been limited in identifying hazards and quantifying their potencies and separating the contribution of these hazards from other etiologic factors. The pace of laboratory studies to identify hazards and to underpin the biologic plausibility of effects in humans has not matched the pace at which new chemicals are introduced into commerce.

The fact that there are pregnant women in the workplace and that they can be exposed to teratogens leads to a problem in setting occupational health standards. An embryo of a few weeks or a foetus of a few months should be given consideration and should not be exposed to a toxic environment. Although one way to solve this problem is to restrict the activities of fertile women in the workplace, this practice is not legally acceptable. Also, the potential for adverse effects on the male reproductive system cannot be overlooked. The workplace should be such that fertile men and women are able to work there without likelihood of harm.

Not all health effects are easily identified through surveillance systems such as registries. Timing and dose of exposure affect the outcome. Adverse pregnancy outcomes such as spontaneous abortion are not routinely reported, and many cognitive defects are only identified several years after birth.

Risk work (chemical exposure) and breastfeeding

Some chemicals can be passed to the baby during breast feeding and could possibly impair the health and the development of the child.

4.2 Aspects of pregnancy that may affect work

Employers and employees should be aware of the following common aspects of pregnancy that may affect work:

- s a result of morning sickness, employees may be unable to perform early shift work. Exposure to nauseating smells may also aggravate morning sickness. A
- ackache and varicose veins may result from work involving prolonged standing or sitting. Backache may also result from work involving manual handling. B

- ore frequent visits to the toilet will require reasonable access to toilet facilities and consideration of the employee's position if leaving the work she performs unattended poses difficulties. M
- he employee's increasing size and discomfort may require changes of protective clothing, changes to work in confined spaces and changes to her work where manual handling is involved. Her increasing size may also impair dexterity, agility, co-ordination, speed of movement and reach. T
- he employee's balance may be affected making work on slippery or wet surfaces difficult. T
- iredness associated with pregnancy may affect the employee's ability to work overtime and to perform evening work. The employer may have to consider granting rest periods. T

4.3 Physical and chemical hazards to consider for pregnancy

HAZARD	WHAT IS THE RISK	HOW TO AVOID THE RISK
Vibration and mechanical shocks	Long-term exposure to vibrations may increase the risk of miscarriage and stillbirth. Exposure to shocks or wholebody vibrations in the later stages of pregnancy can result in premature labour.	It is advised that pregnant workers and those that have recently given birth avoid work that is likely to involve uncomfortable, whole body vibrations, especially at low frequencies, or where the abdomen is exposed to shocks or jolts.
Extreme heat	The exposure of pregnant and breast-feeding employees to extreme heat may lead to dizziness and faintness, particularly in the case of women performing standing work. Lactation may be impaired by heat dehydration.	Employers should limit the exposure of pregnant and breast-feeding workers to extreme heat. Arrangements for access to rest facilities and refreshments should be made in conditions of extreme heat.
Extreme cold	Work in extremely cold conditions such as cold storage rooms has been associated with problems in pregnancy.	Employees must be supplied with thermal protective clothing and their exposure to cold limited in terms of regulation 2 of the Environmental Regulations for Workplaces, made under the Occupational Health and Safety Act (OHSA).
Noise	Prolonged exposure to noise can elevate the blood pressure of pregnant women and lead to tiredness.	Employers should ensure compliance with regulation 7 of the Environmental Regulations for Workplaces, OHSA.
Ionising Radiation	Significant exposure to ionising radiation is known to be harmful to the foetus. Working with radioactive liquids or dusts can result in exposure of the foetus (through	Work procedures should be designed to keep exposure of pregnant women as low as reasonably practicable and below the statutory dose limit for a

	ingestion or via contamination of the mother's skin) or a breast-fed baby to ionising radiation .	<p>pregnant woman.</p> <p>Pregnant women or breast-feeding mothers should not work where there is a risk of radioactive contamination.</p> <p>Employers of registered radiation workers, including radiographers, must comply with the regulations controlling the use of electronic products issued under the Nuclear Energy Act 131 of 1993.</p>
Non-ionising (electromagnetic) radiation	It has not been established that the levels of non-ionising electromagnetic radiation likely to be generated by video display units (VDU's) or other office equipment constitutes a risk to human reproductive health.	<p>Women who are pregnant or who are planning children and are worried about working with VDU's should discuss their concerns with an occupational health practitioner.</p> <p>The following practical measures can be adopted to limit exposure to electromagnetic fields in offices (emfs):</p> <ul style="list-style-type: none"> • Workers should sit at arm's length from the computer (70cm) and about 120cm from the backs and sides of co-workers' monitors. • Workers should have regular breaks from VDU work, as this reduces exposure time. • Radiation-reducing glare screens (or shields) can reduce the electrical component of the emfs. However, shields that distort the image on the monitor should not be used
Work in compressed air and diving	People who work in compressed air are at risk of developing the bends. It is not clear whether pregnant women are more at risk of getting the bends but potentially the foetus could be seriously harmed by gas bubbles.	Pregnant workers should not work in compressed air because of potential harm to the foetus from gas bubbles. For those who have recently given birth there is a small increase in the risk of the bends. The Diving Regulations, 1991, under OHSA, must be complied with.
Physical and mental strain	Excessive physical or mental pressure may cause stress and give rise to anxiety and raised blood pressure during pregnancy.	Employers should ensure that hours of work and the volume and pacing of work are not excessive and that, where practical, employees have some measure of control over how their work is organised. Seating should be available where appropriate. Longer or more frequent rest breaks will help to avoid or reduce

		fatigue.
Physically strenuous work	Employees whose work is physically strenuous should be considered to be at increased risk of injury when pregnant or after the birth of a child.	Heavy physical exertion, including the lifting or handling of heavy loads, should be avoided from early pregnancy onwards.
Prolonged sitting and standing	Sitting or standing for long periods during pregnancy can have serious health consequences. Standing for long unbroken periods can result in complications during pregnancy such as deep vein thrombosis, varicose veins, premature labour and even miscarriage.	<p>Workstations should be adjustable to allow for necessary changes in posture.</p> <p>Pregnant employees who sit for long periods should be provided with a proper chair with lumbar support rest to prevent lower back pain. A footrest could alleviate pain and discomfort in the case of both sitting and standing workers.</p> <p>Pregnant employees who work in a stationary position should be given frequent rest breaks. Mobility during breaks should be encouraged to help prevent swelling of the ankles and improve blood circulation.</p> <p>Where work organisation permits task rotation, this should be done to allow the worker to do tasks that involve standing, sitting and moving.</p>
Anaesthetic gasses	Exposure to anaesthetic gases during pregnancy can lead to miscarriage.	Exposure to high concentrations of anaesthetic gases should be avoided during pregnancy.
Carbon monoxide	Risks arise when engines or appliances using petrol, diesel and liquefied petroleum gas are operated in enclosed areas. Carbon monoxide can result in the foetus being starved of oxygen.	Occupational exposure to carbon monoxide should be avoided during pregnancy and breast-feeding.
Antimitotic (Cytotoxic) drugs	Exposure to antimitotic drugs, which are used for treating cancer, damages genetic information in human sperm and egg cells. Some of these drugs can cause cancer. Absorption is by inhalation or through the skin.	Workers involved in the preparation and administration of antimitotic drugs should be afforded maximum protection. Direct skin contact can be avoided by wearing suitable gloves and gowns. Pregnant employees potentially exposed to cancer drugs should be offered the option of transfer to other duties.
Ethylene oxide	Ethylene oxide is used mainly in sterilising procedures in hospital. Exposure may occur when sterilised goods are transferred to the aerator after the cycle is complete and when changing the gas tanks.	Health risks can be minimised by reducing worker exposure during transfer when the steriliser door is opened. Pregnant employees exposed to ethylene oxide above the acceptable level should be

		transferred to other duties.
Lead	Exposure of pregnant and breast-feeding employees to lead affects the nervous system of young children and is detrimental to child development.	Contact with lead should be avoided during pregnancy and breast feeding. The Lead Regulations issued under OHSA must be complied with These Regulations specify levels at which employees must be withdrawn from exposure to lead.
Mercury and mercury derivatives	Organic and inorganic mercury compounds can have adverse effects on the mother and foetus.	Women of childbearing age should not be exposed to mercury compounds.
Polychlorinated Byphenyls (PCBs)	PCBs can cause deformities in the child. Maternal exposure before conception can also affect foetal development as PCBs can be passed on to the foetus through the mother's blood.	No pregnant women should be exposed to PCBs at work.
Organic solvents	Exposure to organic solvents including aliphatic hydrocarbons, toluene and tetrachloroethylene can lead to miscarriage and have a detrimental effect on the foetus.	Pregnant women should be protected to exposure against these organic solvents.
Pesticides and herbicides	Exposure to certain pesticides and herbicides is associated with an increased risk of miscarriage and can adversely affect the development of the child.	Exposure to pesticides and herbicides should be avoided or minimised
Alcohol	Foetal alcohol syndrome can lead to physical and mental abnormalities in children. Workers in the beverage, catering and associated industries, including wine farming, are particularly at risk.	Where appropriate, employees should be informed of and counselled in the hazards associated with foetal alcohol syndrome.
Tobacco smoke	Tobacco smoke contains carbon monoxide and carcinogenic and other harmful substances. Smoking and the inhalation of environmental smoke affects foetal blood supply and can lead to retarded growth and development and more early childhood diseases. Smoking carries an increased risk of cancer and cardiovascular disease.	Care should be taken to ensure that women employees are able to work without being exposed to tobacco smoke.

4.4 Biological hazards to consider for pregnancy

HAZARD	HOW TO AVOID RISK
Cytomegalovirus	Employees should be required to maintain high standards of personal hygiene, wash their hands after each patient contact and use gloves when handling potentially contaminated wastes in order to minimise the risk of infection.
Hepatitis	General precautions must be taken for all forms of hepatitis. Vaccination is the most effective means available of preventing hepatitis B. l Workers must take particular care to avoid mucous membranes and skin coming into contact with potentially contaminated blood or other secretions.
HIV	Universal precaution is important for workers potentially exposed to HIV. Health care workers should take precautions to prevent needless stick injuries and exercise care when handling the blood, tissues or mucosal areas of all patients.
Rubella (German measles)	Rubella vaccine is the most effective means of preventing the disease, and susceptible employees should be immunised. Pregnancy should be avoided for 3 months after vaccination.
Varicella (chicken pox)	It is advisable to identify employees who have not previously had chicken pox. Pregnant employees who are known not to be immune to chicken pox and who are exposed to an active case should report to a physician.
Toxoplasma gondii	Control measures against toxoplasma gondii for women of reproductive age include high standards of personal and environmental hygiene; the sanitary disposal of cat faeces and avoiding contamination by cat faeces of soil to be tilled for agriculture.

4.5 Safety hazards to consider for pregnancy

- Heat tolerance
 - health risk but also safety risk
- Impaired work capacity and errors of judgment
 - unfit or unable to perform specific job
- Physical ability
 - lifting of heavy goods - back injuries, pre-terminal labour etc.

Any work where there is exposure to physical, chemical, ergonomical or biological hazards must be considered potentially dangerous to the health of woman and determined by specific risk assessment. The potential of exposure of the pregnant worker or a worker nursing a child to hazards at the underground work places poses specific risks to females. **All jobs need to be specifically risk assessed for pregnancy and nursing a child.**

5 FITNESS TO WORK, PRE-EMPLOYMENT ASSESSMENT AND SELECTION

The concept “fitness to work” implies that an occupation has inherent health requirements that need to be met by a person in that occupation in order to minimise the risk of injury or illness. The concept of fitness is thus closely associated with the concept of risk.

Occupational health risks fall into two categories:

- risks associated with exposure to hazard in a particular occupation. These hazards include noise, heat, dust, etc., with their associated adverse health effects on exposed employees; and
- risks associated with failure to meet the capabilities (physical or psychological) required of a particular occupation. Certain occupations pose particular demands on the employee's ability to perform the work in a manner that does not increase the likelihood of injury or illness to the employee or to co-workers.

These two categories of risk imply four occupational categories:

- those with specific health requirements, but low hazard exposure: e.g. bulk truck drivers, onsetters, banksmen;
- those with specific health requirements and high hazard exposure: e.g. rock drill operators, loco drivers;
- those with low health requirements, but high hazard exposure: e.g. welding, underground maintenance staff; and
- those with low health requirements and low hazard exposure: e.g. general surface workers, office and administrative staff.

Medical evaluation of fitness to work has to cover both types of risk. A programme of examinations should ensure that minimum medical requirements are met by employees, and also that any adverse health effects from exposure to hazards in the workplace are detected at an early stage, enabling remedial action to be taken.

5.1 Minimum standards of fitness

The minimum standards of fitness for an occupation are the capabilities that are required to perform the tasks required in the occupation (inclusive requirements), as well as those abnormalities that the employee should not have in order for the job to be performed safely.

Whilst it is not just morally obligatory but also legally on the employer must reduce or minimise the hazards to which employees are exposed, in certain circumstances inherent health and safety risks will remain.

The rationale for conducting such examinations is to ensure that people who have a reasonable likelihood of suffering from the hazards of the job or of imposing additional risk on co-workers are identified and managed in such a manner that the risks are minimized.

5.2 Occupational health risk assessment and minimum standards for fitness

Apart from a major "philosophical" shift, the scope of the South Africa Mine Health and Safety Act (29/1996) has been extended, rather specifically, to medical surveillance (Section 13 of the Act). Primarily with regard to "employees exposed to health hazards" and actions applicable to employees rendered unfit as a result of occupational disease (Section 13(6) and (7)). Medical surveillance, in terms of its intent, is therefore nothing other than a risk-based medical examination or, quite plainly, an assessment of health risk.

At first glance, the Act addresses both medical surveillance and standards of fitness with admirable circumspection. However, on closer analysis, there are two issues that appear to have been underestimated or even ignored. These are:

- The hostility of the underground environment, especially in deep-level mines, is not restricted to traditional hazards such as dust, heat and noise, but also to the physically demanding nature of most work routines. Yet, with the exception of heat tolerance screening (HTS), the health risk of over-exertion and/or premature fatigue receives inadequate recognition. Also the worker cannot get away from his/her working environment – even when resting, workers are still exposed. Recovery when resting is thus very little; and
- In terms of the South Africa Government Department of Minerals and Energy Guideline on standards of fitness, “fitness” is equated, by implication, to the absence of disease. Quite obviously, this is not irrelevant but ignores the health risk associated with poor nutrition and inappropriate shift systems, for example. In this respect the only directive that may have some relevance in the MHS Act is Section 13(5): “an occupational medical practitioner must --- promote the health and safety of employees ---.”

Against the above background, it is suggested that health risk assessments that exclude the possibility of premature fatigue, over-exertion or repetitive strain injury, where such risks indeed exist, pregnancy and breastfeeding are short-sighted.

Establishing minimum standards for fitness for work comprises of three steps:

- Occupational health risk assessment;
- Man-job specifications; and
- Setting standards for medical surveillance (including physical and functional ability).

Step 1 – Occupational health risk assessment

The objective of occupational health risk assessment is to identify all relevant health hazards and the degree to which the various occupations are exposed to these hazards. Risk is the product of both the hazard (the capacity to cause harm) and the extent of exposure. A clear understanding of these risks is essential prior to setting medical standards for these occupations. At the end of this occupational health risk assessment process, each occupation should have a clearly defined occupational health risk profile.

Step 2 – Man-job specifications (also referred to as person-job specifications)

This step includes the process of documenting the risks for each and every occupation. These documents usually comprise a page per occupation, and are kept in a file. Copies of this file are held at the medical station and the Human Resources department. These documents are generally referred to as “man-job specifications” for the various occupations, and should cover both the inherent requirements of the jobs and the expected hazard exposure(s).

Step 3 – Setting standards for medical surveillance

Once occupational health risk profiles and man-job specifications are established, the occupational medical practitioner should set medical standards for each of these occupations as determined by the risk profiles. The medical examinations required to identify the relevant exclusions (or inclusions) should be stated, with the minimum standard required.

Standards for physical ability required to perform certain jobs safely as well as functional ability are required. A test battery to conduct and measure these abilities is a necessity to ensure ability to perform work safely and productively.

6 CONCLUSION

The employment of women is an imperative; however this must be done without compromising health and safety, and following a comprehensive approach as set out here, has enabled companies to successfully employ significant numbers of females without putting themselves or the workplace at risk.

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The Author



Casper J. (Cas) Badenhorst, *Occupational Hygiene Specialist*, Anglo Platinum

Cas Badenhorst is the Occupational Hygiene Specialist of Anglo Platinum Ltd. He is a qualified and registered Occupational Hygienist and a member of the National Council of the Southern African Institute of Occupational Hygiene. He serves on a number of advisory committees and tri-partheid structures and is a member of the Mines Occupational Health

Advisory Committee (MOHAC) to the Mine Health and Safety Council. After graduating from the Potchefstroom University for Higher Christian Education with a Masters degree in cell physiology and toxicology in 1997, Cas worked as an Occupational Hygienist for Columbus Stainless Steel. He joined Anglo Platinum (then Amplats) in 1999 at the Waterval Smelter in Rustenburg and, after working at a number of the Operations and divisions, was promoted to Occupational Hygiene Specialist for the Group. In recent years he was involved in the development of a number of occupational health risk assessment and occupational health programme models, including models catering for women in mining. Cas is a 2007 graduate of the North West University, where he completed his PhD.

