

The Ergonomics Regulations: the role of the health professions

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INTRODUCTION

Ergonomics is the science of fitting workplace conditions and job demands to the capabilities of the working population. In December 2019, the Ergonomics Regulations¹ (the Regulations) were gazetted under the Occupational Health and Safety Act No. 85 of 1993² (OHS), with the purpose of protecting the health and safety of persons who may be exposed to ergonomic risks in the workplace. Under the Regulations, employers have a general duty to ensure that exposure to ergonomic hazards and risks is either prevented or adequately controlled. The Regulations compel employers to undertake ergonomic risk assessments, implement control measures, provide training, and conduct medical surveillance to protect employees from ergonomic-related disorders. The Regulations require that ergonomic risk assessments be performed by a 'competent person', yet stop short of defining explicit criteria for competence. Some confusion has subsequently arisen around the Regulations' definition of a competent person and questions have been raised about whether health professionals have a role to play in ergonomic risk assessment. We use a systems ergonomics approach³ to argue that ergonomic risk assessment should consider, in addition to the environmental and task-related risks, the unique human factor risks that each worker brings to the work situation. Examples of such risks include motor, sensory, psychosocial, cognitive, and behavioural characteristics, which frequently affect health status and functional fitness to work. This paper examines the role of registered health professionals in identifying and managing these risks.

ABSTRACT

Ergonomics is the scientific discipline concerned with customising workplace conditions and job demands to fit the capabilities, limitations, and needs of the workforce. It is a multidisciplinary field, synthesising principles from diverse areas such as human factors engineering, industrial engineering, physiology, psychology, industrial design, biomechanics, kinesiology, occupational safety, and occupational health. The Ergonomics Regulations compel employers to undertake ergonomic risk assessments, implement control measures, provide training, and conduct medical surveillance to protect employees from ergonomic-related disorders. The Regulations mandate that ergonomic risk assessments be performed by a 'competent person', yet stop short of defining explicit criteria for competence. This has led to some confusion regarding the involvement of health professionals in ergonomic risk assessment and raises the question, 'Do health professionals comply with the legal definition of competence for this task?' This paper uses a systems ergonomics approach to highlight the diverse and complex risk factors that human workers bring to the workplace. The authors argue that qualified health professionals are best positioned to identify and manage high-risk motor, sensory, psychosocial, cognitive, and behavioural human factors, and are therefore indispensable in the ergonomic risk assessment process.

The systems ergonomics approach

The systems ergonomics approach³ views work as an integrated system, where humans interact with technology, tools, environments, and organisational structures. Systems ergonomics emphasises the interconnections and interdependencies within the system and acknowledges that changes in one part of the system can impact other parts of the system. Ergonomic solutions must thus consider the whole system rather than isolated elements. Chapanis (1996) defines a system as "an interacting combination, at any level of complexity, of people, materials, tools, machines, software, facilities and procedures designed to work together for some common purpose."⁴ Due to the complexity of components in any work system, ergonomics is inherently multidisciplinary. It integrates knowledge from various disciplines such as human factors engineering, physiology, psychology, industrial design, biomechanics, kinesiology, industrial engineering, occupational safety, and occupational health.

Figure 1 illustrates a simple conceptual framework that explains systems ergonomics. The Person-Environment-Occupation (PEO) Model⁵ was developed by occupational therapists in 1996 and is used to analyse complex occupational performance issues. According to the PEO Model, safe, effective, and rewarding occupational performance is shaped by the interaction of three domains, namely:

- The person domain – the worker, with his/her distinctive physical, cognitive, psychosocial, and physiological characteristics, as well as his/her skills, experiences, and personality

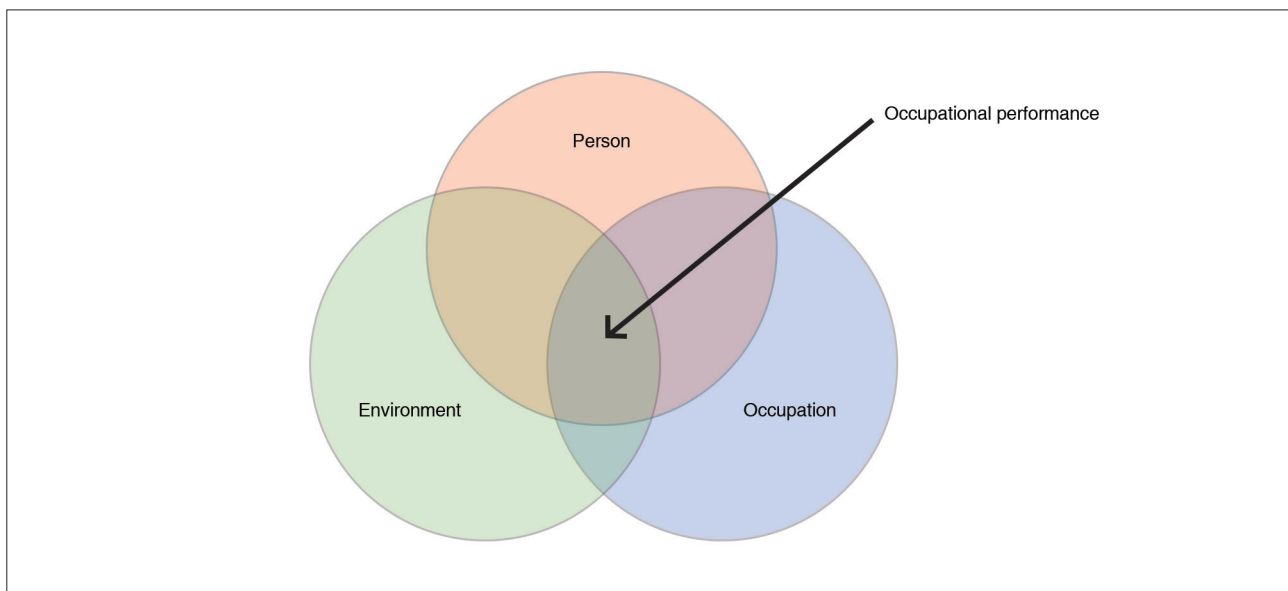


Figure 1. Person-Environment-Occupation Model⁵

- The environment domain – the physical layout of the workplace, social atmosphere, cultural context, and environmental characteristics such as temperature, noise and lighting
- The occupation domain – the work tasks, including tools, equipment, work postures, physical, and mental work demands

These three domains are dependent upon, and influenced by, one another. The higher the level of congruence or balance between the three domains, the better the quality of occupational performance, leading to increased productivity, efficiency, safety, and wellbeing for the worker. Ergonomic risk assessment within the PEO context entails identifying and addressing the ergonomic risks within each domain, and restoring the balance between the three domains.

Risks intrinsic to the human/person component of the system

The person domain of the work system is highly complex, encompassing physical, sensory, psychological, cognitive, and social dimensions. These dimensions vary enormously between individuals and can fluctuate significantly within a person. The PEO Model is particularly useful in understanding and analysing problematic areas that affect workers' occupational performance. Worker problems (or human factors) are highly complex and individual, typically demanding special expertise for effective identification and management. This expertise is provided by medical and other health professionals. Interventions provided by health professionals range from prevention to treatment, and from functional assessment to functional restoration.⁶ Preventive services typically include medical surveillance, ergonomic support to prevent strain and injury, worker fitness evaluations to assess worker risk in relation to inherent job demands, workplace wellness programmes, education and counselling regarding healthy lifestyle habits, stress management, and emotional regulation interventions. Restorative services typically include the treatment of medical conditions, rehabilitation, case management, and reasonable accommodation where appropriate.

Ergonomic risk assessment and the 'competent person'

Ergonomic risk assessment is defined in the Regulations as "a programme, process or investigation to identify, analyse, evaluate and prioritise any risk from exposure to ergonomic risks associated

with the workplace".¹ The Regulations require that the ergonomic risk assessment be performed by a 'competent person',⁷ defined as someone who "(a) has in respect of the work or task to be performed the required knowledge, training and experience in ergonomics and, where applicable, qualifications specific to ergonomics: provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act, 2008, those qualifications and that training must be regarded as the required qualifications and training"; and "(b) is familiar with the Act and the applicable regulations made under the Act".¹ This definition identifies three main requirements for competence, but these are vague and ambiguous:

- The first requirement states that the competent person "has, in respect of work or task to be performed the required knowledge, training and experience in ergonomics."¹ Exactly what the specific requirements are for knowledge, training, and experience in ergonomics is not defined. Considering the multidisciplinary nature of ergonomics, and the range of professionals whose qualifications include education and training in ergonomic principles pertinent to their scope of practice, it is reasonable to conclude that the knowledge, training, and experience of the competent person may differ according to the nature of the ergonomic hazard and the type of risk assessment required.
- The second requirement indicates that "where applicable, [the competent person should have] qualifications specific to ergonomics: provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act, 2008, those qualifications and that training must be regarded as the required qualifications and training."¹ This requirement is particularly vague and confusing. While many professions practise ergonomics in South Africa, the only profession with qualifications *specific* to ergonomics is that of ergonomists. It seems unlikely that the intention of the Regulations is to limit a multidisciplinary field of practice to one profession. The circumstances under which a qualified ergonomist might specifically be required to perform the ergonomic risk assessment is also not identified, with the requirement only given as "where applicable". The second part of this requirement indicates that "where appropriate", the qualifications must be

registered in terms of the National Qualifications Framework Act (NQFA). Again, the specific qualifications required and the circumstances under which they need to be registered under the NQFA remain unclear.

- The final requirement mandates that the competent person should be well acquainted with the Act and the corresponding regulations under it. Therefore, the competent individual is expected to have a comprehensive understanding of the OHSA, the Ergonomics Regulations, and any other pertinent regulations under the OHSA that are relevant to the assessed risk. This underscores the importance of multidisciplinary competence, where professionals within a specific field are trained in, and knowledgeable about, the legal provisions that relate to their scopes of practice.

The authors propose that qualified health professionals are important members of the multidisciplinary ergonomics risk assessment team, especially when evaluating or addressing ergonomic risks associated with a worker's medical or health status.

Ergonomic risk assessment and the role of the health professional

The ergonomic risk assessment detailed in Regulation 6 is subject to the requirements of Section 8.(2)(d) of the OHSA, which requires employers to assess workplace hazards and to establish and implement appropriate control measures to protect the health and safety of persons. The person performing the ergonomic risk assessment should, thus, be proficient not only in identifying the risks, but also in recommending appropriate risk controls. Since work systems risks could be environmental, task-related, person-related, or a combination of these, various forms of expertise might be required to perform an effective risk assessment. Examples of individuals with such expertise include the safety practitioner, occupational hygienist, industrial engineer, ergonomist, or health professional. Input from health professionals is typically required when the identified risks arise in the worker domain of the PEO work system.

Medical surveillance under the Ergonomic Regulations

Regulation 8.(1)(a) contains a statutory obligation for employers to place high-risk employees identified in the ergonomic risk assessment under medical surveillance, which should be overseen by an occupational medicine practitioner (OMP). This provision directly calls for the involvement of the OMP and, where appropriate, other health professionals, in the risk assessment process. An OMP is required to develop an ergonomic medical surveillance programme as part of the normal occupational health services. Medical surveillance for ergonomic exposure needs to be determined by the OMP, according to identified causal factors (Regulations 8.(1)(a) and (b)). The term 'medical surveillance', as defined in the OHSA, is health surveillance for employees working in jobs where either the ergonomic risk assessment identifies a substantial risk, or an OMP recommends that certain employees must be under health surveillance. The aim is to optimise human wellbeing, promote adaptation to the work environment, and monitor the effectiveness of workplace control measures.² The implications of these legal requirements are that:

1. The OMP must be part of the ergonomic risk assessment team as the competent person to identify where raw- or residual-ergonomic risk exposures may trigger the health surveillance requirement, and

2. The OMP is the accountable person for health surveillance. The objectives are to:

- detect ill-health effects at an early stage
- provide data to help employers evaluate health risks and improve containment
- enable employees to raise concerns about how work affects their health
- highlight lapses in workplace control measures
- provide an opportunity to reinforce training, education, and health promotion of employees

Medical surveillance is the analysis of health information and data to look for problems in the workplace that require targeted prevention. Health information and data are gathered in a planned medical programme with periodic examinations that may include clinical examinations and testing, biological monitoring, and/or functional testing of employees. Collation and analysis of data and timely dissemination for an appropriate response are then undertaken.^{1,8} In line with the requirements of labour legislation^{9,10} and medical ethics, all health enquiries, medical testing, and functional testing of employees should be informed by the inherent job demands as identified in a functional job analysis.

The collection of employees' medical data or health information is part of the medical surveillance process¹¹ defined in the Regulations. Medical surveillance can also be defined as a screening process. Screening is the application of a specific medical procedure or test to people who have no symptoms or impairment related to a particular disease, for the purpose of determining their likelihood of having or developing the disease. The screening procedure itself does not diagnose the illness.¹² Where markers for potential pathology or impairment are found, the individual is referred for full investigation by an OMP. These data, or the information from medical screening or surveillance, must be recorded as personal or human health data or information. The appropriate management, sharing and storage of these data highlight the need for health professionals to be recognised as 'competent persons' in relation to the risk assessment process. Medical records of employees include confidential personal data that must be kept in accordance with professional ethical and practice guidelines. Health professionals must also comply with the Protection of Personal Information Act, 2013 (POPIA)¹³ and the Promotion of Access to Information Act, 2000 (PAIA).¹⁴

Evaluation of worker fitness

The work fitness evaluation is a health assessment typically conducted before an individual starts a new job. The purpose of the evaluation is to ensure that the prospective employee is medically, physically, and mentally capable of safely meeting the job's essential duties and demands. It commonly includes a review of the individual's medical history, a baseline medical examination, and, where appropriate, tests related to high-risk physical or mental job demands such as visual acuity, manual material handling, balance, cardiopulmonary endurance, manual dexterity, cognitive ability, and executive function. The goal is to ascertain if the person has any health issue(s) that might interfere with his/her job performance or pose a risk to himself/herself or others in the workplace. Determining and maintaining worker fitness is a risk control measure and is central to risk assessment and medical surveillance. It is an individualised process for each worker.

Serra et al. (2007) describe work fitness as a multidimensional and dynamic concept, incorporating: 1) the worker's physical and mental capacity, 2) the worker's risk in relation to the job

Table 1. Typical functional abilities included in the functional work assessment ^{16-18,21}

Physical functional ability	Psycho-emotional and cognitive functional ability
<ul style="list-style-type: none"> • Gait • Balance, i.e. physical equilibrium, including static and dynamic balance • Range of movement, i.e. dynamic flexibility • Static posture, including stand, sit, stoop, crouch, and reach • Strength, including lift, carry, push, and pull • Coordination/reaction time • Manual strength using one or both hands • Physical endurance, including cardiovascular endurance and muscular endurance 	<ul style="list-style-type: none"> • Sensory, i.e. sight/visual, hearing, smell, taste, and touch • Attention, i.e. the act or state of applying the mind to a particular topic • Memory, e.g. short-term memory, working memory, and delayed recall • Inhibitory control, i.e. the ability to inhibit or suppress automatic or impulsive responses or behaviours to perform a goal-directed action • Verbal comprehension, i.e. the ability to understand spoken language • Mood, i.e. a prevailing affective state, typically positive or negative • Emotions, i.e. strong subjective feelings that result in physical and psychological changes that influence thought and behaviour • Psychomotor abilities, i.e. motor or muscle action directly progressing from mental activity • Perceptual skills, i.e. the ability accurately to interpret and understand sensory information from the environment to recognise patterns, discriminate between different stimuli, and make meaningful interpretations based on sensory experiences • Abstract thinking, i.e. the ability to think about objects, principles, and ideas that are not physically present • Mental endurance • Motivation, including a person's perceived limitations that may affect his/her performance

demands and the work environment, and (3) ethical, economic, and legal considerations.¹⁵ It is, thus, essential that any work fitness evaluation be based on the inherent requirements of the job. Job-related testing is considered fairer, safer, more reliable, and more valid than arbitrary medical examinations.¹⁶⁻¹⁸ The work fitness evaluation is, thus, a complex, multifaceted enquiry conducted by one or more registered health professionals, which simultaneously addresses medical, psychosocial, environmental, task-related, and practical concerns.

Establishing worker fitness as a risk control measure

When considering the 'competent person' to assess employees' health-related fitness to work, it is important to note that:

1. The persons to whom the employer should assign this duty are not defined in the Regulations.
2. Medical and healthcare professionals in South Africa are regulated by the Health Professions Council of South Africa (HPCSA). The HPCSA is a statutory body established by the Health Professions Act No. 56 of 1974.¹⁹ The primary role of the HPCSA is to regulate and oversee the professional conduct and practice of the various health professions. The HPCSA ensures that medical and healthcare professionals meet specific standards of education, training, and ethical conduct. In addition to the oversight provided by the HPCSA, each profession has its own council or regulatory body that works in conjunction with the HPCSA to regulate and govern the profession.
3. Each health professional, when duly registered, is competent and legally entitled to work within the defined scope of their profession, and is the designated person to examine, test, or evaluate the worker and present an evidence-based work fitness recommendation to the employer.
4. Where the risk assessment identifies the requirement for medical work fitness assessment and certification, the employer must appoint an OMP in charge of the work fitness programme. The OMP is a registered medical practitioner with a postgraduate qualification in occupational medicine that is recognised by the HPCSA.
5. The OMP is the primary health professional in this process and will, as the case applies, be assisted by other HPCSA-registered practitioners, including but not limited to general practitioners, medical specialists (e.g. ophthalmologists, cardiologists, physicians, orthopaedic surgeons, neurologists, psychiatrists, etc.),

audiologists, occupational therapists, optometrists, physiotherapists, biokineticists, psychologists, and environmental health practitioners.

An interdisciplinary approach is frequently required when assessing work fitness.²⁰ The assessment should include:

- A functional job analysis to determine the inherent physical, mental, and psychosocial demands of the job and the ergonomic risks. This is typically performed by occupational therapists who have in-depth training in functional activity analysis
- A medical and functional assessment of the worker to determine whether he/she meets the functional job demands in a safe and productive manner (Table 1 contains a list of physical and mental functional abilities commonly assessed in the work fitness assessment)

Discrepancies between worker abilities and job demands are addressed through medical and rehabilitative interventions. Where a worker's impairment remains unresolved, options for reasonable accommodation should be explored in accordance with labour law provisions.^{9,10} It is important that health professionals participate in the reasonable accommodation process due to their understanding of the medical diagnosis, prognosis, limitations, and restrictions of the individual and the functional work-related effects thereof. Individuals with known medical conditions may require individualised risk assessments, as the baseline ergonomics risk assessment may not sufficiently consider the risks posed by the medical condition.^{17,21}

CONCLUSION

Within the multidisciplinary field of ergonomics, health professionals, as defined by the HPCSA, play a critical role in assessing and managing ergonomic risks in workers with high-risk health conditions or the potential to develop such conditions. In this regard, health professionals fulfil the requirement of 'competent person' in the ergonomic risk assessment process.

KEY MESSAGES

1. The Ergonomics Regulations require employers to assess and mitigate ergonomic risks to prevent work-related disorders through four main strategies, viz. risk assessment, implementation of controls, training, and medical monitoring.

2. Collaboration across multiple disciplines is key to effective ergonomic risk prevention, ensuring tailored controls for specific risks.
3. Healthcare professionals recognised by the HPCSA play a crucial role in assessing and managing ergonomic risks that affect the health status of workers.

Declaration of conflicts of interest and affiliation

The authors declare that this is their own work; all the sources used in this paper have been duly acknowledged and there are no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conception: DJK, LS, GT, JL, GV

Drafting of the paper: DJK, LS, GT, JL, GV

Critical revision of the paper: DJK, LS, GT, JL, GV

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