

The impact of the new health and safety (construction) regulations on municipal and design electrical engineers



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1. Introduction

Municipal engineers and in particular electrical engineering staff have traditionally seen Health and Safety (H&S) as two separate managerial entities: H&S management and H&S compliance. They also perceive H&S responsibilities as separate functions, that H&S management department are solely responsible for and that H&S management is more closely associated with occupational health and environmental management and the compliance thereof, than with engineering. Most municipal electrical engineers perceived their electrical engineering responsibilities to ensure the safety of staff during maintenance and construction activities only.

However the new construction regulations requires electrical engineering staff and other engineering departments, including the appointed town engineer (who is a competent person in terms of the general machinery regulation 2 of the OHS Act) to become more involved as the client representative in the interaction with design engineers, procurement and appointment of contractors and advisors on H&S (Defined agents for H&S) being Professional construction health and safety agents (Pr CHSA). The construction regulations defines “construction work” (in terms of municipal electrical activities) as any work in connection with the erection, maintenance, alteration, renovation, repair, demolition, dismantling of, or addition to, a building or structure and the installation, erection, dismantling or maintenance of a fixed plant (switchgear power lines cables etc.).

The process to follow for both maintenance activities and projects in electrical reticulation work requires that a baseline risk assessment be made before any design or planned maintenance activities that will take place. Such baseline risk assessments should indicate the risks and mitigation procedures that must to be developed. In terms of designs for construction projects, such baseline risk assessments must be included in a site specification which is specific to the planned project. This will then be forwarded and explained to designers. Not only are town engineer’s advice to make use of registered Pr CHSA Agent but they are also forced to employ such agents in terms of the new construction regulations for certain projects. It is advisable that only agents who are registered with the South African Council for Project and Construction Management Professions (SACPCMP) and have a background in electrical engineering be used. A person without an electrical background would not be able to give advice on specific processes or understand the dangers involved in low, medium and high voltage switching as well as working on or near live electrical installations.

2. TOWN ELECTRICAL ENGINEERING AND CONSULTING ENGINEERS

To ensure full compliance with the new construction regulations, an understanding of the requirements and procedures of the new Construction Regulations is imperative to electrical engineers and designers of town electrical engineering reticulation networks. According to the new construction regulations, designers are defined as 'a competent person' who: prepares checks and approves a design and includes an engineer contributing to, or having overall responsibility for, a design.

Electrical design engineer's responsibilities, in terms of the new Construction regulations, now extend beyond mere involvement at the design phase, but also include responsibility for ensuring safe construction and installation of their designs as well as the usage and maintenance procedures of their designs. Design engineers' role and accountability for their designs in terms of risk, their designs may pose, includes interaction with health and safety professionals and certification of their work.

Although the responsibility for ensuring H&S during the construction phase is largely the responsibility of principle contractors, specific specialists, subcontractors must also ensure correct installation and in the case of certain low voltage electrical installations, certification according to the specific OHS legislative regulations and safety standards or codes of practice. The design engineer, overall, must ensure that required, specific method statements and procedures are available for the safe installation of designed projects. Practical examples would include electrical switching procedures related to the commissioning of new electrical equipment and reticulation networks.

Method statements for the safe installation of services are not generic but specific to job tasks that are not routinely conducted. Such tasks are usually in a maintenance and construction environment that due to the nature of new work, require guidance on specific procedures. Procedures may include manufacturer's installation methods and acceptable written engineering practices or international and local safety standards. Design engineering is to advise on correct and safe methods to install specific plant equipment and installations, and to ensure that the procedures followed do not increase the risk of injuries but rather mitigate any risk identified. Designers therefore need to take cognisance of the fact that an incorrect method statement can be used against them in legal proceedings.

Electrical engineers, consultants and in-house designers, involved in the design of town electrical networks are responsible for, according to Construction Regulations 6:

- *To ensure that the applicable safety standards incorporated into the construction regulations and applicable regulations are complied with in their designs (e.g. SANS 10142)*
- *To take into consideration the health and safety specification submitted by the client, before a contract is put out to tender, and make available in a report to the client all relevant health and safety information about the design and installation of the relevant structure that may affect the pricing of the construction work;*

- *To inform the client in writing of any known or anticipated dangers or hazards relating to the installation and construction work of their design, and make available all relevant information required for the safe execution of the work they designed, or any subsequently altered designed work (this includes safe work procedures for their specific installation);*
- *To refrain from including anything in their design that requires or necessitates the use of dangerous procedures or materials, hazardous to the health and safety of the persons doing the installation and construction work, which can be avoided by modifying the design or by substituting materials;*
- *To take into account the hazards relating to any subsequent maintenance of the relevant structure or installation and make provision in their design for that work to be performed, in order to minimize the risk of future maintenance activities required;*
- *When given a mandate by the client, to carry out necessary inspections at appropriate stages to verify that the construction and installation of their designs are carried out in accordance with the design's specifications; if the designer is not so mandated by the client, the client's agent, (e.g. Professional health and safety agent - Pr CHSA) will be responsible to carry out such inspections;*
- *The designer or the client's agent (e.g. Pr CHSA) must stop any contractor from executing any construction work which is not in accordance with the relevant design's health and safety aspects: Provided that if the designer is not so mandated, the client's appointed agent (e.g. Pr CHSA) must stop that contractor from executing that construction work;*
- *When mandated by the client, the designer, must do a final inspection of the completed structure, in accordance with the National Building Regulations, and include the health and safety aspects of the structure. Then as far as is reasonably practicable, declare the structure safe for use, and issue a completion certificate to the client and a copy thereof to the contractor, and*
- *The designer must, during the design stage, take cognisance of ergonomic design principles in order to minimize ergonomic related hazards in all phases of the life cycle of the structure.*

3. MAINTENANCE OF TOWN ELECTRICAL NETWORKS

From baseline risk assessments provided by the town electrical engineer, in the form of a site specific health and safety specification (usually prepared by the client's agent - Pr CHSA) designers should be capable and able to analyse risks involved in their design for future maintenance purposes, and ensure their designs afford and mitigate risk as far as reasonable practical. They also need to provide procedures including method statements for correct H&S installation and maintenance of their designed electrical installations, switchgear and reticulation networks.

In respect of preventative planned maintenance or reactive maintenance on municipal electrical infrastructures, electrical town engineers must ensure that detail risk assessments have been made for each anticipated *Job-Task* accompanied by specific methods and procedures (method statements) on how to perform the specific job task safely.

Such procedures will according to the risk identified include risk mitigating procedures (safety plans) on how to perform such task safely, including administrative procedures, engineering methods and the type of personal protective gear and equipment required for specific tasks.

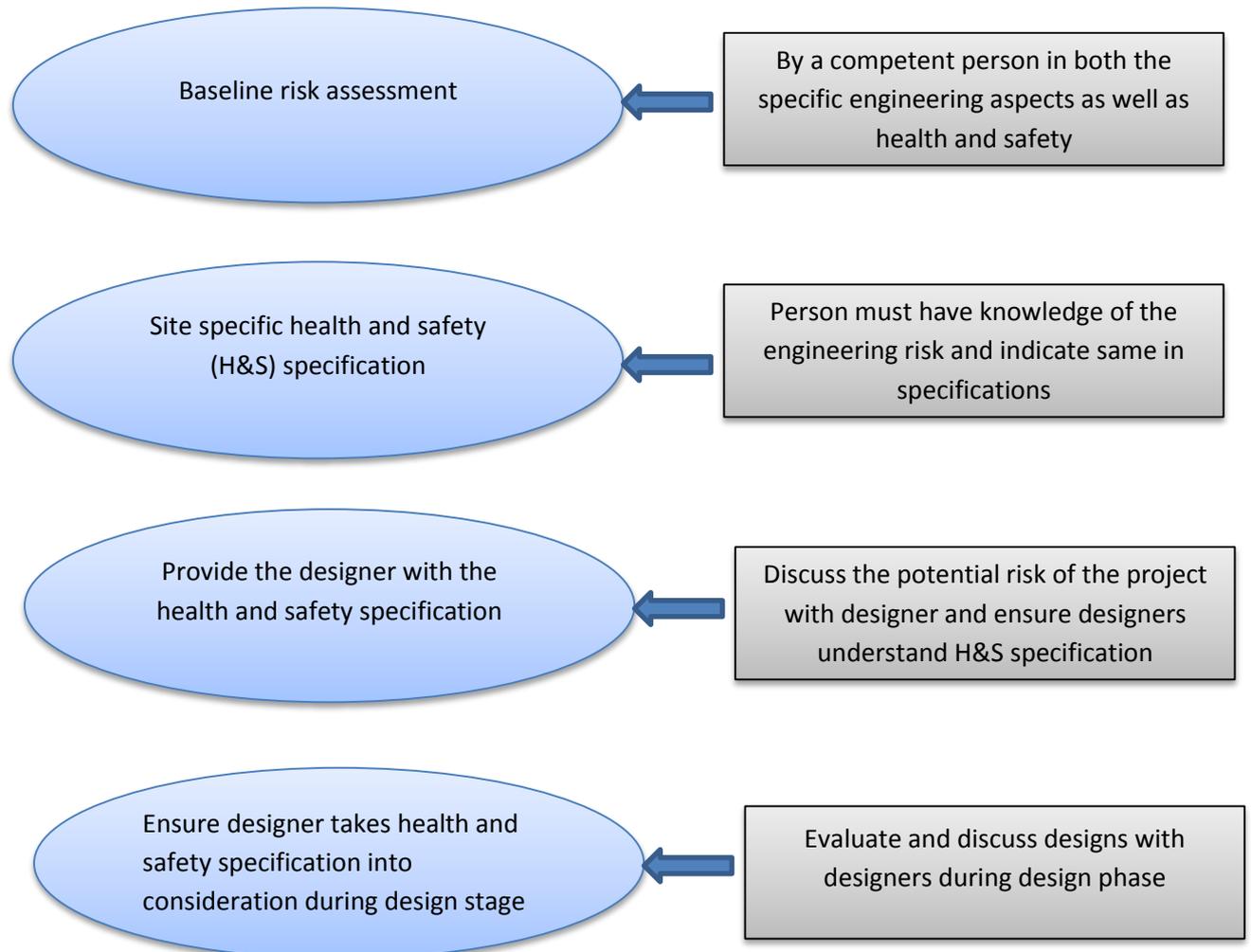
4. RESPONSIBILITIES OF THE TOWN ELECTRICAL ENGINEER (THE CLEINT)

The town electrical engineers, representing the client as the responsible person, in terms of the general machinery regulations 2, responsibilities have expanded dramatically in the new construction regulations, and it would be advisable for town engineers to seek assistance from professional health and safety agents (e.g. Pr CHSA) not only with new projects but also to ensure maintenance activities complies with the new construction regulations. Such professional health and safety specialists must be selected based on their knowledge and experience related to electrical engineering projects and maintenance, not only related to their legislative knowledge but also their engineering knowledge of the specific project.

In terms of the new Construction regulations town engineers, as the client, is force to appoint and make use of Pr CHSA agents. The town electrical engineer or appointed Pr CHSA agent (client) are responsible for:

- *The preparation of a baseline risk a assessment for an intended work;*
- *To prepare a suitable, sufficiently documented and coherent, site specific health and safety specification for the intended construction work based on the baseline risk assessment;*
- *To provide the designer with the health and safety specification;*
- *To ensure that the designer takes the health and safety specification into consideration during the design stage;*
- *To ensure that the designer carries out all responsibilities required in the construction regulations;*
- *To include the health and safety specification in the tender documents;*
- *Where changes are brought about to the design or construction work, to make sufficient health and safety information and appropriate resources available to the principal contractor to execute the work safely.*
- *Where additional work is to be performed as a result of a design change or an error in construction due to the actions of the client, the client must ensure that sufficient safety information and appropriate additional resources are available to execute the required work safely, and*
- *Where a construction work permit is required as contemplated in construction regulation 3(1), the client must, without derogating from his or her health and safety responsibilities or liabilities, appoint a competent person in writing as an agent (Pr CHSA) to act as his or her representative.*

Figure1: The role of designers and the client in new projects



5. INTERACTION AND ROLE OF PROFESSIONAL HEALTH AND SAFETY AGENTS

The introduction of a professional advisor for health and safety heralds a new era where H&S is not merely seen as compliance with administrative and legislative standards or the advice and management by non-technical people on aspects of electrical construction and maintenance activities, but the real input by people that would have the knowledge, qualifications and experience of engineering concepts to understand real electrical engineering threats and the impacts on electrical workers' health and safety.

Although concepts of safety engineering, process safety and the professionalization of engineers who specialise in the interaction of human safety environments, are not that well established in South Africa, the formation and regulation of people with proper knowledge of the build environment including electrical engineering with an understanding of engineering principles will assist in the decrease of electrical engineering related incidents. The registration of this entity by SACPCMP (South African Council for the Project and Construction Management Professions) will address the critical need of the shortage in this field of safety engineering in South Africa.

6. CONCLUSION

Town electrical engineers need to comprehend the following: the impact that the new Construction Regulations will have on their town engineering operations, the role and need for proper H&S specifications as well as the interaction and function of Professional Construction Health and Safety Agents (Pr CHSA) [who are registered with the South African Council for the Project and Construction Management Professions (SACPCMP)].

Electrical town engineering in both construction and maintenance activities, pose unique risk which requires proper interaction with H&S management systems and an understanding (from an electrical engineering point) of risks related to electrocutions, electrical arch flash burns and electrical burns. Furthermore an understanding of electrical engineering risk and concepts such as mechanical, pressurisation, capacitance discharge, induction and the need for engineering and personal protective equipment, equal potential bonding, to name but a few, are required. Specific fall prevention programs (and the procedures to be followed in isolation) and permit systems which is of utmost importance to prevent injury of engineering staff, contractors and the public will ensure the H&S goal of zero harm during town electrical engineering, construction and maintenance activities.

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