Registration, licensing and specialist list in a civil engineering context

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INTRODUCTION

There are a number of international approaches to the regulation of a profession, including:

- **Registration**: Statutory regulation of a profession involves the setting of standards, the keeping of a register of qualified persons, the awarding of titles, the protection of title by law, the establishment of rules of conduct, and the disciplining of registered person who transgress such rules.
- **Licensing**: An area of work restricted by statutory licensing cannot be undertaken by an unlicensed person.
- **Specialist lists**: The non-statutory, voluntary listing of professionals who have met a defined standard of competence in a specialist area, typically administered by a professional or trade body.

Registration recognises demonstrated achievement of a defined standard of competency at an entry point to a profession, licensing authorises eligible persons to practise engineering, while specialist lists indicate peer-recognised competencies within a specialist area.

REGISTRATION AND LICENSING IN SOUTH AFRICA

The Engineering Council of South Africa (ECSA), which is a statutory body, regulates the profession through a register in South Africa and a code of conduct. A person who demonstrates his or her competence, against standards determined by ECSA at an entry level to the engineering profession within one of the basic disciplines of engineering, is eligible to be registered. Registration as such confirms that a person is capable of working independently. ECSA thereafter relies on the integrity of the registered persons (self-regulation) not to take on work which they are not competent to perform, and to perform work within the "norms of the profession".

The Engineering Profession Act of 2000 makes provision for licensing in that it prohibits a person from performing any kind of work identified for any category of registered persons. The Council for the Built Environment (CBE) is, however, responsible for identifying work based on ECSA's recommendations. The CBE is required to consult with the Competition Commission before doing so. The Competition Act of 1998 permits the Competition Commission to exempt all or part of the rules of a professional association (including a statutory body) from the restrictive horizontal provisions of this Act which have the effect of substantially preventing, or lessening, competition in a market. The Act requires the Competition Commission to take into account internationally applied norms, and permits an exemption on the grounds that such rules are reasonably required to maintain professional standards or the ordinary functioning of the profession. The Competition Commission has recently rejected the CBE's application for exemption from certain provisions of the Competition Act filed on behalf of ECSA and on four of the other councils for the built environment in Board Notice 32 of 2016 in Government Gazette 39360 of 29 January 2016.

The Competition Commission, in arriving at its decision, found that competition would be harmed in the following ways should the proposed rules for the identification of work (IDOW) be implemented:

- Unregistered persons will not be allowed to undertake work or offer services for persons regardless of their academic qualifications, practical experience and skills acquired.
- Persons registered with other professional councils who wish to compete with one another will only be able to do so within the parameters of the Memoranda of Understanding which will be concluded between those professional councils.
- Persons registered within specified categories of registration will not be allowed to undertake work outside their category of registration, even if they are competent to undertake such work.

The Commission furthermore found that:

- The restrictions imposed by the IDOW Rules not only reduce the number of persons operating in the relevant market, which is likely to increase the selling price and reduce the quantity of the service supplied in the market, but also have some element of market allocation.

Table 1: Acts which "identify" work in the field of civil engineering

Act	Overview of requirements relating to specific aspects of civil engineering practice
National Building Regulations and Building Standards Act 103 of 1977	A registered person (person registered with ECSA) is required in terms of the Act to report on the condition of any building or the land on which a building was or is being or is to be erected, or any earthwork which is such that it is dangerous or is showing signs of becoming dangerous to life or property. The National Building Regulations issued in terms of the Act require a competent person (person who is qualified by virtue of his education, training, experience and contextual knowledge) to make a determination regarding the performance of a building or part thereof in relation to a functional regulation, or to undertake such duties as may be assigned by the regulations to: • prepare rational designs and rational assessments to demonstrate that an adopted building solution has an equivalent or superior performance to a solution that complies with the requirements of the relevant part of SANS 10400, and inspect and certify upon completion the construction, erection or installation • prepare rational designs and rational assessments in accordance with the provisions of parts of SANS 10400 relating to structural design, excavations, floors, walls, roofs, glazing, drainage, non-waterborne means of sanitary disposal, stormwater disposal and fire installations • judge an existing building to be capable of carrying additional loads arising from the erection or extension supported on such building • submit rational assessments as to the adequacy of the existing systems and installations in combination with the contemplated extensions to comply with the relevant requirements of the regulations for the whole building, including the extensions • assume responsibility for the satisfying of the functional regulations for the structural, stormwater disposal, non-waterborne sanitary disposal or drainage system in its entirety ▪ undertake an appropriate geotechnical site investigation, and • specify precautionary measures where the safety or stability of any property or service is likely to be impaired by such excavation. A person registered in a professional category of registration in terms of one of the councils for the professions identified in the Council for the Built Environment Act is required to declare how the functional regulations are to be satisfied.
Sectional Titles Act 95 of 1986	A professional engineer is required in terms of the regulations issued in terms of the Act to prepare a report on the general physical condition of buildings, with specific reference to any defects in the buildings and the services and facilities relating thereto.
Occupational Health and Safety Act 85 of 1993	The Construction Regulations 2014 requires a competent person (person who has, in respect of the work or task to be performed, the required knowledge, training and experience and, where applicable, qualifications specific to that work or task, and who is familiar with the Act and applicable regulations) to: ▪ perform a wide range of tasks and activities including: ▪ the preparation of fall protection plans ▪ the development of operational compliance plans for, the examination and testing of and the supervision of the moving of outriggers of suspended platforms ▪ the supervision of scaffolding operations, rope access work on site, operation of bulk mixing plants, excavation work, the design and erection of tower cranes, temporary works operations and excavations ▪ inspection of material hoists or similar machinery.

Table 1: Acts which "identify" work in the field of civil engineering (*continued*)

Act	Overview of requirements relating to specific aspects of civil engineering practice
Occupational Health and Safety Act 85 of 1993 (*continued*)	▪ control the issuing, cleaning, examination collection, retuning and recording of cartridges and nails or studs used in explosive fastening devices ▪ the supervision of the design and erection of tower cranes ▪ the supervision and controlling of demolition work ▪ the development of a method statement where excavation involves the use of explosives ▪ the conducting of periodic inspections of structures in order to ensure that structures remain safe for continued use ▪ ensuring that temporary works structures are adequately erected, supported, braced and maintained ▪ the authorising of the casting of concrete and the removal of temporary works structures ▪ the examination and checking of all equipment used in temporary works structures for suitability prior to use ▪ the inspection of temporary works structures ▪ the conducting of a detailed structural engineering survey of a structure to be demolished, developing a method statement of the procedure to be followed and checking the structural integrity at intervals to avoid premature collapses, and ■ perform the roles of construction manager (person responsible for the management of the physical construction processes and the coordination, administration and management of resources on a construction site); construction supervisor (person responsible for supervising construction activities on a site) and designer (person who prepares, checks or approves a design, arranges for a person under his control to prepare a design, designs temporary works, has overall responsibility for a design or prepares specifications). Professional engineers or professional engineering technologists are required to decide on the stability of soils in excavations where uncertainty exists. Professional engineers, professional engineering technologists and professional certificated engineers are required to certify the design of suspended platforms.
National Road Traffic Act 9 of 1996	A professional engineer or professional engineering technologist of the road authority concerned is required in terms of the National Road Traffic Regulations to approve every traffic signal installation at a signalised junction or pedestrian or pedal cyclist crossing.
Housing Consumers Protection Measures Act 95 of 1998	A competent person (person registered with ECSA or with the South African Council for Natural Scientific Professions (SACNSP)) permits the National Home Builders Registration Council to require such persons to approve plans and documents, and requires such persons to supervise the rectification of a home-builder's non-compliance, or determine a home-builder's compliance with the NHBRC's Technical Requirements. Listed competent persons (competent persons whose credentials are accepted by the Council and are admitted to the Council's list) or certification bodies (members of a Council-approved certification scheme who provide certification services through certifiers in their employ who as a minimum are professionally registered with ECSA or the SACNSP or possess a relevant professional designation granted in terms of the National Qualifications Framework Act 67 of 2008) may in terms of the NHBRC's Technical Requirements: ■ demonstrate that a solution for a system, element or component satisfies the performance requirements in the following services areas: ▪ structural system ▪ prefabricated timber truss roofing system ▪ steel frame homes ▪ timber frame homes ▪ water and drainage installations and stormwater disposal systems ▪ roof glazing installations ▪ fills, terraces and subsurface drains, and ■ provide certification services relating to: ▪ site class designations ▪ inherent hazard classes, and ▪ sites underlain by dolomites.
National Water Act 36 of 1998	Only an approved professional person (person registered with ECSA and approved by the Minister after consultation with ECSA) may in terms of the Act perform tasks associated with the safety of dams with a safety risk including the design, repair, alteration and the abandonment of a dam. A professional engineer is required in terms of the Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources to approve plans, specifications and design reports so as to prevent the pollution of a water resource for: ■ the construction of any surface dam for the purpose of impounding waste, water containing waste or slurry ■ the implementation of any pollution control measures at any residue deposit or stockpile, and ■ the implementation of any water control measures at any residue deposit or stockpile.

There are existing regulations or legislations in the sector that cater for public health, safety and financial risks associated with the work undertaken within the built environment, which, if used effectively, should suffice in protecting consumers of the built environment professional services from any wrongdoing or

underperformance by persons offering engineering services.
- The IDOW Rules are not in line with international best practice.

As a result, the Engineering Profession Act cannot be used to license engineers to practice engineering. Other pieces of legislation can nevertheless require that certain activities within the scope of the engineering profession be undertaken by persons registered with ECSA and, in so doing, establish "licensing requirements" for such activities.

LEGISLATION WHICH "LICENSES" ASPECTS OF CIVIL ENGINEERING PRACTICE

Various pieces of legislation regulate aspects of civil engineering practice, and identify or "license" work for persons engaged in aspects of civil engineering. These laws are rooted in Section 24 of the Bill of Rights embedded in the Constitution of the Republic of South Africa which grants everyone the right to an environment that is not harmful to their health or well-being, and to have the environment protected for the benefit of present and future generations.

The primary pieces of legislation which identify work within the field of civil engineering are outlined in Table 1. The Occupational Health and Safety Act has the broadest coverage, and applies to construction works which the Construction Regulations define as "any work in connection with:

a) the construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or similar structure; or
b) the construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or the moving of earth, clearing of land, the making of excavation, piling or any similar civil engineering structure or type of work."

These Regulations also define a structure as:

a) "any building, steel or reinforced concrete structure (not being a building), railway line or siding, bridge, waterworks, reservoir, pipe or pipeline, cable, sewer, sewage works, fixed vessels, road, drainage works, earthworks, dam, wall, mast, tower, tower crane, bulk mixing plant, pylon, surface and underground tanks, earth retaining structure or any structure designed to preserve or alter any natural feature, and any other similar structure;
b) any false work, scaffold or other structure designed or used to provide support or means of access during construction work; or
c) any fixed plant in respect of construction work which includes installation, commissioning, decommissioning or dismantling and where any construction work involves a risk of a person falling."

Some of the legislation referred to in Table 1 makes direct reference to professional registration with a particular statutory council, while others merely refer to competent persons and define what a competent person is. The Construction Regulations in defining a competent

person state that "where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act of 2000, those qualifications and training are regarded as being the required qualifications and training."

The National Qualifications Framework of 2008 enables the South African Qualifications Authority to recognise a statutory body or a non-statutory body of expert practitioners and to register their professional designations on the National Qualifications Framework. Some of the qualifications which impact upon civil engineering work, and which are currently listed on the National Qualifications Framework, are indicated in Table 2. Some of these designations build onto registration with a statutory council. For example an accredited timber engineer is a practicing professional who has prior experience in roof design and construction, and is already registered with ECSA as a professional engineer or professional engineering technologist.

The NHBRC-approved certification scheme included in the recently revised *NHBRC Home Building Manual* makes provision for the certification of services through certifiers who are in possession of a qualification registered on the National Qualifications Framework as an alternative to a listed competent person, i.e. a person registered with ECSA or the South African Council for Natural Scientific Professions (SACNSP) and whose credentials are accepted by the NHBRC (National Home Builders Registration Council).

The National Building Regulations broadly define competent persons and permit a local authority, subject to appeal to the Review Board, to decline or accept the appointment of any person who prepares a rational design or rational assessment that is required in terms of a Regulation, a part of SANS 10400 or a geotechnical investigation. Regulation A19 does, however, spell out the grounds for rejecting an application, which includes not having ECSA or SACNSP registration and inadequately qualified or insufficient experience or contextual knowledge. A person who satisfies the definitions for competent persons provided in SANS 10400 are deemed to have the required qualifications, experience and contextual knowledge.

LISTINGS OF CIVIL ENGINEERING PROFESSIONALS

The Competition Commission recognises in its CBE exemption rejection notice the need to use legislation effectively to protect consumers from any wrongdoing or underperformance of those offering engineering services. There are several shortcomings in ECSA's uniform and generic registration system when a regulator simply equates ECSA registration to public health, safety and financial risks:

- Firstly, the assessment of competence takes place at the entry point to the engineering profession against generic "standards expected in independent employment or practice" within a broadly defined field of engineering.

Table 2: NQF professional designations covering engineering work

Professional body	Status of body	Designation ID	Designation title
Contractors Plant Hire Association (CPHA)	Non-statutory	562	Certified Plant Operator
Engineering Council of South Africa (ECSA)	Statutory	304	Professional Engineer
		305	Professional Engineering Technologist
		306	Professional Certified Engineer
		307	Professional Engineering Technician
		308	Registered Lift Inspector
		309	Registered Lifting Machinery Inspector
		310	Medical Equipment Maintainer
Institute for Timber Construction South Africa (ITC-SA)	Non-statutory	508	Certified Roof Erector
		509	Certified Roof Inspector
		510	Certified Roof Fabricator
		511	Accredited Timber Engineer
		512	Certified Roof Structure System Software Developer
		566	Certified Timber Frame Builder
Institute for Work at Height (IWH)	Non-statutory	426	MWEP Practitioner
		427	MWEP Safety and Transport Controller
		428	Specialised Access Equipment Demonstrator
		429	Rope Access Technician
		430	Rope Access Practitioner
		431	Rope Access Supervisor
		432	Fall Protection Planner
		564	Fall Arrest Rescue Coordinator
		565	Temporary Suspended Platform Erection Supervisor
Plumbing Industry Registration Board (PIRB)	Non-statutory	413	Licensed Plumber
		414	Qualified Plumber
		415	Hot Water System Installer
		416	Solar Installer
		417	Plumbing Training Assessor
		418	Plumbing Inspector
South African Council for Project and Construction Management Professions (SACPCMP)	Statutory	498	Pr CPM: Professional Construction Project Manager
		499	Pr CM: Professional Construction Manager
		500	Pr CMentor: Professional Construction Mentor
		501	CMentor: Construction Mentor
		502	Pr CHSA: Professional Construction Health and Safety Agent
		503	Pr CHSM: Construction Health and Safety Manager
		504	CHSO: Construction Health and Safety Officer
South African Council for Natural Scientific Professions (SACNSP)	Statutory	569	Pr Sci Nat: Professional Natural Scientist
		570	Cert Sci Nat: Certificated Natural Scientist
Water Institute of Southern Africa (WISA)	Non-statutory	530	Professional Process Controller

- Secondly, reliance is placed on the integrity of the registered persons (self-regulation) not to take on work which he or she is not competent to perform, and to perform work within the "norms of the profession".
- Thirdly, it is not uncommon that the nature and subject matter of the work undertaken by a person prior to registration may be very different from that undertaken post-registration.
- Fourthly, the ECSA system does not differentiate between high-risk and low-risk engineering work.

Reliance on competence demonstrated at the point of entry to a profession on a uniform and generic basis does not sit well with the principles of quality management as espoused by ISO 9000:2005, *Quality management systems – Fundamentals and vocabulary*. ISO defines competence as "demonstrated ability to apply knowledge and skills". In quality management systems competence is linked to verified ability to perform activities in a specific context. Reliance on self-assessment of competence to undertake work in a specialised field of engineering also poses risks, as no matter how ethical engineers may be, they are not capable of self-assessing what they do not know. This can lead to an underestimation of the influence of agents, or the identification and the solving of the wrong problems, all of which results in the belief that a design is adequate when it is dangerously inadequate.

The mitigation of risk on projects is uppermost in the mind of "intelligent" developers and clients, as engineering failures can have significant time and cost implications on projects. It is also in the mind of regulators such as the Department of Labour, the NHBRC and the National Regulator for Compulsory Specifications who deal with the Construction Regulations, the NHBRC structural warranty scheme and National Building Regulations, respectively. For example, how does a local authority determine whether or not a person registered with ECSA has the experience and contextual knowledge to function as a competent person in a particular area, and how does a home builder or a client verify the credentials of a person registered with ECSA to undertake specialist work?

SAICE, as a learned society, is well placed through its divisions to put in place specialist lists to verify the credentials of those registered with a statutory body such as ECSA to undertake civil engineering work in specialist areas. This will not only improve the effectiveness of legislation governing civil engineering practice, but will also provide a much needed service to providers and users of specialist services. The JSD has agreed with the SAICE executive to pilot such a listing in the field of structural engineering, based on the following principles:

- Persons admitted to a list must be professionally registered with ECSA, must be actively engaged in a defined practice area and must have demonstrated to their peers a set of outcomes which relate to the competencies uniquely related to the practice area.
- Admission conditions need to include maintenance of professional registration and continuous professional development

within the practice area, and should be linked to offering services to a documented standard of professional service.

- Any person who is aggrieved by a decision of a Division's Assessment Committee may appeal the decision to the SAICE Membership Committee, who will rule on the matter.

The starting point in mitigating risks relating to structural failure or substandard performance is to be able to identify structural engineering competencies amongst persons registered with ECSA. The Joint Structural Division (JSD) published in 2014 a *Guide to Good Practice for Structural Engineering* (www.jsd.co.za/technicial_articles_guides.php) to address the issues surrounding the practice of structural engineering. According to this Guide, structural engineering practitioners, depending on their tertiary education, training, experience, category of registration and recognition by the profession, function at one of four distinct levels, as indicated in Figure 1. The level of practitioner assuming responsibility for the design of a structure is linked to the category of risk as indicated in this figure.

The JSD List of Structural Engineering Professionals, which is linked to the provision of services in accordance with JSD's Standard for Structural Engineering Services (www.jsd.co.za/technician_articles_guides_topic.php?topic=General), provides a means of identifying persons who have structural engineering capabilities to assume responsibility for medium and medium-to-high risk structures. Only those persons who are professionally registered with ECSA as professional engineers and professional engineering technologists, and who have verifiable structural engineering abilities, are admitted to this publically available listing. The list is complementary to legislative requirements and enables those professionals who have structural engineering competencies to have their capabilities verified and recognised, particularly those who have not had the opportunity to obtain internationally recognised qualifications.

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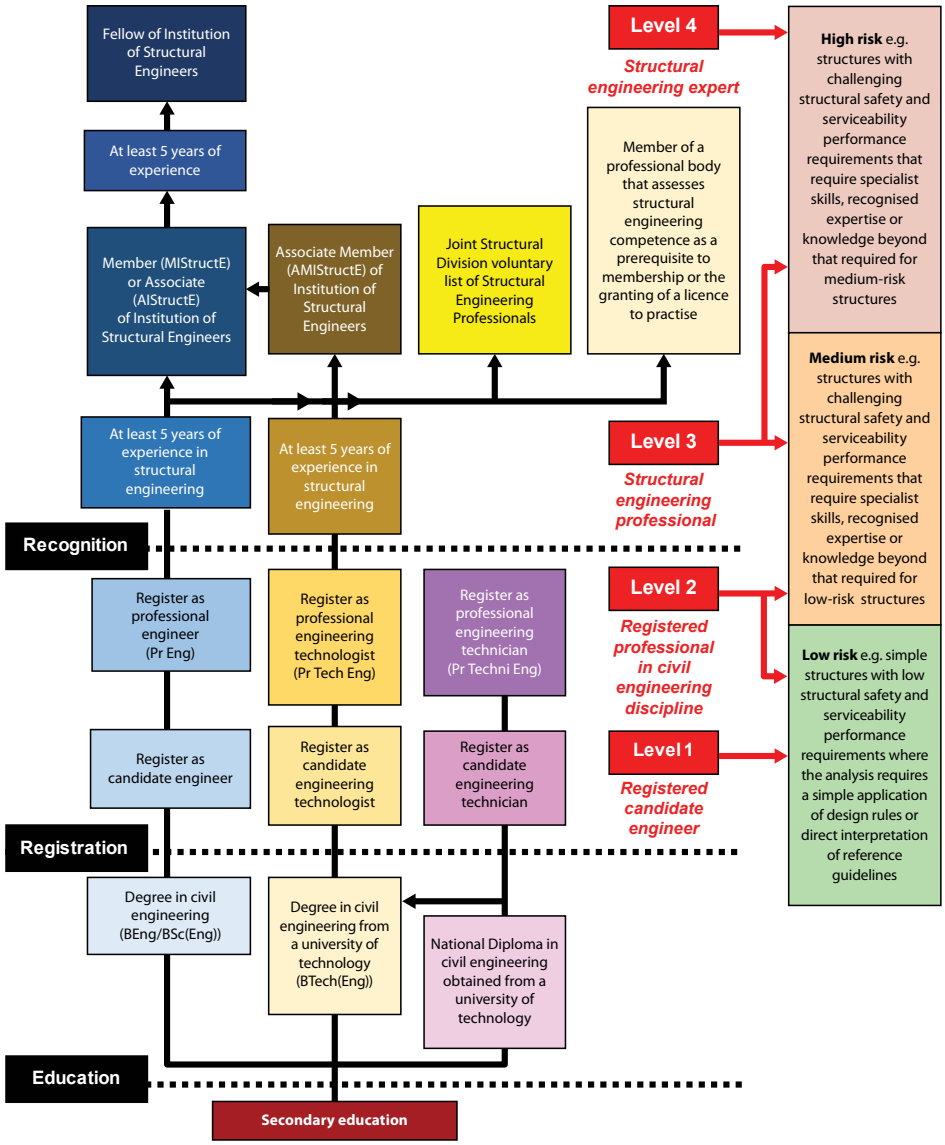

Figure 1: Levels of competence required for structural engineering linked to levels of risk