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CESA
Consulting Engineers South Africa
INFRASTRUCTURE
Indaba
2025

TRANSFORMATION AND BUILDING CAPACITY:

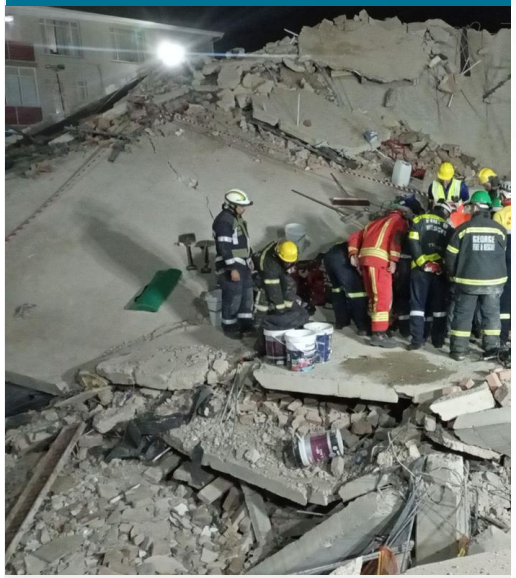
CITY OF CAPE TOWN PERSPECTIVE

ATTRACTING AND RETAINING ENGINEERING PRACTITIONERS

Gerhard Vivier Pr Eng

18 March 2025

George, 6 May



Industry response:

- **Acknowledged** respo
- Played the **Blame Ga**

Government respons

- **Never-ending** investi
- **Increased** regulatory
- **More** inefficiencies

It should never h

ntation

rmined to face the future
urselves publicly
it, are **building a city of**

decision making
rtfolio complexity and

of **resources**

ge sharing and
g and training

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Vision: "The Knowledgeable Client"

ECSA IDoEW Regulations

- Category differentiation of engineering problems and activities and requires specific categories of registration for each:
  - At a **Complex** level by **professional engineers**;
  - At **Broadly-defined** level by **professional technologists** and **certificated engineers**
  - At **Well-defined** level by **professional technicians**
  - At **Specifically-defined** level by a **specified category practitioner**
- *"17.2. Any person who is **employed by an organ of state** and whose conditions of service require of that person **to manage the delivery and maintenance of engineering work is deemed to be a person who performs identified work** contemplated in item 2 of this Notice."*
- Section 18 provides for **Candidates or unregistered persons** to only perform identified engineering work **under the direction, control and direct supervision of a suitably registered person**

Professional Engineer	Professional Technologist	Professional Technician
• Complex • Broadly-defined • Well- defined	• Broadly-defined • Well- defined	• Well- defined

Government Gazette, No. 44333, 26 March 2021: ECSA Board Notice 21 of 2021: Identification of Engineering Work Regulations

Engineering Complexity Model

Value

- 0 – 10 million ZAR
- 10 – 100 million ZAR
- 100 million + ZAR

Type of Work

- Replace
- Enhance
- New

Asset Hierarchy

- Component (L6)
- Asset Type (L5)
- Asset Group Type (L4)
- Asset Class (L3)

Asset Hierarchy example
Component = Pump / Bearing
Type = Mechanical Plant / Bridge
Group Type = Pump station / Road Structure
Class = Water supply Network / Road

		Type of Work				
		Replace	Enhance	New		
Asset Hierarchy	Component (L6)	Technician	Technician	Technician	0 – 10 million ZAR	Value
	Asset Type (L5)	Technician	Technician	Technologist		
	Asset Group Type (L4)	Technician	Technologist	Technologist		
	Asset Class (L3)	Technologist	Technologist	Engineer		
	Component (L6)	Technician	Technician	Technologist	10 – 100 million ZAR	
	Asset Type (L5)	Technician	Technologist	Technologist		
	Asset Group Type (L4)	Technologist	Technologist	Engineer		
	Asset Class (L3)	Technologist	Engineer	Engineer		
	Component (L6)	Technician	Technologist	Technologist	100 million + ZAR	
	Asset Type (L5)	Technologist	Technologist	Engineer		
	Asset Group Type (L4)	Technologist	Engineer	Engineer		
	Asset Class (L3)	Engineer	Engineer	Engineer		

Model Calibration

- Compared model results with survey results based on project manager assessment of their project complexity level descriptors.
- Used the Nelder-Mead algorithm to the determine weightings
- Results: Average % Difference = 4.91%, No. of matches = 45%
- Ongoing and refined based on user experience

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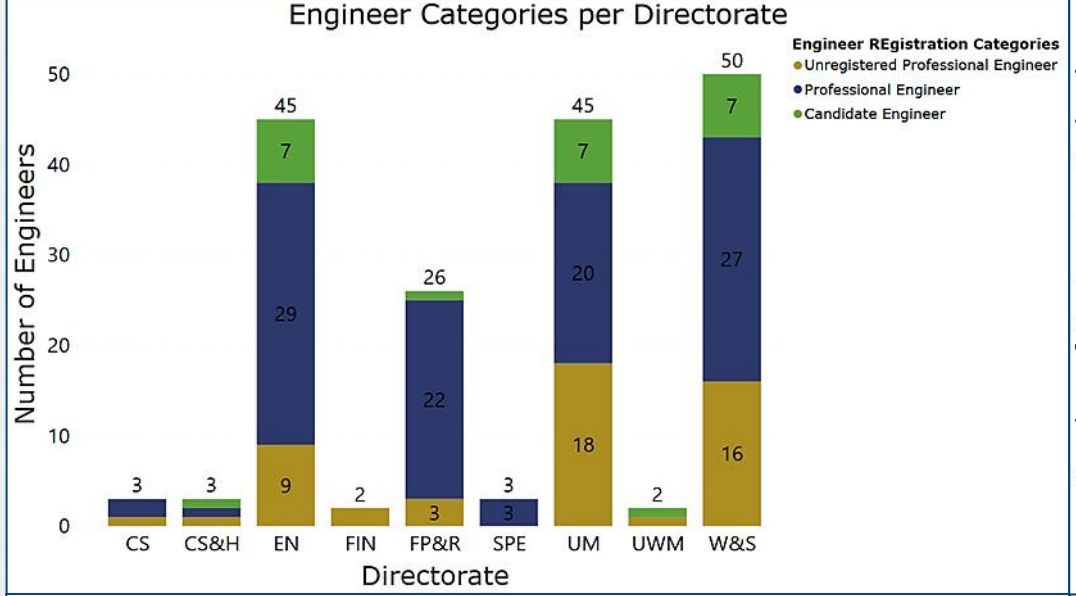
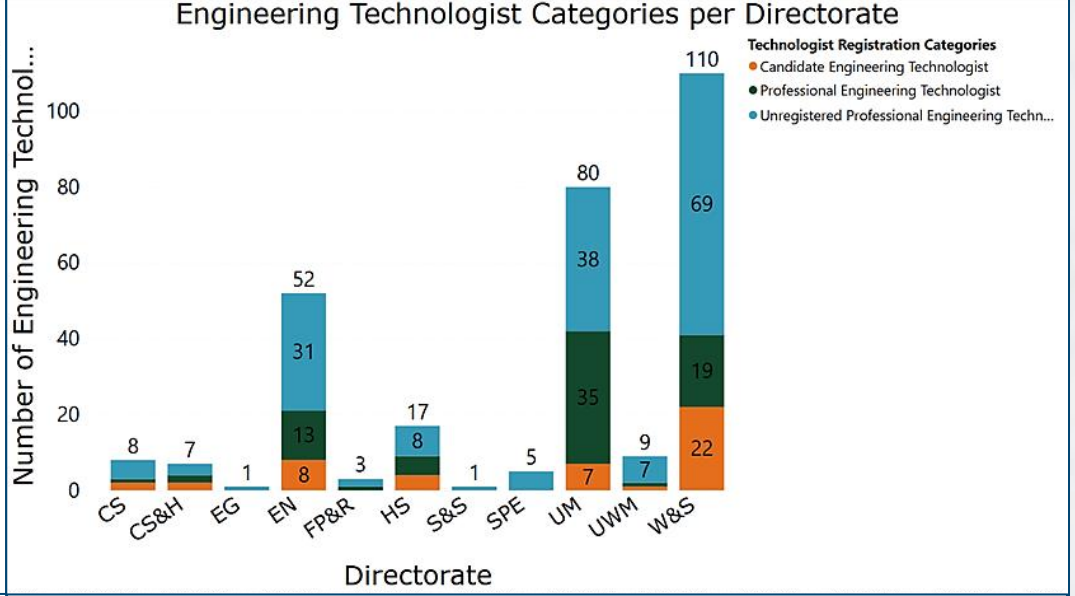
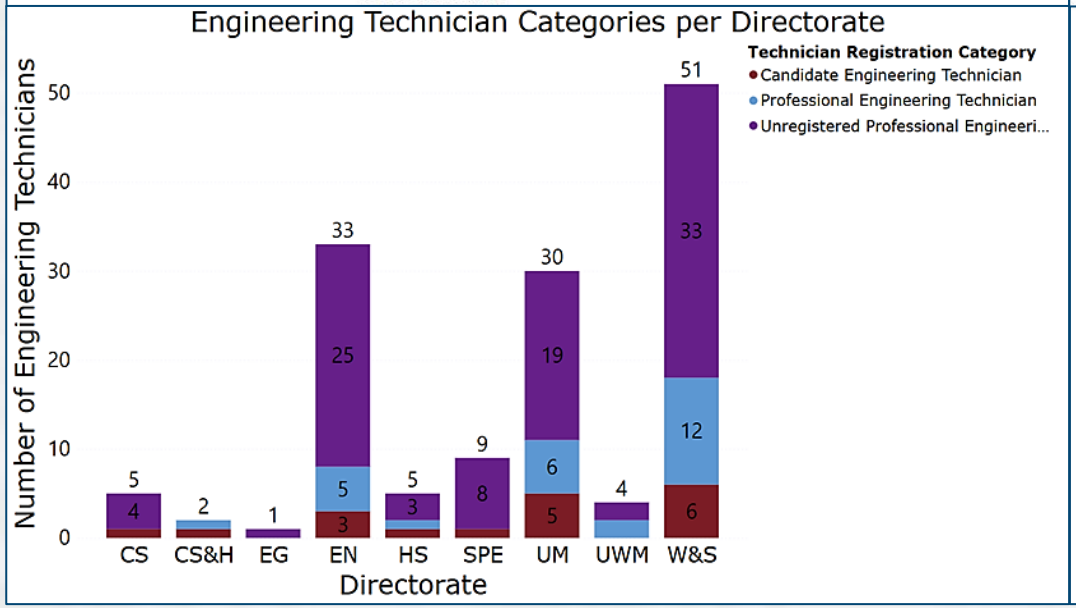
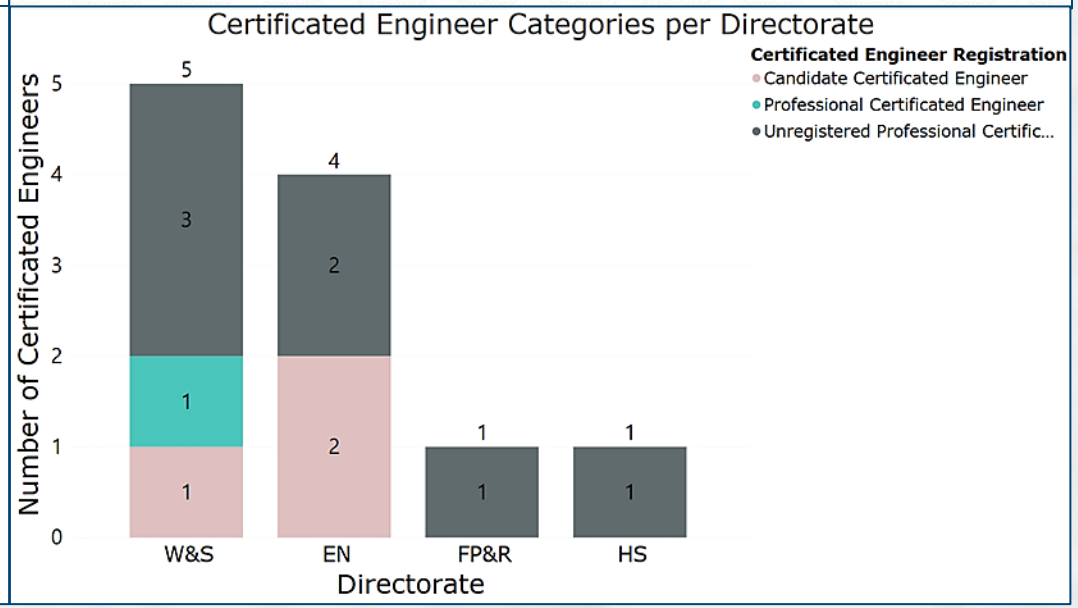
A challenging and complex matter due to the unique nature of projects and a vast amount of variables!

CCT Engineering Staff Database









Category	Professional	Candidate	Unregistered	Total
Engineer	104	24	51	**179 (29%)**
Certificated Engineer	1	3	7	**11 (2%)**
Engineering Technologist	72	104	117	**293 (47%)**
Engineering Technician	27	32	81	**140 (22%)**
Total	**204 (33%)**	**163 (26%)**	**256 (41%)**	**623**

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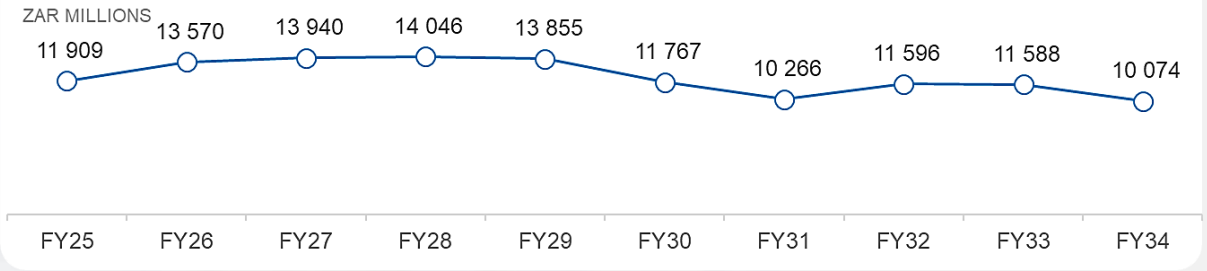
Portfolio Complexity Analysis

Capital Portfolio FY2025 to FY2034: R122.6 billion

Planned Capital Expenditure per FY
10 year latest plan

122 611
ZAR MILLIONS



Budget Percentages per Directorate
10 year latest plan

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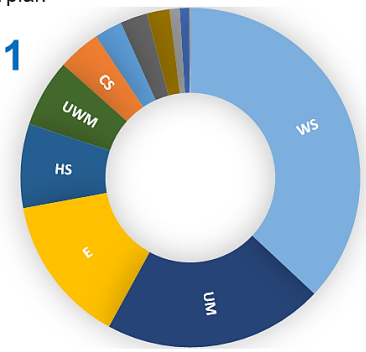
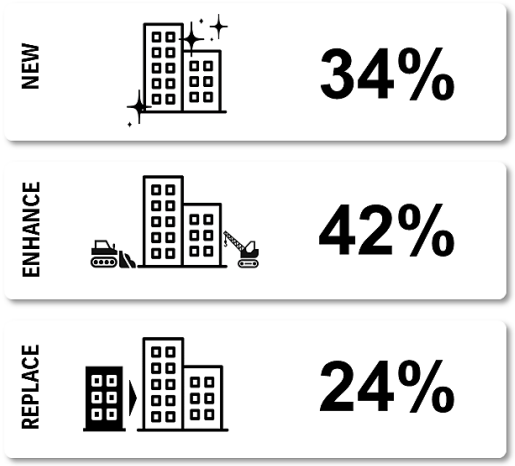
ZAR MILLIONS



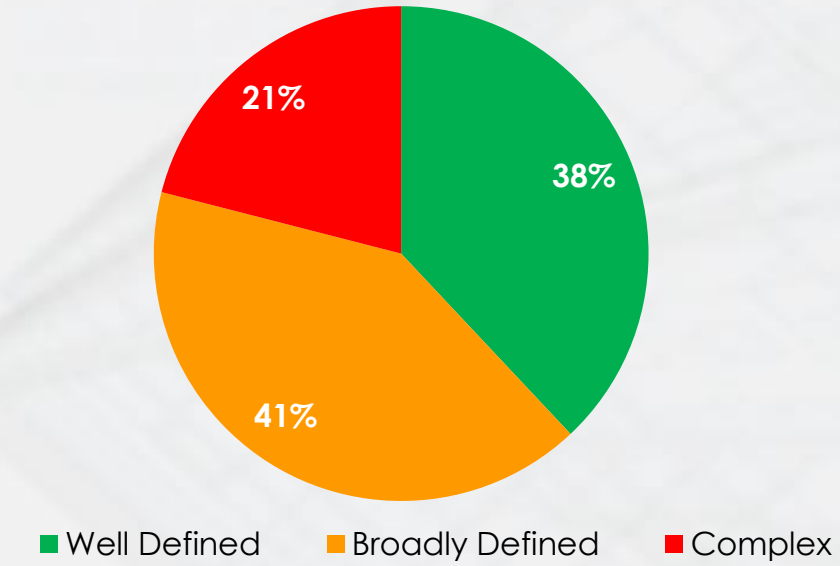
CSH	2,6%	O_CM	0,1%
CS	4,1%	SS	2,6%
EG	1,0%	SPE	2,2%
E	14,2%	UM	21,0%
F	0,9%	UWM	6,4%
FPR	0,1%	WS	37,0%
HS	8,0%		

Investment Reason Description
10 year latest plan

122 611
ZAR MILLIONS



Portfolio Complexity Analysis (SAP data Nov'24)



Next steps

1. Departments to **assess** the complexity of their work.
2. **Adjust** the complexity model to suit the particular work of departments.
3. **Enhance** SAP PPM to allow for Asset Hierarchy and to allow for the allocation of the responsible engineering and other built environment professionals against each project.

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CCT is not compliant to the IDoEW Regulations as published by ECSA and will need a focussed effort to drive professionalisation and become a Knowledgeable Client!

Professionalisation Roadmap

Initiation and Planning

- **Awareness of initiative**
  – Memo to ED's
- **Status Quo analysis**
  – Updated survey results

Recruitment

- **Updated Job descriptions**
  - Competency framework compiled
  - Job description tool developed
- **Attract talent**
  - Engagements with schools and universities
- Improved on-boarding programme

Training and development

- **Provide CPD Accredited training**
  - 2281 CPD points issued = R8,64 million cost saving
- **Develop and implement mentorship programmes**
  - ECSA C&U signed 23 April 2024
  - ECSA Mentorship programme developed and implemented
- **Identify pipeline of candidates for registration**

Performance Management

- Define performance standards in terms of job descriptions
- Reward and recognition
- Probation monitoring

Governance and compliance

- **Monitor compliance**
- **Identification of Works Regulations**
  - **ECSA Compliance plan completed 24 February 2025.**
  - Portfolio complexity analysis ongoing

Evaluation and Improvement

- Determine metrics to monitor effectiveness of programme

Sustainability and Engagement

- **Institutionalise practices**
- **Regular engagements with stakeholders**

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Substantial progress made - almost complete
Commenced with – 50% to 75% complete
To follow – less than 25% complete

Engineering Roadmap shown as blue print for others to follow

Improve Engineering Excellence

1. Mentorship and Training

- Register unregistered key staff and candidates within the City over the short to medium term (Data from Staff Database)
- Employ new unregistered staff only at the bottom two pay scales subject to joining the CCT Mentorship Programme and registered staff for level 3 and above, i.e. professional registration is compulsory from level 3 onwards.
- Continue to register more CPD approved internal training plans and train candidates and professionals to these.
- Embed the ECSA Codes of Conduct and Practice in the daily lives of our engineering staff

2. Create Opportunities for professional growth

- Create a self insured Professional Indemnity Fund to allow City candidates and professionals to apply their trade without fear of personal loss for circumstances beyond their control.
- Allow further career progression in engineering work stream by adding higher levels and payscales

Improve Engineering Excellence

Organisational Design Review

Ensure that organisations have the **right** people, with the **right** skills, doing the **right** work, in the **right** way, in the **right** numbers, with **real** alignment to achieve strategic objectives (Rupert Morrison, 2021)

Operating Model Design → Micro Structure Design → Staff Consultation → Labour Consultation → Micro Structure Adjustments → Making it Real

- **Update the competency framework of the MSR to align with the requirements of IDoEW requirements and provide for additional task levels**
- **Link sign-off levels to the asset management hierarchy**
- **Perform job evaluation and develop job descriptions based on the MSR Competencies that is aligned to the organisational structure and optimised in terms of efficiency.**

4. Monitor Compliance and report to ECSA

- **Perform bi-annual tests of the current portfolio complexity and ensure that the responsible staff assigned to projects are compliant with the IDoEW regulations.**
- **Drive continuous improvement through mentoring and registration of existing staff and new recruitment to fill gaps in compliance.**

Engineers in Cape Town are finding their Voice !

Government Gazette, No. 45181, 20 September 2021: Municipal Staff Regulations

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THANK YOU | DANKIE | ENKOSI