



Faculty of Engineering,
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Tikologo ya Kago le Theknoloetši ya Tshedimošo



ENGINEERING 4.0

Road Maintenance Forum

13-04-2023

Make today matter

INTRODUCTION TO ENGINEERING 4.0

A call to action

- **Training and Certification**
 - A need for Civil Engineering and Transport Engineering related skills
 - Limited dedicated training facilities
- **National Reference Laboratory**
 - Participation in international proficiency testing schemes (AASHTO, FEHRL)
 - Objective, independent laboratory for QC and QA
 - Independent verification of test results on road projects
- **Research and Development**
 - Re-establish R&D competence
 - Masters and PhD pipeline
 - Strengthen relationships between institutions (MoA)



INTRODUCTION TO ENGINEERING 4.0

General Overview

- Training & Certification Laboratory
- National Reference Laboratory
- Concrete Research Laboratory
- York Timbers: Wood Engineering Laboratory
- Accelerated Pavement Testing (APT) Track
- Active Traffic Lane



Training and Certification Laboratory

Highlights

- A 20-station facility used to train and ***certify** civil materials testing technicians
- Engineering students are granted access for training, practical experiments and research experiments



National Reference Laboratory

Highlights

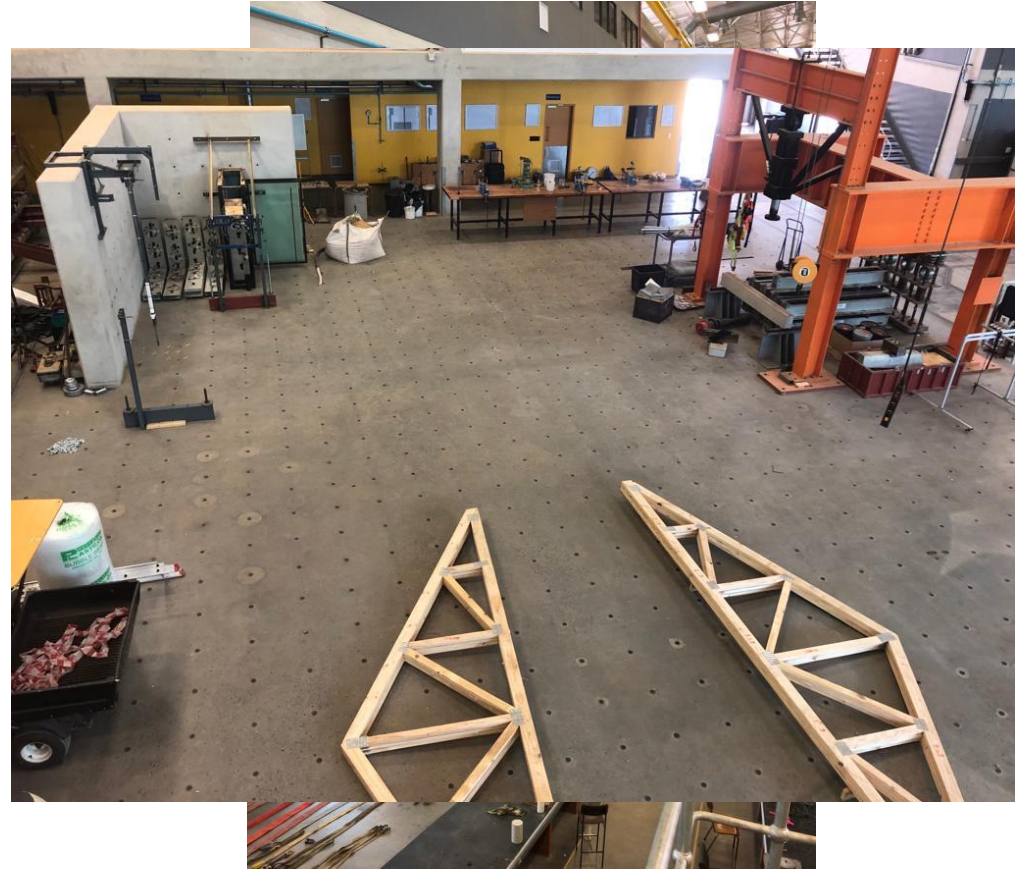
- Serve as the standard for the properties of materials for the road construction industry to which field data can be compared
- Participation in National and International Laboratory Proficiency Scheme for Road Materials Laboratories



Concrete Laboratory

Highlights

- Consists of preparation areas, curing and humidity rooms, and a large test floor where various concrete and structural testing can be conducted
- It also has a 900 mm-deep 20 x 15 m strong floor, which provides possibilities for attaching presses and test members onto the floor and a strong wall for testing



York Timbers: Wood Engineering Laboratory

Highlights

- Cultivate, grow and expand the footprint of mass timber construction using advanced engineered wood products in South Africa and on the African continent
- Collaborative effort between civil and chemical engineering, architecture, materials science, data science, genetics and other related bio-economy disciplines.



Accelerated Pavement Testing (APT) Track

Highlights

- The 100 x 6 m APT track allows for the construction of different pavement structures and their accelerated evaluation using a mobile APT device developed in South Africa.
- Enables engineers to monitor the expected behaviour of a pavement over a fraction of its full life.



Active Traffic Lane

Highlights

- Lane on the N4 into Pretoria dedicated to research
- Allows for the installation of sensors inside, next to and over the lane that can be monitored from a dedicated data house
- The datahouse is also the location of a traffic counter and classifier that has been developed in-house and uses artificial intelligence (AI) to monitor traffic on the N4



A transdisciplinary ecosystem

Engineering 4.0 positioning

- Real-world problems are vague, ill-posed and ill-defined
- Transdisciplinarity significantly improves the success of solutions for real-world problems
- Engineering 4.0 is well positioned and well equipped to serve as an effective transdisciplinary ecosystem



Possibilities are limited by imagination...

Make today matter

- Innovation cannot be delivered in silos
- Collaborative innovation ecosystems drive economic growth and equally important ESG commitments



Thank You



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