



## Civil Engineering: Areas Of Expertise

- Structural Engineering and Design.
- Geotechnical Engineering.
- Environmental Fluid Dynamics.
- Environmental Engineering.



## Facilities

### STRUCTURAL ENGINEERING LABORATORIES:

Has equipment for tensile and compressive testing of steel bars, rolled sections, composite members; concrete cubes and cylinders, blocks and bricks; destructive and non-destructive testing of pre-cast concrete elements (piles, structural components, building elements, etc.); concrete pipes; steel components (scaffolding, shelving and racking etc.); testing and development of elements/components for buildings and Civil Engineering works as well as calibration of pre-stressing jacks.

### GEOTECHNICAL ENGINEERING LABORATORIES:

Boasts a variety of equipment for performing various geotechnical determinations inclusive of; stress path triaxial testing, strain controlled triaxial testing, conventional shear box testing, ring shear testing, compaction equipment testing, soil composition testing, consolidation tests and soil characteristics testing.

### CENTRE FOR RESEARCH IN COASTAL AND HYDROLOGICAL ENGINEERING (CRECHE):

Is a Research Centre which contains the Environmental Fluid Dynamics and Environmental Engineering laboratories. These laboratories are a home to a variety of in-door and out-door equipment inclusive Hydraulic Flume Facilities; Multi-coloured PIV system; a laminar flow-UV light cabinet; a 1200°C Muffle-Furnace; Digital BOD equipment and a Nikon inverted microscope. With these equipment we are able to undertake: flow measurement in shallow rivers/streams, water level monitoring, field studies in rivers and estuaries, consulting and advice on Applied Hydrology, acoustic doppler flow profiling in tidal estuaries & near shore regions, advanced simulation and modelling applications in fluid dynamics and hydrology, water and wastewater quality analysis for COD, BOD, TKN,  $\text{NH}_3$ , Solids, pH, Alkalinity, Chlorides and Conductivity, 2-D and/or 3-D experimental studies, microbiological analysis in a sterile environment., volatile solids determinations, biodegradable Organics determinations and studies of micro-organisms.



### References of previous consultancy and research

Recent research projects undertaken by the programme through CRECHE includes:

- Odour dispersion from landfill sites.
- Coastal water quality modelling.
- Wind, wave and current interactions at a port entrance.
- Turbulence structure and mixing at gas-liquid interfaces.
- Near-shore sediment dynamics.
- Structure & mixing efficiency of stably stratified turbulence.
- Bio-hydrodynamics of estuaries.

- Bioreactors for treatment of landfill leachates and waste waters.
- Passive treatment of landfill leachate using constructed wetlands.
- Behaviour of landfill emissions under a subtropical climate.
- Hydraulics of a waste body.
- The “Cellular method” – a new landfill operational technique.
- Mechanical biological pre-treatment of waste.
- The concept of ZERO WASTE.



## Land Surveying (Geomatics) Programme:

### Areas Of Expertise

- Surveying and mapping using ground, aerial or satellite based techniques.
- Land tenure.
- Spatial information management and spatial analysis.

### Facilities

#### TRIMBLE REAL TIME KINEMATICS (RTK) GLOBAL POSITIONING SYSTEM (GPS):

This equipment is used for real time measurements of positions and also to undertake measurements in differential mode for post processing to give more accurate positions.

#### GEODIMETER MOTORIZED TOTAL STATION:

May be used without a reflector over short distances. This instrument is useful when used in scanning mode for taking angle and distance measurements for mapping of dangerous and delicate sites such as unsupported excavations and historical sites respectively.

#### AERIAL CAMERA CALIBRATION EQUIPMENT:

It's the only one in the sub-region and is used to calibrate aerial cameras for photogrammetric projects required for topographic mapping

### References of previous consultancy and research

- An annual Survey Camp is carried out every Winter Vacation as a practical academic exercise for Land Surveying Students. The Survey Camp is conducted in collaboration with any interested party that approaches the Programme of Land Surveying on mutually agreed terms. Thus far the major beneficiary has been the Ezemvelo KZN Wildlife.
- Evaluation of the existing spatial data for the tourism assets in the former North-South-Central Councils of the Durban Metro and mapping of tour routes for the proposed tours in the Durban Metro area on behalf of MXA and Associates.
- Development of a GIS database of potential tourism sites in Cato Manor area for Cato Manor Development Association (CMDA) based on the sites identified by the MXA and Associates.
- Mapping and establishment of a Web based GIS spatial database of 3D geometrically and colour rectified images of the Rock Art Paintings of the Ukhahlamba-Drakensberg Mountains World Heritage Park.

## Property Development:

### Areas Of Expertise

- Dispute Management.
- Value Management.
- Project Management.
- Facilities Management.
- Procurement Management.
- Quantity Surveying.
- Construction Replacement Valuations.

### References of previous consultancy and research

Consultancy and Contract Research Activities

Staff within the programme have extensive experience within the above domains and can provide a professional consultancy service upon request.

## Contact Details

### Professor DD Stretch

Head of School/Director of CRECHE

Phone : +27 31 2601064

Email : [stretchd@ukzn.ac.za](mailto:stretchd@ukzn.ac.za)

### Mrs Tina Warby

Secretary

Phone : +27 31 2603055

Fax : +27 31 2601411

Email : [warby@ukzn.ac.za](mailto:warby@ukzn.ac.za)