



## **Committee on Engineering Capacity Building**

WORLD FEDERATION OF ENGINEERING ORGANISATIONS  
Proudly hosted by the Engineering Council of South Africa

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### **1. Overview/Summary**

The Engineering Capacity Building committee has made progress in its activities, which include drafting of strategy, and progress on its projects in line with its strategic objectives and that of WFEO.

The report includes projects and participation:

- 1) The UNESCO Africa Engineering Week
- 2) Capacity Building Programme for Africa
- 3) Gender Aviation Summit
- 4) SABTIA Tech Camp and What's Next Conference
- 5) The Africa Report and Infrastructure Report
- 6) Operational Plan against Strategic Objectives / Response to Review Committee

One of the committee's key projects, The UNESCO Africa Engineering week has attracted support from UNESCO and several partners. The UNESCO Africa Engineering week was a great success in promoting the Engineering profession, with ~800

participants in Kenya from over 16 countries, which also presided on key initiatives and resolutions in capacity building. The event included the launch of the first Women in Engineering Forum, and Capacity Building workshops in the areas of Education and Continuous professional development, led by the Capacity Building Committee. The Engineering week through several efforts has managed to maintain support with the international event scheduled in Kenya in September in 2018. FAEO has agreed to align its meeting on an annual basis with this week, and hosted the 3<sup>rd</sup> Africa Engineering Conference. Other initiatives included developing the strategy for the Southern African Federation of Engineering organisations with more than five several countries participating in the development.

The momentum continues with the further launch of events in Africa, also a major event noted in South Africa. WFEO is also given a priority seating at these events, given its leading role in this project.

## **2. PROJECTS BY THE CAPACITY BUILDING COMMITTEE**

### **2.1. UNESCO Africa Engineering Week**

Addressing sustainable development within current climate change challenges will require innovative engineering and technology-based solutions. Engineering capacity and competence building activities are critical to ensure an adequate supply of engineers to work on these global challenges. Such activities are particularly important in Africa, where the per capita number of engineering professionals is lower than in other regions. Given this engineering deficit, activities that promote awareness of engineering as a career as well as show how youth studying science, technology, engineering and mathematics (STEM) can become part of the solution have high priority. To increase engineering capacity in Africa, the UNESCO Engineering Initiative (UEI) in cooperation with partners established an Africa Engineering Week in 2014.

The activities during Africa Engineering Week increases the visibility of engineering, which is particularly important in the continent where there is a great need for engineers to achieve the Sustainable Development Goals (SDGs). To date, five (5) African Engineering Weeks have been successfully held including the most recent, held in Kenya. The Organising committee led by Kenya and the WFEO delegation represented

by the Chair of the Engineering Capacity Building Committee and the FAEO President. The UNESCO Africa Engineering Week for 2018 has and has shown evolution in that the International Event is in Kenya, hosted more than 800 delegates with representation from more than 16 countries and also included the UNESCO support in the outreach programmes. The other major event took place in South Africa, Capetown, and enjoyed strong representation from government, industry, students, and professions in the region, with over 300 delegates.



UNESCO Engineering Week in South Africa: Theme on Preparing for the 4<sup>th</sup> Industrial revolution and addressing the Sustainable Development Goals

The international event in Kenya, Mombasa covered the following:

- First African Women Engineers Summit
- Mentoring Programme for school children
- Workshops on the following under the theme “Harvesting Blue Economy for Accelerated Growth”:
  - Marine Engineering
  - Continuing Professional Development in harnessing blue economy  
Marine Administration & Tourism
  - Marine Construction Equipment
  - Desalination
  - Marine Fisheries & Aquaculture
  - Port, Shipping and Marine Surveillance
  - Blue Economy
  - Pollution Control & Water Catchment Areas
  - Student presentation in Blue Economy and related matters

- IEA Framework and International Recognition Arrangements
- Capacity Building Workshop on Engineering Education and Mobility
- Continuous Professional Development
- Africa Engineering Report & Capacity Building
  - Infrastructure Score Card
  - Renewable Energy
- FAEO Executive Meeting
- SAFEO Strategic Planning Workshop



UNESCO Engineering Week, Kenya Mombasa

Presentations and contributions were also made by the WFEO delegation and the Capacity Building committee played a key role in the initiatives at the event. The Chairperson of the WFEO Capacity Building Committee presented the IEA Framework, Continuous professional development, chaired the Capacity Building

workshop, and presided over the resolutions of the event. WFEO also participated in the outreach programme together with several other participants from locally and abroad.

### **2.1.1. First African Women Engineers Summit**

The 17<sup>th</sup> September 2018, marked the First African Women Engineers Summit. In this regard, women engineering practitioners across the African continent led discussions on challenges faced by women in the engineering profession and strategies to employ in addressing this. The summit was the first of its kind and it is envisioned that henceforth, same will be held during the African Engineering Week.

### **2.1.2. Mentoring Programme for learners at high school**

Noting that the primary objectives of the Africa Engineering Week is to increase the visibility of engineering and its role in sustainable development, to encourage students to study engineering by supplementing STEM curriculum with practical engineering applications, and to incite more African countries to participate ensuring the sustainability of these efforts, a deliberate initiative was undertaken to mentor Kenyan learners in this regard. A 3 day mentorship programme (from the 18<sup>th</sup> to 20<sup>th</sup> September 2018) was successfully held wherein over 200 learners were in attendance. Awareness in engineering and related fields was the main focus of the mentoring initiative. The WFEO Capacity Building Committee also participated at the mentoring programme addressing the learners.

## **2.2. Capacity Building Programme for Africa, Africa Catalyst, and Southern African Capacity Development Programme**

The WFEO Capacity Building Committee has developed the Capacity Building Programme for Africa concept and principles and presented this to both FAEO, SAFEQ and conference events, and encouraged countries to take initiatives for implementation. The SAFEQ project that was hence initiated has resulted in capacity Building initiatives, also resulting from support of the Africa Catalyst project. These projects or activities are conducted by individual countries and, most often than not, they do not gain the recognition they deserve in as far as nation building and societal contributions are

concerned. The different countries within the Southern Africa Development Community (SADC) are working independently and this seems to portray a picture that communicates that little is taking place in as far as engineering capacity building is concerned. Therefore, the WFEO Capacity Building Committee supported by the Engineering Council of South Africa has taken an initiative to ensure that there is support to the SADC countries in order to showcase their capacity building projects and initiatives and provide support. The Southern African Federation of Engineering Organisations' (SAFEEO) is used as the platform in the facilitation of all the projects which are undertaken in the SADC Region in order to provide seamless access to information from SAFEEO member countries and beyond. ECSA, through its role as the Secretariat for SAFEEO was to ensure that all the projects undertaken in the SADC region directly support the capacity building initiatives of FAEO, and therefore support FAEO in its leadership role. Since ECSA hosts the WFEO Engineering Capacity Building committee, and the capacity building committee of FAEO, it is incumbent upon ECSA to ensure that the neighbouring countries within SADC are well capacitated with institutions of international standing, as well as assist in the development of engineering institutions. As a result, ECSA acts as a support where required, through its own experience, to become a conduit for the program coordination which will position the Africa Catalyst project in the direction based on sound foundational information.

### **2.2.1. Accreditation of engineering courses in Mauritius**

The WFEO Capacity Building Committee has developed the Capacity Building Programme for Africa concept and principles, of which this project is aligned to. This were further presentations made at the African Union. The Institution of Engineering Mauritius (IEM) has taken the initiative of setting up institutional capacity and processes in order to accredit universities who offer engineering in Mauritius according to the International Engineering Alliance (IEA) standards, in particular, the Washington Accord. Since ECSA (representing South Africa) remains the only statutory body which is a signatory to the IEA Accords and Agreements, it is has offered its support to countries in the region in this regard. The desktop evaluation of the standard of engineering courses offered at the University of Mauritius was conducted by ECSA in March 2015. The evaluation report was written with certain recommendations that the university were to concentrate on. Following this evaluation, it became obvious that it was vital for

Mauritius to pursue attainment of the international standards in as far as engineering is concerned. The introduction of the Africa Catalyst came at a time when things were already in motion with the challenges, however, of funding. ECSA visited Mauritius under the SAFEO banner in order to play a role of facilitation and to assist wherever possible. Through the grant received from the Royal Academy, ECSA managed to visit the team in Mauritius and to give guidance regarding the formulation of processes, development of documents and establishment of policies. ECSA has thus far managed to invite IEM to participate in one of the regular accreditation visits that took place in South Africa at the University of Pretoria on 27-29 August 2017. Since the team had only been exposed to the theory of the accreditation process, this was an opportunity for them to experience the intricacies involved, the amount of effort required, the time it takes to complete the whole task and the factors to be considered in decision-making. It may take another three (3) to five (5) years before Mauritius is accepted as the signatory to the IEA, therefore this project needs more financial support in order to assist Mauritius on this journey.



After the meeting with CRPE Mauritius

### **2.2.2. Needs and Numbers in Mauritius, Madagascar and Seychelles**

This proposal was developed by the Capacity Building committee to solicit funding at the time of the Africa Catalyst project. The South African Institution of Civil Engineers (SAICE) was awarded a tender whereby the number of engineering practitioners in the SADC region needed to be established. This is in response to the constant call regarding the capacity of the engineering fraternity in the Southern Africa. Therefore the role of WFEO (hosted by ECSA) through SAFEO has been to facilitate the research work and ease of access to those countries where researchers are finding it difficult to

navigate. The countries that required such facilitation were Mauritius, Madagascar and the Seychelles. The meetings in Seychelles were successfully held with the Principal Secretary for the Ministry of Habitat, Infrastructure and Land Transport, the Director General (DG) of the Trade Division and personnel in the Licencing Authority. All these contacts were relayed back to project managers on the ground in Seychelles at the National Institute of Science, Technology and Innovation (NISTI). In general the information specification required for the research is solicited from Universities which offer engineering courses/degrees, voluntary associations, government departments and regulatory bodies. This information would include age, gender, qualification type and engineering discipline. The project was commissioned by SADC and is been facilitated by the Department of Science and Technology in South Africa. It is an on-going study which will be conducted for the next coming 2 years. This means that the facilitation role that ECSA/WFEO is playing would still be of necessity even in the coming 2 years. All the results of the information gathered by the different countries are sent to the research team for consolidation and analysis. The process of data gathering takes times since the institutions have to go back about 10 years into their systems for the information requested. The challenge that was voiced out in Madagascar was the fact that communication is not easy because of the underdeveloped communication infrastructure. For instance, it will be difficult to get information within a particular time due to the fact that the researchers on the ground would have to travel long distances to get information, whereas that information would have been easily accessed via email.



After the meeting with the Dean of Engineering and his staff at the University of Antananarivo

### **2.2.3. Infrastructure Scorecard in Zimbabwe and Malawi**

This study was done by the Southern African Federation of Engineering Organisations (SAFEEO) to create a Mobile APP which is to be used to assess the state of the Infrastructure in two pilot Sub-Saharan African countries (Zimbabwe and Malawi) at present and what must be done to make it world class with particular reference to the role of engineering. The project development objective was to rehabilitate and develop critical infrastructure, improve critical infrastructure in the SADC region and build capacity for planning, construction and sustainable operation, maintenance and management of the infrastructure through empowered professional engineering institutions. The project has the total commitment of the SAFEEO members and their Governments at all levels, political and administrative. The project has been formulated in partnership with other participating donors and in close collaboration with an inter-ministerial Government teams from the Ministries of Science and Technology Development, from the Ministries of Local Government, Public Works and Urban Development, which has usually led this process of Infrastructure development.

### **2.2.4. Training of Professional Mentors through CPD policies in Botswana**

The main objective of this project is to implement the recently approved CPD policy through training of professionals for mentoring, develop systems as well as hold seminars and workshops throughout Botswana. ECSA was instrumental in 2015 with the development of the CPD policy for Botswana Institution of Engineers (BIE). This policy is now being implemented through training of mentors throughout the country in Botswana. Therefore, the facilitation by ECSA was done in the initial stages of the development of the CPD Manuals. Currently, the University of Botswana is ready for its first accreditation visit and will be inviting ECSA for this undertaking.

### **2.3. Participation in the Gender Aviation Summit**

The WFEO Capacity Building committee participated and presented at the UNESCO Gender Aviation Summit in Capetown, South Africa 2018. The event covered the areas of gender equality and the 2030 agenda for sustainable development. The Chairperson of the WFEO Capacity Building committee

presented on barriers and enablers in the education system. The presentation was well received and included a focus on the sustainable development goals, and the mechanisms to transform the Education Landscape through incorporating systematic programmes to include intercultural competence, entrepreneurship, innovation and business development skills amongst others.



WomEng and UNESCO at Global Aviation Summit: Capacity Building Programme addressing School Learners

#### **2.4. WFEO Participation at the SABIYA Africa Tech Camp and What's Next Conference**

This event was addressed by the South African Honourable Minister (Small Business Development) Lindiwe Zulu in the area on Innovation, Incubation, and Business Development. The chair of the WFEO Capacity building committee presented on WFEO, the outcomes of the UNESCO Africa Engineering Week, and the skills required for the knowledge era, with a focus on capacity building to prepare for the technology revolution. The Vice Chairperson of the Capacity Building Committee, Eng. Martin Manuhwa chaired the 4<sup>th</sup> Industrial revolution roundtable discussion. The focus of the event was to build capacity in the areas of Incubation and acceleration which aligns to addressing several of the sustainable development goals. The programme was developed in partnership between by the Southern African Business and Technology Incubation Association and Monash South Africa.



Presentation by the Honourable Minister Lindiwe Zulu

Presentation Roundtable by WFEO, Government and Industry Representatives

## 2.5. The Africa Report and the Infrastructure Report

It was resolved at the UNESCO Engineering Week in Mombasa, Kenya, 2018 that the Africa Engineering report needs development and will be supported by the countries in Africa. The Capacity Building Committee will lead this initiative, and also support the development of the UNESCO Engineering Report.

Mr. Mphikhele Jele has nominated to lead the work on the Infrastructure report by South Africa, and which includes historical work undertaken by the committee as reflected in the report, as well as introduce the integrated approach which is addressed for adoption, and will be presented accordingly. This Africa element of the Infrastructure report will be part of the Africa Engineering Report, and also adopt elements of the previously presented reports and scorecards.

The Infrastructure Project was presented at the WFEO Capacity Building committee in London, with input from, Paul Jowitt, Martin Van Veelen, Mphikhele Jele, and Martin Manuhwa, and it was agreed that the WFEO Capacity Building committee would lead this initiative within the WFEO structures, and that the project should continue. A meeting will be arranged with all parties by the WFEO Capacity Building committee accordingly with parties expected to align and agree on the way forward.

### **3. Future Activities (Operational Plan)**

The committee takes note and appreciates feedback from the assigned evaluator as well as the WFEO review committee, and have also responded to these in this section, and have also provided feedback at the All STCs meeting. The objectives have not changed substantially, and hence are somewhat at a strategic level and an adaption of previous resolutions. The Operational plan for 2019 has been adapted from the Strategic Objectives. The expected measurable actions plans for 2018/2019 are listed as follows under the Strategic Objectives and still stand as plans for 2018/2019:

#### **Be recognized as the respected and reliable source of advice and guidance on engineering capacity building :**

- 1) Development of the Africa Engineering Report
- 2) Development the Infrastructure Report (Integrated) – Mphilkeleli Esau Jele (ECSA) has agreed to lead the initiative, and will present accordingly
- 3) Provide thought leadership at international Events (>3) in Capacity Building
- 4) Provide a centralized repository of engineering capacity building through further development of the compendium into mobile platforms
- 5) Facilitate an integrated approach to Capacity Building in Engineering Education through interaction of World committees and organisations in this space

#### **Be at the forefront of international engineering capacity building efforts**

- 1) Continue to lead and support the UNESCO Africa Engineering week
- 2) Participate in at least two international Capacity Building events
- 3) Set up an effective interactive process to enable formulating one position paper on engineering capacity building issues
- 4) Facilitate the development of capacity building in at least 5 countries
- 5) Support the WFEO Women in Engineering and Young Engineers Future Leaders committees to create capacity development platforms for the promotion of Young Professionals and Women Engineers in Africa

**Improve the visibility/ presence, and stature of WFEO, and attain support of National and International engineering Organizations**

- 1) Ensure sustainability of Projects initiated by UNESCO
- 2) Develop at least one additional International partnership for sponsorship of projects

**Continuously improve the work and quality of the STCs outputs**

- 1) Identify potential future hosts, ensure continuity and handover process for the next committee term – Zimbabwe indicated interest and Eng. Martin Manuhwa has taken the position of Vice Chair of the committee, and has been an active participant, as demonstrated
- 2) Develop new Governance structure
- 3) Increase active participation of members by 20% by 2019 (arrange focussed meetings through technology interactions)
- 4) Market activities more actively on the WFEO website

**4. Sustainable Development Goals**

This STC responds to the Goal 4, (Quality Education) Goal 5 (Gender Equality), Goal 9 (Industry, Innovation, and Infrastructure), Goal 10 (Reduced Inequalities), Goal 11 (Sustainable Cities and Communities), Goal 16 (Peace, Justice, and Strong Institutions), and Goal 17 (Partnerships for the Goals) as primary areas. The Capacity Building committee directly communicates with Policy Makers, the profession, industry and the society, promotes and develops the pipelining skills, and contributes to the infrastructure development.

**5. Budgeting, sources of funds and requests of WFEO allocation**

Thus far the Committee remains able to fund its activities, however given the growth of its activities, it has to continuously seek funding opportunities.