STEM Build Malawi, Mangochi, Malawi (2018 – 2019)

Project Introduction

**STEM Build Malawi** is the creation of project leaders: Katy Toms (WSP), Kelly Jeffery (Jacobs), Gemma Glover (CCS Moments) and Hannah Shenton (NHS) through The Responsible Safari Company (RSC). In July 2018, they assembled a team of 25 women, consisting of twenty-two volunteer engineers from the UK, Asia Pacific and South Africa to finance, design and construct a new Science, Technology, Engineering and Mathematics block consisting of two classrooms at Rainbow Hope Secondary School (RHSS) in Mangochi, Malawi.

Opened in 2017, RHSS is privately registered and operated by a local Malawian NGO, Community Initiative for Self-Reliance (CISER) led by Joseph Makwakwa (Executive Director). It is run under the CISER School Sponsorship Programme through which young people including orphans and vulnerable children are offered scholarly support and vocational training.

Technical Brief

The existing site (Figure 1) consisted of five classrooms across three blocks totalling 368sqm. With 124 students attending, the school became overcrowded, brought on by oversubscription – a ‘good problem’ cause in a community where children were previously discouraged from attending school in favour of pursuing petty trading opportunities. To alleviate the problem, CISER sought financing, design and construction assistance through their local ecotourism partner, RSC.

![Figure 1 Rainbow Hope Secondary School Existing Blocks.](image)

Working virtually and closely with CISER and their appointed local contractor, Beehive Construction, the STEM Build Malawi team developed the plan (Figure 2) for the new building consisting of two classrooms (92sqm each) designated for STEM learning as the students need the skills and knowledge the discipline provides to address challenges within their community. A sustainable design utilising Eco blocks was agreed, and construction works began onsite (Figure 3) ahead of the team’s arrival in Malawi.
Figure 2 STEM Block Floor Plan Approved by the Malawian Local Authority.

Figure 3 Progress updates received from the local project team showing the Eco blocks and construction works undertaken prior to the STEM Build Malawi team departure for Mangochi.

Project Funding

The STEM Build Malawi team ran fundraising campaigns, raising a total of 28,000 GBP and resource sponsorship through their professional networks and personal contacts towards the school build and fit-out costs including locally sourced building materials, furniture, classroom equipment and construction labour. Support was received from various organisations including: Jacobs, WSP, OFR Consultants, South African Airways, Institution of Civil Engineers (ICE), She Wear, Granite Workwear, and Amblers Safety.

IET.tv, one of the world’s largest curators of engineering and technology video resources filmed the expedition to Malawi for a documentary to inspire other engineers to undertake sustainable development projects.
The Expedition

Prior to meeting at the airport, the team had never met in-person. The team met virtually several times from October 2018 until April 2019, developing the building design, reacting to unforeseen events reported by the local team such as the threat to the site from Cyclone Idai aftermath, agreeing actions and scheduling STEM and First Aid workshops aligned with the students’ curriculum and teachers’ training plan.

Figure 4 STEM Build Malawi Team including Malawian RSC Guide, Wellington Chisambo Pictured at Kamuzu International Airport, Lilongwe Malawi on 11th May 2019 following arrival from Australia, South Africa and the UK.

Figure 5 The Team with Rainbow Hope Secondary School Students and Staff on Day 1 on site (13-May-2019).
My participation

Drawing on my previous experience as a building services engineer responsible for designing and supervising the construction of schools within the UK, I contributed to the design development and provided guidance to the local contractor on the positioning and mounting of electrical services.

Ahead of our departure for Malawi, I negotiated waived extra baggage fees for the team flying South African Airways from the UK. This enabled the team transport goodwill donations including PPE, STEM classroom supplies and equipment, laptops, projector, clothing, books etc. at no additional cost.

On site, I built internal walls to support the worktops and sinks in the science classroom which involved brick laying. My other tasks were: priming timber wood frames for the building roof, removing construction debris, cleaning, landscaping, painting walls, chairs and tables and sorting donations (Figure 6 – 8).

I grew up in Sub-Saharan Africa and was motivated by the challenges I experienced in Nigeria to pursue my professional engineering career. The STEM Build Malawi project offered me a unique opportunity to contribute towards influencing and empowering a community within the continent, using the engineering and STEM education skillsets I have acquired during my time in the UK. The expedition afforded me the experience of traditional low-cost construction and an opportunity to learn and share construction best practices. An added attraction was that the project directly addressed a need identified by the locals for the empowerment of members of their own community. This gave me confidence that on the successful project completion and delivery, the building will be utilised as intended because the local community decided and led the process in partnership with the international team.
Personal Funding

I financed my participation in the expedition through personal savings and generous donations from family, friends and colleagues in tandem with funding I received from the IET Travel Award worth £500. 30% of the funding I received from the IET went towards purchasing components for the one-hour STEM workshop I delivered to the Form 3 students at the school.

STEM Engagement Through Workshop

The workshop I delivered with support from team mates, Nalini Murkutla (WSP) and Laura Smith (OFR Consultants) was titled “Harnessing Electricity to Communicate” adapted from Microsoft Education. Splitting students into eight groups of four, I provided them with resources and instructions on how to build a telegraph to understand electrical energy and its role in communications. It felt great being able to engage the students in my chosen engineering discipline and my excitement for this opportunity was met with tremendous enthusiasm from the students and Physics teacher. Through this interactive session, students were able to establish links to topics in their Physics syllabus such as electric current, circuit design, electromagnetism and digital electronics. It was very satisfying to witness the students tackle a new challenge through practical, a first-time experience for them.

Subsequently, all resources used, and spare components were left at the school for use in the new STEM block for other interactive experiments. The lesson plans and additional information on further activities were added to the fifty Keepods donated to the school by the STEM Build Malawi team.
Figure 9 Students working in groups during the STEM Workshop facilitated by Laura, Nalini and I.

Figure 10 The IT classroom was named the “Wellington IT Lab”, a tribute to our amazing Malawian guide, Wellington Chisambo who tragically passed away on our final day on site.
The STEM block was named “The Kamkwamba Building”, after the Malawian innovator, engineer and author William Kamkwamba whose story was adapted in the 2019 Netflix film, “The Boy who Harnessed the Wind”.

![Image](image_url)

**Figure 11** The Kamkwamba Building at Rainbow Hope Secondary School, Mangochi, Malawi completed in May 2019 by STEM Build Malawi Team in collaboration with CISER and RSC.

**Acknowledgement**

I would like to thank the IET Postgraduate and Travel Awards Panel for awarding me with the IET Travel Award and to extend my gratitude to every individual and organisation that supported the STEM Build Malawi Team in achieving our goal. Please note that there are opportunities to sponsor students through scholarship donations at the school. If you are interested, please contact Kate Webb.