

BIOMEDICAL ENGINEERING AID TO DEVELOPING AND RECOVERING COUNTRIES

Over the past 20 years or so Australian biomedical engineers and technicians have been providing technical assistance to developing countries from the Pacific Islands to countries in Asia and the Middle East. Aid projects in Fiji, Papua New Guinea, Timor-Leste, Pacific Island countries, Gaza & the West Bank, Lebanon and Afghanistan have seen literally dozens of engineers and technicians heading off overseas to help restore, repair, maintain, set-up or provide logistics for hospitals in need of help.

It all started way back in the late eighties when a South Australian biomedical engineer called Bob Daly was recruited by the Fijian Ministry of Health and tasked with setting up a biomedical engineering service for the Fiji Islands. Bob was in Fiji from 1989 to 1996 and during his time there set up a functioning BME department. The department serviced the hospitals of Fiji from workshops in Suva and Lautoka and when he left in 1996 he left behind a sustainable BME service.

Fast forward to the late nineties when medical teams visiting Papua New Guinea and several Pacific Islands reported massive amounts of broken medical equipment. There was no-one around to repair the equipment which in many cases was lying outside exposed to the elements or rotting on hospital verandas. As a result of these reports AusAID, the Australian Government aid agency, commissioned scoping studies to see what could be done. The studies recommended two five year aid projects – one in Papua New Guinea and another covering seven Pacific Island countries. The Pacific countries chosen were the Solomon Islands, Vanuatu, Tuvalu, Kiribati, Samoa, Tonga and the Cook Islands. The PNG Medical Equipment Management Project (MEMP) commenced in 1999 and the Medical Equipment Maintenance Project for the Pacific (MEMPP), a year later in 2000.

From 1999 to 2007, over 20 engineers and technicians spent periods from one week to three years in one of all of the Pacific islands. Familiar names in the BME community gave their time to repair equipment, set up policies and procedures, and train and mentor technicians. In PNG, the team, headed up by Bob Daly and Richard Troughear, featured such names as David Smith, Clifford Stephenson, Alex Watson, Bruce Morrison, Steve Threlfo and many others who were there on short term teaching or repairing assignments. The Pacific project was headed by Bruce Morrison with long term advisors Stan Scahill and Ian Davies and a legendry Kiwi technician named Laurie Dyball. Many of the guys from the PNG project like Bob Daly, Steve Threlfo and David Smith also doubled up for the Pacific adventure.



Samoa BMETs repairing a patient monitor

Over seven years, the PNG MEMP trained 33 BMETs and the Pacific MEMPP trained 21 BMETs over seven countries. As well as training technicians, the two projects were committed to training clinical staff in the use and care of medical equipment and providing them with simple ways to check and repair their equipment with tools and materials at hand. In PNG, 157 clinical staff were trained. They were mostly nurses but the total also included anaesthetic technicians, radiographers and lab technicians. In the Pacific 232 nurses received equipment care and operation training.



PNG Nurses learning how to change the oil in a suction pump

In PNG, the MEMP project built or renovated 22 BME workshops in the provincial and some church-run hospitals at a cost of around \$500,000. Another \$500,000 provided tools, test equipment, service aids, components, office furniture and fittings for the workshops. While in the Pacific MEMPP project, tools, test equipment & components amounted to \$137,000. Another \$40,000 provided spare parts and consumables for the hospitals of the Pacific islands.



*Workshop at ANGAU Hospital,
Lae, Papua New Guinea*



*Workbenches in BME Workshop
at ANGAU Hospital,*

Assistance to PNG was discontinued after 2006 but a new project, following on from the Pacific MEMPP, commenced in the Pacific in 2009.

This project managed by Australian Volunteers International (AVI) and funded by AusAID covers the same countries as MEMPP but also includes Nauru. Three senior technicians have been

employed for a period of eighteen months to repair and train the technicians and clinical staff in much the same way as the MEMPP project but with a difference. Rather than a visiting roster, the technicians live in a home country and travel regularly to their other designated countries. Trevor Hezakie from PNG via Griffith in NSW covers the Solomon Islands and Vanuatu, Sens Matai also from PNG covers Nauru, Tuvalu and Kiribati and Andy Lyons from Brisbane looks after Tonga, Samoa and the Cook Islands. An interesting feature of this project is that both Trevor and Sens were among the technicians trained by the PNG MEMPP project. The threesome are making good progress in their tasks and it is hoped that AusAID will extend their contracts beyond early 2011.



Making a difference in Vanuatu – from disorganised to organised...

In the South-East Asian region, engineers and technicians from Flinders Medical Centre's Biomedical Engineering department have been working with ECRI Institute in providing assistance to an equipment servicing company in Malaysia called Radicare. This company provides biomedical engineering services for around one third of Malaysia and asked for assistance back in 2003 to train its technicians in both clinical and laboratory equipment. In the early days technicians came from Malaysia to Adelaide for training, but in recent years John Robson and his team have provided staff to live in Malaysia and coach and mentor Radicare's technical staff on a full-time basis.



New Workshop facilities in Kuala Lumpur

Meanwhile on the other side of the world, two reports by the International Committee of the Red Cross (ICRC) into Healthcare Services for Palestinian Refugees in Lebanon found significant problems with the provision and maintenance of medical equipment in the five Palestinian Red

Crescent Society hospitals. From late 2009 to early 2010, a mission to develop proposals to improve the effectiveness of medical equipment in the hospitals and assess the equipment status, was organised by the ICRC and delivered by David Smith (ex PNG and the Pacific) acting as an Australian Red Cross delegate. David's report led to him conducting a second mission in April 2010 to review the progress of the proposals and to revisit the strategies developed in consultation with the hospitals. This six week mission also reviewed the effectiveness of employing a local qualified biomedical engineer to support the Department of Medical Equipment and Pharmacy in the management of medical equipment.



Training session on Marquette monitor in the Bekaa Valley

David says, “the basic application of sound biomedical engineering practice, particularly by the locally qualified biomedical engineer, resulted in significant improvements in the effectiveness and availability of front line medical equipment in the hospitals.” A third mission is being considered for 2011.



David and counterparts in Beirut

In 2006, Mike Denison, a biomedical engineer from Melbourne completed a basic training course with the Australian Red Cross (ARC) in order to register on the ARC emergency aid worker program. It was not long before he was deployed to Honiara, capital of the Solomon Islands, after the earthquake in 2007. His role there was as a logistician responsible for ensuring the international aid delivered to the Red Cross in Honiara was on-shipped to Gizo (the epicentre), either by boat or plane. This crash course in disaster response led to an understanding of the

plethora of agencies and officials directing the traffic in a disaster situation which has provided a basis for subsequent missions with Red Cross as a biomedical engineer.



Unloading supplies in Honiara, Solomon Islands

From April 2008 to March 2009, Mike worked in the West Bank and Gaza Strip with the International Committee of the Red Cross (ICRC). His role there was to assess 18 Ministry of Health hospitals, make recommendations for purchasing medical equipment and spare parts, and to propose any required infrastructure projects which would support the medical equipment (power, water, steam, drainage etc). During his mission around \$1million of medical equipment and spare parts were purchased and installed, and over 30 infrastructure projects were completed. Mike has returned to Gaza 3 times since that time either assessing previous work or planning for visits in 2011.



New steriliser for Gaza

In 2009 Mike completed a four week mission to Kandahar, Afghanistan for the ICRC which provides assistance to the 400 bed Mirwais Hospital. During the mission, he completed an assessment of the medical equipment and infrastructure, and compiled an inventory and a list of essential spare parts to be purchased.

Back closer to Australia, Bruce Morrison, a biomedical engineer from Newcastle (ex PNG and the Pacific islands) is working on an AusAID & World Bank funded project, developing biomedical engineering services in the world's newest nation, Timor-Leste. Bruce is working under the Ministry of Health with a team of Timorese biomedical engineering technicians and a senior technician recruited from Indonesia. Their aim is to produce a sustainable service based at the

National BME Workshop at the National Hospital in Dili with satellite workshops in each of the five referral hospitals around the country. The six Timorese technicians have been trained to diploma level in Indonesia and have recently completed three month training workshop in Dili. The workshop, which included visits to the referral hospitals for practical experience, has honed their skills such that they are now having good results in diagnosing faults and fixing them when spare parts can be purchased. This project runs until July 2011 with a possible one year extension.



Cesar Augusto rebuilds a suction pump in Timor-Leste

Activities such as these and the enthusiasm shown by attendees at sessions on aid to developing countries at the ABEC and SMBE conferences has led the Biomedical College Board to form a National Panel to advocate for, and assist in the provision of biomedical engineering expertise in developing and recovering countries. The College Board has endorsed the terms of reference and invited Bruce Morrison to become the inaugural Chairman of the National Panel on Biomedical Technical Aid. The Panel will be up and running during the fourth quarter of 2010.