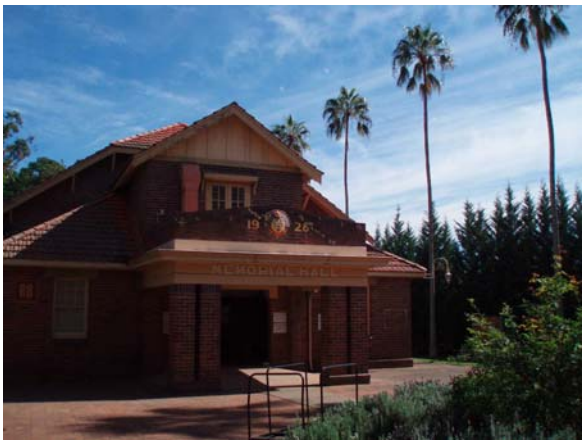
2006 Country Biomedical Engineering Conference Report

The SMBE NSW Country Biomedical Engineering Technicians Conference of 2006 was located in the town of Richmond, NSW. Richmond is a small town situated 63km North West of Sydney, about an hours drive away. The conference was held at the University of Western Sydney, Hawkesbury Campus (shown below). The program was quite diverse including how the NSW country biomedical departments operate, to research projects, updates to Australian Standards and the new resuscitation guidelines. The conference was well attended, although the bulk of the attendees were from NSW, technicians and engineers from around Australia and a couple from New Zealand made the trip. The following report will highlight the topics that I found the most interesting and learned the most from.



The first session of the Conference had Technicians from Western Australia sharing with us how they perform their day to day job. The main problem that these technicians face is the large area that they service. Western Australia is approximately 2.5 million square kilometres and in this area they have 101 different sites to service which include some Islands. The session concluded with the fire alarm sounding and everyone being evacuated from the building with the local fire truck appearing outside.

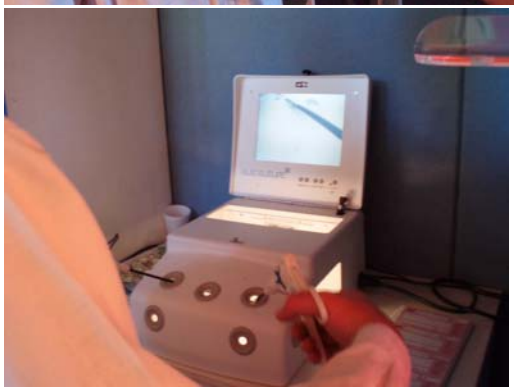
Dr Martin Weltman from Nepean Hospital in Sydney is continuing to perform research into detecting abnormalities of the stomach and duodenum using the MEDEXTEST device. This device uses the principle of Bioimpedance Analysis (BIA) to analyse cellular tissue. This research uses the fact that any tissue abnormalities will results in changing the impedance of the tissue in the area of the abnormality. The MEDEXTEST uses a pen like device which contains an active and a passive sensor. Six Bioimpedance readings are taken from various zones on each limb, hence 24 readings in total. The process takes approximately 20 minutes and consists of taking the readings, then using Transcutaneous Electrical Nerve Stimulation (TENS) to stimulate the area under investigation and then repeat the tests. The results are then analysed and interpreted to observe if there are any abnormalities. At present, this research is used to verify the traditional methods of detection. The benefits of the system are that it is non-invasive, relatively quick and easy.

The new resuscitation guidelines have been a talking point in the medical industry for a while now. Emma Pitt from Welch Allyn presented a history of resuscitation and plans for the future. The history of resuscitation was very interesting and made me thankful that I was not alive in these past periods. The methods used in early times included throwing hot coal and ashes or whipping of the patient. This method only worked if the patient was asleep and not in cardiac arrest. Other methods included rolling the patient over a barrel or laying the patient over a trotting horse. In the 1950s mouth to mouth resuscitation was invented, followed by cardiac massage in the 1960s and in 1973 CPR. The main changes to the current resuscitation guidelines are the ratio of compressions to breaths, from 15:2 to 30:2 at a rate of 100 compressions/second. The theory behind this is to minimise the interruption to the CPR process. The shock protocol has also been modified to the single shock method. The process will be 2 minutes of CPR then a defibrillation, 2 minutes of CPR then a defibrillation and repeated. With a monophasic defibrillator an energy level of 360J, 360J, 360J and for biphasic waveform an energy level of 200J, 200J, 200J is recommended. These guidelines will be due for updates in 2010.

Testing of medical equipment is an important part of medical equipment management. Jerry Zion is a Product Manager of Fluke Biomedical from the United States. The presentation that Jerry gave was explaining the current technology in automation of the testing procedures of equipment. Fluke Biomedical have a range of testing devices and a range of compatible

software including databases for equipment management. Jerry gave us a demonstration of how their products are designed for ease of use, optimal data analysis and transfer from a piece of medical equipment to the test equipment database. Problems that occur in the United States are mainly from human error. For example, when measuring protective earth resistance on a medical device, the value of the resistance may be close to the acceptable range so the technical will alter the result so that it passes, when in fact it doesn't. The fluke range of products tries to reduce the chance of incorrect results being entered by the use of an automated testing system.

Glenn Gibbs is part of the Inhalation Therapy Team from North Coast Biomedical. His presentation was about equipping a rescue helicopter with a medical gas system. This is obviously a challenging project and some of the problems encountered included: not being able to weld in the Helicopter. This is because of the proximity of the gas tubing to the chassis of the helicopter. Other requirements were to refill the gas cylinders without removing them from the helicopter and to be able to turn on and off the gas from the cockpit.



There were a number of trade displays set up in the adjacent rooms at the conference centre. It was good to see that the Service Engineers from each company were present in the booths which enabled us to ask more technical questions. Tyco Healthcare had an interactive booth setup where they had a competition running. The competition was to take the wrapper off a mintie using two laparoscopic clamps. The mintie was viewed on a LCD, as shown to the right. Daniel Fletcher, SMBE-SA treasurer is shown in the photos. He is proof that it is not as easy as it looks. Most participants became very frustrated and some built up a sweat as the stopwatch kept increasing. Daniel completed the task in just under 10 minutes, the winning time was approximately 5 minutes.

As I am a young engineer from a private company, I gained a large amount from this conference. The information presented was largely from the public sector which I am not exposed to. Therefore, the conference gave me the knowledge of the operations of public biomedical engineering departments and the different processes that are performed within these departments. I would like to thank SMBE and Dräger for the opportunity to attend the conference and expand my knowledge of the Biomedical Engineering field.

Tom Allen, SMBE/Dräger Encouragement Award 2005