

## PACIFIC GAME INSTALLATION EXPERIENCES

Solomon Islands is hosting the 2023 Pacific Games (PG) from 19 November to 2 December. As the government and the people prepare to host the 2023 PG, the Ministry of Health (MOH) are also preparing to host athletes and visitors from 14 countries who participated in the 2023 PG. The MOH assigned the Poly Clinic (PC), a new health facility for the treatment of athletes who require medical treatment during the PG. Athletes with serious medical treatment can be referred to the National Referral Hospital for further evaluation and assessment.

For the clinic to meet its purpose and objectives, the MOH requested assistance from the Pacific Community (SPC) Public Health Division to assist in the training of staff and setting up medical equipment of this new facility. SPC reached out to Department of Foreign Affairs and Trade (DFAT) seeking assistance on the biomedical engineering support. DFAT deployed two biomedical engineering consultants to assist the local team in the Solomon in setting-up the equipment for the PC.

The purpose of this report is to highlight some of the findings, achievements and challenges during the biomedical engineer deployment to the Solomon Islands

### 1. BACKGROUND

The original request from the Government of Solomon Islands was for a biomedical engineer for six weeks, but instead, DFAT was able to make two consultants available for a shorter period of time (two weeks), enabling them to work as a team. These biomedical engineer were deployed from Tonga & Tuvalu. Overall, the deployment was very successful and mission accomplished.

### 2. PROGRESS AND ACHIEVEMENTS

**Here are some of the highlights to demonstrate the progress and achievement of this trip.**

#### 2.1 Electrical Fault

As we began the installation, the electrical safety analyzer, Fluke ESA 612 detected a fault on the electrical wiring of the building (figure 3). The fault message indicated there is no grounding or isolated mains detected on the power outlet. We further confirmed this fault with a digital multi-meter and found a 116 V on the Neutral (N)-Earth (E) points, which is supposed to be 0 V or close to 0. This 116 V is

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very dangerous for the safety of the athletes, staff and medical equipment. If the medical equipment safety mechanism fails, this voltage can be fatal and can cause very serious injuries even death.

To identify the cause of this fault, we come up with the following assumptions:

1. The earth terminal is corroded.
2. There is a loose earth connection.
3. The earth line is missing.
4. There is a loose neutral connection.
5. The neutral line is missing.

We knew that number 1 is the least causes of the fault as the building is new. The team moved on to check all switch boards for loose connections (2 and 4) to ensure they well secured and still the fault is still present.

This left us with number 3 and 5 to check for missing earth and neutral connections. The team traced the earth and neutral line and discovered that Earth line is not connected at the ceiling. We immediately connected a new line for Earth from the main switch board to the power outlets and the problem resolve immediately.

## **2.2 Teamwork**

Throughout the duration of the trip, the team attached with the visiting biomedical consultants. The team supervisor assigned one or two engineers to assist as required. These young engineers are so bright and always eager to learn. Their commitment and perseverance contributed so much to the success of this trip. They even stay late at night waiting for the local electrical company as they come to assist to find the fault in electrical wiring of the building. We resolved the electrical faults at the Poly Clinic is due to their dedications and commitments. This has been the most critical part of this project as we were able to work as a team to find and fix the fault in the electrical wiring of the building. This achievement is worthwhile to be recognized

## **2.3 Training**

The trip was a great teaching opportunity and share some of our experiences with the local team. We were able to assist in repairing and carried out preventative maintenance to some medical equipment. One of the first job given is to repair a water pump that feed the biochemistry analyser in the laboratory. The starting capacitor was found to be faulty and was able to replace immediately. Other training involved the followings:

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1. Preventative Maintenance and care for the dental air compressors.
2. Preventative Maintenance and repair of Hamilton T1 ventilators.
3. Introduced the Acceptance testing procedures and reporting.

## 2.4 Sharing Experiences

This trip was a good opportunity to share some of our experiences with the Solomon team. The challenges faced is very common in the Pacific region. We identified few key areas of priorities that needs improvement:

1. **Leadership and Vision:** The department need someone to lead and can create room for improvement in leadership and enhance the quality of biomedical services in the country.
2. **Enforcement of Donation Policy:** This policy need to be re-enforce as it seems there is no regulation to control and monitor the donation of unnecessary equipment into the country.
3. **Testing Procedures and Documentations:** It was noted there is lacking of proper testing equipment at the biomedical engineering department. This may have been contributed to the poor record keeping and documentations. This area need time for staff education and implementation.

## 2.5 Completion of Installation

The installation went well and completed in time before the PG began. The staff at the Poly Clinic were pleased with the outcomes of the installation. User training was also conducted by the visiting engineering team.

## 3. CHALLENGES

### 3.1 Mentoring and Direction

The team of engineers are very young, bright and talented but need proper mentoring and direction. Some of the returning graduates will be the solution in developing and improving the quality of biomedical engineering services in the Solomon but they need a mentor to provide directions.

## 3.2 Proper Working Space

The biomedical team really need a proper workshop and working area for their daily activities. The current workshop is spacious but requires an extreme makeover with proper planning and restructure to transform the area into a professional working space. The recommendation is to introduce the **5S Kaizen Principles** (a system for organizing workflow), which can help reduce waste, improve quality and increase efficiency by organizing the workplace in a visual and standardized way. Some of the technicians may have known about 5S Kaizen Principles but may be need some directions to implement.

## 3.3 Proper Testing Equipment

Biomedical testing equipment available to the local team is out of date and needs upgrade. For better quality testing and services require reliable and right type of testing equipment. Some of the quality testing assurance is not being carried due to lack of testing tools to perform such tests. SPC is currently supplying some new testing equipment for Solomon which is a great investment. Once receive, a proper training on how to use these tools can be arranging. These testing equipment should assist in the preventative maintenance and performance verification of the medical equipment.

## 3.4 Human Resources

There are six biomedical personnel current serve approximately 374 health facilities (aid posts, clinics, community health centres, hospitals) in 9 different provinces in the Solomon. The challenges are that the biomedical engineer/technicians main post is to serve the National Referral Hospital at Honiara (capital of Solomon). The rest of the 8 provinces have with no permanent engineer to look after the service and maintenance of the medical equipment in the hospital. There are few scholars that are currently study overseas, their return will be a boost to the biomedical engineer section.

## 4. FUTURE DIRECTIONS

### 4.1 Ongoing Mentoring and Training

Here are some areas that need future directions and recommendations:

1. Training in proper use of electrical safety testing and reporting.
2. Training on documentation and reporting.
3. Ensure all testing procedures and protocols are carried out such as acceptance and performance verification testing.
4. Training on proper procurement and ordering of equipment and spare parts.

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5. Refresher training for the end users and daily maintenance of equipment.
6. Require assistance in developing and implementing of medical equipment policies.
7. Guidance in the use of medical equipment standards and regulation
8. Recommendation for improvement of Biomedical structure and establishment to accommodate new graduates and technicians.

## **4.2 Asset Registry and Documentation**

## **4.3. Cross Training and attachment**