ENGINEERS IN THE MILITARY

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ABSTRACT

This article attempts to project the needs, roles and tasks of engineers in the military services. Following the modernisation process of the Armed Forces, the need for more technically proficient professionals in the services is on the rise. Sophisticated new military weapons and equipment requires maintenance work to be done by specially trained engineers, thus, the roles of engineers in the military are undeniably becoming very important and need attention and planning.

Military Academy Malaysia complex at Sungai Besi Camp, Kuala Lumpur.
The Military Academy is now the main source of engineers for the Malaysian Armed Forces.

INTRODUCTION

The evolution of the Malaysian Armed Forces, since the early days, have created a greater demand for technically competent personnel. This is due to the introduction of more modern and sophisticated weapons and equipment in the services. In principle, the primary role of engineers in military services is to help the armed forces to fight, move and live. This role ensures that the armed forces can maintain their effectiveness in terms of firepower, mobility and survivability. This article will project the importance of engineers in the military and show why they are needed in the service.

FIRE POWER

When we talk about Fire Power, we are focusing on the weapon system, which includes the weapon and its firing system. Most modern weapon systems will combine both mechanical and electronic components to ensure effectiveness of such weapons to engage its target. Guided missiles and rocket launchers are part of the arsenal in service that need great care by professionals. Mechanical and electrical or electronic engineers work hand in hand in all three arms of services, namely the Army, Navy and the Air Force, to ensure all weapons' readiness is maintained and are ready to be utilised.

Engineers also need to perform modification or customisation to existing weapon systems to enhance its effectiveness or to overcome certain weaknesses identified by the user. In Malaysia, we produce only small arms weapons with imported technology. Thus, engineers still have a lot of space and opportunities to develop various in-house weapon technologies. Therefore, research and development activities will be the focus for the present and next generation of engineers in the military.

MOBILITY

In military operations we need to move swiftly and continuously in order to pursue the enemy and also to avoid being detected by the enemy. Mobility is needed right from the Forward Edge Battle Area (FEBA) all the way to the rear, i.e. for the logistics and administrative elements. Weapon systems need platforms to move on and the logisticians need vehicles to supply the troops. Thus we need mechanical or automotive engineers supported by electrical engineers to ensure that all military vehicles such as the Main Battle Tanks, the Infantry Fighting Vehicles, the trucks and the gun towers are in a serviceable state. The mechanical and electrical engineers must always

be on their toes in situations where there is an urgent need for repair, recovery and redeployment of weapon systems and platforms.

Malaysia's territorial waters, which includes a 160,000 sq. nautical mile Exclusive Economic Zone and 9,000 nautical miles of coastline need to be safeguarded. The Royal Malaysian Navy (RMN) undertakes this responsibility and maintains an open sea line of communications with East Malaysia, which is separated from Peninsular Malaysia by 500 nautical miles of sea. Operating various types of naval ships, the Navy needs engineers to maintain the readiness of their ships so that the ships will be constantly in their operational state and the Navy will be able to perform its task effectively.

In the Air Force we need engineers to maintain aircrafts so that they are ready to be deployed when required. The diverse origin of our military aircraft, i.e. Russian MiGs, British Hawks and US Hornets, presents a challenge to our engineers but that make our engineers superbly knowledgeable in multiple technologies.

Mobility also covers the need for routes, bridges, airports and ports. Thus, closely supporting the mobility of our forces are the civil engineers who are needed to provide and maintain needed infrastructures. For air-land operations, civil engineers must open routes for ground movement, which includes the need to bridge obstacles, natural or artificial. They are also needed to construct or repair ports, airports, landing strips or landing zones, for ships to berth or aircraft to land where needed.

SURVIVABILITY

Besides the need for Fire Power and Mobility, our defence troops also need basic requirements such as food, water and other supplies and support. The civil engineers need to supply the troops, wherever they are, with clean water. Therefore, engineers in the military need to have the skill for providing in-situ water treatment for troops in the field. Military engineers must also be conversant in designing hardened structures. Military structures are exposed to blast and ballistics, and vital military structures need special design considerations.

Military engineers also have a duty to be destructive. They have to deny the enemy, thus they need to perform route denial operation by blowing up bridges, ports, vital buildings and by conducting road cratering. Demolition needs to be designed to ensure minimum use of effort and resources. Military engineers also learn the art of 'magic' because part of their duty is to perform deception and camouflage. With today's electronic eyes, it becomes more challenging to camouflage assets from the enemy's detection. It is also a challenge to the engineers to make the enemy believe that something is there whilst it is not or vice versa.

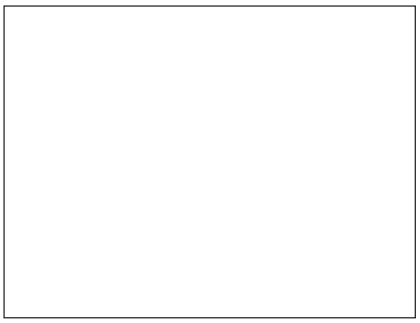
COMMUNICATION

The whole military structure must be mutually supportive to be effective, thus the need for resourceful communication is essential. Communication, electronic and computer engineers work hand in hand to ensure that communication equipment in the military is efficiently managed. The capability must include electronic warfare and information warfare capabilities, which are vital to the services.

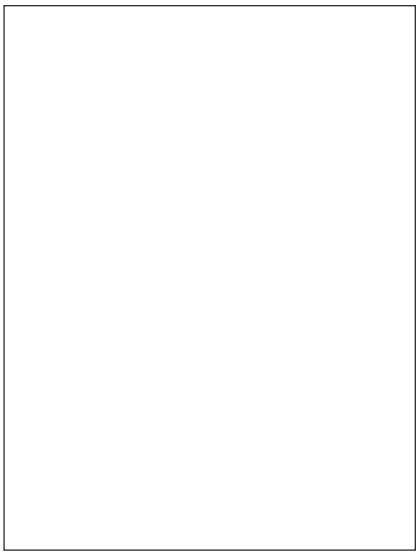
THE SOURCE OF ENGINEERS IN THE MILITARY

Engineers in the Armed Services come from three main sources:

- Existing officers and soldiers sent to higher education institutions to pursue their tertiary education.
- Local engineering graduates hired and commissioned in the services.



Malaysian armoured vehicle being deployed in the 'battlefield' for greater mobility and protection.



JERNAS air defence system. JERNAS is based on the Rapier MK2 missile and launcher, the Blindfire tracking radar and the Dagger surveillance radar

- Cadet Officers from the Military Academy who graduate with engineering degrees.

The Military Academy Malaysia (MAM) was established in 1995. Its establishment caters for the need for more academically qualified officers in the service. Engineering programs, namely Civil, Mechanical and Electrical, are the main programs in MAM beside Management, Nautical Science and Computer Science. In 1999, the first batch of graduates marched out of MAM into military services. The supply continues every year and keeps increasing. Even with MAM, the services still need more engineers and continues to hire local graduates to supplement their needs. Thus the need for qualified engineers in the military is on the rise. To date, MAM has supplied nearly 300 engineers to the services and the number will increase significantly in the years to come.

CONCLUSION

While the military has its role to safeguard the country, engineers in military service are entrusted the role to safeguard Military Readiness in terms of ensuring that all their weapons and equipment are at a high level of readiness. Obviously, this short paper will not be able to cover all the roles and tasks of engineers and the challenges faced by them in the military, but hopefully it will be sufficient as preliminary information to show the importance of engineers in the military. Engineers in the military ensures that our troops can fight, move and live effectively and efficiently. Consequently, military engineers in the Armed Forces help to ensure that their counterparts in civil sectors can continue to work and prosper in a peaceful environment, and the general population of our country can continue to enjoy peace, security and harmony. ■

Undergraduate Cadet Officers of Military Academy Malaysia performing experiments in a Civil Engineering Laboratory.

The F/A-18 Hornet, an all-weather aircraft, is used as an attack aircraft as well as a fighter. In its fighter mode, the aircraft is used primarily as a fighter escort and for fleet air defense; in its attack mode, it is used for force projection and interdiction.

Laksamana class corvettes of the Malaysian Navy in action.