

TRAINING

The current mission to Liberia was preceded by a small deployment of engineer personnel who were required to establish a base in advance of the arrival of the main body of Irish peacekeepers. Without the engineers' work, there would be no camp for the troops, no water and no wastewater services. More importantly there would be no landmine and unexploded ordnance detection and clearance capability. Andy Dennehy reports on the School of Military Engineering.

The School of Military Engineering, in the Defence Forces Training Centre, is charged with conducting all military engineering education required for the support of the Defence Forces, both at home and abroad. Military engineering is divided into two basic areas: infrastructural engineering and battlefield or combat engineering.

Infrastructural engineering is essentially the maintenance and development of the Defence Forces' infrastructure, such as buildings, lands, firing ranges and training facilities, and related activities such as energy management etc. Infrastructural engineers would be typically involved in maintaining existing buildings, designing new buildings and contract or project management.

Battlefield/combat engineering entails the provision of combat engineer support to the Defence Forces in a

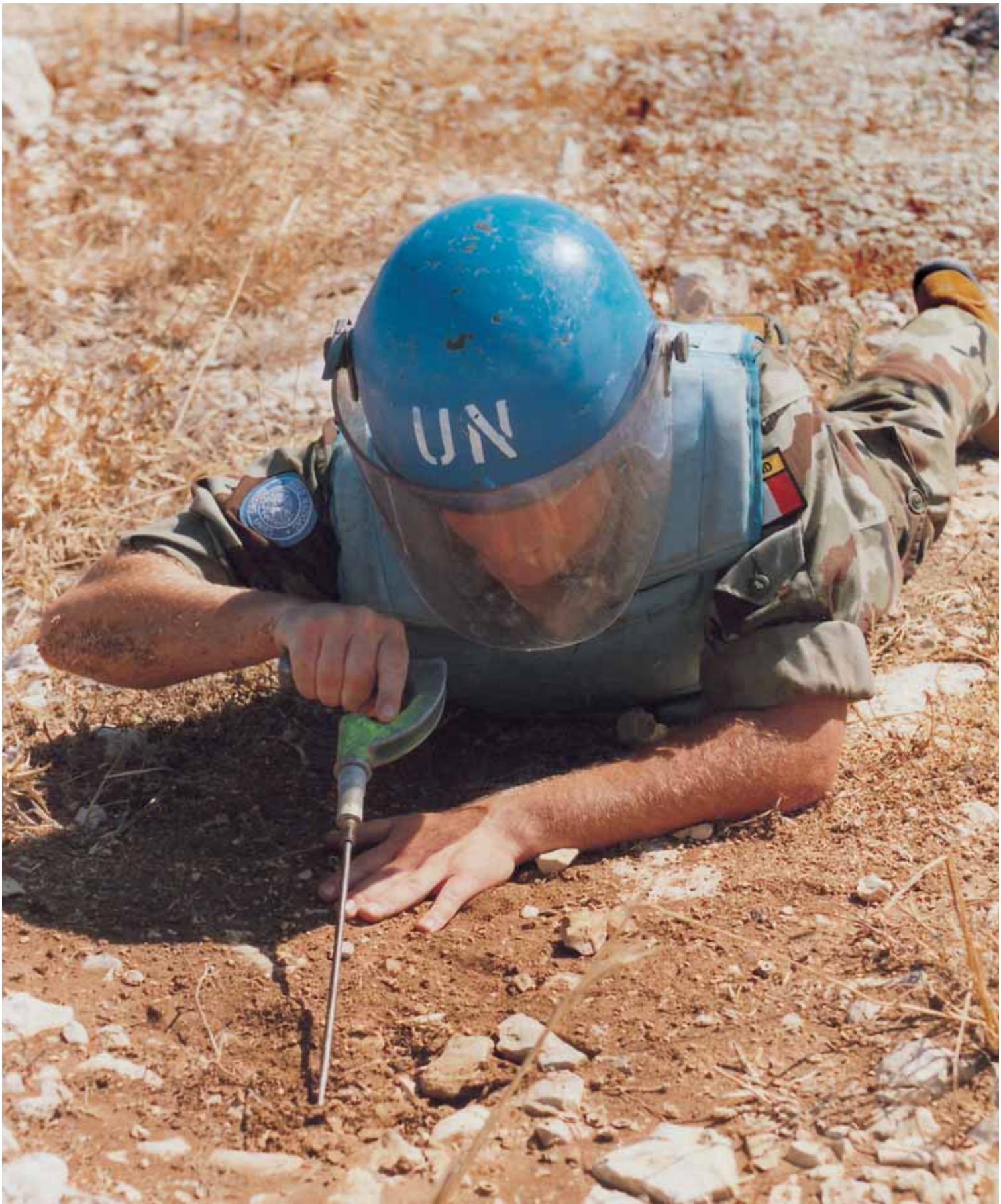
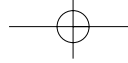
combat or overseas scenario, for instance on peace support operations. This consists of a number of different areas, such as the use of explosive demolitions, explosive ordnance disposal, landmine warfare, military bridging, building or temporary camp construction, the provision of engineering services such as the provision of drinking water, electricity, wastewater services, to list a few.

The School

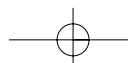
The School of Military Engineering, part of the Combat Support College, is divided into three wings – the combat engineering wing, the infrastructural engineering wing and the technician training wing. The latter is responsible for training all Corps technicians, such as carpenters, electricians, heavy plant-fitters, etc, in conjunction with FAS. The school has a small staff of five officer instructors and 6 NCO instructors, and is commanded by a Lieutenant Colonel.

“We provide training in-house, but we also use external consultants as appropriate. This is not necessarily because we don't have the expertise ourselves, but we use it as a means of keeping abreast of best practice in the industry. Over the last year we have used consultants from Ireland, the Netherlands, Germany and the UK and we have conducted external training in places like Croatia and Germany.”

“Apart from the courses that we run, we also support all other colleges and schools here within the Defence Forces training centre - almost every career course will contain an engineering module. We are also tasked with running the Defence Forces' entire landmine and unexploded ordnance (UXO) awareness/risk education courses for every member of the Defence Forces. And we conduct training on a regular basis for members of An Garda Síochána, the media and some NGOs.”



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"Many engineer officers have at least one post-graduate qualifications. Most are now qualified to Masters level in some specialist area, such as structural or fire engineering, environmental engineering, construction safety or a specific military skill like firing range construction or ballistic safety. All our engineers are expected to achieve Chartered Engineer status very quickly, and they never have a problem doing that," he says.

20 Years of Service

Comdt Duffy joined the army in 1983 as a cadet. He was commissioned as an infantry officer in 1985 and served in an infantry unit for approximately six years. During that time he spent the majority of four years in UCG studying civil engineering. On graduation in 1990 he joined the Corps of Engineers as an Engineer Technical Officer.

"Between 1990 and 2003, I've held numerous appointments within the Corps of Engineers, either in construction project management (maintenance and development of the Defence Force's infrastructure) or in military and combat engineering," he says. "I have completed three tours overseas, twice to the Lebanon as Battalion Engineer Officer and finally two years in the Middle East as an observer. I've been Chief Instructor here in the Engineer School for the last 18 months."

Like most Engineer Officers he has gained additional post-graduate qualifications since joining the Corps, and is a member of two professional bodies – the Institution of Engineers and the Institution of Fire Engineers.

What makes a good military engineer?

Thanks to advances in funding and in technology, the engineer is not called upon to improvise as much as in the past. However, it is still a necessary capability, says Comdt Duffy. "Traditionally a characteristic of any military engineer is resourcefulness and the ability to improvise, but now arising from a decision by the General Staff, a substantial amount of funding has been made available to the military engineering side. So for example in the Liberia situation, we're talking about deploying remote controlled mechanical mine clearance equipment, trailer-mounted water-purification equipment, mobile generators, electrical distribution equipment, mobile heating, ventilation and wastewater treatment equipment and prefabricated buildings and tentage.



The Corps of Engineers at the Defence Forces display in the Curragh.

Command and Conquer

The command mindset required for an engineer officer is above and beyond that of a civilian engineer, explains Comdt Duffy. "Apart from good civilian engineering abilities, you need the highest levels of command, control and leadership. You need

Engineers, explains Comdt Duffy. "We will train privates, who will come here and do a basic combat engineer course. In the past, most of the trainees would be qualified technicians – carpenters, plumbers, welders, fitters, electricians, but now, due to a reduction in the Corps' strength, we're

A 130-strong force had been deployed to Liberia, the majority of which were engineer specialists.

to command your own troops within a given conflict situation, which may be highly dangerous. You need to be able to integrate an engineer element, irrespective of its size, into the main body of troops."

"Running parallel to that you have to have good project management skills. As an engineer officer, you are leading your personnel, you are supporting an infantry battalion or brigade – but you are also managing all of the tasks and the resources that you have."

The Training

The School of Military Engineering provides training for all ranks within the Corps of

taking more non-technical personnel, so our training for them has to be more detailed because they will be expected to carry out certain technical functions abroad under the supervision of a qualified technician. In addition to that, we train NCOs in the same areas but to a higher technical and command and control capability."

"Finally we have our officers, who we train to a level that they can run large projects or be deployed overseas and command medium-sized engineering deployments, such as the Liberian deployment, to execute any one of a variety of different tasks. All of the officers that join the Corps of Engineers already have a relevant third level technical

qualification, as graduate civil, mechanical, electrical engineers, architects or quantity surveyors.

“Upon entry to the Corps, the officers come to the School of Engineering and do a nine-month course, which essentially qualifies them in combat engineering skills because they won’t have experienced this at any third level institution. We also train them in infrastructural engineering, primarily project and energy management so they are able to run large-scale Defence Forces’ building contracts or they can run large-scale construction works abroad in military operations. Because we take in different types of engineer officers, we will do a certain amount of crossover training. In other words, civil engineers, for example, will cover certain aspects of mechanical and electrical engineering, all geared towards the construction of temporary bases abroad. Nowadays we also provide training in general and construction safety to ensure that we are operating to the highest levels of safety,” he says.

Liberia Beckons

At the time of this interview, in mid-November 2003, a 130-strong advance party had been deployed to Liberia, the

majority of which were engineer specialists. Here is a prime example of the versatile and highly important role of the engineer.

“They had already carried out a reconnaissance to find a suitable safe area in which our troops could be based. They will then construct whatever temporary buildings are necessary to house our troops. Engineer personnel will provide all of the engineering related services that we take for granted in Ireland – drinking water, wastewater services, producing electricity... just making sure that the troops have a proper base from which to operate, and where they are safe, secure and healthy.

Engineer Platoon Commander Captain Fran O’Grady was preparing to travel to Liberia at the time of writing. He explains the rigorous training regime that his platoon had to undergo at the School of Military Engineering prior to leaving: “We’ve spent the last couple of months training our personnel by way of lectures, practical exercises, simulations and specialist equipment refresher training. The initial engineer element consists of an initial work party who will remain for about four to five weeks and an engineer platoon who will stay for the full sub-unit deployment. The

platoon consists of a maintenance element who are bringing everything with them, earthmoving plant, generators and distribution equipment, water purification equipment, wastewater treatment equipment, heating and air conditioning equipment, accommodation and a field hospital. The remainder of the platoon are involved in landmine and unexploded ordnance detection and clearance.”

“When we get to Liberia the priority will be establishing the camp and making sure that it’s safe. Then a lot of continuation training will have to be carried out where we will focus on getting our infantry skills honed, getting the engineer skills honed and getting the engineer corps personnel that are going out there to work cohesively as a group. We will prepare to deploy our explosive ordnance detection and disposal capability in support of our own personnel or for humanitarian purposes if necessary.”

Showing Their Worth

Capt. O’Grady says that his platoon is excited at the prospect of being able to show their worth in Liberia. “As military engineers, we’re training for all possible eventualities now. That is, we’re using all



Comdt Paul Duffy, Chief Instructor in the School of Military Engineering.

the equipment in the school here to train in the Engineer Specialist Search and Clearance role. That involves using mechanical mine-flails, robots, bomb protection-suits, metal and explosive detectors, Geographical Information Systems etc. All of these pieces of

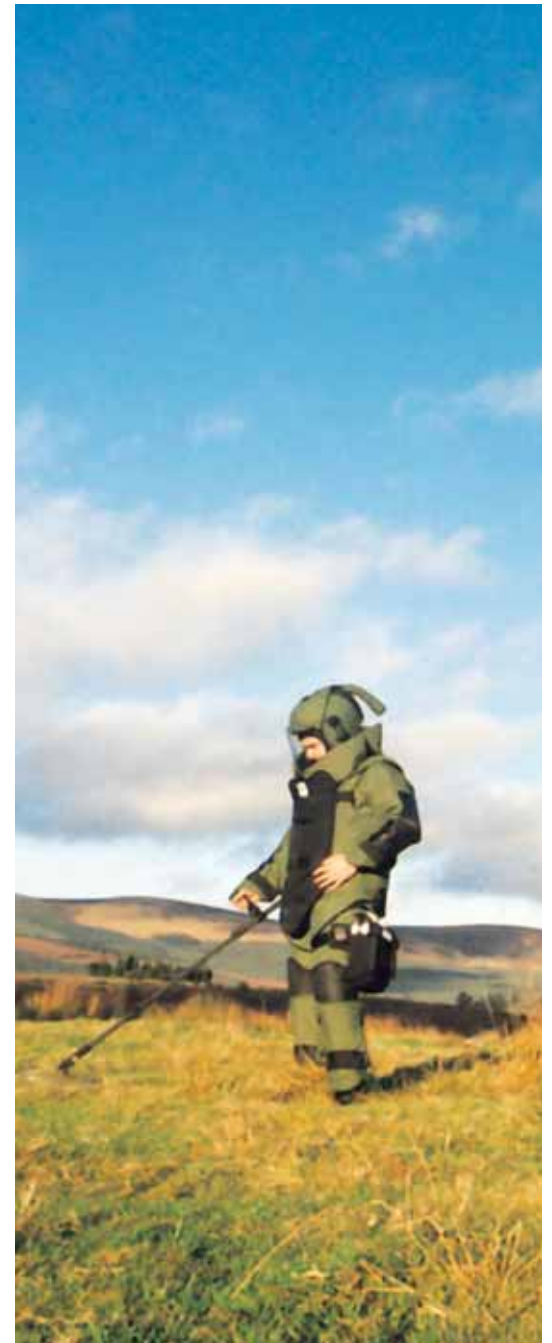
equipment allow us to work in a safer environment."

"The other area we must cover is the provision of mobility, checking whether bridges are safe to travel over, if roads have to be cleared and so on. We will be in a country where there are only dirt

A military engineer, especially on overseas services, is expected to be the architect, the structural engineer, the services engineer, the quantity surveyor and even the tradesman.



A member of the Corps on an EOD exercise.



tracks and we have a lot of vehicles. So we are under no illusions that we will have to work extremely hard for the duration", he added.

Engineer Specialist Search and Clearance

One of the primary areas of combat engineering is Engineer Specialist Search and Clearance (ESSC) Operations which is a combination of explosive ordnance detection and explosive ordnance disposal (EOD), explains Commandant Paul Duffy. "We train small specialist teams to detect landmines, unexploded ordnance, cluster bombs, sub-munitions, booby traps and improvised explosive devices using an array of highly



An EOD unit on a minesweep training exercise.

sensitive detection and mapping equipment. The teams are also capable of clearing unexploded ordnance and booby traps using explosive or mechanical means," he says. The Corps of Engineers can deploy remotely operated robots and remotely operated armoured mini-landmine clearance flails, known as the MV4. Remote devices help us to minimise the risk to our personnel. For larger area clearance operations, the Corps can also deploy two armoured heavy flails each weighing approximately fifteen tonnes with a crew of two, and these can be deployed against the larger anti-tanks mines with an explosive content of around 12 kg and other types of unexploded ordnance

The primary objective in the Specialist Search and Clearance Teams is to conduct various types of operations, such as route clearance, building clearance and area clearance to remove the explosive hazard and ensure the protection of Irish personnel and civilians in the area of operations.

"Nowadays the risk of contamination of these areas by these various items is extremely high," explains Comdt Duffy. "In nearly every theatre of conflict you find mines in marked and unmarked minefields, you find houses that are booby-trapped to deny them to either the local population or to any peacekeeping force. And you can also find items of ordnance that have been deployed over an area by either party in a

conflict that have been discarded or failed to explode but are still extremely dangerous. These range from aircraft bombs, artillery projectiles, anti-armour projectiles to mortars and grenades.

"But the highest risk remains the landmine, both anti-vehicle and anti-personnel, and nowadays in certain scenarios cluster-bomb sub-munitions, which have an extremely high failure rate. These can be seen in abundance both in the Balkans and in Iraq at the moment."

ESSC Module

During the Engineer Young Officers' Course, officers study all of the relevant material that they need to qualify as Engineer

Technical Officers. "One of the most important parts of that course, and one of the most important qualifications, is the Engineer Special Search and Clearance Officer module or qualification," he says. "They must complete a number of modules, which total approximately three months in duration, to qualify them in this area. Apart from various practical and written examinations that they have to pass at the end of the three months training, they complete two weeks of assessment exercises where they are physically assessed in terms of equipment procedures, command and control, threat analysis, safety and disposal methods."

to be capable of understanding the equipment, how it works and its limitations, and then physically deploy it in quite demanding scenarios."

Course Assessment

This interview took place one week before the commencement of the assessment phase of the ESSC module of the 25th Engineer Young Officers course. "Once they complete this course and qualify, they need to come back to the School and be reassessed in three years time. Our equipment is updated every number of years. We have just gone through a major new equipment programme, which has seen all of our

ance of mines and unexploded ordnance from an area of ground using a number of different methods (mechanical, manual and explosive) and the clearance of routes to ensure they are safe for other Irish personnel. We're talking about physically searching the route and locating any device that may be on the route and then dealing with it.

"Another area of assessment is the clearance of booby traps from a building. This is very common in the Balkans where one side of the conflict would booby-trap buildings to prevent the other side of the conflict moving back to their homes. It could be to deny the building to a peacekeeping force or it could be designed to specifically target members of a peacekeeping force. If people knew we were searching buildings on a random basis, they may booby-trap it to either remove or hinder our specialist search and clearance or explosive ordnance disposal capability."

Also included are incident searches where a device or roadside bomb has been placed in a particular area with the expressed intention of targeting Irish personnel. The engineers' role is to locate and isolate the device and then to physically deal with it. As at home, if it is an improvised device the clearance phase will be a joint operation with the Ordnance Corps.

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"At the end of this period, assuming that they pass, they will be qualified to work at home in an anti-terrorist capacity, primarily using systematic procedures for the location and clearance of terrorist equipment and munitions, and abroad for the detection and clearance of unexploded ordnance, landmines and booby-traps. They have a lot of equipment and they need

ESSC equipment replaced on an ongoing basis since 2000 and we are just at the end of that programme."

During the assessment exercises, the students are placed in charge of teams and given various tasks based on a variety of scenarios, and they are assessed on their performance. He says. "Some of the typical scenarios would be area clearance, the clear-

Fire fighting

Another interesting subject covered at the School of Military Engineering is fire fighting. The Engineer Corps is tasked with providing an emergency fire service in Ireland in times of industrial dispute within the fire services. This was illustrated in the Dublin fire strike in the late 1980's and the Wexford fire strike in 1995. The Corps deployed two crews to Donegal during the British Fire Service strike in late 2002 to cover areas in Donegal that are normally covered by fire units from the North.

"Fire fighting is certainly one of the more interesting facets of engineer training" says Comdt Duffy. "We will train all ranks in fire fighting and fire safety. In the case of Officers our aim is train them to the level of Assistant Chief Fire Officer in the fire service". At present the Corps have personnel qualified to instructor level in fire fighting, breathing apparatus procedures, road traffic accident procedures, and hazardous materials incidents. The Corps is also to the fore in formulating the Defence Forces response to Chemical, Biological, Radiological and Nuclear (CBRN) incident planning in terms of protection and decontamination.

"When we go abroad, we can't bring a fire brigade with us, so it is one of the roles



Comdt Paul Duffy of the Corps of Engineers with Private Andy Balfe testing the Cyclops ROV.



Construction of a Bailey Bridge.

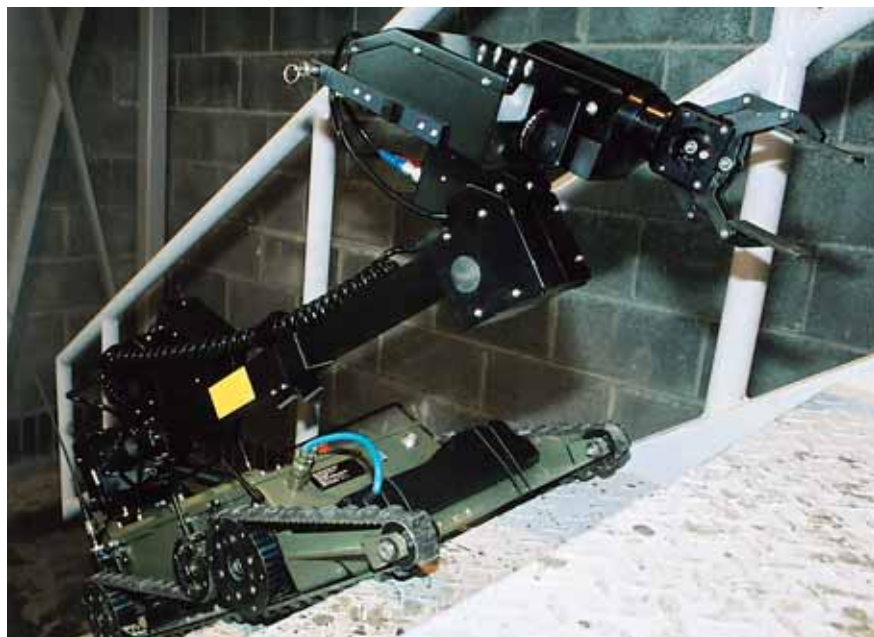
of the Corps of Engineers to provide a fire fighting or rescue capability abroad. Training is conducted in association with the Irish Fire Service but also in the UK and the Netherlands."

Multi-Skilling

"In summary our objective here is to produce engineer officers and personnel who are capable of tackling a wide variety of engineer tasks that will benefit the Defence Forces at home and on any deployment abroad. The Corps can also provide support to local authorities at home in Ireland in times of emergency, such as fire strikes or any kind of local authority industrial action requiring some kind of technical expertise.

"Basically, you get an engineer officer who has a wide range of skills and trained to use the most advance equipment. At the end of their nine-month course, officer students will be qualified as Engineer Technical Officers in the Corps of Engineers. Throughout their careers they will come back to the School of Engineering at various stages to complete more specialist training. For example, they may return to complete a breathing apparatus instructor's course for fire fighting, or an advanced explosive ordnance disposal course to qualify them to instruct in explosive

The physical mindset required for an engineer officer is above and beyond that of a civilian engineer.



Cyclops, Mark 4, remotely operated vehicle climbing a stairs.



Capt Fran O'Grady of the Engineers School pictured in front of a Berro 3000 water purification unit.

They physically put their lives on the line to clear the area to ensure that it will be safe for the remainder of the Irish unit. - Comdt Duffy

ordnance disposal as it relates to overseas.

Through our relationship with the Institution of Engineers of Ireland (IEI) and other institutions, we ensure that the education that we're giving to our engineer officers is comparable to, if not better than, any engineer outside. The bottom line is that we have to be prepared to implement what we have been training to do in an overseas or restricted situation, where you will not have the normal resources or the normal support," Comdt Duffy says.

Setting the Standard

Because of the responsibility that will rest on the shoulders of the successful candidates, the standard that these students are expected to achieve is very high.

"Obviously we use very advanced equipment, internationally recognised procedures and our actions are such that we are trying to reduce the risk as much as possible at all times. Unfortunately in this area there is no such thing as zero risk. All you have to do is look at the number of casualties from landmines, unexploded ordnance, and booby-traps in any conflict in the world, but particularly the ones that are prevalent at the moment like the Balkans, Afghanistan and Iraq."

In the history of Defence Forces peace-keeping the Defence Forces have had an excellent safety record.



Lt James Burke (centre) explaining the means of operation of some landmines.