

# RESCUE 995



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# HAZMAT



## Editor's Note

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More often than not, SCDF is commonly known for our capabilities in firefighting, rescue as well as the provision of Emergency Medical Services (EMS). Some of the more well-known appliances that ply the roads daily include the red rhino as well as the fire engines. Within this nerve of SCDF operations is also a group of highly trained personnel specialised in mitigating incidents involving hazardous materials (HazMat). If you have recently spotted a 'curvier' SCDF vehicle on the road, that would most probably be the new HazMat Control Vehicle (HCV).

Our current day success is a testament to the hard work of the pioneers who had a hand in moulding SCDF's capabilities in mitigating incidents involving hazardous materials. During the early 1990s, AC Lian Wee Teck, SAC Teong How Hwa and AC Francis Ng were each tasked to work alongside many other colleagues to build from scratch the HazMat capability within the SCDF. One of their numerous contributions include the first version of the HCV. These 'projects' have also gradually been improved upon over the past two decades.

Today, emergency first responders from the fire stations are also trained in mitigating incidents involving hazardous materials. Notwithstanding the regular HazMat drills at the fire stations, these personnel who wear a HazMat tab on their uniform, are required to undergo several assessments every six months to test their level of readiness, standards and proficiency. SSG Muhamad Amzar Bin Abdul Jalil from Tampines Fire Station has several stories to share with us on his journey as a HazMat Specialist. Read on to find out more.

SCDF has been busy in the past few months. A 17-member Operation Lionheart contingent departed for Laos on the morning of 3rd August. Led by MAJ Seloterio Euan Izmal, the contingent worked closely with the local authorities to conduct search and rescue operations in Attapeu Province. From 5th to 7th September, a 79 member strong SCDF Operation Lionheart contingent went through a gruelling 36-hour reclassification exercise. Having exceeded all criteria of the United Nations' International Search and Rescue Advisory Group guidelines, it was successfully reclassified as a Heavy Urban Search and Rescue Team.

Behind the veil of these achievements are the grit and hard work of SCDF officers in upholding their Life Saving mission, whether in Singapore or beyond our geographical boundaries.

On behalf of the editorial team, I hope you will be inspired by the stories that we have put together for all of our readers. 🚒

**Michelle Lim**  
Rescue 995, Editor  
September 2018



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The Life Saving Force



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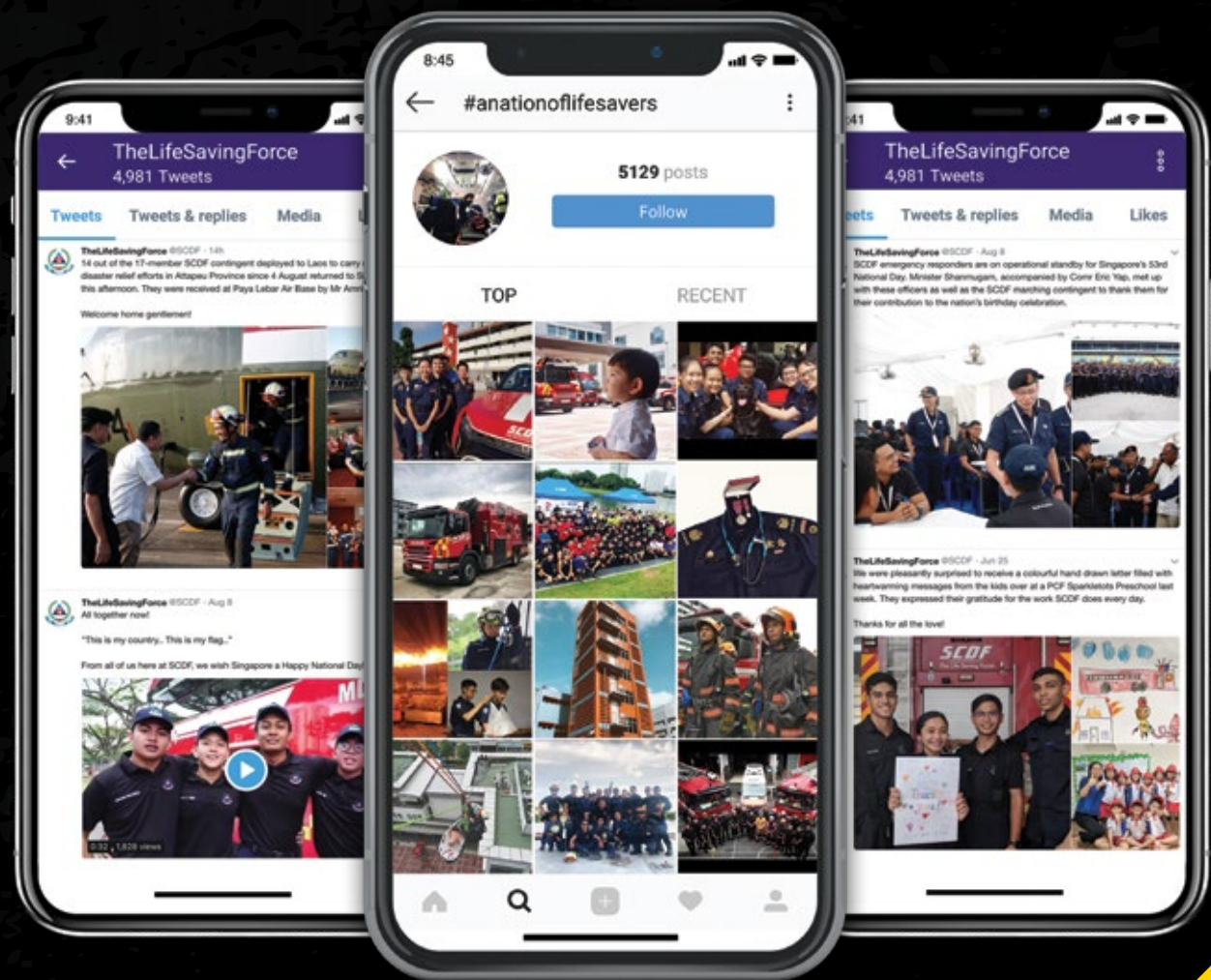
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# TECH BITES



 #ANATIONOFLIFESAVERS

 TheLifeSavingForce@SCDF



# MAILROOM

## VOICES FROM THE HEARTS



**I** am one of the senior doctors from Koo Teck Puat Hospital's Ambulance and Emergency department. During my shift on 25th March 2018, I received a standby call on a case involving a drowsy 2-year-old child from an ambulance crew with the call sign A334 from Seng Kang Fire Station. They were activated to the incident location at a void deck of Anchorvale Road.

I am impressed by the professionalism of your personnel and their wonderful procedural competency. They were skilful and managed to obtain intravenous access for the child, which is no mean feat considering the circumstances they operate in and the technical difficulties in obtaining intravenous access in a paediatric patient.

I would like to commend them as they are a credit to the organisation, and a shining example of the rigorous training and high standards that SCDF stands for.

♥ **David Teng**

**I** would like to express my appreciation to SSG Muhd Haikal Bin Hanafi, SGT Muhd Hazwan Bin Azmir Hamzah, PTE Wong Shi De and PMT Uthman Bin Md Rosli who rescued me from danger. They were deployed to the incident site from Bukit Timah Fire Post on the day of my accident. It is because of their competence and good attitude that I can recover well today.

♥ **Alison Chua Pheok Swee**

**J**ustin and Salihin were so engaging that I lost track of time during my visit to the SCDF Emergency Preparedness Centre located within the SCDF Heritage Gallery. They are very effective speakers and educators in the areas of fire safety and emergency preparedness. I learned lifesaving skills through fun-filled activities and state-of-the-art interactive exhibits.

Kudos to SCDF for having such professional and engaging guides.

♥ **Abdul Jawad**

**W**e are very pleased with Mr Segar's presentation during our guided tour at the SCDF Heritage Gallery. The kids had a lot of fun listening to his stories that came alive through narration! The experience was surreal and emotional as we hear from his experience as a SCDF personnel.

The kids were actively asking questions as well as responding to Mr Segar's questions pertaining to the history and evolution of the SCDF. The interactive and engaging session definitely captured the kids' attention.

We would like to thank Mr Segar for the inspiring and enlightening session.

♥ **Edmund Teoh**

### INCIDENT WATCH



**O**n 16th July 2018 at approximately 3:20pm, a ship caught fire on the waters off Marina Barrage. Upon arrival, SCDF Marine firefighters adopted a two-pronged approach namely, boundary cooling on the exterior of the affected ship using two water monitors from the Rapid Response Fire Vessels and deploying two water jets to penetrate into the cabins to mitigate the deep-seated fire. The fire was extinguished after an intense firefighting operation that lasted about 6 hours. About 100 marine firefighters from the SCDF Marine Command, Brani Marine Fire Station and West Coast Marine Fire Station, including two Marine Fire Vessels and two Rapid Response Fire Vessels, were deployed for this operation.



# SNIPPETS OF SCDF EVENTS



**11B RESCUE BATTALION**

▲ Group photo of the Dialogue Session with 11B Rescue Battalion

On 6 July 2018, Mrs Josephine Teo, Minister for Manpower and Second Minister for Home Affairs, visited the 11B SCDF Rescue Battalion's (RBn) 5th In-Camp Training at the Civil Defence Academy. During the visit, Mrs Josephine Teo was briefed on the capabilities of the SCDF Rescue Battalions which included the shoring capabilities in a collapsed building scenario. The 11B SCDF RBn was involved in the first-ever 12-hour Rescue Proficiency Assessment (RPA) which tests the battalion's response to a large scale disaster. This exercise was simulated at two locations namely, Home Team Tactical Centre and Civil Defence Academy.

During the visit, Mrs Josephine Teo also had a dialogue session with the Operationally Ready National Servicemen in which she highlighted the crucial role of our National Service personnel in keeping Singapore safe and secure. 🇸🇬

## Public Service Istana Reception

**T**he Public Service Istana Reception was held on 3 July 2018 to recognise and celebrate the achievements of Public Service officers. The reception was graced by Madam Halimah Yacob, President of Singapore. The attendees included Minister Chan Chun Sing, Minister-in-charge of the Public Service and other VIPs.

12 SCDF officers were invited to the reception held at the Istana.

The Public Service Week aims to create a greater sense of appreciation and pride for the work of the Public Service, inspire public officers to live out the values and ethos of the Public Service, and inspire them to foster a bold and innovative Public Service that is ready for the future. This year's theme, "One Public Service: Stepping Up Transformation" highlights the need for Public Sector Transformation and the part that every public officer can play. 🇸🇬



On 27 July 2018, five SCDF officers departed from Paya Lebar Airbase, on a Republic of Singapore Air Force C-130 transport aircraft, for Vientiane Airport.

SCDF delivered 11 large modular field tents to Laos in the aftermath of the collapse of the Xe Pien-Xe Namnoy dam in the Attapeu province.

These tents can be assembled quickly without the use of any specialised equipment and are suitable for use as temporary shelters that can provide protection for its occupants. 🇸🇬

## SCDF DELIVERS FIELD TENTS AS PART OF RELIEF EFFORTS



▲ Group photo of the SCDF contingent with AC Daniel Seet, Director Operations

The SCDF contingent was led by MAJ Kenneth Mak. SGT Muhammad Khairi Bin Abdulah, SGT Mohamad Faisal Bin Mohd Sabri, WO1 Azmir Ali Bin Ameer Ali and SGT Sharul'izam Bin Osbman formed the SCDF contingent.

The SCDF contingent returned to Singapore on the same day.



LTA Lina Kobayashi has always been driven by her intuitive desire to render assistance those in distress.

At 13 years old, she joined the National Civil Defence Cadet Corps (NCDCC) because she was drawn to the curriculum of this co-circular activity. In a span of four years, she mastered several practical lifesaving skills including basic first-aid and CPR.

"These are essential skillsets that everyone can apply to their daily lives. To be honest, I joined NCDCC because I was motivated by the practical aspect of this co-circular activity. I wanted to spend my extra time wisely outside classroom hours", says LTA Lina.

After completing her tertiary education, LTA Lina joined the SCDF as a career officer. When asked what influenced her career choice, she said that she was inspired to join the SCDF after witnessing for herself the aftermath of the 2011 earthquake that occurred in Tohoku, Japan.

"I saw the fear in my grandmother's eyes and the fear that paralysed my little cousin who wore a helmet everywhere he went. He hid under tables and door frames each time he felt a tremor. The well-suited businessmen hid under the table of the ramen restaurant while the dangling lights rocked violently. The train systems were down and the shelves in the supermarket were empty – there were no bread, no staples, no water. It was then that I decided that I want to be a helping hand to those in need, especially those in disaster-stricken areas", says LTA Lina.

The years spent in NCDCC allowed LTA Lina to assimilate well to her Rota Commander Training as soon as she started the course.

Having completed her two year Rota Commander tour at Woodlands fire station, LTA Lina is currently a Media Relations Officer at the SCDF Public Affairs Department.



▲ LTA Lina with her grandmother



▲ LTA Lina with her fellow NCDCC cadets

# GUNS & HOSES



On 26 June 2018, the SCDF Marine Command launched its Heavy Fire Vessel (HFV) at the Singapore Technologies Engineering Marine's Benoi Yard. Also known as the Red Sailfish, this vessel has the pumping power equivalent to almost 60 land fire engines. Equipped with 12 firefighting monitors and four deck hydrants, its FIFI 3<sup>1</sup> pump capacity of 240,000 litres per minute can deliver a 360-degree coverage.

The Red Sailfish will be the first vessel of the HFV class in the SCDF fleet of marine vessels. The vessel is integrated with a Dynamic Positioning System, which includes sensors that automatically compute and maintain the vessel's position and heading during firefighting operations at sea. This system enhances the safety as well as the efficiency of operations as it aids the operator in maintaining an accurate throw of water and staying clear of potential collisions in close quarter situations.

The vessel is also one of the few in the world to be equipped with a Chemical, Biological and Radiological protection system. Integrated stand-off detectors, sensors, positively pressurised cabins and enhanced carbon filters in its air handling systems means that the vessel is able to conduct mitigation, monitoring and rescue operations in marine HazMat incidents while keeping the crew safe.

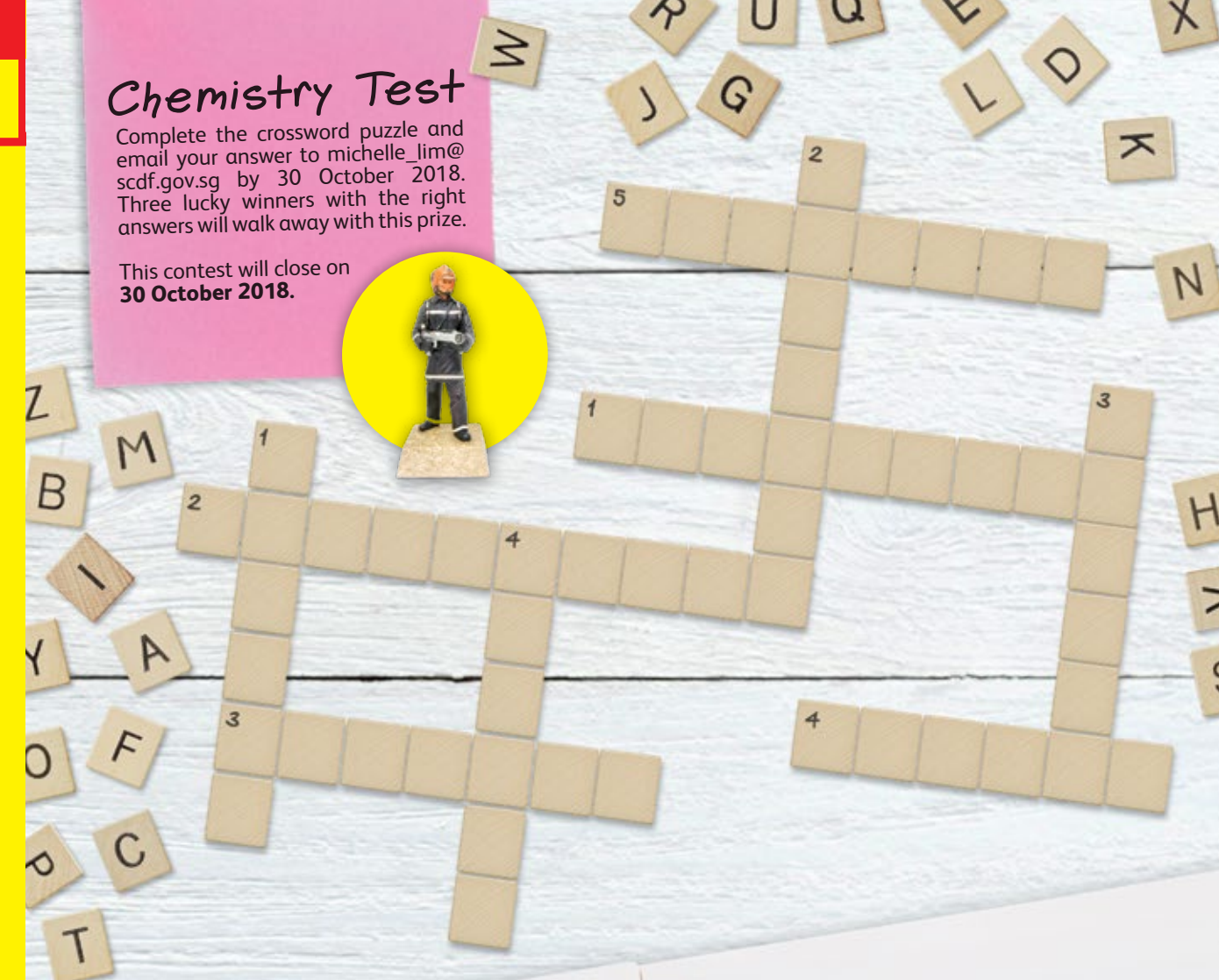
In terms of Command, Control and Communications (C3) systems, the Red Sailfish will have one of the most advanced suite of equipment being incorporated; ranging from live image sharing via 3G/4G network, electro-optic cameras, incident management systems to satellite phone and other voice communications. All these C3 equipment will be part of the Forward Command Room on the Red Sailfish, the first of its type in Singapore.

<sup>1</sup> Firefighting capabilities for vessels are categorised by 3 notations; FIFI 1, FIFI 2 and FIFI 3, with FIFI 3 being the highest.

## Chemistry Test

Complete the crossword puzzle and email your answer to michelle\_lim@scdf.gov.sg by 30 October 2018. Three lucky winners with the right answers will walk away with this prize.

This contest will close on **30 October 2018.**



### Across

- Even though I am not part of the periodic table, I would sit nicely between Radon and Rutherfordium. I am known to be radioactive and you can find me in smoke detectors. Do you know my IUPAC name?
- I am the first element to be produced artificially.
- I am the element with the highest oxidation state.
- The four fundamental states of matter are solid, liquid, gas and \_\_\_\_\_?
- I am an element that defies the laws of Chemistry!

### Down

- Who is the first alchemist to discover Phosphorus?
- I am the heaviest element with a one element symbol.
- I am the densest naturally occurring element.
- What is a Lanthanide with six stable and nine radioactive isotopes?





# 25 YEARS

A Local Merit Scholar of the SCDF, AC Lian Wee Teck was enthralled by the subjects Mathematics, Physics and Chemistry during his undergraduate days at the National University of Singapore.

Little did he know that his specialisation in Chemistry and love for the other two subjects would fit in well with his SCDF career in the years ahead.

In the early 1990s, only one SCDF fire station had basic HazMat equipment that could be deployed in the event of a small HazMat incident. There were no established doctrines to manage a large-scale HazMat incident nor was there a training system or equipping plan for the rest of the fire stations. This specialisation was limited, and operational response came from the personnel of Tuas Fire Station, which was located in the heart of Singapore's main industrial estate in the west.

In an effort to build up SCDF's operational capabilities in handling HazMat incidents, AC Lian (then a Captain rank) and a team of six officers travelled to Sweden to attend a 3-week HazMat course.

The course was designed to train the officers in the principles of handling industrial HazMat incidents, the equipment used for mitigation and the techniques employed in dealing with hazardous materials.

"At the end of the course, our team had an in-depth understanding of the nature and danger of the various classes of hazardous materials. We also had a good hands-on experience of the various equipment used by the Swedish Rescue Services. There was a great sense of realism in the scenario training and simulation exercises with the Swedish Rescue Services. It was then that we identified that this was absent in our system", says AC Lian.





▲ (Back row, 2nd from right): AC Lian (then CPT rank) and his SCDF colleagues attended a 3-week HazMat course conducted by instructors from the Swedish Rescue Services. This learning journey resulted in the build-up of HazMat capabilities in the SCDF.

It was also the first time that AC Lian had the opportunity to appreciate the effects of having a high concentration of ammonia gas on his skin. This experience differed from any other experiment conducted in a chemistry lab. This did not just deepen his understanding of the hazard, AC Lian also saw the dire need to equip our emergency first responders with the best available personal protection equipment to protect them from the adverse risks of a HazMat incident.

“The simulation exercise is important as it helps expose emergency first responders to realistic scenarios during the training phase before he or she is deployed to a real-life incident. Not only will such an exercise imbue a deeper sense of confidence in the emergency first responders, it will also help them resonate with the doctrines and

how to use the equipment in the most effective manner. These were some of the many learning outcomes which we implemented into our system eventually”, says AC Lian.

Apart from the course, AC Lian and his team also studied a series of other overseas publications to better understand how hazardous materials are handled in other parts of the world.

AC Lian explained that there are eight classes of hazardous materials - Explosives, Flammable Gas, Flammable Liquids, Flammable Solids, Oxidising Agents, Toxic, Radiological and Corrosive Agents.

Today, these are some of the fundamental basics incorporated in the training curriculum which SCDF emergency first responders undergo.

Leveraging their learning experience, his team also headed a project to custom-build a simulation system for our emergency first responders over a period of four years. It was through numerous rounds of discussions and refinements that he had with the members of the senior management and colleagues that the team managed to devise a sound HazMat foundation for the SCDF.

“The Swedes adopted a non-encapsulated suit then. This means that the emergency first responder may have a visual and dexterity advantage compared to another who is clad in an encapsulated suit. The Swedes also wore gloves that were separated from the suit. It was through vigorous debates that we finally decided to adopt a fully encapsulated suit for our emergency first responders instead”, says AC Lian.

In comparison, the encapsulated suit would ensure a higher safety standard for our emergency first responders. It helps prevent a situation where the mask or gloves would be dislodged during the mitigation process. In a situation like this, emergency first responders would face the risk of being exposed to the hazardous materials and this would put their safety or lives at risk. No operational outcome can be more important than the safety of the emergency first responder, be it at a HazMat, fire or any other incidents.

The same principle remains in practice till date.

“Our emergency first responders were not only trained in theory or the use of equipment. They were also taught how to organise the incident site into different functional sectors as well as mitigation and decontamination techniques”, says AC Lian.

In 1997, a HazMat incident scenario was weaved into the multi-agency Northstar Exercise for the first time. It was also the first time that the Emergency HazMat Response System was being operationalised to discharge its new responsibility as the Incident Manager for civil emergencies, while working hand-in-glove with other agencies including the Singapore Police Force and medical teams from the Ministry of Health.

“It has been 25 years since we started materialising a HazMat emergency response system for the SCDF. Today, the basic principles in the doctrines or even some of the procedures which we introduced from day one still very much stands in its initial form. This is not just a capability that we have built for the Force; It is also an added shield or armour that safeguards the chemical industry in Singapore. I am thankful to have been given the privilege to play a part in it”, says AC Lian. 🚒







**SCDF**  
The Life-Saving Force

**INSARAG**  
Preparedness

INSARAG International Classification

**RECLASSIFIED**

▲ Comr Eric Yap receiving the Heavy USAR reclassification certificate from Mr John Caucutt (extreme left), INSARAG Regional Secretariat and Mr Winston Chang (2nd from left), Global Lead OCHA, Office of the INSARAG Secretariat, United Nations.





▲ The symbolic 'Heavy USAR Team' patch was presented to COL Michael Chua, Contingent Commander and several members of the SCDF Operation Lionheart Contingent by the INSARAG Classifiers, led by Ms Chen Hong, INSARAG Classifier Team Leader.

On 7 September 2018, the 79-strong SCDF Operation Lionheart Contingent was reclassified as a Heavy Urban Search and Rescue (USAR) team.

Through a gruelling 36-hour exercise, the SCDF Operation Lionheart Contingent exceeded all criteria of the United Nations' International Search and Rescue Advisory Group (UN INSARAG) guidelines. The members of the team were

assessed by a group of 13 experienced international classifiers from the UN INSARAG who have expertise in various aspects of a USAR deployment.

The 'Heavy' classification is the highest level of recognition accorded to Urban Search and Rescue (USAR) teams globally and this 'Heavy' classification validates SCDF's capability to conduct technically complex search and rescue operations



▲ The 'Heavy USAR Team' patch is also worn by the SCDF contingent members when they are deployed on missions.



▲ The contingent also integrated the use of robotics like the semi-autonomous load carrying transporter into its operations in this reclassification exercise.



▲ Members of the SCDF Operation Lionheart Contingent cutting through the trunk of a fallen tree with a chainsaw to gain access to a casualty. This scenario simulates the conditions of a possible incident site.

in the aftermath of urban disasters. Compared to Light and Medium teams, Heavy USAR teams are able to operate at two independent worksites

simultaneously, equipped with search dogs and are able to conduct medical treatment on victims as well as their team members.



▲ The contingent members deployed the Unmanned Aerial Vehicle to conduct a recon at the site during the reclassification exercise.

In 2008, the SCDF Operation Lionheart Contingent was the first in the Asia-Pacific to be classified and in 2013, reclassified as a Heavy USAR team. In this year's reclassification exercise, the contingent, which comprised of regular officers and National Servicemen, also integrated the use of robotics into its operations. This includes the use of an Unmanned Aerial Vehicle and a semi-autonomous load carrying transporter.

The SCDF Operation Lionheart Contingent has been deployed to numerous countries affected by major disasters. In total, the contingent has been deployed for 18 missions, with the most recent deployment to the Attapeu province in Laos.



Scan the QR Code to see the SCDF Operation Lionheart contingent in action.



# Exercise Northstar II ... validating Emergency Preparedness for Jurong Island

By  
LTA Teong How Hwa  
Hazmat Planning  
Ops Dept, SCDF HQ

**"Proactive planning, regular exercises, dialogues with the industries, and support from all related agencies are our best protection against disasters."**

The Y2K millennium bug is a much talked about topic these days. Yet, for Singapore, there is another big development that we must be aware of - Jurong Island. Many million tons of sand have been filling the sea of Singapore to increase the land mass of the seven southern offshore islands, moulding them into one. When completed by 2001, the Jurong Island will be 3 times the size of Sentosa with a total land mass of 2670 hectares. However, unlike Sentosa, this island will house as many as 150 chemical companies such as oil refineries and petrochemical plants which store tons of hazardous and flammable chemicals. It is estimated these companies will employ a total of around 30,000 people. Past incidents in other countries have taught us that despite the best efforts of responsible facilities to safely manage their hazardous chemicals, incidents escalating into major disasters may still occur. SCDF has therefore led a full-scale civil emergency exercise involving the Executive Group (EG) and the deployment of ground forces. The exercise, code-named "Exercise Northstar II" (second in the series of the Civil Emergency Hazmat Exercises), was set in the year 2000 where most of the

reclamation works would have been done. It was held at Pulau Ayer Merbau on 27th Jan 1999 from 0800 hrs to 1400 hrs and the company involved was The Polyolefin Company (TPC).

The scenario started off with a routine morning on 27 Jan 2000, 0830 hrs. Two technicians were doing a normal maintenance job at tank yard II of TPC when a flexible hose failed at its connection and liquid hexane gushed out from the tank. The volatile liquid was quick to catch a spark, resulting in the formation of a pool fire. Within minutes, the hexane tank exploded due to the intense heat and overpressure. The proximity of the burning tank to pipes and tanks resulted in a series of fires and explosions. In view of the situation, Ops Civil Emergency was declared. The fires were now threatening the large LPG spheres in the southern part of Ayer Merbau. Based on computer modelling, it was calculated that if a BLEVE (Boiling Liquid Expanding Vapour Explosion) were to occur at one of the spherical tanks, a heat wave having a radius of 4 km would develop. The intensity of the heat wave

would cause second degree burns on humans standing in the open. Those within the 1-km radius of the BLEVE would be roasted alive!

SCDF had the challenging task of co-ordinating different groups of people to perform their roles. Led by the Exercise Director, COL Derek Pereira, Chief-of-Staff of SCDF, a total of 18 agencies/departments including TPC and the Fire Brigade of Petrochemical Corporation of Singapore (PCS) took part in the planning and execution of the exercise. About 600 responders and a total of 36 vehicles and equipment were deployed for the entire exercise, which lasted about 6 hours. The Incident Commander for the exercise was LTC Puniamoorthy, Head Operations Department of SCDF, and the Ground Commander was MAJ Chris Tan, Commander of 4th CD Division. The activities that were carried out can be broadly classified into two main categories i.e. the site activities and the EG activities. The site activities were focused on the mitigation of the fire and Hazmat incident by the ground units whereas the EG activities were more on the deliberation of major issues that required decision-making at EG (CE) level. The scenario painted had brought out issues that EG (CE) would have to decide on for Jurong Island. Main discussions

include the strategy to be adopted for the protection of the entire population on Jurong Island, the possibility of in-place protection, and the massive amount of resources required for evacuation and its implications. With the intense burning of fuel, large amount of thick smoke would engulf the shipping lanes. As a result, shipping activities would be disrupted due to poor visibility. The access and the control of the media was also discussed. The discussion also included the question of whether to allow the entry of the press into Jurong Island. In addition, such an incident would not, in all likelihood, escape some adverse media reporting. EG (CE) thus deliberated on the strategies to counter such reports.

The end of the exercise marks a new beginning. We must never be caught off-guard for a Hazmat incident, especially on Jurong Island where there is a large number of chemical and petrochemical industries. This highlights the importance of proactive planning, regular exercises and dialogues with the industries, and support from all related agencies. As of now, SCDF would be following up on all the recommendations made and the lessons learnt so as to enable Jurong Island to become a chemical hub with world class contingency plans. ■

Bird's eye view of Pulau Ayer Merbau (one of seven islands of Jurong Island)



The plant area.



Tact HQ was set up at PCS Fire Station.



CCS was set up at the engine bay of the PCS fire engine.



Members of EG (CE) visiting the incident site.



SCDF Commanders working closely with PCS fire officer.



Large Monitor in action.



Ground Commander, Maj Chris Tan briefing EG on the latest developments.



Hazmat Incident Team (HIT) mitigating a leak from a transfer pipe.



Hazmat Incident Team in action.



Hazmat control vehicle providing specialist advice and meteorological information to the ground commander.



SPF officers managing the Temporary Mortuary.



Teamwork is crucial for such an incident.



Decontamination is necessary for casualties who were splashed by toxic chemicals.



Handling a mass casualties situation at site.



Paramedics in action.



A fruitful exercise ends with a warm handshake.

... cont'd from Pg 3

## HOME TEAM IN ACTION @ WOODLANDS

have been found to smuggle the IIs in specially-modified boots of cars or specially-constructed compartments in the coaches/lorries. They also offer forged/fake passports as well as photo-substitution services.

### Home Team joint-operations/co-operation

Singapore Civil Defence Force (SCDF) and Police have been assisting SIR in its fight against the trafficking of IIs and illegal entry/exit. Joint operations have been conducted by SCDF, Police and SIR at Woodlands Checkpoint regularly. Specially-trained SCDF dogs are used to detect IIs hiding in lorries and buses, adding a new dimension to SCDF-Police-SIR collaboration and co-operation. Who would have thought that the SCDF has a role to play at the checkpoint! Police and SIR Officers also carry out joint operations daily on buses and motorcycles. In 1998, the Home Team seized a total of 16 cars, 12 motorcycles, 3 buses, 2 lorries, 1 van and an oil-tanker used in the trafficking of IIs. A total of 182 IIs were charged and convicted.

Traffic Police and Police also manage the traffic flow at the checkpoint - thus facilitating the travellers undergoing Immigration and other formalities. Other forms of Home Team collaboration/co-operation include:

- CISCO Officers escorting NTL persons (i.e. those refused entry by SIR) to the Departure Section for repatriation to JB.
- placing in the SIR blacklist the names of persons found by CNB to have consumed controlled drugs or involved in drug activities.

The Home Team spirit is very much alive at Woodlands Checkpoint. There have been excellent co-operation among the agencies in carrying out the work so as to achieve the common goal in making Singapore a safe and secure best home for everyone. ■





▲ SAC Teong (middle), seated beside a 'transformer' (left) that was upcycled using cardboards. This 'transformer' can also be 'transformed' into a fire engine when dismantled and reassembled.

# FIRED-UP. A PASSION IN CREATION

The literal translation of the Japanese word 'origami' is 'folding paper'. On SAC Teong How Hwa's free time, he enjoys creating art through paper folding craftwork. With the use of a flat piece of paper, he will tap his sense of creativity to create a two or three dimensional artwork.

SAC Teong is also an avid fan of upcycling. Retired or unwanted materials such as cardboards and old fire hoses are given a new life when they are being upcycled into functional items once again. Some of these creations include retired hoses that are upcycled as functional and stylish looking luggage tags as well as emptied out fire extinguishers that are being repurposed as lamp or table stands.

"The possibilities are infinite", says SAC Teong.

SAC Teong is a creator.

Upon graduating from the National University of Singapore with a Bachelor of Engineering in Chemical Engineering, the Local Merit Scholar joined the SCDF in early 1990s. This was the formative years of the SCDF, just into its integration with the Singapore Fire Service. Having completed his tour as a Rota Commander at Alexandra Fire Station, he took up a staff officer appointment in the SCDF Operations Department where he began his journey in building up the HazMat capability for the organisation.

"The Tokyo subway sarin attack incident that occurred in Tokyo in March 1995 prompted the need for countries to heighten their level of preparedness in being able to respond to similar cases that may also happen within their territory. It was also in the same year that Singapore started reclaiming land to establish Jurong Island and today, Jurong Island has become the home to many petrochemical companies that own a maze of gigantic cylindrical tanks and pipelines", SAC Teong recounts.





▲ First HCV, custom-built by the SCDF.

With these developments, a National Doctrine Committee involving several government agencies was formed. SAC Teong was represented in this committee to build up the HazMat response capabilities in the SCDF as quickly as possible.

Then, the newly formed SCDF relied on rudimentary techniques when tasked to deal with cases that may involve Chemical, Biological, Radiological or Explosive (CBRE) agents.

As a staff officer then, SAC Teong visited several fire services abroad to learn about their HazMat capabilities and the ways in which they respond to cases which involved CBRE agents. Equipped with new knowledge, SAC Teong and his team began to introduce a suite of capabilities to the SCDF.

“One of the most unforgettable milestone is when the first version of the HazMat Control Vehicle

(HCV) was launched. It functioned as a mobile laboratory that was supported by a database of about 3000 types of chemicals as well as a suite of detectors and personal protective equipment. The vehicle was also positive pressured, which means that our emergency first responders can penetrate into a threat area using this vehicle and without being exposed to the potentially hazardous agents”, says SAC Teong.

The first version of the HazMat Control Vehicle was custom-built by the SCDF to suit SCDF’s operational needs. It was an integration of different systems including a suite of communication tools and a gas dispersion modelling system which allowed emergency first responders to track the movement of hazardous substances using computer systems.

Since then, other vehicles with HazMat capabilities were progressively added into the fleet. They include the pioneer versions of the Decontamination Pod and HazMat Pod. These pods were movable modules that were transported to the incident sites when the need arose.

“The safety of our emergency first responders has always been our priority. In addition to developing our fleet of appliances, we also trained our emergency first responders to respond to HazMat incidents safely. To do that, the frontliners will first have to acquire new knowledge that is closely related to Chemistry. One example includes the ability to recognise and decipher Hazard Warning Diamonds signage. It is only through understanding the concepts that they will be able to function safely. That was the first step”, says SAC Teong.

The emergency first responders also had to be accustomed to operating in a new set of HazMat Protective Suit which fully encapsulates the individual. On top of that, it was made of a thick and non-permeable material.

“I tried on a variety of HazMat suits that were available in the open market before we could finally decide on the most suitable one for the SCDF. The earlier versions of these suits were made of a thicker material which restricted the movement of the emergency first responders. The gloves were also not as ‘tactile’ as what we have today. Those were the starting years”, says SAC Teong

SAC Teong spent most of his career developing HazMat capabilities for the SCDF. As he rose up the ranks, he also become the first Director of SCDF’s HazMat Department when it became independent from the Operations Department. This development paved the way for SCDF to begin its strategic recruitment of more personnel with relevant field knowledge as well as establish strong ties with other agencies. Today, the HazMat component continues to be integrated in the multi-agency counter-terrorism Northstar Exercises.

SAC Teong believes in life-long learning.

Last year, he was recognised by the Singapore’s Professional Engineers Board as a Professional Engineer. The prerequisites to being registered



as a Professional Engineer to the Professional Engineers Board include having an approved qualification recognised by the board as well as years of relevant practical working experience. His hard work has also earned him the ‘Er’ salutation.

“I am thankful for the opportunities that SCDF has given me to develop my knowledge and skillsets in the area of chemical engineering as well as risk analysis and safety. I also hope to inspire younger officers to work towards such areas of professional development”, says Er. Teong.

Whether it is origami, upcycling or building up the HazMat capabilities in SCDF, it is no doubt that this man is fired-up by a passion to create. 🚒





*AC Francis has been practicing Taekwondo for more than a decade. Some of the learning outcomes of this sport has also influenced his personal and professional values.*



The tranquillity of the night was ruined when a fire broke out in one of the neighbouring units. He waited alongside his neighbours at the void deck for the arrival of the firefighters to render assistance. Then a 12-year-old boy, he witnessed for himself the bravery of firefighters. AC Francis Ng recalls that this faithful incident occurred on the night before he sat for his PSLE Chinese paper.

In the subsequent four years of his student life at the Saint Joseph's Institution, he would have to stroll past the Central Fire Station each day after

school. AC Francis' daily walks to the near-by bus stop ignited in him a deep sense of curiosity on the roles and functions of a fire service.

It was not until his undergraduate days at the National University of Singapore that he managed to connect the dots. AC Francis had a clear view of the Pulau Merlimau refinery fire from the Central Library. While watching the plumes blemish the clear blue skies, he made a promise to himself to join the fire service upon completing his undergraduate studies.

The Geography major did not imagine that he would be assigned the responsibility to oversee the establishment of the first SCDF HazMat fire station on Jurong Island – the Jurong Island Fire Station. Little did he expect that he would carve out a career in the SCDF on the HazMat track.

“Till date, I am still the only SCDF HazMat officer without a Chemistry or any other science or engineering related qualification. Well, the study of physical geography comprises of some elements of science and that helped lay the foundation for





▲ AC Francis Ng, Director, HazMat Department.

my understanding in Chemistry and Physics. As an avid reader, I gradually mastered Chemistry and Physics over the years”, AC Francis reveals.

AC Francis spent most of his career in the SCDF in the Operations Department, HazMat Department, fire stations and Division Headquarters.

AC Francis shared with us that the modern day SCDF HazMat appliances are equipped with cutting-edge equipment. For example, the HazMat Control Vehicle is the first HazMat vehicle in the world to have a built-in laboratory that is supported by sophisticated and gold standard computer systems that can monitor the movement of chemical agents, wind speed and directions. Leveraging the newly installed SIGIS 2 stand-off detectors that are capable of detecting even chemical warfare agents from a distance of a five kilometres radius and the Unmanned Aerial Vehicle, the need for a physical deployment of emergency first responders to incident sites with unknown dangers which are unabated is also minimised.



To help the firefighters at the fire stations maintain a high level of readiness, they are required to undergo the HazMat Responders Certification Test twice a year. On a day-to-day basis these firefighters are also required to take part in HazMat drills where they will don the Chemical Agent suit to complete a series of physical activities.

In addition, they also participate in multi-agency exercises to validate contingency plans. This includes an annual multi-agency exercise codenamed Exercise BOCA which is held weeks before the National Day Parade as well as the Singapore F1 Race.

In addition, AC Francis revealed that SCDF has also equipped all emergency first responders with their own personal Chemical Agent Suit and fire engines with HazMat detection capabilities and this has possibly put SCDF in the international forefront as we are likely to be the only fire service



in the world with such high levels of preparedness and readiness in managing HazMat incidents.

“The SCDF HazMat branch started with just two staff namely AC Lian Wee Teck and LTC Sakhubai Ramanathan. Of course, we were much more junior in ranks then. We had only one HazMat fire station then. Today, HazMat has not only evolve into a department. It is also supported by a strong and committed pool of HazMat Specialists from six HazMat fire stations as well as our Special Rescue Unit”, AC Francis says.

The SCDF has come a long way in building up its HazMat capabilities and training syllabus for the emergency first responders and HazMat specialists from the fire stations and HazMat Department.

In recent years, Civil Defence Academy and HazMat Department have also began training overseas participants in the area of HazMat incident management as well as provide consultancy services to foreign fire services with the aim of building up similar capabilities from scratch. While the organisation continues with its new pursuits in this ever-changing security climate, these achievements bare testament to our success.

When AC Francis is not in his SCDF uniform, the sports enthusiast will either be challenging himself at long sprints or donning the dobok secured with a black belt.

“I love martial arts especially Taekwondo. I have been practicing it for almost a decade. Taekwondo requires its practitioners to think on the move and on your feet. We react under pressure but we also have to stay calm and cool while tackling our opponent. Whether it is during a Taekwondo sparring session/competition or HazMat incident, it is almost impossible to plan your opponent’s next move. As such, our next move may be both defensive and offensive, or both at the same time, depending on the situation”, AC Francis says.





▲ SSG Muhamad Amzar Bin Abdul Jalil

SSG Muhamad Amzar Bin Abdul Jalil served National Service with the SCDF as a firefighter at Changi Fire Station. Upon completing his service to the nation, he decided to join the SCDF as a career officer as he was drawn to the lifesaving mission of the organisation.

As a firefighter, he responded to both fire and rescue incidents. This included prolonged firefighting operations as well as rescue operations. At the age of 18, he thought he had mastered the art of a lifesaver.

It was not until he started his journey as a career officer that he learned what was in store for his career ahead. Apart from being a Section Commander tasked with the leadership role to

command a section of emergency first responders, he was also given the opportunity to become a HazMat Specialist.

“It has been eight years since I joined SCDF. I have been with the Tampines Fire Station, one of the six HazMat fire stations in SCDF. Since I became a HazMat Specialist, I have acquired knowledge and skillsets in the area of Chemistry. More importantly, the knowledge and skillsets are essential for me as an emergency first responder, and I also get to apply what I have learnt. That is the beauty of this job”, says SSG Amzar.

As a HazMat Specialist, SSG Amzar is equipped with in-depth knowledge and specialised skills to respond to HazMat incidents.

# “WHITE POWDER” INCIDENT

“The incident that happened at Woodleigh MRT Station in 2017 is still one of the unforgettable HazMat incidents which I have attended to. As we donned on our protective gear while on the way to the incident, a few of the other HazMat Specialists and myself were already discussing on the possible ways which we should mitigate the incident”, says SSG Amzar.

On 18 April 2017, Woodleigh MRT Station was temporarily closed for more than three hours after a suspicious substance sparked a security incident. Upon SCDF’s arrival at the incident site, the HazMat Specialists were briefed on the areas which the suspicious substances, in the form of white powder, were found at.

“Using a spatula, we scooped some of the ‘white powder’ and placed it in a glass veil for sampling purposes by our colleagues who responded in the HazMat Control Vehicle. This vehicle is equipped with a laboratory where the substances can be tested”, says SSG Amzar.

While the samples were being tested, SSG Amzar and his team began to clear the white substances and decontaminate the areas where it was found.

“We were relieved to know it’s just flour!”, says SSG Amzar.

Such false alarms are not a norm.

Speaking from experience, SSG Amzar said that he has also responded to incidents involving the leakage of chemicals with harmful effects. One of them included a chlorine leak incident that happened at a swimming complex.

The human body absorbs chlorine primarily through inhalation as well as through the skin. Chlorine inhalation can cause irritation to the skin and eyes and sore throat. In some cases, it may even cause symptoms of asthma.

“The swimming complex is usually frequented by children and a chlorine leak means that the safety of the children is at risk. As such, we are required to be swift when tackling such incidents”, says SSG Amzar. 🚒





MAJ Kenneth Mak, a HazMat Security Senior Staff Officer from the HazMat Department, 'shops' for a living. He is constantly on a look out for new technologies that can be used for detecting and deciphering CBRE threats. To do so, he keeps in touch with the subject matter experts from the relevant industries and works closely with these stakeholders to conduct trials and demonstrations on the newest equipment available in the market.

The Griffin Gas Chromatography-Mass Spectrometry (GCMS) system, an analytical method that combines the features of gas chromatography and mass spectrometry to identify different substances within a test sample, is a recent example of one of his many purchases. This system, which has already been incorporated in the HazMat Control Vehicle (HCV), can be used to separate and identify the substances present within one sample.

"Not only does this technology come with a bigger information database, the palm-size device which is used to collect samples is also more portable than the older versions. In fact, emergency first responders can also collect the samples and monitor the situation without having to leave the HCV", says MAJ Kenneth.

CPT Mui Chin Nam, a fellow Senior Staff Officer from the HazMat Department, looks into matters concerning the threats which involve the use of Improvised Explosive Devices (IEDs). CPT Chin Nam works closely with the relevant departments and government agencies to plan exercises to maintain the readiness of the responders. This is achieved through SCDF's participation in multi-agency exercises including an annual exercise codenamed Exercise BOCA.

"It is through these exercises that the knowledge and skillsets of our emergency first responders are put to the test. Their response at these planned Chemical Agent or Bomb Explosion scenarios are also essential in helping SCDF and the relevant agencies evaluate and validate the contingency plans. Such training opportunities will prepare them for a real-life incident too", says CPT Chin Nam.

▲ CPT Mui Chin Nam (left) and MAJ Kenneth Mak (right).



Like other officers from the HazMat Department, MAJ Kenneth and CPT Chin Nam are also required to serve as Duty HazMat Officers (DHOs) outside their regular office working hours.

DHOs work on a 12-hour shift at least thrice within a span of two months. When on duty, they will be activated to respond to confirmed cases which involve hazardous materials. They will play the role of an advisor to the ground commander in-charge of the incident. This includes providing them with a direction on how to mitigate a leakage or the demarcation of the hot, warm and cold zones. In addition, they will also assist to run the relevant tests on the samples collected by the emergency first responders.

“Emergency first responders can now pass to us [the DHOs] the samples through a small opening of the HCV. We will then test the sample in a box which specially designed to prevent the interiors of the HCV from being contaminated.”, says MAJ Kenneth.

One of the incidents which they have attended to as DHOs is a case involving the leakage of ammonia from a compressor. CPT Chin Nam explained that ammonia is often used as refrigerant and for this incident, ammonia was gradually filling the chiller room due to a malfunctioned compressor.



▲ CPT Chin Nam using the Griffin Gas Chromatography-Mass Spectrometry (GCMS) system which has been incorporated into the HCV recently.

While one section of the emergency first responders was sealing the leakage point, the DHOs requested for the others to set up several water jets to create a water curtain around the area.

“Ammonia is water soluble. In addition, the water curtain would also help prevent more ammonia from being released into the atmosphere as it can potentially irritate the respiratory tract of those who are within the vicinity”, says CPT Chin Nam.

Both MAJ Kenneth and CPT Chin Nam revealed that the role of HazMat officers is not merely confined to administrative roles.

“As a DHO myself, I get to experience first-hand the use of the technologies and equipment that the organisation has invested in and I value this real-time, hands-on opportunities”, says MAJ Kenneth. 🚒



▲ Emergency First Responders can hand over the sample to the DHOs via an opening on the HCV. DHOs will then conduct the required tests on these samples within this box.

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