

FOCUS



Strengthening our Safety Culture

JUL 2021 | ISSUE 108

04 | Training Safely Amidst the COVID-19 Pandemic

08 | Making a Difference

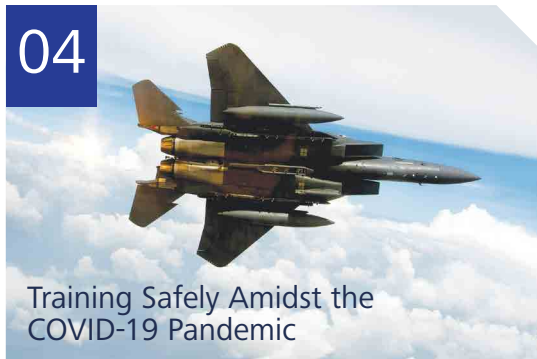
12 | Just Culture and Its Importance in Safety

16 | Safety – An Imperative for Airfield Damage Recovery Operations


SAFETY
Mission Success ALWAYS

CONTENTS

04



Training Safely Amidst the COVID-19 Pandemic

08



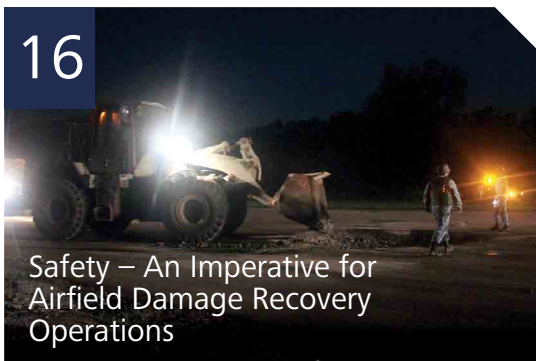
Making a Difference

12



Just Culture and Its Importance in Safety

16



Safety – An Imperative for Airfield Damage Recovery Operations

24

Safety Activities

30

4 Pics 1 Word

31

Crossword Puzzle

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Foreword

From Head Air Force Inspectorate



The COVID-19 pandemic has been with us for over 18 months now, and we have gradually adapted to living with the virus. Practises such as mask-wearing and social distancing will likely be continued in the foreseeable future, and we have to continue to stay alert. I am proud to say that the RSAF has done an excellent job thus far in curbing the spread of COVID-19 while maintaining operational readiness 24/7. This is an attestation to the resilience and perseverance of all our RSAF personnel.

In this issue of **FOCUS**, we start off with MAJ Zhang from 149 SQN sharing his experience of being part of the first large-scale deployment overseas since the COVID-19 pandemic and the precautions the RSAF participants took to stay COVID-free while training safely. This serves as proof that we can safely conduct overseas training amidst the pandemic, which is crucial in providing the vast airspace required for the high-end quality training of our aircrew.

ME2 Chen from 801 SQN then recounts the event which led him to receiving an Outstanding Safety Award (OSA) where he discovered during an oil-replacement task that oil tank outlets in a H450 UAV were incorrectly installed. His finding ultimately prevented potentially serious damage to the H450 engine. His strong fundamental knowledge, proactiveness and

inquisitive spirit is commendable and one that we must aspire to emulate in our daily work.

MAJ Wong from AFI then discusses Just Culture and its importance in safety. Just Culture helps in creating a more conducive organisational climate by having a fair system in how individuals will be evaluated for their errors. This encourages open reporting, which in turn ensures a more effective and robust safety and operational management system.

Lastly, ME6 Pang and ME4 Lau from 506 SQN share how Airbase Civil Engineering (ACE) squadrons have internalised safety and implemented robust safety initiatives into their everyday operations. These measures have helped the ACE community to eliminate or reduce the hazards and risks in their workplace, keeping the opportunities for accidents occurring to a minimum.

These articles selected in this **FOCUS** issue all have one thing in common, and that is they are good examples on how we can strengthen our safety culture in the RSAF. Let's continue to imbue safety as part of our everyday lives. **Mission Success, Safety Always!**

COL Linus Tan Jin Kiat 
Head Air Force Inspectorate

Training Safely Amidst the COVID-19 Pandemic



MAJ Zhang Zhewei
Pilot
149 SQN



Introduction

The Republic of Singapore Air Force F-15SGs, together with the Gulfstream G550 Airborne Early Warning (AEW) and A330 Multi-Role Tanker Transport (MRTT) successfully deployed to Darwin, Northern Territory (NT), Australia for detachment from 7 Oct to 11 Dec 2020. The detachment comprised around 200 personnel from four squadrons throughout the 2-month long deployment.

With the vast training airspace available in Darwin, coupled with air weapons ranges over in Bradshaw Field Training Area and Delamere, the detachment provided the opportunity for aircrew to conduct a multitude of high-end air-to-air and air-to-ground training missions in day and night environments.

This allowed our aircrew to hone our professional competencies through live weapons employment and Mission Orientated Training (MOT) together with the A330 MRTT and G550 AEW.

Challenges Amidst the COVID-19 Pandemic

The deployment to Australia was the first large-scale overseas deployment by the RSAF since the COVID-19 pandemic occurred. With several overseas exercises like Ex COPE TIGER and Ex PITCH BLACK cancelled since the start of the year, the opportunity to deploy to Australia amidst the pandemic posed several challenges that were uniquely different from the normal deployments.



Adhering to COVID-19 Medical Requirements

To prevent the spread of COVID-19 in Australia, our personnel had to deploy earlier to serve the mandatory 14 days of quarantine. They were also subjected to a total of three Reverse Transcriptase-Polymerase Chain Reaction screening swab tests during deployment. The first swab test had to be conducted 72 hours prior to departure with evidence of a negative test result before boarding the flight to Darwin. The second and third swab tests were conducted on the day of arrival and prior to the end of the quarantine period respectively. Similarly, for re-deployment back to Singapore, a pre-departure swab test and a swab test on arrival were conducted. Re-deployed personnel had to be self-isolated until negative test results were obtained.

During the 14 days quarantine, there was a need to ensure the well-being of personnel while they were isolated within the confines of the accommodation. Mental and physical well-being of personnel were also maintained through daily engagement via video conferencing. Cardio workout videos available online were used during daily sports sessions to maintain physical fitness during isolation. Aircraft system briefs were conducted by aircrew with Subject Matter Expert (SME) inputs from respective aircraft trade specialists which led to a richer cross sharing of knowledge. Vocational sharing was also conducted to foster interactions amongst the different vocations.

As part of the deployment plan to provide medical support to RSAF personnel, an RSAF Medical Officer (MO) was deployed together with the detachment. The MO liaised with the Royal Australian Air Force (RAAF) medical counterparts and acted as the main point of contact between RAAF, Air Force Medical Service and the Detachment Commander to assist in the management of Australia's COVID-19 medical requirements, which may

differ with medical directives back home. The MO also conducted medical briefings for quarantine procedures to the main party deployed, which helped manage the expectations for detachment personnel undergoing quarantine in isolation for the first time.

Safe Management Measures in Daily Operations

At the end of the quarantine period, detachment personnel were subjected to Safe Management Measures (SMM) as they conducted their daily operations. SMM for personal hygiene, such as safe distancing, frequent hand washing, and sanitising of workplace, were largely similar between the NT and Singapore. However, there were two notable differences between NT and Singapore's SMM. Firstly, wearing a mask in public space was not mandatory, and secondly, there were no limits to the number of people for social gatherings. The detachment thus took a measured approach to ensure safety of our detachment personnel and enforced mask wearing practices at work and limited travel after work to essential trips only, capped at a maximum of five personnel per group.

In addition to the SMMs implemented, the detachment also had a robust plan to ensure that detachment personnel out of quarantine continued to remain COVID-19 free. Firstly, interactions with transit crews ferrying aircraft and resupplies from Singapore to the detachment were minimised. Most of the detachment personnel would be segregated from the transit crews. Only essential personnel required to hand-take over equipment at pre-identified locations would don full personal protective equipment while maintaining safe distance from the transit crews.

Much was also done to contain any potential COVID-19 outbreak within the detachment. Crew pairings were carefully planned in advanced, and isolation rooms were also identified early. If any detachment personnel start to exhibit Upper Respiratory Tract Infections symptoms, they would be isolated together with any paired crew that had worked with them in close proximity. The MO would then administer a swab test for them and work with RAAF medical support to ascertain the swab test results were negative before allowing them back to operations.

Lastly, there was a need to guard against complacency with the low number of reported COVID-19 cases in NT. As intensity of flying operations started to ramp up progressively towards the war phase during MOT, face to face mission coordination, briefs and debriefs by the Mission Commander (MC) were attended by essential A330 MRTT crew and Airborne Control Intercept (ACI) controllers only. While interactions between the aircrew from the F-15SG, A330 MRTT and G550 AEW were kept minimal, it was imperative that





flight supervisors ensured proper mission planning for execution, deconflictions and contingencies were coordinated. This was necessary to ensure safety of flight would not be compromised while executing challenging scenarios such as air strikes with simulated airdrops. Constant reminders during mission planning, briefs and debriefs were emphasised to ensure all crew maintained safe distancing and adhered to the mask-on policy, while being focused on the mission.

Conclusion

The successful conduct of Darwin detachment with zero COVID-19 infections provided assurance that overseas training can be conducted safely despite the pandemic. Overseas training continues to provide the vast airspace required for quality training of aircrew in order to sharpen and hone our competencies. With valuable lessons sieved from this detachment, future detachments will have the necessary medical and safe management plans put in place to ensure safety in training amidst the pandemic.



ABOUT THE AUTHOR

MAJ Zhang Zhewei is an F-15SG fighter pilot in the RSAF. He is a Qualified Flying Instructor and currently holds the appointment of Unit Safety Officer in 149 SQN. He graduated from National University of Singapore and holds a Bachelor of Engineering (Honours) in Industrial and Systems Engineering.

Making a Difference



ME2 Chen Zhi Wei
Air Force Engineer
801 SQN

On Jun 2020, I led in the 5-yearly oil line replacement task on the H450 Unmanned Aerial Vehicle (UAV). This task involves the draining of oil from the oil system, replacing the oil lines and conducting an external condition check on the UAV oil system.

After draining the oil from the oil lines and tank, I decided to go a step further and performed visual checks on the oil lines and the internal of the oil tank. I did so as I had recalled that there were previous incidents of oil sludge found in the H450 UAV oil system and thus decided to do a final check. I wanted to ascertain that there were no oil sludges in that particular oil tank. From my inspection, I did not observe any dents, scratches or corrosion on the oil system components. However, I observed that the oil tank outlets (one

for the oil supply line to engine and one for the drain port) were designed differently. I noticed that the supply outlet port to the engine was slanted downwards, while the drain outlet port had a raised profile. I then referred to the Technical Manual (TM) but the TM did not explain the design difference in the oil tank outlets. Being inquisitive, I went on to check the other relevant TMs and related system engineering notes but could not find any information on the H450 oil tank outlet ports.

Although I could not find any related information, I found that the observations were contradictory to my fundamental engineering knowledge. I recalled that raised profiles were typically adopted to prevent sediments or sludge particles that had settled to the bottom of the

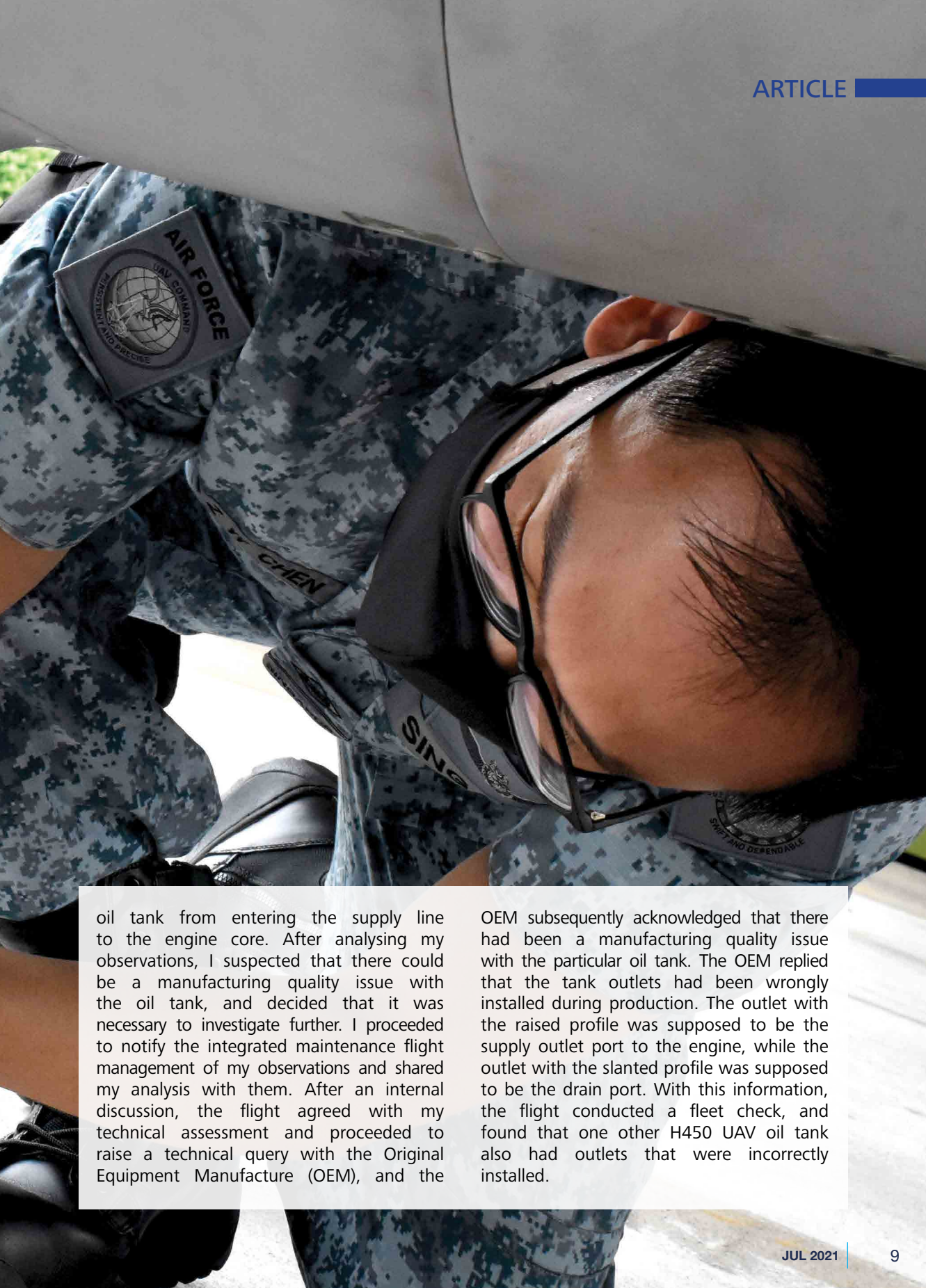
Internal View of Oil Tank



Figure 1: Incorrect Oil Tank Outlet Orientation (Top View)



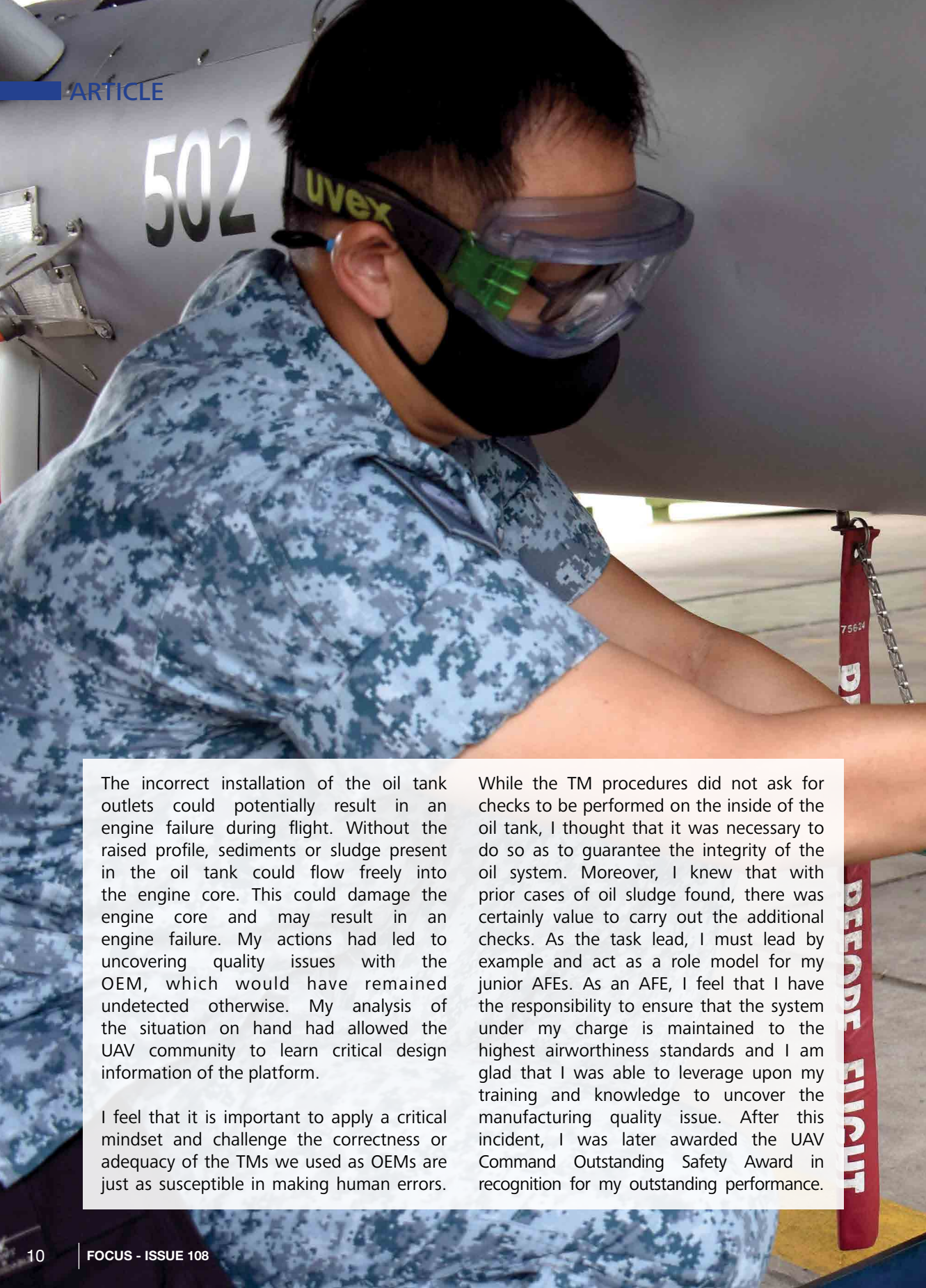
Figure 2: Correct Oil Tank Outlet Orientation (Top View)



oil tank from entering the supply line to the engine core. After analysing my observations, I suspected that there could be a manufacturing quality issue with the oil tank, and decided that it was necessary to investigate further. I proceeded to notify the integrated maintenance flight management of my observations and shared my analysis with them. After an internal discussion, the flight agreed with my technical assessment and proceeded to raise a technical query with the Original Equipment Manufacture (OEM), and the

OEM subsequently acknowledged that there had been a manufacturing quality issue with the particular oil tank. The OEM replied that the tank outlets had been wrongly installed during production. The outlet with the raised profile was supposed to be the supply outlet port to the engine, while the outlet with the slanted profile was supposed to be the drain port. With this information, the flight conducted a fleet check, and found that one other H450 UAV oil tank also had outlets that were incorrectly installed.

502



The incorrect installation of the oil tank outlets could potentially result in an engine failure during flight. Without the raised profile, sediments or sludge present in the oil tank could flow freely into the engine core. This could damage the engine core and may result in an engine failure. My actions had led to uncovering quality issues with the OEM, which would have remained undetected otherwise. My analysis of the situation on hand had allowed the UAV community to learn critical design information of the platform.

I feel that it is important to apply a critical mindset and challenge the correctness or adequacy of the TMs we used as OEMs are just as susceptible in making human errors.

While the TM procedures did not ask for checks to be performed on the inside of the oil tank, I thought that it was necessary to do so as to guarantee the integrity of the oil system. Moreover, I knew that with prior cases of oil sludge found, there was certainly value to carry out the additional checks. As the task lead, I must lead by example and act as a role model for my junior AFEs. As an AFE, I feel that I have the responsibility to ensure that the system under my charge is maintained to the highest airworthiness standards and I am glad that I was able to leverage upon my training and knowledge to uncover the manufacturing quality issue. After this incident, I was later awarded the UAV Command Outstanding Safety Award in recognition for my outstanding performance.

In addition, 1 AELG also conducted a review of our safety programmes and introduced the **3H Safety Framework**, which involves inculcating safety ('Head'), internalising safety, ('Heart'), and practicing safety ('Hands').

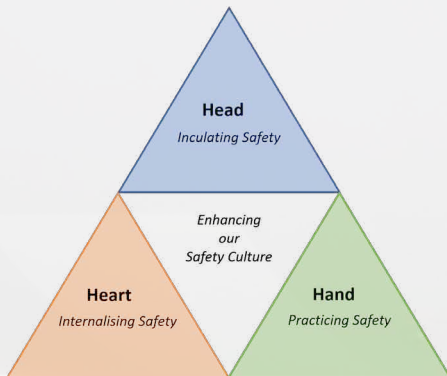


Figure 3: 1 AELG 3H Safety Framework

The **3H framework** enhances our Group's safety culture by equipping the 'Head' with the necessary safety knowledge to mitigate safety risks, engaging the 'Heart' to reinforce safety commitment and passion, and using the 'Hands' to execute maintenance tasks proficiently and safely.



ABOUT THE AUTHOR

ME2 Chen Zhi Wei is an Air Force Engineer (AFE) by vocation and is currently the Safety Warrior for 801 SQN. His prior appointment includes Planning, Scheduling and Maintenance Controller in UC MCF. He graduated from Coventry University and holds a Bachelor degree in Mechanical Engineering.

Just Culture and Its Importance in Safety



MAJ Donald Wong
Pilot
Air Force Inspectorate

Introduction

Open reporting is crucial for a strong safety culture as it allows for the key lessons to be shared and safety systems to be strengthened. To encourage people to come forward and report errors and violations, an organisational climate conducive to such open reporting must exist and be perceived as such. By adopting a Just Culture safety policy, an atmosphere of trust can be established between employers and employees, where people would feel safe to report without fear of unfair punishments or repercussions. This article briefly discusses Just Culture and its importance in safety to organisations.

What is Just Culture?

Just Culture is one of the components of a safety culture developed by James Reason¹ in his 1997 book, *Managing the Risks of Organisational Accidents*. He describes the five components as *Just Culture*, *Reporting Culture*, *Learning Culture*, *Informed Culture* and *Flexible Culture*, and each of these cultures play a pivotal role in engendering a strong safety culture for an organisation. (See Figure 1).

James Reason describes Just Culture as "An atmosphere of trust, where people are encouraged to provide essential safety-related



Figure 1: James Reason's 5 components of a safety culture

¹ Dr. James T. Reason, Professor Emeritus of Psychology in the University of Manchester and is the originator of the Swiss Cheese Model that is utilised for safety analysis.

information, while at the same time recognise that a line must be drawn between acceptable and unacceptable behaviour". Just Culture is founded on the values of fairness, transparency, open-reporting, and learning. Unlike a punitive culture or "no-blame" culture which is neither desirable nor feasible, Just Culture is positioned as a balanced and moderate safety culture in which a fair and measured approach is applied to dealing with unsafe acts. It allows for the requirements of honest, appropriate behaviour and desire for mission success to be combined with the application of appropriate discipline and accountability (See Figure 2).

Organisational Cultures		
Punitive (Blame) Culture	Just Culture	Blame-Free Culture
Aggressive, people are afraid to report	Balanced approach: fairness, trust and accountability	No accountability & culpability for wilful violations

Figure 2: Types of Organisational Cultures

The key tenets of Just Culture are:

- It recognises that human errors can and will occur.
- It holds the individual(s) accountable for their actions. Personnel's actions must be considered in context with other contributing causal factors, and they must be treated in a fair, consistent, objective and timely manner.
- Personnel are not punished for actions, omissions or decisions that commensurate with their experience and training. However, gross negligence and wilful violations are not tolerated.
- All personnel have an active responsibility in reporting errors and violations to support safety learning and improvements.

The Importance of Just Culture

Sydney Dekker: "Rather than individual versus systems, we should begin to understand relationships and roles of people in systems"

In an ideal world, systems and processes would run perfectly and smoothly without a glitch. However, in reality this is rarely so. Tweaks and improvements are often required, especially if they are large, complex and interconnected with other systems and processes in a larger ecosystem. This would typically require regular reviews and continual feedback and testing to ensure its robustness and effectiveness. Despite our best efforts, as long as humans are in the loop, it is impossible to design away the chances of errors occurring. We have to acknowledge that errors are inevitable and will happen every now and then, and thus it is more crucial that we place the appropriate attention to resolve it, and have sufficient safeguards to reduce/eliminate the opportunity for it to occur again.

This forms the basis on the importance of Just Culture. On one end, people are naturally

fearful of making mistakes and reporting their own failures. Employees are less willing to report and inform the organisation about their own errors and other safety problems or hazards if they are afraid of being punished or prosecuted. On the other spectrum, employers or management personnel are unable to make the right decisions to improve safety if such failures or safety incidents are simply swept under the carpet. Just Culture aims to bridge this gap by establishing and building trust between employees and employers. With a Just Culture, when an employee commits an error, the focus would not be punishing the employee solely for the error, but rather take into account of all the perspectives and underlying factors that led to the employee's decision making in causing the error, and review the processes to prevent its future occurrence. This changes the mentality to focus on fixing the issues that caused the error, rather than fixing the person who caused the error.

A Just Culture policy ensures that individuals are not blamed for honest errors and mistakes, and hold those who engage in wilful violations and gross negligence accountable for their actions. By fostering such a culture, people would be less fearful to report their incidents, and be more empowered to learn from their mistakes and improve on their work processes and conditions knowing that they can trust the management to be objective, and focus on the "why" the incident occurred and resolve the underlying issues. With a high level of trust between employees and employers, it is likely that the number of safety incident reports would increase, and this in turn would ensure a more effective and robust safety and operational management.

Just Culture supports the Reporting Culture through the conscious recognition and desire to share safety critical information to improve safety systems. This in turns leads to the positive reinforcement in the Learning Culture

as it improves the level of safety awareness amongst employees in recognising and managing safety situations and incidents in the future. As such, Just Culture can be viewed as an enabler of a strong safety culture in any organisation.



Figure 3: A Just Culture Provides the Support for a Reporting and Learning Culture

Applying Just Culture

Just Culture is practised in many organisations, including established militaries such as the United States Air Force, Royal Australian Air Force and Royal Canadian Air Force, as well as non-military organisations, such as Singapore Airlines, Qantas Airlines and the United Kingdom's National Health Service (NHS).

In order to incorporate the practice of Just Culture, organisations would first have to establish the fundamental principles of Just Culture which they would abide by, and must ensure that these principles are applied at all levels of the organisation. There is also a need to establish a clear definition on what constitutes as errors and violations, and the boundaries of acceptable and unacceptable behaviours. It should be clear that blatant violations and reckless behaviours would be viewed as unacceptable.

Recognising the Different Behaviours and Managing Them

In a Just Culture, behaviours are represented in three basic categories: **Human Error**, **At-Risk Behaviour** and **Reckless Behaviour**.

1. Human Error. Human error involves unintentional and unpredictable behaviour, and causes or could have caused an undesirable outcome. This could have arisen from a result occurring from incompleteness of a planned action, unintended failures during the execution, or unintended inadequacies in the plan. Meting out disciplinary actions may not be warranted or productive in these cases.

2. At-Risk Behaviour. At-risk behaviour is the failure to recognise a risk or belief that the risk undertaken is justified. People who perform routine tasks on a daily basis are most vulnerable to such behaviours as over time, they could become complacent as the perception of risk fades away. When this happens, they will try to do more with less and take shortcuts. The solution is not just to focus on those who engage in at-risk behaviours but to also uncover the possible systemic reasons for their behaviours and decrease their tolerance for risk taking.

3. Reckless Behaviour. Reckless behaviour is a blatant disregard or wilful violation to safety rules and procedures. Personnel who behave recklessly know that it is not the norm, and that others are not engaging in the same behaviour. They make a conscious choice to violate the rules even with the knowledge that substantial risks are involved. Such behaviour should be defined as unacceptable and should be disciplinary dealt with in order to prevent such undesirable behaviour from festering.

Conclusion

Just Culture promotes an atmosphere of trust and common understanding on the acceptable and unacceptable behaviours, and encourages people to open report their errors or violations, knowing that they would be treated fairly and justly. Ultimately, a Just Culture is an enabler that strengthens an organisation's safety culture and is a positive and vital step towards enhancing accident prevention.



ABOUT THE AUTHOR

MAJ Donald Wong is a staff officer in Accident Prevention Branch, Air Force Inspectorate. He is the editor of the **FOCUS** magazine and is a Fokker 50 pilot by vocation. He graduated from the University of Queensland with a Bachelor of Arts (Hons).



Figure 4: Recognising and Managing the Different Behaviours

Safety – An Imperative for Airfield Damage Recovery Operations



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Commanding Officer
506 SQN

ME4 Lau Wei Cheng
Air Force Engineer
506 SQN

Introduction

An important aspect of Air Base Operability (ABO) is Airfield Damage Recovery (ADR) operations, which falls within the purview of Airbase Civil Engineering (ACE) squadrons. In peace, the scope of ADR operations is wide and covers both operations and training. To support daily launch and recovery of aircraft, personnel from the respective Airfield Damage Recovery Flight (ADRF) maintain the airfield lighting and aircraft arresting systems. On the other hand, for wartime Force Generation, the flights in ADR Training Center provide ab-initio and re-currency training for servicemen in runway repair and Unexploded Ordnance (UXO) disposal.

Safety has always been at the forefront of ACE ADR operations, and it is a constant work-in-progress. As with many other operations within the SAF, there are also safety concerns and risks associated with work in ACE ADR operations. One such example is the complex runway repair operation which involves the orchestrated movement of multiple heavy plants (weighing as much as 17 tons) while personnel are stationed on the ground to guide the plant operators. Safety is paramount during such operations and within the ACE community, many safety measures have been established and updated regularly over the years to safeguard our people against these hazards.



The Focus Magazine article: “*Managing Risk in Runway Repair Operations*”¹ published in 2012 highlighted the risk involved in runway repair operations and discussed the use of the 5M4L model to minimise such risks, which is still very relevant in today’s context. In it, the article explained the ways in which the 5M4L has allowed procedures and training to be holistically evaluated to ensure their relevance for safe operation. More importantly, the article also discussed in detail the attention paid to safety by the Individual, Team, Unit and Organisation levels, and how this has played a pivotal role in enabling the ACE community to achieve and maintain an accident free safety record in runway repair operations. The good safety record of the ACE community is not an overnight success, but instead is the culmination of the unwavering effort and dedication put in by every stakeholder in the community over many years.

In this article, we will discuss the various efforts the ACE community has undertaken in recent years and in particular as part of the SAF Safety Review, to enhance safety within ACE ADR operations. In addition,

we will also highlight some of the safety measures that the community has implemented to combat the effects of COVID-19 on ACE training and operations.

Enhancement of Safety through Process Reviews and Hazard Controls

While new technology and techniques have refined the ways that operators carry out certain ADR tasks, the fundamental concepts of many ADR operations have remained largely unchanged over the years. Many ADR operations are still largely labour intensive and involve the use of heavy machinery. Continual reviews are required to ensure that safety is not compromised as a result of obsolete work processes. In addition, hazard controls have also been employed by the ACE community to reduce work-associated risks and make the working environment a safer one for all. In the Swiss Cheese model of accident causation, James Reason likens the



¹ Published in Focus Magazine Issue 71 and authored by ME6 Wong Chee Yuen.

ARTICLE

various organisational defences against failures to slices of the cheese, and the weaknesses in these defences to holes in the slices of cheese. The hypothesis of the model is that accidents occur when all these “holes” align. The safety measures implemented by the ACE community are aimed at breaking the chain of accidents.

The inculcation of a strong safety culture within each ACE squadron has also played a pivotal role in the enhancement of safety consciousness in our people. For example, in 506 SQN, the unit promotes the culture of “Dare to Care” where all personnel are encouraged to take ownership of safety and to practice pre-emptive intervention to correct at-risk behaviors observed in their workplace. The flights in charge of runway repair and

Chemical, Biological, Radiological and Explosives (CBRE) training have come up with brilliant bottom-up approaches to enhance safety in their respective work environments, which we will summarise in the upcoming sub-sections. In addition, we will also highlight some of the other commendable safety initiatives implemented by the various ACE squadrons to enhance safety in ADR operations.

Airfield Lighting Operations

Airfield lighting is a critical system be it in peacetime or wartime, as it provides visual means of guidance for the pilots during the take-off and landing phases of their sorties. On the ground, these lighting systems are maintained by ADRF from the various ACE squadrons. As the airfield lighting is powered



of defense against preventable accidents and injuries, 508 Squadron modified the SPAL truck with additional LED lights installed on the side of the truck to provide better visibility to the deployment crew.

Aircraft Arresting System Operations

Similar to the hook-wire system installed at the end of runways, the Mobile Arrestor Gear (MAG) is a mechanical system that is used to rapidly decelerate aircraft in event of emergency. As the name suggests, it is mobile and is equipped with a set of trailer wheels to facilitate transportation via towing. During the deployment of MAG, the positions of the wheels are raised via a control lever before the anchoring of the system onto the ground could be done. During deployment, the crew is required to work under one of the trailer wheels. The unintended activation of the control lever which would lower the trailer wheel, could cause potential injuries to the crew that is working below the wheel. 508 SQN had designed an engineering hazard control against the accidental lowering of

wheels through the incorporation of a cover box to provide isolation for the control lever. With the cover box, deliberate actions must now be taken by the crew to remove the cover before the control lever could be used, thus the chances of accidental lowering of the trailer wheel (due to human error) during work is removed.

As part of the SAF Safety Review conducted in 2019, the ACE community also looked at ways to minimise injury to personnel due to moving parts during AAS maintenance work. From which, 3 areas of safety hazards were identified during the review: (1) retrieval of purchase tape of the aircraft arresting systems, (2) activation of barrier net for checks, and (3) movement of hook-wire support arm during rectification works. To ensure that all operators are more cognizant of such dangers, "Stay Clear" zones are now incorporated as part of the training for the operators. In addition, case studies of the dangers from these moving parts are also now incorporated into the training materials so that the trainees are educated on these dangers at the very onset of their training.



Runway Repair Training

The incorporation of the "Safety Bubble" Concept was also a collective effort from the SAF Safety Review by the 506 SQN runway repair training flight, aimed at enhancing the safety of all personnel during runway repair operations. The Safety Bubble, as shown in Figure 2, is an imaginary envelope that is drawn around each heavy plant, where no man or vehicle is allowed to breach during operation of the heavy plant. To further complement the Safety Bubble, a set of training slides were also created to familiarise the operators with certain visual cues during operations to prevent the compromise of the Safety Bubble. Figure 3 illustrates the correct and incorrect visual cues that could be observed by the operator while he is seated in the cabin of the Motor Grader. The implementation of the Safety Bubble has changed the way training for runway repair operations is conducted as there is now a much greater emphasis on the safety distances between vehicles and the man.

This emphasis on safety in training has permeated to our RRR NSFs, who in 2019 had

also undertaken efforts to develop a Virtual Reality (VR) Trainer for Marshallers in runway repair operations. This VR software was developed in partnership with Defence Science and Technology Agency (DSTA) and designed for training of ground marshallers, whose work involves the marshalling of heavy plants moving in close proximity to them. The main impetus for the project include:

1. Giving the trainee marshaller opportunities to gain experience in a safe virtual environment before they proceed onto the live training.
2. Allow training of responses to emergency scenarios in a controlled environment, which otherwise would not be possible in live training.

Moreover, driving aids, such as the reverse camera system, have been added to dump trucks used in runway repair operations to enhance the safety of our personnel during operations. By coupling the implementation of such technology with the guidance provided by the ground marshals, the operators would now be better equipped to guard themselves and their vehicles against bad judgement calls that may arise from parallax errors and blind spots.

Standard Minimum Safety Distance Plant to Plant to Human

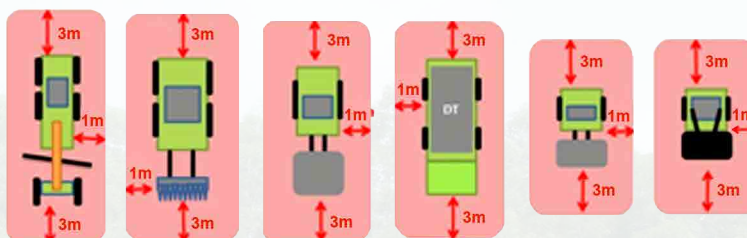


Figure 2. Safety Bubbles for the Different Heavy Plants

Motor Grader Safety Bubble (Front)

From the reference point (1m distance away) Shoulders to Head are visible.



From the reference point (3m distance away) Stomach to Head are visible.

Figure 3. Front View of Operator from Motor Grader cabin: Incorrect (left) and Correct (right) Visual Cues



CBRE Training

To address the problem of lack of realism in demolition training, Chemical, Biological Radiological and Explosives Training Flight (CBRETF) took the initiative to develop an interactive training aid to enhance the level of realism for their training. Traditionally, the trainees are required to connect the different dummy training aids to simulate a firing circuit for explosive ordnance disposal. The main issue with the traditional set-up was that no positive feedback can be provided, unlike when handling live explosives. The EOD Basic Demolition Training Simulator (EBDTS) was developed by the flight to curb this problem by providing feedback (in the form of a buzzer and flashing LED lights) to the instructors and trainees when the circuitry has been connected properly. The implementation of EBDTS has allowed trainees to receive more realistic training in a significantly safer training environment and provided a mean for instructors to arrest mistakes quickly before moving onto the live firing sessions.

Implementation of Safety Measures due to COVID-19

The advent of COVID-19 has resulted in one of the greatest disruptions known to mankind. Given its transmissibility and lethality, COVID-19 possesses the ability to impair

the operational readiness of the SAF if not managed properly. The global pandemic has posed a set of challenges to ACE ADR operations, particularly in the area of training which is aimed at supporting Force Generation. All training and operations must continue but in a manner which does not compromise the safety of personnel.

During training and operations, there are instances where personnel are required to be in close proximity to one another. With the Safety Distancing Measures (SDMs) in place, such proximity (of under 1m) would only be allowed for a maximum of 30 minutes in any one time period. In addition, the donning of masks is strictly enforced for all personnel while carrying out their tasks. Another measure that was set in place was the arrangements to cohort the personnel by location, to prevent cross-mixing from occurring. In the area of runway repair training, the training of different teams continued even during the Circuit Breaker period, but was carried out in a decentralised manner, with different teams of instructors and trainees stationed at different training grounds/localities to do their respective training. In cases where equipment was to be shared between different groups of personnel, the groups are required to do the necessary disinfection of equipment as part of their Hand-Over-Take-Over (HOTO) process. All these safety measures have been set in place to allow trainees to achieve their training objective while ensuring a COVID-safe environment for everyone.



Conclusion

Just like all other operations within the RSAF, many of the ADR operations carried out by the ACE community are accompanied by their own set of hazards and have the potential to result in undesirable consequences if not properly managed. On top of the examples from the various squadrons which were mentioned earlier, there are many more safety measures and innovations which the ACE community has implemented over the past years to make ADR operations safer. The intent of these technological and processual innovations is aimed at creating additional lines of defence against preventable accidents and injuries.

Safety has always been an area in which the ACE community places a lot of emphasis and much effort has been undertaken over the years to raise the safety standards of every stakeholder to achieve zero accidents in our line of work. The ACE community has also been proactively seeking out areas of concern and undertaken efforts to update our safety measures to ensure their continued relevance with the changing times. We strongly believe that our efforts undertaken thus far will go a long way in sustaining RSAF's safety culture of "*Mission Success, Safety Always*".

ABOUT THE AUTHORS



ME6 Kenneth Pang is currently holding the appointment of Commanding Officer, 506 SQN. His previous appointments included Head of Ground-based Systems Office, Air Engineering Logistics Department and Head of Platform Operability Branch, Air Power Generation Command.



ME4 Lau Wei Cheng is an Air Force Engineer (AFE) by vocation and holds the appointment of Officer-In-Charge, Rapid Runway Recovery Training Flight in 506 SQN. He graduated from Nanyang Technological University in 2020.

Chief of Air Force Safety Award



*Left to right: CPL Tan Qin Yi Warren, LCP Soh Shih Chi, MG Kelvin Khong, LTA (DR) Benjamin Tan, ME3 Brenda Tan.
Not in picture: LCP(NS) Glenn Ang*

On 1 Mar 2021, a servicewoman from 808 SQN complained of a sudden onset of headache, neck pain and nausea. Noting that the conditions were indicative of an unusual ailment, her colleague ME3 Brenda Tan Poh Kim immediately informed CAB (East) medical post and medical team from 708 SQN, comprising LTA (DR) Benjamin Tan, CPL Tan Qin Yi Warren, LCP Soh Shih Chi, and LCP (NS) Glenn Ang Zhen Xiang were quickly deployed to provide medical attention.

The unwell servicewoman was assessed by a Medical Officer and a decision was made to evacuate her back to the medical post for stabilisation and treatment. She was subsequently suspected to have suffered a haemorrhagic stroke and the Medical Officer ordered an immediate evacuation to Changi General Hospital via the base ambulance. The evacuation was carried out expeditiously and the servicewoman's life was saved. It was subsequently discovered that the ailment was not easy to diagnose, and any delay in the unwell servicewoman's medical treatment could have resulted in long term neurological deficits or worse a fatality.

The timely and instinctive response from all the involved personnel were commendable. For the strong safety instincts and exemplary professionalism which helped to save the servicewoman's life, they were all awarded the Chief of Air Force Safety Award.

Chief of Air Force Safety Award



LCP Koh Wei Han (left) receiving his award from MG Kelvin Khong (right).

In May 2021, LCP Koh Wei Han from 6DA Bn demonstrated two exemplary acts of civic-mindedness by responding to a distress/alarm call system from HDB block which led to him performing Cardiopulmonary Resuscitation (CPR) on an elderly and putting out a fire following a notification from SCDF my Responder Mobile Application.

For the first incident on 6 May 2021, LCP Koh responded to the siren from the distress/alarm call system located at HDB block, and found an elderly man lying motionless on the floor. With his prior experience in National Civil Defence Cadet Corps and training in CPR, he deduced that the casualty was suffering from a cardiac arrest. He immediately called for the ambulance and proceeded to perform CPR on the casualty. He then handed the casualty to the paramedics upon their arrival. His quick-witted actions and courage to step forward had increased the casualty's chance of survival.

For the second incident on 31 May 2021, LCP Koh responded to a fire incident with another NSF from the same battalion following a notification from the SCDF my Responder Mobile Application. At the incident site, both of them identified the type of fire taught from the Unit Safety Induction Programme and then used a nearby Fire Extinguisher to put out the fire before the arrival of SCDF. Both servicemen had not only stopped the fire from getting out of control but also prevented collateral damages to the nearby shops and injuries to members of the public in the vicinity.

The timely and instinctive responses from LCP Koh was commendable. For his brave and civic-minded actions in both incidents, LCP Koh was awarded the Chief of Air Force Safety Award.

Chief of Air Force Safety Award



ME2 Danny Nah



ME1 Emerson Low

On 10 Jun 2021, a civilian contractor from the Peace Carvin (PC) V maintenance team collapsed in the hangar during his break from work. ME2 Nah Beng Hwee Danny and ME1 Low Song Da Emerson immediately stopped work and responded to the contractor. Noticing that the contractor was not breathing, both of them provided medical attention to the contractor through a combination of Cardiopulmonary Resuscitation (CPR) and the use of Automated External Defibrillator. They persisted with this medical support to the contractor until the arrival of the Air Base's Emergency Service.

The contractor was subsequently resuscitated on-site and evacuated to St. Luke's hospital for further medical treatment. According to the doctors from St. Luke's hospital, the contractor's life was saved due to the swift and prompt application of medical attention provided to the contractor by ME2 Nah and ME1 Low.

The timely and instinctive response from both servicemen was commendable. For the strong safety instincts and exemplary professionalism which helped save the contractor's life, they were both awarded the Chief of Air Force Safety Award.

Outstanding Safety Award



Commander ACC BG Chan Ching Hao (left) handing the award to MSG Tan Yew Jinn (right).

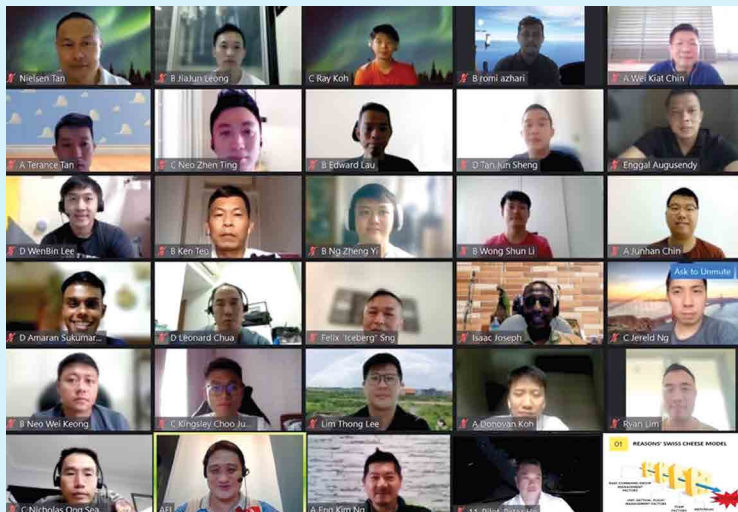
On 22 Feb 2021, during the take-off for a night flying, MSG Tan Yew Jinn heard a thud in the cargo compartment of the C-130 aircraft. Despite the low lighting environment and being partially obscured by the aircraft structure from his sitting position, he was quick to spot the right-hand side emergency exit door had dislodged and fell inwards into the aircraft. He immediately alerted the crew and the pilot aborted the take-off.

MSG Tan displayed a high level of mental alertness and was commended for his quick diagnosis of the situation. His actions were decisive and communication to the pilot was concise. After clearing off the runway, MSG Tan immediately investigated the emergency exit door and ensured all components were accounted for.

MSG Tan's response to the incident prevented the situation from further developing into an inflight emergency. He also displayed exemplary airmanship and strong safety awareness by considering the possibilities of Thing Falling Off Aircraft (TFOA) and Foreign Object Debris (FOD) causing damage to the formation of F-16s planned to take off after them.

In view of his contribution toward flight safety and the considerations for subsequent consequences, MSG Tan Yew Jinn was awarded the RSAF Outstanding Safety Award.

RSAF Safety Officers' Course



The RSAF Safety Officers' Course was conducted from 6 to 16 Jul 2021 via Video Teleconferencing. 26 officers, including officers from TNI-AU successfully completed the course. This course aims to equip all personnel with the knowledge and tools to contribute towards safety at their respective workplaces.

01/21 CAF Quarterly Safety Forum



01/21 CAF Quarterly Safety forum (CQSF) was held on 8 Jul 2021 via Video Tele-Conferencing which saw over 370 personnel participating from over 49 locations in our RSAF air bases and camps. The forum allowed our personnel to understand the RSAF's safety performance in the last quarter, discuss and share the safety incident/issues that occurred, and be aware of the watch areas to look out for in 2Q WY21/22.

Annual Safety Workshop



The Unmanned Aerial Vehicle (UAV) Group Annual Safety Workshop was conducted via Video Tele-conferencing on 7 Jul 2021. Participants were apprised of the RSAF Safety Trends, Safety Watch Areas and e-Safety Climate Survey results. The workshop also provided the opportunity for participants to cross-share and safety lessons within the UAV group community.

Ground Safety Team at NDP 2021



Leading up to the National Day Parade, measures have been put in place to ensure the safety of our aircrew and aircraft during the rehearsals. The Civil Aviation Authority of Singapore (CAAS) has established a Temporary Restricted Area (TRA) on selected days and timings in many areas all over Singapore. During the NDP rehearsals and actual day parade, the TRA is an area which prohibits the conduct of aerial activities (such as kite-flying, hoisting of captive balloons, and flying of unmanned aircraft including drones). Personnel from AFI and volunteers from the RSAF and Sport Singapore also assisted in the enforcement efforts to ensure the smooth and safe conduct of the flying rehearsals.



COMING SOON
Stay Tuned

4 Pics 1 Word

What word can you derive from the 4 pics?



1



2



3



4

--	--	--	--	--	--	--	--

P	N	E	C	Y	N	M
O	S	S	M	T	I	E

We welcome your feedback, contributions of safety related stories, cartoons, suggestions, experiences or concepts you could share. Email us at



apb_pub@defence.gov.sg

with your full name, and contact number.

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5



6



7

--	--	--	--	--	--	--	--



8

G	Y	A	R	T	E	I
I	N	K	D	D	N	W

1. "Sneeze" by zulaufdesign
2. "Cough" by Lisa Marie Cannon
3. "Headache" by dtasheva
4. "Face" by OneModel
5. "Alarm" by debsilver
6. "Alarm!" by Freerk Zandberg
7. "Alarm" by jumpordie
8. "Alarming" by Matthew Caldwell

Permission granted by LOTUM GmbH to publish 4 Pics 1 Word in **FOCUS**

WIN!
\$30
WORTH OF
VOUCHERS!

Crossword

Email your answers with your Rank/Name, Unit, Contact number and last 4 digits of your NRIC to AFI (ME3 Su Xinyi) by 8 OCT 2021. All correct entries will be balloted and 3 winners will receive \$30 worth of NTUC FairPrice vouchers each.

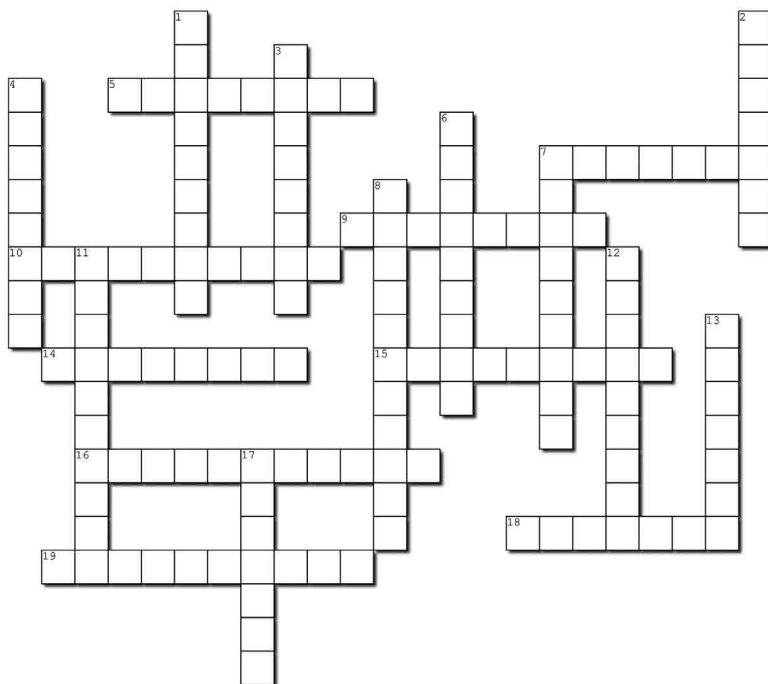
The crossword puzzle is open to all SAF personnel except personnel from AFI and members of the FOCUS Editorial Board.

FOCUS 107 WINNERS

ME2 Tan Baojie
HQ AFTC

ME2 Kush
819 SQN

ME2 Hee Sze Ying
DMPB. AELD



Across

5. As with many other operations within the SAF, there are also safety _____ and risks associated with work in ACE ADR operations
7. Open reporting is crucial for a strong safety _____ as it allows for the key lessons to be shared...
9. Just Culture aims to bridge this gap by establishing and _____ trust between employees and employers.
10. To further _____ the Safety Bubble, a set of training slides were also created to familiarise the operators
14. Personnel who behave recklessly know that it is not the norm, and that others are not _____ in the same behaviour.
15. Firstly, interactions with transit crews ferrying aircraft and resupplies from Singapore to the detachment were _____.
16. In order to _____ the practice of Just Culture, organisations would first have to establish the fundamental principles...
18. From my inspection, I did not _____ any dents, scratches or corrosion on the oil system components.
19. Moreover, I knew that with prior cases of oil sludge found, there was certainly value to carry out the _____ checks.

Down

1. Vocational sharing was also _____ to foster interactions amongst the different vocations.
2. This would typically require regular _____ and continual feedback and testing to ensure its robustness and effectiveness.
3. With the vast _____ airspace available in Darwin,
4. Just Culture is positioned as a _____ and moderate safety culture in which a fair and measured approach...
6. After _____ my observations, I suspected that there could be a manufacturing quality issue with the oil tank,
7. ...an organisational climate _____ to such open reporting must exist and be perceived as such.
8. I found that the observations were contradictory to my _____ engineering knowledge.
11. Mental and physical well-being of personnel were also _____ through daily engagement via video conferencing.
12. Many ADR operations are still largely labour _____ and involve the use of heavy machinery.
13. The incorrect installation of the oil tank outlets could potentially result in an engine _____ during flight.
17. The inculcation of a strong safety culture within each ACE squadron has also played a _____ role in the enhancement of safety

Answers to page 30: "Symptoms" and "Warning"

Do the right thing

A COVID-19 advisory

You have a sore throat, you're feeling blue

maybe it's just the flu?

Before going to work, a kiss and hug?

Don't worry, it's just a bug.

In the office, you're wearing a mask

To contain the spread... a difficult task.

As you go about your meetings, lunch or play...

Whoever's around you may regret that day.

If you are sick, don't wait any longer. Wear a surgical mask, go see a doctor.

Don't go to work, school or public places.

Stay home, don't add to cases.

Let's do our part.

Or we'll be back at the start.

gov.sg