



## LJMU Research Online

**Khalique, A and Bury, A**

**Emergency Reflex Action Drills (ERADs) onboard ship**

<http://researchonline.ljmu.ac.uk/id/eprint/26137/>

### Article

**Citation** (please note it is advisable to refer to the publisher's version if you intend to cite from this work)

**Khalique, A and Bury, A (2025) Emergency Reflex Action Drills (ERADs) onboard ship. Seaways: The International Journal of The Nautical Institute, 3.**

LJMU has developed **LJMU Research Online** for users to access the research output of the University more effectively. Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in LJMU Research Online to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain.

The version presented here may differ from the published version or from the version of the record. Please see the repository URL above for details on accessing the published version and note that access may require a subscription.

For more information please contact [researchonline@ljmu.ac.uk](mailto:researchonline@ljmu.ac.uk)

<http://researchonline.ljmu.ac.uk/>

March 2025

www.nautinst.org

# Seaways

The International Journal of The Nautical Institute

**Listen to the user**  
PTBs and safety p05

**Drills are not a drag**  
Getting it right by  
reflex p08

**Data in depth**  
What S-100 can do  
for us p10

**The beautiful game**  
Lessons in  
shiphandling p21

## A perennial problem?

Tackling the pilot ladder issue p06

# Emergency Reflex Action Drills (ERADs) onboard ship

Do drills really make a difference?

Dr Abdul Khalique

Dr Alan Bury MNI

Liverpool John Moores University

Drills are rarely popular on board. And yet, conducting regular drills for all known shipboard emergencies is essential to ensure the crew's preparedness and ability to respond effectively.

These drills provide numerous additional benefits, such as reinforcing emergency procedures, allowing crew members to practise with the equipment likely be used in real-life situations, and promoting teamwork to identify and correct any operational weaknesses. Additionally, drills help build confidence, improve communication, and ensure that both new and experienced crew members are well-versed in ship specific safety protocols. Consistent practice also allows for the evaluation of response times and the refinement of procedures to ensure optimal performance during an actual emergency. The importance of mandatory shipboard drills is evident in the following SOLAS requirements:

- Every crew member must take part in at least one abandon ship drill and one fire drill each month.
- If more than 25% of the crew have not participated in abandon ship and fire drills on that specific vessel within the past month, a drill must be conducted within 24 hours of the ship's departure from port.

## Getting buy-in

Despite all this, many crew members find drills burdensome, leading to a lack of active participation. While this may seem valid from a time and cost perspective, understanding – and sharing – the fundamental nature of human reactions during emergencies can help crew recognise the true value of these drills.

It is crucial for shipboard officers to emphasise the importance of drills to their non-officer crew, nurturing a mindset that sees these exercises as essential. By doing so, both officers and ratings can work together effectively as a unified team in moments of critical need during an emergency.

Every individual is inherently equipped to handle basic emergencies throughout their lives, through instinctual training that is crucial for survival. The crucial word here is training. Being able to cope with emergencies by reflex is an acquired skill.

## Developing reflex

Imagine a two or three month-old baby bitten by a large mosquito. Although the baby may feel traumatised, what can they do other than cry? In that moment, crying is the only action available to express discomfort or even distress. The baby is overwhelmed by this perceived life-changing event. However, as this child grows into an 18-year-old adult, will they respond to similar pain in the same way?

The straightforward answer is no. Instinctively, their hand will lift and swat at the area where the mosquito bit them. This change highlights a significant shift in how we respond to stimuli as we mature.

When an alarm is triggered by a bite or sting on the human body, a natural instinct kicks in where one hand automatically lifts and swats at the area affected. This response is largely automatic and does not require conscious thought or mental processing. In fact, there isn't enough time to engage the brain in this action because pondering questions like, 'What is biting me?' or 'Is it large or small?' would only slow down the response.

However, this instinctive response is not purely a matter of chance. It is the culmination of years of training that refine human reflexes, leading to what is commonly known as 'reflex action'. From the early stages of babyhood through to adulthood, individuals continually practise and develop their reflexes to react promptly to stimuli or events that pose a potential threat.

“ When seafarers participate in drills, they are not just going through the motions; they are actively training their reflexes to respond efficiently in emergencies. ”

To ensure that these reflex actions produce consistent and effective results, extensive practice is necessary. This is where drills come into play, providing essential training for various scenarios. When seafarers participate in drills, they are not just going through the motions; they are actively training their reflexes to respond efficiently in emergencies.

If crew members were to react to a shipboard emergency in the same way they would to a mosquito bite, their well-trained reflexes should take charge to respond automatically based on the skills and experiences cultivated through regular drills, bypassing the cognitive decision-making processes.

This reaction is underpinned by scientific principles, as it is well-established that when the brain is involved in making decisions, it tends to rely on logic derived from sensory information – especially from sight and sound. In an emergency, the brain can be overwhelmed by this information. Therefore, the more thoroughly individuals practice their reflexes through drills, the more effective and swift their responses will be in real emergencies.

### Immediate physiological response

Although shipboard emergencies differ vastly from the relatively minor annoyance of a mosquito bite, they are typically characterised by loud alarms, visual chaos, and high-stress environments that can create serious physical and psychological effects.

When the senses detect an emergency, they send signals to the brain, which interprets this information as a 'distress alarm', indicating an imminent and serious danger that requires immediate action for survival. This critical information is relayed to the rest of the body through the nervous system, which also autonomously regulates essential bodily functions such as breathing and heartbeat. At the same time, the brain activates the adrenal glands, prompting the release of adrenaline into the bloodstream. This surge of adrenaline triggers a range of physiological responses, including an accelerated heartbeat, an increased breathing rate, and the dilation of air passages in the lungs. These changes enable the body to intake more oxygen, enhancing muscular strength and overall performance.

In addition to these immediate effects, adrenaline also stimulates the release of glucose and fats into the bloodstream, providing essential nutrients that offer a powerful boost of energy. This natural physiological response is crucial as it prepares the body to confront perceived danger effectively. By increasing the availability of energy sources, adrenaline ensures that muscles receive the necessary fuel to react quickly and decisively. This heightened state of readiness not only sharpens focus and enhances physical performance but also enables individuals to respond to threats with greater speed and agility, optimising survival in high-stress situations where every second counts.

### Aftereffects

The adrenaline rush is typically short-lived, lasting around 20 minutes at the most. Its primary purpose is to initiate a rapid response to evade immediate threats. If the danger persists, the body calls upon another hormone known as noradrenaline. This hormone helps sustain elevated blood pressure, increased heart rate, and higher glucose levels, ensuring that the body remains prepared to handle the ongoing threat. Should the situation continue to escalate, the tertiary mechanism of the adrenal glands activates the production of cortisol. This hormone plays a crucial role in managing the effects initiated by noradrenaline, facilitating the utilisation of body fat, protein, and carbohydrates to maintain blood pressure and energy levels. Thus, the body adapts over time, ensuring it can cope with prolonged stress and danger while maintaining essential functions.

### Survival responses

The entire process of responding to danger is intricately designed, with hormones playing a vital role in safeguarding human safety. When an individual encounters a threat, these hormones activate one of five primary trauma responses:

1. **Fight:** Directly confronting the threat with assertiveness and resolve.
2. **Flight:** Escaping or retreating from the perceived danger.
3. **Freeze:** This response occurs when a person becomes paralysed ie unable to take any action against the looming threat.
4. **Fawn:** In some situations, individuals may attempt to placate or soothe others to evade conflict; however, this response is generally less relevant in the context of shipboard emergencies.
5. **Flop:** Become unresponsive or lose consciousness when confronted with overwhelming danger.

This immediate physiological reaction is essential for survival, as it helps the body prepare for action, enabling individuals to effectively navigate high-stress situations. However, in shipboard emergencies, some of these responses of this nature can be actively unhelpful.

### Why practise?

The activation of these responses occurs only when a person perceives a danger as a genuine threat, leading to the release of hormones from the adrenal glands. In the absence of such threat detection, no hormones are released, rendering the question of trauma response irrelevant. This is why it is vital to practise emergency scenarios during shipboard drills, allowing crew members to treat trauma, threats, or emergencies as a 'normal task'. Through consistent participation in shipboard drills, seafarers can effectively condition their bodies and minds to react appropriately when faced with real dangers at sea.

All seafarers undergo professional training to effectively manage emergencies, which ideally should prevent the onset of trauma in such situations. A substantial body of evidence supports this concept in medical science, particularly through Emergency Reflex Action Drills (ERADs). These drills consist of specific action sequences that surgeons must follow during critical surgical procedures. In ERADs, the necessary thinking and planning are done in advance, and the procedures are practised repeatedly. This preparation enables surgeons to perform these actions reflexively. This is a principle that seafarers must also adopt.

To achieve this level of readiness, it is essential for crew members to actively participate in drills. By doing so, they train their reflexes to respond to emergencies as a natural function, rather than relying solely on the effects of hormones like adrenaline, noradrenaline, and cortisol for an energy boost. This proactive approach ensures that seafarers can respond decisively and effectively when faced with real-life threats, enhancing overall safety on board. 🌊



Credit: Capt N Chalaris FNI