HindSight 30

The ability or opportunity to understand and judge an event or experience after it has occurred

EUROCONTROL

WELLBEING

QF32 AND POST-TRAUMATIC STRESS

Steven Shorrock interviews Captain Richard Champion de Crespigny

MORAL REASONS FOR PROMOTING WELLBEING IN ORGANISATIONS

Suzanne Shale

SYSTEM WELLBEING

Anders Ellerstrand

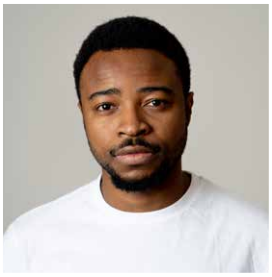
THE ENERGY PROJECT @MUAC

Marinella Leone

BURNOUT IN EMERGENCY MEDICINE: HOW DO WE GET BETTER?

Shannon McNamara

Plus much more on Wellbeing in aviation and beyond



Spring-2020

by John Santurbano

When I arrived at MUAC in 2018, I observed that the organisation was focused on reaching performance targets through continuous changes, mostly leveraging on technology. The pressure of 'key performance indicators' together with the challenging operational situation was generating high stress levels for everyone. When stress is high, people and teams naturally become more self-centred, and cooperation can be affected. In this environment, the wellbeing of people can become neglected. We had to take a step back to act where it is most beneficial for MUAC, including its most important aspect – the people.

MUAC is an organisation composed of smart, highly competent and professional staff. However, to collaborate effectively, 'emotional intelligence' is also important. Therefore, I promoted ways to enable more sustainable performance by focusing on personal and group development. In this way, the organisation can maintain its excellence more effectively. This means working together as a group, taking responsibility for personal and collective performance, acting with integrity, and cherishing growth and diversity.

In line with this vision, some changes had already emerged by the time I become Director. One of them was MUAC's 'Energy and Resilience Management' project (see the article in this issue of *HindSight*). These projects were driven by a handful of colleagues working on cultural development and human performance. These staff members were passionate about people, and they were trying hard to shift the organisation towards a culture that puts people, their wellbeing and performance where they belong – at the centre of the system. I felt that initiatives for wellbeing needed maximum support from the top management, so that's what I did and asked my management team to do as well.

In aviation, we need a culture and strategy that is built around its people. Wellbeing is a key enabler to achieve human performance that should not be seen as a 'nice to have'. Rather, it is essential both ethically and also for excellent business performance. Proof can be seen in a significant decrease of delays, increased customer satisfaction and high staff engagement in innovation.

John Santurbano
Director of EUROCONTROL's Maastricht Upper Area Control Centre

WELCOME

Welcome to Issue 30 of *HindSight* magazine – the EUROCONTROL magazine on the safety of air traffic management. The theme of this Issue is 'Wellbeing', which has an undeniable link to safe operations, though this is not often spoken about. This Issue coincides with the COVID-19 pandemic, a serious threat to human wellbeing that was unthinkable to most people just a few months ago. The spread of the virus and its effect on our everyday lives has brought the biological, psychological, social, environmental, and economic aspects of wellbeing into clear view in a way we have never seen before.

While the theme of wellbeing seemed rather 'soft' and personal for *HindSight* magazine at the time that it was considered, it now seems to be the most meaningful and important theme for this time that we share. The authors of the articles in this Issue were considering wellbeing in the context of aviation, and other industries. But the articles touch on topics that are deeply relevant to the coronavirus pandemic.

In the minds of the general public, 'stress' is a term that has long been associated with operational jobs such as those of air traffic controllers and pilots. And stress, both acute and chronic, is part of everyday work and life, though it is not often discussed among front-line staff. Stress is a by-product of many lines of work up to CEO level and can be aggravated by shiftwork and any resulting sleep disturbance. Stress can also be more acute at certain times, such as serious incidents.

Now – with increased concern about health, isolation, job security and the future more generally – stress touches us all like never before. Traumatic life events have been found to be the biggest cause of anxiety and depression, now the most common mental health problems in many countries. But how a person thinks about these events and acts on their thoughts and feelings determines the stress they experience. For many, especially those affected by traumatic events such as an accident or near accident, post-traumatic stress (PTS) will confront them. This is discussed with Captain Richard Champion de Crespigny in this Issue. If not recognised and managed appropriately, PTS will become increasingly problematic, perhaps progressing to post-traumatic stress disorder (PTSD).

While fatigue and stress associated with high workload and shiftwork are known issues for front-line aviation personnel, we now find different stresses, with concern about the future of aviation and job security, as well as the health of us and those around us. For others, especially those in health and social care, like emergency physician Shannon McNamara who writes for this Issue, burnout and severe fatigue are becoming critical issues, as well as post-traumatic stress.

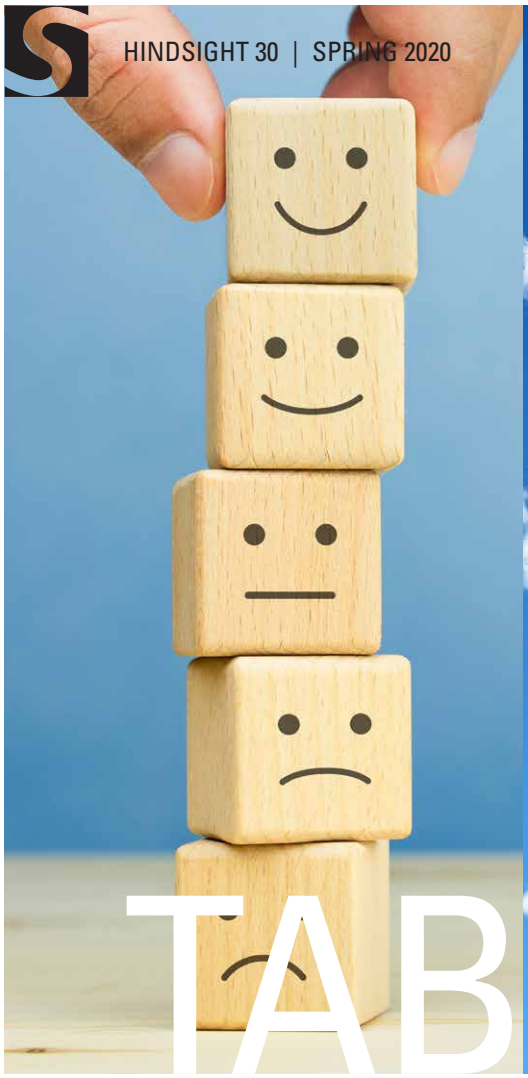
In response to everyday wellbeing issues, and the coronavirus pandemic, we have had to change our behaviour, integrating new behaviours into our daily lives. Some of these behaviours involve changes in frequency, such as handwashing and surface cleansing. Others involve old habits that we find hard to break, such as touching our faces. Still other behaviours seem to run contrary to our nature as social beings, such as keeping physical distance between ourselves and others. Behaviour change psychology has informed many wellbeing issues, such as smoking, drinking, and exercise, and is especially relevant now, as we try to implement behavioural measures to slow the spread of coronavirus. We try to learn from behaviour change psychology in this Issue, with an interview with Nick Godbehere. The research reminds us that we need to make behaviour change not only easy, attractive and timely, but social. The resurgence in community thinking and action is a warm reminder of our intuitive understanding of our social needs.

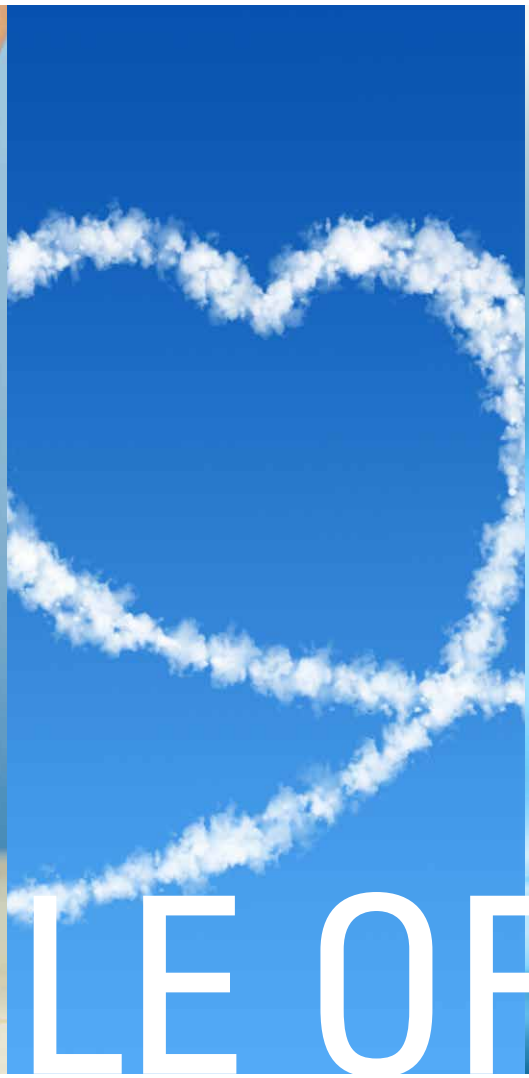
Because wellbeing is not an individual issue. It is rooted in the social and physical environment, including our organisations, as several writers remind us. And as Suzanne Shale writes in the Op Ed, there are also moral reasons for promoting wellbeing in organisations. The articles in this issue focus on a number of initiatives by air navigation service providers, airlines and professional associations. These include peer support, mindfulness, energy management facilities and coaching, and support following serious incidents.

Whether among family, friends, or colleagues, one thing is clear: we need to talk about wellbeing. We need to talk about mental wellbeing, not only now during the coronavirus pandemic, but after coronavirus. We need to talk about health, relationships, work, and all the other aspects of life that give meaning and purpose, but that can also bring stress, anxiety, and other problems. And now is also a good time to pick up and reinforce healthy habits, including checking in with people to see how they are – or how they *really* are.

With *HindSight*, we hope to help support these conversations. Do your operational and non-operational colleagues know about *HindSight*? Would you be willing to ask them, and encourage them to subscribe? Search 'SKYbrary HindSight' for details.

The next Issue of *HindSight* is on 'Learning from Everyday Work'. What have you, your peers and your organisation learned by paying attention to what goes on in everyday work, whether things go well or not so well? Let us know, in a few words or more, for Issue 31 of *HindSight* magazine.





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CONTACT US

HindSight is a magazine on the safety of air traffic management. The success of this publication depends on you. Please tell us what you think. And even more important, please share your experiences with us. We would especially like to hear from current controllers and professional pilots (the main readership) with a talent for writing engaging articles.

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Carsten Fich
CEO Naviair

INVITED FOREWORD

Continuous changes and demand for cost efficiency have become the reality for any business, and this is especially true in our world of aviation. But I as a CEO still have the responsibility to support and develop the organisation to secure the wellbeing of Naviair employees.

Naviair has a long tradition of supporting any employee who faces any kind of life crisis or health problem that may cause a shorter or longer sick leave. We offer anonymous access to counselling. A physiotherapist and relaxation therapist are present every day, and the CISM team is well-educated and appreciated. We offer numerous free-to-use health programmes, an attractive canteen, social events and fitness facilities. All of this is in addition to a modern and healthy work environment, including facilities to rest and socialise. These human values have spread into the corporate culture of Naviair, an attractive company that genuinely cares for people.

But how do we frame and secure these provisions for wellbeing in conjunction with the ongoing changes, demand for cost efficiency and the rising complexity of our ATM systems? I have no clear answer, but what I do know today, and have experienced as a rather new CEO in Naviair, is that strong trust between management and employees and a well-established just culture have formed an informal atmosphere. How is this relevant? I believe in a free and open dialogue at all levels of the organisation to ensure that we can discuss safety, human performance and job satisfaction whenever changes and challenges are on the table. Then we will be more successful having dedicated involvement from the employees.

This brings the words "shared responsibility" into my mind. For operational staff, it is a personal and professional obligation to be fit for every shift according to rules and company policies, just as management are expected to discuss and provide satisfying working conditions. We must, for example, balance effective resource planning and the conditions important for operational staff. We learned a few years ago that our ability to offer healthier and more predictable shift planning, easier shift changes, and the best possible vacation planning raised job satisfaction to a new level.

However, I also see that European ANSPs are challenged when it comes to sufficient operational staff to meet the demands relating to capacity and delays. When units are low on sufficient staff, shift planning may be stretched to the limit and some personal flexibility may be reduced for a longer period. We must even be competitive to maintain our workforce. An everyday 'walk the talk' effort creates the necessary relationships, confidence and engagement.

When running a 24-hour operation, such factors will influence how the employees perceive wellbeing, job satisfaction and work-life balance. This is our everyday challenge and responsibility, when delivering an efficient and safe service. Getting it right leads to both better self-care and better human performance.

Be well.

Carsten Fich was born in 1960 and educated as a Civil Engineer in Copenhagen in 1985. He holds a PhD from the Technical University Denmark from 1989. For many years, he was engaged in developing the Metro system in Copenhagen as Director and Head of Operations. From 2006 to 2015, he was the CEO of the Nordgroup, where he was leading the company's transition from public ownershp to privatisation. In the period 2016–2018, he was the CEO of Reconor and private advisor/board member. Since 2018, he has been the CEO of Naviair. Carsten lives in the countryside in Roskilde near Copenhagen with his wife. He has two grown-up daughters.

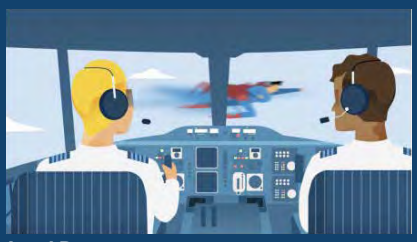
SKYclips

SKYclips are a growing collection of short animations of around two minutes duration which focus on a single safety topic in aviation. Created by the industry for the industry, they contain important messages to pilots and air traffic controllers with tools for safe operations.

There are SKYclips on the following topics

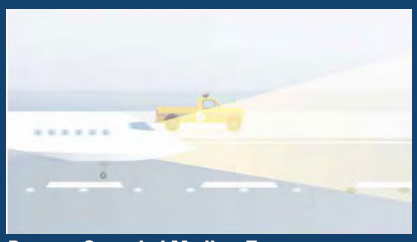
- Aimpoint selection
- Airside driving
- Airspace infringement
- Callsign confusion
- Conditional clearance
- Controller blind spot
- CPDLC
- Helicopter somatogravic illusions
- Immediate departure
- In-flight fire
- Landing without ATC clearance
- Level busts
- Low level go around
- Low visibility takeoff
- Mountain waves
- Pilot fatigue
- Readback-hearback
- Runway occupied medium term
- Sensory illusions
- Speed control for final approach
- Startle Effect
- Stopbars
- TCAS - Always follow the RA
- TCAS RA High Vertical Rate
- Unexpected Traffic in the Sector
- Workload Management

Each SKYclip is developed by aviation professionals from a variety of operational, technical, and safety backgrounds.

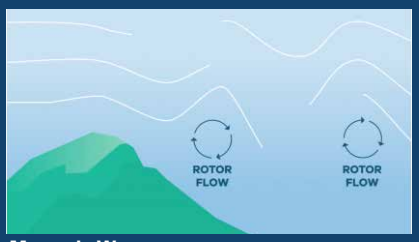

Level Busts

Unextpected Traffic in the Sector

Workload Management


Runway Occupied Medium Term

Airspace Infringement



Mountain Waves

Find the SKYclips on SKYbrary at https://www.skybrary.aero/index.php/Solutions:SKYclips

Steven Shorrock
Editor in Chief of HindSight

CAN WE TALK ABOUT MENTAL WELLBEING?

Jim White (sports broadcaster): "What baffled me – and I don't know if you'll just give me a couple of sentences on it – you're a good-looking man, you played at the highest level, you were a good player, you're a good husband, a good football administrator, you're an intelligent fella. So why?"

Clarke Carlisle (professional footballer): "Well, here is part of the problem, Jim. Because all of that is an irrelevance. It's an illness. So that'd be like applying that and saying, why have you got diabetes? It's all an irrelevance. That circumstantial stuff is irrelevant. When you've got an illness, and it takes hold, and it's not diagnosed or it's not treated correctly, it will get to that disaster stage. Now that's why we're here today. Fellas, we talk to each other. We do talk to each other, but we can be very blasé or flippant. *"What's going on?" "Aw, you know, she's doing my head in, or he's doing my head in, they're doing my head in."* Then we're like, *"Oh OK, let's pop off."* Do you know what? Ask again. *"What can I do for you? Can I help you?"* You know, it's not for me to fix your problems, but what it is for me to do is listen to you, Jim. Because sometimes, as a guy, all you need is to be is listened to and acknowledged. You feel dismissed in this generation, in this 24/7. Everyone wants a piece of you. Just listen to me for once. When guys are going through tough times, there's often that thought that no-one wants to listen. Nobody's going to help me. You've got to ask yourself, have you given someone the opportunity to help you? You know, in the first ten years of my suffering, I didn't let anyone help me because I thought I had to deal with it."

A Good Player in Deep Distress

This is a video-recorded conversation between Jim White, a well-known Scottish sports broadcaster, and Clarke Carlisle, an English former professional footballer and former Chairman of the Professional Football Association. Carlisle made over 500 appearances during his 17-year career, playing for nine clubs across all four English divisions. At 1.91 m (6 ft 3 in), he was an imposing centre-back and also known to be a highly intelligent footballer (and with a clean sweep of A-grades at the end of high school).

In December 2014, Clarke stepped out in front of a truck in North Yorkshire. He survived physically relatively unscathed, but his mental health deteriorated and he disappeared in 2017, again considering taking his own life. A year later, in the video, he described himself as *"very, very content today"*.

A 2015 study by FIFPRO (Fédération Internationale des Associations de Footballeurs Professionnels), the worldwide representative organisation for 65,000 professional footballers, found 38% of 607 active professional players and 35% of 219 former players reported suffering from symptoms of depression or anxiety, or both. In a typical 25-person squad, this equates to nine members of the team. Sleep disturbance affected one in four, overall.

How much do we talk about mental health, especially in professions where a large majority of staff tend to be male, such as air traffic controllers and pilots, as well as senior managers?

Imagine Clarke was one of your colleagues, perhaps an air traffic controller, a professional pilot, or a manager. How would you know that this 'good player' was in trouble? It probably won't be obvious from his behaviour. People in distress can have a remarkable ability to mask the signs and symptoms, especially in professions where there may be fears – however unfounded – about the implications of saying "I need help". Your colleague laughs and jokes with the rest of you. Conversations about the troubles of life are flippant and blasé. You never ask him how he's really doing and if he say's "fine" or "all good", that's the end of the conversation. But Clarke is in deep distress. Perhaps he is suffering from depression, anxiety, or post-traumatic stress disorder. He may have been through a major life change, or not. You can't see anything that rings alarm bells, but you've not really had a conversation.

> Having spoken to many hundreds of air traffic controllers in many countries about safety culture, one thing I notice is that the topic of wellbeing rarely comes up in conversation.

Boys Don't Cry

Two lessons seem to be learned by many males growing up in this world, perhaps even by most of us. One lesson, learned from a young age through parenting and early socialisation, is "Boys don't cry". The second, learned and reinforced in social groups and via the media, is "Men don't talk about feelings". These phrases don't need to be said, as such. Observing and interacting with others is powerful enough to embed these rules in our psyches. These rules contribute significantly to many problems of mental wellbeing throughout life.

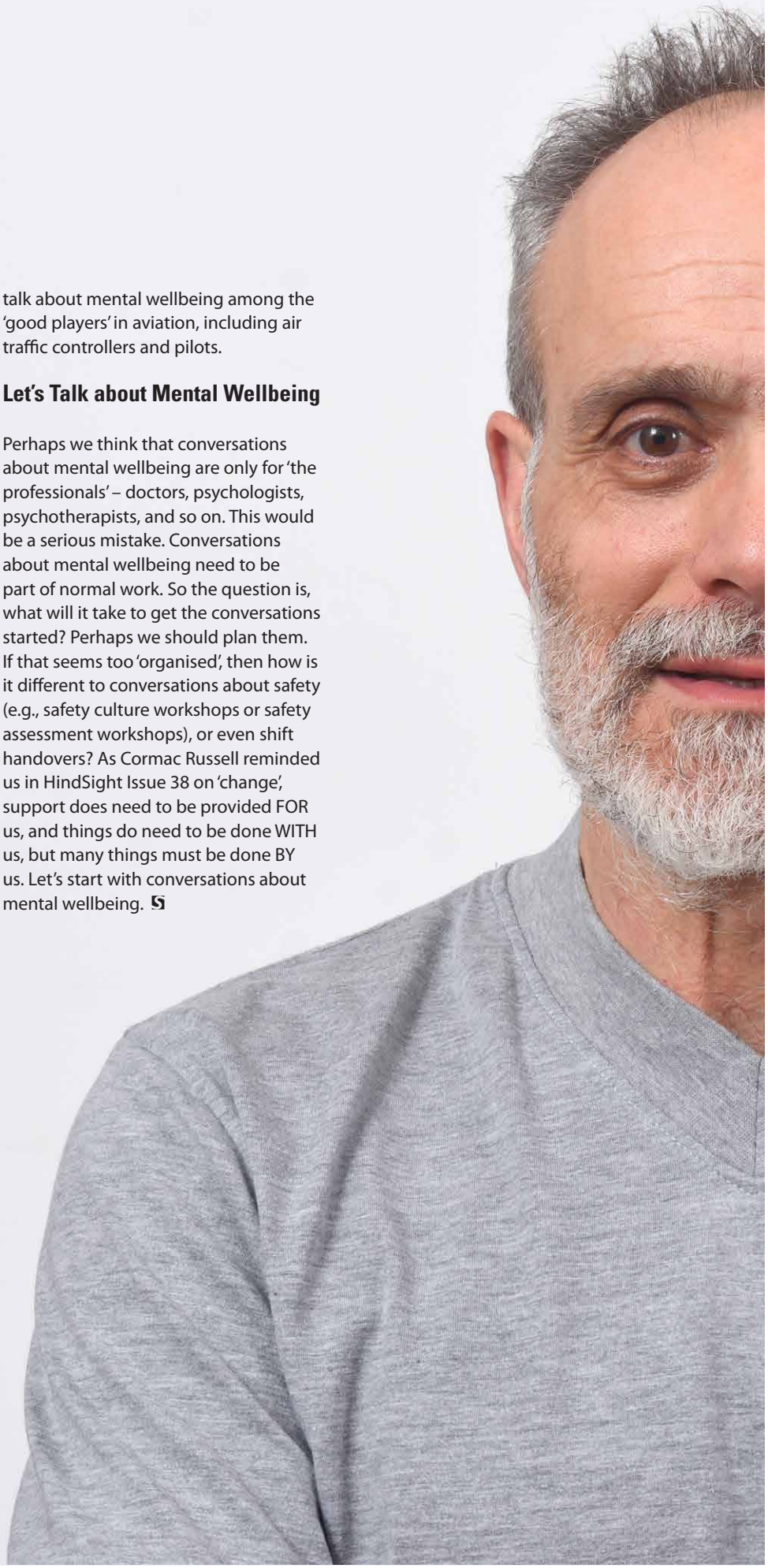
In considering this theme for *HindSight*, I was concerned that it might be too 'soft'. The theme is very different to all previous themes. But the connection between wellbeing and safety, and organisational performance more generally, is undeniable. We just tend to deny ourselves the opportunity to talk about it.

Indeed, having spoken to many hundreds of air traffic controllers in many countries about safety culture, one thing I notice is that the topic of wellbeing rarely comes up in conversation. I also notice that, in most of the workshops I've participated in, the majority of air traffic controllers are male, or else the environment is culturally 'masculine' (usually both). When wellbeing has come up in conversation, the social environment seems to be in really bad shape. Of course, individuals don't necessarily wish to bring up sensitive issues in a group. But there remains a reluctance to talk about mental wellbeing among the 'good players' in aviation, including air traffic controllers and pilots.

Conversations about mental wellbeing need to be part of normal work.

Let's Talk about Mental Wellbeing

Perhaps we think that conversations about mental wellbeing are only for 'the professionals' – doctors, psychologists, psychotherapists, and so on. This would be a serious mistake. Conversations about mental wellbeing need to be part of normal work. So the question is, what will it take to get the conversations started? Perhaps we should plan them. If that seems too 'organised', then how is it different to conversations about safety (e.g., safety culture workshops or safety assessment workshops), or even shift handovers? As Cormac Russell reminded us in HindSight Issue 38 on 'change', support does need to be provided FOR us, and things do need to be done WITH us, but many things must be done BY us. Let's start with conversations about mental wellbeing.



WHY SHOULD YOUR WELLBEING MATTER TO ANYONE ELSE?

MORAL REASONS FOR PROMOTING WELLBEING IN ORGANISATIONS

Is a focus on wellbeing a 'nice thing to do' in organisations, or are there more fundamental arguments? In this Op-Ed, **Suzanne Shale** outlines ethical arguments for making wellbeing a priority.

KEY POINTS

- **We all have an interest in our own wellbeing, and to some extent our own wellbeing depends on the wellbeing of others. But self-interest is not the only reason to support the wellbeing of others.**
- **Attending to wellbeing requires trade-offs with other goals. If organisations and social institutions are to prioritise wellbeing, they must have compelling ethical reasons for doing so.**
- **Arguments for prioritising wellbeing can be made from each of the major Western ethical traditions.**
- **Leaders of organisations, along with their staff, should discuss and reflect on the reasons for focusing on wellbeing**

Please take a moment to try this thought experiment, devised by the renowned British philosopher Bernard Williams (Smart and Williams, 1973).

Jim is a distinguished botanist exploring a country caught up in the midst of a vicious civil war. He finds himself in a village that has been captured by Pedro, the head of an armed militia. Tied up against the wall are twenty randomly selected villagers, whom Pedro was about to execute as an example to potential resisters. Made aware of the arrival of his eminent visitor, Pedro decided to show clemency. If Jim will kill one of the twenty villagers, then as a special mark of the occasion, the remaining nineteen villagers will be let off. If Jim refuses, then Pedro will proceed with the execution.

Williams posed his readers the question, "What should Jim do?" but I would like you to consider a slightly different one. What do you think you would do?

Thought experiments are designed to provoke, and to stay with us as we examine our assumptions. They are intended to be unsettling. This one, while obviously unrealistic, is designed to highlight the limitations of basing our decisions on consequences alone.

In many of the professional groups with whom I've discussed the challenge, an initial response is to grab the gun and shoot Pedro. Williams anticipated this. He wrote that a quick assessment of the situation shows that if you tried this then you, as well as all the villagers, would end up dead.

After further reflection, responses fall into three different lines of reasoning. Some will argue that it is better to save nineteen lives at the expense of one. Those adopting this reasoning will often go on to assess the value of the lives to be taken or spared. Disconcertingly, even among health professionals there will frequently be a consensus that elderly, disabled or unwell villagers might be chosen in order to spare healthy adults and children. A second line of reasoning is that killing an innocent villager would be so at odds with a person's absolute commitment to the sanctity of life that they would refuse to do it, even at the expense of their own life and those of the villagers. This group argues that all the responsibility for the deaths properly attaches to Pedro, and not to themselves. A third line of

argument concentrates on the nature of conscience and virtue. This group contemplates the reality of having to live the rest of their life with the consequences of their action on their conscience. They attempt to weigh this against the mathematical calculus that Pedro is suggesting.

What bearing does any of this have on the business of promoting wellbeing in aviation and other social institutions? The purpose of this article is to set out the ethical arguments for why we should make others' wellbeing a priority, not just a 'nice to do'. Promoting wellbeing involves many considerations. For example, it calls for attention to human factors and ergonomics, to the nature of the built environment, to action on bullying, harassment and incivility, to support for team functioning, and to our own role as bystanders when we observe troubling behaviour. Common responses to Jim's dilemma reveal the three major Western ethical traditions, and how we all use them in our day-to-day reasoning. Drawing on these ethical traditions, we can sort the wide range of activities that go to promoting wellbeing into different types, and see how they are supported by different ethical justifications.

Not providing for the wellbeing of those responsible for others is not just an operational problem, but an ethical breakdown.

Your wellbeing matters because it has consequences for others

One tradition in ethical theorising emphasises the consequences of our actions. The best known of these, called utilitarianism, was proposed by the nineteenth century philosopher Jeremy Bentham. Utilitarians argue that the ethically optimal solution is one that achieves the greatest good for the greatest number of sentient beings, all of whom count equally in the calculation. We should aim to maximise the achievement of 'worthwhile' pleasure, and also minimise pain and suffering. In its time, utilitarianism represented a revolution in moral thought. It challenged the moral grip of the church. And it opposed nineteenth century status distinctions by insisting that the wellbeing of all sentient beings (even women and animals) should be considered.

Much of the ethical content of professional life is underpinned by such 'consequentialist' considerations. And much of the ethical justification for attending to the wellbeing of professionals is consequentialist in nature. Managing risk in high-hazard activities requires leaders and colleagues to manage the impact of fatigue, stress, illness, mood, hunger and thirst, toxic team dynamics and all the rest. This is not only in the interests of the individual, but because of the dangerous or damaging consequences for others. This is an obvious truth in the world of aviation, but in the spheres in which I work (healthcare, humanitarian operations and policing) it has yet to be fully grasped. On consequentialist grounds, I would argue that not providing for the wellbeing of those responsible for others is not just an operational problem, but an ethical breakdown.

Your wellbeing matters because we owe each other respect

While consequentialism can carry us a long way, it was the problematic nature of utilitarianism that inspired the Jim and Pedro thought experiment. One major problem in acting to maximise benefits is that this can lead to the moral interests of some (e.g., in being alive) being sacrificed to promote the moral interests of others. The competing ethical tradition places emphasis on obedience to absolute rules and duties irrespective of the consequences. It is following the moral rule – such as a rule against killing – that is right, in and of itself.

Those brought up in a religious faith will no doubt be able to recall several such rules. The most celebrated secular theory of 'absolute duties' was proposed by German philosopher Immanuel Kant. According to Kant, when you consider how to act you should ask yourself whether, if you formulated a universal law that was binding on everyone at all times, then your act would be compatible with it. This is more or less consistent with the 'golden rule' that you should treat others as you would wish to be treated yourself. According to Kant, we should also always treat humans as an end in themselves, not as a means to an end.

This so-called 'duty-based ethic' clearly prohibits us from sacrificing the interests of one to the interests of the many. And having a duty to treat people as an end in themselves, not as a means to our own ends, requires us to treat everyone with respect.

Wellbeing is commonly undermined by behaviours that fail to meet up to the standard of the golden rule, or the principle of equal respect. Take bullying, harassment, incivility, and discrimination as examples. We know that these behaviours are nasty, but more than that, they violate fundamental ethical duties. Being bullied, harassed, treated uncivilly or discriminated against is dehumanising. It feels like being treated as merely a means to another's end. And such behaviour has consequences for individual and team performance. It is thus wrong with respect to both duty and potential consequences.

Leaders and colleagues who permit the emergence of a toxic workplace culture are breaching the ethical duties they owe to others, as well as falling foul of legal and corporate obligations.

Your wellbeing matters because professionals should strive to be virtuous

On the surface of it, this third ethical justification is closest to the idea that promoting wellbeing is simply a nice thing to do. But if we look closer, there is a stronger claim to be made.

Virtue ethics is one of the most long-standing ethical traditions. Virtue ethics proposes that good decisions ultimately arise out of the good character of a person. An ethical person will aim to live a good life, and achieve full flourishing as a moral person. Consciously cultivating virtue, we hope to grow wiser with practice. This coarse summary hints at one of the commonest criticisms of virtue ethics, which is that it is somewhat self-centred. It could lead to 'keeping one's hands clean' at the expense of achieving valuable goods by accepting moral compromise.

Leaders and colleagues who permit the emergence of a toxic workplace culture are breaching the ethical duties they owe to others, as well as falling foul of legal and corporate obligations.

Classical and Christian theology embraced four character traits as 'cardinal virtues'. These were prudence (the wisdom to choose the appropriate course of action), courage, temperance or self-control, and fairness. The philosopher Alasdair MacIntyre (1981) has argued that if we want to know what is virtuous in the modern world, we have to attend to the valuable goals that are intrinsic to the practice itself (so-called 'internal goods'), rather than any additional advantages gained from pursuing it (external goods).

In the practice of medicine, this includes the prevention of ill health, cure of disease, alleviation of pain, and the advancement of medical science. The 'external' goods are such things as financial reward and the esteem of peers.

Returning to aviation, one obvious 'internal good' of the practice is transporting people safely. Another may be doing so at least cost to the environment. What virtues do aviation practitioners and leaders need to cultivate in order to accomplish these ends? What virtues will allow them to sustain the wellbeing of colleagues in pursuit of aviation's 'internal goods'? To the four cardinal virtues (wisdom, courage, self-control and fairness) we might add honesty, empathy, humility, trustworthiness, and courtesy. These are virtues that we all owe to each other, regardless of our role or rank.

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QF32 AND POST-TRAUMATIC STRESS

Most of us will experience post-traumatic stress at some point in our lives, associated with critical incidents at work or events in our personal lives. For some, this progresses to a more severe disorder. In this article, **Steven Shorrock** reports on an interview with **Captain Richard Champion de Crespigny**, on his experiences post-QF32.

"Pan, Pan, Pan, Qantas 32, engine failure, number two engine, maintaining 7,400 feet, maintaining current heading. Stand by for instructions."

While such transmissions will usually be followed by a temporary increase in stress for both pilots and air traffic controllers, they are trained to deal with such emergencies. But the engine failure of QF32 on 4th of November 2010 was on a scale that very few front-line professionals ever have to deal with. In fact, 21 out of 22 aircraft systems on the Qantas A380 were compromised, and the crew had 120 ECAM checklists to deal with (compared to four or five checklists in a typical simulator session). The crew brought the aircraft to a safe landing at Singapore.

But the stress of critical incidents doesn't end with a safe outcome. The end of a critical incident may be the beginning of another kind of stress, which can last for weeks, months, years or even decades: post-traumatic stress (PTS) and post-traumatic stress disorder (PTSD).

For the rest of the article, I'll refer to 'PTS(D)' to cover both PTS and PTSD. Post-traumatic stress (PTS) is a normal and generally adaptive response to experiencing a traumatic or stressful event, such as an accident or assault. PTS is a very common and normal condition that most people will experience multiple times during their lifetime. If symptoms persist for months or years, they may fit the diagnosis of post-traumatic stress disorder (PTSD), a clinically-diagnosed condition listed in the Diagnostic and Statistical Manual of Mental Disorders (fifth revision, May 2013). According to the National Institute of Mental Health, PTSD will affect 6.8% of U.S. adults in their lifetime. The difference between PTS and PTSD depends on a set of diagnostic criteria and a diagnosis, but PTSD often remains undiagnosed.

Having spoken to Richard for a few hours, I discovered we had a few things in common. We both grew up in family businesses. Both of our mothers died while we were in our late teens. And we had both experienced, and studied in some depth, PTS(D) (my account can be read at http://bit.ly/PTSDandme). So, I was naturally interested in Richard's experience, post-QF32, having read his accounts of it in his books *QF32* and *FLY!*

In *FLY!*, Richard noted that he knew nothing about PTS(D) when he stepped off his A380 at Singapore, but *"what happened that day affected me badly for many months"*, he wrote.

After dealing with the immediate briefings and checking on the wellbeing of passengers and crew, he attempted to return home as a passenger with the other pilots to Sydney. That B747 flight was forced to return to Singapore after another engine failure. He finally arrived home after another day of delay. The following morning, he woke feeling wretched, and was soon in the bathroom, physically unwell.

I asked Richard when he first become aware of the signs of PTS. *"It was five days afterwards when I attended an interview at the Australian Transport Safety Bureau. They said, 'Tell us what happened when you left the hotel and for the rest of the flight.'"* The ATSB had allocated about 20 minutes to hear Richard explain what happened. It took four hours.

Richard got to the point in the story 12 minutes after the engine failure when he decided to climb to 10,000 feet and remain inside 30 miles to mitigate for an all-engine out approach to Singapore – what he calls an 'Armstrong Spiral'. He decided on this action after being overloaded by all the failures that affected QF32. Complexity overwhelmed his senses and thinking. He was unable to maintain his mental model of the aircraft, its many failures and the knock-on effects that created additional failures.

That was a point of maximum stress. *"I was trying to describe the failures to the ATSB,"* said Richard, *"but recalling my memories put me back into the cockpit reexperiencing this avalanche of stresses. My emotions became overloaded and at that point I broke down and cried."* Five days after the crisis, the act of recalling the original situation triggered the PTS. *"That was the first time I realised I was in trouble".* He wrote in *FLY!*, *"It was the first time I had lost my composure since my mother had died 37 years earlier, when I was 17 years old."*

For the next two weeks, every time Richard recalled that point in the flight where he had to prepare for an 'Armstrong spiral', he would start to cry. He then realised that he needed professional help.

Symptoms

Richard experienced typical symptoms of PTS, including flashbacks – perhaps the most well-known symptoms of PTS(D) in popular culture. Traumatic events are re-experienced from memory, as if you are back in the scene, triggering the emotions and often physical sensations that were present at the time. Flashbacks can involve several senses, or just one.

Richard remarked that *"These stressful memories stay dormant, ready to be re-enacted when a certain sensory pattern of events arrives at the brain. It could be a sound, a smell, a taste. These memories remain strong, replay often and put the sufferer back into the crisis."*

While flashbacks are temporary, a more general background rumination is also familiar to those who have experienced PTS(D). Richard's mind was stuck in a four-hour loop, starting with engine explosions, through two hours in the air, then two hours on the ground. The loops were incessant and exhausting, while awake and in his dreams. A related problem is counterfactual thinking – mental simulation of 'what ifs'. *"During the day when I was suffering PTS, my conscious mind was full and distracted. I had no free mental space. I couldn't stop thinking about the event. I was thinking about 'what-ifs'. There was no room for anything else."* This can bring feelings of 'survivor guilt' and shame, even if others would see no justification for these feelings. Such rumination is common among people with PTS(D). While it seems counter-intuitive, it is actually a form of 'avoidance' since it avoids actively processing the traumatic event itself.

Another symptom is hyperarousal or hypervigilance, where the mind and body are on red alert to perceived threats. Of all the symptoms of PTS(D), hypervigilance, heightened startle reactions and associated 'fight-flight-freeze' states can be the most physically and mentally exhausting and debilitating. Everyday things and situations can become potential threats, and reactions tend to be neither proportionate nor predictable. Because of this, focusing can be a problem. *"If I read a sentence, I'd immediately forget it. I was looking at the words, but I wasn't reading or absorbing them. My mind was totally preoccupied and distracted."*

Of all the symptoms of PTS(D), hypervigilance, heightened startle reactions and associated 'fight-flight-freeze' states can be the most physically and mentally exhausting and debilitating.

Sleep was also a problem. Sleep is shorter, lighter and more disturbed with PTS(D), and disturbed sleep exacerbates the condition. Sleep disturbances such as insomnia, fragmented rapid eye movement sleep, and nightmares predict later development of PTSD symptoms, and go on to maintain and exacerbate PTSD. Research findings show that sleep affects emotional regulation and so-called memory extinction, a process of new learning that inhibits older memories. *"One side of my brain seemed to be awake. And even when I was dreaming, I would have lucid dreams about the event and all the 'what-ifs', so I would wake up even more stressed and exhausted. The bad dreams reinforced my bad memories. They didn't weaken with the processes of*

sleep." Memories of QF32 were persisting and being reinforced. Newer, more pleasant memories were not getting laid down. To many, nightmares can be one of the most acutely distressing symptoms of PTS(D). As they reoccur, and you come to expect them, sleep can become further affected, with severe consequences for mental and physical health – a vicious circle.

PTS(D) and the Brain

When talking to Richard, his enthusiasm for the inner workings of things is impossible to miss, whether referring to an A380 or the brain. *"Well, I'm fairly mechanical, so I always have to start at the core."* He is naturally analytical and understanding the brain and mind was, for him, an essential part of recovery. The first chapter in *FLY!* is about neuroscience. When talking to him, he often refers to the brain's core – the limbic system, which serves several functions necessary for preservation, as an individual, group, and species. *"The amygdala, the thalamus, and the hippocampus form the old subconscious lizard brain. It's fast and responds to threats. And we have the cortex, which is a slow but very powerful part of the sentient mind, providing thought, awareness, consciousness, reasoning, prediction, so on."*

Traumatic experiences are so common that you or someone close to you is likely to experience them at some point in your lives, and many of you will experience PTS, which for some will progress to PTSD.

Richard found it useful to understand why, with PTS, people think, feel and react the way they do. *"If you can just be aware that the amygdala – the emotional centre – is responding to threats very quickly. It's situated below the cortex but it's disconnected from the higher conscious functions of logical analysis, reasoning and language. This helps to explain our gut feelings and fears that we cannot explain in words. With the fear response of fight, flight or freeze, the amygdala causes levels of cortisol and adrenaline to spike. That increases our heart and breathing rates, tightens our muscles, and turns off part of our immune system."* For people with PTS(D), it means that they may be angry, touchy, emotional, nervous or even unresponsive.

For Richard, understanding brain function helped him explain his experience, normalise his feelings and remove shame.

He also noted that with PTS(D), the amygdala and cortex can become cross-coupled in a situation of positive feedback that leads to overload and panic, from which recovery is difficult. Passengers with a chronic fear of flying know this state well. This is the feeling that causes some to stand up and try to open the aircraft door. This also helps to explain people's fights for toilet paper during the coronavirus crisis.

Symptoms of PTS(D) will depend on the person, but it is not just a mental condition. It is profoundly physical. Research indicates a variety of biological changes. The amygdala helps control emotion, memories, and behaviour, and the right hemisphere, which controls fear and aversion to unpleasant stimuli, can change in volume. The hippocampus, which helps to consolidate the transfer of information from short-term memory to long-term memory, can become significantly smaller.

Brain signals are affected, as are hormone levels. Noradrenaline (or norepinephrine) helps to mobilise the brain and body for action, and levels tend to be raised with PTSD. Cortisol, meanwhile, helps the body to respond to stress, and baseline levels are often lower in people with PTSD compared to people without PTSD. Research shows that cortisol helps to reduce the levels of high adrenaline that are released during a 'fight or flight' response. Adrenaline (and noradrenaline, or norepinephrine) is also involved in memory formation. But the picture is complex, and there may be a greater cortisol response to trauma-related memories, especially in men. On a more relatable level of physical experience, PTS(D) feels like it is stored in the body – in the head, muscles, and skin.

Many with PTS(D) also experience physical illnesses, often associated with detrimental changes to the immune system. In Richard's case, he was sick for two months after QF32 with pneumonia. *"The sickest I've ever been"*, he said. Some research evidence indicates that PTSD is associated with several conditions, including viral infections, cancer, Alzheimer's and obesity.

Opening Up: Acknowledging PTS(D)

Traumatic experiences are so common that you or someone close to you is likely to experience them at some point in your lives, and many of you will experience PTS, which for some will progress to PTSD. It is so ubiquitous that we rarely acknowledge it or talk about it. PTS(D) symptoms can remain hidden for months or years after a triggering event. Many will never come to understand or accept their experiences. This can create severe complications. Richard said, *"PTS is a normal reaction to stress. But if we don't manage the PTS then it can become a more physiological condition, which is PTSD. And that's when you can suffer greatly."*

Richard noticed something interesting after giving presentations about PTS. Sometimes, women would ask him to sign a book for their husband. He was curious about why this was. *"I'd say, 'Sure, why doesn't he come and talk to me?' And they'd say, 'Well, he can't. He's outside crying!' That happens regularly."* Many who have experienced PTS(D) will recognise this. For some, discussing or accessing memories of the original traumatic events is too much to bear, while others can but struggle to discuss the symptoms of PTS(D) without crying. Richard noted that, *"Women tend to express what they're feeling and that's part of the grieving process. Men tend to hide their emotions, particularly military veterans."* There is a large body of research on this. But one finding is consistent: women cry significantly more than men. And research also suggests that crying has several benefits for wellbeing.

On writing and talking about PTS(D), Richard found that many of those he had written about were suffering in silence. *"About half the people I wrote about in QF32 contacted me afterwards and said, 'Thank you for writing about the PTS that you had, because I had a traumatic experience, and have suffered PTS and nightmares ever since. And that's the first I've ever heard of it."*

This may explain the interest in PTS and QF32. It will surprise many to learn that the second most-asked question Richard is asked about QF32, is about PTS. (The first was about why he didn't pass the route check on the day.)

It seems that many of us, and especially men, deny or hide our experiences or else try to fight them alone. For traumatic experiences, this denial prolongs a struggle that is already too much for any of us individually.

Richard wrote in *FLY!* that he thinks every one of the 26 QF32 crew members, and many passengers, suffered PTS to some degree.

PTS(D) and Just Culture

Our conversation moved on to another dimension: just culture as a critical part of PTS recovery. *"QF32 turned out well. It had a happy ending. But what if I'd made a mistake and it didn't turn out well? What if someone had died? Then I'd have intense guilt and shame. And if you don't have a just culture, and in an environment where people might be criminalised for their honest mistakes, the PTS gets a lot worse."* Accidents happen sometimes, he noted, particularly where decisions must be made quickly under uncertainty. *"We need to really be on the lookout for people who have, through an honest mistake, had an incident, because they will most likely be suffering severe post-traumatic stress."*

He emphasised how this attitude is necessary not only for senior management, but everyone, including colleagues. *"Everyone has strengths and limitations, but failure is part of the human condition. I embrace failures as opportunities to learn and adjust. And I don't mind that errors happen in the cockpit. What's important is that we detect and fix them so they don't escalate."*

Time Out

Once Richard realised that he was experiencing PTS, he knew that he had to recover before returning to work.

He recalled the actions of Major General John Cantwell, now a retired senior Australian Army officer. Cantwell opened up about suffering from PTS as a result of military service that included leadership roles in the Gulf War (1990-1991), in Bagdad (2006), and as the Commander of the Australian Forces, Middle East & Afghanistan in 2010. John wrote about his PTS(D) in his book *Exit Wounds*, published in 2012. *"You must*

get yourself out of leadership positions if you are suffering PTSD," said Richard. *"You must take yourself off-line. You're not in a fit state to make good decisions and lead others. It is critical that you take yourself out of positions of responsibility, especially concerning safety."*

Specifically, air traffic controllers, pilots and others in positions of leadership and responsibility should not go to work if they are suffering PTS(D), until it is treated. In Richard's case, it took four months. *"After QF32, one of the managers said, 'Richard, you've had a bad week. I want you take a week off.' And I said, 'You know what? I think I need a couple of months.'"*

Soon after returning to Sydney, Richard was meant to take delivery of a new A380 from Toulouse and fly it to Australia. This was a great privilege, and a reward for handling a 24-hour delay on an earlier flight. But he knew he wasn't ready. *"I rang the A380 fleet manager, and I said, 'Look, I'm not sure I'm able to evaluate my fitness to fly, so to be safe, you should take me off that delivery flight. You need to allocate it to someone else.' And he said, 'Thank you, Richard. Thank you for saying that.'"* Following this, Richard sought psychological counselling.

It seems that many of us, and especially men, deny or hide our experiences or else try to fight them alone. For traumatic experiences, this denial prolongs a struggle that is already too much for any of us individually. This is understood among those who work professionally with trauma. Dr Peter A. Levine, author of the book *Waking the Tiger: Healing Trauma*, wrote, *"Because the symptoms and emotions associated with trauma can be extreme, most of us (and those close to us) will recoil and attempt to repress these intense reactions. Unfortunately, this mutual denial can prevent us from healing. In our culture there is a lack of tolerance for the emotional vulnerability that traumatized people experience. Little time is allotted for the working through of emotional events. We are routinely pressured into adjusting too quickly in the aftermath of an overwhelming situation."*

Richard recalled a pilot colleague who turned up to a briefing one morning before a seven-day trip. Richard noticed that the man looked tense, his fists closed tight. Richard asked the pilot *"What's the matter?"* The pilot replied, *"Nothing"*. Richard persisted until the pilot revealed that his mother had a heart attack the night before, and was in hospital. *"I said, 'Why are you here?' He said, 'I've got to do the trip.' I said, 'No, you don't.' I rang up the chief pilot and we got him a taxi to see his mother in hospital. If you look for the signs, you can detect stress in other people. As a leader, you have a duty of care."*

Referring to pilots, air traffic controllers, and others in positions of responsibility, Richard talked about the need to be humble and vulnerable about one's mental state. *"In the same way that we feel no shame to tell others about broken bones and other physical injuries, we should not feel reticent to admit fractures in our mental health. We need to say, look, 'I'm not well and I need to seek help.' Faced with the stresses that we have today, the people that will cope are the people who will detect that something is wrong, tell others and seek help."*

As noted by Amy Edmondson in her book, *The Fearless Organization*, this is helped by an environment where it is psychologically safe to be vulnerable. *"And that that is the critical thing we need,"* said Richard. *"If we want to care for and bring the most out of the people, then we need a culture of psychological safety where people feel safe to step up, voice their problems and ask for help."*

But many with PTS(D) do not understand or communicate their experience. Richard said, *"You never know the state of people when they turn up to work. You never know what's happening in the background. So you can only look for the signs."* In some cases, people may mention that they're suffering PTS. In these cases, *"We should be empathetic and compassionate and believe them because it takes courage to talk about this. We should help them to seek professional help."*

Recovery and Growth

In *FLY!*, Richard wrote that *"PTSD wears you down physically, mentally and emotionally, damaging health, happiness and relationships."* No one who has experienced it would disagree. But the truth is that there can be recovery and even growth from trauma. People recover from PTS(D) in different ways. Efforts to recover may need to address the physical, mental, interpersonal and spiritual dimensions. People find benefits in exercise, psychotherapy, walking in nature, meditation, writing, poetry, and – crucially – sufficient, good quality sleep. For Richard, it initially involved a few sessions with a psychologist. *"You need trained professionals to build trust with the person and work out a way to recovery."* For Richard, this involved replacing unwanted memories with good memories, an approach known in the literature as 'memory reconsolidation'. However, there are various ways to work clinically with PTS(D), with psychologists, psychotherapists and psychiatrists. An early sign of Richard's recovery was when he became interested in aviation again. Three months after QF32, he started looking up again at aircraft in the sky.

But even after initial recovery, people's PTS(D) can still be triggered many years or even decades later by reminders of the events or the symptoms, or both.

Research on 'post-traumatic growth' shows that there can be growth from trauma, and people can come out of post-traumatic stress stronger, albeit different.

Richard overcame this by reading and writing to understand PTS(D) as thoroughly as possible. *"I'm a logical person. I didn't quite understand. I just wrote two pages about post-traumatic stress in QF32, but then I studied a lot more about PTS and PTSD for FLY! I found it cathartic to write and talk about it."* Since then, he has spoken about QF32 so many times that it does not trigger an emotional reaction. *"There is nothing in the QF32 story that drags me to tears."*

In *FLY!*, Richard talks about the analogy of PTS(D) and a broken vase. Once it's broken, it may not be possible to remake a vase, but you can make something new – a mosaic. *"Well, when you come out of PTS(D), when you start to heal and grow, you're not going to be the same person any more."* Research on 'post-traumatic growth' shows that there can be growth from trauma, and people can come out of post-traumatic stress stronger, albeit different.

Richard still flies the A380 (currently grounded by the coronavirus crisis), has written two books and delivers presentations to many governments and industries worldwide. He is involved in clinical safety with many organisations and is the Ambassador for Health, Safety and Quality at St Vincent's Hospital in Australia. *"There were many opportunities that presented after the QF32 crisis. I accepted the challenge to take up some of these opportunities. After a crisis, some of us are given a platform to take what they've learned and put it to great use to help others."*

Often forgotten in literature about PTS(D) are the partners and other loved ones who experience the person's symptoms or may be traumatised by the event itself, who may suffer from secondary trauma. Partners and families of people with PTS(D) also find the symptoms difficult to live with. These may include anger, irritability, moodiness, emotional and physical distance, and unpredictable crying. Richard said, *"It was at a party three months after the QF32 event when the first person approached Coral and said, 'You know, Richard's had a bad time after this flight. How do you feel?' Coral burst into tears. No one had ever asked her that question."* More recently, Richard was surprised to learn that, even after several years, certain memories of QF32 still upset his wife.

During the process of recovery, Richard kept his pilot's licence current in the simulator and went back flying once he was well enough. After four months off, fully recovered, he got back into a plane. *"I was fine because I'd taken all that time off to satisfy the investigators, company, media and to get my emotional health back. And I've never looked back because I resolved my PTS. I've flown out of Singapore in Nancy-Bird Walton [the A380] many times and while those southerly departures sometimes trigger memories of QF32, these memories are calm and factual, not fearful emotional memories, so I don't suffer a fear response."*

QF32 and You

You are highly unlikely to experience an event that is even remotely similar to QF32. But during your life, you or someone close to you will probably experience PTS. Your understanding and response to them will determine whether your recovery is swift or long. Understanding the symptoms and underlying causes, and finding or offering support – from friends, family, colleagues, and professionals – may be the crucial difference. And by taking positive steps, you are more likely to grow from the experience.

FLY! - Life Lessons from the Cockpit of QF32 was published by Penguin Random House in 2018 (Fly-TheBook.com).

QF32 was published by Pan Macmillan in 2012 (QF32.com).

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Richard Champion de Crespigny is an Airbus A380 Captain with Qantas Airlines with over 20,000 flying hours. He was born and educated in Melbourne, Australia. He decided on a flying career at 14-years old when his father organised a tour of the Royal Australian Air Force (RAAF) Academy at Point Cook in Victoria. Three years later, he joined the RAAF Academy in 1975 and began flying a year later. By 1979, he had successfully completed a BSc in Physics and Maths, and a Graduate Diploma in Military Aviation. He continued in the RAAF until 1986, when he joined Qantas, where he converted to Boeing 747s. In 2004, he converted to Airbus A330 and in 2008 converted to Airbus A380 as one of Qantas' most senior captains.

Following QF32, Captain Richard Champion de Crespigny was appointed as 'Member in the General Division of the Order of Australia' (AM) "for significant service to the aviation industry both nationally and internationally, particularly for flight safety, and to the community". He has won a number of awards including Flight Safety Foundation Professionalism Award in Flight Safety and the Guild of Air Pilots and Air Navigators Hugh Gordon–Burge Memorial Award for Outstanding Contribution to Air Safety (both in 2011). In 2014, he was awarded Doctor of the University (honoris causa) at Charles Sturt University. He has written two best-selling books: *QF32* and recently-published *FLY!* Life Lessons from the Cockpit of QF32.

STRESS: ACUTE AND CHRONIC

Stress, burnout, critical incident stress, post traumatic stress… What's the difference between these common terms? **Carol Quinn**, a registered counsellor, who worked for 21 years as an ATCO, explains some important distinctions.

What is stress?

There are many definitions of stress that tend to emphasise the relationship between a person and their external world. The UK Health and Safety Executive define stress as *"The adverse reaction people have to excessive pressures or other types of demand placed on them."*

Those pressures may come from different sources. When there is an imbalance between the external demands and our internal 'resource capacity' to deal with them, stress is experienced.

Just as our mobile phones need constant recharging and updates in order to function and to protect from bugs and viruses, as human beings we need to recharge and look after our mental and physical wellbeing.

Stress (unlike a motivating pressure) is not good for you – it is an unhealthy state that needs to be addressed for mental health. Often we find an excuse to neglect self-care, or our belief system gets in the way. We might pay more attention to maintaining our car (fuel, oil and tyres) than ourselves. Just as our mobile phones need constant recharging and updates in order to function and to protect from bugs and viruses, as human beings we need to recharge and look after our mental and physical wellbeing.

What is burnout?

The World Health Organisation (2019) refers to burnout as *"a syndrome conceptualised as resulting from chronic workplace stress that has not been successfully managed and is defined by three symptoms:*

- *feelings of energy depletion or exhaustion*
- *increased mental distance from one's job or feeling negative towards one's career*
- *reduced professional productivity"*

Burnout may be the result of chronic or prolonged stress, but it isn't the same as too much stress. Stress involves too many pressures that demand too much of you, physically and mentally.

However, stressed people can still imagine that if they can just get everything under control, they'll feel better. Burnout is a condition of exhaustion where mental health has eroded over time due to chronic exposure to non-traumatic stressors.

People experiencing burnout often don't see any hope of positive change in their situations. They lose motivation, and seem to be beyond caring. If excessive stress feels like you're drowning in responsibilities, then burnout is a sense of being 'dried up'. While you're usually aware of being under a lot of stress, you don't always notice burnout when it happens.

What can be done to prevent or address excessive chronic stress and burnout?

You have a lot more control over stress than you may think. There are positive steps you can take to deal with overwhelming stress and get your life back into balance. It's important to pay attention to the three R's:

- **Recognise** – Watch for the warning signs of burnout.
- **Reverse** – Undo the damage by seeking support and managing stress.
- **Resilience** – Build your resilience to stress by taking care of your physical and emotional health.

Recognising the signs is key. Sometimes our work can define us. But work achievements aren't everything. Asking yourself what and who you are outside work can be liberating and help to find a healthy balance in the way we set boundaries and manage our priorities for self-care. Knowing how to delegate and nurturing your creative side is essential. Being off 'sick' to pay attention to stress doesn't mean you are bad at your job; on the contrary, it is being conscientious. Trying to push through the exhaustion and continuing as you have will only cause further emotional and physical damage.

By learning to give yourself permission to pause and change direction, you can manage your stress, overcome burnout and give yourself a chance to feel healthy and hopeful again.

One of the most effective things is to reach out to others. We know from research that social support is a natural 'salve' to the effects of stress, reducing feelings of isolation or difference. ATCOs often avoid reaching out; convincing themselves that experiencing stress is an issue of their own ability and competence. They don't realise it is a health issue.

The person you talk to won't necessarily 'fix' your stressors. They just have to be an attentive and acknowledging listener, without expressing judgement.

What is critical incident stress and post-traumatic stress?

Critical incident stress (CIS) and post-traumatic stress (PTS) are both terms to describe a normal, acute and somewhat predictable psychological reaction to an unusual or traumatic event. It can have survival value and it is not an illness. Critical incidents are *"unusually challenging events that have the potential to create significant human distress and can overwhelm one's usual coping mechanisms"* (International Critical Incident Stress Foundation, ICISF).

In order to do our jobs with focus, we ATCOs often try to contain our emotions and strive to keep the 'picture' of what is happening, whilst planning for the safe and orderly control of any situation. When something out of the ordinary or unexpected happens, it can leave us feeling like that control has been taken away from us. The magnitude or suddenness of some events overwhelms our reasoning ability, leaving us feeling helpless. This is down to our brain's survival networks and the 'shortcuts' to safety-orientated actions. These are influenced by the way the amygdala, part of our brain with a key role in emotion and behaviour, detects threats from our environment, which can render the higher parts of our brain weak. Autonomic emergency responses such as aggressive outbursts or startle and hypervigilance persist to keep us safe and defended.

When we are impacted by our biology in this way, we often don't feel right. Memory, concentration and appetite are hijacked by certain stress hormones, brain structures and the autonomic nervous system generally. These evolved to help us defend against threats at lightning speed, without conscious reflection. But once we recognise it, we can then choose to regulate the response and soothe ourselves, thereby reclaiming a sense of control. The small things that we do have control over at these times are key (e.g., what to eat, who to be with, when to rest or exercise).

Post-traumatic stress disorder (PTSD) is a dysfunctional variation of PTS, resulting from a complex interaction between the traumatic event and the individual experiencing the event. Symptoms must persist for a minimum of 30 days. It can be treated successfully. This is discussed elsewhere in this Issue of *HindSight*.

What is Critical Incident Stress Management (CISM)?

Critical incident stress management (CISM) is a comprehensive, integrated, systematic and multi-component approach. The aim of CISM is simply to help people to help themselves. CISM principles come from learnings from the First World War. These principles are:

- to provide support near to the front line or place of work (proximity)
- to mitigate more serious psychological difficulty or physical illness (immediacy)
- to normalise reactions and instil a hope for recovery (expectancy).

Any crisis 'intervention' should be based on need and should target the response (not the event). It is in our nature as ATCOs to analyse an event over and over, and in doing this we often forget to pay attention to caring for our response.

Normalising the response is not to dismiss the seriousness of it, but rather to acknowledge, validate and encourage choices for adaptation to a sense of being able to cope. This may involve finding a 'new normal' and there has been much research in recent years around experiences of personal growth after traumatic events – post-traumatic growth.

Internationally, most ANSPs have adopted the ICISF models of CISM. There has been some confusion with terminology. The use of the word 'management' can trigger a fear that somehow we are going to be managed by someone, when the real aim is to enable ATCOs to help themselves, through information and an opportunity for catharsis. Similarly, 'incident' has a specific meaning in ATC, while it is the response to the crisis that needs to be addressed.

What we do know for certain is that unpredictable things happen. Being able to recover from the experience of dealing with these, alongside the everyday (more predictable) busy experiences, is key to adaptive functioning. Not just for a procedure-driven aviation system and for ourselves as workers, but for our mental health as human beings.

"You can't stop the waves, but you can learn to surf." ~ Jon Kabat-Zinn.

Carol Quinn worked as an ATCO with NATS from 1988 to 2009, latterly on Heathrow Approach. She is now a trauma therapist, registered with the British Association of Counsellors and Psychotherapists (BSc Psychology, MSc Psychological Trauma). Carol helped set up the NATS CISM programme, co-ordinating over 200 CISM peers and sat on the EUROCONTROL CISM User Group. She now supports individuals and organisations worldwide.

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SYSTEM WELLBEING

Wellbeing is not just an individual concern. It's about the system as a whole, as **Anders Ellerstrand** explains.

When I hear the word 'wellbeing', I connect it to an individual. Wellbeing is about me or about another person. As the final part of my studies for a Master degree in Human Factors with the Coventry University, I conducted a research project that made me realise that we should discuss wellbeing not only on a personal level but also on a system level.

The Malmö ATC Centre in Sweden

A background for my study was that the Swedish ATC Centre in Malmö saw a steady increase of air traffic between 2014 and 2018. The number of IFR traffic movements in 2018 was up by 14.5% from 2014, while the number of controllers remained the same. The main indicator of safety (the number of separation minima infringements per the last 12 months) showed a positive trend and the centre stayed well within the performance targets, which are set on a European level. Based on these data, it seemed like a good idea to look for the positive factors that enabled this. My research was based on interviews and a survey with controllers at the centre.

The ATC centre in Malmö handles an airspace divided into 12 sectors. A suite of two ATCOs can control from one up to five sectors. The executive controller is responsible for the sector and handles radio communication, and the planner controller handles coordination with adjacent sectors. The controllers are supported by a technical ATM system with a range of tools to facilitate conflict detection and resolution. Some tasks are fully automated. A total of about 175 air traffic controllers work at the centre.

Wellbeing

During the research interviews, I asked four questions. The answers covered a lot of areas but here I will focus on answers related to wellbeing.

Imagine a really good day at work, when you feel truly pleased with yourself and your work. Can you tell me about it?

Some controllers started talking about their own wellbeing, like "I'm well rested, with energy and a positive feeling" but many also said things like "there is a positive mood in the group" or "the colleagues matter, their mood, there is a positive spirit".

Working as a controller is not a one-person job; it is about teamwork, and the wellbeing of the group affects the work of the individual. You can get an idea of what the day will be like, based on the mood people are in, as they arrive to work. Group wellbeing is, however, also affected by the situation at work. A good day is when staffing is sufficient to give a good balance between work and breaks. Traffic matters as well – enough to keep you busy and challenged but not too much. There is also a sense of professional pride that seems to affect wellbeing, and controlling is a job that gives you immediate feedback – you can see it on the radar screen if you succeed.

What do you value most about yourself as a controller? What is your asset?

Apart from the technical skills of controlling, answers concerned cooperation and the ability to support fellow controllers. Some mentioned professional pride, how controllers like to be challenged and how they have high standards when it comes to providing good services.

We should discuss wellbeing not only on a personal level but also on a system level.

What do you value most about being an air traffic controller?

Answers were about pride, for instance about the responsibility of the job and about doing a good job, "to make a difference". People also value variation: "no day is like any other". Controlling is also fun: "after 30 years, it's still fun to go to work". Now, isn't that wellbeing? Another aspect was brought up: "the job is demanding and stressful, but when I leave the room, I leave it". This may not be the case always, but several controllers mentioned it. Most days, you don't bring your work to the coffee break or home to your family. Work is everything when you are in position but then you can leave it. Controllers also mentioned shiftwork and how their ability to influence the roster made it easier to balance work and family life.

What is needed for wellbeing and can an organisation do something to create wellbeing?

What do you value most about Malmö ATCC? When Malmö ATCC is at its best – what factors contribute to that?

Among the first things mentioned was "colleagues". Again, this tells us how controlling is not an individual job but teamwork: "we take care of each other" and "we have fun". At the Malmö Centre, controllers always work two-by-two and the importance of this was emphasised: "you learn from each other" and "all planner controllers do everything to help their executive controller".

The physical environment with a height adjustable workplace was mentioned: "it's good to be able to stand up and work". But support functions and management were mentioned even more: "former controllers in many positions, they understand us"; "there is a short distance between senior manager and the people on the floor"; "no hierarchy"; and, "the manager trusts me and listens to my opinion". At the centre there is not a fixed roster. Instead controllers have the possibility to influence their roster to fit individual needs. This was mentioned by controllers: "we can schedule for enough rest between shifts"; "roster staff is very accommodating"; and, "choice of annual leave, I have influence".

What is system wellbeing?

For me, the lesson from my survey is to look at the whole picture. Just counting the number of hours between shifts or how long you sit in position before a break will not tell the whole story. When I asked controllers about positive factors that help them do a good, safe job, the answers show that many factors explain it. You may change the rostering based on solid scientific proof that it will provide better rest, but if you at the same time create problems for the balance between work and family, you may achieve nothing.

One of the things I find striking in the results of my survey is the importance of colleagues. As a controller you rely heavily on your planner/executive, but also on controllers working other sectors. Having good relations and knowing that people around you are having a good day and are in a good mood may be as important as pure technical skills.

Anders Ellerstrand has been an ATCO for over 35 years and has an MSc in Human Factors in Aviation. He is a Watch Supervisor in Sweden but has also worked for ICAO.

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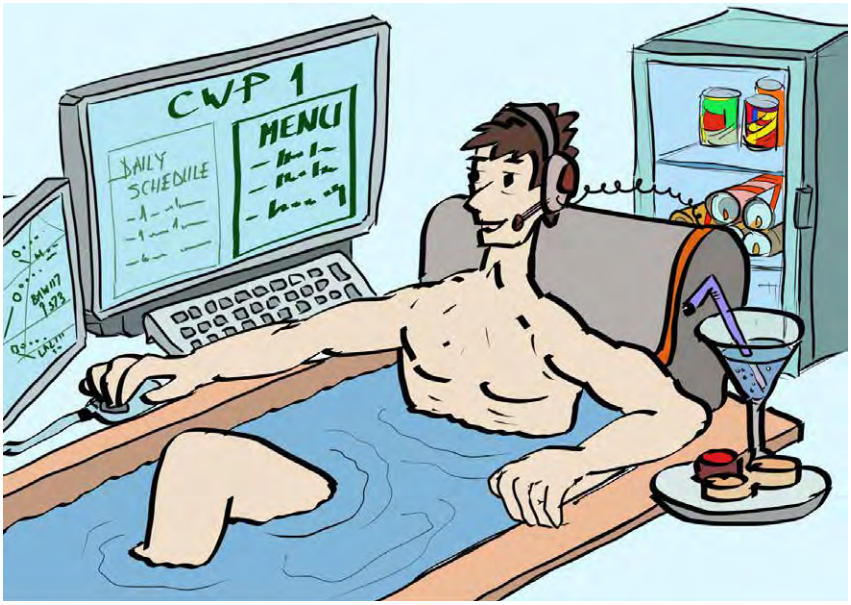

Imagine a really good day at work, when you feel truly pleased with yourself and your work. Can you tell me about it?

WELLBEING: A SHARED RESPONSIBILITY BETWEEN ORGANISATIONS AND PROFESSIONALS

EU Implementation Regulation 2017/373 introduces the concept of shared responsibility between organisations and their air traffic controllers. **Guadalupe Cortés Obrero** and **Marc Baumgartner** explore how this might look in reality.

Wellbeing is a challenging topic for frontline professionals such as air traffic controllers. It addresses a topic which is seen as 'soft' and subjective. There are no common metrics (e.g., runway or sector capacity), nor is there a common approach to address the issue of wellbeing. So this article raises some key issues that may affect both air traffic control organisations and their professionals with regard to wellbeing, especially in light of the newly introduced EU Implementation Regulation 2017/373 (IR 2017/373).

Wellbeing is a holistic concept related to health. In 1948, the World Health Organization (WHO) defined health as *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"*. Wellbeing therefore includes physical, psychological, social, organisational, environmental and economic aspects. There is an extensive European regulatory framework and there are published standards regarding workers' health management with respect to a variety of issues, such as the safety and health of workers, work-related stress, working time and informing and consulting employees.

In air traffic control, as of January 2020, IR 2017/373 establishes the specific requirements for air traffic control organisations to prevent and limit the negative effects of occupational fatigue and stress on ATCOs, the impact of rostering system, and the exclusion of psychoactive substances abuse to ensure air traffic safety. Specifically, reference is made to the need to prevent and mitigate these negative effects from a wider perspective, considering both the individual and the organisation for safety purposes.

The truth is that the characteristics and culture of the organisation can impact employees' health, and stress is a clear example. For instance, Costa (1995) describes work demands, operating procedures, working times and tools, as well as work environment and organisation, as the main sources of stress of ATCOs. According to Costa, these stress factors might lead to long-term effects on the air traffic controller's health, contributing to hypertension, heart disease, diabetes, ulcers and psychoneurotic disorders. WHO reinforces this, stating that stress may impact individuals, and in turn affect the organisation (e.g.,

level of commitment, absenteeism, performance), as well as society in general (e.g., cost of health insurance, consequences to the public).

Compliance is the main driver for many activities in ANSPs. This can be traced to issues of accountability and liability. Since the introduction of Single European Sky legislation and the creation of EASA, many states and ANSPs have started comprehensive compliance work which has institutionalised certain aspects related to controller wellbeing. Managing employees' wellbeing effectively, including compliance with IR 2017/373, requires that ANSPs adopt a comprehensive long-term strategy, developing appropriate policies, and – more importantly – to develop and monitor effective practices, taking a holistic perspective.

Air traffic controllers perform their activities under specific formal and informal rules, in a particular cultural, social and legal context. Organisations need to focus on the human dimension and should be ready to invest in air traffic controllers' wellbeing, aiming not only for compliance but also to cherish their human capital.

ATCOs, on an individual level, must comply with the human dimension of IR 2017/373 to meet specific requirements and be "fit for duty". That is, they must be medically fit, rested for duty and free from psychoactive substances. In its published guidance manual, IFATCA explains that the Implementing Rule implies a shared responsibility between the organisation and the individual. ATCOs are responsible for certain 'hygiene' factors such as rest, exercise, and good diet, to be able to fulfil a very demanding job. This might also require a change of culture. It raises questions about what kinds of activities we should undertake before shifts, for instance, and about practices related to work (e.g., "Can I continue to change my shifts to work seven days in a row to have more days off afterwards?"). Some practices may have to change with the new framework, and some new trade-offs may be necessary.

The wellbeing of ATCOs is essential for safe and efficient ATM, and IR 2017/373 introduces the concept of shared responsibility between organisations and their air traffic controllers. ANSPs need to go beyond compliance, instead aiming for excellence in terms of mental and physical health at work for air traffic controllers. The prevention and management of the problematic use of psychoactive substances, and the negative effects of fatigue and stress-related risks, should not be the end of the road, but just the beginning to maximise the wellbeing of ATM personnel, for both safety and efficiency.

Reference

IFATCA (2018). *IMPLEMENTING REGULATION (EU) 2017/373 FOR ATM/ANS. General advice and guidance with regard to the new EASA requirements on stress, fatigue and psychoactive substances*. Version 1.0, December 2018. http://bit.ly/IFATCA2017373

Guadalupe Cortés Obrero is an ATCO with tower, TMA, and en-route experience. She holds degrees in Linguistics, Air Transport Management, and Human Factors in Aviation. Guadalupe is accredited as a Human Factors Specialist by the European Association for Aviation Psychology. She collaborated with Aprocta and IFATCA for several years, and now she is leading Human Factors at ENAIRE, including fatigue and stress management.

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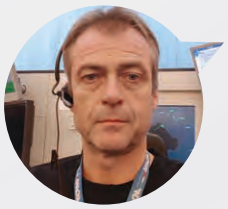

Marc Baumgartner is an air traffic controller and supervisor in Geneva ACC. Marc was a member of the Performance Review Body/Performance Review Commission. For eight years until 2010, he was President and CEO of IFATCA and has coordinated the activities of IFATCA in SESAR and EASA.

COMFORT AT WORK: A SPOILED CHILD'S WHIM OR CONDITIONS FOR SAFETY?

Sources of discomfort at work act like a constant toothache that affects wellbeing and performance, and appeals for comfort are not the 'whims of spoiled children', says **Emmanuelle Gravalon**.

Nowadays, we hear and read a lot about wellbeing at work. Most of the time, articles explain that to perform well at work, you must feel well in your head and body. Lots of advice is given. Think positive! Be active! Sleep well! Be nice to people! The advice is usually very individual. It is as if wellbeing were an external factor that everyone must bring to work, and as if individual wellbeing automatically induces wellbeing at work.

Shift workers are sometimes made to feel guilty for asking for 'comfort at work' and have to continue with an attitude of 'the work must go on'.

Lack of wellbeing at work will have a negative impact on your performance. Long-term lack of wellbeing will induce tiredness, anxiety, boredom, and perhaps depression. It will also negatively affect physical health, which will lower again your performance. Most will acknowledge that lack of wellbeing is affected by 'bad' working conditions (including the physical and ambient environment), relations with colleagues and management, job security, salary, promotion possibilities, and so on.

And yet, 'good' working conditions are mostly perceived as 'comfort at work'. 'Comfort' is a taboo word in the workplace. Comfort is for your home, for relaxation. 'Comfort at work' seems to be a spoiled child's whim, even more so when it concerns such privileged workers as air traffic controllers.

Like many other air traffic controllers, I have encountered situations where working conditions were affecting my performance: work in progress close to the control room, broken air conditioning systems, unergonomic working positions, a broken chair, a flickering screen, an unserviceable printer, and even such 'details' as a broken coffee machine. Other situations have involved tense relationships within the team or with managers, and unrecognised workload.

Many workers experience such issues. So what is the problem? One problem lies in how such accumulated sources of discomfort affect those working shifts in safety-critical professions. When the air conditioning is broken in a nine-to-five office, one can find another place to work, or perhaps even go home to work. When the coffee machine is out of order, you can have a break elsewhere.

This difference also affects the way that requests are taken into account. Shift workers are sometimes made to feel guilty for asking for 'comfort at work' and have to continue with an attitude of 'the work must go on'. But cumulative disturbances take away part of your capacity, like a toothache. We air traffic controllers need to assign our cognitive resources to gathering and processing information, planning, making decisions and implementing them, monitoring outcomes, and cooperating with other stakeholders. We need concentration, and we need it for the whole period we are working.

Air traffic controllers are trained to deal with unusual and uncomfortable situations. Our professionalism and adaptability allow us to overcome temporary annoyances. But when sources of discomfort pile up or last for a long time, they become like a toothache and endanger our cognitive processing, wellbeing and performance, and therefore safety.

Emmanuelle Gravalon has been working as an air traffic controller for over 30 years. Formerly in Limoges airport, she is currently an approach controller in Basel-Mulhouse International airport. She is an HF facilitator for controllers, and graduated in Ergonomics & HF Basics from Paris Descartes University.

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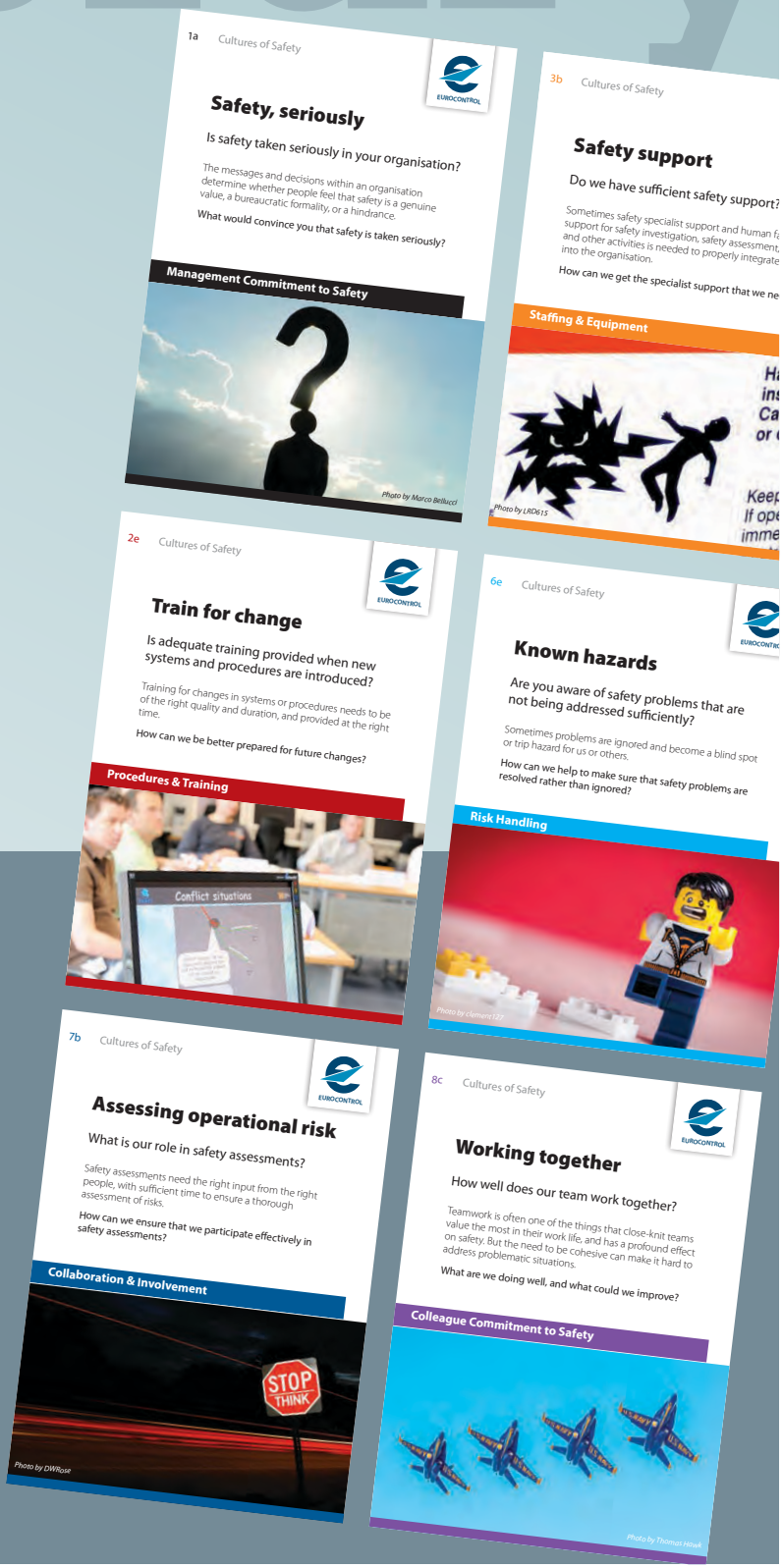

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SAFETY MANAGEMENT Q&A

Andrea Sack is Director Safety, Security and Quality at Austro Control.

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1. What is the most significant change facing your organisation at the moment that has relevance to aviation safety?

Austro Control is presently working on a concept to introduce remote tower operations. Remote or digital towers have become highly relevant for most ANSPs in the past years, and some ANSPs have already gained a lot of experience in their operation. This is good for us, because it gives us opportunities to learn from our European neighbours and it also means our ATCOs will have the chance to gain knowledge from their peers. What makes the change so significant from a safety perspective is the implications for technology, procedures and operations, and human factors generally. The concept of remote towers, with a view of the airport through technology rather than a controller being on site looking out the window, is a whole new way of working. Therefore, it requires careful planning, safety and change assessment and – very importantly – strong support and contribution by operational staff.

2. Why is this change necessary? What is the opportunity or need?

As a starting point, we are working on a concept to introduce a virtual centre for some of our approach units, which are presently located on site at the conventional towers. We are making this change to increase the efficiency of our operations and to enable an increase in capacity in other units. Once introduced, this will allow to gain experience with implementing this technology, operating remotely, and help us understand what the change means for front line operators. Based on the outcome and lessons learned, we can then make more educated decisions as to how we could utilise this technology for other use cases.

3. Briefly, how is safety assured for the change?

A safety expert was appointed to the remote tower team from the very beginning of the conception phase, and a safety assessment will be planned and carried out according to our methodology. Our safety case is also based on available safety assessment guidance material, which has been developed by EUROCONTROL, CANSO

and EASA. As part of the safety case, we are carrying out a human factors assessment to thoroughly address all aspects of the change, including team resource management, workload, human-machine interfaces, and ergonomics more generally. As a starting point, we intend to produce a thorough job analysis of work as it is done today.

4. What are the main obstacles facing this change?

Apart from the technical enablers, I think more than anything else it's the challenge of ensuring that ATCOs feel competent to carry out their jobs the same way as if they were on site, and giving them a good sense of situational awareness. We need to look carefully at human performance scenarios, where we get an understanding of what the controllers need to see and how well they need to see it. This is where we will aim to get information from other ANSPs, where remote operations have successfully been implemented.

5. What is the role of front-line practitioners? How is their expertise incorporated into change management?

Front-line practitioners have been involved from the very beginning and are actually leading some of the work packages. We have a very participative approach to our safety work, where everyone in the safety assessment team is encouraged to bring in their expertise and where we strive to reach a consensus.

6. What do they think about the change?

Of course, there are some insecurities. It's a change in the way they work, and in the technology deployed. But I think the approach we are taking, to start with the centralisation of approach services is one where they can gradually familiarise themselves with the look and feel. I think that it is natural for controllers to want to see an exact replica of what they would experience on site, but we need to differentiate between needs and wants for our implementation to be a success, and this takes time.

7. How can front-line practitioners get involved in safety management to best support operational safety?

Whenever we carry out a safety risk assessment in ATS, we always make sure front-line operators are part of the assessment team. In fact, we have trained many of them to become safety peers, which means they can lead and moderate the risk assessments. While it's not ever going to be possible to get every front-line person involved in safety decision-making, we do always make sure they're adequately represented. We also always encourage front-line practitioners to take on safety roles, such as operational safety functions, becoming members of the local safety committees or acting as safety assessment peers. To be honest, we couldn't do our safety work without the contribution of the front-line operators.

PILOT WELLBEING: THE LIVED EXPERIENCE OF THE PILOT

Should the focus of pilot wellbeing be on ultra-rare, catastrophic events, or the relatively common difficulties that affect our physical, mental and social wellbeing? In this article, **Captain Paul Cullen** reports on a project to investigate the lived experience of the pilot.

KEY POINTS

- **Work-related stress can affect the physical, mental and social wellbeing of airline pilots.**
- **The current focus seems to be on the prevention of catastrophic, but exceptionally rare murder-suicide events.**
- **The focus also needs to be placed on lower level suffering, which is not commonly understood or acknowledged, nor is the impact on safety.**
- **Most pilots seem to be thriving, and valuable lessons can be learned from these individuals to reduce susceptibility to psychological distress.**

The Role of Pilot Mental Health in Accidents

When pilot mental health is mentioned, many people think of Germanwings 9525. To prevent another high-profile catastrophe, authorities went to great lengths to detect and remove pilots with mental health issues, and provide support to pilots with mental health issues. Since 1982, of almost 1,500 fatal accidents involving commercial aircraft, eight were deliberately caused by pilots. But by focussing on rare, high-profile events, might we be missing the bigger picture of pilot wellbeing? My research suggests that we know surprisingly little of the influence of pilot wellbeing on safety and accidents.

'The Right Stuff'?

Pilots have traditionally been considered to possess 'The Right Stuff', being somehow resilient to the issues suffered by the general population. However, the evidence suggests that this is not the case. A 2012 study of over 800 Brazilian pilots reported an incidence of 24% for common mental disorders and recommended that mental health should be considered a priority of civil aviation in Brazil (Feijó et al, 2012).

In 2016, Harvard University reported on a study of more than 1,800 pilots (Wu et al, 2016). Over a two-week period, 13% of pilots met the threshold for clinical depression or a major depressive disorder and 4% of pilots reported having suicidal thoughts. Eindhoven University of Technology studied 1,147 European pilots in 2018, reporting that 40% of pilots experienced high burnout (Demerouti et al, 2018).

It is difficult to know how many commercial pilots are flying today, with estimates ranging from 130,000 up to 290,000. But if the results of the studies above are reflective of what is going on worldwide, there could be thousands – or tens of thousands – of active pilots experiencing these sorts of mental health issues.

The Lived Experience of a Pilot

It has long been known that many factors affect our performance. These can be external to the person (e.g., weather, organisational culture) or internal (e.g., alertness, experience, confidence or wellbeing). Pilot wellbeing includes physical, mental and social aspects.

Since 2015, *The Lived Experience of a Pilot* research team at Trinity College Dublin have been trying to understand the relationship between pilot wellbeing and flight safety. As a pilot and a member of the research team, I am interested in the effects of work-related stress on pilot wellbeing and the associated impact on both pilot performance and flight safety.

Work-related stress is defined by the World Health Organisation as "the response people may have when presented with work demands and pressures that are not matched to their

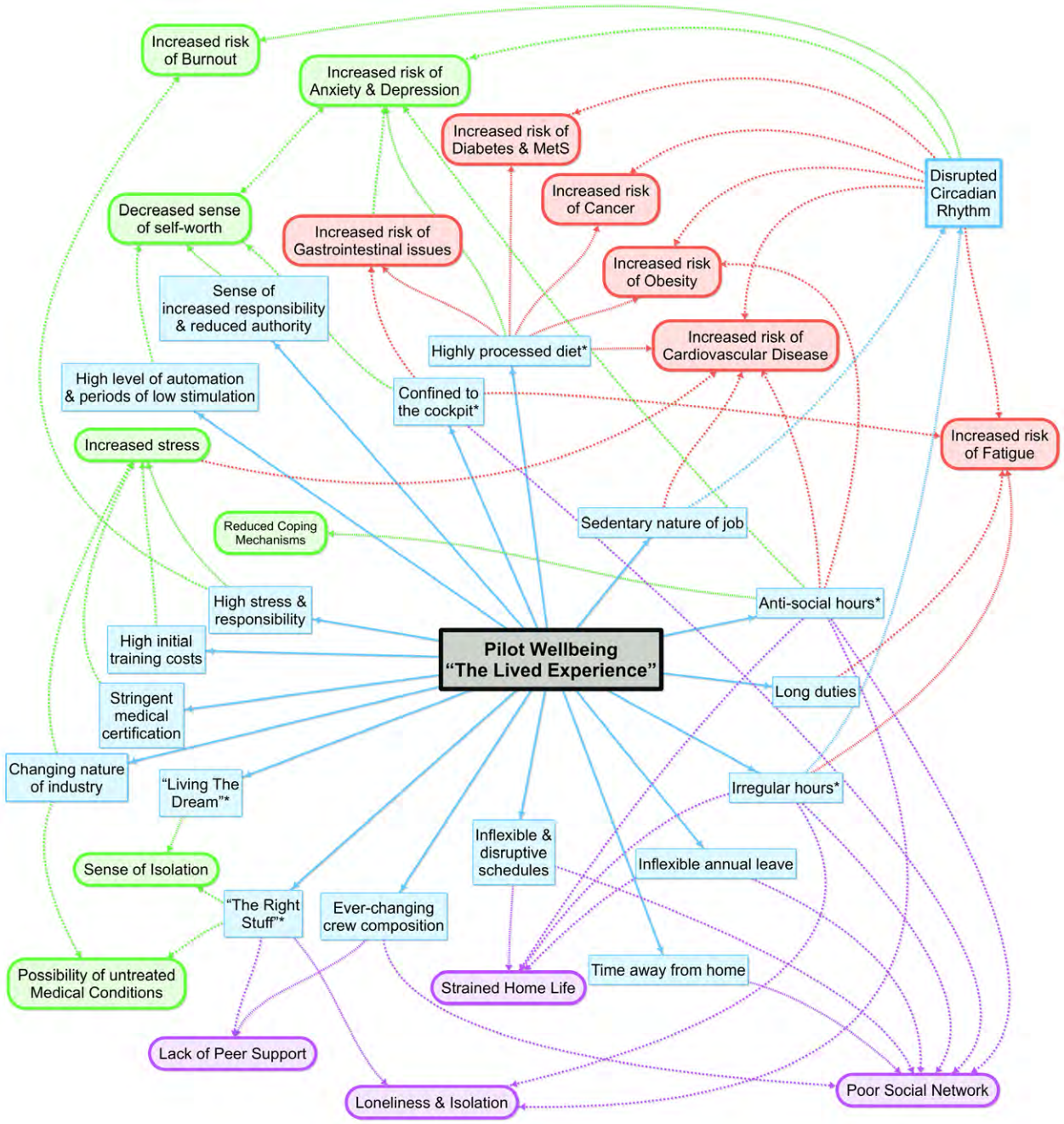

Figure 1: Factors affecting pilot wellbeing

knowledge and abilities, and which challenge their ability to cope".

Things outside the workplace, like family problems or debt, can be responsible for stress. A person experiencing stressful life events may find that he or she is less able to cope with the demands of work, even though work is not the cause, or may not have been a problem before.

Our preliminary field research identified sources of work-related stress and involved informal investigations with over 100 pilots. Considering physical, mental and social aspects of wellbeing, the 'Lived Experience of a Pilot' model was created. This was further refined based on an extensive review of the scientific literature, input from numerous medical experts, and a series of workshops with pilots (Cahil, et al, 2018, 2019). A simplified visual depiction of the model is shown in the diagram in Figure 1. Sources of work-related stress are shown in blue, and the resultant physical, mental and social health outcomes depicted in red, green and purple respectively.

Workshop participants identified what they believed to be the most significant and common sources of work-related stress, and proposed six scenarios that described what they believed to describe the true picture of pilot mental health and flight safety.

Scenario 1 – Pilots mostly coping well

This was considered to be the most typical and frequently occurring scenario, where a pilot is coping. This could involve something short-term, like tiredness or fatigue, with performance slightly degraded, resulting in small errors and omissions that are either self-corrected or picked up, for example by the other pilot or ATC.

Scenario 2 – Pilots mostly coping well but impact(s) on physical health

This was thought to be similar to scenario 1, except the impact on wellbeing was more significant and longer-term, involving something like back-pain, irritable bowel syndrome or tiredness, all of which are common in pilots, with potential to affect performance. As with scenario 1, errors are self-corrected or picked up by his or her colleague.

Scenario 3 – Plots experiencing difficulty but mostly coping well

In this scenario, pilots are coping, but experiencing difficulties that affect physical, mental or social wellbeing. Due to a complex combination of personal and work factors, combined with the operational situation on the day, there is potential for something to go wrong, resulting in a safety occurrence if not caught by the pilot, his or her fellow pilot, or some other defensive layer. While not considered to be as frequent as scenarios 1 and 2, almost all pilot participants admitted to having had first-hand experience of this scenario.

Scenario 4 – Pilots mostly coping but long-term impacts

This describes a scenario commonly known as 'leisure sickness', i.e., developing symptoms of sickness during weekends or vacations. A risk factor for developing this condition is the sudden lifting of a high workload and stress. Participants described occasions when they would become ill and run-down at the end of a demanding series of duties. Free days would allow recovery, just in time to report back for duty the following week. Occasionally an extra free day or two was needed to fully recover, and some reported that these sick days were cynically viewed by their employers as abusive use of sick leave.

Similar patterns were observed upon commencing vacations. In both cases, often the illness would not need to be reported to their employer, with the incidence of leisure sickness largely remaining under the radar. In this scenario, there is no immediate threat to safety as the pilot is off duty.

A more alarming trend highlighted was that of mortality rates soon after retirement. Participants reported a concern that the majority of retired pilots who are dying today, are those who have retired in the last 5-10 years. Those who retired more than 10 years ago seem to be outliving younger colleagues.

Scenario 5 – Pilots not coping

This scenario described the situation where pilots suffer to the point that they can no longer cope. Potential exists for significant impact on wellbeing, with the pilot most likely stopping working. The pilot might also be at risk of self-harm or suicide. As with scenario 4, there may be no safety risk.

Today's pilots work in a radically different environment from that experienced by previous generations. The hazards associated with this environment are not fully understood.

Scenario 6 – Extreme cases

The final scenario described the extreme and exceptionally rare cases such as murder-suicide. Despite the exceptionally low incidence, it is this scenario that has received the most attention recently.

Of all the scenarios, scenario 3 was considered to be the most significant in relation to specific impact on safety, and most deserving of attention. Currently, however, the catastrophic but exceptionally rare events described in scenario 6 seem to be the focus.

Where do we go to from here?

Currently we seem to be addressing symptoms, not the contributory factors. This makes pilot health different to other aspects of aviation, where we address safety-related issues more proactively. In healthcare systems, health promotion works alongside the treatment of illness. In dealing with pilot wellbeing, a parallel preventative strategy needs to be adopted.

Today's pilots work in a radically different environment from that experienced by previous generations. The hazards associated with this environment are not fully understood. It could be argued that pilots are unknowingly participating in one of the largest biopsychosocial experiments ever conducted.

Further research is needed to understand not only the frequency and severity of suffering, but also to

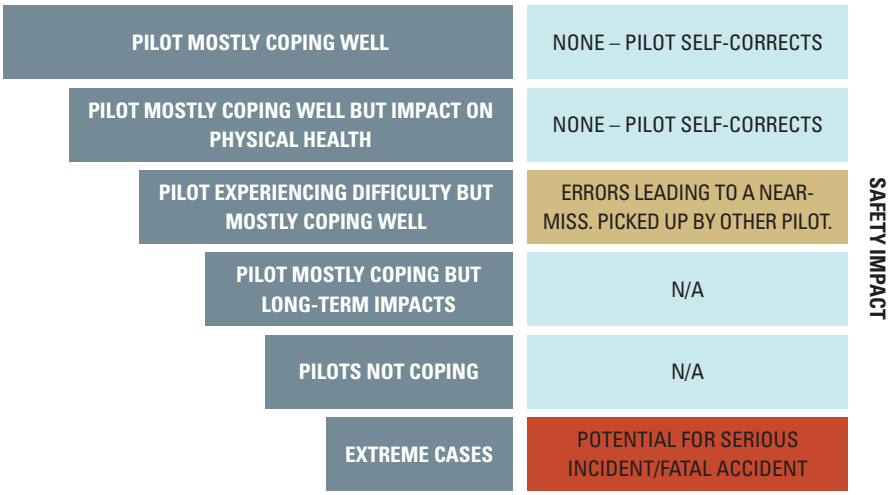

Figure 2: Lived Experience of a Pilot workshop findings

understand why this is happening, so as to provide the evidence base on which to develop future regulations, policies and procedures. If pilot mental health issues are not properly understood, we will be unable to reduce the likelihood of such issues developing, and will therefore be unable to be proactive.

Pilot wellbeing is both a flight safety concern and an occupational safety and health issue. To address it effectively will need not only traditional aviation expertise, but also input from health, safety and medical experts.

As a starting point, the 'Lived Experience of a Pilot' research team constructed a detailed 'general health questionnaire', which looks in detail at the biological, psychological and social aspects of the participants' daily lives, both inside and outside the cockpit. Our research also addresses solutions to work-related stress, both at airline and pilot self-management level. This includes tools for awareness and management of work-related stress and wellbeing.

The survey closed in January 2020 and early analysis is already beginning to give valuable insights into what makes some pilots more or less susceptible to mental health issues. The job of a pilot is somewhat unique, in that we are shift-workers who routinely work long duties, away from home and experience circadian disruption to a high level. With almost 1,100 pilots worldwide having participated, it is encouraging to note that, while many are struggling, the majority appear to be thriving within the same work environment.

This presents an opportunity for valuable lessons to be learned for all stakeholders in aviation, not only about how mental ill-health can negatively affect safety, but how mental wellbeing can positively affect safety and all other goals. One thing that is clear from our research is that protecting the mental health of pilots is not impossible, but it will not be straightforward and will require commitment from all involved.

Note: The research described in this article is independent and is not linked to any airline, pilot group or the regulator.

Captain Paul Cullen has been an airline pilot for over 20 years, with over 13,000 hours flying A320, A330 and B737. He has a particular interest in the mental resilience of pilots and is an accident investigator and researcher with the School of Psychology, Trinity College, Dublin.

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The job of a pilot is somewhat unique, in that we are shift-workers who routinely work long duties, away from home and experience circadian disruption to a high level.

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WELLBEING, CULTURE AND THE NEED FOR A PSYCHOLOGICALLY SAFE ENVIRONMENT

Organisations will need to develop cultures where people feel psychologically safe to speak up about matters relating to wellbeing, says **Captain Paul Reuter**.

'Wellbeing' is one of these buzzwords that regularly pops up, and sneaks into every other presentation or lecture. For me, as a non-native English speaker, 'wellbeing' evokes saunas and yoga retreats, probably because I equate it with 'wellness'. And I have the suspicion that this is true for a number of high-level aviation executives when they are confronted with 'wellbeing'.

This is a pity because in our dynamic, complex, and hazard-prone aviation environment, the wellbeing of our front-line staff needs to be one of our prime concerns. For all our technological advancement, the human element is still the most resourceful, resilient and surprisingly effective safety 'tool' at our disposal.

The new regulation (EU) 2018/1042 relating to pilot and peer support programmes is the latest acknowledgement that we need to find ways to deal with staff wellbeing (or lack of wellbeing) and allow people to be properly cared for and reintegrated safely into their workplace. The effectiveness of these support programmes hinges on the willingness of the organisations that need to implement them to go beyond simple regulatory compliance, and create an environment where these programmes will be seen as being credible and will work.

In our dynamic, complex, and hazard-prone aviation environment, the wellbeing of our front-line staff needs to be one of our prime concerns

The best definition of such an environment that I have found is by James Comey, former head of the FBI:

"(…) is about understanding the truth about humans and our need for meaning. It is about building workplaces where standards are high and fear is low. Those are the kind of cultures where people will feel comfortable speaking the truth to others as they seek excellence in themselves and the people around them."

If we want to take wellbeing for front-line staff seriously, we will need to look beyond the odd presentation, nutritional programme, or well-meant motivational slogan. Organisations will need to develop cultures where people feel psychologically safe to speak up about matters relating to wellbeing, while embracing and understanding their responsibilities. Organisations will need to foster a climate where staff *"feel safe enough to take interpersonal risk by speaking up and sharing concerns, questions or ideas"*, according to Amy Edmondson (2018), leading to opportunities for both for the organisation and individuals.

This sort of environment is likely to foster safety-conscious behaviour, motivation and a sense of purpose, benefiting safety and other goals. Indeed, Kotter and Heskett (2008) provide data to show that organisations that have a culture adapted to their context and needs tend to perform much better than organisations that don't. Outside of aviation, many organisations have benefited from creating environments that foster staff engagement and wellbeing.

In aviation, we have had for a number of years many of the building blocks to create such a culture and environment, including crew resource management, just culture, human factors research and now peer support, just to name a few.

Unfortunately, organisations have rarely seen beyond these 'silos of knowledge' and have often failed to use the tools at their disposal to build a culture that merges all of these elements so that 'being well' and 'performing well' are two sides of the same coin. Additionally, there can be ambiguity between an organisation's professed values and culture and the underlying business practices that the organisation encourages.

In such cultures, it is difficult for both line managers and front-line staff to understand clearly what is really expected of them. This can lead to

Executive management and line managers need to understand the importance of 'talking the talk and walking the walk' every day, especially so on the 'bad days'.

impairment not only of the quality of performance but also to wellbeing issues, including stress and mental health problems.

For safety-critical staff, such as pilots or controllers, the only fallback may be a set of core professional values, which help to navigate a sea of ambiguous or contradictory expectations at an organisational level. It might also fall to professional associations to reinforce a credible professional ethos and create more psychological safety within a group of professionals.

By encouraging candid questions and sharing doubts and concerns within a team or a crew, individuals and groups may create an atmosphere of trust and respect that will help a team function effectively, even in a disruptive or divisive environment.

Ultimately however, it should fall to organisations to define clear and credible values and to communicate them both internally and externally. Commitment to these values needs to be visible, coherent and felt in all aspects of the organisation, whether operations, training, communications or hiring practices. Both executive management and line managers need to understand the importance of 'talking the talk and walking the walk' every day, especially so on the 'bad days'.

In an environment where the economic, environmental and safety challenges will grow, we as an industry will be challenged to foster such a culture with wellbeing being woven into everything that we do, not a regulatory add-on. This is our duty of care, not only to our front-line staff but also to the travelling public.

Paul Reuter is a Captain Boeing 737NG for Luxair, and President of the European Pilot Peer Support Initiative. He is a former president of Luxembourg's Airline Pilot Association, former Technical Director of the European Cockpit Association, and former Chairman of ECA's Safety Strategy Task Force. Paul is an IFALPA Accredited Accident Investigator.

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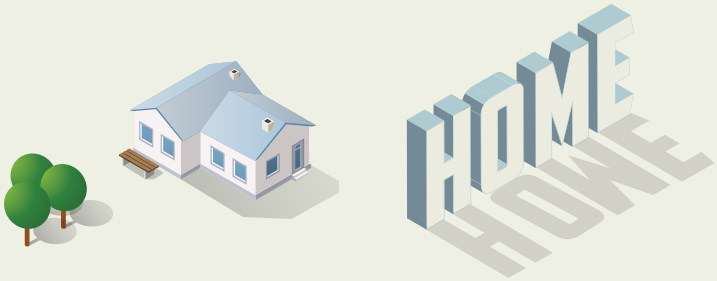

THE PROFESSIONAL AND THE PERSONAL

The so-called 'work-life balance' is familiar to almost all of us. But work is part of life, and can take over as our focus moves from home and family. **Captain Nick Carpenter** reflects on this familiar shift.

Japan is an interesting country and it recently experienced a once-in-a-generation change; Emperor Akihito abdicated from the Chrysanthemum Throne and his son Crown Prince Naruhito ascended to it. This brought a ten-day public holiday, unprecedented in Japan where most workers only take 10 days annual leave in a whole year (The Times, 29 April 2019). There is a conflict in Japan between the goal of being seen as a good worker and the personal desire to take time off while colleagues remain at work. So ingrained is this need to be seen at work that the government recently passed a law to cap overtime at 100 hours per month in an effort to reduce 'karoshi' – cases of employees working themselves to death.

For most of us, the idea of death from overwork is almost impossible to conceive, and yet in Japan, societal demands trump personal ones. But this is not a purely Japanese problem, it is a daily battle in line flying. The rules say that we must only operate for a restricted number of hours while operations ask us to exceed those hours. Having exceeded the hours before and not suffered negative consequences, our delusion of invulnerability is bolstered. This encourages us to accept the request to exceed the limitation.

This conflict can also be expressed in more subtle ways. Most airlines are keen to maintain their on-time performance and, in order to make this a collaborative effort across departments, details of connecting passengers are inserted into the flight plan. As a result, at briefing, when pilots are considering the meteorological impacts on their flight, the 40 pages of Notices to Airmen, the restricted fuel load, and whether they will be at a legal mass to land, they discover that there are also 75 passengers who have tight connecting times at the destination. The unwritten, but clear implication of a delay is that these 75 passengers will be severely inconvenienced. These conflicts between production and protection are well known and, in the main, do not adversely affect operations.

> There is a conflict in Japan between the goal of being seen as a good worker and the personal desire to take time off while colleagues remain at work.

A more interesting, and less often discussed trade-off is one that we make daily, between work and family. So obsessed are we with the need to earn money to pay for our houses and cars that we lose sight of the fact that there is a significant part of our life that suffers as a result: our family and friends, relationships that are central to our ability to function as human beings.

Interested in peer assistance, I find myself drawn to the thoughts of Aristotle. He claimed that there are three modes of persuasion; *Logos*, *Ethos* and *Pathos*. *Logos* is the logical part that makes us rationalise how important work is to build funds for our family's future. Ethos is how we understand ourselves, our values and credibility as a reliable worker. But, Aristotle claimed, the road to *Logos* is through *Pathos* or emotion. The word 'empathy' is derived from *pathos* and something that, it could be argued, is increasingly missing in our workplaces.

Emotion drives most of what we do, be it love, pride or anger, and yet, as modern workers in organisations we try to suppress it. It is hard to identify the competing emotions that drive us especially when they are disguised by the products of our professional lives. The cars that we drive and the houses that we live in and our

glowing employee reports symbolise professional success, and yet our relationships may be withering on the vine. As pilots, air traffic controllers, and other professionals, we are caught in a world where our emotional need for recognition at work is met by company rewards and incentives. Our focus can subtly shift away from our home and family until work becomes the centre of our world.

For many of us, the need to look after our family is met by the money that we earn. But this only meets basic needs for food, housing, and security. Unfortunately, work fills our days, and fogs our judgement and values. When combined, it is easy to become goal-conflicted. We need that promotion, so we must work harder. When family asks for more of our time, we consider them unreasonable because of how hard we are working, and so begins a vicious cycle of longer days and more distraction as we sow the seeds for a financially secure future.

As a very bad gardener, I struggle to identify weeds from flowers, and this is the problem with 'the professional and the personal': sometimes the weeds can strangle the flowers that we want to cultivate for our wellbeing.

Nick Carpenter is a military trained and commercially experienced airline pilot flying widebody aeroplanes in Asia. His interest in flight safety has inspired him to study for both Bachelor's and a Master's degrees in Psychology. In addition to flying, Nick is the operations manager at the Aviation Safety Institute in Australia.

Our focus can subtly shift away from our home and family until work becomes the centre of our world.

A SURVEY OF PROFESSIONAL PILOTS' HEALTH AND WELLBEING

There is increasing concern about how professional pilots' working conditions affect wellbeing. **Marion Venus** outlines research on pilot wellbeing, suggesting that present flight time limitations may not prevent fatigue and could foster sleep problems.

KEY POINTS

- **Research suggests that high numbers of professional pilots may be severely fatigued, with some reporting significant sleep problems and burnout. A majority of professional pilots keep flying despite fatigue and mental health issues, even after severe life events.**
- **We surveyed 1097 professional pilots to investigate how professional pilots' working conditions, schedules, work-related and psychosocial stress, sleep problems and fatigue can affect mental health, mood and wellbeing.**
- **Professional pilots' average fatigue scores were higher than reference scores for patients with clinical sleep-wake disorders (including insomnia) and significantly higher than healthy, non-pilot respondents. Around a quarter of pilots reported multiple sleep problems associated with flight duties and layovers.**
- **Fatigue and sleep problems were associated with symptoms of depression and impaired pilot wellbeing. Several factors were associated with pilots' worries regarding their Medical Class 1, job and livelihood.**
- **Many pilots preferred sick leave when unfit due to fatigue, because they feared negative consequences, perceived a lack of support, feelings of guilt, or feared of stigmatisation by their employer.**

Background

In Europe, the liberalisation of aviation led to rapid growth in air travel. The number of daily flights approximately doubled between 1992 and 2016, while the number of routes almost tripled within these years (Brannigan, et al., 2019). This deregulation allowed the development of new business models, e.g., the emergence of low-cost carriers and new employment models. However, there are concerns that operators use legal flight-time limitations as goals, despite high levels of fatigue. So called 'pilot pushing' describes the pressure on pilots to maximise productivity and keep flying as many sectors as possible. While the pilot-in-command remains responsible for every aspect of flight safety according to the Chicago Convention, high levels of fatigue can be a threat to flight safety.

Shiftwork and insufficient sleep are associated with higher levels of stress, degraded health and higher occupational accident risks.

Shiftwork and insufficient sleep are associated with higher levels of stress, degraded health and higher occupational accident risks. These risks relate to flight operations with irregular long shifts, jetlag, circadian disruption, and restricted sleep time (e.g., due to late arrivals, early starts, back-to-back rostering, and so on). The research findings give us cause for concern. For instance, research by Reis, et al (2016) surveyed 435 pilots of commercial Portuguese airlines and found that:

- 35% reported clinically relevant sleep problems
- 59% reported significant daytime sleepiness
- 90% reported severe fatigue.

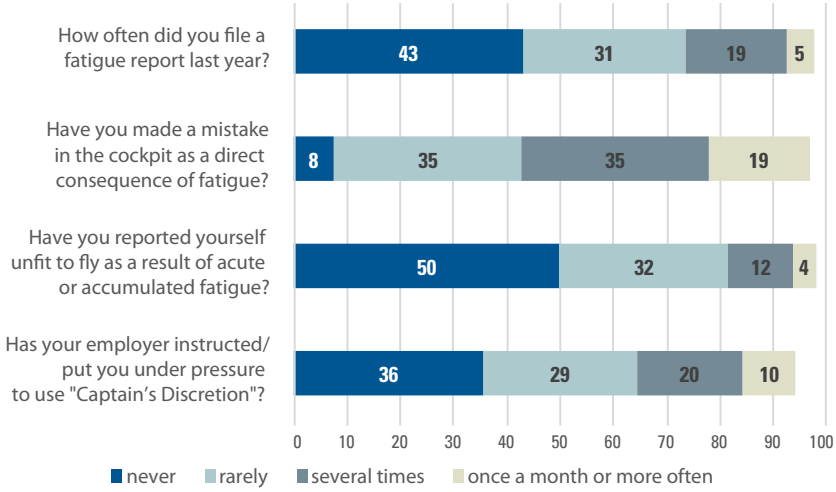

Figure 1: Professional pilots' fatigue in the cockpit, fatigue reports, and use of Commander's discretion

Research by Aljurf, et al (2018) among 328 commercial airline pilots in the Gulf Cooperation Council found:

- 68% reported severe fatigue
- 34% reported excessive daytime sleepiness
- 67% reported having made mistakes in the cockpit because of fatigue
- 45% reported they had fallen asleep at the controls at least once
- 35% reported significant symptoms of depression

With nighttime flying and sleeping during the daytime after trans-meridian flights, circadian rhythm disruptions and lack of sleep can impair a pilot's mood. Early and late flight duties also result in more stress, more tiredness and more impaired mood compared with rest days.

Several studies have investigated professional pilots' mental health, which can be impaired by exhausting schedules, accumulated fatigue and roster-induced sleep restrictions. It has been found that 63% of professional pilots kept flying despite significant fatigue, mental health issues or after severe life events ('inappropriate presenteeism'), while 54% had gone on duty while sick least once ('sickness presenteeism') (Johansson & Melin, 2018). Demerouti, et al (2018) found that 33% of American short-haul pilots questioned reported high burnout scores. However, there are flaws in fatigue research, which has sometimes used unsuitable and unreliable tools and methods.

Psychosocial and work-related stressors like low income, job insecurity, less experience on the latest aircraft type and hours of physical exercise were also neglected in previous research, yet these factors can significantly affect pilots' mental health and wellbeing.

Our Research

We wanted to investigate how professional pilots' working conditions, schedules, work-related and psychosocial stress, sleep problems and fatigue can affect mental health, mood and wellbeing. In March 2019, we launched an anonymous online survey, which was answered by 1097 professional pilots. Pilots had to report their actual duty rosters, hours of physical exercise for the last two months, age, income, flight hours on their present type of aircraft, subjective job security, psychosocial stress, fatigue severity, sleep problems and mental health (depression, anxiety screening, wellbeing, common mental disorders).

In the last two months, pilots reported on average 63 flight hours and 112 duty hours, had flown 61 sectors with 2.3 standby days, 3.9 early starts and 4.5 night flights. Short- and medium-haul pilots reported on

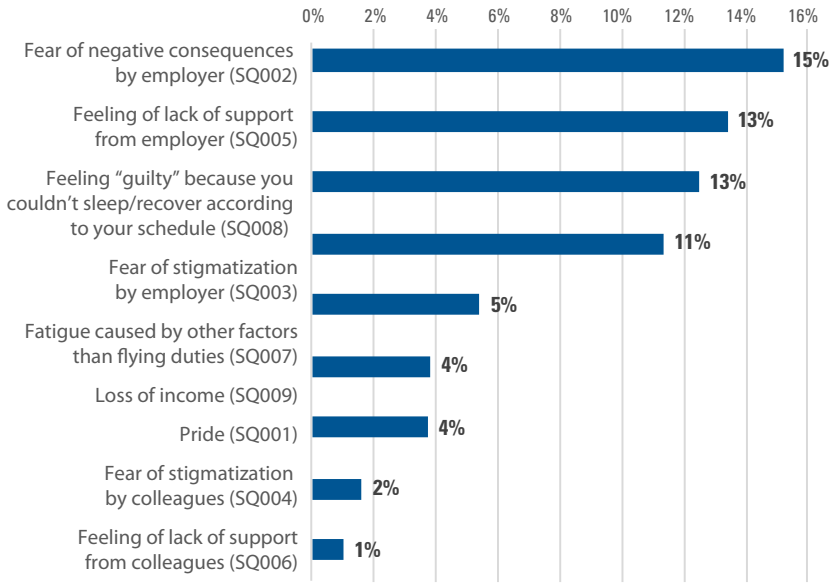

Figure 2: Why professional pilots prefer sick leave to fatigue leave (N=406)

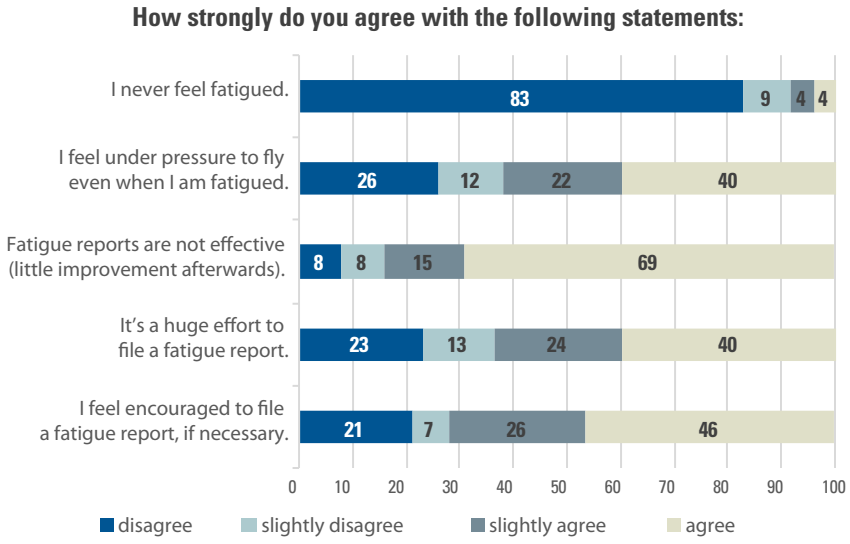

Figure 3: Frequencies of professional pilots' responses about fatigue and fatigue reports (N=406 professional pilots)

average 124 duty hours, 67 flight hours and 40 sectors, while long-haul pilots reported 101 duty hours, 67 flight hours and 10 sectors.

What we found

We found that 76% of the studied pilots reported severe fatigue. Professional pilots' average fatigue score was 4.5 on a scale from 1 (lowest fatigue score) to 7 (highest fatigue score). By way of comparison, reference values for fatigue were published by Valko, Bassetti, Bloch, Held, & Baumann (2008), who measured fatigue in patients and healthy subjects. The average fatigue score of patients with multiple sclerosis was 4.7, while patients after an ischaemic stroke reported a lower average fatigue score of 3.9. Patients with clinical sleep-wake-disorders (including insomnia) reported lower fatigue scores (4.3) than active professional pilots. Healthy respondents reported significantly lower fatigue with an average value of 3.0.

In our sample, 24% of pilots reported multiple sleep problems on eight or more nights every month, strongly associated with flight duty and layover. Also, 26% reported severe sleepiness on average 50 hours after their last flight duty. We found that psychosocial stress and more duty hours fostered sleep problems, while higher levels of psychosocial stress, sleep problems and more night flights significantly increased fatigue. More fatigue and sleep problems were associated with more symptoms of depression and more impaired professional pilots' wellbeing. More psychosocial stress, lower income, fewer hours on the present type of aircraft and job-insecurity were associated with pilots' worries about their Medical Class 1, job and livelihood.

More fatigue and sleep problems were associated with more symptoms of depression and more impaired professional pilots' wellbeing.

Regulators recommend that pilots and operators should openly discuss fatigue, and fatigue management should be addressed without repercussions. According to the results of this research, the reality might be different. Data concerning fatigue and safety can be seen in Figure 1.

Professional pilots reported an average of 1.2 days fatigue leave and 6.8 days of sick leave. Many pilots preferred sick leave when unfit due to fatigue because they feared negative consequences, perceived a lack of support, or feared of stigmatisation by their employer (Figure 2). Some pilots felt guilty because they could not recover as rostered, while others preferred sick leave to avoid loss of income.

Of the pilot respondents, 79% agreed that fatigue reports are ineffective because of little or no improvement afterwards (see Figure 3), while 60% felt under pressure to fly when they were fatigued.

Fatigue itself is neither a physical nor a mental disorder, but an indicator that a person's functioning in different areas of life (e.g., overall motivation, work, family and social relationships) might be impaired. Commission Regulation (EU) 2018/1042 states, *"Crew members are not to carry out duties on an aircraft when under the influence of psychoactive substances or when unfit due to injury, fatigue, medication, sickness, or other similar causes."* So, the question remains, when do fatigue and other health issues render professional pilots unfit to fly? As general guidelines, we might propose the following:

- Pilots must only fly when fit to fly, legal according to Part-MED. It is important to learn to say "No", before aeromedical examiners, employers or fellow pilots say "You do not look 'fit to fly'. I will not fly with you" or "I will not let you fly that fatigued."
- Pilots with doubts about their fitness to fly should ask a pilot peer, mental health professional or aviation clinical psychologist. It is hard to assess one's own fatigue, lack of sleep, exhaustion, and even mood, and the implications.
- Pilots are trained to manage threats or problematic situations in-flight

effectively. But sleep problems, accumulated fatigue and burnout often cannot be resolved quickly or without help. Both need professional treatment and proper recovery.

- Pilots and cabin crew often cannot obtain eight hours of good sleep before they start their flight-duties any time of day. Pressure to sleep can create more stress. This is relevant to regulators, operators and crew-planners.

Conclusion

These findings suggest that current flight time limitations may not prevent fatigue and could foster sleep problems. The findings also suggest problems of burnout, impairment of mood, depression and realistic worries about health and safety, despite flight-time limitations and mandatory fatigue risk management. Pilots, crew-planners, operators, regulators can act to reduce fatigue and its effects.

Marion Venus started her career as work, clinical and health psychologist. After 10 years as health and safety manager in industry and aviation, she completed her PPL(A) in 2011. She started her PhD at the Department of Psychology of the University of Bern in 2017, entitled 'Pilots' working conditions, rosters, stress, sleep problems and fatigue, and how they can affect health and wellbeing'. Marion Venus is head of research and training at Venus Aviation.

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THE ENERGY PROJECT @MUAC

The EUROCONTROL Maastricht Upper Airspace Centre has pioneered an approach to personal energy and resilience management for staff. In this article, **Marinella Leone** describes the journey of the 'Energy Project'.

KEY POINTS

- **Maastricht's Energy and Resilience Management Project (in short, 'Energy Project') is a pioneering effort in the entire aviation industry, to improve MUAC staff energy management skills and personal resilience.**
- **The project uses self-assessment combined with online personal development, coaching, workshops, communication and 'energy spaces'.**
- **The Energy Project has become more popular and is now used for personal growth by an increasing number of employees throughout MUAC.**
- **The benefits spread well beyond the workplace and there is international interest.**

In 2013, I moved to the Operations department in Maastricht UAC as Team Leader of Safety, Quality and Human Performance. In those days, I was busy integrating human factors tools and methods into safety processes in a structured way. The aim was to influence MUAC safety by focusing on human performance and satisfying the stress and fatigue regulation.

Those years were marked by greater-than-forecasted air traffic growth across the whole MUAC airspace, often outpacing growth across the rest of Europe. MUAC was working hard to adjust quickly to the increased pressures by introducing a many adaptations and more radical changes to technical systems and working practices. During this period, I observed that staff inside and outside the Ops room were suffering from stress and fatigue, in some cases leading to burnout.

It was at this point that I realised that we had been 'working around the human', forgetting the person in the middle of this system change. My dinners with Ellen Beckers and Ilona Bonten from the MUAC Training and Proficiency team became opportunities to dream about an integrated method, encompassing different disciplines, to counterbalance increasing pressures. The MUAC Energy and Resilience Management Project (the 'Energy Project') was born and thanks to this, my job has changed so that today I can focus on Human Performance, from the individual up to organisation cultural changes.

> This approach aims to empower staff to manage the issues that affect their personal resilience and find ways to energise by balancing body, mind and emotions.

What does The Energy Project involve?

The MUAC Energy and Resilience Management Project has implemented an integrated and structured approach to energy management to improve MUAC staff energy management skills and personal resilience. This approach aims to empower staff to manage the issues that affect their personal resilience and find ways to energise by balancing body, mind and emotions. The project includes different components, as set out below.

Self-assessment

We provided Ops Room staff with a self-assessment tool, based on the 'job demands-resources' model. This is a model of occupational stress that suggests that strain is a response to an imbalance between demands on the individual and the resources available to deal with those demands. The outcome of the self-assessment helps to determine which personal development paths staff could undertake. The aggregated results of the individual assessments are also analysed to validate the relevance of the development topics offered and to review organisation resources.

resilience development
positive routines
self-awareness & self-management
sleeping strategies burn-out prevention
stress signals & impact energising nutrition
workload management team engagement
facing challenges in a different way nutrition
relaxation techniques leadership
work/life integration emotional intelligence
energy management
postural art mindfulness at work
body & mind alignment

Figure 1: Topics covered

Personal development and coaching

Development paths are offered in different forms such as on-line development, and individual and group coaching. The topics addressed in the development trajectory can span different directions depending on personal needs. Some of these topics are shown in Figure 1, as we continuously develop new modules.

Workshops

Workshops are planned on Thursdays with different topics to attract different people. The sessions help people to improve self-awareness, refuel their own energy from their own strengths, and to understand their own rhythms.

Communication

Postcard-size 'Energy cards' were placed around the MUAC building, including quotes, advice and positive messages corresponding to the theme of the month. These were available for anyone to take and use. Videos are created and continuously shared to encourage people to adopt healthier behaviours and attitudes.

Energy spaces

MUAC already had a new recreational building when starting the project. Now there is a dedicated Energy Room where one can spend a quiet moment, meditate, stretch, relax, or do yoga. The Energy Room has been successful in providing space for energy-related activities and to offer a different and safe environment to conduct innovative workshops and coaching sessions. Many people are now making use of the Energy Room for their own practice, or just to be in silence. It's also possible to get a professional massage (at one's own cost) or an osteopathy treatment, as the room has been equipped with accessories to provide relaxation or to facilitate stress and pain relief.

Who takes care of the project?

The Energy activities are nurtured and supported by the Energy Team. This is a team of people from different backgrounds and functions who make the MUAC's stress and fatigue risk management system work in practice. The team has expanded over time to include managers and specialists from welfare (for overall coordination), operations, engineering, HR, health and safety, communication, facilities, and medical, plus coaches from an external company who support the internal coaches in preparation and delivery of initiatives. From the beginning, the Energy Project required determination, persistence and patience from the Energy Team. These were qualities that the team learned to sustain. The team has a common purpose to make a difference for individuals, teams and the organisation as a whole, and we have been celebrating our successes so far.

The team has a common purpose to make a difference for individuals, teams and the organisation as a whole, and we have been celebrating our successes so far.

What have been the obstacles and challenges?

The main obstacles were the initial resistance of "this is not for me" and "what would people think if I engage in these activities?". Often, people do not feel completely comfortable to access the Energy project in the beginning. Resistance was sometimes driven by scepticism, misunderstanding of purpose, fear of self-awareness, and fear of being seen as weak (if participating or supporting). Many were also concerned about confidentiality. It was more difficult to reach ATCOs compared to other staff mostly due to the inability to plan dedicated time for these activities in working hours. Only supervisors had the opportunity to be planned during working

time to attend basic training on stress management and burnout prevention, essentially in managing their teams.

Despite these obstacles, once staff understand what the Energy initiatives entail, they often start quickly moving from one workshop or coaching session to the next. ATCOs preferably engage in these activities in their free time and in an external location or via videocall, as they understand that these prevention measures will just make them stronger.

The worldwide interest that the Energy Project has generated has come as a surprise.

How is it going now?

The project started slowly, with just a handful of operational staff actively participating, but over the years it has become more popular and is now used for personal growth by an increasing number of employees throughout MUAC. And for those who have the courage and curiosity, the benefits are proving to spread well beyond the workplace.

New faces and ambassadors have been raising awareness, correcting misperceptions, and raising the profile of the Energy activities from the (wrong) idea of being a 'wellness centre initiative' to a 'life-changing experience', both inside and outside of work. The communication campaigns involved many staff. The feedback of line management or colleagues, and their encouragement to participate in energy and resilience management workshops or coaching sessions, has been key to connecting with staff.

The activities in the Energy Room have become popular, and staff keep requesting continuation of activities, as well as specific energising team activities outdoors. The Energy Room and other recreational spaces are now used by people individually and in small groups for several activities such as sport, relaxation, yoga and massage.

Today we benefit from the presence of a people-oriented MUAC Director and an increasing number of managers and staff who truly believe in the ambition of the Energy team and support this culture change.

The worldwide interest that the Energy Project has generated has come as a surprise. The Energy team was contacted by many stakeholders and has travelled around the world to support other organisations.

A sincere and warm "Thank you" is the recurrent feedback we usually receive from those people who had the experience of being involved in Energy activities, especially at the end of a workshop or a coaching path. Here are some of the quotes that I still remember:

- "I am not the same person as before."
- "We feel the vibe of this change in the organisation."
- "This growth path is surprising, like playing civilisation games. You start small with very little, and your awareness and the ability to master life grows into you like a new empire at every coaching session."
- "I love the Energy Room! Just 15 minutes of basic yoga and some breathing exercises in this relaxing space will calm me down and renew my energy levels. Perfect break to get ready for a few more hours in the hectic environment called 'the Ops Room'."
- "Coaching used to have an image for me that I would have to be in desperate need of help or that there would be something 'wrong' with me as a person. Working with a coach is an opportunity to advance both at work and in my private life and save a lot of energy by changing the rules of the game."
- "The workshops have helped me appreciate we are all in the same boat, it becomes a lot easier to develop understanding for colleagues when they are in a challenging situation."

What about the future?

The Energy and Resilience Support Network aims to engage even more staff to shift behaviour at all levels and in all departments. The Energy team will continue to innovate by offering new training modules with different formats, while keeping the overall approach that has delivered such good results. Alongside the current staff, ab-initios, new supervisors and newcomers receive training, slowly leading to a positive development in the MUAC culture. Maastricht's Energy and Resilience Management is an all-encompassing effort, available to all staff, working to build a healthy and happy group of employees.

Marinella Leone is a Project and Human Factors manager at Maastricht Upper Area Control Centre (MUAC) in The Netherlands, where she supports projects in the facilitation and analysis of changes from a human factors perspective and with a change management approach. She is also involved investing in the development and delivery of human factors training, TRM and individual coaching, especially for operational staff, including ATSEPs. People and company culture transformation are her passion.

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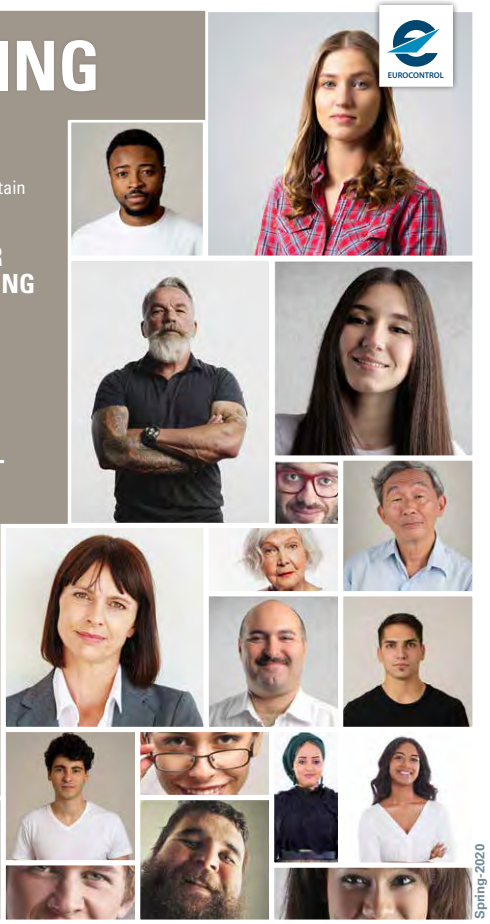

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PAN FOR CONTROLLERS AND PILOTS:

THE NEW ZEALAND AVIATION PEER ASSISTANCE NETWORK

In New Zealand, air traffic controllers and pilots have come together to create a Peer Assistance Network to provide a trusted 'port of safety' when things are not going well. **Herwin Bongers** describes the PAN initiative.

As air traffic controllers and pilots, we need to operate to an unusually high standard of performance. But being human means that we are still vulnerable to the effects of stress and emotional strain. If someone breaks a leg, nobody expects that they will be able to run a marathon anytime soon. For some reason, we seem to think that psychological issues are different. We turn up for work when our ability to perform is compromised. The Work Health Organization and International Labour Organisation (2000) have studied the consequences of compromised mental health problems in the workplace and found a deterioration in planning and control, poorer decision-making and increased error rates.

Perhaps because our jobs are so critical, the fear of losing our medical certificate and our career may drive us to avoid seeking help. So, what do we do when life issues start to impact us?

In 2014, after two suicides amongst our controllers, the New Zealand Airline Pilots' Association (NZALPA) decided something needed to be done. The aviation Peer Assistance Network (AvPAN NZ) was formed.

There are three key pillars of success for a peer assistance programme. They are trust, trust and trust.

This was for two reasons. One reason was to provide a trusted 'port of safety' when things are not going well. Another was to enhance the safety of aviation by providing accurate information from a colleague who is expertly trained. One goal here is that the decision to take time off can be made fully informed with facts and not rumours or suspicions.

We are lucky in New Zealand because air traffic controllers and pilots have a close association. So, we were able to create a Peer Assistance Network that includes support volunteers from both areas of the industry. In five years, we have trained 40 volunteers who have assisted in over 300 requests for assistance. We've learnt from our mistakes and are continually evolving.

The shared work experience of peers helps to build trust, empathise and understand situations that are unique to our professions. It also helps to remove stigma from asking for help and making it safe to ask the questions. This is why a programme like PAN is so important to both pilots and controllers.

But, no matter how well-intentioned people are, there are some traps for such a programme. To avoid the traps there are three key pillars of success for a peer assistance programme. They are trust, trust and trust.

- The trust of **controllers and pilots** is of vital importance. This is slowly built up over time by strictly following confidentiality protocols and through success stories becoming known about. Conversely, if a peer discovers that their personal matters have been shared without their knowledge, they can feel betrayed and negative news quickly travels. The endorsement of the programme by the unions is also critical.
- The trust of the **management**. The programme can't be viewed as a way for workers to hide from proper clinical help. Escalation protocols have been developed, and volunteers understand and adhere to these.
- The trust of **health professionals**. To avoid the pitfalls of peers delivering 'help' which clinically worsens a situation, training has to be of the highest quality. If needed, individuals must be guided towards professional help. Ongoing training of volunteers is vital.

Because studies show that often the seeds for mental health issues later in life can be sown early in a career (particularly during ab-initio training), it is important to have proactive and positive conversations around mental health. With this in mind, young instructors receive training to understand stress and to know what to do about it.

As for the future, we see the challenges ahead are for global peer assistance alliances, where we can set protocols and share data to influence better workplace practices, improving training outcomes, reducing bullying and making our lives and jobs more satisfying and safer.

Herwin Bongers is a full-time B777 pilot and Chairman of the New Zealand Aviation Peer Assistance Network (AvPAN NZ).

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MANAGING THE IMPACT OF SERIOUS INCIDENTS

How can air navigation service providers and other aviation organisations help and manage staff involved in serious incidents and accidents? **Robin Gurt** shares the experience at skyguide of the management of serious incidents.

Serious incidents or accidents in aviation do not only draw the attention of the public and official investigation bodies. They usually also have an emotional impact on the ones that are involved, including controllers, pilots and other aviation professionals. While management and staff of the organisation concerned might be dealing with external pressure, they should not forget to care about the individuals most affected by the occurrence. In times of stress, it is always good to have a structured process that helps the individuals as well as the organisation to cope with an incident that just happened. In 2013, skyguide therefore introduced the 'Management of Serious Incidents' (MOSI) process, which has three goals:

- Ensure a fair and harmonised treatment of all cases.
- Rebuild trust and relationships between the concerned parties.
- Respond to media and political pressures in a credible manner.

The first consequence of initiating MOSI is that the involved controller is withdrawn from operational duty. The purpose of doing this is to protect the concerned individuals (including cognitive, emotional and physical impacts), the company, and those served by the company. The process involves appointing a case coordinator, who acts as point of contact for all involved and interested internal stakeholders. In times of crises, it is very important to relieve as much pressure from front-end actors as possible. In order to reduce psychological impact, the controller concerned must get in contact with a critical incident stress management (CISM) peer. The intervention itself is not mandatory but the contact with the peer is. The experience shows that usually there is a conversation between the controller affected and the peer, which helps to reduce first stress reactions.

As a next step, the controller has the possibility to review the incident with the recordings available (e.g., radar and voice) in order to understand what happened and to prepare him- or herself for the debriefing that follows afterwards. The debriefing involves the line manager, involved persons and safety experts. It aims to get a common understanding of the case, share experience, and – most importantly – to care for the controller involved and to decide how to move on. One decision can be to reintegrate the controller straight away or to assist reintegration with accompanying measures such as coaching or simulator training. If reintegration is not possible for the time being, the case may be escalated to the next higher level for further clarification and decision.

Usually the process can be closed with reintegration 48 hours after the process has been launched. Even though there is always some uncertainty for a controller after a serious incident, the process provides guidance and next steps. This helps the individual as well as the company to cope with a serious occurrence that might have had an emotional impact. Since its introduction, MOSI was launched more than 40 times. Importantly, the process is accepted among staff to deal with serious incidents on the individual level.

In times of crises, it is very important to relieve as much pressure from front-end actors as possible

Robin Gurt is Counsel for Just Culture and Investigation Management at skyguide in Zurich, Switzerland.

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CLEAR TO CALM: A PROMISING FUTURE FOR MINDFULNESS IN ATM

Mindfulness-based stress reduction has showed promise in many aspects of industry and society, and aviation is no exception. ENAIRE's Clear to Calm project is integrating mindfulness practices for air traffic controller stress reduction, as **Alberto Rodriguez de la Flor** reports.

The introduction of the new EU Regulation 2017/373 has been quite a challenge for all ANSPs. Part of it, regarding new obligations to set up management systems for fatigue and stress have, ironically, stressed many ANSPs, and ENAIRE is no exception.

Now, organisations must define and operate new procedures to manage controllers' fatigue and stress in such a way that it mitigates the effects on the safety of operations.

Stress and fatigue can have many sources, from organisational to personal, and there are many ways to reduce and mitigate them. Not all mitigation means have the same effect over different individuals, though, and acceptance by controllers has to be taken into account.

While EU 2017/373 concerns operational safety, both fatigue and stress also have strong occupational health connections. These elements are managed with different regulations, which are not fully consistent with EU 2017/373. A coordinated and holistic approach is therefore required.

Mindfulness is one approach to addressing stress and fatigue. In 2015, the UK Mindfulness All-Party Parliamentary Group was set up to: a) review the scientific evidence and current best practice in mindfulness training; b) develop policy recommendations for government, based on these findings; and c) provide a forum for discussion in Parliament for the role of mindfulness and its implementation in public policy. The group published a 'Mindful Nation UK' report to address mental and physical health concerns in the areas of education, health, the workplace, and the criminal justice system through the application of mindfulness-based interventions.

Inspired by this 'Mindful Nation' project, ENAIRE wanted to test whether eight-week mindfulness-based stress reduction interventions can be used for ATCOs' stress reduction in the longer term. This was supported by some of our ATCOs with previous experience on mindfulness to help mitigate, reduce and prevent stress. We called this 'Clear to Calm'.

Mindfulness-based stress reduction instructors certified by the University of Massachusetts were carefully selected. Over 50 volunteers from Barcelona ACC and TWR are currently participating in the project. Around half of them have already completed the first intervention. Controllers participate anonymously, so that their identities are protected. While analysis is ongoing, reductions in stress have been found. The effect on safety-related behaviour is also being measured in the participating ATCOs, and operational safety benefits are evident. Personal reports from

controllers suggest that this has been one of the most well-appreciated initiatives for ATCOs in the organisation. The study will also measure stress levels in the long run – six months and at least one year after the interventions.

The project provoked great interest in other ATS units, who are willing to run similar projects, and this time, fostered by their own unit managers. We are also creating meditation spaces in ATS units so that ATCOs can make use of these between operational times.

While the study has limitations, the results have been quite promising. Seldom have projects been so well accepted, with such interest across the whole organisation. We will continue to strive to offer mindfulness-based stress reduction programmes in the organisation with the aim to become a safer, mindful air navigation service provider.

Alberto Rodriguez de la Flor is an en-route ATCO, working also as a specialist in ATM safety, team resource management, and human factors in the Safety Division of ENAIRE. Apart from being an Aerospace Engineer, he holds an MSc in Educational Neuropsychology and an MSc in Psychobiology and Cognitive Neuroscience.

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ADDRESSING MENTAL HEALTH ISSUES IN THE PILOT COMMUNITY WITH PEER SUPPORT

How can pilots raise concerns about their mental health and receive confidential support to work through such issues? Pilot peer support programmes offer one method, as the **European Pilot Peer Support Initiative Board** reports.

"After extensive research and surveys, it has been proved beyond doubt that pilots are, in fact, only human." Dr Ries Simons, European Society of Aerospace Medicine

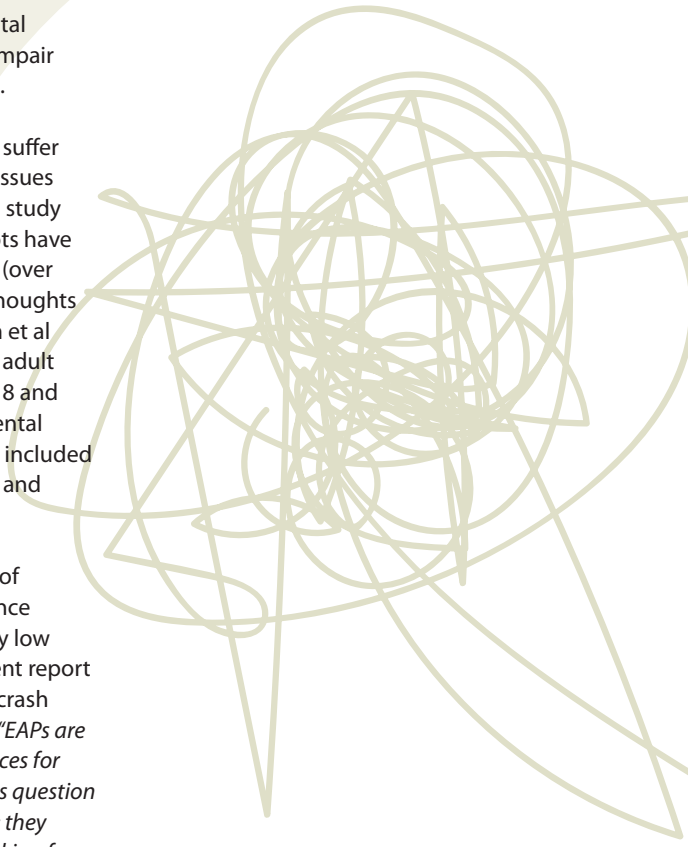
Pilots are perceived by the general public as intelligent and strong characters who are independent problem solvers and set high personal standards. They are accustomed to high workload and occupational stress, and indeed train regularly in techniques to stay proficient and calm in unexpected and high-pressure scenarios. So people may think that pilots can and should be able to cope with whatever life throws at them, because that is what they are trained to do.

The reality, however, is often very different. Problems and stressors on the flight deck are time-limited (or gravity-limited) and the professional skills, procedures and knowledge pilots use to deal with them do not necessarily work with the stresses of personal life. Furthermore, normal coping mechanisms can sometimes be overwhelmed by the traumatic effects of being involved in a flying incident or accident.

Pilots are also generally seen as high-achieving professionals with high standards. A perceived failure to cope can negatively affect their mental wellbeing and can negatively impair their professional performance.

Studies have shown that pilots suffer similar levels of mental health issues to the general population. One study (Wu et al, 2016) has shown pilots have a high incidence of depression (over 12%) and some have suicidal thoughts (4%). For comparison, Wittchen et al (2011) showed that 27% of the adult EU population aged between 18 and 65 had suffered at least one mental disorder in the past year. These included anxiety (14%), depression (7%) and insomnia (7%).

Unfortunately, the acceptance of help, such as employee assistance programmes (EAPs), is relatively low amongst pilots. The BEA accident report into the Germanwings D-AIPX crash cited possible reasons for this: *"EAPs are sometimes under-utilized resources for reasons such as these: employees question the confidentiality of the service; they perceive a stigma attached to asking for professional help with personal matters; or, they are unaware of the programme and its capabilities"* (p. 38). A key reason is the common belief and fear amongst pilots that, if known to the outside world, mental health or psychological issues will have the immediate consequence of removal of their flying



Problems and stressors on the flight deck are time-limited (or gravity-limited) and the professional skills, procedures and knowledge pilots use to deal with them do not necessarily work with the stresses of personal life.

licence or medical certificate, with the consequent possible loss of livelihood. We can add to that the stigma attached to 'mental health' issues in society.

While these issues have been present for decades, they have largely been ignored until Germanwings flight GWI 4U9525, which crashed in March 2015, with the loss of all 149 passengers and crew on board. This turned the non-disclosure of pilot mental health issues into a matter of urgent priority.

Amongst the multiple solutions that have been identified by a dedicated EASA Task Force in 2015 to address the issue of pilot mental health and wellbeing, the most promising is the set-up of peer support structures by operators. For many years, peer support has been successfully used to allow people to address issues of mental wellbeing, both in aviation (e.g., Stiftung Mayday, Project Wingman) and beyond (e.g., law enforcement and firefighters). The term 'mental wellbeing' covers many areas, such as life stresses (e.g., divorce, financial pressures), training performance or professional standards issues, substance abuse and addiction issues, and concern over medical and licence issues.

Whilst operators may have internal processes for dealing with these issues, these avenues might not appeal to pilots due to confidentiality issues and fear of potential loss of licence and livelihood, or other repercussions.

Pilot peer support programmes (PPSPs) provide a way for pilots to raise concerns in these areas and receive support and help to work through them all within a 'safe zone', which is protected by confidentiality.

This is where peer support comes in. Pilot peer support programmes (PPSPs) provide a way for pilots to raise concerns in these areas and receive support and help to work through them all within a 'safe zone', which is protected by confidentiality.

Trained peers are essential. Experience has shown that a pilot is more likely to 'open up' about their problems and issues to a fellow professional; someone who does the same job and understands first-hand the unique stresses and demands that go with it. The barriers to 'opening up' are both historical and societal, but in the specific case of pilots it is important to note that the ability of a pilot to carry out their job is dependent on the external agencies of the licensing authority and the aviation medical authority. Fear of losing either a licence or Class 1 medical can lead to behaviours which are not compatible with exercising the privileges of the pilot's licence. It is important to note, however, that evidence shows that in the vast majority of cases pilots will retain their medical and licence after declaring a mental health issue (in the US, denial of medical certificates for mental health issues in 2017 was 0.08% of cases reported; Berry, 2018). The peer has a significant role in reassuring the pilot that they can seek assistance for their issues in a non-punitive way.

Peers are trained to signpost the pilot towards appropriate help, and by having them operate under the close guidance and support of the mental health professional, this allows the 'best of both worlds': speaking to a peer who intimately understands the job and its peculiarities while still having access to high quality psychological advice via that peer.

As EASA regulation 2018/1042 is the first time that such support programmes are regulated, the implementation of these will certainly present regulators and operators with several challenges as well as opportunities to learn.

Nevertheless, peer support is a concept that we hope will allow us to support the mental wellbeing of front-line staff and make a real difference in the lives of the concerned people.

In that context, a non-profit initiative was formed in 2016 to gather the existing expertise on peer support programmes within Europe. It consisted of pilots (European Cockpit Association - ECA), aviation medical doctors (European Society of Aerospace Medicine - ESAM), and aviation psychologists (European Association for Aviation Psychology - EAAP), together with the Stiftung Mayday Foundation in Germany and elsewhere, and the Pilots Assistance Network programme from British Airways. Given the name EPPSI (European Pilot Peer Support Initiative), its aim is to provide best practice and guidance for operators, regulators and interested stakeholders in the field of pilot peer support programmes. EPPSI has produced resources aimed at assisting airlines and employee representative organisations in the creation of their programmes.

Note

For a more detailed examination of the pilot's professional and personal situation from a psychological perspective, see the British Psychological Society (2017) position statement on pilot mental health and wellbeing.

http://www.bps.org.uk/news-and-policy/aviation-and-aerospace-psychology-pilot-mental-health-and-wellbeing or http://bit.ly/2I7ZUCM

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For the European Pilot Peer Support Initiative Board:

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STRESS PREVENTION THROUGH ORGANISATIONAL-LEVEL INTERVENTIONS

Stress management by air navigation service providers is required by European regulations, but implementation is not easy. In this article, **Paola Tomasello, Simone Pozzi, Giacomo Dusi, Gianluca Del Pinto** and **Stefano Bonelli** outline four organisation-level interventions that can benefit individuals and organisations.

KEY POINTS

- **The changing nature of air traffic management is likely to change the nature of stress experienced by controllers.**
- **European Regulation 2017/373 requires that air navigation service providers take steps to manage air traffic controllers' stress and provide education and information programmes on the prevention of stress.**
- **Four organisational-level interventions are proposed that can benefit individuals and organisations: surveys, work-related stress risk assessment, reporting, and new peer profiles.**

The 21st century ATC workplace is a fast-paced, dynamic and stimulating environment, with lots of opportunities and rewards for those who work within it. But there is a downside. The growing complexity of air traffic, changing airline business models, and the introduction of highly automated systems can increase stress levels, exposing ATC personnel to serious health risks.

For instance, the introduction of semi-automated conflict detection and resolution tools will bring about changes in the controllers' role, moving them to a more supervisory position. In this scenario, the major cause of stress is no longer the combination of high mental load with time pressure, as in 'traditional' ATC. Stress is more likely to be induced by limited scope for decision-making and reduced control, along with the sudden need to take over in case of any malfunctions of the automated systems.

Air traffic controllers are well adapted to cope with short-term exposure to pressure, but there will be greater difficulty in coping with prolonged intensive pressure. Stress management involves skills that people need to develop and maintain, not only as individuals, but as companies. To what extent can companies afford to ignore stress effects in terms of higher turnover, absenteeism, sick leave, effects on organisational reputation, and workers' legal actions? And what is the cost in terms of degraded performance and safety?

The Regulatory framework addresses these issues. The European Regulation 2017/373 (point ATS.OR.200), states that an Air Navigation Service Provider shall:

- develop and maintain a policy for the management of air traffic controllers' stress
- provide air traffic controllers with education and information programmes on the prevention of stress.

Implementing this is not an easy task. Good practices for the implementation of acceptable means of compliance are still to be consolidated. It is also difficult to determine the economic return of a stress management system. Four organisational-level interventions are proposed below that can benefit individuals and organisations.

Surveys

Surveys work in the same way as diagnostic tools work for doctors. They aim at measuring stress levels within an organisation and identifying their causes. Proactive awareness of these factors helps to prevent stress effects increasing until they become hazardous, acting in the same way as doctors' early awareness of the causes of symptoms helps to prevent the disruptive effects of illnesses.

Several case studies about the use of surveys to measure stress levels in the workforce are reported in literature. Among them, in 2004 British Telecom launched 'STREAM', a tool designed to mitigate stress in the workforce. STREAM was intended to help managers and their staff identify negative stress effects on wellbeing. After completing a questionnaire, workers were emailed a report with a stress assessment on three levels: red, orange, and green. If employees were rated at the red or orange level, they also received information on how they could reduce stress. A report was also sent to the employee's manager. In case of red or orange assessment, the manager had an obligation to meet the employee in person to discuss the relevant issues and agree on actions to be taken.

There are other standard approaches, such as the Health and Safety Executive Management Standard approach (United Kingdom) and the INAIL-ISPESL model (Italy). The Perceived Stress Scale and the General Health Questionnaire are often reported as reference questionnaires.

Regardless of the approach and tools selected, it is important to agree the use of sensitive data. The more workers understand that feedback will benefit their work life, the more surveys can be a source for reliable information. Similarly, employees will be keener on participating in surveys if the use of sensitive data is oriented by just culture principles.

Work-Related Stress Risk Assessment

Risk assessments are well established in aviation. What is proposed here is to enlarge their scope to include also an assessment of work-related stress risk, and its potential impact on safety, performance and organisational costs. The main objective is to mitigate any critical work-related stress issues in order to improve the working conditions and levels of protection of workers' health and safety. To ensure effectiveness the process must involve workers and include the following two phases.

The first phase involves detecting work-related stress via valid risk indicators, including:

- **work-related stress effects,** including, for example: errors and incident reports; sick leave; staff turnover; penalties; specific and frequent formal complaints by workers to company health practitioners
- **work content aspects,** including, for example: work environment and equipment; workload and pace of work; working hours and shifts; correspondence between workers' skills and professional requirements for accomplishing tasks
- **work context factors,** including, for example: role allocation within the organisation; autonomy, control and scope of decision-making; career evolution and development; team cooperation; and available peer support.

The second phase concerns intervention. An intervention strategy is implemented and its impact is monitored, to reduce the risk of harm to workers and the company.

Reporting

Incident reporting is also a widely acknowledged practice in ATC. Would it be feasible to enlarge its scope to include the opportunity for controllers to complete a self-declaration of temporary incapacitation due to acute stress or burnout? Such an approach may complement the implementing rules of the European Regulations 376/2014 and 340/2015.

Regulation 376/14 states that safety reports are mandatory when they concern *"Fatigue that affects or could affect the ability to safely perform air traffic or air navigation functions"*. Controllers must fill in a safety report if fatigue symptoms occur during job. Regulation 340/15 (at the ATCO. MED.A.20) prescribes that *"Licence holders shall not exercise the privileges of their licence at any time when they are aware of any decrease in their medical fitness which might render them unable to safely exercise those privileges"*. This is the case when stress reaches a level that may cause health disorders.

In case stress-related incapacitation is reported, the controller could be made exempt from operational functions and could be employed in non-operational tasks. Staying in the workplace in some cases might be useful to speed up the recovery period. When the acute stress or burnout symptoms have been addressed, the controller may have the possibility of declaring him- or herself fit again to carry out his duties.

However, several open questions are to be addressed: to what extent is the self-perception of stress reliable? Would it be useful to improve it via training? Also, would the practice of stress self-declaration be socially accepted? In other words, to what extent have we overcome the stigma related to psychological distress? Finally, could this stress self-declaration report submission be financially damaging for the reporter, and can we develop protections against this disincentive to report?

New Peer Profiles

In aviation, peer support programmes already exist. The question is if they still meet the requirements of the European regulations. In fact, they are often highly reactive. Peer support to recover from excessive stress may arrive too late, for wellbeing or human performance, or both.

The EU has foreseen in new regulations that the protection of physical and mental health must take place when the person is still fit. In line with this, new peer profiles must be created to make peer support programmes more proactive and all-inclusive. Stressful situations must be prevented by acting on their sources, rather than solely treating their effects.

Table 1: Pros and cons of the four interventions

	Intervention	Pros	Cons
1	Surveys	Identification of stress levels and sources	Sensitive data management
2	Work-related stress risk assessment	Identification of stress impact on workers' health, safety and organisational costs	Requirements for human and material resources
3	Reporting	Enabler of a database of stress-related incidents Protection of safety and workers' health	Reliability of self-declaration of stress Potential financial loss Potential stigmatisation
4	New peer profiles	Direct involvement of ATC personnel in stress management	Requirements for training and supervision

Conclusions

The proposed interventions are based on growing evidence that stress management programmes have a beneficial impact on daily work especially when they embrace both individual and organisational factors. Positive effects include the improvement of employees' effectiveness and motivation at work, as individuals and teams. These data demonstrate the importance of wellbeing to business.

Stressful situations must be prevented by acting on their sources, rather than solely treating their effects.

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WELLBEING
EUROCONTROL IANS COURSES

The EUROCONTROL Institute of Air Navigation Services (IANS), located in Luxembourg, develops and delivers Air Traffic Management Training, Services and Tools for Air Navigation Service Providers, Airlines, Training Organisations and Civil and Military State Authorities worldwide.
Building on over 45 years of expertise, the Institute provides a wide range of training courses, services and tools – from general introduction courses on ATM concepts through to advanced operational training.
Here are some courses that may be of interest to air traffic controller readers, and others, on the topic of wellbeing.

TRM Facilitator [TRM-F]

Team Resource Management (TRM) focuses on operational human performance and teamwork in ATM operations. It explores the gap between 'work-as-imagined' and 'work-as-done' in human factors terms. When implemented effectively, TRM zooms in on the things that go well during daily ATM operations and facilitates ways to replicate this success. It encourages the exchange and understanding of operational pitfalls and strengthens the human safety net.

Personnel attending this TRM Practical Facilitation Skills course will be trained to use and adapt the EUROCONTROL prototype training material so that they are able to deliver TRM sessions for air traffic controllers. The prototype training material will be made available to participants who attend the course.

During this intensive course, participants can expect to facilitate a group discussion and to co-facilitate a half-day TRM session delivered in English. This requires a conversational level of English language proficiency (e.g. CEFR B2, ICAO L4 or higher).

It is highly recommended that participants who wish to attend this course have previously followed the TRM in ATM course [HUM-TRM-A].

Prerequisites

Participants on this course are required to have either completed the TRM in ATM course or to have TRM experience within an organisation that has implemented a TRM programme. A sound theoretical background of the TRM initiative is expected of participants on this course, as it mostly focuses on practical TRM aspects.

Important Note

EU Commission Regulation 2015/340 states that one of the Acceptable Means of Compliance (AMC) for meeting the human factors ATC Refresher Training requirements (as part of Continuation Training) is to train air traffic controllers in team resource management. EUROCONTROL's well-established TRM concept and prototype training material may be used by ANSPs to implement this AMC and consequently meet the regulatory requirement.

Objectives

By the end of the course, participants will be able to:

- Use facilitation techniques to deliver TRM subject material
- Customize the existing prototype TRM training materials and create new TRM modules

Audience

This course is designed for personnel who wish to become TRM facilitators.

It is primarily aimed at air traffic controllers, however ATSEP and AIM personnel will also benefit from this course.

Energy Management [HUM-EM]

Through this course, ANSPs are assisted in organising training for their staff as a part of their FRM (Fatigue Risk Management) programs. It's known that ATM professionals who are mentally and physically fit find more pleasure in their work and perform better. This energy management course focuses on resilience and energy management for sustainable human performance. It describes different strategies to improve responsiveness before (preventive), during (resistance) and after (recovery) stress events. It provides improved awareness and strength, but also tools and techniques for mental flexibility, emotional stability and physical fitness.

Content

- Physiological rules – understanding how your energy resources function
- Techniques of reinforcement - reinforcing yourself before a moment of pressure
- Techniques of resistance - resisting under pressure
- Mechanisms of recovery - recovering after moments of pressure

Objectives

At the end of the course participants will:

- understand the permanent interaction between body and mind: your physical and physiological reactions, the evaluation of your energetic capacities
- be able to increase efficiency by transforming stress into positive energy
- be able to improve their individual and their organisation's resilience, better self control
- be able to better control themselves in emotionally demanding situations;
- have improved resistance to stress.

Audience

This interactive course is for high performing ATM professionals who want to increase their resilience and stress resistance and improved awareness on self-management. The learning is based on an engaged participation to the course.

Fatigue Awareness for ATC e-Learning Course [HUM-FAT-ATC]

Air traffic control is typically a 24/7 operation and the controllers who work the system are regularly having on call on their physical and mental resources to carry out their duties, which are often highly demanding and can have serious consequences if not carried out correctly. This course is designed to help air traffic controllers manage their fatigue both at home and during a shift, and maintain lifestyle habits that promote alertness.

Objectives

By the end of the course, the participant shall be able to:

- Explain why understanding the effects of fatigue is important
- Explain how fatigue affects the individual
- Be aware of signs and sources of fatigue
- Consider actions to prevent or respond to fatigue
- Explain how shift work affects circadian rhythms
- Consider how to counteract fatigue when on shift

Audience

Air traffic controllers and student air traffic controllers, supervisors and OJTIs.

Other courses relevant to wellbeing:

- Stress and Fatigue management [HUM-SFM]
- Fatigue awareness for ATM Managers [HUM-FAT-MGT]
- Design and Assessment of Systems Using Human Centered Approaches [HUM-DESIGN]

Check the prerequisites and dates for each course, and register at EUROCONTROL Training Zone.
https://trainingzone.eurocontrol.int/

BURNOUT IN EMERGENCY MEDICINE: HOW DO WE GET BETTER?

Research in healthcare has found that emergency department doctors report higher levels of burnout than any other medical specialty. In this article, emergency physician **Shannon McNamara** describes her own experience, and how a shift in perspective can help.

KEY POINTS

- **There are many sources of burnout, including workload, inefficiency, broken systems, interpersonal incivility, and exposure to traumatic stress.**
- **Exposure to secondary traumatic stress is ubiquitous in health care workers and is directly related to burnout and compassion fatigue.**
- **Distress caused by traumatic stress is treatable but stigmatised.**
- **A Safety-II perspective may reduce burnout and traumatic stress by highlighting successes, prioritising the perspectives and expertise of front-line workers, and limiting individual blame, thus improving wellness.**

In the past eight years as an emergency physician, I've experienced burnout multiple times. A recent study showed that three-quarters of emergency medicine trainees were experiencing burnout (Lin, 2017). I often wonder, why are so many of us so miserable?

The medical profession is now paying more attention to wellness and burnout. The prominent Stanford Well MD centre emphasises a three-pronged approach to wellness through addressing culture, efficiency of practice, and personal resilience. I've witnessed the detrimental effects of a dysfunctional and under-resourced practice environment. I've felt the sting of a toxic institutional culture that is rife with professional incivility and interpersonal discord. Both are clearly factors in the development of burnout.

Framing a lack of wellness as a lack of personal resilience feels like shifting the responsibility. Clearly, if burnout is so prevalent, this is an environmental problem, not a personal failure.

Whenever I see the framing of 'wellness' through personal resilience, however, I feel really angry. Though individual strategies may well be effective in some circumstances, framing a lack of wellness as a lack of personal resilience feels like shifting the responsibility. Clearly, if burnout is so prevalent, this is an environmental problem, not a personal failure.

Personal Resilience and Traumatic Stress

My anger comes after many years investing in my own 'personal resilience' without the support of the medical community. Our environment exposes us to a heavy dose of traumatic stress, but our profession doesn't have a systematic way of managing it. Unfortunately, acknowledging and treating work-related traumatic stress is still stigmatised.

After my first year as a physician, I sought the care of a mental health professional for a non-work issue. I didn't consciously know that I wasn't well. At our first meeting, the therapist assured me that the personal challenge that brought me to her would be simple enough to address. Then she asked how we were going to address my work trauma.

I worked in a busy, urban 'Level 1' Trauma Centre that provides the highest level of trauma care to critically ill or injured patients, with a bustling intensive care unit. In that first year, I lost count of how many people I watched die. I lost count of how many open chest resuscitation cases we did in the emergency department for victims of gun violence. And I lost count of how many families I notified of their loved one's death. I didn't know that this was trauma. I worked in trauma, I didn't experience trauma.

The therapist didn't use terms like 'PTSD' (post-traumatic stress disorder). She just helped me feel feelings again. I would sit on her couch, tell her stories from work, and cry. It took us years to work through the backlog of stories I carried and to process the new ones. I gradually stopped seeing intrusive imagery about death before bed. My moods and my relationships improved. By the time I graduated from residency (a stage of graduate medical education), I was still burned out, but at least I was sleeping well.

Since then, my exposure to traumatic stress has lessened. It will never fully disappear. My job as an emergency physician is to take care of everyone who comes in the door. There will always be people who suffer and who die. There will always be families who grieve. This is part of the job. I stay in therapy to keep the distress related to that traumatic stress at bay, and it helps.

Mitigating Traumatic Stress

My frustration with the healthcare industry's focus on wellness is the notable lack of conversation about how to manage the universal challenge of traumatic stress. We know that secondary traumatic stress is ubiquitous in the health professions. We know that this contributes to burnout. We know that professional support can help. And yet, we don't talk about it. Seeking help is still stigmatised. It's rare to hear physicians openly discuss seeking or obtaining professional support for coping with traumatic stress. It's rare for organisations to offer professional supervision to mitigate that stress. Instead, we joke about getting a drink after a tough day.

Watching people die was hard enough. Being blamed for what went wrong while being asked to do an impossible job only amplified that stress.

As I pursued more professional development in quality and safety, I discovered that not only were we failing to address the problem of traumatic stress, we may be making it worse. At administrative safety and quality meetings, I noticed that those making the rules often didn't understand how the work was done. Front-line clinician expertise was rarely considered in seeking the so-called 'root cause' of the perceived failure, nor in crafting solutions for the problems uncovered. Shame and blame were ubiquitous: often subtle, but rarely absent. I wondered, why were we relentlessly focused on finding someone to blame, instead of trying to learn how we succeeded and how to do better next time?

Does Blame Make Us Safer?

When things go wrong, there must be someone or something to blame, right? In my own practice, I experienced similar burdens of hindsight. When an adverse outcome occurred, our team was scrutinised and often blamed for what happened. When a patient did well, we occasionally received positive feedback. Often the processes that lead to both good and bad outcomes were the same. When we were critical of a process or asked for more resources, our calls often went unanswered.

Watching people die was hard enough. Being blamed for what went wrong while being asked to do an impossible job only amplified that stress.

Many years after residency, I realised that I was still feeling cynical, burned out, and exhausted under the weight of the stories that I carried. Despite seeking support, I unconsciously blamed myself for my own failures to rescue patients from death or from suffering. It wasn't hard to imagine how it happened – I was named in a malpractice suit and endured a few of my own cases going through the 'root cause analysis' process. There were people lining up to blame me when bad things happened.

As I talked to my colleagues, it was clear that my experience was actually well within the norm. Most U.S. physicians get sued. Everyone has bad outcomes. It's part of the job. We work in a high-risk field, and the risk to us is also significant.

Safety-I to Safety-II

Gradually, something shifted. I realised that I alone could never conquer death or suffering. How did I imagine that I could? I couldn't blame myself for every bad thing that ever happened. But I could keep doing my best. I could always keep learning, keep growing, creating more kindness, and more safety. But I needed to let go of the weight of the shame of failure and transform it into recognising the realities of my impact as an Emergency Physician.

I started learning about complex systems and how they fail, and about how safety sciences have accepted the reality of how and why things happen, while acknowledging that it is not always possible to know. I heard people ask, "knowing what we know now, how do we get better?" instead of pointing fingers at those in the

past who were doing their best with what they knew at the time. Instead of searching for 'root causes', I started wondering: *how do we identify and create conditions that create safety?* How do we stare the realities of uncertainty, danger, and mortality in the face, and still be well?

Making this shift to a 'Safety-II' perspective took me years and great effort. The shift happened outside of the context of the predominant medical paradigm that still seeks 'root causes' and fails to acknowledge the realities not-knowing. In medicine, we often avoid acknowledging that we are just as human as everyone else, just as vulnerable to uncertainty, to mortality, and to being wrong. By recognising the strengths and limits of our shared humanity, we can start to build environments where humans can thrive. Perfection may be unattainable, but we can always seek more good in the world.

Debriefing Death

It's still really difficult for me to watch someone die. Now, after I do, I make sure that someone on the team leads us through a moment of silence to honour the person whose life just ended. Afterwards we debrief what happened. What do we know, and what don't we know? What did we do well? What systems supported us? Where did we feel challenged?

As I stand next to a person that died, I struggle to ask, "How could we do better next time?" I fear that asking this question to a team there may encourage them to carry the full weight of responsibility for the patient's death on their shoulders. The reality is that even when we perform optimally, most of the patients who experience cardiac arrest will die. Not every failure to rescue is a failure – many rescues are impossible. We often never know which is which.

We get better from both less bad and more good. I know that debriefing on what went well alone helps us get better. By focusing on our successes, I hope that we can stay calm and carry on even in the face of a career where ultimately we will continue to watch people die.

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THE LIGHTER SIDE

"I think I'm getting burnout"
"Have you seen a doctor before"
"I am a doctor"

Jim, it's time for the mindfulness course

Let's have an extended briefing today

This is the third burnout this year

STEADYING THE MIND: MINDFULNESS IN THE NUCLEAR INDUSTRY AND BEYOND

There is evidence from military settings and other high-pressure, safety-critical environments that mindfulness helps to reduce stress and enhance attention. In this article, **Martin Summerfield** explores mindfulness in the nuclear sector.

KEY POINTS

- **Mindfulness is effective in reducing stress, anxiety and burnout.**
- **Mindfulness provides such benefits without compromising alertness and awareness and understanding of the operational situation.**
- **Mindfulness could potentially improve the mental health of air traffic controllers and pilots, and also enhance flight safety.**

Thoughts, whether positive or negative, are normal events in our mind, and can greatly affect our wellbeing. Mindfulness is simply about being aware of experiences in the present moment. It includes the practice of meditation (i.e., time purposefully put aside to 'train' attention) but also encompasses informal moments of noticing internal events such as thoughts and feelings, and also what's going on around you. Taking the time to notice how you are sitting, at your ATC workstation or in a cockpit seat, is a good example of being 'mindful'.

In much the same way as doing push-ups or running laps benefits our bodies, mindfulness training has been shown to have long-term benefits for our minds. The benefits build up over time, especially if practised daily. Instead of working up a sweat, you take time to work on your attention, which may begin with focussing on the breath.

Practising daily helps you in everyday life to create space between stressful events and your reactions, to be more considered and less immediately caught up in events. Potentially stressful events will inevitably occur in our work life and home life on a day-to-day basis. What's important is how we set ourselves up for the day, and how we relate to those stressors.

In much the same way as doing push-ups or running laps benefits our bodies, mindfulness training has been shown to have long-term benefits for our minds.

The human mind has gained great evolutionary advantage from being able to plan ahead and to review and reflect. However, these capabilities can become problematic when we are under a significant amount of stress. Reflection can quickly turn into regret, whilst planning can turn into worrying. Neuroscientist Amishi Jha has explored the way stress affects attention. Her research involving the US Army (Jha, 2017) found that mindfulness is effective at protecting attention and working or short-term memory at times of heightened stress.

To reduce the effects of stress, first we need to be able to see what is happening for us at a given time. Once we have established this self-awareness, we can start to make more informed decisions. For an ATCO, this might mean simply taking a few breaths to 'reset'. Or it might be that at the end of a particularly challenging schedule, you prioritise looking after your work-life balance. You might become more conscious that during time for relaxation, your attention is being drawn back into thoughts of work. If we are aware of this, we are better able to do something about it.

The Nuclear Experience

Mindfulness has recently been used within the UK nuclear industry. Within EDF Heysham 1 and 2 nuclear power plants, 100 staff (around 10% of the workforce), have undertaken a

mindfulness course. These staff come from a range of backgrounds, with the majority describing themselves as engineers of various descriptions. The nearest equivalents to the roles of air traffic controller and professional pilot are probably the operation engineer and their associated supervisors and shift managers, who operate the reactor control rooms. Within each power plant there are approximately 500 staff, of whom 45 operate the control room. These staff work on rotating shift patterns to cover the monitoring and operation of these control rooms. The skill sets include the capacity to maintain vigilance of incoming reactor data, detailed knowledge of reactor systems and operating procedures, the ability to respond effectively in normal and abnormal situations, and the ability to communicate clearly and work well as a team.

There are times of lower-level baseline workload and times of increased pressure. Planned 'outages', when reactors are shut down for routine maintenance, greatly increase the workload for control room staff. These biannual events involve lengthy spells of increased shift work over a number of months. 'Unplanned outages,' which are events that trigger an unexpected shutdown, create the most pressurised situations.

The Fukushima Daiichi accident, which followed the earthquake-induced tsunami in 2011, highlighted the vital role of control room teams in responding to situations as they unfold, and to work from detailed knowledge of the system rather than rules alone, similar to QF32 (see HindSight 29). The control room teams at Heysham spend a significant number of days each year in the control room simulator, where they build skills in order to be able to recognise each situation as it unfolds, and to adapt and devise appropriate response strategies. Fukushima further highlighted the need for staff to be able to be flexible, in order to account for key staff being unavailable. It also highlighted the need for resilience during unprecedented events, in order to be able to prolong high-level performance.

Control room staff and instructors who have undertaken the mindfulness course, have found it invaluable in terms of recognising and regulating both their own stress levels and those of colleagues around them. Self-reported levels of wellbeing and attention have risen over the duration of the course. There are a number of studies seeing similar results within the medical profession, where mindfulness has been shown to reduce stress and limit burnout for staff working in Intensive Care Units (Duchemin et al., 2015).

To reduce the effects of stress, first we need to be able to see what is happening for us at a given time. Once we have established this self-awareness, we can start to make more informed decisions.

Mindfulness in Aviation?

So what about aviation? The value of mindfulness is increasingly recognised in the military due to the growing evidence base. In the New Zealand Air Force News (2018), psychologist Flight Lieutenant Carsten Grimm stated that "*militaries all over the world are adopting it because of the research pedigree that's emerging*".

Norwegian F-16 pilots and support personnel undertook mindfulness training, reporting reduced levels of anxiety and increased ability to regulate attention and emotions (Meland, 2015). In a study looking at military helicopter pilots, Meland (2016) highlighted the capacity for mindfulness to reduce anxiety and arousal without compromising alertness and situational awareness. This ability to remain both calm and alert is potentially of enormous value to both pilots and ATCOs. Daily practice of mindfulness supports restful alertness and reduces unhelpful 'reactivity' in response to stressful events.

Starting out with Mindfulness

There are clear advantages to using mindfulness to regulate stress:

- It is a drug-free treatment.
- There is a good evidence base to support the benefits for mental wellbeing.
- It can enhance awareness and protect this vital capacity at times of stress.
- It can be practised almost anywhere, at any time.
- It's accessible. There are readily available apps, CDs, books and courses.

For individuals, apps such as 'Headspace' or '10% happier' are good places to start. The book and CD *Finding Peace in a Frantic World* by Professor Mark Williams is highly recommended. Going further, attending a course, such as mindfulness based stress reduction (MBSR), led by a qualified teacher, has great merit. However, just like physical exercise, it requires ongoing commitment.

The key to successfully introducing mindfulness into an organisation, is to make any intervention specific to the work context. For staff engagement, it's important for the content and delivery to be relevant to the specific work environment. A successful mindfulness programme at two of EDF's nuclear reactor sites involved more of the neuroscientific background to mindfulness than might be used with other workplaces. There was also a focus on the application of mindfulness in the safety-critical situations faced by staff.

There is also great value in seeing this approach as a way of supporting the 'whole' person, which was the approach taken by EDF Energy. What happens outside of work inevitably impacts our performance and safety within work, however much we (or our employer) may wish to ignore this reality. We are human, after all.

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Martin Summerfield trained to deliver mindfulness with Bangor University and is an accredited with the British Association of Mindfulness Based Approaches. Martin has worked with several large organisations and individuals and has a particular interest in the application of mindfulness in safety-critical industries. He worked with EDF Energy and their staff to deliver mindfulness interventions at two nuclear power plants between 2017-2020.

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IT'S OK TO TALK

Many front-line professionals have distressing or traumatic experiences at some time in their career. **Andy Elwood** was a military search and rescue helicopter winchman, and on learning about the prevalence of male suicide, found ways to encourage people to talk about mental health.

KEY POINTS:

- **Suicide is among the leading causes of death among younger men in some countries.**
- **#MenDoLunchDay on 14th Nov is a campaign to start more conversations about mental health.**
- **Talking about mental health and suicide saves lives.**
- **Get your '5-a-day' for good mental health.**

Life as a Helicopter Winchman

My patient was trapped in a Land Rover, which had been compressed and mis-shaped after the improvised explosive device (IED) had gone off during a patrol in Afghanistan. It was the middle of the day and over 50 degrees C. The weight of my body armour was pressing down on my shoulders and restricting me getting into the enclosed space to assess the injured soldier. I could feel the threat to my own life, as well as an immense pressure to get him onto the helicopter for a swift transfer to the hospital in Camp Bastion.

I was no longer on my tour of Afghanistan as a Paramedic on the RAF battlefield rescue helicopter. I was on holiday in France, and it was five years later. I closed my eyes in the shower but I could still see his face. I turned the water to cold and I could still feel the 50-degree heat of the day. Despite scrubbing and scrubbing at my body, I could still feel sand on my skin. I was naked in the shower, but I could still feel the weight of my body armour.

I quickly wrapped a towel around myself and came through into the small apartment to join my wife. The flashback was over, but my wife knew something was wrong immediately. "What's happened in there? Are you OK? What's wrong?" she asked.

I was still trying to work out what had just happened. I wasn't sure I wanted to burden her with these images and what I'd been through, but I was genuinely scared for myself and my future. I was thinking, "Why me? Why now? Does this mean I have PTSD? Is this the end of my flying career?"

We already had trust, but my wife made me feel I could tell her anything that day. She listened intently. She didn't interrupt. She asked open questions and allowed silences as I thought about what I would say next. She didn't judge me for what I told her. She accepted me as I was.

My wife and I were still able to go outside that day in France and gradually I began to feel better. It did take me a few days to go back into the shower, but I haven't had another flashback since. Talking about it really helped.

I was straight back to work when we returned from holiday. I was happy and continued to fly and progress in my career. I also began delivering crew resource management training for healthcare in my spare time.

The following year, 2016, was the '22 challenge'. It involved 22 press ups to promote awareness for veteran suicide prevention, highlighting the 22 veteran suicides per day in the US. Having seen the horrors of war first-hand, this campaign resonated with me. I was shocked to learn that suicide was the number one cause of death for men between 20 and 49 years of age in the UK. Worldwide, suicide is among the three leading causes of death among those aged 15-44 years in

some countries, and the second-leading cause of death among 15-29 year-olds globally (WHO, 2020). When I was nominated to take part in the challenge by a friend, I decided to accept.

I got permission to use the coastguard rescue helicopter in my videos for my 'Big22' challenge campaign. The aircraft did press ups with me in one video and winched me into some places not everyone could access for other videos. It gave people a glimpse into what it might be like to fly on a search and rescue aircraft, and what the crews might go through on their missions to save lives, 24/7.

#itsoktotalk

As the campaign caught people's interest, I began travelling to other 999 bases and inviting other emergency personnel to join me doing press-ups. Very quickly I realised that people on other bases, in other emergency services, all had a lot to talk about when someone created a safe space to do this – whether pilots, fire officers, police officers or ambulance controllers. Out of the campaign grew the tagline #itsoktotalk.

Interest grew so much that I had to reduce the number of aircraft flying in our final video, as my chief pilot didn't want it being viewed as an 'airshow' by the CAA. Our final video had over 45,000 views and as a result, people opened up to me with all kinds of personal stories afterwards.

The best thing to happen as a result of the video was that one man who was in the video had the courage to ask for help. We got him assessed and he received a diagnosis of post-traumatic stress disorder (PTSD). Having completed a personalised treatment plan, he is now successfully back at work and enjoying family life again.

I became an online advocate for talking about mental health. In 2018 I delivered a mental health workshop, which was attended by the Duke of Cambridge, at the National UK Search and Rescue Conference. My workshop contributed to the formation of a National Steering group on mental health and wellbeing.

Mental First Aid

Later in 2018 I left search and rescue helicopters – the best job I ever had – because I believed I will help save more lives by working on mental health than I would by flying as a paramedic winchman. I'm now a mental health first aid instructor. I have made it my mission to help reduce male suicide in the UK, by speaking, campaigning and training.

Real listening involves creating safety and trust, attending to the person, avoiding judgement, and not offering advice or trying to 'fix' the person.

We face a crisis with three out of every four suicides being male. I grew up in a village in the UK with a suicide rate so high that we were featured on the BBC news. The issue became even closer to my heart, when a colleague, who was my instructor through search and rescue training, ended his own life. As often is the case, he was a person so many of us respected and we never suspected the level of distress beneath his professional mask.

One of the key parts of the mental health first aid course is dispelling the myths around suicide. If you are worried that someone may be thinking about ending their own life, asking directly about suicide is essential. Discussing suicide openly creates safety and trust for an individual to talk about how they actually feel and find support and a way forward.

#MenDoLunchDay

I also deliver campaigns online to reach out to men, especially to encourage them to talk about how they are, and to access professional help. One such campaign is #MenDoLunchDay on 14 November, which I founded in 2018. The idea is to have one day as part of the 'Movember' focus on male health to take some time out and just talk to others about how you are and what's going on for you. The idea is to ask a man you care about to lunch, ask him how he is, tell him how you are, and then to take a selfie and use the hashtag #MenDoLunchDay. Women have an important role to play in this campaign. Often men who don't feel comfortable talking to their male friends or colleagues will speak to a woman they trust. Both years the campaign has been running, many women asked a man they cared about out to lunch to start a conversation with him about his wellbeing and mental health.

In 2019, the response was fantastic. People got involved at work, looked up old mates they hadn't seen for a long time, and others connected with men around the globe on voice and video chat.

We had a response from men around the globe, including Australia, New Zealand, Panama, USA, Canada, Europe and even Antarctica, where the men had lunch outside in the freezing conditions. The reports of conversations and support were wonderful. The message was that many men didn't feel alone any more and that they now had someone to talk to. They felt better for talking and being listened to, and for listening.

The Power of Listening

This is the power of real listening. It creates human connections and people don't feel alone. Real listening involves creating safety and trust, attending to the person, avoiding judgement, and not offering advice or trying to 'fix' the person. This kills fear and shame, which are barriers to people talking about their feelings and difficulties. Breaking down the stigma around mental health conversations is essential to getting people support when they need it most.

We can all listen to someone and make an impact for someone. Might you do something positive to start the conversation on mental health where you work?

Mental Health Five-a-Day

We know that we should be aiming for five portions of fruit and veg a day, but what are five things to do daily for good mental health?

- Connect – with the people around you.
- Be active – step outside & enjoy a physical activity.
- Take notice – be curious, catch sight or the beautiful, remark on the unusual.
- Keep learning – learn and try something new, especially if it is fun.
- Give – do something nice for a friend or a stranger. Smile, volunteer, thank someone.

Andy Elwood is a former winchman paramedic with 18 years of experience working on rescue helicopters around the world. He is now a mental health first aid instructor and mental health campaigner.

www.AndyElwood.com

Resources

Mental Health at Work. A website curated by Mind, a mental health charity, including resources, toolkits, case studies and blogs. https://www.mentalhealthatwork.org.uk

NHS Health Scotland. Animations exploring issues of mental health, suicide, and compassionate conversations. https://bit.ly/2y4Y0RS

World Health Organisation. I had a black dog, his name was depression. https://www.youtube.com/watch?v=XiCrniLQGYc

LEARNING FROM BEHAVIOUR CHANGE:

A CONVERSATION WITH NICK GODBEHERE

Behaviour change has emerged as critical for the wellbeing of individuals, groups, organisations, and countries. It applies to habits such as smoking and drinking, and even hand-washing and other behaviours highlighted by the COVID-19 pandemic. **Nick Godbehere** has worked with a variety of organisations and government bodies for over 20 years, helping to encourage behaviour change for health and wellbeing. Nick talks to **Steven Shorrock** about learning from behaviour change.

KEY POINTS

- **Behaviour change is about providing the opportunity for people, from individuals to whole countries, to help change their behaviour for the better.**
- **Habits are shortcuts to our best and worst behaviours and behaviour change can help people move away from bad habits towards good ones.**
- **We have to understand triggers and rewards in order to change habits. Triggers for a behaviour might be individual, social or environmental. Rewards might include secondary gains from engaging in a behaviour that is fundamentally unhealthy.**
- **Behaviour can be changed by design by making a healthier behaviour easy, attractive, social and timely to do.**
- **The stages of change model can be helpful. Change needs to be supported through different stages: 'pre-contemplation', 'contemplation', 'preparation', 'action, and 'maintenance'.**

Thanks for talking to me, Nick. Please could you give us a bit of an overview of who you are, your background and what it is that you do.

Well, my background is in psychology, first at degree and postgraduate level. I now work in behaviour change and social marketing. Social marketing essentially involves using the principles of commercial marketing to create social good – pro-social behaviour, for the country's good, for the community's good, for the individual's good.

So I use my psychology and behaviour change background to generate behavioural insights. This is an approach that combines insights from psychology, cognitive science, and social science to discover how people make choices. I work in tandem with a strategy and planning team and a creative design team to produce whatever kind of intervention we think is appropriate for the audience to help change behaviour, referring to behaviour change theory.

Steven: *And what kinds of people have you worked with?*

Nick: A lot of our work is in public health for local government or central government. So if I give you an example, we're working on a project for a client in Greater Manchester to do with smoking cessation. That is aimed at people who are still smokers as part of a public health initiative in Greater Manchester to 'make smoking history'. We have also worked on the 'dry January' campaign with local authorities to reduce alcohol consumption. We are interested in sets of behaviours, beliefs and values that are shared by different segments of the population, including different professions.

Steven: *You mentioned behaviour change and that's something that's of interest to this issue of HindSight magazine. So can you say a few words about what behaviour change is from your perspective?*

Nick: Behaviour change is really about providing the opportunity for people, from individuals to whole countries, to help change their behaviour for the better. I try to think of it as being a change for the good that will benefit everyone. The individual will hopefully benefit in terms of health and wellbeing. This will then have an impact on their family and then, ultimately there will be a benefit to the community, and wider benefits as the health and wellbeing of the nation improves. There are implications of that in terms of organisations and government generally. If people are healthier, for example, then that takes pressure off the health service. The principles are similar whether we look at groups or individuals. It's about providing choices and resources to be able to make those choices in a more positive direction – for the social good.

There are ethical issues around who decides what is the social good and who is the beneficiary of behaviour change, but there are also behaviours which are known to be harmful, and we can see this now with the COVID-19 pandemic. Health and wellbeing are now very high on the agenda and behaviour change is extremely important. I've lost count of the number of times I've heard people say, "I've become aware of how often I touch my face." Studies vary but it is suggested we touch our faces, on average, around 15 times an hour while performing office-type tasks. Although I've seen news reports and recommendations not to touch your face, I've not really seen any alternatives being suggested for what is essentially an unconscious activity. The UK Behavioural Insights Unit has a blog on their website that suggests some things to try. They suggest a few ideas such as 'if-then plans'. If I am on the phone, then I will keep my other hand in my pocket. Other suggestions include things like wearing sunglasses, creating a barrier to touching one's eyes.

Steven: *Yes, and it sounds a bit like what we try to do in human factors, in trying to make it easier for people to get it right by design, but behaviour change*

tends to be more focused on habits. This is especially relevant right now with the coronavirus pandemic. People are being asked to change old but strong habits like handshakes and touching their face, and asked to create new ones, like very frequent handwashing and cleansing of surfaces, reducing our touching of public surfaces, and social distancing.

Nick: Yes, and habits are especially important for everyday activities. You wouldn't want to learn to drive a car every morning, for example. But we have habits that aren't that good for us. Habits are shortcuts to our best and worst behaviours and behaviour change can help people move away from bad habits towards good ones, through communications or changing the architecture of an environment. Most of the time, behaviour change is about trying to redesign habits in a more positive direction. People can be stuck in a behaviour because they are not even aware of it or because they don't see a way to be able to change.

Steven: *And we have to consider what happens before and after a habit to trigger it and keep the habit strong and active.*

Nick: Yes, we have to think about the cue, which triggers a routine or response, for which we get a reward. We have to understand the triggers and secondary gains in order to change habits. Triggers for a behaviour might be individual, social or environmental. Rewards might be so-called secondary gains from engaging in a behaviour that is fundamentally unhealthy. So, for instance, a smoker might not be aware what triggers the smoking behaviour or what the reward is for continuing to smoke, other than an addiction. But rewards can often be more secondary, like going outside work for a break, or some peace away from the children. So, we need to help people understand what the triggers are to smoke for a particular person, and the rewards. Help them to become aware of when the triggers occur, then take it from there to replace the habit with something healthier but that still gives a reward.

As part of this, we have to understand the role that emotions play in decision-making. There is evidence that suggests that around 95 per cent of individual consumer decisions are driven by emotions. These are outside of conscious awareness. So behaviour change has to work at an unconscious level, understanding drivers and barriers to change then creating different interventions to help shift behaviour.

Steven: *So you mentioned, for instance, it could be smoking, it could be exercise or it could be drinking. In all of those three areas, we build up both healthy and unhealthy habits. How do you practically go about trying to influence behaviour?*

Nick: At a large scale, we base our approach to behaviour change on social marketing frameworks and principles to design campaigns or interventions. For the project in Manchester about smoking, we did a lot of behavioural insight work to understand what was triggering people's behaviours. There are individual aspects, social aspects, and environmental aspects that influence behaviour.

We then work as a team to design a campaign or an intervention to help people think and point them in a healthier direction, which might be toward support. Then you evaluate and feed that back, so you've got a feedback loop, constantly learning and tweaking behaviour change activities.

Steven: *Throughout that process, what kinds of principles and theories do you use?*

There are individual aspects, social aspects, and environmental aspects that influence behaviour.

Nick: To create an intervention that has more chance of working, we often use the 'EAST' framework, which applies on a large scale to countries, and on a smaller scale to organisations and individuals. This was developed by the UK Behavioural Insights Team and is a tested and pragmatic framework. The model uses four principles for designing behaviour change interventions to get the greatest level of success. Essentially, any behavioural intervention that you design should be something that is easy, attractive, social and timely. So if you're looking at a campaign for behaviour change, you want to be able to create something that offers those elements. First, is it easy to do? It could be the default, it could be simple to do, and take little energy. Second, is it attractive? It might attract attention and give rewards. Third, is it social? It could be something that you can do with others or that others are doing, maybe even a commitment to others. And is it possible the right time? Ideally, people should be prompted to change behaviour when they are most receptive. This might involve helping them to understand the barriers to behaviour change and highlighting immediate benefits. The easier, more attractive, more social and more timely it is for somebody to replace an unhealthy behaviour with a healthier behaviour, the more chance you have.

Steven: *This overlaps with the 'COM-B' model of behaviour change from Susan Mitchie and colleagues, which finds that we are influenced by whether we have the capability to change, the opportunity to change, and the motivation to change. So we need to be capable of changing behaviour, physically and psychologically. We need to have the opportunity, which might be social or physical, maybe just having the time to change. And we need to be sufficiently motivated, which really comes from the inside and can be more automatic, involving emotions and impulses, or more reflective, involving evaluations and plans. But it can be helped by good information and support within organisation. So what can organisations do to help behaviour change?*

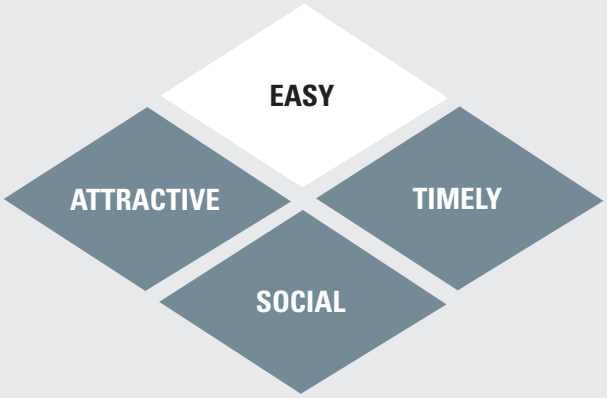

Figure 1: The EAST Framework (Behavioural Insights Team, 2014)

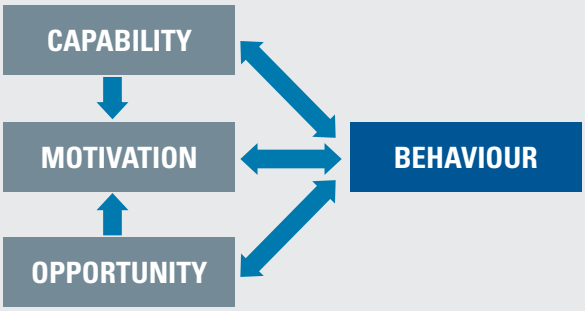

Figure 2: The COM-B Model. (Mitchie, et al). CC BY 2.0

Nick: Whether it is an individual or organisation, you need to focus on what you can control.

Again, you've got individual aspects, social aspects and environmental aspects. So it might be that all three elements have to be dealt with, or there might need to be a stronger focus on one. If you think about the concentric circles of the self, the closer you get to the centre if the self – the core of your 'innermost being' – the harder it is to change that behaviour. It might be a person's self-concept, core values and beliefs, where psychologically an individual cannot picture who they would be in life without a cigarette, for example.

But towards the edge of the concentric circles, you have environmental elements, which is what we call the 'choice architecture'. And that could be things that an organisation can do, which the individual might not even be aware of. When you make changes here, behaviour changes without people even thinking about it.

Any behavioural intervention that you design should be something that is easy, attractive, social and timely.

Now is there something an organisation can put into place to help support people in that step between just sitting there thinking, "I need to do something" and actually taking action? One of the things that's talked about in the book 'Nudge' is the placement of foods in canteens. If you want to encourage drinking water rather than unhealthy drinks, make good quality water freely available, and maybe give good quality drinking glasses. We've made the choice that in our office we would put the water fountain at the other end of the office. Every time you want a drink of water, not only are you getting water, but you're getting away from the screen, getting up and walking across the office and perhaps socialising. That's changing the choice architecture. Without thinking about it, people will make better choices by having them put in front of them.

Another example is the problem of people on their mobile phones walking out into the street. Illuminated strips at the edge of the pavement at crossings, green or red, help people to see the signal. The best behaviour change often happens out of awareness, without having to make a conscious decision.

But research does show that providing staff with some control over their working environment can reduce stress. It's not necessarily about removing poor choices but making it easier to make good choices.

Steven: *How do you address behaviour change when someone is not thinking about changing compared to someone who wants to change their behaviour?*

Nick: The stages of change model can be helpful. This is quite a traditional model of behaviour change that places people at certain points. We'd look at where different groups were in terms of stages of change, and pitch messages or interventions to take people to the next stage. We tend to segment groups depending on factors like age group and gender, and things like attitudes, values, or beliefs. These all influence behaviour change at each stage.

So people might be at the 'pre-contemplation' stage, where they're not even thinking that they need to change their behaviour. And then you've got the 'contemplation stage', the 'preparation stage', the 'action stage', and the 'maintenance stage' or 'relapse stage'. It's a bit like stepping stones along a process, though these can overlap and people can move forwards and backwards.

At the pre-contemplation stage, even just raising awareness about stress management or the need to keep active means you might help somebody to move from pre-contemplation to contemplation. You've already helped to start the behaviour change process. Or we might target an intervention at the contemplation stage to try to help people move a little further into that stage and into preparation, because activity is more likely to happen if you're well prepared.

Steven: *We've seen this with the COVID-19 pandemic in terms of handwashing and surface cleaning, and also social distancing, where people went from not thinking about it too much, to doing this very mindfully. How does that apply to other examples related to wellbeing?*

Nick: If we go back to the EAST model, it's about making it easy, attractive, social, and timely. If somebody wants to do more exercise, maybe start running, the preparation stage might involve different activities. For an individual, before you go to bed every night, you might put your running gear next to your bed. So the first thing you do when you wake up in the morning is see your running gear. For an organisation, it might mean free access to a gym or just 15 minutes to have a group walk to help support the social side of the activity.

It's the same for smoking. Again, we need to understand the secondary gains. If it is around social interaction with friends, how can we replace the social involvement of smoking? For the individual, it could be electronic cigarettes at first, but for the organisation it could be small social gatherings, and social support like smoking cessation services, or a counselling service.

Steven: *So just stopping a behaviour isn't necessarily enough.*

Nick: That's right. We don't necessarily want people to just end a behaviour because that can lead to it needing to be filled by something. When people stop smoking, they often start visiting the fridge quite a lot! It replaces one negative behaviour with another negative behaviour. We need to think about the secondary gains for any unwanted behaviour, and replace these with healthy rewards that are easy, attractive, social, and timely.

Stages of Change
(The Transtheoretical Model)

- **Precontemplation:** People tend to underestimate the disadvantages of their behaviour, and are not thinking about changing behaviour.
- **Contemplation:** People recognise that their behaviour may be problematic, and are considering at some level the costs and benefits of changing the behaviour but probably still feel ambivalent or conflicted.
- **Preparation:** People accept that changing their behaviour is good for their wellbeing, are ready to take action and are taking small steps toward the behaviour change.
- **Action:** People are changing or have changed their behaviour and intend to keep new healthy behaviours.
- **Maintenance:** People have sustained their behaviour change for a while and intend to continue the behaviour change going forward. People work to prevent relapse to earlier unhealthy behaviours.

(Adapted from Prochaska and DiClemente, 2005)

Processes of Change

- **Get the facts** about healthy behaviour via information and education, including the risks and disadvantages of unhealthy behaviour and opportunities and benefits of healthy behaviour.
- **Pay attention to your feelings** about the unhealthy behaviour (e.g., anxiety and worry) and the healthy behaviour (e.g., inspiration and hope).
- **Create a new self-image**, including the healthy behaviour as an important part of who you want to be.
- **Notice the effect on others** of unhealthy behaviour.
- **Notice public support** for the healthy behaviour.
- **Decide and make a commitment** to change and prepare to take action.
- **Get support** from people who support the change, including emotional, social and practical support.
- **Use substitutes** for unhealthy ways of thinking and acting.
- **Use rewards** for progress in positive behaviour and reduce rewards that come from negative behaviour.
- **Manage your environment** using reminders and cues that encourage healthy behaviour.
- **Focus on success** instead of failure.
- **Set goals that are** specific and incremental
- **Plan the behaviour change,** including how you will tackle barriers and solutions when facing these obstacles.
- **Identify difficult situations,** especially risky situations, selecting and practising solutions.
- **Accept setbacks,** understanding that setbacks are normal and can be overcome.

Expanded from Prochaska and Velicer (1997)

Nick Godbehere is a market research and behaviour change consultant at Hitch Marketing Limited, UK. He has a bachelor's degree in applied psychology and a master's degree in psychological research methods. He is a Market Research Society Certified Member with 20 years' experience as a research-practitioner using qualitative and quantitative data collection and psychological theory to inform behaviour and organisational change strategies, communications, policy design and concept and product design.

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RESEARCH SHOWCASE

AVIATION HUMAN FACTORS AT THE UNIVERSITY OF SOUTHAMPTON

The Human Factors Engineering team in the Transportation Research Group at the University of Southampton conducts research on human performance in systems, especially in the aviation industry. In this Research Showcase, **Katie Plant** and **Neville Stanton** outline some of the group's research activities.

The Human Factors Engineering team at the University of Southampton has a decade-long history of conducting research into aviation human factors. Our work primarily focuses on the design, development and evaluation of aviation technologies and processes. We strive to conduct research with a tangible impact, so we work closely in partnership with industrial organisations including GE Aviation Systems, Rolls-Royce Engines and BAE Systems. Our current flagship aviation research programme, Open Flight Deck (OFD), is an industry-academia collaboration, aimed at developing an open architecture platform so that manufacturers can build and customise their own flight deck. We also supervise PhD students, many of whom study part-time whilst working in aviation-related fields. Four of our current projects have been selected to showcase what we do and the impact they might have in the future.

What's it doing now? Developing decision-making support tools for engine conditions[1]

A key focus for human factors in aviation is the drive to bring more technological applications into the flight deck. This aims to provide the pilot with better information on the current state and future projection of the aircraft's capabilities. In relation to engine parameters, flight-deck displays have remained relatively unchanged since the early days of powered flight. Analogue dials might have been replaced by digital readouts but limited, descriptive information is still provided, despite technological advancements in sensing and processing. During abnormal operating conditions, this can result in flight crews having insufficient information to make an accurate assessment of engine conditions. As part of the open flight deck project, Rolls-Royce are developing a suite of technologies for enhanced cockpit decision-making, aimed at guiding flight crews through decision-making processes related to abnormal operating scenarios (e.g., engine oil leak or fan blade damage).

The intended outcome is to reduce the disruption associated with such scenarios, including minimising in-flight shutdowns or significant maintenance costs. To enable this, pilots will be presented with information about the context of the flight, such as range and distances to nearby airports, and facilities at those airports.

We are working with Rolls-Royce to develop these 'user-centred flight-deck applications'. This involves ensuring that principles of human factors are implemented at the very beginning of, and throughout, the design process to ensure that the technological system matches the cognitive processes and needs of the end user, i.e., commercial pilots. We have conducted interviews to understand how pilots currently make decisions in abnormal operating scenarios. This enables pilots' cognitive processes to be represented in decision support tools.

Enhanced cockpit decision-making applications comprise two main interconnected elements: the 'engine condition application' and the 'user application'. The engine condition application consists of advanced diagnostic algorithms that determine the condition of the powerplant and how it is being operated. As these algorithms are aware of aircraft state and operation, they can determine what to tell the flight crew and when. The user application provides the human-machine interface for the flight crew. This is carefully designed for each specific feature using human factors methods. These methods help to ensure that pilots are correctly guided through the decision-making process. Ultimately, these new technologies change the role of the pilot and the tasks they need to conduct. Factors such as end-user satisfaction, acceptance, trust and decision-making will be evaluated in simulated flight trails in the near future.

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Future technology on the flight deck: the use of touchscreens in turbulent conditions[2]

The functionality and complexity of the flight deck has increased significantly in recent years. Current displays are already crowded, with little room to incorporate increased functionality. Touchscreens have the potential to increase functionality as they are more customisable and provide a virtually unlimited array of user applications. They also have the added value of offering immediate feedback, potentially reducing the need for recalling items from memory. The ease in which touchscreens can be updated and modified is attractive to aircraft manufacturers. What is less well known is how their usability might be impacted in turbulent conditions, especially in a fixed location.

Working with GE Aviation Systems, as part of the Open Flight Deck project, we've been investigating the usability of touchscreens in turbulent representative motion, generated on a 6-axis motion simulator. We have tested touchscreens in centre, side, and overhead positions under conditions of light chop, light turbulence and moderate turbulence (for ethical reasons we were not allowed to put people into simulated heavy turbulence). Performance measures including error rate, movement times, accuracy and arm fatigue/discomfort were captured. We found that central screen positioning meant faster movement times and lower error rates across all vibration conditions. However, side screen positioning was more comfortable for the user. Longer interaction styles (e.g., slide bars) are likely to increase discomfort so should be avoided. Confirmation of input selection is important, especially at high levels of turbulence where errors are more prevalent. Our research has shown that it is possible to interact with a touchscreen using short, single, presses with reasonable accuracy and low error rate, even under moderately turbulent conditions. It is likely that touchscreens will be commonplace on the flight deck in the near future, so well-designed human factors studies are increasingly important, to ensure optimal implementation for the user.

What went right? Understanding adaptation in air traffic management[3]

Europe's air traffic control providers manage some of the most complex airspace in the world and have achieved excellent levels of safety performance. However, ATM is undergoing unprecedented change and a number of new challenges face the industry. New regulations, new technologies and automation, the desire to reduce the environmental impact of air travel, and a demand for further cost efficiencies could affect safety. The ATM industry needs to ensure that safety is managed appropriately in light of changing risks. The traditional approach to safety monitoring has been one that identifies and counts the number of times that a safe service was not provided. In the case of ATM, losses of separation had been a key measure. Safety occurrences are investigated so that the lessons can be learned to prevent a reoccurrence.

As safety occurrences reduce in frequency, and as there is less data, it can become even harder to understand the safety of operations. Recent advances in safety research suggest a new approach. At the heart of this is the idea is that safety is created through how people and the system as a whole adapts. Understanding how safety is created requires an understanding of why things go right, rather than just wrong, which means understanding everyday work. The ultimate goal of this research is therefore to provide guidance on how organisations can successfully harness 'adaptation' to improve their understanding of what keeps them safe. It is hoped that ATM organisations will use the findings to update how safety is managed. Whether this is formalised in safety management systems, or through guidance, training, and informal processes, remains to be seen. Our existing means of monitoring safety and understanding and assuring changes do not yet take into account ideas of adaptation. The complexity of the system is starting to catch traditional approaches out. So, this research will provide more guidance to ATM organisations trying to manage safety.

Two become one: The case for single pilot operations

One of the most controversial areas of research that we are involved with concerns single pilot operations (SPO) or distributed crewing. This is an emotive topic, causing passionate debate on either side of the argument. SPO involves removing the First Officer from the flight deck and distributing their duties to advanced automation systems in combination with a ground-based station, supported by human operators. As such, a remote co-pilot would support flight operations or even take over control in emergency situations. This is motivated by long-term savings in crew costs, improved aircraft availability and serviceability, as well the anticipated pilot shortage associated with increasing demand.

Arguably, the main barrier to SPO is not the technology; aircraft have been progressively 'de-crewed' for many years. The main barrier is public acceptance of the risk of pilot incapacitation, along with and the need for complete redesign of the concept of operations for a distributed air-ground system. Many issues remain to be solved, including crew coordination, workload allocation, single-pilot incapacitation, communication and social issues, the design of advanced automation systems and certification.

Human factors requirements are therefore a key driver in the case of SPO. Our research has applied a range of human factors methods to model how an SPO environment might work, exploring how different agents (both human and technological) might perform different functions. This has demonstrated the potential for increased safety, and systems as resilient as current operations, especially when SPO are facilitated by a ground station co-pilot instead of only on-board automation. Autonomous systems monitoring pilot health and the behaviour of aircraft systems are still at a premature stage of development. Also, many research questions remain, and there is much work to be done in gaining public, pilot, aviation industry and regulator acceptance for the proposed changes.

The aerospace industry is at a pivotal moment in history in terms of future technologies and capabilities. Hybrid and all-electric aircraft concepts are being investigated, as well as increasing automation and autonomy in traditional aircraft. With the introduction of new technology, as old problems are addressed new issues arise. The human factors discipline and profession has an important role to play in design and evaluation of new technologies to ensure that human performance is optimised to enable successful task performance, so that the system as a whole works optimally. The integration of human factors approaches into the early phases of the design of such systems is essential to ensure the success and continued safety of these future systems.

For additional information about any of the projects mentioned or general interest about what we do please contact Dr Katie Plant at **K.Plant@soton.ac.uk.**

Dr Katie Plant is a lecturer in Human Factors Engineering in the Faculty of Engineering and Physical Sciences. She is the author of 'Distribution Cognition and Reality: How Pilots and Crews Make Decisions' (CRC Press, 2016) and was awarded the Honourable Company of Air Pilots award for Aviation Safety Research in 2014. Katie runs an undergraduate module called 'Human Factors in Engineering' and project manages the University of Southampton's contribution to the Open Flight Deck project.

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Professor Neville Stanton is Professor of Human Factors in Transport within Engineering and Physical Sciences at the University of Southampton and conducts research into human performance in technological systems. In 2007 The Royal Aeronautical Society awarded him the Hodgson Medal and Bronze Award with colleagues for their work on flight-deck safety. Neville is the Principal Investigator for the Open Flight Deck Project.

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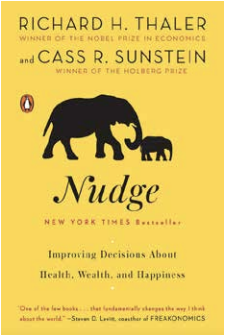
Acknowledgements

1 Open Flight Deck is co-funded by the UK Aerospace Research and Technology Programme; a partnership between Department for Business, Energy and Industrial Strategy (BEIS), UK Aerospace Technology Institute (ATI), and Innovate UK. More information can be found at https://openflightdeck.co.uk/. Pete Beecroft is a Systems Design and Integration specialist for Rolls-Royce, one of the world's leading technology companies. He works primarily in research for whole engine and aircraft-level technologies. **peter.beecroft@rolls-royce.com**

2 Luke Bolton is a Senior Engineering Manager in Emerging Technologies at GE Aviation Systems. **luke.bolton@ge.com**

3 Craig Foster, a Safety Specialist at NATS, is undertaking a part-time PhD exploring the concept of adaptation in air traffic management. **craig.foster@nats.co.uk**

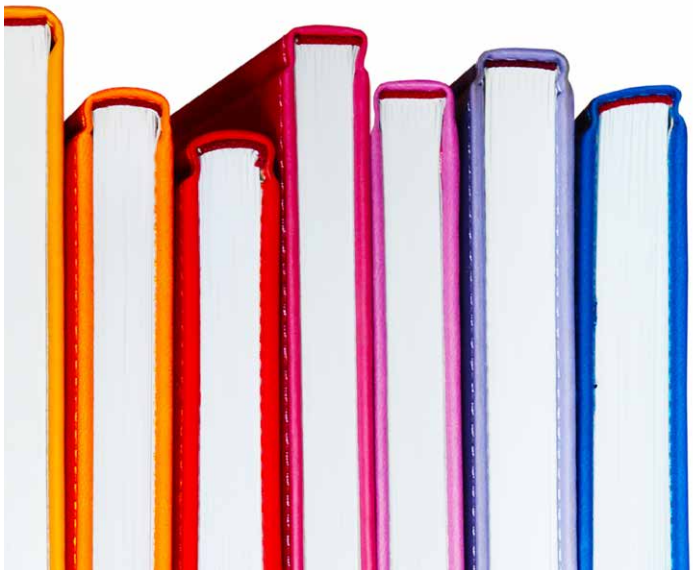
If you want to read more about some of the issues raised in this Issue of HindSight, then these books might be of interest.

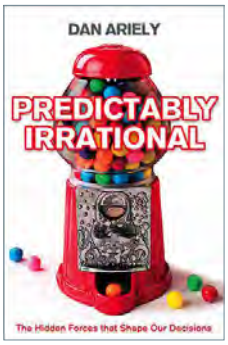


Nudge: Improving Decisions About Health, Wealth and Happiness,
by Richard H Thaler and Cass R Sunstein (2012)

From the publisher: "From Cass R. Sunstein and Richard H. Thaler, winner of the 2017 Nobel Prize in Economics, Nudge is the book that changed the way we think about decision-making. Nudge is about choices – how we make them and how we can make better ones. Every day we make decisions: about the things that we buy or the meals we eat; about the investments we make or our children's health and education; even the causes that we champion or the planet itself. Unfortunately, we often choose poorly. We are all susceptible to biases that can lead us to make bad decisions. And, as Thaler and Sunstein show, no choice is ever presented to us in a neutral way. By knowing how people think, we can make it easier for them to choose what is best for them, their families and society. Using dozens of eye-opening examples and original research, the authors demonstrate how to nudge us in the right directions, without restricting our freedom of choice."

"'How often do you read a book that is both important and amusing, both practical and deep? ... A must-read for anyone who wants to see both our minds and our society working better." (Daniel Kahneman, author of Thinking, Fast and Slow)





Predictably Irrational: The Hidden Forces That Shape Our Decisions,
by Dan Ariely (2009)

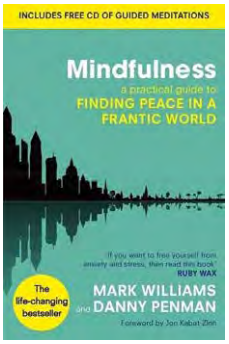
From the publisher: "Why do smart people make irrational decisions every day? The answers will surprise you. Predictably Irrational is an intriguing, witty and utterly original look at why we all make illogical decisions. Why can a 50p aspirin do what a 5p aspirin can't? If an item is "free" it must be a bargain, right? Why is everything relative, even when it shouldn't be? How do our expectations influence our actual opinions and decisions? In this astounding book, behavioural economist Dan Ariely cuts to the heart of our strange behaviour, demonstrating how irrationality often supplants rational thought and that the reason for this is embedded in the very structure of our minds. Predictably Irrational brilliantly blends everyday experiences with a series of illuminating and often surprising experiments, that will change your understanding of human behaviour. And, by recognising these patterns, Ariely shows that we can make better decisions in business, in matters of collective welfare, and in our everyday lives from drinking coffee to losing weight, buying a car to choosing a romantic partner."

"Ariely is not out to overthrow rationality. Instead, he and his fellow social scientists want to replace the "rational economic man" model with one that more accurately describes the real laws that drive human choices." (David Berreby, New York Times)

The Body Keeps the Score: Mind, Brain and Body in the Transformation of Trauma,
by Bessel van der Kolk (2002)

From the publisher: "The effects of trauma can be devastating for sufferers, their families and future generations. Here one of the world's experts on traumatic stress offers a bold new paradigm for treatment, moving away from standard talking and drug therapies and towards an alternative approach that heals mind, brain and body."

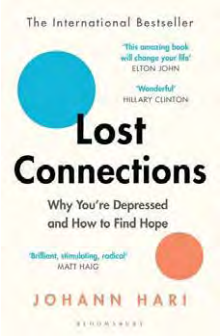
"Van der Kolk draws on thirty years of experience to argue powerfully that trauma is one of the West's most urgent public health issues ... Packed with science and human stories." (New Scientist)



Mindfulness: A Practical Guide to Finding Peace in a Frantic World,
by Mark Williams and Danny Penman (2011)

From the publisher:
"MINDFULNESS reveals a set of simple yet powerful practices that can be incorporated into daily life to help break the cycle of unhappiness, stress, anxiety and mental exhaustion and promote genuine joie de vivre. It's the kind of happiness that gets into your bones. It seeps into everything you do and helps you meet the worst that life can throw at you with new courage. The book is based on Mindfulness-Based Cognitive Therapy (MBCT). MBCT revolves around a straightforward form of mindfulness meditation which takes just a few minutes a day for the full benefits to be revealed. MBCT has been clinically proven to be at least as effective as drugs for depression and it is recommended by the UK's National Institute of Clinical Excellence – in other words, it works. More importantly it also works for people who are not depressed but who are struggling to keep up with the constant demands of the modern world. MINDFULNESS focuses on promoting joy and peace rather than banishing unhappiness. It's precisely focused to help ordinary people boost their happiness and confidence levels whilst also reducing anxiety, stress and irritability."

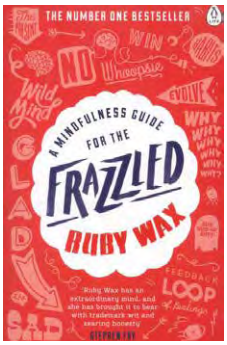
> *"Want a happier, more content life? I highly recommend the down-to-earth methods you'll find in 'Mindfulness'. Professor Mark Williams and Dr. Danny Penman have teamed up to give us scientifically grounded techniques we can apply in the midst of our everyday challenges and catastrophes." (Daniel Goleman, Author of 'Emotional Intelligence')*



Lost Connections: Uncovering the Real Causes of Depression – and the Unexpected Solutions,
by Johann Hari (2018)

From the publisher: "Depression and anxiety are now at epidemic levels. Why? Across the world, scientists have uncovered evidence for nine different causes. Some are in our biology, but most are in the way we are living today. Lost Connections offers a radical new way of thinking about this crisis. It shows that once we understand the real causes, we can begin to turn to pioneering new solutions – ones that offer real hope."

> *"This is one of those extraordinary books that you want all your friends to read immediately--because the shift in world-view is so compelling and dramatic that you wonder how you'll be able to have conversations with them otherwise." (Brian Eno)*



A Mindfulness Guide for the Frazzled,
by Ruby Wax (2016)

From the publisher: "Five hundred years ago no one died of stress: we invented this concept and now we let it rule us. In A Mindfulness Guide for the Frazzled, Ruby Wax shows us how to de-frazzle for good by making simple changes that give us time to breathe, reflect and live in the moment. It's an easy-to-understand introduction to mindfulness, weaved together with Ruby's trademark wit and humour."

> *"Well timed and combines a theoretical, practical and personal account of mindfulness... an easy, uplifting, humorous read." (The Psychologist)*

Would you like to write for HindSight magazine?

HindSight is a magazine aimed primarily at air traffic controllers and professional pilots, on the safety of air traffic management.

As such, we especially welcome articles from air traffic controllers and professional pilots, as well as others involved in supporting them.

Here are some tips on writing articles that readers appreciate.

1. Articles can be around 1500 words (maximum), around 1000 words, or around 500 words in length. You can also share your local good practice on what works well for you and your colleagues, on the theme of each Issue, in up to 200 words.

2. Practical articles that are widely applicable work well. Writing from experience often helps to create articles that others can relate to.

3. Readers appreciate simple and straightforward language, short sentences, and concepts that are familiar or can be explained easily.

4. Use a clear structure. This could be a story of something that you have experienced. It helps to write the 'key points' before writing the article.

5. Consider both positive and negative influences on safety, concerning day-to-day work and unusual circumstances, sharp-end and blunt-end.

If you have an idea for an article that might be of benefit to others,
we would like to hear from you.
Please write to **steven.shorrock@eurocontrol.int**

HindSight

The ability or opportunity to understand and judge an event or experience after it has occurred

The theme for HindSight 31 will be

LEARNING FROM EVERYDAY WORK

HindSight is an aviation safety magazine for air traffic controllers and professional pilots on the safety of air traffic management.

We welcome articles and short contributions, including good practice examples, by **Friday 14 August 2020.**

We especially welcome articles written by or with operational air traffic controllers and professional pilots. Some suggested subject areas include the following, all with reference to safety:

- stories from operational experience, emphasising change from learning
- insights from methods for understanding everyday work
- understanding how everyday work is changing over time
- learning from differences in everyday work between different groups (locations, professions, etc)
- understanding performance adjustments and variability
- understanding and handling surprises
- learning from collaboration with engineering and safety colleagues.
- learning from multiple perspectives on work
- learning from unwanted events, and
- learning from excellence.

Draft articles (1500 words maximum, but may be around 1000 or 500 words) and short examples of experiences or good practice (that may be helpful to other readers) (200 words maximum) should:

- be relevant to the safety of air traffic management
- be presented in 'light language' keeping in mind that most readers are air traffic controllers and professional pilots
- be useful and practical.

Please contact
steven.shorrock@eurocontrol.int
if you intend to submit an article,
to facilitate the process.

If you are interested in downloading back issues of the **HindSight collection**
http://www.skybrary.aero/index.php/HindSight_-_EUROCONTROL

In the next issue of HindSight:
"LEARNING FROM EVERYDAY WORK"

This edition is printed in 8000 copies

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