Aviation Human Factors Industry News

Volume XII. Issue 21, October 30, 2016

Hello all,

To subscribe send an email to: rhughes@humanfactorsedu.com

In this weeks edition of *Aviation Human Factors Industry News* you will read the following stories:

Why Safety Deserves a Capital "S"

By Gordon Dupont System Safety Services

Have you ever noticed that the names of people, cities, countries, months, days and important places all start with a capital letter? Titles, car types and most abbreviations for words are honoured with a capital. In short, we tend to use capitals to denote important words.So why not a big, for all to see, capital "**S**" for **S**afety? The only logical answer I can find is that it is not traditional to do so. If that is the case then it's time we updated the tradition.

Why shouldn't Safety have a capital" "S? It has never been so important as now with so many lives depending on it. I've given it a capital for years except when Microsoft Word drops it back down to a small "s" when my back is turned.

I can remember, not that many years ago, when Safety was for wimps or mama's boys as they were called back then, because real men just used their common sense to survive and didn't need silly Safety rules to dictate what they could or couldn't do. Sure, some of those without common sense were killed, but it was survival of the fittest and good for the gene pool. Then, organizations like CCOHS (Canadian Centre for Occupational Health and Safety) and OSHA (Occupational Safety and Health Administration) , began to make Safety rules. Please note that these Safety organizations were given capital letters, but not Safety unless part of the title.

The FAA, CAA, ICAO, TC, etc. also got into the Safety business and with regulations and rules untold thousands of lives have been saved, but no one thought to recognize Safety for the importance in Saving lives that it deserves.

I believe that today, Safety is an important factor in a person's life.

Today, they won't allow you to take a child home from the hospital without a Safety approved car seat.

Lee Iacocca thought he was right at the time, in 1971, when he said, *"safety doesn't sell cars"* and refused to authorize a $1.00 per car fix to the Pinto gas tank because it would be cheaper to pay out for the odd person who would get burned in a rear end car crash. (Over 500 would suffer that fate with 27 being fatal in Pinto rear end collision accidents)

But he was so very wrong when people realized that the car was unsafe and shortly thereafter they went out of production (1980) even with the fix. So, the Pinto earned a capital, but not Safety that today sees cars with shoulder harness seatbelts, airbags, collapsible steering wheel, crumple zones, reinforced doors that don't jam, etc., etc.

Today, Safety does sell and is expected. Without Safety, no company will remain in the aviation business for long. Thus, it is time that Safety receives the importance and respect it deserves. Safety deserves a capital "S". I, for one, will spell it that way and if you are serious about Safety: I urge you to do the same.

NTSB Faults Crew 'Mismanagement' in Akron Hawker Crash

The National Transportation Safety Board (NTSB), finding significant deficiencies with the crew's management of the approach involved in a Nov. 10, 2015 Hawker 700A crash, is calling on the FAA to mandate flight data monitoring programs. The board is also asking for a mandate to install flight data recorders that can support those programs, safety management systems (SMSs) and improved landing and approach training for Part 135 operators.

Those recommendations were among 13 the board made as a result of its investigation into the crash that occurred while the Hawker, N237WR, was on a non-precision approach to Runway 25 at Akron-Fulton International Airport. All nine aboard were killed in the accident.The NTSB cited as a probable cause “the flight crew’s mismanagement of the approach and multiple deviations from the company standard operating procedures, which placed the airplane in an unsafe situation and led to an unstabilized approach.” It further cited the operator’s “casual attitude toward compliance with standards,” inadequate training and operational oversight, lack of a formal safety program and the FAA’s insufficient oversight. The Safety Board believes that flight data monitoring, as well as SMS programs, might have uncovered the deficiencies that contributed to the crash.

According to NTSB chairman Christopher Hart, travelers on charter flights “implicitly trust that FAA standards, the charter company’s standard operating procedures and the professionalism of the pilots will protect them from harm. The protections built into the system were not applied, and they should have been.”

The investigation revealed that the briefing for the non-precision approach was “unstructured, inconsistent and incomplete” and that a checklist was not used. Further, the NTSB contended that the first officer’s action “placed the airplane in danger” and while the captain recognized the situation, he never took over control. The first officer set the flaps in the wrong configuration and slowed the aircraft below the proper approach speed, putting the aircraft at risk for a stall. The airplane crossed the final approach fix at an altitude of about 2,700 feet msl, 400 feet above the published minimum crossing altitude of 2,300 feet. Since the airplane was high, it was “out of position” to use the normal descent rate of 1,000 fpm and the rate quickly increased to 2,000 fpm. As the first officer attempted to arrest the descent, the aircraft entered a stall.

The investigation further revealed that both the captain and first officer had been fired from the previous employer—the captain for failure to show up to recurrent training and the first officer for performance deficiencies. Further, the weight-and-balance measurements for the accident flight were wrong. In addition, the NTSB found shortcomings in the crew resource management training, inadequate training for continuous descent approaches and deficient maintenance records on the part of the operator, Execuflight.

http://ntsb.gov/news/events/Documents/2016_acronoh_BMG_abstract.pdf

Airport Safety Week

MORE THAN 150 AIRPORTS TAKING PART IN AIRPORT SAFETY WEEK 2016

This year sees a record-breaking number of organizations actively involved in promoting safety at airports through Airport Safety Week. Over 150 airports, airlines, service providers and government organizations will take part in this unique industry initiative to promote safe working and operating environments at airports across Australia, New Zealand and around the world. Airport Safety Week, now in its third consecutive year, runs from 17-21 October 2016 and is a joint initiative of the Australian Airports Association (AAA) and New Zealand Airports Association (NZ Airports). This year the event has been kindly sponsored by the Civil Aviation Safety Authority (CASA), ISS, and Sydney Airport.

'Airport Safety Week brings together airport and aviation industry operators at our largest international gateway airports and some of our smallest regional aerodromes to strengthen safety awareness for people working in airport environments,' said Caroline Wilkie, CEO of the AAA.

'We have also been fortunate enough to secure sponsorship from CASA, ISS and Sydney Airport, which is incredibly valuable in assisting up provide participants with the resources and materials they need to make Airport Safety Week a success,' Ms Wilkie said.

A number of airports in Africa, Asia, the Middle East, Europe and North America have also joined the program.

Each day of Airport Safety Week will have a specific safety theme to cover all areas of safety surrounding airports.

Our themes for Airport Safety Week 2016 are:

Day 1 - Monday, 17 October 2016: Human factors

Day 2 - Tuesday, 18 October 2016: Airside works

Day 3 - Wednesday, 19 October 2016: Airside driving

Day 4 - Thursday, 20 October 2016: Environmental considerations

Day 5 - Friday, 21 October 2016: Fatigue

'More than half a million passengers pass through our airports each day on thousands of aircraft movements, while tens of thousands of people work at airport locations; it is essential that safety remains the top priority' Ms Wilkie said.

NZ Airports CEO, Kevin Ward, said that providing a safe environment for passengers and staff is the result of careful planning and strict processes and is an ongoing priority for airport operators and aviation industry participants across Australia and New Zealand.

'Airport Safety Week is an opportunity to reinforce the importance of safety at our airports and look at ways to further improve on our already very high standards,' Mr Ward said.

Adding to the appeal of Airport Safety Week are three national activities that all participating airports and organizations are encouraged to undertake.

These national activities are:

Team Gathering – Monday 17 October;

Foreign Object Debris (FOD) Walk – Wednesday 19 October; and

Wear Personal Protective Equipment (PPE) to Work Day – Friday 21 October.

'Each of these activities are designed to encourage all airport employees, even those in non-operational roles, to take a renewed interest in the critical issues impacting safety at an airport.'

'The team gathering offers an opportunity to discuss topical safety issues in a collaborative environment, while the ever popular FOD Walk and Wear PPE to Work Day encourage people to take a hands-on approach to safety and recognize that everyone has a role to play,' Ms Wilkie said.

In addition to the national activities, many airports and aviation organizations will choose to promote airport safety in their own way.

'In previous years, some airports have held BBQs or morning teas to discuss safety issues, while some others went as far as designing a public showcase in the airport terminal.' 'We understand the limitations on airports and other businesses and encourage everyone to participate in any way they can. Every activity, no matter the scale, goes some way to improving safety awareness and that's what Airport Safety Week is all about,' Ms Wilkie said.

Another highlight of the week is the announcement of the 2016 Airport Safety Awards which recognizes organizational and individual excellence in safety promotion and practices. The awards winners for 2016 will be announced shortly.

A list of participating airports along with a range of information resources that have been prepared to support Airport Safety Week activities and events are available from www.airportsafetyweek.com

https://www.youtube.com/watch?v=vyD3my_hbtE

Is Your Safety Policy Truthful?

Dr. Robert Baron is the President and Chief Consultant of The Aviation Consulting Group. He performs extensive work in his core specializations of Human Factors (HF), Safety Management Systems (SMS), Crew Resource Management (CRM), and Line Operations Safety Audit (LOSA). He consults with, and provides training to, hundreds of aviation organizations on a worldwide basis.

Is Your Safety Policy Truthful?

The following safety policy is fairly representative of a safety policy you might see at any aviation organization. Take a look at it and then I will continue the dialogue below.

Safety Policy Statement

The XXX Safety Policy directly reflects the company's commitment to safety in the workplace, operations, and a positive safety culture. This policy applies to all personnel and every aspect of the company's activities.

XXX utilizes a Safety Management System ("SMS") to reduce risk of injury to personnel, to prevent accidents, minimize damage to equipment and property, and to work proactively towards identifying and reducing the existence of hazards and/or risk in the workplace.

It is XXX's corporate policy to identify and comply with all applicable federal laws and regulations regarding safety in the workplace. XXX strives to incorporate aviation industry "best practices" concerning safety and provides each employee with a safe and healthy working environment. Safety and risk analysis is an integral component of all company decision making processes.

The Accountable Executive is Mr. XXX who is President of XXX. As Accountable Executive, Mr. XXX is responsible for all operations and activities authorized under the certificates, and accountable on their behalf, for meeting the requirements of the Federal and local Regulations. The SMS Program is managed under the Accountable Executive's authority by the SMS Manager who reports directly to the Accountable Executive.

No single person in the company holds veto power in matters which require a group approach to ensure a safe work place.

Every employee is required to take both a proactive and preventative approach to safety. Every employee must take steps to immediately mitigate hazards where the need exists and to report the hazard or incident through the appropriate company reporting procedure.

Disciplinary action shall not be taken against an employee who acts to prevent an injury or who reports any accident, incident or hazard. All employees are required to abide by the standards and procedures set forth in the Safety Management Manual.

Elements such as illegal activity, negligence, acts of willful misconduct, or undue care and attention, shall be considered to be outside the scope of this Policy and shall be dealt with in accordance with the company's "Standards of Conduct Policy".

A safety policy—typically one page—is an implied contract between Management and employees. It should be conspicuously posted in various parts of the facility as a reminder of "how the company does safety"— signed by the highest level manager (typically the CEO or Accountable Executive).

At face, these policies look great, but sometimes they may not be telling the truth. As a global aviation SMS consultant, I have seen numerous occasions where the Accountable Manager (who signed the policy) couldn't recall even one point on the policy. In other cases, management might operate contrary to what is specified in the policy. For instance, a manager not wearing safety goggles or hearing protection in an area where these safety items are required would contradict Paragraph 6. The manager is not only violating a rule, but is also setting a bad example, or negative role modeling. This may create a negative NORM. Another example would be if employees are being reprimanded for reporting unsafe conditions, which contradicts the penultimate paragraph in the above policy.

Here's the problem. If the safety policy is just eye candy, then employees will have a lack of trust with management. If trust is lost, it is a very difficult thing to get back. Employees will stop reporting. Safety will be degraded. Your company's entire SMS will be negatively impacted.

Is YOUR Safety Policy truthful? If so, that's great! You probably also have a good safety culture. However, if your company's Safety Policy is not truthful, then… well…maybe not so much!

BA 747 jammed-gear landing traced to maintenance error

UK investigators have determined that a maintenance error resulted in a British Airways Boeing 747-400's having to land without deploying either of its wing main-gear assemblies.

The aircraft (G-CIVX) had departed London Heathrow on 30 January this year, its first flight since a scheduled A-check.This check included replacement of the landing-gear control module.

When such a replacement is carried out, maintenance manual requirements include fitting a rig pin in the undercarriage selector valve quadrant through which the landing-gear is controlled from the handle in the cockpit.

But the UK Air Accidents Investigation Branch states that the rig pin was omitted.

It says this occurred through a combination of deficiencies in the operator's task-card system, inadequate handover between engineering shifts, and the distraction of an engineer – who had noticed the rig pin's absence and, concerned about possibly being injured, had taken an overdue break.

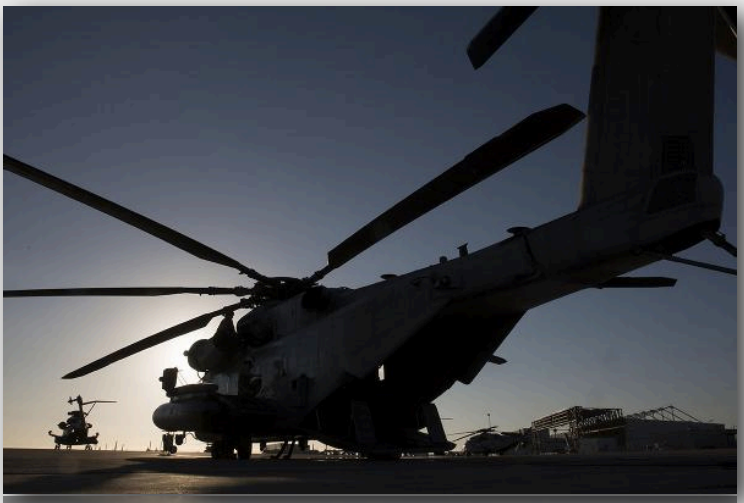
The incorrect rigging during the module replacement subsequently caused the landing-gear lever to jam after the crew retracted the undercarriage. It would not move to the 'off' position, which depressurizes the hydraulic system.

Having opted to return to Heathrow, the crew lowered the nose-gear and the two fuselage main-gear assemblies using the alternate gear-extension procedure.

BA has since introduced additional rig pin processes, reinforced handover procedures and provided supplementary task-card training.

Aviation Chief: Crash That Killed 12 Shouldn't Have Happened

A Marine Corps CH-53E Super Stallion collision off the coast of Hawaii in January that left all 12 Marines aboard dead was the result of an epidemic of low flight hours and subpar readiness rates across the fleet, the head of Marine Corps aviation told Military.com on Wednesday.



Speaking the day the Marine Corps was expected to release its full investigation into the tragic crash, Lt. Gen. Jon Davis said the probe found the aircraft themselves were in fine condition to fly for the Jan. 14 night training mission.
"I would actually say there shouldn't have been a mishap," Davis said. "If you read the investigation report, it's pretty clear that there were a lot of things that could have happened to stop it from happening and didn't happen, to include the recommendation of the safety officers involved not to fly the mission."The pilots themselves were current on their training to fly the mission, but not as proficient as they would have been due to widespread shortfalls of available aircraft, leading to cutbacks in monthly flight hours.

Davis said the decision to relieve Lt. Col. Edward Pavelka, commander of Marine Heavy Helicopter Squadron 463, three days before the crash was tied to these key readiness concerns. Both of the aircraft involved in the collision were from the Hawaii-based squadron. "Even though the whole '53 fleet was suffering, they were suffering more than others," Davis said.

In a statement, a Marine Corps Forces Pacific spokesman, Lt. Col. Curtis L. Hill, confirmed that crash was the result of pilot error. "Investigators believe that the low light conditions made it difficult for the aircrew to recognize the rapid decrease in separation between the aircraft, which led to the collision," he said. "Investigators found that all pilots and aircrew were qualified in accordance with regulations and standards and medically fit for duty … Investigators found the main contributing factors were low aircraft readiness leading to inadequate pilot proficiency, human factors, and the squadron's lack of focus on basic aviation practices."

Since the crash and the arrival of the new commanding officer, Lt. Col. Eric Purcell, the squadron's average pilot flight hours have more than doubled, due in significant part to a two-and-a-half-year effort to improve the readiness rates of the CH-53 and the Navy's MH-53E Sea Dragon.

Across the entire CH-53 fleet, Davis said, pilot flight hours have more than doubled. Meanwhile, he said, key equipment reset and maintenance has been completed, including replacement of aging wires and new fuel pipes.

"I've got a high degree of confidence that the material condition of these airplanes, and frankly these airplanes -- even the ones in the collision -- we don't believe there's anything wrong with them," he said. "We have better readiness now -- still not good enough, but we're working on it."

At their readiness nadir in 2015, only 23 percent of CH-53s were available to fly. The same year, pilots of the aircraft logged the fewest number of flight hours of any aviation platform since 1988, according to an investigation by the Virginian-Pilot.

The commandant of the Marine Corps, Gen. Robert Neller, told a congressional panel in March that commanders had kept the heavy-lift helicopters in theater "a little big too long" in Iraq and Afghanistan, leaving the platform overworked and badly in need of reset.

Ultimately, the Marine Corps plans to replace all its CH-53s with the brand-new CH-53K King Stallion now in testing. The first aircraft will be delivered to the service in 2019, and the transition is expected to happen over the next decade.

Safety Team IDs Top Fatal Helicopter Accident Causes

Loss of control in flight, unintended flight into instrument meteorological conditions and low-altitude operations accounted for 50 percent of 104 fatal helicopter accidents between 2009 and 2013, according to a recent analysis by the United States Helicopter Safety Team. The USHST has begun developing safety recommendations aimed at mitigating fatal accidents resulting from these three causes, and a recommendations list and action plan is expected to be completed by early next year.

The USHST also has begun to enhance its outreach to key helicopter industry groups where the largest number of fatal accidents occurs: personal/private sector, helicopter air ambulance, commercial helicopter operations and aerial applications. Ad hoc outreach groups from the USHST will identify points of contact within these industry segments, engage key personnel in seminars and industry meetings, and attend conventions and gatherings relevant to these identified sectors. Outreach will be a continuing process for the next three-and-a-half years.

From 2016 through 2019, the USHST is focusing major attention on reducing fatal accidents within the U.S. civil helicopter community. The industry-government partnership is targeting a reduction by 2019 to 0.61 fatal accidents or less per 100,000 flight hours. The fatal accident rate goal for this year is 0.73 or less. In fact, for the first six months of 2016, the fatal accident rate is only 0.54, a 47-percent decrease compared to 2013, but slightly higher than the overall fatal rate of 0.52 in 2015.

Lawsuit Filed In Red Arrows Ejector Seat Accident

Pilot Fatally Injured When Seat Activated On The Ground

A lawsuit has been filed against the manufacturer of an ejector seat aboard a Red Arrows Hawk T1 aircraft that inadvertently activated while the plane was on the ground. The pilot, Flt Lt Sean Cummings, was fatally injured when the parachute on the seat failed to deploy.The U.K. newspaper *The Mirror* reports that the suit has been filed by the U.K. Health and Safety Executive against Martin Baker Aircraft Ltd, alleging violations of health and safety laws.

The accident occurred in November 2011. The official investigation found that there was a problem with the ejection seat firing handle, which was left in an "unsafe position." It is thought that handle was snagged by a strap and pulled into that unsafe position four days previous to the accident. Both the seat manufacturer and the RAF were found to have some responsibility for the accident.

The official inquest determined that the accident, and Flt Lt Cunningham's death, were "preventable."

A court date has not been set.

Paperless Maintenance Introduced at all Lufthansa Technik Maintenance Sites in Germany

From now on Lufthansa Technik documents the resolution of defects on aircraft from Lufthansa Airlines and Lufthansa Cargo in electronic form. The electronic job sheet (eJobcard) has already been introduced at all German line maintenance stations, and the Ground Log Book (GLB), a paper-based document, has been replaced with the electronic Ground Log (eGL). In this way, the world's largest MRO provider is already saving hundreds of thousands of pages of paper each year, and in the future this will reach millions of pages.The basis is provided by the "Maintenance Log", an application developed by Lufthansa Technik as part of the "paperless maintenance" program.

The application assists aircraft technicians in recording and outputting data, and it can be used on various mobile devices.

"Electronic documentation, when used in combination with mobile devices, requires one-off data entry by the maintenance personnel directly at the site when the information is acquired," explains Gerald Frielinghaus, head of the "paperless maintenance" program at Lufthansa Technik.

With "paperless maintenance", Lufthansa Technik is not only saving paper, environmental resources, time and money; it is also accelerating the provision and transmission of information. It also makes some work processes fully obsolete and others, thanks to electronic documentation, more streamlined, clearer, and less prone to error. Superflous data entry is no longer necessary.

"Our colleagues working on the aircraft appreciate the new application. It brings noticeable relief in terms of necessary documentation work and allows personnel to concentrate more on their technical work," says Dr. Rainer Sebus, who is taking over leadership of the program with immediate effect - Gerald Frielinghaus is retiring.

During the coming months, more than 2,000 mechanics in Frankfurt will be equipped with smartphones and tablet computers as part of the project. This will enable them to document their findings directly at the site in nearly every work situation. Other advanced steps in the project include individualized digital order control and the stronger integration of complaint management support processes, for example when documenting delays or damage.

Scientists find that budgies hold the key to avoiding aircraft collisions

Aircraft-safety researchers from the University of Queensland have welcomed some highly-qualified aviation experts into their ranks - a group of budgerigars, named Drongo, Nemo, Titan, Milkyway, Blackhole, Tian and Rama.

In their quest to develop automated anti-collision systems for aircraft, the Australian research team studied the mid-air antics of 10 budgies - and found that they never, ever crash in flight. The researchers released the budgies into a tunnel one pair at a time, recording their movements on high-speed cameras as the birds flew towards each other.

The birds completed the 'collision course' more than 100 times - and did not strike each other once. The secret? The birds always veered right, and rarely flew at the same height.

"Both strategies (veering right and separated altitudes) suggest simple rules by which collisions can be avoided in head-on encounters by two agents, be they animals or machines," the study found. "The findings are potentially applicable to the design of guidance algorithms for automated collision avoidance on aircraft," the authors concluded.

Professor Mandyam Srinivasan, who led the investigation, said that the birds' tactics - formed over the 150 million-year evolution of natural flight - had vast implications for developing anti-collision systems in aircraft. "Birds must have been under strong evolutionary pressure to establish basic rules and strategies to minimize the risk of collision in advance," he said.

"But no previous studies have ever examined what happens when two birds fly towards each other. "Our modeling has shown that birds always veer right and sometimes they change their altitude as well, according to some pre-set preference."

7 DO'S AND DON'TS FOR GETTING THE MOST FROM THE SMARTEST PEOPLE IN THE BUILDING

Isolated leaders are the dumbest people in the building.

A nameplate on the door and a title after your name doesn't make you smarter than people with dirt under their fingernails.

Disconnected leaders – seduced by position and perks – don't get it.

Lunch:

At lunch this week, a turnaround specialist explained that the answers for struggling organizations are typically found in front-line supervisors. This is especially true when internal issues are the reason for the struggle.

Front-line supervisors always understand day-to-day operations better than disconnected leaders.

7 do's and don'ts:

1. Don't occasionally bring front-line supervisors to upper-management meetings.
2. Do push information and authority to people who supervise work.
3. Do become friends with front-line supervisors. Walk around in the trenches two or three times a week. (Every day wouldn't be too often.)
4. Don't plug your ears to nagging complaints from someone in a blue shirt.
5. Don't rush to solutions or give quick answers.
6. Do lean in and ask questions.
    - Why are we doing it that way?
    - What's holding you back from moving this forward?
    - What assumptions got us into this mess?
    - How might we take an imperfect step forward? (In a turbulent world, all solutions are imperfect.)
    - What's important about this? For greater clarity, add, 'for you,' 'for your team,' 'for our customers,' or 'for our organization,' at the end of the question.
    - What do you think?
    - How can I help?
    - Tell me more.

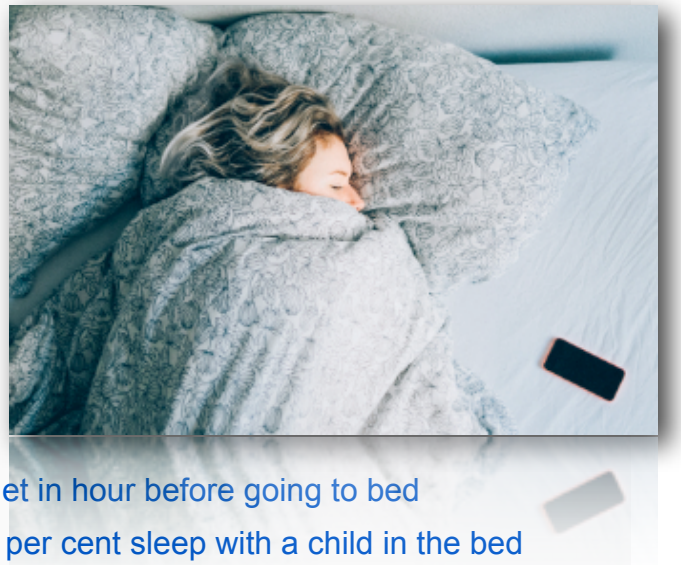
7. Do make their lives easier. Clear the path. Remove obstacles to performance.

If you're in top management or the C-Suite, the people with sweat on their brows know more about day-to-day operations than you.

How medications can impact your body clock and sleep

Sleep snapshot at a glance

About 20,000 of you took part in our sleep snapshot in September. Here's what you told us:



- 76 per cent of you worry about your sleep at least some of the time
- 75 per cent have trouble falling asleep at least some of the time
- 83 per cent have trouble going back to sleep at least some of the time
- 44 per cent get six or less hours of sleep per night
- Only 12 per cent wake feeling refreshed in the morning
- 48 per cent use a smartphone or tablet in hour before going to bed
- 14 per cent sleep with a pet and four per cent sleep with a child in the bed
- Needing to go the toilet, thoughts and the temperature were the top three sleep disruptions

It's no secret a coffee too close to bedtime — or even a cup tea for some — can make it hard to get to sleep.

Drugs like the caffeine in your cappuccino and other stimulants like those found in cold and flu pills are widely known for their effect on sleep.

But there's a range of other drugs that can impact sleep in ways you might not be aware of.

According to David Ray, Professor of Medicine and Endocrinology at the University of Manchester, there is still much for the experts to learn when it comes to the science of how medications interact with sleep.

Dr Ray believes the delivery of many medicines will one day be tailored to the timing of an individual's body clock, in a bid to get the most from specific drugs.

Because everyone's preferred sleep cycle (also known as your chronotype) varies by age, gender, and genetics, a person's "internal time" does not necessarily match the clock on the wall.

So as researchers gain a better understanding of how different drugs interact with body clocks, personalizing treatment in the future might couple internal time-keeping with a smart-release mechanism for drug delivery, Dr Ray said.

Symptoms that present during sleeping hours, such as nocturnal asthma, could be good targets for specifically timed drug release, he said.

Despite this, it's a concept that is already applied, to a certain extent, in current medical practice — for example with some varieties of statins, a class of drug widely used to reduce cholesterol in the blood.

"The early generation of statins had quite a short half-life, and they essentially only work if you give them at night," Dr Ray said.

"So if you give them in the morning they have no effect, because the enzyme they inhibit is only really active overnight."

The half-life of a drug is the time it takes for it to halve in concentration in your body, and drugs with short half-lives are typically those that need to be taken multiple times a day.

Your body clock affects the levels of different hormones in your body throughout the day and night, to prepare for different activities. For example in the morning, it ramps up the level of the steroid hormone cortisol, to help you get up and tackle the day.

What this all means it that sometimes, matching a drug's half-life and the time of day it is taken with these fluctuations in hormone levels, can be used to provide more effective treatments.

So which drugs interact with our body clock?

"Essentially … many of the drugs we use will interact with the circadian clock," Dr Ray said.

But that's not a good reason to stop, or make changes to the medications you're currently taking without talking to your doctor, he said.

From studies in animals like mice, we now understand some of the basic mechanisms involved in body clocks.

And Dr Ray says scientists in the field are now beginning to translate this research into the clinic. The aim is to see how these processes work in humans, and how they could be used to make current drugs more effective.

"For some drugs, such as the statins, it's clear and we already know that the time of day makes a big difference to how they work," Dr Ray said.

"For others such as glucocorticoids, we know that the time of day may impact the drug's side effects — for example disrupting sleep."

Glucocorticoids are a type of steroid drug widely used for treating inflammation.

"In the UK more than 1 per cent of the population have a regular, repeat prescription for a glucocorticoid — we know that those drugs directly regulate the clock, and patients who are given them to take in the evening very frequently describe disturbed sleep," Dr Ray said.

"So often people will say 'oh I'll take it in the morning', but … we don't really know beyond these anecdotes … what the consequences are of taking it at different times of day, either for it to be the most effective or to get the best window between the beneficial effects and the off-target effects."

Despite not knowing the effect that taking them at different times of day might have, they're still very effective medications, Dr Ray said.

He's currently doing research into the time of day that patients with a long-term steroid prescription take their medication, to see if there are any associated side-effect risks.

What about sleeping pills?

Melatonin, a hormone that normally increases in your body at night-time to help you prepare for sleep, is available in prescription-only pills in Australia. It's most-often promoted to help insomnia, or to reset an out-of-synch body clock due to jet lag or sleep disorders.

But the appropriateness, timing and dosage need to be considered for each specific sleep problem, and the research into the effectiveness of melatonin tablets is ongoing.

According to Dr Ray, "the dose of melatonin in most [Australian] tablets is too low to achieve a meaningful increase in concentration in the brain, where it has its action preparing the brain for sleep."

Night time cold and flu medications are another go-to for people who are looking to get more sleep. The culprits in these tablets, as in many over-the-counter sleeping pills, are drugs known as "older generation" or sedating antihistamines, which include diphenhydramine and doxylamine succinate.

While they can encourage sleep, the quality isn't the same—and they won't help shift your sleep cycle, since they don't affect the body clock. You'd be better off making changes to your behavior to improve your sleep, Dr Ray said.

The future of sleep disorder treatments

Scientists are also beginning to identify chemicals that could be used to affect the clock in a specific way, for example to treat people with sleep disorders.

In 2014 researchers at the Salk Institute discovered that a single gene keeps the cells of the body's master clock in synch, and that reducing its activity allowed cells to adjust to a light-dark shift more quickly.

Scientists believe drugs that specifically alter the body clock could provide a potential cure for jetlag.

They could also have much wider implications for sleep disorders and serious disease — as it's thought that sleep disorders may increase the risk of developing dementia, and they often occur before periods of mental illness, including onsets of psychosis in people at risk of schizophrenia.

"We are in the very early stages of identifying molecules that can be used to affect the clock, but those are a few years off, and would be used primarily to treat primary disorders of the circadian rhythm, or of sleep," Dr Ray said.