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Lessons Learned

By **Matheus Abreu**

Interview – Capt. Goldenstein: automation in aviation

Runway incursions in Brazil: current scenario

By **Alexander Coelho Simão**

editorial

Dear reader,

We have reached the 10th edition of our operational safety magazine, addressing operational and health issues concerning our aircrew.

In our cover article, written by Safety Specialist Matheus Abreu, witch discuss the importance of decision-making for flight safety. Using practical examples, he encourages you to evaluate how you would react in each situation.

In the healthcare field, our Safety Analyst, Eduardo Morteo, along with Dr. Cíntia Yoko Morioka, talk about the Coronavirus pandemic. The Safety Alert written by them brings information about symptoms and transmission, providing valuable tips on how to take precautions.

The Brazilian Aeronautical Accidents Investigation and Prevention Center - CENIPA, represented by Air Force colonel Alexander Coelho Simão, wrote about runway incursions, one of the biggest risks to operational safety today. The article provides an overview of occurrences in Brazil with data broken down by aerodrome. He also discusses a case study, which allows us to recognize some contributing factors and how we should mobilize to prevent such situations from happening.

Our partners of Gol airlines brought us an article about the Hurry-Up Syndrome and the need to perform tasks quickly. Gol's Safety Analyst, FO Felipe Vasconcellos, explains how syndrome, associated with factors such as competitiveness, organizational culture, and maturity levels of the flight team, can affect safety.

In IFALPA Lounge, we brought up a Capt. Jack Netskar – IFALPA President article addressing smoking and electronic cigarettes, an important topic, giving that smoking is one of the leading causes of premature deaths worldwide.

We conclude this edition with something different. For the very first time, we are publishing an interview in our magazine. Our dear Capt. Fábio Goldenstein, Captain of Boeing 737NG at Gol Airlines and an association consultant, talked to us about his 48 years of knowledge and experience, flying in the airline industry and talks about a subject that is more in evidence than ever: automation.

Acknowledgment
On behalf of the ASAGOL Team, I would like to give a special thanks to our colleague Eduardo Morteo Bastos, who this month left his role as Safety Analyst at the association to fulfill the dream of becoming an airline pilot. This magazine is largely the result of his work and dedication.

Congratulations on the "promotion", Morteo! Thank you for everything and we wish you wonderful flights! See you on the airways!

And to all of you joining us here, enjoy your reading!

Capt. **Mário Sérgio Amato Júnior**
President of ASAGOL

Highlights of this edition

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Lessons Learned

By Matheus Abreu, Flight Safety Specialist.

This publication offers the reader the opportunity to "interact" with the industry's (ASR – Aviation Safety Report) information. You will see the sequence of events that led the crew to the point where an immediate decision had to be made. You will be able to practice your decision-making skills with the lessons learned from these abnormal conditions. This publication is based on NASA´s disclosure model "What would have you done?". The information in this publication is intended only for the prevention of aviation accidents.

Case 1 - Bad weather formation ahead

We flew inbound coast and faced two heavy formations. The radar indicated that after we had cleared these clouds, we would have nothing else ahead. In a matter of 5 minutes, two more heavy formations appeared, and we have decided to fly between them. As we entered, the clouds merged, and the situation became more and more critical. I checked the possibility of returning, but we were already extremely restricted. **What would you have done?**

Crew action: After a few minutes, I saw light reflection on the water. I headed towards it, descending to 1,000 ft. We achieved better flight conditions and proceeded to the destination without any problems. I believe I could have looked for more information about the region's weather before the flight, as the meteorological conditions deteriorated rapidly.

Case 2 - I can hear you

As we were departing for a red-eye flight, from an uncontrolled aerodrome, we received information via radio frequency that there was an aircraft entering the final approach for landing. We informed that we would hold short, until the arrival of the aircraft on final approach. After the aircraft was off the runway, I announced that we would begin taxiing for immediate takeoff, since we were also aware that there was another traffic approaching for landing in sequence. Right after that, we heard the first aircraft that had cleared the runway inform on the general frequency: 'Attention to an aircraft not in coordination entering the runway'. **What would you have done?**

Crew action: We realized then that such uncoordinated aircraft was ours. All this time we had been listening to the active frequency but transmitting on the wrong one.

Case 3 - What do you think, captain?

During descent in IMC and icing condition, we received an Anti-Ice and Duct Fail warning. We followed the QRH items and landed safely. Maintenance inspection did not identify what had caused the failure and the aircraft was then cleared to fly. It was holiday and several passengers would have been grounded if we had an AOG, at the time. We were afraid to proceed with the flight for several reasons: there were icing conditions from FL 230 to FL 260; we were limited to FL 250 because due a single pack operation; we would be flying over mountainous terrain, and it was a red-eye flight. We expressed our concerns to the company and were informed that the decision to proceed with the flight was at our discretion. **What would you have done?**

Crew action: We decided to fly during the day, with improved meteorological conditions. During the flight, the Master Warning came on followed by the Anti-Ice Duct Fail. This caused the Anti-Ice protection of the wings to be disabled. We quickly exited the icing level. All QRH items were performed and maintenance was updated via ACARS. Then, we landed.

Case 4 - Too much of a hurry

Our aircraft was on the short final for landing on a uncontrolled helipad. The pilots of the helicopter in front of us was aware of our position and intention to land right before them. Despite knowing this, the helicopter remained on the helipad after landing for no reason. **What would you have done?**

Crew action: Because of that, we had to hover at low height, as we were very close. This required a lot of power from the helicopter and this situation put us at unnecessary risk. While hovering, I noticed that the main rotor had raised a cloud of dust behind us. As soon as the aircraft ahead cleared the helipad, we proceeded to land. When leaving the aircraft, I realized that we cannot put our safety in the hands of other people. We could have reduced the speed of the aircraft during the approach so that we were not too close to the aircraft ahead or even performed go-around so that the other helicopter would have enough time to clear the helipad before we could land.

Case 5 - Surprise paraglider

We were flying VMC off the coast of São Paulo State and saw three paragliders over the shore. One of them crossed the airspace at 3,000 ft passing close to us. **What would you have done?**

Crew action: We had to make a deviation to avoid a collision and proceed with the flight.

Case 6 - Remember the M in MDA

We were performing a Localizer approach to runway XX. On our descent to the MDA we cleared the clouds layer and I started looking for the aerodrome. I thought the co-pilot would only decent until the MDA, waiting for visual. I kept looking outside trying to spot the runway and for a moment at him. He was still commanding the aircraft to descend. What would you have done?

Crew action: I asked him to stop the descent immediately. We stabilized at 150 feet below the MDA until we caught sight of the airport. We proceeded with the approach and landed. In retrospect, I should have called Missed Approach and received vector for a new approach. The only reason for us to continue was our misjudgment of the situation.

Case 7 - Dying of thirst

Close to touchdown, I identified that the collective control was limited downwards. I couldn't reduce the thrust. **What would you have done?**

Crew action: I noticed that there was a plastic water bottle below the co-pilot's collective, which prevented the full movement of the collective lever. We removed the bottle and proceeded with the landing.

The coronavirus and the proper precautions

By Eduardo Morteo Bastos
and Cintia Yoko Morioka*

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A warning to aircrew of the increase in Coronavirus cases.

Vem sendo noticiado um surto de infecção causado por novas cepas do Coronavírus (2019-nCoV, SARS-CoV, and MERS-CoV).

According to what has been reported by the main media, as of February 17, more than 1,800 people have died in China because of the complications caused by this virus.

Worldwide, almost 900 people were infected in more than 20 countries.

Symptoms

Symptoms can be confused with normal viral or bacterial infections: fever, cough, shortness of breath, and difficulty breathing. Coronavirus causes mild to moderate respiratory infection of short duration. Other symptoms may involve runny nose, cough, sore throat, and fever.

However, the elderly, immunocompromised and/or patients with preexisting cardiopulmonary disease may also present more serious infections with pneumonia or severe respiratory syndrome.

Transmission

Transmission occurs by air, through person-to-person contact and contact with contaminated animals (cats, camels, bats). This infection is very similar to infections caused by SARS and MERS.

ANVISA (Brazilian Health Regulatory Agency) and ANAC (National Civil Aviation Agency – Brazil) have taken steps to inform air transport users about the risks of this disease.

Recommendation

Due to the high potential of worldwide spreading of this virus through aviation, naturally, workers and frequent users of air transport are more exposed.

ASAGOL recommends that at the sign of any of the symptoms mentioned above, you must seek medical help. Clean your hands more often than the usual, avoid contact with people suspected of being infected and avoid touching your mouth, nose and eyes, biting nails, etc.

Eduardo MORTEO Bastos *is ASAGOL's Safety Analyst. He is a Commercial Pilot, graduated in Aeronautical Sciences and graduating in Psychology. He holds a postgraduate degree in Flight Safety and he is an Safety Manager accredited by the National Civil Aviation Agency - Brazil (ANAC). He participated in the preparation of the Flight Instructor Manual - MIV, created at the National Training Committee of the CNPAA - National Aeronautical Accident Prevention Committee. He also coordinates Ab Initio courses for Private and Commercial Pilot and Flight Instructor.*

Cintia Yoko Morioka *is a Physician and holds a Medical degree from UNICAMP - Campinas State University. Residency in General Surgery - UNICAMP. Residency in Gastroenterological Surgery and Surgical Oncology at Toyama University. PhD in Medical Sciences from Toyama University. Post-Doctorates - FMUSP. (São Paulo University - Medical School). Hospital and Health System Administration - FGV-SP (Getúlio Vargas Foundation - São Paulo). Occupational Medicine - USP.*

Runway incursions in Brazil: current scenario

By Alexander Coelho Simão*

1. Introduction

A runway incursion on March 27, 1977, at Los Rodeos Airport, Tenerife, resulted in the worse accident in the history of world aviation. The collision between two Boeing 747 aircraft - the KLM 4805 and the Pan Am 1736 , victimizing 583 souls (NTSB, 2007).

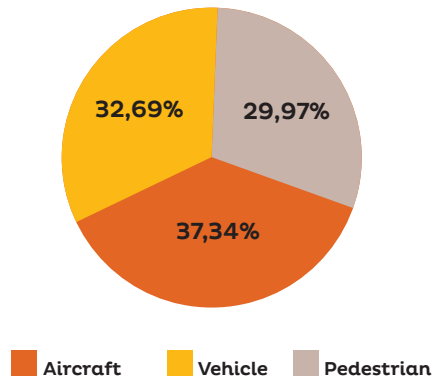
Runway incursions are a constant concern for the agencies responsible for civil aviation worldwide and currently constitute one of the most serious threats to flight safety.

In summary, this article aims to bring up an updated overview of runway incursions in Brazil, as well as showing the main results obtained by CENIPA (The Brazilian Aeronautical Accidents Investigation and Prevention Center) in the investigation of a recent event that took place at Brasília International Airport (SBBR).

2. Statistical data on runway incursions in Brazil

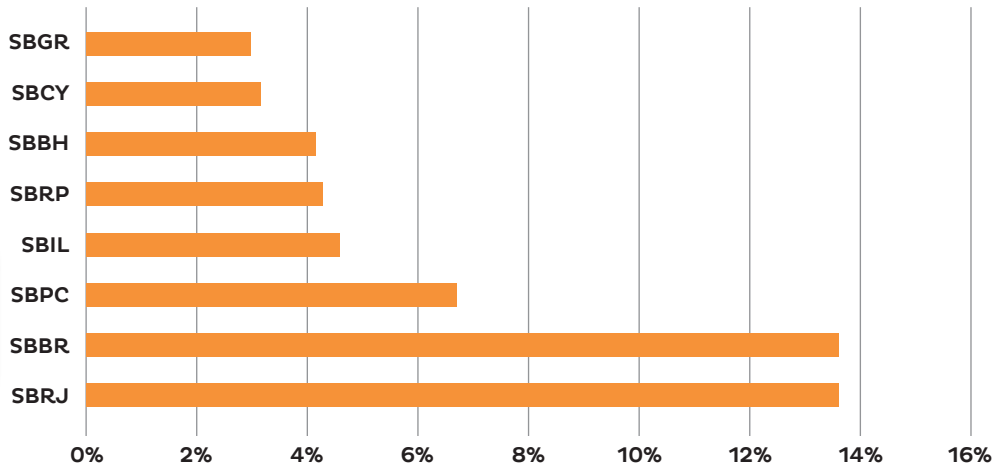
Runway incursion is defined by the ICAO (2007, p. 11) as "any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft."

Runway incursions by entity incurring the runway



According to statistical data provided by DECEA (Department of Airspace Control – Brazilian Air Force) (2019), in the last five years, there were 1,473 runway incursions at Brazilian airports. The two graphs below show the breakdown of these occurrences by entity incurring the runway and aerodrome.

Runway incursions by airport



3. Final Report IG-065/ CENIPA/2018 - Main lessons

3.1 History of the flight

GOL 1732 took off from SBBR (Brasília) to SBSL (São Luiz), at 00:30 am (UTC), in order to perform a regular passenger flight, with six crewmembers and 154 passengers on board.

FAB 2345 had taken off from SBSC (Santa Cruz Air base) to SBBR, in order to carry out personnel transport, with three crewmembers and five passengers on board.

During the takeoff run of the Boeing 737, at SBBR, the FAB 2345 aircraft, which had just landed, was spotted still on the runway. The civilian aircraft took off over the military, passing a few meters above its fuselage. The aircraft were undamaged and all their occupants were unharmed.

3.2 Contributing factors

According to Final Report IG-065/ CENIPA/2018, the following factors contributed to this runway incursion:

Attention: the controller's attention was impaired by the context experienced in his work routine in which, due to the physical obstacles in the control Tower, expectations were created that the aircraft would follow the instructions sent, even if they could not visually accompany them from their position. The fact that the control officer did not identify that the FAB aircraft did not clear via TWY "G" after having read back that it would, demonstrated that his focus of attention was not properly oriented to the situation.

Attitude: despite having good technical training, the FAB 2345 copilot showed little familiarity with the SBBR operation. This may have contributed to her not contesting the instructions received from the captain, regarding the taxi sequence after landing on runway 11L. Likewise, the attitude of not following the standard phraseology prescribed in the MCA 100-16/2016 (the Brazilian aeronautical phraseology manual), by the tower control officer, may have contributed to the FAB 2345 crew carrying out the frequency change for the Ground Control before exiting the runway.

Communication: despite not understanding the request of the FAB 2345 crew after landing, the tower control officer did not urge them to repeat the message and issued instructions for the aircraft to clear the runway on TWY "G", considering the proximity that the aircraft was from that intersection. In this case, there was selective listening, in which the spoken content was inferred from what was expected to be heard. Furthermore, the non-assimilation by the ground control officer of the verb tense (future tense) used by the FAB crew when communicating the intersection where they would clear, contributed to the fact that he did not realize that the aircraft was still on the runway.

Physical work conditions: the light interference from the apron and the TWY "H" blind spot compromised the safety of nighttime operation.

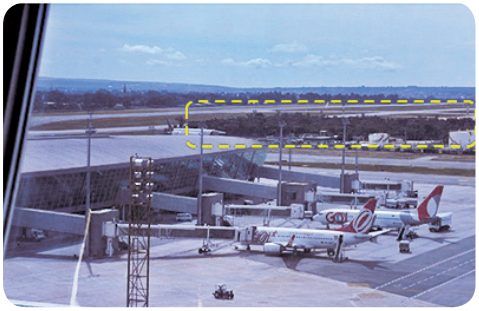
Air traffic coordination (ATS): the inadequate exchange of information between the Tower and Ground controls after the FAB aircraft landed contributed to the uncertainty as to the actual positioning of traffic.

Employment of means (ATS): despite all difficulties in visualizing the C95M (Cessna Caravan – military designation) on the runway, the Tower controller did not use the resource provided for in ICA 100-37/2017 (Brazilian Air Traffic Services Instruction), which required instructing the aircraft to report when it had cleared the runway. It is possible that the employment of this procedure could have prevented the incident.

Phraseology of the air traffic officer: the phraseology used by the tower control officer when he instructed the FAB 2345 crew to contact the ground control without conditioning this act to the aircraft exiting the runway in use, may have induced the pilots to change the frequency while they were still on the runway. With this action, the air force pilots were unable to interfere when the Tower incorrectly authorized the Boeing 737NG to take off, while the runway was still occupied.

Air Traffic Management skills (ATS): there was no dexterity in the execution of the ATS procedures, such as visual scanning and phraseology usage, that exhausted the possibilities of identifying that there was an aircraft on the runway at the time of clearing the takeoff of another.

Airport infrastructure: the existence of several blind spots at the airport contributed to the tower control officers inferring that the FAB 2345 was in a position different from its actual location. The cameras used to mitigate the risk of blind spots did not cover all areas and were not dedicated exclusively to the use of the control Tower. The illumination of some aprons obfuscated the view of the controllers. All these conditions, combined with the lack of a RADAR Surface Movement System, contributed to the military aircraft not being noticed on the runway when the GOL 1732 was cleared to take off.



Perception: the similarity between the letters "C" and "G" associated with the conditions for their visualization at night contributed to the pilot's misperception. The controller's perception was reduced by his expectation that the crew had strictly followed the instructions. In addition, the failure to view the aircraft due to the TWY "H" blind spot led him to conclude that the runway was clear. The expectation of not finding the aircraft on the runway reduced the controller's perception, regarding the aircraft's actual location, contributing to the outcome.

Insufficient pilot experience: the lack of familiarity of the FAB 2345 co-pilot with the aerodrome may have contributed to her not questioning the captain's message, requesting to clear the runway via TWY "C", when, in fact, the intercession by which they passed was TWY "G".

Support systems: so far in Brazil, no regulations defines the position in which the aircraft should change the frequency for Ground Control after landing. The lack of provision in regulations may have contributed to the FAB 2345 crew contacted ground frequency while occupying the active runway.

4. Conclusion

In this article, we presented some statistical data about runway incursions in Brazil as well as the results obtained in the investigation of a recent event that occurred at SBBR.

As can be seen in this serious incident, the circumstances that result in an runway incursion differ considerably and arise from several contributing factors that invariably belong to three main segments: the cockpit, the airport infrastructure and the air traffic control.

This finding indisputably proves that the solution to this problem requires general mobilization and effective participation of all professionals involved in airport activities. Do your part!
Safe flights!!!

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*__Alexander Coelho Simão__ *is colonel of the Brazilian Air Force (FAB), works at the Operational Division (DOP) of CENIPA and holds a master's degree in Aviation Safety and Continuing Airworthiness from ITA.*

Compulsion to fly

By FO Filipe Vasconcellos*

Brazilian aviation is an extremely competitive environment and this directly affects the operational strategies of airlines. The relentless pursuit of greater efficiency creates an increasingly competitive atmosphere in terms of production.

The managerial dilemma, which seeks a balance between protection and production, increasingly depends on human interaction with decision-making, assertiveness, conflict management, among others.

The challenge of balancing this dilemma also depends on what stage the company is in terms of its implementation, expansion and consolidation. Its market experience is also a significant factor as the organizational culture involves the process of training employees and the level of maturity reached by the group's work process.

In this scenario, the safety team works to prevent impulsive or compulsive decisions from putting the operation at risk, such as the non-adherence to the procedures recommended by the organization in the pursuit of goals.

What is impulsivity?

"Behaviors or responses performed prematurely, with no real analysis of possible consequences, which converge enormously to undesirable and even deleterious results." (Daruna, 1993)

What is compulsion?

Compulsions or compulsive rituals are the repetitive behaviors or mental acts that the person feels compelled to perform to decrease the anxiety and/or discomfort associated with the obsessions or rules to be strictly followed.

The important thing to understand is that every compulsive action is the result of impulsiveness, that is, a voluntary (clearly excessive) act in response to the obsessions that, in most cases, the individual cannot resist.

Currently, compulsion comes to mind when relating the actions of the flight crew during the landing operation phase. In this article, we decided to change the prism a little for a new event that stands out every day, which is the "COMPULSION TO TAKE OFF".

It is not very difficult to picture an agitated pilot amid the busy daily routine of operations, but it is important to understand the reason for this need to perform tasks quickly.

This topic has been studied since the world´s worst aviation disaster involving a KLM aircraft and a Pan-Am aircraft in Tenerife. Among the several actions carried out then, the Air Line Pilots Association was created and, after conducting an 18-month investigation that involved three countries, it identified a specific element within Human Factors and classified it as the Hurry-Up Syndrome.

The Hurry-Up Syndrome

It is officially known as "any situation that degrades a pilot's human performance by a perceived/actual need to rush tasks or duties for any reason". This syndrome is illustrated by directly relating the need to keep the aircraft on schedule, pressures from the OCC or the ATC, pressures to keep to the schedule despite maintenance and weather, and the dilemma concerning duty time regulations.

The behavioral phenomena in the aeronautical industry currently present a new trend, which is the compulsion to fly or more specifically to take off. Among these professionals, there is a sort of fear of delaying the operation and consequently entering into a ripple effect that systematically damages the operations.

According to the psychologist and specialist in Human Factors, Bruno Blaya, "the hurry-up syndrome is an organizational dynamic dictated to meet the deadlines defined by a competitive and overcrowded market, and aviation is a synchronous system, where the time pressure experienced by employees, whether declared or not, is prioritized over processes, resulting in errors, deviations or violations".

Within the scenario of new opportunities for threats, corporate work must be taken into account in order to mitigate possible flaws in organizational processes, which involve not only the pilots but also all other employees involved in the operation. In addition, it is essential that employees, especially those who carry out activities that may pose risks to Operational Safety, are aware that safety is more important than punctuality.

The compulsion to take off not only facilitates active failures but also increases the range of situations that exceed the human capacity of those involved to the point of negatively affecting an operation, as in the following example:

"The crew closed the doors late and during the taxi out - in coordination with the ground control - it is suggested that they take off from an intermediate taxiway. After acceptance, the crew accelerated the data entry process and performed it incorrectly. In their haste, the pilots mistakenly inserted Actual Zero Fuel Weight (AZFW) instead of Gross Weight (GW). Consequently, the takeoff occurred with a weight discrepancy and the aircraft left the ground on the last third of the runway. The opposite threshold was only a few meters away. This fact almost led to a runway excursion."

Following the premise that any accident can and should be avoided, examples like this are not intangible and should not be considered improbable. Therefore, an increase in the workload or any other factor that raises the complexity of the operation must be carefully executed and checked, even if it requires more time for preparation.

All those involved in the air operation must police themselves regarding the compulsions for the release and subsequent departure of the aircraft. We should all bear in mind that the real priority is our number 1 value, SAFETY!

*__Filipe Vasconcellos__ *is a First Officer and Safety Analyst at GOL Linhas Aéreas.*

Smoking and Aircrew

By Captain Jack Netskar*

Background

Cigarette smoking is the single most important preventable environmental factor contributing to premature death in the world. The high morbidity and mortality rates are due to the effects of cigarette smoke on several diseases, but primarily on lung cancer, ischaemic heart disease, stroke, and peripheral vascular disease.

Physiological and psychological effects of smoking

Tobacco smoke contains a rich assortment of toxic components. Carbon monoxide and nicotine have received considerable scientific attention, particularly as to their acute and chronic physiological effects. A great deal of literature is available describing the effects (and the effects of withdrawal) of these substances on cardiovascular, psychological, and psychomotor functions in active and passive smokers.

Aviation environmental factors such as altitude, hypoxia, fatigue, and performance (impairment of memory, reaction time, vision, and vigilance) have been studied as they relate to carbon monoxide exposure. Particulates found in cigarette smoke also add to the irritative effect of low humidity and ozone on eye and nasal mucous membranes. These occur despite the rapid ventilation rates of the modern cockpit.

Electronic cigarettes

In recent years a wide array of products that simulate the act of smoking have been introduced. There are currently three broad categories of these products:

- Heated tobacco products (HTPs), which produce aerosols containing nicotine and toxic chemicals upon heating of the tobacco or activation of a device containing the tobacco.
- Electronic nicotine delivery systems (ENDS), which heat a liquid to create an aerosol that is inhaled by the user. The liquid contains nicotine (but not tobacco) and other chemicals that may be toxic to people's health.
- Electronic non-nicotine delivery systems (ENNDS), which are similar to ENDS but the heated solution delivered as an aerosol through the device does not generally contain nicotine.

While some of these products have lower emissions than conventional cigarettes, they are not risk free, and the long-term impact on health and mortality is as-yet unknown. E-cigarettes have caused acute lung injuries, and the U.S. Centers for Disease Control and Prevention (CDC) has named this as e-cigarette, or vaping, product use associated lung injury (EVALI). The injury is believed to be associated with e-vitamin acetate.

There is insufficient evidence to support these products as smoking-cessation tools. It is also important to note that electronic cigarettes and/or their liquids may be illegal in some countries.

Considering the above, IFALPA recommends a completely smoke free environment on all aircraft including the flight deck area. In addition, it is highly recommended that pilots not use cigarettes or e-cigarettes at all.

Notes

WHO Report on the Global Tobacco Epidemic 2019, https://www.who.int/tobacco/global_report/en//

Interview – Capt. Goldenstein: automation in aviation

Capt. Fábio Goldenstein has worked in aviation since the early 1970s, having served more than 34 years at VARIG and now 12 years as Captain at Gol. In this interview with ASAGOL, Goldenstein comments on the current situation of automation in world aviation.

ASAGOL – You have dedicated 50 years of your life to aviation. In your time life experience, how can we define automation in aviation?
Capt. Goldenstein – In a broader sense, we could say that automation is the execution of tasks through mechanical and/or electronic devices to replace human work. For air transport, we are talking about the possibility of performing more elaborate and complex tasks in this way, normally assisted by the pilot.

The introduction of these systems has brought several consequences to the work of the flight crew, starting with the decrease in the number of crewmembers in some types of aircraft.

The systems previously assisted and operated by a third professional started to run in automatic mode, without the pilots' manually operation.

ASAGOL – In your opinion, what motivated the use of automation in flight operations?
Capt. Goldenstein – Economic pressure, of course. Technological research in general emerges from new demands. The technologies are made available to pay for their high investments in research and the industry ends up turning a profit from it.

Air transport is no exception. Technological development allowed, initially, the reduction of crewmembers into the cockpit. That was followed by the need to accommodate more and more airplanes within the airspace, which forced the new projects to integrate multifunctional control systems, as the reality with today's autopilots when compared to first and second generation of analog aircraft.

ASAGOL – Do you think that currently the motivating elements for the use of automation have been eliminated?
Capt. Goldenstein – I believe that those elements will never be eliminated. The industry seeks both profit and safety, which alternate in priority, continuously. This is what we are witnessing now, in a way, it seems that we have made a lot of progress in the pursuit of profit and we are going through a moment that forces us to reflect more on safety issues.

On the other hand, the market foreseen a robust growth for the next 20 or 30 years and the industry will need to meet this demand and train the professionals who will be the operators of these aircraft. From this fact, there are some different points of view.

Some believe and defend that automation is the simplest and cheapest way to replace experienced pilots and there are those who defend that more automation is not necessarily the solution.

ASAGOL – What problems can arise from the high degree of automation offered to pilots?
Capt. Goldenstein – Initially, I would say that complacency is the first major direct problem, but understanding such complacency is not that simple.

The pilot has a very high level of automation in the control functions of the aircraft. However, strange as it may seem, this workload can increase a lot if the operations go out of the programmed ideal mode.

This happens all the time on terminal areas that are increasingly congested, adding to the workload of pilots and flight controllers.

Another issue is that a significant part of the information on the functioning of the systems has been "suppressed" from the operational manuals. Manufacturers provide only what they present as "operationally necessary". This helps to disseminate the concept that a pilot's training and experience can be made cheaper with the increasing implementation of new technologies.

ASAGOL – Can this advancement in automation generate technology dependence?
Capt. Goldenstein – It is important to highlight that, in the past, there was the concept that "the pilot must stay ahead of the airplane". The technology available

onboard meant that the pilots' situational awareness was always very high, since the airplane depended more on the direct contact with the machine, whether to fly or to navigate.

Nowadays, the lack of this direct contact degrades the pilots' ability to perceive the behavior of the aircraft, making them increasingly dependent on automatic systems.

If, on the one hand, our activities onboard reached a high level of efficiency and complexity, on the other hand, we started to have incidents and accidents in which the problem generated by this distance became evident. Somehow, the industry needs to take a step back, in what is called back to basics.

ASAGOL – What is your opinion about the current moment in aviation and this automation scenario from the point of view of the flight crew?
Capt. Goldenstein – A friend of mine, who is also a pilot, once said that we are facing a situation previously experienced in rail transport. The great expansion of trains in the late 19th and early 20th centuries completely changed the characteristics of the work, to the point where today the driver "watches" an operation remotely controlled by command centers along the railway lines.

Nowadays, aviation is experiencing great expansion. The need for thousands of new professionals for workstations cannot be satisfactorily fulfilled, either because training schools are unable to meet the demand or because the profession of pilot no longer arouses the same interest it once has in the officers of the armed forces in search of civilian opportunities. The pilot profession has gone international and we are (Brazil) major exporters of qualified labor.

These factors forced companies to adopt higher limits in their operational procedures, which older pilots often call "stiffening of SOP´s".

ASAGOL – What solutions have been proposed to mitigate the problems generated by over-automation?
Capt. Goldenstein – We are moving towards possible solutions to help mitigate problems. While companies adopt the "stiffening of SOP's", there is the implementation of data analysis programs of enormous relevance, such as FOQA.

However, the industry seeks to avoid rather than to understand the nature of the errors and deviations that occur daily. The way in which these programs were implemented in some locations led pilots to excessively fear the consequences of monitoring, starting to use progressively more automation.

We are now facing a serious challenge. After analyzing recent accidents, it was concluded that cultural differences between operators did not constitute the reason. The conclusion cast doubt on the extent to which statistics can even replace redundancy.

Competent authorities and manufacturers are being questioned and required to review their certification processes, operating manuals and training standards. Maybe it's time to take a step back.

ASAGOL – In addition to possible safety problems, what other factors can be generated by the high automation of processes?
Capt. Goldenstein – The level of safety of operations has reached a very expressive mark. New generation aircraft are capable of performing much more complex operations than those that were performed a few decades ago, with previous generation aircraft. This all brought to the industry an idea that pilots became "operators" of systems and the reliability of equipment is greater than the need for redundancy.

Viewing things from a statistical perspective has given space to enormous pressure in increasing working hours, the number of sectors (takeoffs and landings) and a reduction in the number of crewmembers onboard. Fatigue is now a serious threat to flight safety and it brings us back to the issue of complacency, which is aggravated by this worldwide problem.

I have spoken to pilots who fly in different countries and who are engaged in all types of operations: long and short-haul, transpolar, multi-time zones flights, etc. The complaint is always the same when it comes to flight schedules and fatigue. There has been great pressure from air carriers amidst this scenario of monumental competitiveness and the entities representing professionals in the industry have not always been successful in addressing this issue in employment contracts.

Here in Brazil a team of pilots managed to develop an important fatigue measurement tool - the Fatigometer - which has everything to be implemented in other countries as well. This evidences how well trained our professionals are to engage in discussions in search of new alternatives.

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