

June 2022

100 KNOTS

India's Premier Crew Magazine

Health

Mental Health
in Pilots

Environment

Reducing Airport
Carbon Footprint

People

India's First Female
Offshore Captain
Mayuri Deshmukh

Operations

Operational safety
under IFR Helicopter

Safety

Generative Safety Culture
in a long term perspective

Statistics

Helicopter Operations



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Editor

Preet Palash
Sakshi Shreya

Contributors

Capt. Amit Singh FRAeS
Capt. Mayuri Deshmukh
Capt. Peeush kumar
Dr. Aishwarya Agicha
Capt. Anil Goyal

Correspondents

Prashant Prabhakar
Radhika Bansal

Photographer

Utkarsh Thakkar

Illustrator

Saurav Chordia

Creative Head

Ashiba Saeed

For Advertising, Queries and Suggestions
Mail: editor@100knots.com



EDITORIAL DESK



Preet Palash
Editor

Dear Aviation colleagues,

Welcome to the June edition of the 100 KNOTS Magazine.

May has indeed been one of the most exciting months for Indian aviation in the recent past. The atmosphere was filled with zeal and nostalgia when Jet Airways took off for the demonstration flight. Jet Airways has been a defining airline for Indian aviation where a lot of our colleagues started their careers and have fond memories of. We extend our warm wishes and support to the hard-working team at Jet Airways and look forward to see them in the air like their glory days. We also got to see the beautifully painted Akasa air B737 Max. Akasa Air is on track to receive its first Boeing 737 Max by mid-June and launch commercial operations by July. SpiceJet announced settling the financial dispute with Credit Suisse AG paving way for future fleet and network development. Go First has also received SEBI approval to finally launch IPO by the end of June or early July, making way for the infusion of much-needed funds into the carrier.

While the industry has shown commendable resilience, the unfortunate war in Ukraine coupled with the global supply chain crisis and weakening rupee has pushed the finances back into the red. IndiGo reported a consolidated net loss of INR 1,681.80 crore for the quarter ended March 2022. On the other hand, Indian passengers are becoming increasingly frustrated with the airlines, according to a survey undertaken for Bloomberg, saying that customer service and the behaviors of airline staff have deteriorated sharply in the wake of Covid-19. This survey is in line with the findings of recent DGCA Inspections where all carriers were found with deficiencies in cabin maintenance and upkeep. As the country progresses, passengers shift from cost-sensitive to product sensitive. With more players entering the market with better products, the competition will only get fierce, and these product offerings could be the deciding factor in the future of these airlines.

In this issue, we have brought together Industry experts from all domains who have written on critical subjects, both technical and non-technical that affect our daily operations. We get candid with Capt. Mayuri Deshmukh and explore her journey of becoming India's first female offshore captain. Capt. Amit Singh FRAeS shares his insights from a recent survey on generative safety culture survey in India. Capt. Peeush Kumar shares his opinion on improving operational safety under IFR for helicopter operations and Capt. Anil Goyal talks about reducing the carbon footprint at airports.

The investigations into the recent crash of China Eastern flight MU5735 earlier this year have once again brought back pilot mental health to the forefront of aviation safety discussions. This accident brings back horrific memories from the year 2015 when Germanwings Flight 9525 intentionally crashed into the French Alps. A recent study estimates that 792 million people are living with a mental health disorder but very few seek help. Clinical Psychologist and Ph.D. scholar Dr. Aishwarya Agicha explains why we as a community need to spread awareness and normalize the receipt of mental health treatment.

I close this message by inviting everyone to submit their exciting ideas to 100 Knots. All papers are received with a high degree of enthusiasm and they will find a home in future issues. We are committed to publishing all discoveries, methods, resources, and reviews that significantly cover the Indian aviation sector at large.

Our sincere thanks to all the contributors for their support and interest. We hope to hear from you soon!



100 KNOTS

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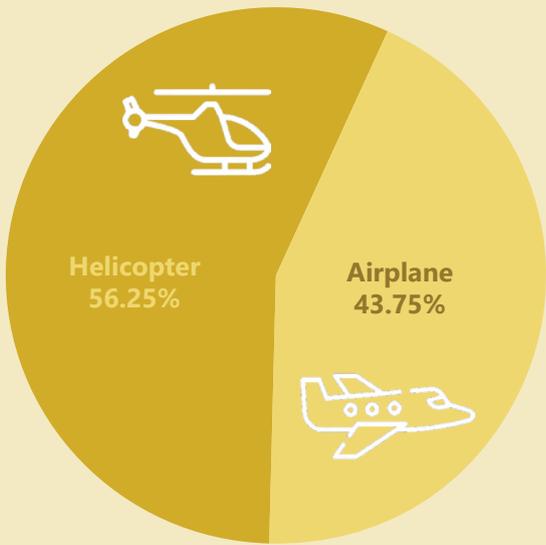
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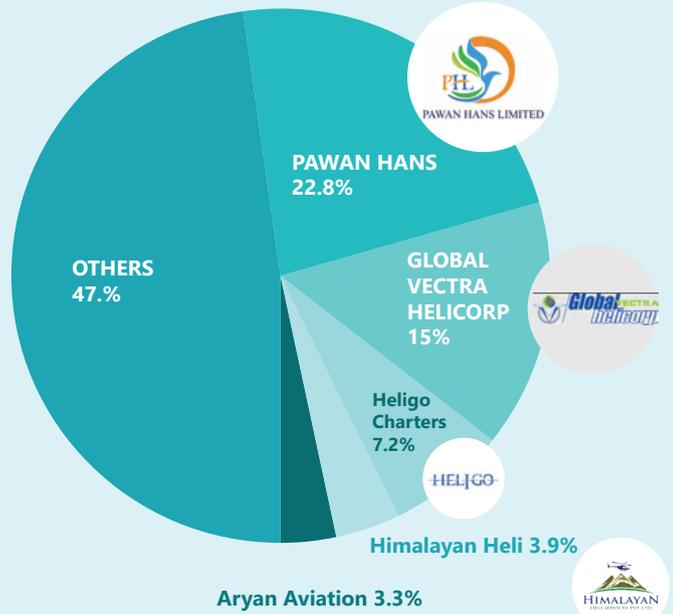
India (Civil)

Fleet size	180
Operators	47
Types operated	24

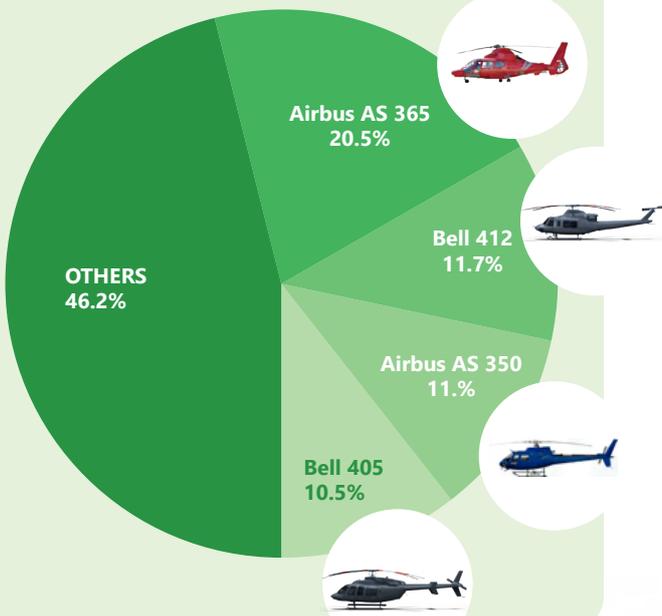
Market Preference (Non-Scheduled)



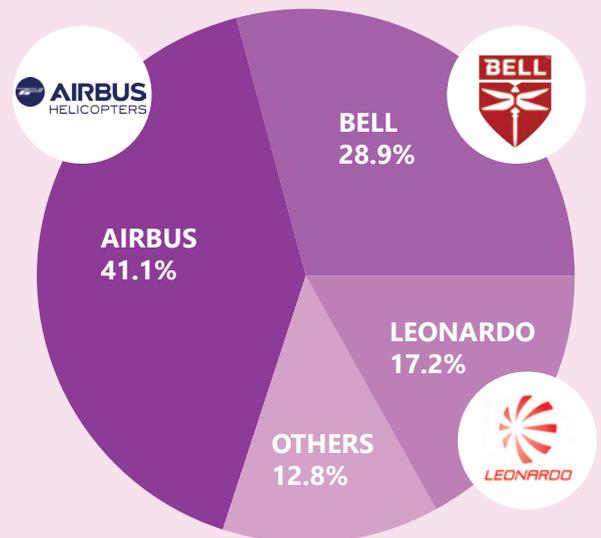
Market Share (Operators)



Market Share (Helicopter Type)



Market Share (Manufacturer)



MOST OPERATED HELICOPTER

Airbus AS 365 Dauphin 2

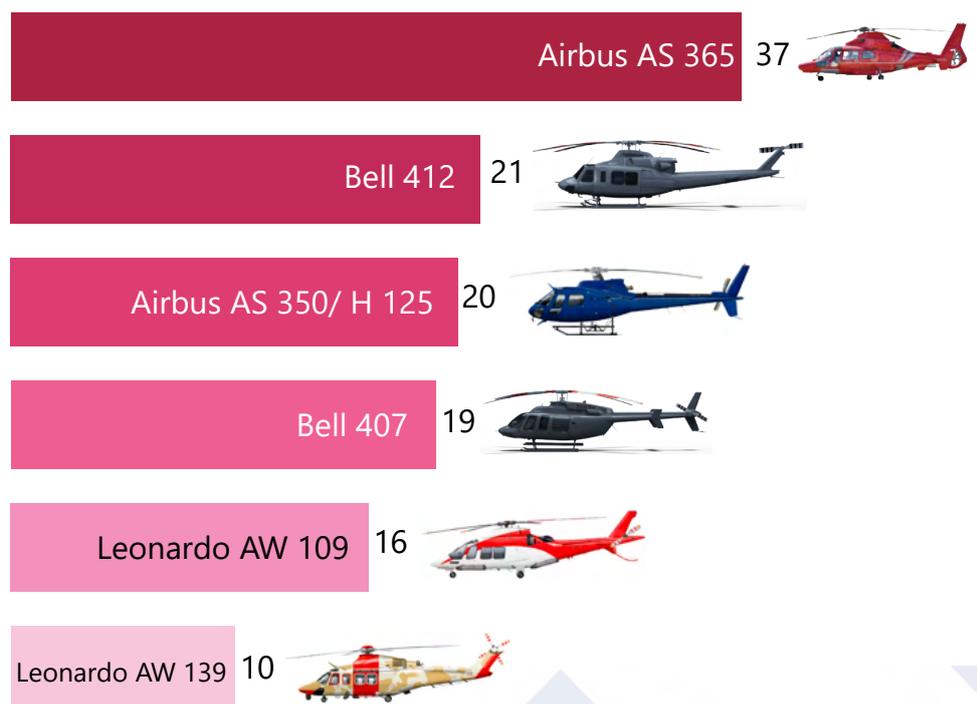


Details

Total in India	37
Manufacturer	Airbus Eurocopter Aérospatiale
Country of Origin	France
Produced	1978-2022
Price	US\$ 9m
Passenger Capacity	12
Max takeoff weight (MTOW)	4,300 Kgs
Payload	2,300 Kgs
Maximum speed	165 Knots
Ferry range	827 km
Service ceiling	19,000 ft

Helicopter by Fleet Size

0 5 10 15 20 25 30 35 40



Operator	Fleet
Pawan Hans	31
Heligo charters	4
Reliance Industries	1
Aryan Aviation	1
Total	37

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Biggest Helicopter

Kazan Mi-17

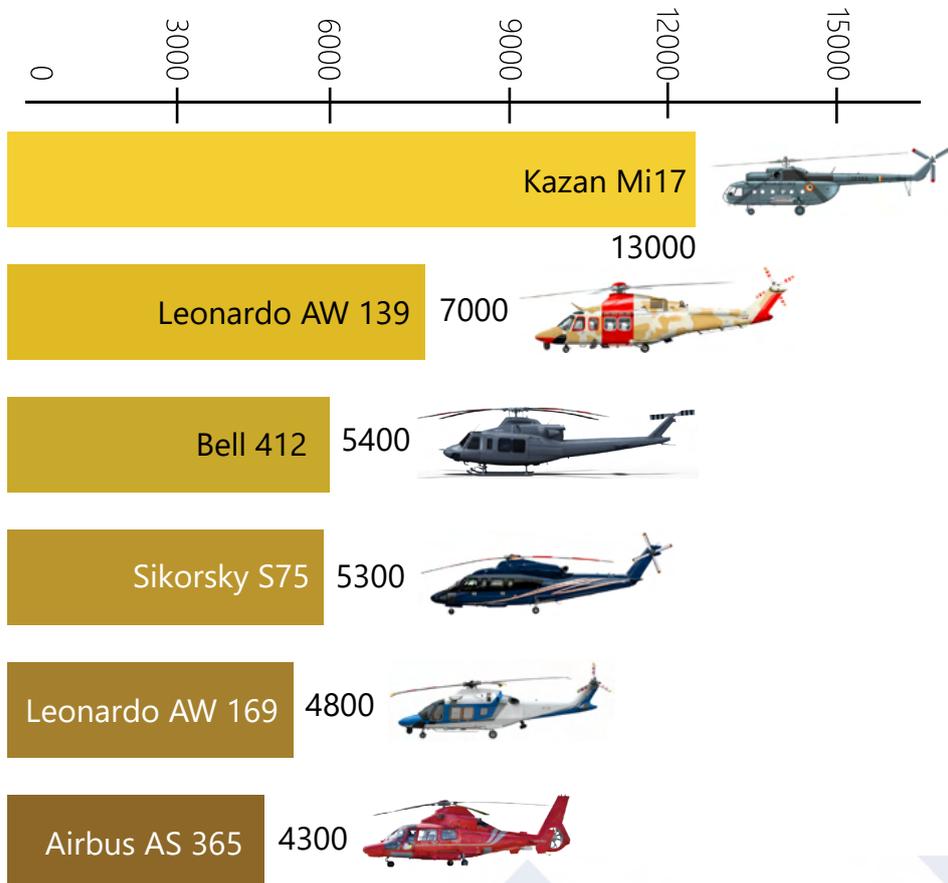


Helicopters by MTOW

Details

Total in India	7
Manufacturer	Kazan
Country of Origin	Russia
Produced	1977-Present
Price	US\$ 17m
Passenger Capacity	26
Max takeoff weight (MTOW)	13,000 Kgs
Payload	4,000 Kg
Maximum speed	140 Knots
Ferry range	800 Kms
Service ceiling	20,000 ft

Operator	Fleet Size
Sky One Airways	4
Pawan Hans	3
Total	7



Most Popular Manufacturer



Fleet size	74
Country of origin	France
Market Share	41.1 %
Total Operators	18
Total Types	7
Most Popular Type	AS 365

Type	Number
AS 350/ H125	20
AS 355	3
AS365	37
EC 145/ H 145	4
EC 120/ H 120	1
EC 130/ H 130	5
EC 135/ H 135	4
Total	74

Other Manufacturers

Bell (Origin- USA)



Bell 206	8
Bell 407	19
Bell 412	21
Bell 429	3
Bell 505	1
Total	52

Leonardo (Origin- Italy)



AW 109	16
AW119	1
AW 139	10
AW 169	4
Total	31

Kazan (Origin-Russia)



Mi 171	1
Mi 172	6
Total	7

Robinson (Origin-USA)



R 44	3
R 66	3
Total	6

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Largest Operator

Pawan Hans



Details

Established	15 October 1985
Fleet Size	44
Hubs	Juhu Aerodrome Rohini Heliport
CMD	Sanjeev Razdan

Other Operators by Fleet



Global Vectra Helicorp



Heligo Charters



Himalayan Heli



Aryan Aviation

Fleet Size

27

13

7

6

Type	Fleet Size
 Airbus AS 365	28
 Bell 407	3
 Bell 206	3
 Kazan Mi 172	3
 Airbus AS 350	2
 HAL Dhruv	2
Total	41

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Most Popular Helicopter

HAL Dhruv



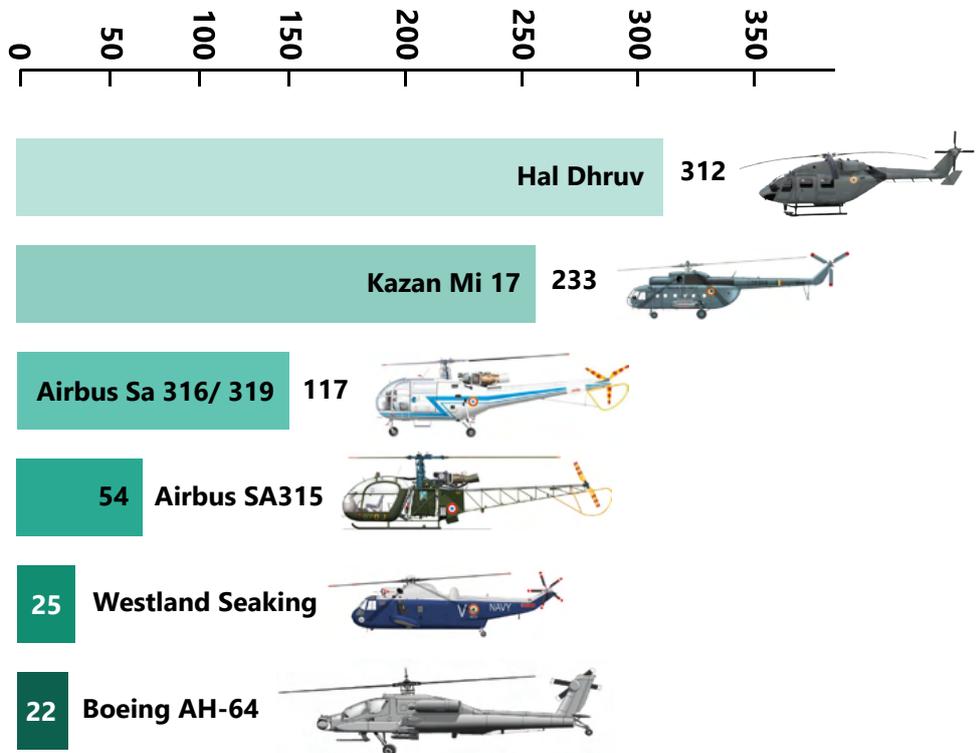
Details

Total in India	312
Manufacturer	HAL
Country of Origin	India
Produced	2002-Present
Price	US\$ 6m
Passenger Capacity	12
Max takeoff weight (MTOW)	5,500 Kgs
Payload	2,600 Kg
Maximum speed	135 Knots
Ferry range	640 Kms
Service ceiling	14,000 ft

Operator

	Indian Air Force	Fleet	107
	Indian Army		191
	Indian Navy		14
	Total		312

Helicopter by Popularity





Aishwarya Agicha
Clinical Psychologist



Mental Health in Pilots

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The crash of China Eastern flight MU5735 earlier this year, has once again brought back pilot mental health to the forefront of aviation safety discussions. The Boeing 737-800 was cruising at FL290 when it suddenly pitched into a near-vertical descent, plummeting into a mountain at extreme speed. Data from a black box recovered in the crash suggests inputs to the controls pushed the plane into the fatal dive.

This accident brings back horrific memories from the year 2015, when Germanwings Flight 9525 was intentionally crashed into the French Alps by the operating co-pilot Andreas Lubitz, killing all 150 souls on board. The investigation found Lubitz, had previously been treated for suicidal tendencies and declared "unfit to work" by his doctor. Lubitz however, decided to conceal this information from his employer and continued flying. In another bizarre accident, US-Bangla Flight 211 crashed at Kathmandu Airport killing 51 people. The investigation revealed that Captain Abid Sultan demonstrated severe mental stress, extreme fatigue, lack of sleep and even crying on several occasions that ultimately led him to be spatially disoriented.

The topic of mental illness among airline pilots is not new, but identification and seeking treatment remains a present-day challenge. Deadly accidents in the recent past coupled with pandemic related stress have brought back pilot mental health to the forefront of aviation safety discussions. The Aviation Safety Network lists nine crashes of commercial aircraft over the last four decades believed to be caused by pilot suicide. Yet the reporting of mental health-related symptoms is very low among airline pilots as compared to their industry counterparts.

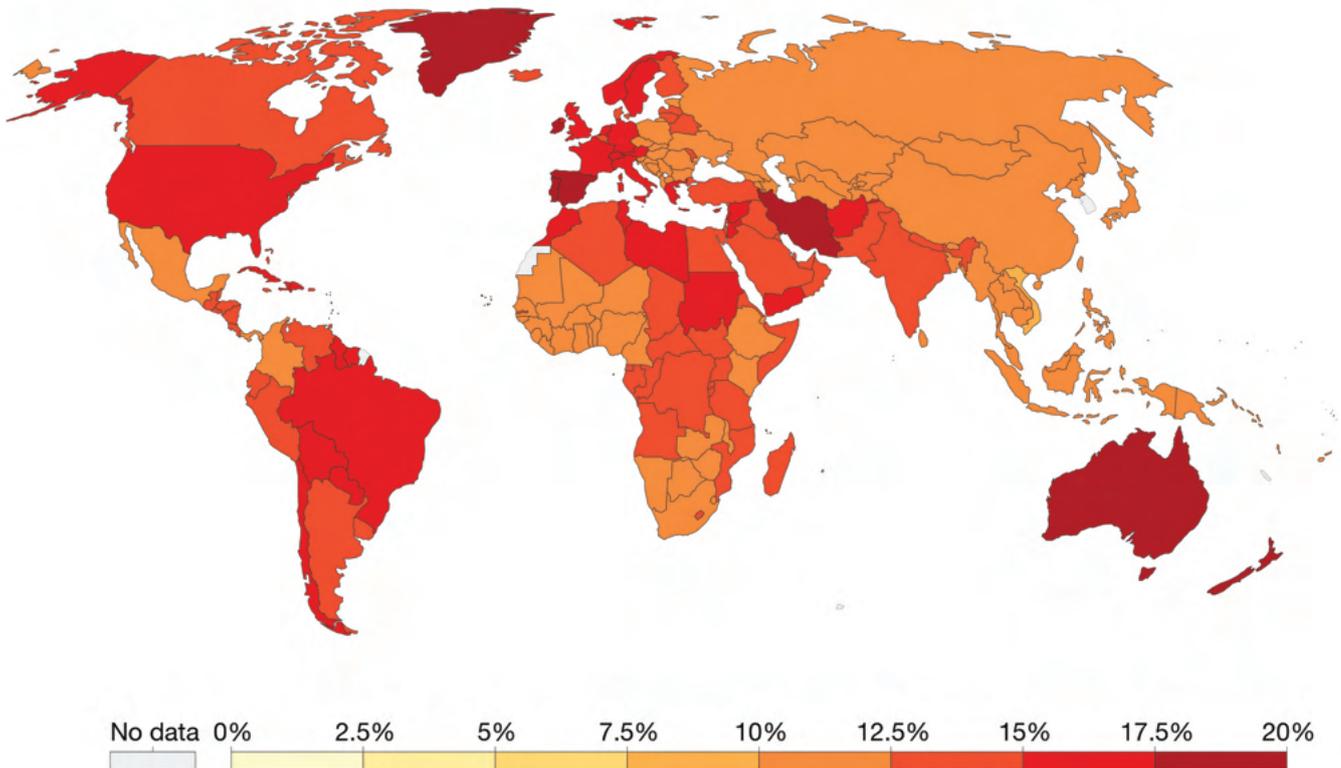
A 2016 Harvard University survey found that 12.6% of the 1,848 airline pilots who completed the survey were clinically depressed, and 4% reported having suicidal thoughts within the past two weeks. Research done by Bor and Robert in July 2007 suggests mental illness is second to cardiovascular disease in reasons for losing a pilot license. While these numbers doesn't necessarily translate the same in Indian community, a lack of data doesn't shouldn't be taken as an absence of a problem.

Common reasons behind this reluctance are believed to be public stigma, fear of losing licenses, loss of income, and ultimately fear of loss of employment. Moreover, this male-dominated profession emphasizes being resilient and independent; thus, admitting having a mental health problem is extremely difficult. Respondents have also indicated a sense of mistrust in mental health professionals. And lastly, pilots who did step out to seek treatment, found it difficult to follow it routinely due to long and irregular working hours.

Share of population with mental health disorders, 2019

Our World in Data

Share of population with any mental health; this includes depression, anxiety, bipolar, eating disorders and schizophrenia. Due to the widespread under-diagnosis, these estimates use a combination of sources, including medical and national records, epidemiological data, survey data, and meta-regression models.



Source: Institute for Health Metrics and Evaluation, Global Burden of Disease (2019)

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What is Mental Health

Mental Health refers to our cognitive, behavioral, and emotional well-being. It is all about how we think, feel and behave. Mental health can affect daily life, relationships, and even physical health. Mental well-being and the absence of mental illness are essential to the safe performance of pilots and aviation safety-sensitive duties. There are many mental health conditions, such as grief, psychosocial stress, depression, anxiety, panic disorders, personality disorders, and substance misuse/abuse.

A 2017 study by the Institute for Health Metrics and Evaluation estimates that 792 million people lived with a mental health disorder. This is slightly more than one in ten people globally (10.7%). People with depression have a 40% higher risk of developing cardiovascular and metabolic diseases than the general population. People with serious mental illness are nearly twice as likely to develop these conditions.



Recognition

Just like any other illnesses, early detection is the key. Pilots should watch out for persistent feelings of worthlessness, helplessness, and hopelessness lasting more than two weeks. Symptoms also include sweating, palpitations, sleep disturbance (possible insomnia), poor diet, choking or frequent shortness of breath during or before flying.

Why are Pilots so Vulnerable?

Pilots in many ways form a unique occupational group. The profession in itself is very demanding as one needs to have high mechanical and technical intelligence to handle complex machine systems. Pilots are exposed to difficult working conditions that feature inconsistent schedules, extended periods away from home, marital problems and frequent encounters with fatigue. These factors cause subconscious stress that accumulates over time and may lead to psychopathologies.

Routine Mental Exam

The present aeromedical infrastructure lacks expertise in examining accurate mental fitness i.e., issues affecting the emotional state, mental health, or cognitive ability to safely conduct their duties. Civil aviation authorities should establish mental fitness assessment programs for the medical examiners and include it as part for of recurrent checking. These methods should be approached in a way that helps promote a constructive and non-threatening environment. However, mandatory reporting of medical issues that affect flight safety should be encouraged.

Airlines should also engage in both preventive and routine mental health screening, evaluation, and record-keeping to ensure continued mental well-being.

Awareness Campaigns

It is important to normalize the receipt of needed mental health treatment and this must be reinforced via regular awareness campaigns and leadership endorsement. Airlines should effectively focus on creating a supportive culture where pilots can receive mental health assistance without any fear and hesitation. A holistic approach to educating and addressing pilot mental fitness issues offers the best opportunity for a positive outcome.

Accessibility

Civil aviation authorities should mandate airlines to establish a mental health department that is independent of corporate management. Efforts should be made in making treatment and information easily available.

Creating Supportive Atmosphere

The best strategy for minimizing the risks related to pilot mental fitness is to create an environment that encourages and is supportive of pilot voluntary self-disclosure. Airlines need to educate the pilot community on mental fitness for duty issues and ensure pilots experiencing such issues are cared for in a confidential, non-stigmatized, and safe environment.

Financial Support Program

Financial and career implications for professional pilots can be significant even for short-term medical disqualification and this is the prime deterrent stopping pilots from coming forward. To overcome this, stakeholders should establish a Financial Support Program where along with loss of income, medical insurance and loss of license should be provided.

Data Collection and Analysis

Line Operation Safety Audits (LOSA), Voluntary Reporting System (VRS), Fatigue Risk Management System (FRMS), etc along with routine surveys should be conducted as part of the Safety Management System (SMS) to identify the present status, initiate or update corrective actions and identify the trend to develop preventive solutions.



How Can the Industry ● Mitigate Risk?

When to see a psychologist?

Any persistent feeling of worthlessness helplessness and hopelessness should not be present for more than two weeks. Symptoms like sweating, palpitations, sleep disturbance (possibly insomnia), poor diet, choking and shortness of breath that occurs frequently, before or after flying willalso require a consultation with Mental Health Professional.

Mindfulness: Mental Health Training

To stay resilient in times of stress is as important as technical skills. Pilots need an absolute amount of mental readiness to perform under pressure and to do so, mental training is required. This training should focus on enhancing the pilot's ability to cope with stress and develop a mental toolbox that can be readily used when presented with a situation. Mindfulness Training is one such method that works immensely well for pilots.

Mindfulness is simply about being present in the present moment without judging it. The sutra of mindfulness says "when walking, the practitioner must be aware that he is walking. When the practitioner is sitting, he must be conscious that he is sitting. No matter what position one's body is in, the practitioner must be conscious of that position. Practicing thus, the practitioner lives in direct and constant mindfulness of the body". The practitioner should be conscious of each breath, each movement, every thought and feeling that comes across his mind, and everything that has any relation to the present state of the body.

Research in neuroscience suggests that the more aware you are, the more resilient you are to stress. The whole focus of the practice is to take control of the fight and flight response of the body and manage the anxiety produced due to hyperactivity in HPA Axis in the brain regions. Practicing mindfulness lessens the inflammatory response in people exposed to psychological stressors. This practice dampens the activity in the amygdala and increases the connections between the amygdala and prefrontal cortex. The connections thus developed create an automated relaxing response when a surprise occurs and facilitates the recovery post the occurrence of a stressful event.

Additionally, Performance training should be practiced to develop additional mental skills so as to overcome performance-related stress. These include interventions like Cognitive restructuring, behavioral rehearsal, and assertiveness training. All of these techniques are mixed with core technical training to enhance the ability to deal with job-related performance pressure.



Conclusion

Everyone has mental health, and it doesn't have to be diagnosable conditions like depression or anxiety. As we navigate our daily lives, external or biological factor can degrade our mental well-being. As the work-life balance slides, mental health disorders are on the rise and continued stigma causes people to suffer in silence (in extreme cases leading to public safety situation). As the early signs are very subtle, most of us don't realize until it reaches the threshold where our daily lifestyle is affected. Nevertheless, it is important to seek therapy as early as possible. Increased investment is required from regulators, operators and health organizations. Campaigns have to be launched for mental health awareness to increase understanding and reduce stigma; for efforts to increase access to quality mental health care and effective treatments; and for research to identify new treatments and improve existing treatments for mental disorders.



ABOUT THE AUTHOR

Aishwarya Agicha is a Licensed Clinical Psychologist. A Ph.D. Scholar and an attendee of the International Summer School on Aviation Psychology, she has over four years of work experience in providing expert psychological services to a wide variety of clientele in both IP and OP settings. Her main research area surrounds the field of cognitive, clinical, and aviation psychology. She has expertise in the area of Psycho-Diagnostics, Neuro-Psychological Assessment and Profiling, IQ Assessment along with Personality, Behavioral and Emotional Assessments. Over the positions she has held, she has demonstrated her effectiveness in need-based therapeutic services including Cognitive Behavior Therapy, Psychodynamic Therapy, Family and Marital Therapy, Play Therapy, and other tailored evidence-based psychotherapy techniques including Mindfulness, Acceptance, and Compassion based approaches such as DBT. She is passionate about working with Aviation Crew and looks up to enhancing Mental Training programs for Pilots. Aishwarya is married to Vaibhav who is a Senior First officer on B787 and they both reside in Doha, Qatar.



India's First Female Offshore Captain

Rising above the Invisible Barrier



Mayuri Deshmukh
Captain AS365 N3





Although we are familiar with the oil and gas industry, very rarely do we come across pilots who fly in the Off Shore! What is more remarkable and inspiring is to discover a female pilot flying in this unexplored and unusual sector. Today we'll be riding along with Capt. Mayuri Deshmukh, India's first female offshore captain and delving a little more into this fascinating and unique field of aviation.



JOURNEY

My journey into flying began in 2008 when I went to Florida, the USA to pursue my Commercial Pilot's License (Helicopters). It was always my dream to fly the rotary-wing. The inspiration came from my father, a Helicopter pilot himself, who I used to watch take-off and land every day across the runway and from whom I used to hear exhilarating stories about going to the remotest places and his experiences of flying in the tricky terrains.

After struggling initially and working in ground operations for a while, I got my first flying break after joining a reputed corporate company. I enjoyed the overall tenure and it was quite a comfortable job but the limited flying was holding me back from exploring my dream of acquiring varied experiences in helicopter flying. So, my real journey as an aviator started in 2015 when I joined Pawan Hans Ltd. My first exposure to the hills in the North East was in the hills of Upper Shillong, I still have the picture of the golden rays falling on the ridges etched in my mind. After that my journey grew further richer by flying pan India, sunrise to sunset, ferrying aircraft from the corners of India to the most unexplored and remote terrains of the Northern plains. Flying over the Islands of Lakshadweep and Port Blair was a beautiful experience always.

My further journey which was the most exciting part for me was when I was taken up into Offshore. I was apprehensive whether as a female pilot I would be inducted since flying Offshore was a complete male bastion. Accommodation, association with other pilots, and acceptability were all a cause of consideration in my mind. But thanks to the people in organizations like Pawan Hans and ONGC, who set the bar differently, I was rather welcomed happily and I could make an entry into this novel field of flying. After this significant step, there was no looking back, despite the struggles.

I joined Offshore as a co-pilot in 2016. The next aim was to become an Offshore Captain, the process for which is long drawn and arduous and requires a lot of patience and hard work. It involves thorough training because the nature of work is complex. In that sense, it was an accomplishment for me personally when I got my fourth stripe.

Becoming an Offshore Captain is as much a dream come true for me as it was becoming a Helicopter pilot. It is indeed one of the most challenging sectors to fly. Like any other profession, the task which lies ahead doesn't get any easier, it is an important milestone but maintaining an approach for safer skies does entail putting in continuous hard work.

Off Shore as an industry

Offshore flying refers to the transportation of passengers and cargo between the mainland and offshore oil rigs and platforms. Helicopters are the industry's workhorse, delivering employees to and from projects. Crew change and production, which entails replacing personnel and material for maintenance and repairs, emergency evacuation, and search and rescue missions are the most common tasks.

Offshore ops in India are divided between the West Coast and the East Coast. West coast operations are to Mumbai High, the largest oil field in the Arabian Sea. It houses all the major platforms, rigs, and floaters in the field. East Coast operations cover the Godavari Basin in the Bay of Bengal.

Due to the high entry barriers set by the customer, getting contracts for offshore can be fairly difficult due to the risks and complexities involved. There are several regulations that focus on operations, pilot qualifications, and the equipment used. Pilots must undergo extensive training. Before they are deployed offshore, they must pass multiple competency tests. Similarly, there are vintage provisions and rigorous maintenance monitoring for helicopters to suit operations.





Challenges and risks

Since the domain of flying is over the sea, offshore operations can have their own set of risks. Although the safety record is excellent, accidents and fatalities do occur. There is no room for complacency when it comes to offshore helicopter safety, especially given the harsh conditions in which they operate. The following are the primary challenges:

Nature of helidecks

Landing and taking off over helidecks are the most difficult obstacle for a helicopter pilot on Offshore because they are floating or semi-floating in nature. Because the platforms are situated in the sea, they are not as stable as helipads that are located on land. Everyday challenges include obstructions, gusts, hot gases, restricted deck size, and up to 50 takeoffs and landings daily.

High Humidity and Temperature

The passenger-carrying capacity of helicopters is limited due to weight limitations. Most offshore helicopters do not have air conditioning to avoid incurring a weight penalty. Because the weather is hot and humid for most of the year, the fatigue level of pilots assigned to production tasks increases exponentially.

Ditching

Ditching is defined as the controlled emergency landing of a helicopter on water. Since offshore operations are performed over long distances and in an often hostile

environment over water, events and emergency situations may arise which require immediate ditching.

Psychological and Physiological Exhaustion

The degree of physical and mental weariness is quite high. The flight commitment can last for up to two hours or more, with multiple landings. Landings and takeoffs are manual, repetitious, and fast-paced, whereas only cruising flights are automated.

Rapidly changing meteorological conditions/Monsoons

Offshore flying is very challenging during monsoons. Low-level clouds, reduced visibility, and heavy rain or storms can all make flying challenging. Furthermore, the pitching, rolling, and heaving experienced while landing on floating decks necessitates a high level of flying skill and accuracy.

Life at the platform

The contracts require staying overnight at platforms, and while efforts are made to increase comfort, it does become a little restrictive in nature. Except for emergencies, there is no mobile network or internet access. Because the levels are stacked on top of each other, one must constantly climb and descend multiple staircases.

Since its inception, there has been a consistent effort toward making offshore operations safer. In recent years, DGCA has made considerable efforts to improve operational safety by introducing enhanced Flight Duty Time Limitations (FDTL), routine audits, and high training requirements. Better ground installations and airborne equipment with modern landing systems are being mandated to orientate the overall approach to safer operations. The oil platforms have been equipped with weather observation and reporting stations, navigation aids like Automatic Direction Finder (ADFs) and Helicopter Approach Path Indicator (HAPIs), a control room, and cameras. Besides DGCA, the customer also lays down a further comprehensive training program that is binding to the companies. Overall, a lot of efforts go into making offshore operations safer. Systems have improved over the years. The inherent risks associated with doing repetitive tasks in physiologically challenging demanding environments continue to be a challenge.

Offshore captaincy involves one of the highest training standards in the helicopter industry. The syllabus laid down currently by the customer requires extensive training as a pilot under supervision. An Instrument Rating is mandatory and there is also a requirement to operate a minimum of three monsoons before getting released to fly offshore. Pilots also have to undergo night training so as to prepare for any emergency situations. Helicopter Underwater Escape Training and ditching procedures are a part of the syllabus and are renewed from time to time. Indian oceanic routings are structured and well laid out in conjunction with Mumbai Air Traffic Services and Juhu Air Traffic Controller. They have been made keeping in mind the separation between scheduled and Non-Scheduled airline operations from Santacruz airport and helicopter operations at Juhu. The Kilo routings are specially designed for helicopter operations systematically to lead west towards Offshore fields. The operations are primarily VFR and special VFR from sunrise to sunset. There is Night Ambulance that is on constant standby for casualty evacuation at Mumbai High.



How does the industry mitigate risks?

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How to join?

Due to a lack of interest and readily available candidates from the armed forces, India currently lacks a commercial helicopter training school. There are currently no cadet or operator-sponsored programs, as there are with the major airlines. Independent candidates prefer to train in the United States, Canada, New Zealand, Australia, or Southeast Asia. Following the receipt of the license, the candidate may apply directly to the operators. Vacancies are scarce, but so are applicants. With the continued growth of helicopter popularity, the industry will require more pilots in the coming years.

Life as an Offshore Pilot

The life of an offshore pilot has its advantages and disadvantages. Unlike airlines, helicopter operations in India follow an ON/OFF rostering pattern, with pilots working 6 weeks ON followed by 3 weeks OFF or 4 weeks ON followed by 2 weeks OFF. The majority of helicopter operations take place between sunrise and sunset, with only a small percentage of operations taking place at night. As a result, red-eye flights, as well as Ultra Long-Haul flights are extremely rare. So, while the rest part at night is an advantage, one has to be prepared for long hours of work in the daytime. Flying is almost every day from morning to evening. Offshore is like a second home for those on duty.

About the Author

I'm Capt. Mayuri Deshmukh from Pune. My father was a helicopter pilot in the Indian Air Force. I've watched him fly out of the most exotic locations that have planted the dream in me to fly this machine. My sister is an Airbus Captain with one of the leading commercial airlines. We are both fortunate to have found our source of inspiration at home, in my father, who has been a constant and a brilliant guiding force to us, and in our mother who has been our greatest support system.

The Ministry of Civil Aviation recently honored me for being India's first female offshore captain. I can't be more satisfied that I chose to pursue my dream which appeared impossible at first, but the will to persist and to be patient has taken me to a new path completely. Flying offshore can be a very rewarding experience that improves your skills and overall cockpit management. It is difficult due to physiological barriers but the rewards at the end of the day are well worth it. Being the only woman pilot flying in this sector currently, I do wish that more women come forward to join an industry that is unconventional and has its own challenges.





Amit Singh FRAeS
Captain A320



Generative Safety Culture in a long term perspective

"The first duty of business is to survive and the guiding principle of business economics is not the maximisation of profit – it is the avoidance of loss..."

Reducing incidents and ill health can have a direct effect on the bottom line. Studies published by Health & Safety Executive in U.K. have shown that 70% of the incidents at work are preventable by good management. Some leading companies go much further and regard all incidents, including 'near misses' as preventable. Examination of root causes during investigation bears out this view. Companies following a 'total loss' approach learn from the experience they gain in investigation and take steps to ensure that similar problems cannot recur. This is a positive way of bringing risks and costs under control when things have gone wrong.

Safety Culture



The term 'safety culture' originated in the investigation report following the 1986 Chernobyl nuclear accident. Subsequently the International Atomic Energy Agency (IAEA) refers to the multilevel model of culture that was developed by the distinguished management consultant and organizational psychologist Edgar Schein.

Safety Culture refers to the extent to which every individual and every group of the organization is aware of the risks and unknown hazards induced by its activities; is continuously behaving so as to preserve and enhance safety; is willing and able to adapt itself when facing safety issues; is willing to communicate safety issues; and consistently evaluates safety related behaviour.

Evolutionary model of Safety Culture

'Poor safety culture' has been identified among the causes of numerous high-profile accidents in other industries, such as the Bhopal gas tragedy, fire at King's Cross underground station; the sinking of the Herald of Free Enterprise passenger ferry, the passenger train crash at Clapham Junction, the disasters of the Space Shuttles Challenger and Columbia, the Überlingen mid-air collision accident, and the BP oil refinery accident.

There is no doubting the reasons for pursuing a strong safety culture or indeed the rewards for attaining this goal but the dilemma lies in the how and the challenging journey required to reach it.

As James Reason puts it so succinctly, 'few things are so sought after and yet so little understood.' The hard work and dedication to the cause are indicated when he goes on to state that 'a safety culture is not something that springs up ready-made from the organizational equivalent of a near death experience, rather it emerges gradually from the persistent and successful application of practical and down-to-earth measures.



The foundation and Survey

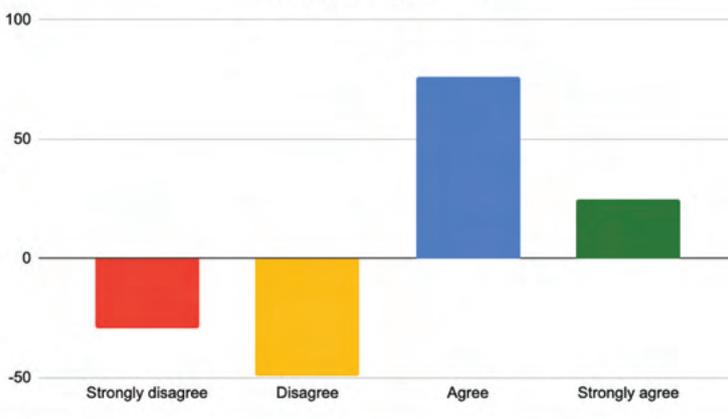
Safety Matters Foundation is a non-governmental organization based in India, with the main objective of establishing a generative safety culture wherein each stakeholder feels responsible for their own safety and that of the others. In order to achieve this, the foundation publishes well researched papers, articles and a human factor centric blog 'mindFly'. The foundation revisits the aircraft accident investigation reports from a human factor point of view, thereby fostering the human brain to think.

In a first, a Safety Culture Survey was conducted in 2020. The main objective of the survey was to assess the state of prevailing organizational safety culture in India. The results of the survey suggest that there is a positive safety culture in general, however there is a need to build trust through positive affirmations and improved communication amongst the stakeholders. Reporting culture will improve only if the reporter trusts that just culture is well established and will be implemented consistently.

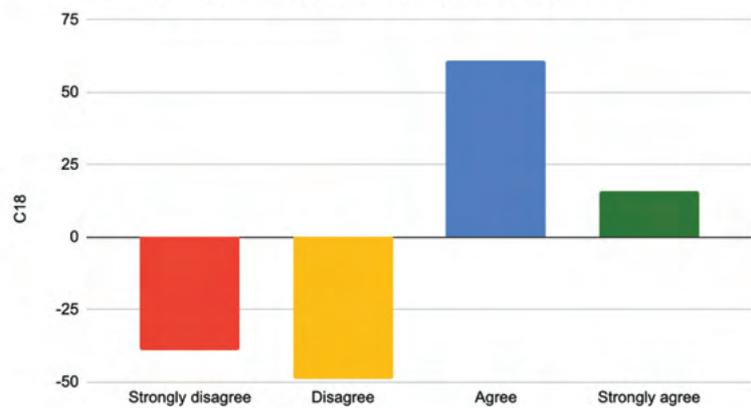
To a question on the corporate safety culture, if it was excellent and exemplary, the number of respondents in agreement with the question we're significantly higher than those who disagreed. There is however a need to convert those who display strong negative emotion on the overall prevailing safety culture. There are nearly 13% of the respondents who have chosen not to respond or a neutral emotion. The state and the organizations need to work together in a convincing manner to build a positive safety culture.

The management of the organizations need to reassess the prevailing safety culture by establishing a system of feedback and communication to build the employees confidence. A system which proactively seeks feedback and delivers the response in terms of action shows the genuine intent and enhances safety reporting culture.

Overall safety culture



Safety Concerns addressed by the State



The state too needs to respond in a timely manner to the concerns of the stakeholders. If issues are left open or not addressed, the confidence in the effectiveness of the system is lost and the reporting of important safety related issues drops. Investigations must be carried out in an open, fair and timely manner. Reports must be disseminated according to the defined timeline and feedback or criticism must be accepted in a positive manner.

There is a general sense of mistrust between the state, management and the stakeholders. The mistrust which is generated leads to the stagnation of the safety culture at a pathological stage. There is a feeling of resignation amongst the

respondents who have commented on the subject. The respondents have exhibited a negative emotion in general.

There are certain areas of strength and a few concerns. However, if the system does not proactively look for threats or address the issues of concern then the strengths are nullified due to the increased propensity to ignore warning signs and may buckle under pressure.

Fatigue

Fatigue is an area of concern for all respondents across functional areas and they have expressed the same very strongly. The respondents strongly disagree to the question if the employers have implemented fatigue management in their organisation. Fatigue is now a global concern and numerous studies have proven the ill effects of fatigue on safety at workplace if it is not managed systematically.

The Likert scale shows that respondents agree that compliance with safety requirements is viewed as essential in maintaining a good safety culture in the organisation (A9). Workers are aware of the organization's safety reporting system (C14) and that the safety training imparted to the workers is helpful to the practical working circumstances (D21).

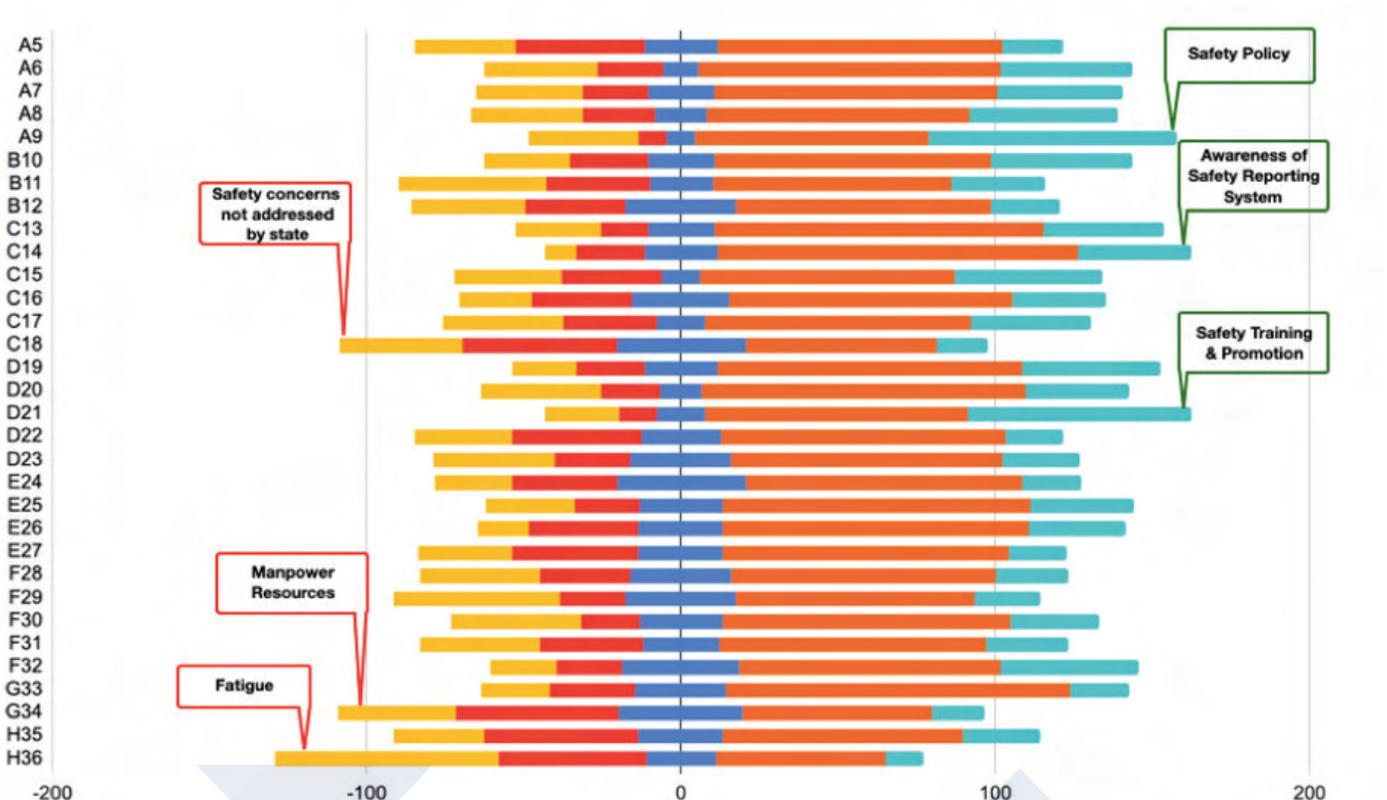
On the other hand, the key concerns or negative emotions expressed by the respondents are related to the processing of safety information and specific events. The respondents feel that enough resources and manpower are not dedicated to safety (G34) and Safety concerns once raised are not dealt with in a timely and comprehensive manner by the state (C18). This is further qualified by highlighting the biggest concern which is globally an emerging threat and risk to flight safety, that of fatigue. The respondents feel that fatigue management is not implemented by the employer (G36).

Corporate Support

Corporate support for implementing and maintaining safety culture needs to be enhanced. There is a general agreement that adequate manpower and resources are not put into safety.

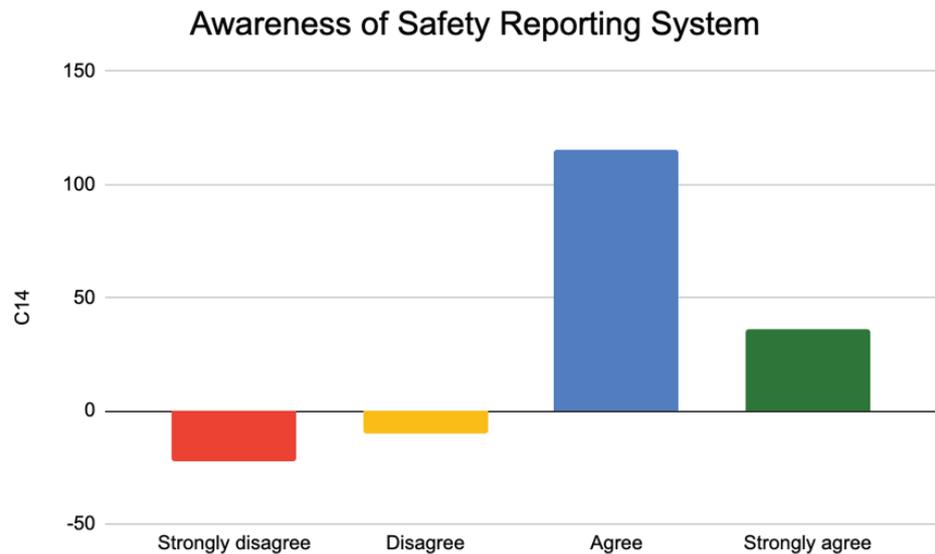
Key Enablers

Safety training and promotion is important for awareness of threats. The respondents are in general agreement that adequate safety training is carried out and that there is a method for communicating the lessons learnt from incidents and accidents. This enhances awareness level and preparedness to deal with surprises. However, flaws & inconsistencies in the investigation of accidents by the authorities and inherent delays in producing the reports has generated an atmosphere of mistrust.



System for Addressing Safety Concerns

There is a need to develop a method for differentiating between genuine error and an act of willful violation. The respondents have expressed their concern that key safety issues raised to the state regulator are not dealt with in a timely and comprehensive manner by the state. Effective Safety communication ensures that a strong reporting culture exists in the organisation. Clear instructions for reporting and the ease of reporting will ensure that reporters have no inhibitions. This process culminates with a thorough analysis and feedback to all stakeholders.



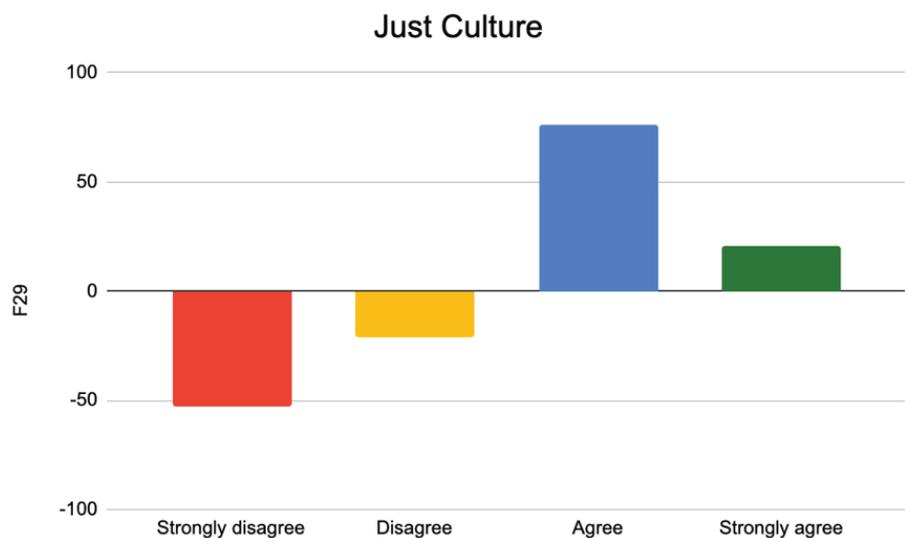
Accident Investigation

Accident investigation is a part of the safety management system. Accident investigations have been influential in the evolution of safety management systems. Lessons learned through accident reports have shaped and evolved safety science toward a better understanding of how accidents happen. Information sought by Safety Matters from the authorities has revealed that there is no documented process for effectively handling accident investigation recommendations. There is no follow-up and communication of key findings so much so that state personnel indicted for lapses are not held accountable through administrative action. Accident investigation reports are delayed despite the order for expedient investigation. Key evidence is manipulated and requests for reinvestigation go unanswered despite revealing substantial new evidence.

Just Culture

There is a strong negative response to this core question. Even though the number of respondents in agreement are greater than those not in agreement but the number of those who strongly disagree are significantly high. There is a need to be seen doing things inline with just culture and doing it genuinely. The practice of "walk the walk and talk the talk" is significant here.

Application of just culture by the regulator and the organisation is an important step towards generating trust amongst the stakeholders. The elements of safety culture are fostered through consistent application and feedback.



Conclusion

A great safety culture is when people continue to work safely and do the right things, even when no-one is watching. People in senior positions create an organisational climate which is open to criticism and fosters comments and feedback from all employees. In the words of Sidney Dekker, Professor of Humanities and Social Science, Griffith University, safety culture is a "culture that allows the boss to hear bad news". Every organisation has a safety culture, but not all are equally safe. In a generative safety culture, the awareness has permeated the organisation, from the boardroom to the casual contractors, and everyone thinks of safety and the work as inseparable. This is the zenith in a safety culture.

However desirous of this, most organisations operate at a reactive or a calculative stage of safety culture. Safety becomes a priority when an occurrence takes place and over a period of time, the organisation slips back to the pathological culture or move over to the calculative safety culture.

A commitment from the top echelons of the organisation is essential to drive the point home. Safety, when it becomes a way of life, seamlessly integrates into all processes thereby reducing the burden of being just another chore, to an essential element for survival of the business and people.

ABOUT THE AUTHOR



Amit is an aviation Safety & Training expert with over 35 years of airline experience. Amit is the founder of an NGO, Safety Matters Foundation which is dedicated towards establishing a generative safety culture in aviation.

Amit has been associated with IndiGo and AirAsia India where he headed Training and Operations/Safety respectively.

Amit is a Fellow of the Royal Aeronautical Society, UK which is the highest grade awarded to those who have made outstanding contributions in the profession of aeronautics.

Amit writes the human factors blog mindFly and has published papers on the subject which have been used as a part of airline pilot training curriculum.



Anil Goyal
Captain Q400-SpiceJet

Reducing Carbon Footprint Airports

The aviation sector is facing increasing pressure to clean up its act when it comes to climate change, but gas-guzzling airplanes aren't the only culprits. As airports expand, so too does their carbon footprint, with more energy required to power new terminals, ground transport vehicles, and the creation of infrastructure. Building capacity for additional aircraft can also create a backlash amongst environmentalists – see, for example, the frenzy over a potential third runway at the UK's Heathrow Airport.

Many airports across the world have therefore adopted greener elements into their designs and operation strategies, as well as subscribed to eco-friendly initiatives. The Airport Carbon Accreditation programme, run by Airports Council International (ACI), is helping more than 200 airports to manage their emissions, with the ultimate goal of carbon neutrality. In this article, we will find out India's most environmentally friendly airports and find out what elements of their design help them offset carbon emissions.

Airport Council International (ACI) has developed a simple tool to calculate Green House Gas (GHG) emission at and around the airport. Any airport regardless of size or in house expertise can use this at no cost with only readily available operational data to calculate GHG. Airport Emissions are divided according to ownership and control of the source:

- Scope 1**- emissions owned or controlled by the airport operator
- Scope 2**-emissions from the off-site generation of electricity and/or heating/cooling purchased by the airport operator
- Scope 3** - emissions owned or controlled by airport tenants and other stakeholders working at or around the airport



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The Airport Carbon Accreditation programme provides a unique common framework and tool for active carbon management at airports with measurable results. It covers the operational activities that contribute most to carbon emissions. It is site-specific and can be used at any airport as part of its daily environmental management activity and long term strategy as it helps to guide and support airport environmental management through a process of continual improvement and partnership with its airport stakeholders. Carbon mapping occurs when the airport has a policy commitment to emissions reduction and development of a Carbon Footprint for the airport's scope-1 and scope-2 emissions, which are under its control. Carbon reduction occurs when the airport shows a reduction in carbon emissions as compared to the base year. Four types of accreditation are provided starting from "Mapping, Reduction, Optimisation, and Neutrality". Beginning in 2009, the programme has made steady progress. The table below shows the comparative study of the number of airports accredited with respect to region and India.

In India, there are:

- 486 total airports, airstrips, flying schools and military bases available in the country
- 123 airports with scheduled commercial flights including some with dual civilian and army use
- 34 international airports.

Category	No of Airports World Wide	No of Airports in Asia Pacific Region	No of Airports in India
Mapping	98	7	Nil
Reduction	95	20	4 (Kolkata, Bhubaneshwar, Varanasi, Trivandrum)
Optimisation	57	23	Nil
Neutrality	63	7	4 (Bangalore, Delhi, Hyderabad, Mumbai)



While a commendable effort has been made by four public-private partnership airports that have achieved carbon neutrality the same cannot be said about airports solely operated by the Airport Authority of India (AAI). The Airport Authority of India should take it as a social responsibility and also as part of "Clean India, Green India" mission to have at least 30% of its airports in the Airport Carbon Accreditation programme in the next 2-3 years and reduce carbon footprint and energy consumption.

Environmental and sustainability projects implemented may include:

- Energy conservation initiatives, clean energy projects and circular economic initiatives to encourage all stakeholders of the airport to engage and contribute to good practice
- Strictly monitoring electricity and water consumption in the airport
- An integrated waste management system, targeted at zero landfill waste

About the Author



Anil comes with rich experience in military and civil aviation. In a career spanning 27 years and counting, Anil has flown more than 30 different types and is an accomplished experimental test pilot. He was the project test pilot on fighter aircraft upgrade and two indigenous prototype development project, SARAS and Intermediate Jet Trainer (IJT). His expertise lies in aircraft performance, stability and control, flying/handling qualities, avionics, certification, and airworthiness. He also has significant experience in Radars, Electro-Optical Sensors, Communication systems, Displays, HOTAS and Controls, Human-machine interface, Navigation system, Datalink system, and Electronic warfare.

Anil is also a Qualified Flying Instructor with a wide experience of training ab-initio to experienced operational pilots. Anil retired from IAF in 2016 after 23 years of service. He is presently working with SpiceJet Airline as a Line Captain.

Operational safety under IFR Helicopter Operations



Capt. Peeush Kumar
TRE H145



Takeaways from this article are intended for helicopter operations in general, irrespective of engine configuration or crew stations (single/multi). A proposition to embody flight safety traits of IFR (Instrument Flight Rules) framework through 'Low and Slow' helicopter attributes is attempted in succeeding paras towards a safer operational ecosystem.

Available tools of IFR structure, enhanced situational awareness in contemporary cockpits, reduced cockpit workloads and proven reliability of machines are consolidated to augment flight safety. The emerging picture also offers an optimised commercial space through industry growth. Finally, ensuing proposal entails implementation of 'Point in Space (PinS)' procedures and acceptance of 'Single Pilot' operations under IFR (SP-IFR) for helicopters. It may be however known that option for SP-IFR already exists for aeroplanes in Indian airspace.

Bringing life to aforesaid elements merits a glance of helicopter operational environment in differentiation with aeroplanes. This approach helps alignment of context for better acceptability of stated proposals.



Challenges of Helicopter Operations

Bane of helicopters is identical for single and multi-engine helicopters, but substantially varies from a usual fixed wing operational environment. Helicopter operations, routinely under non-scheduled/general aviation category are characteristic of lower enroute altitudes (usually < 9500ft AMSL), involve 'direct routing' for destinations (non-ATS routing), have limited endurance, with most operations under VFR from heliports/helipads [1] in uncontrolled airspaces (Class G). The typical operational environment renders exposure to terrain, human-made obstacles, weather - poor visibility/low cloud base in particular, other helicopter traffic (VFR traffic isn't mandatorily separated by ATS in uncontrolled airspace) [2], flying through restricted airspaces (normally a non-impacting element for fixed wing traffic on ATS routes) and limited two-way communication with airspace controlling/advisory/information units [2]. Such usual 'by-products' of low altitude operations of helicopters is indeed rare for fixed wing operators.

Steered by commercial returns, general orientation of aviation operational support is structured for fixed wing operations. As an apparent consequence, the lowest altitudes to fly for receiving satisfactory ground based navigational signals or a continuous two-way radio contact (both are based on 'line of sight' ranges) are frequently higher than usual altitudes employed by helicopters. Not receiving signals from radio based navigational aids, or a discontinuous two-way radio contact are typical challenges for navigation and communication. Similarly, meteorological forecasts limited by existing locations of AMOs/MWOs (Aviation Meteorological Office/Meteorological Watch Office) located at aerodromes have restricted relevance for helicopter operations in far-off uncontrolled airspaces.

Attributed to this distinct ecosystem, employing a 'Broad Brush', fixed wing templated procedures to organise helicopter operations, naturally proves sub optimal. In context of 'slower speeds', visualising a helicopter undertaking instrument approach procedure into a high traffic density airport like Mumbai/Delhi, thereby forcing fixed wing traffic to 'Hold' back awaiting its landing, should be self-explanatory.

Lower operating altitudes are typical to helicopter operations irrespective of a single/multi engine configuration. Accompanied with poor visibility conditions/low cloud base, these turn critical against obstacles and terrain even during enroute phase, with most vulnerability during approach and landings.

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IFR structure presents a guaranteed safety environment for approved crew & flying machines. Reminders of helicopter safety are reiterated through unfortunate accidents and must be addressed at organisational levels. Executive/Operational level initiatives remain localised and short lived.

Inherent safety of operations under IFR must be utilised to facilitate frequent, higher intensity of helicopter operations under IFR. In enroute phase of a flight, DGCA permits flying using minimum IFR altitudes [3] as a realisable alternative to ATS (Air Traffic Service) routes; a reasonable alternative for helicopters. Connecting terminal airspaces through 'ATS route' structure is although a routine pattern for air traffic controllers handling aeroplanes; accommodating abovesaid minimum IFR altitudes for 'direct routing' (Non ATS routes) of helicopters under IFR, however, may need cooperative agility. During approach and landings, the unique alternative of low speeds (70-90kts approx.) amongst helicopters is an advantage for direct manoeuvring to final approach track with minimum disruption to traffic flow. Similarly, a 'low-speed' quick 'climb-out' may reduce traffic delays in terminal airspace. Such flexibility of procedures should be adapted to absorb helicopter operations under IFR as much as practically feasible.

At the organisational level, under proposed initiatives by apex Regulatory Authority (DGCA) and Air Navigation Service Provider (AAI), if implemented, shall facilitate flight safety and long-term perspective growth of helicopter industry. Since a safe 'round the clock', all weather operational environment by helicopters is feasible only under IFR, industry growth also requires a reasonable capability increment for such operations. Implementing operations under IFR using PinS procedures and 'Single Pilot' operations under IFR are therefore placed as proposals below: -

Implementation of Point in Space (PinS) Procedures

Knowledge that these procedures have been specifically developed for terminal phase helicopter operations (arrivals, approach and departures), is a reasonable incentive for the umbrella objective of flight safety. Terminal phase operations at heliports can be linked with IFR route structure for 'direct routing' or through RNP 0.3 (Required Navigation Performance) routes in mountainous terrain, offering a seamless IFR structure for helicopter operations. In this realm, subject to consent of Ministry of Civil Aviation to introduce PinS procedures, an ongoing initiative may soon be realised to support flight safety and helicopters' industrial growth.

[More on PinS (Point in Space) at <https://www.indianrotors.in/viewtopic.php?t=538>]

Single Pilot Operations under IFR on Helicopters

While an option of SP-IFR for aeroplanes is already prevalent, it is disallowed for helicopter operations. Given contemporary helicopter cockpit capabilities, situational awareness, augmented information through portable devices, and precedence of regulations in the west, there is a little rationale in it being discounted for Indian helicopter operators. Primary objective of flight safety under IFR, industrial growth through increased availability of crew, and cost optimisation for operators, would be clearly assisted if this element is favourably considered by DGCA.

Facilitation by Air Navigation Service Provider (ANSP; AAI)

Traditional occupancy of aeroplanes in IFR structure has inadvertently biased traffic management against helicopter traffic in terminal airspaces. Specific IFR procedures for helicopters at airports may be promoted to minimise disruptions in scheduled traffic flow through flexibility of procedures. Under the aegis of AAI, Air Traffic Management (ATM) must be tailored to absorb PinS procedures at heliports in uncontrolled spaces to support helicopter operations under IFR as routine.





References and Notes

- [1] DGCA CAR, Definitions - Section 8, Series O (Parts IV & V) – ‘Heliport’ is defined official term, while helipad has been used colloquially.
- [2] AAI published AIP India, Par 1.4 of ENR 1.4 – ATS Airspace Classification
- [3] DGCA CAR, Para 5.1.2 of Section 9, Series C, Part 1, Issue II
- [4] DGCA CAR, Para 4.9 of Section 8, Series O, Part 2
- [5] DGCA CAR, Para 3.11.1 of Section 8, Series H, Part 2
- [6] EASA Easy Access Rules for Air Operations, Para (d), ORO.FC.200, section 2, sub part FC: Flight crew, Annex III (Part ORO)
- [7] FAA, Title 14, Chapter 1, Sub chapter G, Part 135, Para 135.99



ABOUT THE AUTHOR

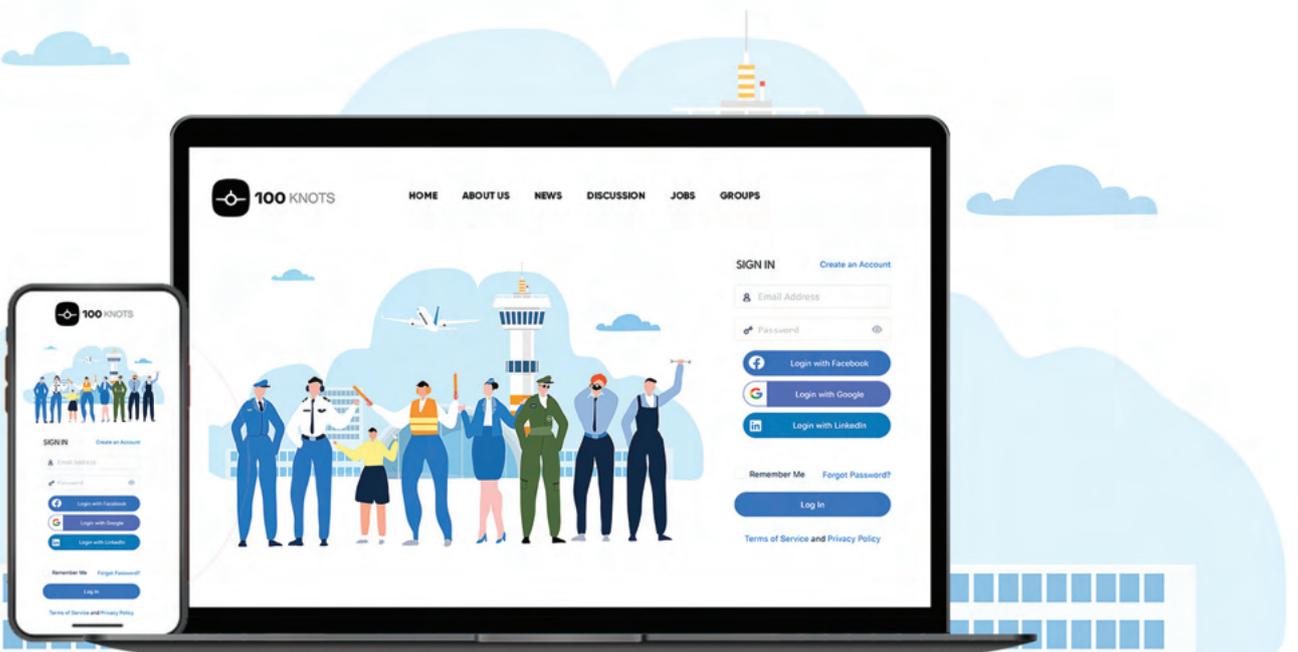
Capt. Peeush Kumar is a certified experimental test pilot for rotary wing aircrafts and a Type Rating Examiner on H145 (M/s Airbus) helicopter. Currently working for a non-scheduled category operator, he has a flying experience on more than 20+ helicopters and aeroplanes. His solo initiative @ IndianRotors.in has active support of Rotary Wing Society of India (RWSI). Presently pursuing PBN (Performance Based Navigation) based helicopter operations in India, Capt. Peeush can be reached at Peeush_Saini@yahoo.co.in.

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