In Search of Safer Skies

A Report on Aviation Safety

Researched, written and edited by

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2065 B.S.

Initiated and supported by

Society of Ex-Budhanilkantha Students (SEBS)

(In memory of Hemraj Bhandari who died in the September 2006 helicopter crash in Phale, Ghunsa)

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FOREWORD

The SEBS Initiative for Aviation Safety has its birth in the pain, anger, and grief following the helicopter crash in Ghunsa in September 2006. Many well-known personalities and leaders of Nepalese society lost their lives in that accident including Harka Gurung, Chandra Gurung, Tirtha Man Maskey, and State Minister Gopal Rai. Our friend and valued SEBS-member, Hem Raj Bhandari, perished alongside these luminaries covering their conservation efforts in Taplejung for Nepal TV.

Our primary mission in undertaking this initiative is to raise awareness about the appalling conditions within Nepal's civil aviation sector, which have led to increasing frequency of air crashes in the country over the past few decades. Through our efforts, we hope to inspire the entities active in the sector to make improvements and bring the operating conditions to international standards.

Since this initiative is dedicated to the memory of our beloved friend, Hemraj Bhandari, who was a budding journalist himself, the initiative is also aimed at promoting investigative journalism in Nepal. It is our aim to utilize investigative journalism to study and evaluate the conditions prevailing in Nepal's civil aviation sector and to ultimately deliver the findings to the general population as well as to concerned authorities and agencies.

As part of this initiative, investigative journalist Mr. Toya Dahal has put together the jigsaw bits and pieces from various sources, including official investigation reports following previous air accidents, and constructed for us a coherent picture of the pertinent issues surrounding aviation-safety in Nepal. He has put extra-time into preparing this report while continuing his normal duties as a reporter in Kantipur. Similarly, the SEBS members of this group have selflessly contributed their time, money and ideas in helping Mr. Dahal complete this report.

As we commemorate three years of that tragic accident in the mountains of Ghunsa, we can only hope that these efforts will lead to tangible improvements in aviation safety in Nepal. It will certainly lay the foundation for further research and informed reporting on the topic. As it has been written for the general reader and made easily accessible from the web (www.aviationsafetyinnepal.com and www.sebsonline.org), we hope it will lead to a heightened awareness of the importance of aviation safety measures among consumers of air-services in Nepal.

It is always easy to pass the buck on to the government, the Civil Aviation Authority, and the airline operators for their neglect of aviation safety. But as consumers of airline services, it is our responsibility too to be informed about this issue and try to effect positive changes in it. We thus invite everyone to read this report and take its lessons to heart. We request journalists and media-houses to disseminate the findings of this report to all corners of the country.

In particular, this report clearly states that, among other reasons, the Ghunsa helicopter crash took place due to undue pressure from passengers aboard the ill-fated MI-17 to fly in inclement weather. This should give us reason to pause: the Shree Airlines helicopter that crashed into the mountains of Ghunsa carried some of the best brains in the country. Yet, when explicit or implicit pressure was applied on the pilot to take off into the ominous clouds no one thought it worth their while to let flight safety, rather than other imperatives, be their overriding concern. What does this say about awareness of aviation-safety in Nepal? Next time we board an aircraft in the misty mountains of Nepal racing towards our next appointment somewhere else, this should make us wait and think: are we fulfilling our roles as responsible passengers with due regard to the safety of all others on board? Moreover, as Toya Dahal bravely points out, the official investigation committee report makes no mention of this "passenger-pressure" factor at all! How long will the culture of covering up the truth by placing the blame on a dead pilot continue?

These are a few things, we feel, that should prick our conscience as simple consumers and lay citizens. Improvements in aviation safety can only come when

consumers themselves are fully aware of it and demand it from the operators and the government authorities. This awareness can only come if consumers themselves make the effort and if the national media provides this issue the coverage it deserves.

Inevitably, there is much to be desired on the part of the operators and regulators too. We hope this report will help them to identify and implement important improvements in the sector. Living as we do in the Himalayas, where mountainous terrain and monsoon clouds make flying a naturally hazardous task, improvements in weather-monitoring stations and flight-equipment to suit those conditions seems is one such important lesson.

Other causes of poor flight-safety and recommendations for improvement are contained within these pages. We end our short foreword with these few words, and hope once again, that the lessons from this investigative work will be taken up with the urgency that they deserve.

The SEBS Initiative for Aviation Safety Executive Team

(Abhishek Basnyat, Arun Adhikary, Bhaba Thami, Bipasha Rai, Dechenla Sherpa, Kapil Mishra, Subash Manandhar, Upendra Bom)

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Summary

Many fatal air accidents have occurred over the last two decades of the six-decade-long history of aviation in Nepal. In the 1990s, after the government adopted a liberal aviation policy, the government-owned Nepal Airlines Corporation's monopoly over the aviation sector came to an end. But the emergence of private sector did not prove to be very fortunate. Although competition grew as the number of aircraft increased, the number of accidents soared because many of the airline companies did not pay adequate attention to flight safety.

It has become apparent that satisfactory efforts have not been implemented on an on-going basis to make Nepal's civil aviation sector free from danger and risks. The Civil Aviation Authority (CAA), which is primarily responsible for flight safety, has resorted to temporary and ineffective measures. Instead of pressuring airline companies to correct the mistakes that have already come out in public, the CAA remains silent in case its own weaknesses come to light. As a result, air mishaps have continued to increase and the accident investigation commissions give the same recommendations to the Civil Aviation Authority to correct the same mistakes time and again.

In one case, the CAA did not even respond clearly to the queries of the Ministry of Tourism and Civil Aviation as to whether the recommendations of the accident investigation commission had been implemented (See page 10). This too shows that the CAA is not serious about flight safety.

The Commission for Investigation of Abuse of Authority had recommended that airline operators be removed from the CAA operators' committee that oversees the operation of air services because their presence in the committee can influence the implementation of aviation safety regulations. The corporation has not even implemented this recommendation.

Airline operators were found to be taking advantage of the weaknesses of the CAA, which is responsible for overseeing flight safety and implementing policies, by flying aircraft that have technical weaknesses (for example, Air Ananya chopper crash in Mimi, Humla) and not hesitating to take risks to make profit. Their insistence on flying in bad weather has also caused accidents like the Shree Airlines helicopter crash in Phale, Taplejung. According to many reports of the accident investigation commimission, several accidents have taken place precisely because pilots defied the rule of not flying in bad weather.

There other factors for the rising number of accidents. Nepal has a difficult terrain; despite the awareness of the quickly fluctuating weather, airports here lack modern equipment for collecting and disseminating adequate information to minimise risks; necessary technology has not been installed in old model aircraft.

There is rampant disregard for rules and regulations. The reports of the investigation commission point out that airline companies have not been paying attention to flight safety due to inadequate human resources and the lack of monitoring technology and capacity in the CAA's aviation safety department.

SEBS has prepared this report with the objective of studying the state of Nepal's aviation safety and providing recommendations for addressing its weaknesses. The report discusses various factors that lead to accidents and includes many of the findings of the accident investigation commission. It has been found that simply implementing the commission's recommendations for flight safety would significantly reduce accidents.

In Search of Safe Aviation

The concept of aviation safety developed with the expansion of civil aviation and the challenges that came with it. Initially, human and technical factors were almost equally responsible for accidents. According to the International Civil Aviation Authority, 80 per cent of accidents across the world now result from human error and 20 per cent from technical error. The prevalence of equipment-related accidents in this age of technical sophistication indicates a serious challenge for aviation safety. Moreover, due to the limited expansion of roads and the difficult terrain of the country, air route has become a reliable means of transport in Nepal. The frequent occurrence of air accidents is hence a grave problem. This is a serious and unfortunate aspect of aviation in Nepal. Government and non-government sectors, concerned agencies and consumers should make a concerted effort to make the Nepali skies safe for flight by addressing the technical and human errors that cause accidents.

1 Tragic history

The emergence of modern aircraft has made the subject of aviation safety increasingly important. Air transport was introduced in 1903 after Orville and Wilbur Right built a modern aircraft. But within five years of their invention, their aircraft also met with an accident. On 9 September 1908 when an aircraft flown by Orville had reached an altitude of 100 feet, a section of its wing came loose. As a result, the aircraft became unbalanced and fell to the ground. Orville, one of the builders of the aircraft, was seriously injured in the accident. His ribs and legs were broken. An American lieutenant named Thomas Selfridge, who was also on that flight, was killed. This was the first ever plane accident. Since then many tragic accidents have occurred in the history of global aviation. Based on the lessons learnt from these accidents, billions of dollars have been spent and extensive research and testing have been carried out to make air travel free from accidents. But air accidents have not been eliminated completely.

1 A
History of Aviation in Nepal

The first aircraft landing in Nepal took place in 1949. The plane that landed in the cow pasture of Gaucharan, where the Tribhuwan International Airport is now located, was of Indian Ambassador Sarjit Singh Mahathia. In 1950 an Indian airline named Himalaya Aviation started charter flights from Kathmandu's Gaucharan to Calcutta. Soon flights from Kathmandu to Indian cities like Delhi, Banaras and Patna also started.

Domestic flights to towns like Pokhara, Bhairahawa, Simara and Biratnagar also started in the 1950s. Many other towns could not be accessed by road at the time. In 1958 the Royal Nepal Airlines Corporation was established. After that commercial flights began to operate in Nepal. The number of international airline companies that flew in the Nepali skies gradually increased. Within a short period of time several airports were built in both remote and easily accessible areas.

1B
The On-Going Accidents

The happy beginning of aviation in Nepal did not last long. On 5 March 1955 a Kalinga Air aircraft crashed in Simara. Two persons lost their lives in the accident. This was the first air accident that took place in Nepal. Again, in 1956 fourteen people lost their lives when an Indian Airlines aircraft crashed in Kathmandu. This was the second air accident in Nepal. On 5 November 1960 four people were killed when a Nepal Airlines Corporation aircraft crashed in Bhairahawa. Both the number of aircraft and the occurrence of accidents in the Nepali skies have been rising since. To date five dozen aircraft have met with accidents in Nepal. More than 500 people have lost their lives in these accidents. (See list of accidents.)

1 C
List of Accidents

s No	Date of accident	A/c Reg	Type of A/c	Operator	Place of accident	Fatality	Survival
1	8/3/1955	VT-AZX	Dc-3	Kalinga air	Simara, Bara	02	01
2	15/05/56	VT-DBA	Dc-3	Indian Airlines	Kathmandu	14	19
3	24/03/58	VT-CYN	Dc-3	Indian Airlines	Patnebhnajyang	20	None
4	05/11/60	9N-AAD	Dc-3	RNAC	Bhairahawa,Kapilbastu	4	None
5	01/08/62	9N-AAH	DC-3	RNAC	Tulachan Dhuri	10	None
6	12/07/69	9N-AAP	Dc-3	RNAC	Hetauda, Makwanpur	35	None
7	27/02/70	9N-RFP	Dhc-6-100	VVIP	Jomsom,Mustang	01	04
8	13/09/72	9NRF10	Dc-3	VVIP	Dhulikhel, Kavre	31	None
9	10/05/73	HS-TGU	Dc-8-33	Thai Airways	Kathmandu airport	1	110
10	15/10/73	9N-ABG	Dhc-6-300	RNAC	Lukla, Solu	00	06
11	31/3/75	9N-AAZ	PC-6	RNAC	Baudha Kathmandu	5	None
12	27/12/79	9N-RAE	alloutte-111	VVIP	Langtang, Rasuwa	6	NOne
13	30/10/81	9N-ABJ	PC-6	RNAC	Biratnagar, Morang	10	None
14	22/12/84	9N-ABH	DHC-6 Twin otter	RNAC	Cheklatidanda	15	8
15	02/05/86	9N-ABI	DHC-6 Twin otter	RNAC	Sanfebagar Airport Achham	None	
16	19/8/87	9N-ABB	DHC-6 Twin otter	RNAC	Dolpa	None	
17	9/6/91	9N-ABA	DHC-6 Twin otter	RNAC	Lukla Solukhumbu	None	
18	28/6/91	9N-ABS	DHC-6 Twin otter	ATSC	Simikot Humla	None	
19	31/07/92	HS-TID	Airbus-310	Thai	Ghyangphedi	113	None

				Airways			
20	26/09/92	9N-ACI	Y-12	Nepal Airways	Lukla, Solu	None	
21	28/09/92	AP-BCP	Airbus-310	PIA	Bhattedanda Lalitpur	157	None
22	/ 04/ 93	9N-ACK	Bell_206	Himalayan Helicopter	Langtang Rasuwa	None	
23	08/11/93	9N-ACS	Y-12 II	Nepal Airways	Jomsom, Mustang	None	
24	31/07/93	9N-ACL	Dornier-228	Everest Air	Solighopte	18	None
25	14/01/95	9N-ABI	DHC-6 Twin otter	RNAC	Kathmandu Airpot	2	23
26	15/07/95	9N-ADB	Y-12	Nepal Airways	Bharatpur, Chitawan	None	
27	24/01/96	9N-ADM	MI-17	Nepal Airways	Sotang	None	3
28	25/04/96	9N-ABR	HS-748	RNAC	Meghouli,Chitwan	None	
29	28/07/96	9N-ACC	DHC-6 Twin otter	ATSC	Simikot, Humla	None	
30	23/12/96	9N-ACF	Y-12	Nepal Airways	Dolpa	None	
31	30/09/97	9N-AEC	AS-350 Ecureuil	Karnali	Thupten Choling	1	4
32	13/12/97	9N-ADT	MI-17	Gorkha Aiarlines	Kalikot	None	
33	04/01/98	9N-ARL	Bell-206	VVIP Flight	Dipayal, Doti	None	
34	21/08/98	9N-ACC	DHC-6 Twin otter	ATSC	Chucheli Kharka	18	None
35	24/10/98	9N-ACY	AS-350B Ecureuil	Asian Airlines	Mulkharka	3	None
36	20/11/98	9N-ABK	PC-6/B2-H4	RNAC	Phakding	1	None
37	17/01/99	9N-ADA	CessnaC-208	Necon Air	Jumla	5	7(2serious injuries)
38	30/04/99	9N-AEJ	AS-530BA Ecureuil	Karnali air	Lisunkhu,Sindhupalchok	None	
39	31/05/99	9N-ADI	AS-350B2 Ecureuil	Mnakamana airways	Ramechhap	None	
40	09/07/99	VT-HCI	Boing 727	Lufthansa cargo	Bandeshwar Hill, KTM	5	None
41	05/10/99	9N-AEG	HS-748	Necon Air	Ramkot VDC KTM	15	None
42	27/07/00	9N-ABP	DHC-6 Twin otter	RNAC	Dharampani Dada, Dadeldhura	25	None
43	02/12/00		Dornier-228	Ghorkha	Lukla Solu	None	1 enjuried
44	05/04/01	9N-AEV	DHC-6	Yeti	Tumlingtar,	None	12

			Twin otter		Shankauwasabha		enjuried
45	11/10/01	9N-ADK	MI-17	Air Ananya	Mimi, Humla	None	
46	12/11/01	9N-AFP	AS-350B Ecureuil	Fistail Air	Rara, Mugu	5	None
47	17/07/02	9N-AGF	DHC-6 Twin otter	Skyline	Gadgade Dada, Dailekh	4	None
48	12/05/02	9N-AGE	AS-350b2 Ecureuil	Karnali Ecureuil	Makalu Basecamp	None	
49	22/09/02	9N-AFR	DHC-6 Twin otter	Shangrila	Kristi Nachne Chaur,Kaski	18	None
50	28/05/03	9N-ADP	MI-17	Simrik Air	Everest Basecamp Solulhumbu	2	2 Serious 2minor
51	20/04/04	9N-AEE	BHA-751	Budda air	Trivhubhan int.. Airport	1	
52	25/05/04	9N-AFD	DHC-6 Twin otter	Yeti	Lamjura solu	3	None
53	30/06/05	9N-AEO	Dornier-228	Gorkha airlines	Lukla solu	None	13
54	02/07/05	9N-ADN	MI-17	Shree	Everest Basecamp solu	None	
55	04/01/05	9N_AGG	AS-350 Ecureuil	Air Dynasty	Those VDC Ramechhap	3	None
56	23/09/06	9N-AHJ	MI-17	Shree Airlines	Ghunsa Taplejung	24	None
57	07/05/06	9N-ADT	MI-17	Simrik Air	Dhaulagiri Base camp	None	None
58	21/06/06	9N-AEQ	DHC-6/310	Yeti Airlines	Jumla Airport	09	None
59	03/03/08	RA-27019	MI-8 MTV	UNMIN	Bethan Ramechhap	10	None

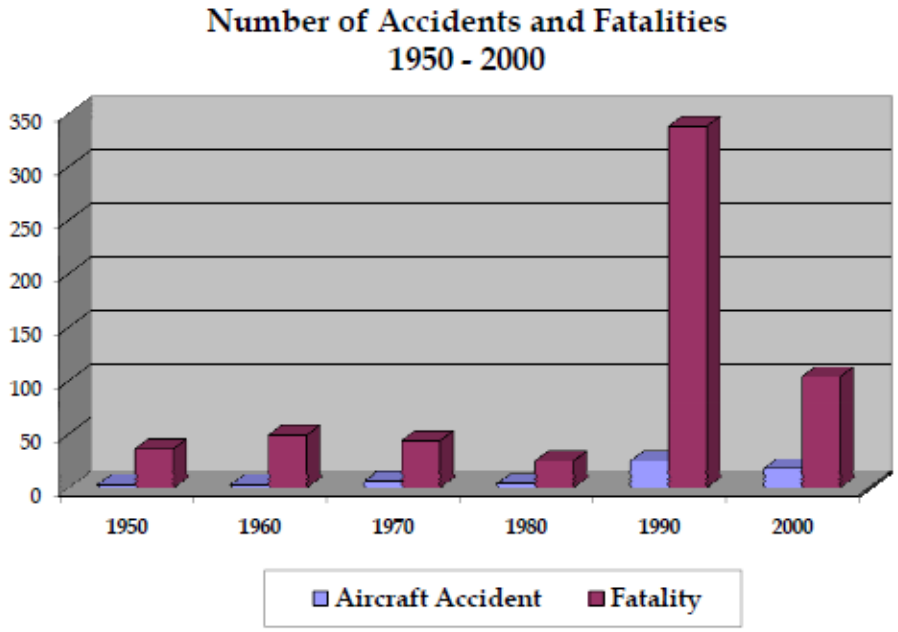
Source: Ministry of Tourism and Civil Aviation, Nepal Civil Aviation Authority, Dr Khagendra Bahadur Shrestha

Although the details and statistics for fatalities in these accidents are available, the details of economic loss are not documented. Insurance companies and airline operator companies do not publicise the facts about economic loss. One thing that can be concluded from the available statistics is that most accidents and incidents of danger have occurred after Nepal adopted a liberal aviation policy. The series of accidents reveal that the government's effort to regulate and strengthen aviation safety has not been effective. If we categorise these accidents according to the time period, we can see that most accidents took place after the 1990s.

Since Nepal adopted a liberal aviation policy in the 1990s, private airline companies were able to operate their flights in Nepal's air route. The number of aircraft rose exponentially in the following period. With the growth in the number of aircraft, air accidents have also been on the rise. However, according to one of the principles of the ICAO (International Civil Aviation Organisation), an aircraft by definition is technologically sophisticated and risk free, and

therefore, increase in the number aircraft does not necessarily increase the occurrence of accidents. However, in Nepal the growth in the number of aircraft and the rise in the number of accidents have been taking place simultaneously. See graph below.

Aircraft accidents and fatalities that have occurred every decade from 1950 to 2000



Since the adoption of a liberal aviation policy, 25 aircrafts were involved in accidents in the 1990s, killing 338 people. Between 2000 and 2008, eighteen aircrafts have met with accidents and 104 people have lost their lives. Since the 1950s an investigation commission has been set up after each accident. The commission has given plenty of recommendations for addressing technical and human weaknesses to prevent accidents from occurring again. Unfortunately, the Ministry of Tourism and Civil Aviation does not have most of the commission reports; it only has some that contain the commission's recommendations. In most cases, even Civil Aviation Authority officials who were in the investigation commission do not know where those reports are.

2 Various aspects of the accident reports

Even the Ministry of Tourism and Civil Aviation does not have the accident reports. Ministry officials who are responsible for overseeing the civil aviation sector do not know what was in the reports and what are the areas that need improvement. Most of the reports on the accidents that occurred before 2005 had suggested that a warning system should be installed in aircraft to avert risks by keeping aircraft technically sound. The reports suggest that there should be GPS and weather radar in the aircraft; there should be oxygen equipment while flying above the altitude of 10,000 feet; and the cabin crew should have necessary equipment including masks for flying at high altitudes.

The global positioning system (GPS) helps the pilot during flight by providing data on ground proximity and terrain. The weather radar gives information about the approaching weather and helps the pilot avoid the zone of bad weather.

The Civil Aviation Authority had formulated a regulation for installing this technology as early as the 1990s. But the regulation had not been implemented even after its term ended in 2000. The reports on the accidents of Nepal Airlines Corporation's Twin otter plane in Dharampani, Dadeldhura in 2004 and Shree Air's MI-17 crash in Ghunsa, Taplejung have also identified these weaknesses.

International rules on installing weather radar and advanced technology for giving a timely warning against difficult conditions have not been enforced in Nepal. ICAO's Annex 6 provides information on this. (ICAO Operation of Aircraft Part III Fifth Edition July 2001[1])

It is striking that the helicopter that crashed in Ghunsa had not even been designed for carrying passengers. Flying passengers in a cargo helicopter could be one of the causes of the accident. Passenger helicopters are of much higher standards in terms of safety and design. Also, such helicopters are twice as expensive as cargo helicopters.

The CAA pretends not to know even when all helicopter operators in Nepal have been carrying passengers in violation of international standards. The investigation commission report on the Shree Air MI-17 crash in Ghunsa suggests that only helicopters designed for carrying passengers should be used for passenger flights but it does not say whether the aircraft that crashed was a cargo or a passenger helicopter.

Recommendations have been made to the Civil Aviation Authority for addressing the human, technical and managerial weaknesses that have caused the accidents. In Poush 2064 Tourism and Civil Aviation Secretary Lilamani Poudyal sent a letter to the CAA asking which of the commission's recommendations have been implemented so far and which have not been implemented. But the CAA did not even send a written response to the ministry. Instead, it sent a photocopy of the commission's recommendations and some papers that provide no evidence of the implementation of those recommendations.

Senior ministry officials say, "The CAA does not seem to have implemented or have had others implement the recommendations." The accident reports have also clearly revealed that the CAA does not monitor aviation safety effectively. The report on the Yeti Air Twin otter crash in 2006 has also exposed the weaknesses of aviation safety.

One can imagine how risky the aviation sector is when the Civil Aviaiton Authority, which is responsible for making airline operators implement the recommendations for aviation safety, has itself not been active in following these recommendations. Due to the CAA's weaknesses, airline operators, who do not want to invest more in safety equipment to ensure a high standard of aviation safety, have had an easy time.

Aircraft Accident Investigation Report
Yeti Airlines Pvt. Ltd
9N-AEQ Twin-Otter DHC-6/310
Near Jumla Airport
On June 21, 2006

October 2006
Government of Nepal
2.10 Safety oversight system by Civil Aviation-Aviation Safety Department:

The manpower of Aviation Safety Department does not seem to have sufficient time to perform safety oversight functions of Nepalese registered air operators, as required by ICAO Annexes. The primary reason for this is increasing number of air operators, variety in fleet types and the limited number of flight operations inspectors (FOIs). Even from these limited number of FOIs, the inspectors are being deputed to perform regular flight duties at various airlines under various pretexts. This may have some influence on their ability to perform critical oversight of the airline operations owing to the conflict of interest introduced. Significant deficiencies were observed in different flight safety documents for Yeti Airlines like SOP, training manual etc. which again are indicative of lack of adequate supervision by CAAN even after they have been approved by CAAN. The lack of sufficient guidance in the form of Advisory Circulars (guidance material) to amplify various FOR requirements is resulting in varying interpretation of regulations.

Thus, the Flight Operations Division should also have suitable positions for adequately qualified personnel who can work on the oversight of flight safety documents that carry equal importance.

CAA Director General Yagya Prasad Gautam admits that airline companies have not implemented the recommendations of the commission. “Aviation safety is not the job of the CAA alone, it is also the responsibility of airline operators,” says Gautam. “On our part we have told them to implement the recommendations set out in the reports of the investigation commission.” This remark suggests that the body that formulates aviation safety law and is authorised to grant or deny permission to airlines based on whether or not they adhere to policies and regulations, is itself not serious about aviation safety. Let’s look at some of the facts contained in the report prepared by the commission that investigated the Yeti Airlines accident:

Aircraft Accident Investigation Report
Yeti Airlines Pvt. Ltd
9N-AEQ Twin-Otter DHC-6/310
Near Jumla Airport
On June 21, 2006
October 2006
Government of Nepal
3. Conclusions
3.1 Findings
……
11. The lack of crew coordination led to the increase of mental workload to the pilot flying.
12. The crew did not follow the appropriate approach and miss approach procedures that added to the cockpit workload.
13. Altercation between the flight crew before take-off at Surkhet could have contributed to the lackadaisical approach to monitoring of flight by the co-pilot throughout the flight.
14. The decision to make a sharp turn just before landing at a high bank angle caused the aircraft to stall.
15. The Captain continued with the sharp turn to align the aircraft with the R/W 27 centre line for landing while trying to avoid terrain and he did not react to the stall warning due to his fixation.
16. The stalled condition of the aircraft during the sharp turn without sufficient terrain clearance and prompt stall recovery initiation led to terrain contact.
17. Some aspects of Yeti Airline SOP for Jumla airport were ambiguous and this ambiguity had escaped CAAN's scrutiny during approval.
18. The Yeti Airlines flight crew training program did not sufficiently prepare the crew to deal with unplanned emergencies.
19. There was no indication of the co-pilot's objection or comment on the manner in which the overshoot was done.
20. The CAAN approved CRM training program at Yeti Airlines was limited to passive listening to the instructor and did not prepare the crew sufficiently for intervening incase of colleague's omissions or unsafe actions.
21. The Operation Department and Flight Safety Department of Yeti Airlines did not have effective means of monitoring SOP compliance by flight crews during various stages of flight.
22. The Operation Director, Chief of Flight Safety had been performing line flying duties of comparable to that of regular line pilot. Thus, they could not spare sufficient time to perform duties required of their positions.

2. A. Human Factor

Eighty per cent of aircraft accidents around the world are caused by human error. But study reports suggest that 95 per cent of air accidents in Nepal result from human error. Reports have identified human error as the cause of accidents even when the aircraft were flown by highly alert and experienced pilots. The report on the Skyline Twin otter crash at Gadgagade Danda of Dailekh in 2002 attributes the accident to pilot Bijay Giri's mistake. Similarly, the 2004 Yeti Air Twin otter accident in Lamjura, Solukhumbu has also been attributed to Captain Srivastav's faulty decision to enter a bad weather zone.

Aviation Accident Investigation Report
Yeti Airlines Pvt. Ltd
9N-AFD Twin-Otter DHC-6/310
Lamjura Solukhumbu
on 25 May , 2004
Analysis
g) Overconfidence of Pilot

Both the pilots can be said to have been overconfident in thier flying. If there dicisionto proceed via direct track instead of proceeding via south of Lamjura IMC conditons can be taken as any indicatation of their attitude, it can be seen That this is is a clear indication of their overconfidence . Captain Prakesh Shrivastav was said to have been an overconfident pilot .He was previously involved in four incidents and one accident. Altho he had attended many crew resource Managment(CRM) courses, It would seems the lessons learned from these courses were not followed. His hazardous attitude flying , sense of invulnerability and desire to present him as a "Macho" character ultimately proved fatal

In 2001 after a Fishtail Air helicopter sank in the Rara Lake, neither the engine nor the passengers in the aircraft could be found. This time, too, the investigation commission's report held Captain Rabin Kadariya responsible for the accident.

Helicopter Accident Investigation Commission
Kathmandu, Nepal.
FINAL REPORT
Accident of Fishtail Air Charter Flight
9N-AFP Ecureuil As-350B Helicopter
On12 November 2001
At Rara
3.2 Cause

The accident investigation commission has determimed the primary cause of accident to the application of wrong flight procedure by not maintaining a safe hight over water even after acquiring translational lift and sufficent airspeed and carring out a right bank towards the middle of the lake while still flying low, which resulted in an increase in load factor with an apparent rise in the gross weight of the helicopter and simultaneous decrease in the vertical component of the total rotor thrust. consequently, the helicopter started to drift down to close to water surface, the realisation of which was delayed due to the illusion created by the loss of depth perception over water, and it continued its descent with right bank until it finally plunged into the lake.

Pilots have been held responsible for nearly all accidents, which has raised questions over Nepali pilots' flying competence. Helicopter pilot Madan KC, who has been flying for 30 years, accepts that most accidents occur due to pilot error. However, he maintains that the reports prepared by Nepal's investigation teams are not scientific or grounded in reality, and therefore, not all the accusations heaped on the pilots can be true. There is a trend of placing all the blame on the pilot who died in the accident and absolving all the other parties responsible for the accident. According to Captain Subash Rijal, unlike in other countries, there is no in-depth and scientific investigation of air accidents in Nepal, and as a result, pilots are held responsible for most accidents. This comment made by Rijal, who has also been involved in investigating air accidents, raises questions over the findings of the accident investigation commission. There is basis to support that accident does not result from pilot error alone.

The ICAO has laid emphasis on human error and explained how the pilot's mistakes can lead to accidents. The pilot is in the foremost and most decisive position during a flight. However, the cabin crew including the ATC, flight engineer and co-pilot provides backup support to the pilot. The cabin crew is responsible for other tasks, from checking the aircraft's technical condition to providing weather information.

A safe flight is possible with the necessary support on all these fronts. A minor error on the part of one person can lead to an accident. One's personality -- behaviour, sensitivity, temperament and patience – can affect one's performance on the job. These things can be the cause of an accident. For example, the lack of understanding between the pilot and the co-pilot was one of the likely causes of the helicopter accident in Raralihi, Jumla.

Aviation Accident Investigation Report
Simrik Air Pvt. Ltd.
9N-ADO Mi-8 MTV-1
Raralihi, Jumla
23 November, 2006,
3. CONCLUSIONS
3.1 Findings:
9. The Captain could not identity the landing site positively that the co-pilot had pointed out. The lack of suitable markings at the landing site could have resulted in confusion to the Captain in selecting the proper landing site.
10. Inability of the Captain to ascertain the proper dimensions of the landing site from the air was compounded by his lack of familiarity with the site and the glare of the setting s
3.2 Probable Cause
The Commission determines the probable cause of the helicopter 9N-ADO accident at Raralihi as the failure of the Captain to positively identify the intended landing site pointed out by the co-pilot. Additionally, lack of the Captain's familiarity with the unmarked and dirtcovered landing site located in the terrain of Raralihi, too restricted to allow Mi-8 MTV-1 helicopter landing, led to the accident.

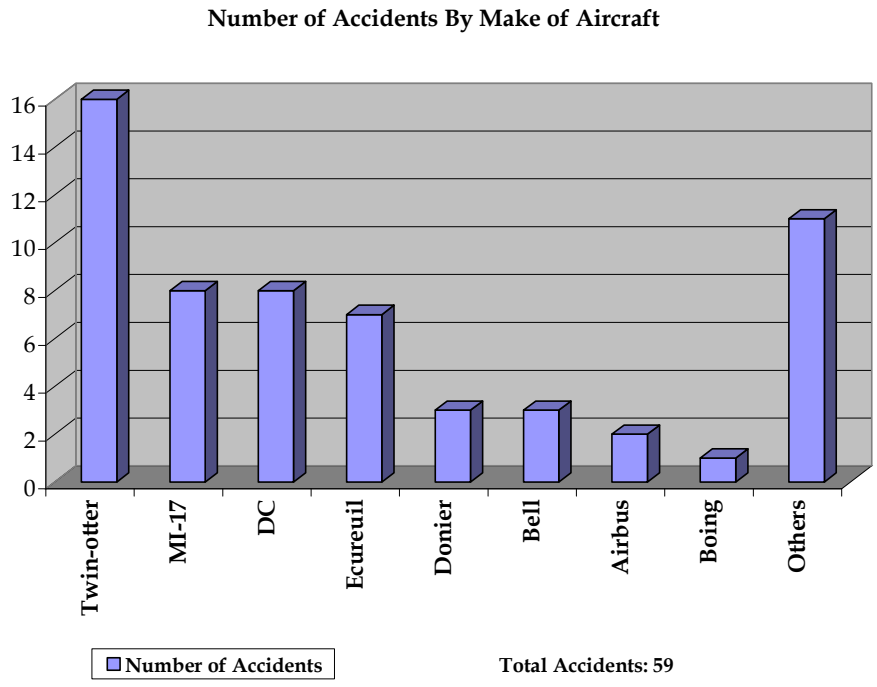
Wreckage of helicopter 9N-ADO at Raralihi, Jumla

Aircraft operators need to pay attention to all these things in order to minimise accidents. However, in Nepal, there has been no in-depth investigation of all parties involved in the accidents, nor has there been a study on the level of coordination between team members responsible for ensuring a safe flight.

2. B. Technical Factor

Twin otter planes that fly most frequently in the Nepali skies have met with the highest number of accidents. To date Twin otter planes have met with sixteen accidents. MI-17 helicopters are the next common aircraft to have met with accidents. They have already been in eight major accidents. DC-3 aircraft that flew in the Nepali skies in the 1950s and 60s and disappeared since also met with eight accidents. Small helicopters called Ecureuil have met with seven accidents. Dornier planes and Whale helicopters have met with three accidents each. Airbus-300 planes have met with two accidents and the Boeing 727 has met with one accident in Nepal. The rest of the aircraft have met with eleven accidents in total.

Graph 2 The number of aircrafts that have met with accidents in Nepal



The investigation reports suggest that there were no technical weaknesses in most of these aircraft that met with accidents. Only a few accidents are said to have been caused by technical error. However, in the case of Air Ananya's MI-17 helicopter crash of 11 September 2001 in Mimi, Humla, the investigation report has itself confirmed that the accident resulted from technical error.

Helicopter Accident Investigation Commission
Kathmandu, Nepal.
FINAL REPORT
Accident of Air Ananya (P) Ltd. Helicopter 9N-ADK(MI-17)
Accident Date : 11 September 2001
At Mimi VDC, Ward NO. 8 Humla
3.2 Cause

The commitee has concluded that the probable cause of the accident of 9N-ADK was due to the right engine failure at short final . As a result there was a sudden decrease in performance of the helicopter and eventually it crash landed at the helipad. The poor standards of maintenance of operator and moreover the inability of pilot-in-command to cope with the emergency could be the other contributing factors of this accident .

However, it is not easy to keep the aircraft that fly in the Nepali skies technically sound. Twin otter aircraft that are no longer manufactured around the world are still flying in the Nepali skies. Their repair and maintenance has also become increasingly difficult. According to engineer Kedar Pahadi of the Nepal Airlines Corportation, since the equipment necessary for the repair and maintenance of these aircraft do not arrive in time, parts of old and damaged aircraft are used to replace the malfunctioned parts. Although the Nepal Airlines Corporation has seven Twin otter aircraft for domestic flights, three or four of them are always lying in wait for repair. After Twin otter aircraft, MI-17 helicopters have met with the highest number of accidents; they have met with eight major accidents. But only one of them was said to have been caused by technical error. As for one MI-17 helicopter of the Asian Air, it disappeared during flight six years ago and has not been found. The investigation commission did not identify any technical weaknesses in the seven Ecureuil helicopters that met with accidents. MI-17 Russian helicopters have met with accidents many times in other countries as well. Although these helicopters are flown in 72 countries across the world, European countries and America have categorised them as technically weak aircraft.

Maintenance of aircraft that belong to private airline companies is also weak. These airline companies have been claiming to be short of maintenance funds, so it is not surprising that they are hesitant to comply with the CAA's directives for installing modern equipment in their aircraft. They say that airline operators cannot afford such equipment. According to pilot Yogesh Hirachan of the Nepal Airlines Corporation, the GPS in their aircraft are not of good quality. The idea behind recommending the installation of such equipment is that the machine itself can work as a guard against accidents. The GPWS (Ground proximity warning system) in the aircraft is an example of this. It gives warning about the aircraft's proximity to the ground and the possible danger arising from that. It gives directions to pull up the aircraft when it comes close to the ground surface.

Although most aircraft of Buddha and Yeti Airlines are equipped with this machine, the majority of aircraft used in domestic flights in Nepal do not have this technology. CAA officials say that since the small aircraft of the government-owned Nepal Airlines Corporation are not equipped with this machine, it is not possible to take action against private airline companies. An official from the Aviation Safety Department says, "Three years ago, we had informed the airport of our decision to prohibit the flight of NAC aircraft that were not installed with this equipment, but the ministry pressured us to revoke the decision within an hour."

Although the CAA cannot take action against operational flights under the pressure of the government and the power centre, it can make newly bought planes and helicopters install necessary equipment for flight safety while issuing their operation permit. Engines of helicopters and planes have a fixed lifetime. In Nepal there are only a few helicopter companies that overhaul their MI-17 engine after flying for 3,000 hours. Some helicopter operators themselves complain, "Has any aircraft ever been made to overhaul its engine? How can there be a timely overhaul when there is no body that monitors the amount spent on this?"

This remark suggests that there is not even a regular inspection of aircraft' technical condition. Accidents also occur because technicians don't check the aircraft' technical condition before the flight. Although there are around 90 military and civil aircraft registered for regular flights within Nepal, only 60 are in operation. Most of them are small aircraft which are also the ones that have met with most accidents.

Number of Aircrafts in Operation in Nepal

	Airline	Number of Aircrafts
1	Nepal Airlines Corporation	7
2	Yeti Air	11
3	Buddha Air	7
4	Shangrila Air	2
5	Sita Air	2
6	Fishtail	1
7	Shree	2
8	Cosmic	1
9	Gorkha	1
10	Dynasty	3
11	Simrik	2
12	Manang	1

Available data on the accidents suggest that small aircraft are weak in terms of safety. Aircraft of nearly all airline companies operating regular flights in the Nepali skies lack technical soundness. Due to these weaknesses, increasing number of aircraft have been on the verge of fatal accidents every year.

2. C

MAJOR INCIDENTS

SN	Date of Incident	A/c Reg	Type of A/c	Operator	Place of Incident	Defect Report	Defect
1	12/01/96	9N-ACM	HS-748	Necon Air	Janakpur	Flpa Master cable	Flpa Master cable broken
2	7/3/96	9N-ACB	B-757	RNAC	Kathmandu	Nose Rodome	Nose rodome Crack found
3	26/3/96	9N-ACV	DO-228	Everest Air	Bharatpur	MLG light	Micro switch assy

							on landing gear
4	6/9/96	9N-ADK	MI-17	Everest air	Jiri-Kathmandu	wind Shield	Bird Strike
5	**4/9/96**	**9N-ABX**	**DHC-6**	**RNAC**	**Dolpa**	**Compressor blade**	**Nose olio found collapsed**
6	10/10/96	9N-ADE	HS-748	Necon Air	Kathmandu	Port wing leading adge	port side wing leading edge bird strike noticed
7	**15/11/96**	**9N-ACX**	**HS-748**	**Nepal airways**	**Pokhara**	**Right Engine**	**Right Engine Failure**
8	**19/12/96**	**9N-ACA**	**B-757**	**RNAC**	**Kathmandu**	**HYD.press ure line**	**Leak in hydrolic connection**
9	**28/12/96**	**9N-ADE**	**HS-748**	**Necon air**	**Pokhara**	**Break unit**	**NO1break unitassy found Jammed**
10	**7/01/97**	**9N-ACE**	**DO-228**	**Everest Air**	**Bhairahawa**	**RH engine**	**Short of eng.In stalled in right engine broken**
11	**17/11/97**	**9N-ACE**	**DO-228**	**Everest air**	**Kathmandu**	**RH engine**	**Right engine shut down**
12	**21/01/97**	**9N-ACB**	**B-757**	**RNAC**	**Kathmandu**	**ASI**	**ASI stuck up at150kts**
13	**26/01/97**	**9N-ACA**	**B-757I**	**RNAC**	**Frankfurt**	**Thrustrever ser**	**Thrustreverser Problem**
14	**22/02/97**	**9N-ADE**	**HS-ADE**	**Necon Air**	**Kathmandu**	**RH flap tab**	**RH wing trailing edge skin crack**
15	**21/03/97**	**9N-ACB**	**B-757**	**RNAC**	**Kathmandu**	**Mach ASI**	**Mach ASI mode control**
16	**01/04/97**	**9N-ACM**	**HS-748**	**Necon air**	**Kathmandu**	**Super charger**	**Supercharger Internal oil leakage**
17	**11/05/97**	**9N-ACP**	**HS-748**	**Necon air**	**Biratnagar**	**Hydraulic Power**	**Hydraulic power loss**
18	20/06/97	9N-ACC	DHC-6	ATSC	Simikot	Heavy landing	Heavy landing
19	03/05/97	9N-ABQ	DHC-6	RNAC	Phaplu	Heavy landing	Heavy landing
20	**26/06/97**	**9N-ACV**	**DO-228**	**Everest air**	**Kathmandu**	**Landing gear**	**Landing gear extension sys tem problem**
21	**12/07/97**	**9N-ABU**	**HS-748**	**RNAC**	**Pokhara**	**Door lock**	**Door lock problem**
22	**21/08/97**	**9N-ADA**	**C-208**	**Necon air**	**Nepalgung**	**Subd MLG axle**	**Subd MLG axle cracked**
23	**15/09/97**	**9N-AAV**	**HS-748**	**RNAC**	**Pokhara**	**Right wing tip**	**Right wing tip collided with R wing tip of parked 9N-AEA**
24	**13/08/97**	**9N-ACB**	**B-757**	**RNAC**	**Dubai**	**wind screen**	**No 1 LH wind screen heater eliment failure**
25	28/10/97	9N-AED	AS-350	Karnali Air	Lukla	Hard Landing	Hard Landing
26	**01/11/97**	**9N-ACA**	**B-757**	**RNAC**	**London**	**L pack ACM**	**L pack ACM Defect**
27	**14/11/97**	**9N-ACC**	**DHC-6**	**ATSC**	**Kathmandu**	**Rear baggage compartme nt**	**Rear baggage compartment wing broken**
28	**6/11/97**	**9N-ACM**	**HS-748**	**Necon air**	**Kathmandu**	**collision on**	**Collision on**

						ground	ground, A/C unserviceable
29	6/11/97	9N-ACW	HS-748	Nepal Airways	Pokhara	collision on ground	Collision on ground, A/C unserviceable
30	07/05/08	9N-ADU	Biman	Avia Club	Pokhara	Fall during runway	Power glider damage
31	09/09/98	9N-AED	AS-350	Karnali air	Rapti	Emergency landing	Inboard stop
32	12/09/98	9N-AEQ	DHC-6	Lumbini Airways	Lukla	Compressor Stall	Bleed Valve
33	22/09/98	9N-AEP	DO-228	Cosmic Air	Pokhara	fuel Flow Fluctuating during enfine running	Fuel Flow TX. found chafing
34	26/11/98	9N-ADI	AS-350	Manakamana	Rolpa	Tail rotor hit	tail rotor damage
35	31/03/99	9N-AEW	B-1900	Buddha air	Kathmandu	A/C pressurizat-ion	pressurization fail
36	8/5/99	9N-ADC	MI-17	Air Ananya	Rolpa	Tail Rotor Hit	Tail Rotor Damage
37	8/5/99	9N-AET	DHC-6	Yeti	Jomsom	Compressor stall	Bleed valve faulty
38	31/05/99	9N-ADI	As-350	Manakamana	Ramechap	Force landing	Decleared Accident
39	12/04/99	9N-AFD	DHC-6	Yeti	Nepalgung	Singal engine landing	compressor stall
40	23/05/99	9N-AEW	Be-1900	Buddha	Kathmandu	L gear not retract up	Indicating Problem
41	03/06/99	9N-AEP	Do-228	Cosmic	Jomsom	Hydraulic not on	Hydraulic motor relay
42	14/06/99	9N-AFE	DHC-6	Yeti	Nepalgung	Singal engine landing	FCU Problem
43	22/07/99	9N-AFD	DHC-6	Yeti	Lukla	Hard landing	Hard landing
44	27/07/99	9N-ACR	AS-350	Dynasty	Lukla	Starting Problem	Ignator faulty
45	17/12/00	9N-AGM	Sab-340	Cosmic	Kathmandu	Hydraulic Leakege	Hydraulic Leakege
46	13/09/01	9N-ADK	MI-17	Air Ananya	Kathmandu	Toppled	Helicopter toppled during landing
47	13/02/01	9N-AGA	Be-900c	Mountain air		Engine Failure	Left engine failure on flight
48	07/03/02		AS-350	Air dynasty	Kathmandu	A/C	

technical condition of aircraft is also weak. These negative indicators of the technical condition of aircraft in Nepal show that accident risks are high. The persistence of equipment-related accidents in this age of technical sophistication reflects a big challenge. It is worth remembering that the first ever accident of a modern aircraft in the history of global aviation had occurred after the aircraft's propeller came loose, i.e., due to technical weakness.

It is common knowledge that the consequences of weak maintenance of equipment are seen only at a later stage. Most accidents also testify this. The above mentioned accidents show that air accidents are not caused by one particular factor alone. Multiple factors are associated with each accident. If we were to look at these factors in isolation, it would be hard to determine the exact cause of any of these accidents. The reports of the accident investigation commission suggest that 95 per cent of the accidents in Nepal were caused by human error and 5 per cent by technical error. But if we were to look at the cases of near-accidents, we can surmise that technical factors are more responsible for air accidents. (See accidents highlighted on the table.)

The ICAO attributes air accidents to three main factors: human error, technical failure, and environment. All these factors can be taken into account while examining the air accidents that have occurred in Nepal. While aircraft in Nepal are bound to fly in bad weather on one hand, they also have to fly with ill-maintained engines on the other hand. Although most reports of the accident investigation commission point to human error as the main cause of accidents, they also talk about the lack of timely maintenance of aircraft.

3. Aircraft and Airports

Where an aircraft can fly depends on the design, construction and condition of the aircraft. Not all types of aircraft are suitable for a country like Nepal which has a rough terrain and dilapidated runways.

3 A Poorly Built Airports

Twin-otter planes that are common in Nepal can operate in all kinds of airports. Many Twin-otters have sustained minor damage while landing at or taking off from poorly built airports. The wheel and landing gear also face problems from time to time. Small accidents have become almost commonplace for aircraft operating in poorly built airports.

According to Captain Prabhakar Ghimire of Yeti Airlines, “Operating aircraft in the poorly built airports in remote areas can be very risky. In the rainy season the runway is muddy which makes it difficult to take off or land. For this reason, the Nepal Airlines Corporation does not operate its flights to Manang, Suketar (Taplejung), Kagel and Thamkharka (Solukhumbu) in the rainy reason. In 2063 B.S., Yeti Airlines had suspended its flights to Rumjatar, Okhaldhunga for four months because of the airport’s poor condition.

Aviation Security Chief Ravi Kansakar says that after force landing eight or nine times in Dolpa airport, they realised that the airport was not in a good condition. Initially they thought it was pilot error and even took minor action against the pilot who had carried out force landing. But till now the airport’s condition remains the same. This shows how risky airports are in Nepal. CAA statistics show that 11.67 per cent of accidents have occurred within the vicinity of the runway.

Airport management is also responsible for aviation safety. Beechcraft, which is considered to be one of the safer aircraft, does not yet fly in Nepal precisely because of the poor condition of the airports. Buddha Air, which has not been in a major accident so far, has emphasised the need to improve the communications and weather information system between the Tribhuwan International Airport and other airports. Captain S.B. Bhattarai of Buddha Air reiterates that althought it is important for the aircraft to receive correct and timely information during a flight, airport towers in Nepal have not been able to provide information in a systematic manner. One airport official admitted that many areas within the airport system are weak and that airports and towers must be improved and modernised. He added that funding has been requested from JICA for this purpose.

4. Weather and Technology

The ever fluctuating weather and the difficult mountain terrain are also responsible for the rising number of accidents. These problems are beyond human control. Avoiding flights in such conditions could be one way to prevent accidents. Investigation reports have recommended that in order to make domestic flights smoother, weather information towers need to be installed in areas where the aircraft needs to fly at a maximum altitude; but this recommendation has not yet been implemented. Such a provision would enhance the safety of aircraft flying through passes in high hills and mountains and in fluctuating weather conditions. Twin otter planes in Nepal have to fly through mountain passes at an altitude up to 20,000 feet to reach their destination. But Twin-otter planes currently operating in mountain and hill areas cannot fly beyond the altitude of 12-13,000 feet. In Nepal weather information technology is still in its initial stage. CAA officials say that towers that provide scientific weather information are too expensive to be installed anytime soon.

To arrive in Lukla, aircraft have to fly through Lamjura pass in Solukhumbu, where the weather fluctuates very quickly. Even if the weather is calm at the time of take-off from Kathmandu, it often changes by the time the flight reaches Lamjura. The Yeti Airlines aircraft flown by Prakash Shrivastav, an experienced pilot, met with an accident due to changing weather. Similarly, in 2005 Shree Air's MI-17 helicopter met with an accident in Everest base camp because of the fluctuating weather; the investigation report states that the pilot did not assess weather conditions correctly. The commission that investigated the 2 July 2006 accident of Yet Airlines' Twin-otter has also attributed the accident to bad weather and pilot error.

Aircraft Accident Investigation Report
Yeti Airlines Pvt. Ltd
9N-AFE DHC-6/300 Twin-Otter Aircraft
Bajura Airport
03 July, 2006
November 2006
Civil Aviation Authority of Nepal

3.2 Probable Cause

The Investigation Committee determines that the probable cause of the accident was flight-crew's continued flight to at Bajura, with the intention of landing, in excessively gusting winds. The resulting control difficulties in maintaining the desired flight path during landing were exacerbated by the illusion (during period of high crew workload) resulting from the up-sloped runway at Bajura caused the aircraft to descend below the desired flight path and contact terrain. The contributory causes to the accident were virtually non-existent operational control of STOL flights by Yeti Airlines, insufficiency of CRM trainings at Yeti Airlines and lack of adequate oversight of Yeti Airlines by CAAN Flight Operations Division.

At a discussion programme on "Aviation Safety in Hazardous Weather" (मौसमको समयमा हवाइ सुरक्षा) organised by the CAA in 2007, Joint Secretary of Ministry of Tourism and Civil Aviation Hari Bhakta Shrestha had recalled how the wind had knocked down the tower in Bharatpur airport. Shrestha had been warning a Nepal Airlines Corporation flight that was flying from the west not to proceed towards Bharatpur as there was a windstorm. But within five minutes, the tower itself was knocked down by the wind. Shrestha said that he almost lost his life in this incident. Had the flight not been warned in time, it could have been in danger.

Despite the unstable weather across Nepal, airports in Nepal have no weather radar except in the Kathmandu airport. But even Kathmandu airport is making do with primary and secondary radar for getting flight information. Air traffic controllers say that these are very old and need replacement. General Secretary of Nepal Air Traffic Controllers' Association Navin Acharya asserts that drastic changes are needed in the Tribhuwan International Airport technology in general. As the government has not been able to invest in modern technology, air traffic controllers are bound to stick to older trends.

Some instances reveal that correct information from the tower can prevent accidents even when aircraft equipment faces a problem. Five years ago, when the radar and navigation equipment of the Boeing 757 flown by Captain G.P. Rijal faced complications during the flight, the information transmitted by the tower enabled the plane to land successfully. On the other hand, the absence of proper information technology resulted in the Thai Airlines and Pakistan Airlines accident in 1992. In some cases, the communication between the pilot and the air traffic controller has been hindered by language problem.

ACCIDENT
INVESTIGATION OF
MI-8MTV-1 HELICOPTER RA-27019,
AT BETHAN VDC WARD NO.9, RAMECHHAP
ON 03 MARCH 2008

Findings

14. **Some deficiencies of Vertical-'T' observed:**

- lack of office premises, store,
- all documents in Russian language,
- short duration of department heads,
- SOP not followed properly.
- English language proficiency lacking.

Every now and then there are also problems with weather information and radio frequency. It is important to modernise airport towers to transmit correct information.

Earlier the aviation sector did not give much importance to meteorology, but since a number of accidents have been caused by hazardous weather, meteorology has now become a priority area. Weather information technology in Nepal has improved with the expansion of civil aviation. The offices of Nepal Department of Hydrology and Meteorology are located in the vicinity of airports

in order to get weather forecast in time. There is no separate agency for meteorology research in Nepal. Meteorology is an integral component of aviation safety. Weather forecasting has become more simple since America first launched a weather satellite in 1960. This event ushered in a new era in meteorology. Many countries are now gathering necessary information by sending modern weather satellites into space. In Nepal too weather forecasting is carried out on the basis of images and information collected via satellites.

5. Aviation Policy and Practices

The International Civil Aviation Organisation (ICAO) was established to ensure safe and regular flights worldwide, to make necessary arrangements for safe, regular and cooperative flights for people across the world and to prevent the negative consequences of unnecessary competition in the aviation sector. The ICAO has fixed standards for achieving these goals. ICAO member countries have to follow these rules. Nepal became an ICAO member in 1960.

Although the Ministry of Tourism and Civil Aviation and the Civil Aviation Authority have done plenty of work on paper since air services began operation in Nepal, accidents continue to occur as policies and recommendations are rarely implemented. The aviation policy itself states that aircraft should be brand new at the time of purchasing. It also states that the government will provide financial support to airline operators who buy directly from the aircraft manufacturer. The government is also meant to provide some concession to airline operators who purchase aircraft that have been operating for five years. Despite all these provisions, airline operates rarely purchase new aircraft.

There are two conditions in which a machine is at risk: when it is brand new and when it is very old. There can be manufacturing defects in a brand new machine and an old machine may have lost is fixed working capacity. The aircraft may face unforeseen problems in either of these conditions. This is why Nepal's aviation policy discourages the purchase of old aircraft.

The 2006 aviation policy legally prohibits airline operators from renting pressurised aircraft that is older than 15 years and has completed 75 per cent of its economic design life hour, or completed 45,000 pressurisation cycles. However, neither airline operators nor the CAA have been providing information on the types of aircraft that are entering Nepal. According to the policy, decision on buying non-pressurised aircraft has to be made on a case by case basis; however, aircraft older than 20 years are not allowed at all as experts say that aircraft become outdated over a period of 20 years. Although legal provision exists, they are not implemented. Before registering an aircraft or issuing a flight permit, the technical condition of the aircraft must be examined. But the CAA has no mechanism to ensure this.

The ICAO maintains that an aircraft's national registration can follow the legal procedures of the concerned nation. This has made things convenient for all stakeholders. Individual countries can choose to decide whether to register other countries' commercial aeroplanes, or to limit the registration to aeroplanes of national companies. Each aeroplane has a different registration number. International flights have to clearly indicate their nationality and registration number on the aircraft. According to Article 29 of the Chicago Conference Declaration, an aeroplane that flies internationally to any country should contain the following documents: aeroplane

registration certificate, certificate of airworthiness, licences of all crew members, travel registration book and aeroplane radio station licence (licence indicating whether radio has been installed or not) including the details of passengers and/or cargo on the plane. But airline companies have often been known to break this rule.

The Office of Air safety and Flight Monitoring (हवाइ सुरक्षा तथा उडान अनुगमन कार्यालये) that was set up to reduce accidents has not been able to monitor these issues. The investigation commission reports have also drawn attention to the weaknesses in flight safety oversight.

Aircraft Accident Investigation Report
Yeti Airlines Pvt. Ltd
9N-AEQ Twin-Otter DHC-6/310
Near Jumla Airport
On June 21, 2006
Safety oversight system by Civil Aviation-Aviation Safety Department:

The manpower of Aviation Safety Department does not seem to have sufficient time to perform safety oversight functions of Nepalese registered air operators, as required by ICAO Annexes. The primary reason for this is increasing number of air operators, variety in fleet types and the limited number of flight operations inspectors (FOIs). Even from these limited number of FOIs, the inspectors are being deputed to perform regular flight duties at various airlines under various pretexts. This may have some influence on their ability to perform critical oversight of the airline operations owing to the conflict of interest introduced. Significant deficiencies were observed in different flight safety documents for Yeti Airlines like SOP, training manual etc. which again are indicative of lack of adequate supervision by CAAN even after they have been approved by CAAN.
The lack of sufficient guidance in the form of Advisory Circulars (guidance material) to amplify various FOR requirements is resulting in varying interpretation of regulations. Thus, the Flight Operations Division should also have suitable positions for adequately qualified personnel who can work on the oversight of flight safety documents that…

The pilot has to enter the technical defects of the aircraft s/he has flown into the technical logbook. The CAA should then conduct a regular monitoring to ensure that the airline operator has maintained the aircraft according to the pilot's recommendations. Since the CAA conducts technical auditing of airline companies only once or twice a year, pilots have stopped entering minor technical flaws into the logbook. No one monitors the flight even when the load on an aircraft exceeds the established limit.

Based on the information on some of the serious accidents from the past, action has been taken against those held responsible. In 2001 when Air Ananya's MI-17 helicopter nearly met with an accident due to a technical error in its tail, the CAA's Airworthiness Division had briefly suspended all maintenance staff. Similarly, following a hydraulic leakage in an SAAB-340 of Cosmic Air, the flight crew members were suspended for investigation. However, although action has been taken, they continue to repeat these mistakes. This reflects the indifference of air operators.

The country has to issue flight permit and certificates for aircraft within the standard framework. The criteria for providing such certificates have to meet or exceed the standards set by ICAO. But many airline companies in Nepal have obtained their flight permit without having acquired their aircraft. A Necon Air aircraft had carried an air worthiness certificate for two years without

even operating a single flight. Even now, Air Nepal, which does not have any aircraft, has already obtained an air worthiness certificate.

6. Poor Management

There is a trend of replacing the director general and airport chief as soon as a new government or a new minister is in office. Changing senior officials before they have learned about their responsibilities weakens the CAA's work performance. On top of this, those who take up such positions without due procedures work more under the influence of power centre than in accordance with rules and regulations. Although the Commission for Investigation of Abuse of Authority (CIAA) had directed the CAA to remove airline operators from its board three years ago, no progress has been made on that front. The CIAA's recommendation was informed by the awareness that a board made up of private airlines and Nepal Airlines Corporation officials cannot make independent decisions regarding important issues of the aviation sector.

The practice and behaviour of air operators need to change on many fronts. They have been known to give pressure to fly even in unfavourable conditions and to exceed the weight limit on flights so as to maximise their profit. Last year Yeti Airlines had suspended its flights to Rumjatar, Okhaldhunga because the condition of the airport made it risky to take off and land. But within 15 days Yeti Airlines operated a chartered flight although no improvements had been made at the airport. Locals had protested saying that the Airlines had operated the flight solely because chartered flights are more expensive than regular flights.

Twin-otter pilots say that it's the counter staff more than airline operators who are responsible for overloading the aircraft with excess weight. Several incidents also testify this. In many cases, pilots have had to get the excess load removed before taking off. Sometimes illegal and restricted items are also loaded on to the aircraft. A few years ago, a Nepal Airlines Corporation flight to Lamidanda had to do an emergency landing when acid spilled on the aircraft.

Aircraft Accident Investigation Report
Heli Hansa Pvt. Ltd
9N-ADT Mi-17 Helicopter
Dhaulagiri Base Camp
on 07 May, 2006
September 20, 2006
Government of Nepal
3.2 **Probable Cause**
The helicopter attempted take-off in a tail wind which resulted in an increment of its take-off weight causing it to sink uncontrollably. Overweight of the helicopter, due to un-weighed passenger luggage, at take-off could not be categorically ruled out. Inadequate appreciation of unfavorable wind conditions resulted in the accident, which could have been compounded by the effects of hypoxia on the crew members caused by the lack of proper breathing equipment. Insufficient CAAN oversight may have also contributed to unsafe acts by Heli Hansa and its crew.

Air route is growing ever more important in Nepal due to the lack of reliable road transport and the rising number of people who want to travel without hassle. The aviation sector has flourished

since the adoption of a liberal aviation policy. Over a short period of time many airline companies have started operating their flights. Unfortunately, the number of accidents has also grown with this. There have been 40 major accidents since 1990.

In Nepal passengers who use domestic air services alone number 12 lakh every year. Internal competition has also intensified. There was hope that the competition between air operators would make them vie for passengers' trust and raise the standard of air services and aircraft maintenance. But this has not happened. On the contrary, air operators have been flying even technically defective aircraft in the name of competition. There is a need to address prevalent weaknesses and bring massive reform in the aviation sector.

7. Ghunsa accident

7 (a) Visit to the accident site (a recollection)

While returning to Kathmandu on a helicopter after attending a programme in Ghunsa, Taplejung on the morning of 23 September 2006, 24 leading national and international personalities including State Minister for Forest and Soil Conservation Gopal Rai lost their lives when their helicopter crashed two minutes after take-off. This was the first accident in the history of air accidents in Nepal in which so many eminent figures lost their lives at once.

Helicopter parts were only found on the third day of the accident. A search and rescue team went from Kathmandu to Ghunsa via Suketar, Taplejung. I, Toya Dahal, was also in the team as a journalist. On the first day, after flying over Khotang, Okhaldhunga and Udaypur, our helicopter could not go futher due to bad weather. When we could not fly towards Taplejung, the pilot tried to navigate towards Biratnagar.

The pilot contacted Biratnagar airport tower on his radio. He was told that there was bad weather in Biratnagar too and that flights had not been able to land in Biratnagar airport due to poor visibility. As it was easier to get to Taplejung from Biratnagar than from Kathmandu, our plan was to stay in Biratnagar that night and fly to Suketar, Taplejung early next morning. But now this was not possible either. We returned to Kathmandu after flying for one hour ten minutes.

Four more helicopters were being sent from Kathmandu towards Ghunsa. One of them, an army helicopter, had already left by the time we landed in Tribhuwan Airport. The second helicopter left soon after we landed. After landing, I met the aggrieved relatives of those who were missing. They were also preparing to fly in the same direction on another helicopter. We had only just sat in the helicopter when mountaineers of the Mountain Rescue Association also boarded the aircraft. As we could not fit in, we came out and got on another helicopter. After flying for some time, our helicopter entered thick clouds. It was hard to guess in which direction we were proceeding. A Nepal Television journalist was also missing along with the eminent personalities of the nation.

I had gone to collect news about plane accidents like this before. I had seen terrible sights of aircraft fallen to pieces, bodies burnt to cinders, limbs dismembered during the crash. These images from the past revolved before my eyes as I was on the helicopter. I tried to dispel them

from my mind but I could not. Every now and then I'd see distant hills and mountain peaks from the helicopter window. Then I'd start with fear: what if we saw the wreckage of the missing helicopter in one of those hills? An hour had already passed as I pondered over these dark possibilities.

The helicopter was flying over Taplejung. The pilots were trying to fly directly to Ghunsa from where the helicopter had gone missing. But after contacting Suketar airport tower in Taplejung, we were told that it was not possible to fly all the way to Ghunsa because of bad weather. So we landed in Suketar.

By the time we landed, the army helicopter that had taken off an hour before us had already returned after searching for the missing helicopter in the hills of Ghunsa. The army pilot informed us that they could not trace anything because of the thick clouds. It was raining. We headed towards a lodge near the airport. I went to the airport tower and gathered information about the conditions in the Ghunsa area. Locals, army and police personnel based in Ghunsa and the tower officials were guessing that the helicopter was most likely in a place named Phale near Ghunsa.

As Ghunsa was a remote area, there was no communications system. Some staff of the World Wildlife Fund office in Ghunsa had satellite phones on which we received information about the condition of the area and the search being carried out by locals. I knew that pilots and flight engineers can make stronger guesses about such accidents. As they are experienced in flying, they can guess which terrain is more risky and where accidents can occur in bad weather conditions. I remained in contact with them and the tower and sent information to Kathmandu.

Although we reached Suketar as early as 8 p.m. due to bad weather no flights could take off for Ghunsa till 4 p.m. We had been told that 70 locals from Taplejung had gone on foot to locate the accident site. The police had also informed us that a team of police personnel had been sent on foot. Around quarter past 4, the army helicopter went to look for the possible site carrying the mountaineers of the Himalayan Rescue Association and the army rescue team. In 40 minutes the helicopter returned to Suketar after dropping off the rescue team near Ghunsa.

Although helicopters of Simrik Air, Shree Air and Air Dynasty were also on stand-by at the airport, it was the army helicopter that seemed most active in flying back and forth. The army helicopter was flying even when the Shree Air helicopter that had come to look for another helicopter of the same company had not flown yet. I inquired one Shree Air official about this. His simple answer was that the army helicopter had weather radar which provided weather information and made flight easier. Perhaps, I thought, had there been weather radar in the Shree Air helicopter, it might not have entered a hazardous weather zone in the first place and the accident might have been prevented.

It had been raining heavily. The wheels of the helicopters parked at the airport kept plunging into the wet ground making the base of helicopters almost touch the ground. As soon as the rain subsided, the pilots would run towards the helicopters. They would start the helicopter and lift the wheels out of the ground before parking it in another spot. As the Suketar airport runway was not tarred, no flights operated there for three months in the rainy reason. As soon as the rain stopped, the sky would be overcast. The weather did not improve for two days. Conducting air search was out of the question.

In the evening, some crew members and officials of the four helicopters on the stand-by were having their meal. Two of the crew members were friends of mine. I also got introduced to the rest of the crew. They talked about the Russian and Nepali pilots who were also missing along with the helicopter. One of them said, "Captain Kim used to be overconfident while flying." Another crew member of Shree Air added, "But he's a pretty good pilot." Someone else said, "I heard he had done a force landing before this incident." Their conversation was getting interesting. A Simrik Air pilot said, "Who doesn't make small mistakes every now and then? We can't tell what's going to happen to us tomorrow." Another airline staff said, "Maybe because Dasain is round the corner, I'm so restless to go home. I'll head home as soon as I reach Kathmandu. And home means my village in Dhading." The Simrik Air pilot said, "How come you're talking about going home? It's been two days we haven't been able to do anything. It seems the weather won't let us conduct an air search tomorrow either."

Just then the 7 p.m. news on Radio Nepal announced that the Ministry of Tourism and Civil Aviation and the Civil Aviation Authority had intensified the air search and extensively mobilised the rescue teams, security forces and locals. We laughed when we heard this.

The chief district officer, whose office was only half an hour away from the airport, did not visit the airport for three days. The CDO did not show up at the airport even though senior government officials, chief of the rescue team, airline officials, relatives of victims and journalists were there. Chief of the rescue team Khagendra Bahadur Shrestha had scolded him on the phone for sending a wrong message to Kathmandu without getting proper information. From the second day the rescue team had stopped passing the information received on satellite phones and radios on to the CDO. But some journalists had still been sending news to Kathmandu referring to the CDO.

On the third day the weather seemed to have cleared a bit. It was then that we received the news from Ghunsa that the accident site had been located. There were no survivors. Most of the bodies were burnt beyond recognition. It was only possible to rope-climb to the accident site so the rescue team had returned after pitching a green tent on the site. The rescue team sent this information to Kathmandu. We called and informed our office. The CDO learned about this only after the Kathmandu media gave the news. It turned out that he had again sent a message to Kathmandu without understanding the reality; he had simply assumed that the bodies were to be taken to Kathmandu on the same day.

We were taken on the army helicopter to see the crash site in Phale Danda near Ghunsa. MI-17 helicopters are generally flown by Russian pilots, but the one that belonged to the army had their own pilot and engineer. The weather was not clear and the crash site was in a narrow pass, so we could not see it clearly. We returned to Suketar. In the afternoon we again went to Ghunsa on the Shree Air helicopter. The helicopter was flown by a Russian pilot and a Nepali co-pilot.

It was their first flight in that region. We were all startled when the Nepali pilot asked us to point out Ghunsa to him during the flight. We were worried that we might also get lost. The helicopter was flying through a narrow pass, and every now and then it felt as though the fan that was whirring in great speed had brushed against the hill.

Ghunsa region

As Ghunsa was at a height of 3000 plus metres, there was the risk of altitude sickness. Arranging food and lodging for so many people was also going to be a problem. The rescue team decided to go to the crash site the next morning. At the crash site only a few bodies could be identified. Only half of Minister Gopal Rai's face and some of his body parts could be identified. Although the bodies of Mingma Norbu, Dr Tirthaman Maskey, Dr Bigyan Acharya, Captain Kim and Dr Harka Gurung were identified to some extent, it was not possible to identify the bodies of 14 others including Hemraj Bhandari as they were completely burnt and destroyed.

Autopsy findings of Decedents of Shree Airlines 9N-AHJ Helicopter Accident at Ghumsa

Body/ Remains	Head, Face & Neck	Torso	Upper Limbs	Lower Limbs

A – DB 1 Mingma Norbu Sherpa - Identified at site by local people; facial features & clothes	Laceration, 5 cms A-P scalp over mid top, muscle deep right upper eyelid; Contusion inner aspect upper lip; Abrasions multiple punctuate & linear right cheek bone,	Multiple closed fracture left anterior lateral aspect of rib cage; Abrasion left shoulder, left scapular region; No external injuries in the abdomen and pelvis	Contusion right thigh, left fore arm; Abrasion, multiple punctuate dorsum right hand	Contusion posterior mid 3rd of right thigh, left knee
C – DB 3 Ms Jennifer Lynn Hedley – identified by sex, physical characteristics, personal item (ring) and dental identification	All bones of skull missing;, head burst open, brain tissue missing; extensive 1st to 3rd degree burn, face and neck	Multiple fractures vertebral column, anterior rib cage; 1st to 3rd degree burn chest, both clavicles burnt, right lung; Left breast tissue present in anterior chest; Whole of posterior rib cage burnt with multiple burns, fractures of left half; Abdomen burst open, 1st to 3rd degree burn, exposing liver and abdominal contents, Multiple fractures of pelvis, both ilio-sacral dislocation; sacral region of vertebral column fracture	Multiple fractures, Missing Right arm below mid humerus; Left burnt & fracture of mid humerus; burn left forearm and dorsum of hand with burn	Multiple fractures; Missing Right below mid tibia, whole right thigh burn, Right leg burn exposing burnt bones; Whole Left. thigh burnt, Left leg burnt exposing burnt lacerated muscles and fractured bones; dorsum of Left. foot burnt and fractured, attached to leg by a muscle flap only
D – DB 4 Dr. Tirtha Man Maskey – Identified by necklace & locket	Head & face completely charred, scalp missing from the top and back, remaining scalp charred	Muscles of anterior chest missing, anterior left rib cage charred exposing underlying cooked lungs; vertebral column fractured at lumbar region with attachment only by a strap of muscle, liver and gall bladder not discernible due to charring;Genital organs missing, Left half of pelvis fractured; all soft tissues of pelvic region cooked	Right shoulder joint dislocated; upper limbs heat contracture	Upper half of both thighs cooked, both femurs charred and broken at the middle, Parts distal to mid third on both sides missing
F – DB 6 Dr. Bijnan Acharya, Identified based on DNA analysis	Skull bones fragmented and burnt, with cooked brain tissue; broken remains of cervical spines; some fragments of jaw bones with some teeth attached, burnt	Left scapula with charred flesh attached; portion of upper spine & ribs, 6 pieces of vertebrae, burnt; Abdomen and pelvis missing	Humeral head only, rest missing	Missing
H – DB 8 Min. Gopal Rai, identified by clothes and facial features, though burnt	Closed fracture bones of cranial and facial skul; Face and neck 1st to 2nd degree burn; upper jaw right 1st premolar burnt,	Upper half of anterior chest 1st to 2nd degree burn, lower half below nipples charred; Both clavicles and ribs on both sides of anterior chest multiple closed fracture; Whole of	Right, 1st to 3rd degree burn; soft tissue of dorsum of distal arm and forearm missing, dislocation of elbow joint, and heat	Both, muscles of superior two-third avulsed; all parts distal to two-third of thighs are missing

	right canine and 2 incisors fractured, 2nd left incisor fractured	posterior trunk charred; Multiple fractures posterior rib cage; Abdomen burst open with viscera exposed and partially burnt, Perinium burnt, genitalia charred	contracture of wrist and fingers; Left, 1st to 3rd degree burn, compound fracture and dislocation of wrist	
T – DB 20 Capt. Klim Kim - Identified by the watch in his wrist	Not present	Not present	Left upper limb with scapula, charred; arm exposed to muscle layer; distal phalanges of all fingers missing (metal wire entangled between the fingers).	Not present
Dr. Harkha Gurung - Identified on the basis of dentures	Soft tissue of scalp avulsed from top of the head to the anterior; parts of both parietal bones missing,	Neck charred;, Chest charred; Genitalia, penis & scrotum burnt	Fingers of both hands burnt	Muscles of both thigh extensively lacerated and charred, Left. femur fracture;, avulsed lacerations both legs; dorsum of both feet missing from distal 3rd of leg
Mr. Pauli A. Mustonen, Dental identification	Teeth,	Missing	Missing	Missing
Mr. Matthew Stewart Preece, Dental identification	Teeth	Missing	Missing	Missing
F/E Safronov Vallery, Dental identification	2 pairs of crown & bridge	Missing	Missing	Missing

Followings could not be identified from the examination of body parts and remains

Ser.No.	Name	Ser.No.	Name
1.	Mrs. Mina Rai	8.	Mr. Bijaya Kumar Shrestha
2.	Dr. Damodar Prasad Parajuli	9.	Dr. Chandra Prasad Gurng
3.	Mr. Narayan Prasad Poudyal	10.	Mr. Hem Raj Bhandari
4.	Mrs. Yeshi Lama	11.	Dr. Jill Bowling Schlaepfer
5.	Mr. Dawa Tshering Sherpa	12.	Ms. Margarate R. Alexender
6.	Mr. Sunil Prasad Singh	13.	Capt. Mingma Tshering Sherpa
7.	Mr. Sharad Kumar Rai	14.	C/A Guruwar Tandul

premolar burnt, closed fracture; Whole of joint, and heat

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Only mountaineers could rope-climb to the crash site, so we again returned to Suketar. The rescue team packed the remains of the bodies and brought them back. The remains of 24 bodies weighed only 200 kgs. Members of the rescue team said that most of the helicopter parts were completely burnt and destroyed. I inquired them if the investigation team formed in Kathmandu could go to the crash site. Their reply was simple: “They can’t go there. We have filmed and

photographed the site, they can investigate on the basis of these photos and video clippings. We've heard that they will also investigate the bits and pieces we've collected." This team, led by a mountaineer who had scaled the Everest, had previously carried out its operation in three air accident sites. They said, "We've heard that the previous investigations were also based on the remains we collected from the site."

In Ghunsa, locals told the rescue team and journalists that the helicopter had taken off in bad weather under pressure from the minister. As the minister was in a rush to attend another programme, the pilot was under pressure to fly the helicopter. Locals said that the pilot took off despite cloudy weather because he could not refuse the minister. A few seconds after taking off, the helicopter entered the clouds. In a moment, they heard an explosion and guessed that the helicopter had crashed. Deepak Prasad Bastola, the flight engineer on the army helicopter that took the rescue team to the crash site, told the journalists, "The nature of the accident suggests that the pilot had flown under pressure." The investigation commission report does not even mention Bastola's remark which was aired in the media.

7 (b) Accident Report

The accident report has not emphasised the fact that the helicopter had flown under pressure. The report says that Captain Kim took off without taking the bad weather into account because he was not familiar with the weather and terrain of that region. It says that Captain Kim had violated the flight operations regulation by flying in conditions of poor visibility.

Helicopter Accident Investigation Commission
Kathmandu, Nepal.
FINAL REPORT
Accident of Shree Airlines (P) Ltd. Helicopter 9N-AHJ (MI-8 MTV-1)
Accident Date : 23rd September 2006
Accident Site : Lelep V.D.C.- 9 Phaledanda, Taplejung
Submitted to,
The Government of Nepal
on 4th December 2006

The flight was in command of Capt. Klim Kim and this was his first flight to Ghunsa. The weather at Ghunsa was cloudy. The helicopter, with 4 crew members and 20 passengers and TOW 10,344

2.3.10 Violation of Regulation
MI-8MTV-1 Helicopter 9N-AHJ was certified for Visual Flights Rules (VFR) only. On that day while being at Ghunsa, pilots were completely aware of surrounding weather. It was completely covered up with low clouds having poor visibility. But pilot intentionally decided to take-off and entered into the clouds just after the take-off clearly violating the Flight Operations Regulation.

The report suggests that the helicopter tried its best to reach a high altitude to resume its flight but due to gravity and altitude, the helicopter could not be navigated and crashed against a hillside when it reached near a hill. The helicopter crashed in Phale Danda at a height of 990 metres. The investigation commission has also reported that both pilots were of captain status and that the generally unhealthy relationship between Russian crew and Nepali crew could also have contributed to the accident.

2.3.11 Crew Coordination

The weather of Ghunsa was not advisable for VFR flight. The Flight Engineer had already started the APU (possibly under the instruction of Captain). As per eyewitnesses, Co-pilot and cabin attendant were out of the helicopter at that time and later they entered to helicopter when engines were already started as well as the passengers were on board.

Both pilots were of Captain status, so the trans-cockpit authority gradient was flat. This situation could inhibit non-flying pilot interfering with or objecting flying captain's decision or action, thus affecting crew coordination and communication adversely.

.

There is possibility that unhealthy relationship between Russian (foreign) crew and Nepalese crew existed. Generally there appears to be an unhealthy working environment between Russian crew (Captain and Flight Engineers) and Nepalese crew (mostly Co-pilots). the Russian crew's intention is to delay the Nepalese pilots' upgrading to Captain thus insuring their jobs security whereas Nepalese would like to be assisted towards their career promotion to Captain. So there is likelihood of not getting optimal communication and interaction between the Russian crew and Nepalese crew.

According to the report, the remnants of the black box suggest that there were no technical errors. But the pilot and passengers failed to adopt the safety measures required for high altitude flights. The report concludes that the pilot was cheifly responsible for the accident as he had flown in bad weather conditions even though the helicopter was registered for VFR flight.

3.2. Causes

The Commission has concluded that the probable cause of the accident is the cumulative effect of the followings :

a. Without analyzing the local weather condition, pilot took-off from Ghunsa helipad in poor visibility and immediately disappeared into the cloud and continue flight in bad weather on IMC condition violating the visual flight regulation in such weather.

b. This was first flight of Capt. Kim, so he was not familiar to the terrain around Ghunsa and local weather condition mainly in rainy season.

c. Pilot could not maintain the normal rate of climb and speed after reaching to 4033 m. though the engine power was maximum. The combined effect of low speed, low main rotor RPM, helicopter weight at that altitude and flying into cloud (IMC) resulted the helicopter to sink and finally hit the rocky cliff at 3990 m. The helicopter was severely damaged and burnt and all 4 crew members and 20 passengers died in this accident.

d. Lack of crew coordination among the pilots and lack of situational awareness, pilot took-off from Ghunsa and climb for high altitude and hypoxic effect.

The report does not mention anywhere that the helicopter carrying 20 passengers was a cargo version helicopter, not a passenger version helicopter. However, it has recommended the Ministry of Tourism and Aviation to formulate clear policies regarding passenger helicopters and cargo helicopters.

4.4 To the Ministry of Culture, Tourism and Civil Aviation

1. The Civil Aviation (Accident Investigation) Rules, 2024 B.S should be amended in the context of open sky policy of the Government, the establishment of CAAN and the Nepali commitment in the international forum.
2. The Rules should incorporate the formation of the Accident Investigation Commission, its accountability, minimum qualifications of the members, compensation for their services, etc.
3. Expert Development Program should be initiated in the field of aeronautical engineering, aviation security, aviation medicine, meteorology, air law and investigation techniques, etc. and a roster of Accident Investigation Experts should be maintained in the Ministry.
4. Accident Investigation Management Unit should be established in the Ministry to monitor the implementation of the Commissions' recommendations and to maintain the archives.
5. As to conduct the Accident Investigation is the State obligation, instead of levying the cost to the concerned operator, Ministry should provide logistics, budget and other essentials to the Commission.
6. A clear national policy should be developed to regulate the helicopters certified to Cargo Version for transporting revenue passengers to enhance their safety.

Twenty-four leading personalities including Nepal Television journalists Hemraj Bhandari and Sunil Singh lost their lives in that accident.

8. UNMIN helicopter accident

On 3 March 2008 one of the helicopters of the United Nations Mission in Nepal (UNMIN), which came to Nepal to assist in Nepal's peace process, crashed in Bethana, Ramechhap. It was natural for everyone to be curious as to why an aircraft operated by an organisation like UNMIN met with an accident in the Nepali sky. Unfortunately, it was revealed that the accident occurred because a department of UNMIN had operated the technically weak aicraft in violation of the aviation rules and prevailing laws. The facts brought out by the investigation commission report suggest that UNMIN had been operating its flights at high risk by taking advantage of the weak government of Nepal and the apathy of the official body responsible for monitoring the implementation of regulations.

The helicopter crashed on its way back from the Maoist cantonment in Dudhauli, Sindhuli. Ten people including the crew members lost their lives. More than a dozen villagers witnessed the helicopter exploding in the air and falling to the ground. The accident investigation commission reported that both the engines of the helicopter had failed 23 seconds before it hit the ground.

ACCIDENT
INVESTIGATION OF
MI-8MTV-1 HELICOPTER RA-27019,
AT BETHAN VDC WARD NO.9, RAMECHHAP
ON 03 MARCH 2008

The Government of Nepal constituted the Commission
for the Accident Investigation on 4th March, 2008

Findings
19. Both engines shut down at 16:18:20 NST (23 seconds before impact).

The facts presented in the report suggest that the helicopter crashed due to technical problems. The report has identified problems in the Main Gear Box and the hydraulic system of the helicopter.

The Government of Nepal
constituted the Commission
for the Accident Investigation
on 4th March, 2008

Findings
17. Signal of minimum oil pressure of MGB 'ON' at 16:18:10 NST.
18. Signal of minimum pressure in hydraulic system 'ON' at 16:18:13 NST.

The investigation commission found many weaknesses in UNMIN's engineering division which is reponsible for aircraft maintenance. It also found weaknesses in the technical condition of other aircraft. A member of the commission said that the engineering division lacks even essential equipment. The report also pointed to the lack of capable human resources.

To UNMIN (user)

1. Ensure designation of responsible persons for engineering, quality control, chief pilot etc.

The investigation also revealed that the other UNMIN aircraft in operation have oxygen cylinders but no oxygen. The report has identified hazardous meteorological conditions, technical weaknesses and effects of hypoxia (a problem that arises due to lack of oxygen while flying at high altitudes) as possible causes of the accident.

Contributing Factors

- Hazardous meteorological conditions
- Lack of safety oversight
- Effects of hypoxia
- Manual shut down of engines

A member of the investigation commission said that other aircraft operated by UNMIN are also at high risk due to their weak technical conditions. The report does not mention the fact that UNMIN had violated national and international regulations while operating its aircraft. The country where the aircraft is registered and the company that has obtained permission to operate its aircraft have to give their approval saying that the aircraft is suited to the place. But UNMIN has been operating its rented aircraft without having received such approval. The ICAO's flight

operation regulations also mention this. (ICAO Operation of Aircraft Part III Fifth Edition July 2001)[2]

UNMIN has not followed the procedure of submitting necessary paperwork to the concerned country. A foreign pilot flying in the Nepali sky has to fly under the supervision of an experienced pilot for one year before taking command of the flight. But the main pilot who was flying the UNMIN helicopter that crashed had only flown in Nepal for ten hours in total. The report states that the accident occurred because the pilot did not have adequate knowledge of the terrain and because he entered hazardous weather zone in violation of flight operation regulations. According to the report, the helicopter, which was registered for VFR, had violated flight operation regulations by entering the clouds.

CAUSES

1. Violation of regulations

- *IMC flight with VFR certified helicopter.*
- *Entry into CB clouds*

Annex 6 of the ICAA flight operation regulations mentions that passenger aircraft must have equipment for providing weather information.

The information technology needs to be installed before the weather radar is at risk (ICAO Operation of Aircraft Part III Fifth Edition July 2001)[3]. The helicopter that crashed had no such equipment. The report does not mention anywhere that it was designed for carrying cargo, not passengers. Passenger aircraft are meant to be of advanced technology, but UNMIN's

[2] **International Operations — Helicopters CHAPTER 1. GENERAL**

Note 1.— Although the Convention on International Civil Aviation allocates to the State of Registry certain functions which that State is entitled to discharge, or obligated to discharge, as the case may be, the Assembly recognized, in Resolution A23-13 that the State of Registry may be unable to fulfil its responsibilities adequately in instances where aircraft are leased, chartered or interchanged — in particular without crew — by an operator of another State and that the Convention may not adequately specify the rights and obligations of the State of an operator in such instances until such time as Article 83 bis *of the Convention enters into force. Accordingly, the Council urged that if, in the above-mentioned instances, the State of Registry finds itself unable to discharge adequately the functions allocated to it by the Convention, it delegate to the State of the Operator, subject to acceptance by the latter State, those functions of the State of Registry that can more adequately be discharged by the State of the Operator. It was understood that pending entry into force of Article 83* bis *of the Convention the foregoing action would only be a matter of practical convenience and would not affect either the provisions of the Chicago Convention prescribing the duties of the State of Registry or any third State. However, as Article 83* bis *of the Convention entered into force on 20 June 1997, such transfer agreements will have effect in respect of Contracting States which have ratified the related Protocol (Doc 9318) upon fulfilment of the conditions established in Article 83* bis.

[3] ***Annex 6 — Operation of Aircraft Part III***
1/11/01 II-4-8
4.12 Helicopters when carrying passengers — signIoicant-weather detection
Recommendation.— *Helicopters when carrying passengers should be equipped with operative weather radar or other signIoicant-weather detection equipment whenever such helicopters are being operated in areas where thunderstorms or other potentially hazardous weather conditions, regarded as detectable, may be expected to* exist along the route either at night or under instrument meteorological conditions.

passenger aircraft are technically flawed. Passenger helicopters are twice as expensive as cargo helicopters. The investigation commission report on the Ghunsa accident in 2006 has recommended that the government should formulate separate policies for passenger aircraft and cargo aircraft and that it should implement legal provisions for aviation safety. But the government and the CAA have not made much progress on this front.

UNMIN is yet to pay crores of rupees to the government of Nepal for landing, parking and navigating its aircraft here. At the 12 March 2008 press conference, UNMIN chief Ian Martin had said that the regulations of Nepal did not apply to UNMIN and that the fee would be paid by another subject if necessary. But Article 12 of the universally applicable Convention on International Civil Aviation states that everyone needs to follow a country's flight operation regulations (Convention on International Civil AviationDoc *730017*. 2000).

Even the cockpit voice recorder on the UNMIN helicopter was not on, which shows how carelessly it was flying. According to national and international regulations, aircraft cannot fly without turning on the cockpit voice recorder.

ACCIDENT
INVESTIGATION OF
MI-8MTV-1 HELICOPTER RA-27019,
AT BETHAN VDC WARD NO.9, RAMECHHAP
ON 03 MARCH 2008
Why and how both engines shut down could not be determined with certainty because of CVR spool not set to starting position.
15. CVR spool not set to starting position before first flight of day.

It is unfortunate that even a responsible UN agency like UNMIN failed to adhere to aviation safety rules and regulations.

9. Conclusion

(a) Causes of the Rising Number of Accidents

1. This investigative study has led us to believe that the primary reason behind a steady rise in the frequency of air mishaps in Nepal is a lack of implementation of recommendations proposed by accident investigation commissions. This study has revealed that the Ministry of Tourism and Civil Aviation, the Civil Aviation Authority and airline companies have not implemented such recommendations in an adequate manner.

2. After the implementation of a liberal aviation policy, competition in the aviation sector has rapidly increased in terms of business, but not in terms of raising the standards of air services.

3. Flights operate despite hazardous weather conditions and aircraft carry excess weight in the name of competition.

4. Aircraft in operation are not technically sound.

6. The Aviation Safety Department that monitors flight safety lacks facilities and human resources.

7. Flights are often operated under pressure to maximise profits.

8. There is no information technology to warn aircraft flying over a rough terrain against bad weather and other complications.

9. Runways are dilapidated.

10. The sale and purchase of old aircraft continues.

11. Low-cost cargo helicopters are used as passenger helicopters.

12. Some pilots have language problems.

13. Most documents with information on helicopter operation are in Russian.

14. MI-17 helicopters are rarely flown by Nepali pilots.

15. Aircraft and engine are not repaired or maintained in a timely manner.

16. Pilots do not get adequate training or experience-sharing opportunities very frequently.

Although competition between airline businesses has increased since the adoption of a liberal aviation policy, the government and air services operators have not been able to ensure flight safety. Both parties seem apathetic towards this issue. One of the reasons for the weak policy implementation is that air operators themselves are on the Civil Aviation Authority board.

The trend of flying in hazardous weather and weak technical conditions must come to an end. There must be monitoring to ensure that aircraft are not flying under pressure in the name of business competition, and strict action must be taken against those found responsible for such actions. Passengers must be informed about the aircraft's technical condition and the crew members so that they can stay alert for flight safety. Sufficient efforts have not been made to prevent accidents even though more than 500 people have lost their lives in air accidents. This can perpetuate the cycle of accidents.

(b) Recommendation

An independent commission endowed with the right to take action must be formed to investigate whether the government, the Civil Aviation Authority and air operators have implemented flight operation rules and regulations for aviation safety. While registering and renewing the term of airline companies, those found weak in terms of safety must not be given an extension. The CAA needs to change its working style. The CAA must be free from direct influence of airline companies and the government.

LIST OF ABBREVIATIONS USED

A/C : Aircraft
ACCI: Accident
AFH : Airframe Hours
AMSL : Above Mean Sea Level
AMT : Aircraft Maintenance Technician
AOC = Air Operator Certificate
ATPL = Air Transport Pilot License
ATS = Air Traffic Service
AUW : All-Up-Weight
BGRG : Bearing
CAAN : Civil Aviation Authority Nepal
CG : Center of Gravity
CPL : Commercial Pilot's License
C of A : Certificate of Airworthiness
C of R = Certification of Registration
CRM = Cockpit Resources Management
CVR : Cockpit Voice Recorder
Commission : Accident Investigation Commission
DCA : Department of Civil Aviation (now obsolete)
DME : Distant Measuring Equipment
EH : Engine Hours
ENG : Engine
FCU : Fuel Control Unit
FDR : Flight Data Recorder
FOR : Flight Operations Requirements issued by CAAN
F/O = First Officer
Ft : Feet
GPS = Global Positioning System
HF = High Frequency
HMG : His Majesty's Government
HP : Horse Power
HR : Hours
IAW : In Accordance With
ICAO : International Civil Aviation Organization
IFR : Instrument Flight Rules
IGE : In Ground Effect
IPS : Inch per Second
ISA : International Standard Atmosphere
Kg : Kilogram
L : Liters
LIC : License
DBC : Dhaulagiri Base Camp

m : Meters
Min : Minutes
MR : Main Rotor
MSL : Mean Sea Level
MTOW : Maximum Take-Off Weight
NDB : Non-Directional Beacon
Ng : Gas Generator rpm
Nm : Nautical Miles
NOC : Nepal Oil Corporation
OAT : Outside Air Temperature
OGE : Out of Ground Effect
O/S : Over speed
PAOC : Provisional Air Operator's Certificate
PIC : Pilot-in-Command
P1 : Same as PIC
P.N or P.No. : Part Number
Qty : Quantity
R/W = Runway
SB : Service Bulletins
SL : Service Letters
SOP : Standard Operating Procedures
SOAP : Spectrometric Oil Analysis Procedure
sq. : Square
SSB : Single Side Band (radio communication)
S/N : Serial Number
STOL = Short Take Off and Landing
TGB : Tail Gear Box
TOW : Take-Off Weight
TR : Tail Rotor
TSN : Time Since New
TSO : Time Since Overhaul
UTC : Universal Time of Co-ordination
VFR : Visual Flight Rules
VHF : Very High Frequency (radio communication)
VIP : Very Important Person
VOR : Very High Frequency Omni-directional Radio range
WT. or Wt. : Weight
YR or Yr : Yearly
: Number

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