Helicopter Safety Recommendation Summary for Small Operators

Prepared by the International Helicopter Safety Team
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Introduction

This document is intended to provide a summary of the initial findings and recommendations developed from detailed helicopter accident analysis done by the International Helicopter Safety Team (IHST). Included in this document are brief descriptions of the key helicopter safety enhancements relative to five basic safety themes identified by the IHST's Joint Helicopter Safety Analysis Team (JHSAT) and validated by the IHST's Joint Helicopter Safety Implementation Team (JHSIT).

The IHST, formed in early 2006, is an all-volunteer team of helicopter community stakeholders dedicated to reducing worldwide helicopter accidents by 80% in ten years. Over 300 volunteers work on various regional IHST teams around the world to achieve this goal. The core processes used by these teams have been adapted from the proven analytical methods developed by the Commercial Aviation Safety Team in its highly successful work to improve commercial fixed wing aviation safety.

The foundation of these safety recommendations is the IHST/JHSAT report which was developed by a team of analysts from the helicopter operating, manufacturing, and regulatory communities using US National Transportation Safety Board (NTSB) reports to carefully document hundreds of helicopter accidents. Details of the analytical process used can be found on our web site, www.ihst.org.

Use of the recommendations made in this document does not guarantee risk free operation of helicopters; however, the JHSAT/JHSIT work has shown clearly that these recommendations will significantly reduce helicopter operational risks. Although the recommendations summarized below are based on analyses of US accidents, the IHST has observed strong similarities in accident causal factors in the worldwide helicopter fleet. Correlation with other regional studies suggests that these recommendations have a significant element of universal applicability in worldwide helicopter operations.

These recommendations were devised primarily for small fleet operators who generally operate one to five helicopters; however they are scalable to larger operations. Analyses conducted by the IHST indicate that relative to the practices already in use by some larger operations with best-in-class safety records, small helicopter operations have the most to gain from these recommendations. IHST also recognizes that larger operators have additional means within their company infrastructure to develop and support more sophisticated safety measures.

IHST makes these recommendations with the belief that they are attainable with currently available technology, systems and practices.

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Safety Enhancement Themes:

The IHST recommendations are grouped under five thematic headings, with specific safety enhancement steps in each. This arrangement facilitates assessment of operator safety practices. The five themes are:

1. Safety Management Systems (SMS), Risk Identification and Avoidance
2. Training
3. Helicopter Systems and Equipment
4. Information
5. Maintenance

Each theme's specific recommendations are shown with a red/yellow/green rating scale corresponding to the operator's implementation of those safety enhancements. Moving from red to green in each area establishes a growth path to encourage safety improvement. Each element in the matrix states a basic objective; many approaches can be taken to achieve the desired result. Operators should be allowed maximum flexibility in achieving each objective; one size does not fit all.

Use of Summary Data:

The table at the end of this document is provided as an example of how data from multiple operators might be used as a decision-making tool to track safety improvement implementation. This tool could be used by any entity interested in tracking safety improvement, such as helicopter associations, operator groups, accreditation programs, safety researchers, etc.

The summary sheet in this document is populated with sample data to illustrate how the final scoring system works.

The red/yellow/green scoring thresholds are recommended levels, which users may modify to suit their individual needs.

1. Safety Management Systems (SMS), Risk Identification and Avoidance: An operator should be able to show they use a documented method to identify, assess and correct safety concerns, problems, hazards and occurrences. The process should encourage reporting of occurrences, events, non compliances, etc, in a non punitive environment. The SMS should employ a means to report, document, analyze and correct identified issues. A well established SMS would also integrate inputs and outputs from the subsequent items in the following matrix.

Safety Management Systems (SMS), Risk ID/Avoidance	**Each element = 3**	**Each element = 2**	**Each element = 1**
Documented SMS Process	No formal SMS	SMS under development, implementation timeline but not yet in use	Documented SMS process in use
Standards specific to operations, training and maintenance	No operating guidelines	Some guidelines, but limited in scope and use	Standards documented and in use
Non-punitive Safety Event Reporting Process	No formal reporting process	Reporting process under development with implementation timeline, but not yet in use	Documented reporting process in use

Note: The IHST has developed an SMS 'toolkit" which offers guidelines for establishing a SMS which can be scaled to fit any size operation, see www.ihst.org.

2. Training: The operator should be able to show that its pilots and other essential employees participate regularly in initial and recurrent training. The IHST analyses concluded that small operators would benefit in more frequent simulator training and specialized training in Aeronautical Decision Making, Crew Resource Management (CRM), instrument meteorological conditions (IMC) recognition and avoidance, mission specific training and make/model transition training. Although full motion simulator training is desirable, it is not always a practical consideration. Recent technological advances have made desk top flight training devices a practical means of receiving certain training. Collection of information by the operator's SMS will help identify specific training needs. Many OEMs also offer ground and/or flight training which are of high value.

Training	Each element = 3	Each element = 2	Each element =1
Training requirements established by operational data/events/reporting	No system to identify training needs	Basic training needs established, not linked to an SMS	Training needs established and kept current by SMS process
Basic training curricula for helicopter pilots – Aeronautical Decision Making (ADM), Recognition and Avoidance of IMC (IMC) and Crew Resource Management Training (CRM)	No basic plan established	Basic plan established, partially complete	Basic training complete, recurrent training planned every 3 years
Operation specific training for mission, make model transition, power management, etc.	No operation specific training plan established	Operation specific training plan established, partially complete	Operation specific training complete, recurrent training carried out
Simulator training	No simulator training planned	Training plan in place utilizing desktop flight training devices	Training plan in place utilizing best available simulator training devices.

Note: The IHST has developed an training 'toolkit" which offers guidelines for establishing training programs for any size operation, see www.ihst.org.

3. Systems and Equipment: Each operator should be able to verify that their helicopters are equipped with fully functioning safety equipment such as shoulder harnesses at each seat location, crash resistant fuel systems and wire strike protection systems. Also, the operator should be able to show that its helicopters are equipped to minimize risks associated with intrinsic mission risk. Examples include, but are not limited to, floats for operations over water, load devices for heavy lift, EVS/SVS/NVG equipment for operations in poor/low visibility, radar altimeters for low altitude operations, and personal locator devices for remote and/or over water operations.

Helicopter Systems and Equipment	**Each element = 3**	**Each element = 2**	**Each element = 1**
Mission specific safety equipment requirements	No requirements established	Can show evidence of developing mission specific safety equipment requirements and timeline to implement plan	Installed additional equipment to mitigate inherent mission risks - i.e., floats, night vision goggles, load sensing devices, wire strike protection, etc.

4. Information: Through detailed accident analyses the IHST determined that lack of information about the operation of an aircraft prior to an accident was a frequent issue. Several manufacturers have recently developed simple devices that record primary operating parameters (attitude/altitude/airspeed/rotor speed, etc) and basic cockpit image and voice recording capability. These devices are relatively simple to install and are gaining the support of several large helicopter manufacturers. This will assist accident investigators in gaining full understanding of accidents which will ultimately allow for more meaningful safety improvements to be made in the future.

Information	Each element = 3	Each element = 2	Each element = 1
Simple Flight Data Recorders (FDR)	No FDR usage	Plan to install FDR with installation timing identified	FDR installed
Flight Data Monitoring (FDM), (not applicable to private, not for hire operators)	No FDM	FDM fitted, not adequately utilized or managed.	FDM fitted, data downloaded, analyzed and appropriately managed

Note: The IHST has developed an FDM 'toolkit" which offers guidelines for establishing flight data monitoring programs for any size operation, see www.ihst.org.

5. Maintenance

Maintenance error frequently contributing to accidents has been found to be directly related to non-compliance to the OEM's published Instructions for Continued Airworthiness (ICA). IHST recommends strict adherence to published ICA and confirmation by improved maintenance Quality Assurance (QA) functions. The operators SMS should address alternate oversight and QA processes for remote maintenance.

Modern digital technology has enabled introduction of monitoring systems in new larger helicopters and some of these capabilities are becoming economically feasible for smaller helicopter applications. A top recommendation for maintenance related accidents is implementation of basic Health and Usage Monitoring Systems (HUMS) or Engine Monitoring Systems (EMS) as a maintenance tool to reduce system failure risk.

Maintenance (Mx)	**Each element = 3**	**Each element = 2**	**Each element = 1**
Monitoring helicopter airframe and engine health	No engine or airframe monitoring	Plan to establish basic engine or airframe monitoring with implementation timeline	Basic vibration health monitoring for engine and airframe in use and part of SMS
Monitoring Mx, (not applicable to private, not for hire operators)	No Mx Quality Assurance (QA) or internal auditing program	Mx QA program exists but not effectively managed and/or implemented	Effective Mx QA program in use and part of SMS

	SMS, Risk Identification & Avoidance					Training						Helicopter Systems & Equipment			Info		Mx		
	Op Guidelines	Documented SMS	Safety Reporting Sys	External Risk Consultants	Accident Record	Data Driven Training Rqts	Basic Training	Specific Training	Simulator Training	OEM Training	Fund Set Asides	Basic Equipment	Mission Specific Equipment	Type Design Upgrades	Simple FDR	FDM/FOQA	Health Monitoring	Mx / Overhaul QA	**Total**
Op 1	1	2	2	1	1	2	1	2	3	1	1	1	1	2	2	2	1	2	27
Op 2	3	2	2	2	2	3	3	2	2	2	1	2	2	2	1	2	2	3	38
Op 3	2	1	2	2	1	3	1	1	2	2	2	1	2	2	1	2	2	2	31
Op 4	1	1	1	2	1	1	2	2	2	1	2	2	1	1	1	1	1	1	24
															Average Score				30

Scoring: Green: ≤ 25 pts, no red Yellow: ≤ 30 pts, ≤1 red Red: ≥ 31 pts, ≥ 2 red

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