



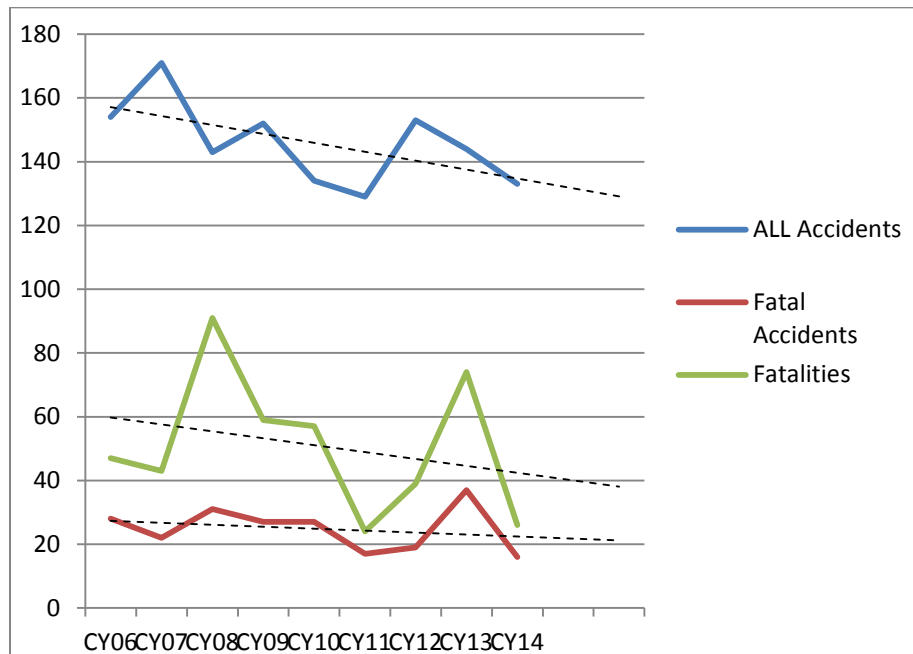
Rotorcraft Safety Initiative (RSI)

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Background for initial efforts of FAA Aviation Safety, Aircraft Certification and the Rotorcraft Standards Staff to concentrate efforts on the **fatal** helicopter accidents. This initiative is in response to the significant increase in fatal accidents in FY13. This data would also support the movement towards Survivability and Fatalities additional focus for IHST.

Fatal helicopter accidents reached devastating levels in fiscal year 2013. That year ranked as the highest fatal accident count since 1994, resulting in 161 accidents, 37 fatal accidents, and 74 fatalities. In comparison, commercial aviation (Part 121) suffered zero fatalities. If you look at the past five years, the rotorcraft industry has experienced 253 fatalities. This is equivalent to the loss of all passengers aboard two Boeing 737s. The Federal Aviation Administration’s mission is to provide the safest, most efficient aviation system in the world, and we are failing. The Rotorcraft Safety Initiative (RSI) was formed to identify Intervention Recommendations to eliminate similar fatal accidents from occurring. This initiative will generate bold and rapid solutions that when implemented will radically improve rotorcraft safety, resulting in the highest safety indices in aviation history.

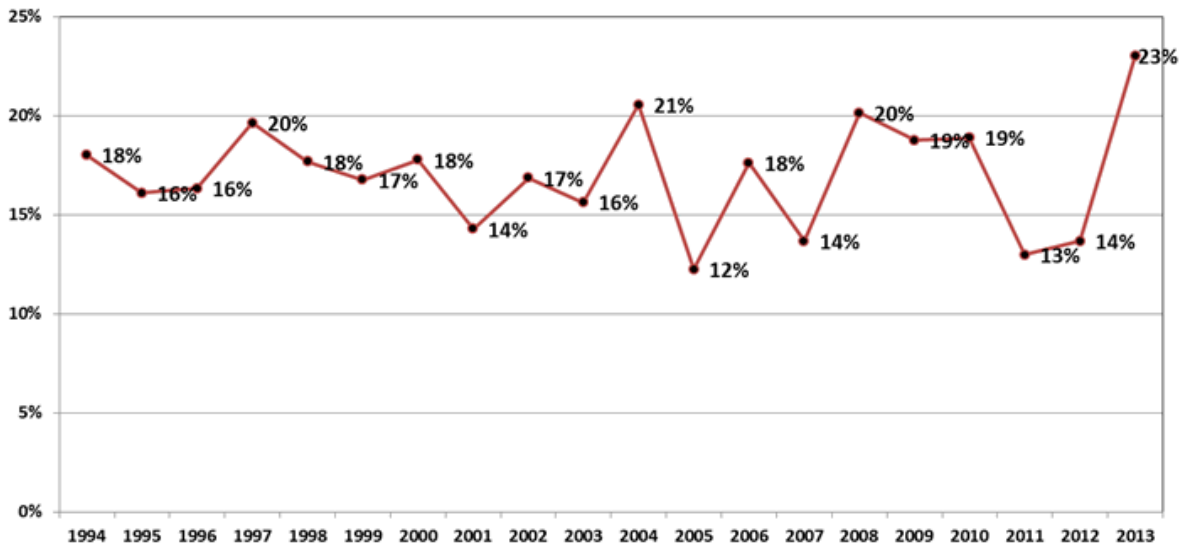
The following chart that shows the progress of IHST since its creation in 2006:



Positive downward trend in **ALL Accidents**. Positive downward (minor) trend in **Fatalities** and **stagnant** trend for **Fatal** accidents.)

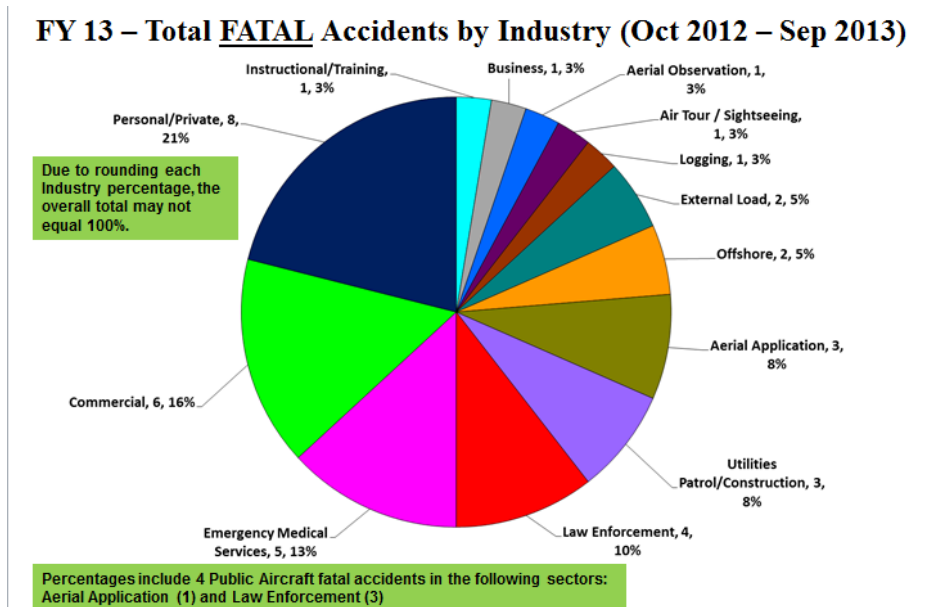
The following charts are extracted from the FAA Rotorcraft Directorate (ASW-100) Monthly Accident Briefing and are depicted in Fiscal Year format:

Fatal Rotorcraft Accidents as a Percentage of All Rotorcraft Accidents – 20 Year Lookback



Top 5 Fatal Industries (CY 09-13)

1. Personal/Private (32)
2. Commercial (16)
3. HEMS (15)
4. Law Enforcement (10)
5. Aerial Application (09)



The following information is derived from the same methodologies as used in the U.S. JHSAT efforts involving helicopter accident analysis. Additional analysis at a higher level was accomplished by the U.S. JHIMDAT on CY09-11. A limited effort internal to the FAA was accomplished on fatal accidents within the following Fiscal Years: FY 12 and 13. No further detailed analysis was accomplished to support this effort.

Top 5 "Priority" Fatal Occurrence Codes (CY 09-13) with following associated tables:

1. Loss of Control (35)
2. Strike (29)
3. Visibility (29)
4. System Component Failure (12)
5. Fuel (5)

LOC - Loss of Control	DR - Dynamic Rollover	2
	LTE - Loss of T/R Authority	2
	OL - Exceeding Operating Limits	8
	PM - Performance Management	10
	UNK - Unknown	13
LOC - Loss of Control Total		35

Strike	HTOL - Takeoff or Landing	5
	LALT/M - Low Altitude Mission	14
	OBJ - Object Strike	10
Strike Total		29

VIS - Visibility	FG - Fog/Glare	6
	IIMC - Inadvertent IMC	18
	N - Night/Darkness	5
VIS - Visibility Total		29

SCF - System Component Failure	E - Engine	1
	H - Helicopter	11
SCF - System Component Failure Total		12

FUEL	Ex - Exhaustion	5
	ST - Starvation	2
FUEL Total		7

During the development of the U.S. JHSAT Compendium report, the team began to highlight fatal accidents. We identified the following: Injury data from the three year roll-up of helicopter accidents show that 16% of the accidents produced a fatal injury of at least one or more of the occupants.

The following tables represent the “Top Five” as it relates to FATAL accidents in the 2000, 2001 and 2006 datasets:

84 Fatal Accidents of 523 Total Accidents (16%)

Occurrence Category – FATAL vs. All Accidents

Fatal	ALL	Occurrence Category	Sub-Occurrence Cat
1	12	FIRE	P - Post Impact
2	15	VIS - Visibility	IIMC - Inadvertent IMC
3	7	Strike	OBJ - Object Strike
4	3	SCF - System Component Failure	H - Helicopter
5	18	VIS - Visibility	N - Night/Darkness

There was only one Occurrence Category within the “Top Five” for “Fatal” accidents that would have also ranked in the “Top Five” for “All” accidents: SCF – System Component Failure, H – Helicopter. The Occurrence Category of Fire, P - Post Impact, which ranks the highest amongst the Fatal Occurrence category ranks 12th when considering “All” accidents. The highest ranking Occurrence Category of “All” accidents is AUTO – Autorotation, E – Emergency and that would rank 9th when considering “Fatal” accidents only.

Standard Problem Statements (SPSs) – FATAL vs. All Accidents

Fatal	ALL	SPS Level 1	SPS Level 2	SPS Level 3
1	2	Pilot Judgment & Actions (PJ&A)	Human Factors - Pilot's Decision	Disregarded cues that should have led to termination of current course of action or maneuver
2	8	Pilot Judgment & Actions	Flight Profile	Pilot’s flight profile unsafe – Altitude
3	18	Post-crash survival	Crashworthiness	Post-crash fire
4	16	Pilot Judgment & Actions	Human Factors - Pilot's Decision	Willful disregard for rules and SOPs
5	48	Safety Management	Safety Program	Insufficient employee performance monitoring

There was only one SPSs within the “Top Five” for “Fatal” accidents that would have also ranked in the “Top Five” for “All” accidents: PJ&A, Human Factors - Pilot's Decision, Disregarded cues that should have led to termination of current course of action or maneuver. The highest SPS for “All” accidents PJ&A, Human Factors - Pilot's Decision, Autorotation – Forced ranks 12th when considering “Fatal” accidents. As you can determine from the table above, the items ranked 3-5 would be not be ranked in the “Top 15” when considering “All” accidents.

Intervention Recommendations (IRs) – FATAL Accidents vs. ALL Accidents

Fatal	ALL	IR Level 1	IR Level 2	IR Level 3
1	31	Systems and Equipment	Post Incident Survivability	Crash resistant fuel systems
2	4	Safety Management	Risk Assessment/Management	Personal Risk Management Program (IMSAFE)
3	29	Safety Management	Safety Culture	Establish risk assessment program to eliminate culture of non-compliance
4	5	Training/Instructional	Safety Training	Training emphasis for maintaining awareness of cues critical to safe flight
5	13	Safety Management	Risk Assessment/Management	Establish/Improve Company Risk Management Program

Note: The Top 5 IRs represent 15% of the approximately 165 + IRs in the Joint Helicopter Safety Analysis Team methodology for FATAL Accidents ONLY.

There was only two IRs within the “Top Five” for “Fatal” accidents that would have also ranked in the “Top Five” for “All” accidents: Safety Management, Risk Assessment/Management, Personal Risk Management Program (IMSAFE) and Training/Instructional, Safety Training, Training emphasis for maintaining awareness of cues critical to safe flight. The highest IR for “ALL” accidents, Training/Instructional, Advanced Maneuver Training, Autorotation Training Program ranks 73rd when considering “Fatal” accidents.

Also, in the U.S. JHIMDAT's latest report, The Comparative Report, we looked into the proportionality of Fatal and Non-Fatal accidents. This is a comparison was from the initial data set (CY2000, 2001 and 2006) to the high level analysis of CY2009 - 2011. Under the heading of "Proportions of Fatal and Non-Fatal Accidents", the team selected several different data categories to analyze whether a statistical difference existed in the proportions of fatal versus non-fatal accidents in the JHIMDAT data as compared to the JHSAT data. For each data category selected, the team performed a separate chi squared analysis.

The categories selected were:

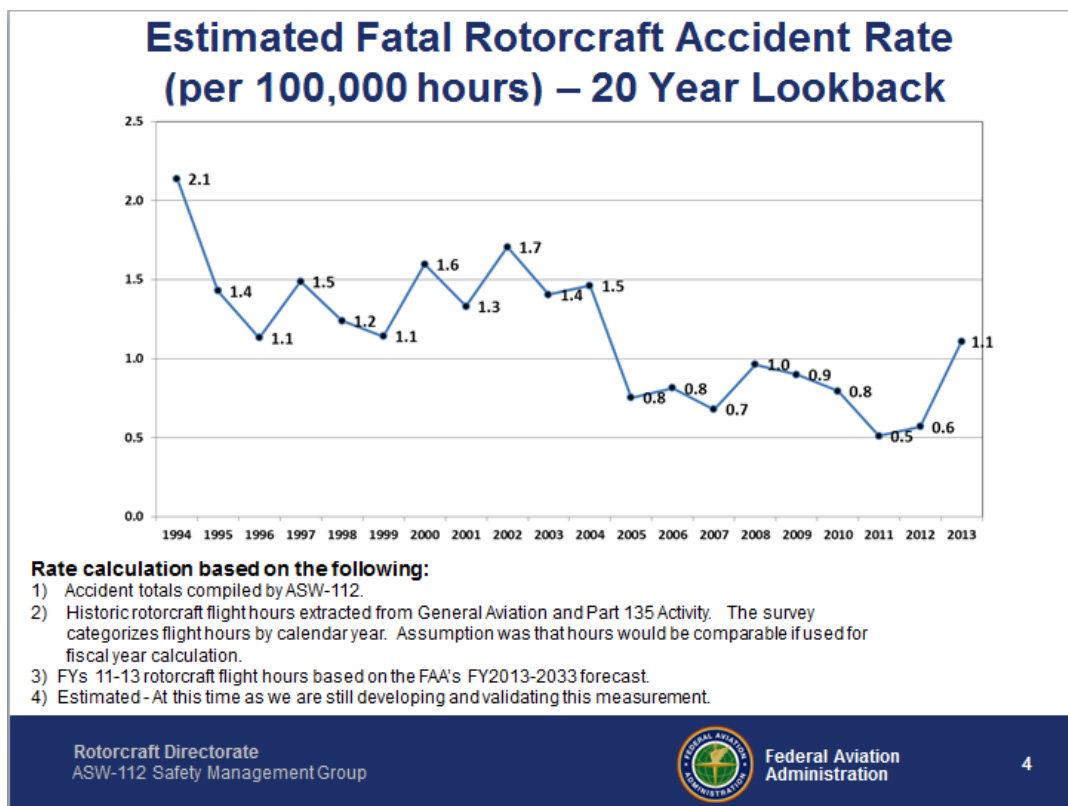
- Accidents by Occurrence Category
- VMC Only Accidents
- IMC Only Accidents
- Accidents by Pilot's Make/Model Flight Hours

Regardless of the data category used for analysis, the conclusion was the same. The proportions of fatal versus non-fatal accidents in the JHIMDAT data were not statistically different when compared to the JHSAT data.

The Comparative Report can be found at the following location:

<http://www.ihst.org/portals/54/2011%20Comparative%20Accident%20Report%20Vol%201.pdf>

The Rotorcraft Standards Staff is currently developing a methodology to accurately identify the Rotorcraft Accident Rate and Fatal Rotorcraft Accident Rates. It is important to amplify that this is preliminary and we are still developing and validating this measurement. Bottom-line: Better Data = Better Decisions.



Supporting Documentation – Do not distribute

The following tables represent the “Top Five” as it relates to ALL accidents in the 2000, 2001 and 2006 datasets:

523 Total Accidents

Occurrence Category – ALL vs. Fatal Accidents

ALL	Fatal	Occurrence Category	Sub-Occurrence Cat
1	9	AUTO - Autorotation	E - Emergency
2	15	LOC - Loss of Control	PM - Performance Management
3	4	SCF - System Component Failure	H - Helicopter
4	21	AUTO - Autorotation	P - Practice
5	7	SCF - System Component Failure	E - Engine

Standard Problem Statements - ALL vs. Fatal Accidents

ALL	Fatal	SPS Level 1	SPS Level 2	SPS Level 3
1	12	Pilot Judgment & Actions	Landing Procedures	Autorotation – Forced
2	1	Pilot Judgment & Actions	Human Factors - Pilot's Decision	Disregarded cues that should have led to termination of current course of action or maneuver
3	8	Pilot Judgment & Actions	Procedure Implementation	Pilot control/handling deficiencies
4	20	Maintenance	Performance of MX Duties	Failure to perform proper maintenance procedure
5	157	Pilot Judgment & Actions	Landing Procedures	Autorotation – Practice

Intervention Recommendations - ALL vs. Fatal Accidents

ALL	Fatal	IR Level 1	IR Level 2	IR Level 3
1	73	Training/Instructional	Advanced Maneuver Training	Autorotation Training Program
2	11	Maintenance	Instructions for Continued Airworthiness (ICA)	Follow ICA procedures with confirmation of compliance
3	35	Training/Instructional	Advanced Maneuver Training	Simulator Training - Advanced Maneuvers
4	2	Safety Management	Risk Assessment/Management	Personal Risk Management Program (IMSAFE)
5	4	Training/Instructional	Safety Training	Training emphasis for maintaining awareness of cues critical to safe flight

Note: The Top 5 IRs represent 12% of the approximately 2354 + IRs in the Joint Helicopter Safety Analysis Team methodology for ALL Accidents.

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