Integration of Aeronautical Knowledge and Safety Management into Flight Operations

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Problem

- Current trends in rotorcraft accident rates worldwide do not appear to be subsiding

- Many factors contribute to this situation

- Most important are statistics that point to the human factor

Contributing Factors
Pilot Judgment & Actions……………. 84%
Pilot Situation Awareness……………. 31%
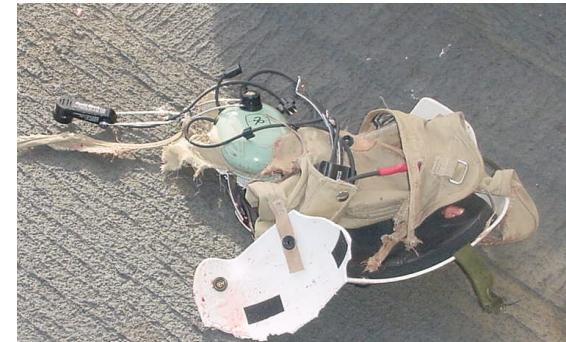Maintenance………………………….. 20%
Mission Risk…………………………. 19%

Research Question

- Can the use of graphic aircraft accident information (aligned with requisite helicopter operational knowledge) influence and enhance aircrew knowledge and learning during training to enhance safety?

Helicopter Industry Safety Situation

Accidents by Industry (523 Total Accidents)

Industry	Fatal (Red)	Non-Fatal (Yellow)
Personal/Private	19	78
Instructional/Training	7	85
Aerial Application	4	50
Emergency Medical Services	10	30
Commercial	7	32
Law Enforcement	5	29
Air Tour / Sightseeing	3	28
Business	3	22
Aerial Observation	6	16
Offshore	5	17
Firefighting	7	12
Logging		10
External Load		14
Utilities Patrol/Construction	3	8
Electronic News Gathering	3	6

Total Accidents

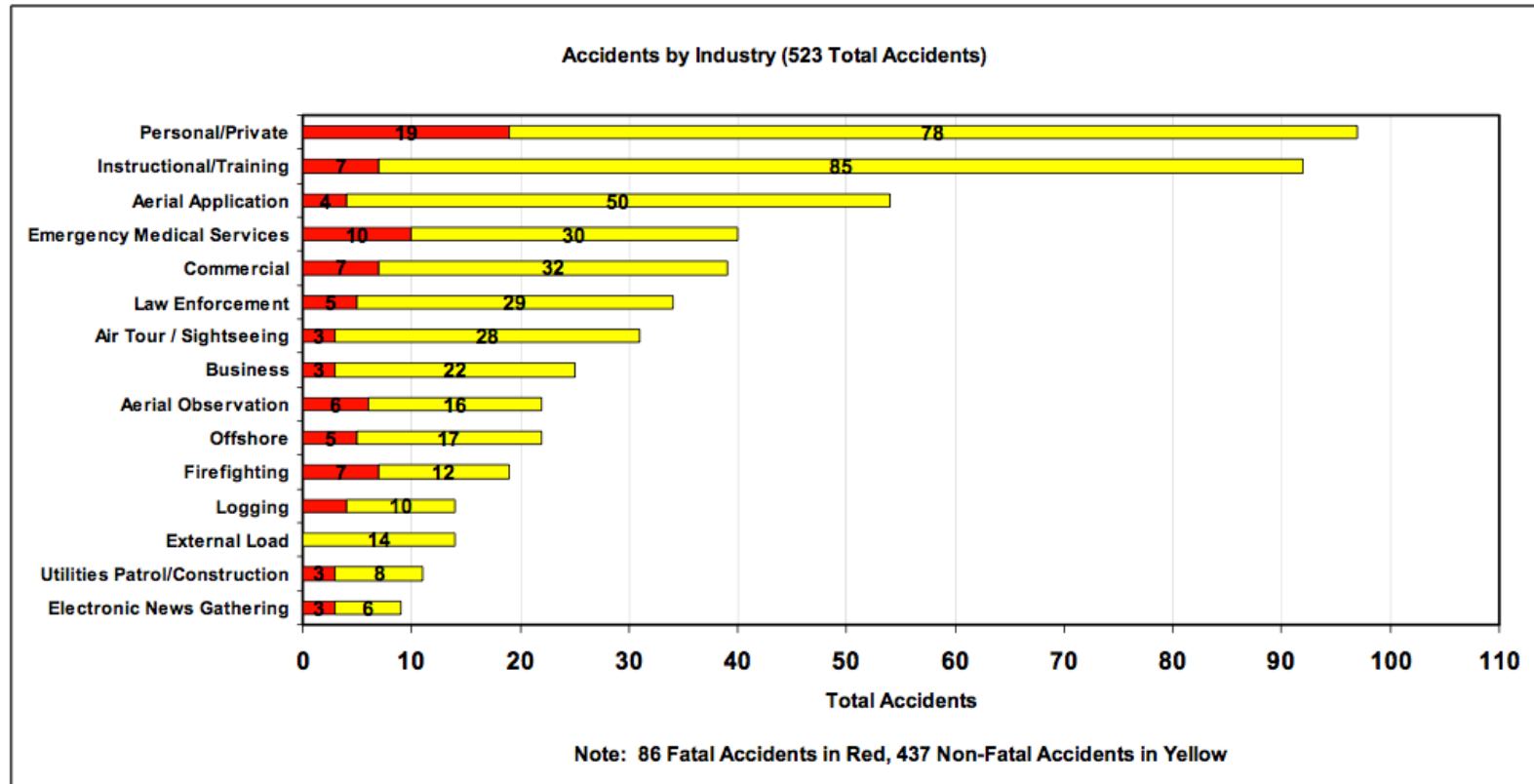Note: 86 Fatal Accidents in Red, 437 Non-Fatal Accidents in Yellow

Figure 6. Accidents by Industry (523 Total Accidents)
Note: 86 Fatal Accidents in Red, 437 Non-Fatal Accidents in Yellow

Source: Data from multiple documents from the International Helicopter Safety Team, www.IHST.org

TALKING POINTS
- THE INDUSTRY SEGMENTS WHOM ARE HAVING THE MOST ACCIDENTS IN THE INDUSTRY ARE PERSONAL/PRIVATE AND INSTRUCTIONAL/TRAINING
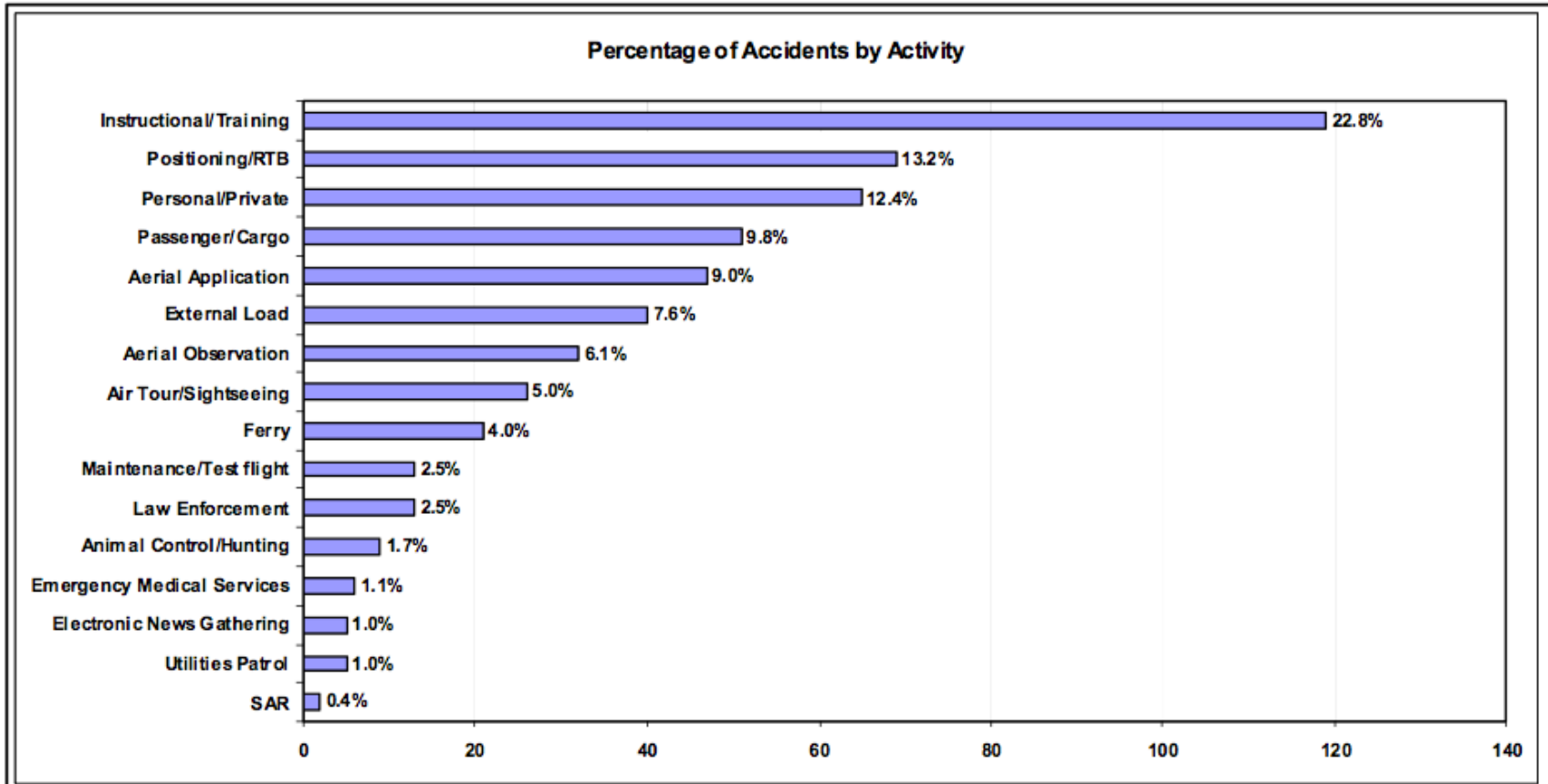
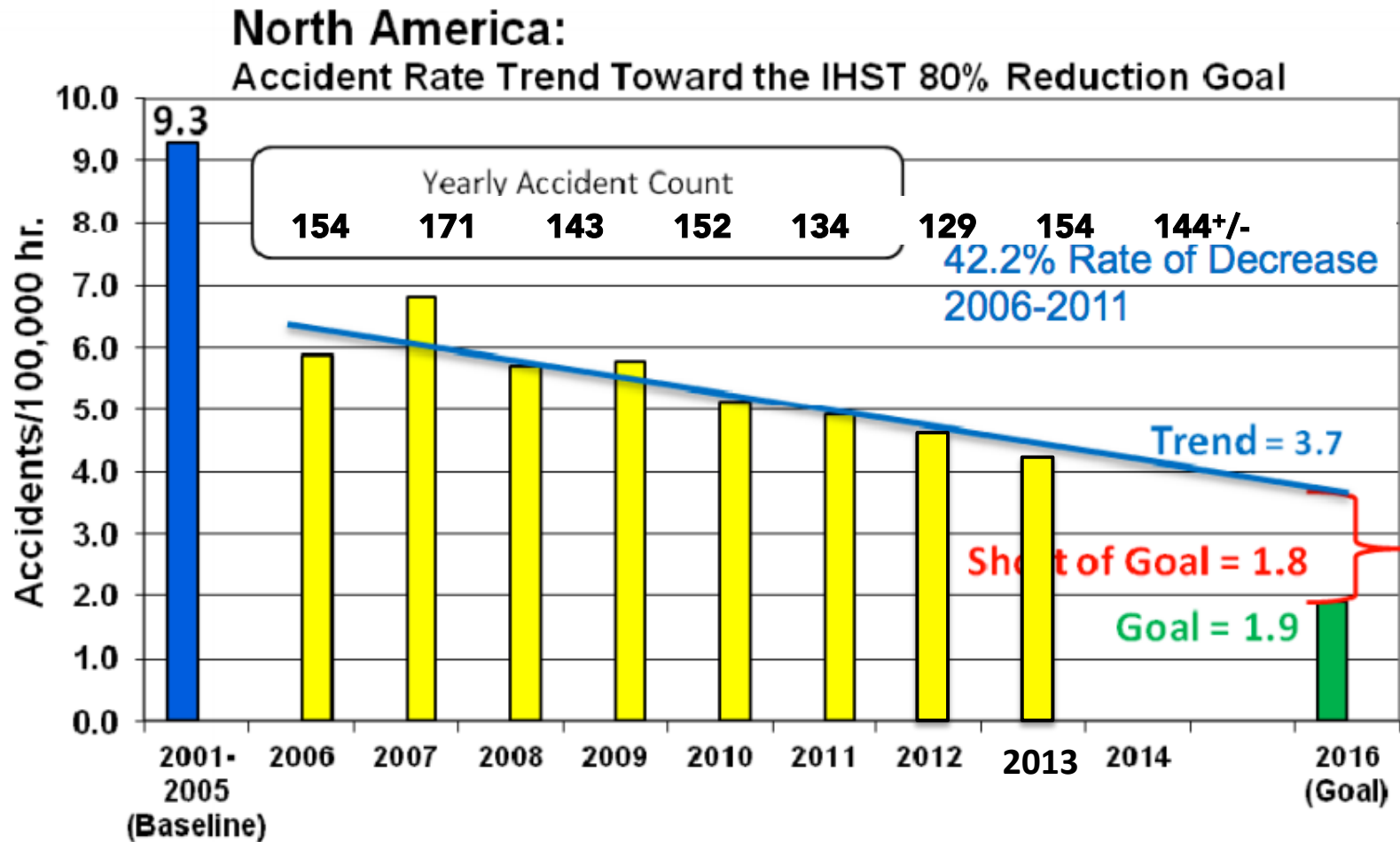# Helicopter Industry Safety Situation

Percentage of Accidents by Activity

Activity	Percentage
Instructional/Training	22.8%
Positioning/RTB	13.2%
Personal/Private	12.4%
Passenger/Cargo	9.8%
Aerial Application	9.0%
External Load	7.6%
Aerial Observation	6.1%
Air Tour/Sightseeing	5.0%
Ferry	4.0%
Maintenance/Test flight	2.5%
Law Enforcement	2.5%
Animal Control/Hunting	1.7%
Emergency Medical Services	1.1%
Electronic News Gathering	1.0%
Utilities Patrol	1.0%
SAR	0.4%

Figure 7. Percentage of Accidents by Activity

Source: Data from multiple documents from the International Helicopter Safety Team, www.IHST.org

TALKING POINTS
- NOTICE THE ACTIVITY'S FOR THE TWO SEGMENTS PERSONAL/PRIVATE AND INSTRUCTIONAL/TRAINING ARE ALSO DISPLAYED IN THE TOP THREE ACCIDENT FREQUENCIES.

Helicopter Industry Safety Situation

North America:
Accident Rate Trend Toward the IHST 80% Reduction Goal

Yearly Accident Count: 154 171 143 152 134 129 154 144+/-

42.2% Rate of Decrease 2006-2011

Trend = 3.7

Short of Goal = 1.8

Goal = 1.9

Source: Data from multiple documents from the International Helicopter Safety Team, www.IHST.org

TALKING POINTS
- TRENDS ARE POSITIVE, BUT THIS DOESN'T ACCOUNT FOR DIFFERENES IN AMOUNT OF FATALS, NOR DOES IT ACCOUNT FOR THE SEEMINGLY STATIC YEARLY ACCIDENT COUNTS

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The Training Environment and Culture

- Current Aeronautical Knowledge Training Approach
  - FAR Part 61/141 dictate requirements for certifications and ratings
  - Limited resources accompanying regulations to develop aeronautical knowledge
  - Schools often offer minimum needed to pass FAA tests (anomaly's are large Pt. 141 institutions)
  - NTSB utility

Discussion Cont.

- Use of graphic illustration in training/education
  - AASL promotes use of multimedia as an evolutionary area
  - Media can "help build and analyze mental models of problem situations"
  - Graphics enhance learning across a variety of tasks
  - Cognitive theory of multimedia learning as complementary to verbal learning

(AASL, 2013; Huerta, 2006; Huk & Steinke, 2007; Mayer, Hegarty, Mayer, & Campbell, 2005; Zacks & Tversky, 2003)

TALKING POINTS
- THE AVIATION INDUSTRY HAS BEEN PROMOTING THE USE OF GRAPHIC INFORMATION FOR DECADES
- IMPLEMENTING GRAPHIC DETAILS IN EDUCATION AND TRAINING HAVE FOUND TO BE EXTREMELY USEFUL

Visual Learning Facts

- Approximately 65% of the population are visual learners
- The brain processes visual information 60,000 times faster than text
- 90% of information that comes to the brain is visual
- 40% of all nerve fibers connected to the brain are linked to the retina
- Visual literacy is the ability to encode and decode
- Visual aids in the classroom and prove learning by up to 400%

http://www.studymode.com/essays/Statistics-On-Visual-Learners-1211593.html

Challenges To Graphic Detail

- Sensitivity

- Perceptions of Government establishing low quality

- Potential Manufacturer litigation

Potential Course of Action

- Full Industry/FAA support of bringing graphic information into aeronautical knowledge to enhance awareness and applicability of skills training to aeronautical/safety knowledge.

Recommendations

- Solution is simple and cost effective
  - Graphic results in training and in recurrency
- The result is a cost effective, poignant method of integrating safety awareness into actual training, which further enhances the organizations safety management processes.

Thank you for attending this session

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