

Report Documentation Page

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14. ABSTRACT When flying in low level environments, impact with suspended wires continues to be a significant threat for both military and civilian pilots. The primary objective of this effort was to couple scientific content and instructional methods with the latest proven technologies and theories related to pilot spatial perception of wires, or other airborne obstacles. NAMRL provided both scientific and technical support to the Naval Survival Training Institute. NAMRL conducted a thorough review of existing aviation data related to wire-strike mishaps and incidents, including civilian and DoD wire-strike mishaps to identify both quantitative and causal factor variables. Based on the outcome of the analysis, NAMRL created learning objectives to guide the development of a wire-strike avoidance training module. The finalized version of this teaching tool was presented to the NSTI Senior Directors in early January 2010. Post presentation feedback for this product was very positive, and the final product for this effort was delivered during the last week of January 2010.			
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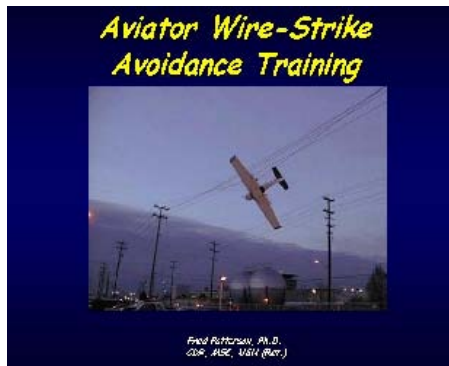
RESEARCH INFORMATION BULLETIN

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Aviator Wire-Strike Avoidance Training



When flying in low level environments, impact with suspended wires continues to be a significant threat for both military and civilian pilots. Data from the National Transportation Safety Board indicates during a recent five year period (2005-2009), wire-strikes involving U.S. civilian pilots damaged or destroyed 79 aircraft and caused 62 fatalities. Within the U.S. Department of Defense (DoD), suspended wires also pose a major risk for military aviators whom are often required to fly low altitude flights over unfamiliar terrain. Military safety reports indicate,

over a ten year period extending from 1994 to 2003, Army helicopter pilots were involved in 34 wire-strike mishaps which unfortunately resulted in 7 deaths. In addition to the rotary wing community, fixed-wing military aircraft have encountered similar wire-strike problems. The combined annual wire-strike rate for the Navy, Marine Corps, and Air Force fixed wing communities consistently reaches an average of 2 to 3 mishaps per year.

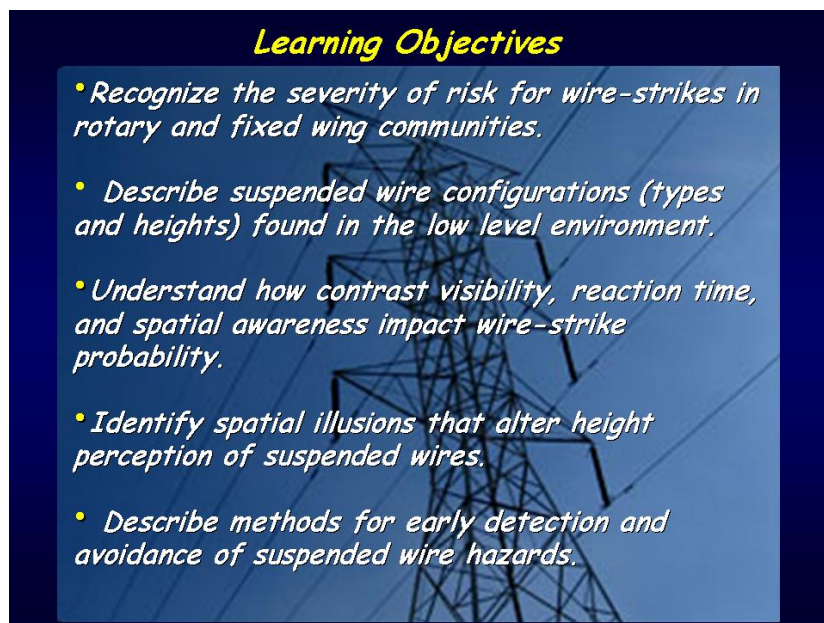
To enhance mission performance by reducing the threat of wire strikes, the Naval Air Systems Command (PMA205) funded NAMRL to research wire-strike causal factors and produce training methods for reducing these types of mishaps. The primary objective of this six month effort was to couple scientific content and instructional methods with the latest proven technologies and theories related to pilot spatial perception of wires and other airborne obstacles. To accomplish this task, NAMRL provided both scientific and technical support to the Naval Survival Training Institute (NSTI). The broad scope of this support included: (1) advising NSTI on current and emerging research related to in-flight spatial awareness and aerospace physiology training and (2) recommending technical media for presentation of NSTI courseware. Detailed aspects of this collaboration involved NAMRL drafting specific text content and graphic storyboard material for upgrading courseware related to aviation spatial disorientation mishaps



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lessons learned, aviation spatial strategies, and perspective illusions related to wire-strike mishaps.

To meet the specific goals of the NAVAIR tasking, NAMRL conducted a thorough review of existing aviation data related to wire-strike mishaps and incidents. This review consisted of analyzing both civilian (Federal Aviation Administration; FAA) and DoD wire-strike mishaps to identify both quantitative and causal factor variables. Based on the outcome of this analysis, NAMRL created learning objectives to guide the development of a wire-strike avoidance training module. The finalized version of this teaching tool consisted of 19 enhanced media PowerPoint slides with imbedded videos and animations. The final product also included a 4,600 word technical document with voice over, background text, and supporting references.



Learning Objectives

- Recognize the severity of risk for wire-strikes in rotary and fixed wing communities.*
- Describe suspended wire configurations (types and heights) found in the low level environment.*
- Understand how contrast visibility, reaction time, and spatial awareness impact wire-strike probability.*
- Identify spatial illusions that alter height perception of suspended wires.*
- Describe methods for early detection and avoidance of suspended wire hazards.*

To test and validate the quality and content of the Aviator Wire-Strike Avoidance Training module created by this NAMRL work effort, Fred Patterson, Ph.D., the principal developer of this product, presented the training information to the NSTI Senior Directors in early January 2010. Post presentation feedback for this product was very positive, and the final product for this effort was delivered during late January 2010.



For additional information related to the Aviator wire-strike avoidance training module, please contact NAMRL scientist Fred Patterson, Ph.D. at phone number (850) 452-4316 or by email at: frederick.patterson@med.navy.mil