Air Marshal Subroto Mukherjee Memorial Oration - 2002

Professor Douglas A Wiegmann

Dr. Douglas Wiegmann is an assistant professor of aviation human factors and associated head of the Aviation Human Factors Division at the University of Illinois. He received his PhD in experimental psychology in 1992 from Texas Christian University and received postdoctoral training in aviation psychology from the Naval Aerospace Medical Institute. Prior to coming to the University of Illinois, Dr. Wiegmann served as an aviation psychologist for the U.S. Navy and was an accident investigator for the U.S. National Transportation Safety Board (NTSB). Dr. Wiegmann has authored over 100 articles and conference presentations on topics related to human performance and aviation safety. He is also the co-developer of the Human Factors Analysis and Classification System, a method for analyzing human error in aviation accidents that has been adopted by aviation organizations throughout the world. Dr. Wiegmann has twice received the U.S. Navy and Marine Corps Commendation Medal for his significant contributions to human error research and aviation safety. He was also recently awarded the Flight Safety Foundation's de Flores Award for significant individual contributions to aviation safety. Dr. Wiegmann is a board certified human factors professional and a private pilot. He is also an active member in the Aerospace Medical Association, the Human Factors and Ergonomics Society, and the Association of Aviation Psychologists.
AVIATION HUMAN FACTORS: ACCIDENT ANALYSIS AND PREVENTION

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Introduction - Humans, by their very nature, make mistakes; therefore, it should come as no surprise that human error has been implicated in 70% to 80% of all civil and military aviation accidents. Perhaps more surprising, however, is the fact that the number of aviation accidents attributable solely to mechanical failures has decreased markedly over the past 40 years, while those attributable at least in part to human error have declined at a much slower rate. Such observations clearly indicate that interventions aimed at reducing the occurrence or consequences of human error have not been as effective as those directed at mechanical failures. Therefore, if accidents are to be reduced further, more emphasis must be placed on understanding and preventing human error in aviation.

Aim - A comprehensive analysis of existing databases needs to be conducted to determine those human factors responsible for aviation accidents and incidents. To develop new investigation methods and techniques so that data gathered during human factors accident investigations can be improved and analysis of the underlying causes of human error facilitated.

Discussion - Human Factors Analysis and Classification System (HFACS) was developed to meet these needs. This system, which is based on Reason’s (1990) model of latent and active failures, was originally developed for the U.S. Navy and Marine Corps as an accident investigation and data analysis tool. Since its original development, however, HFACS has been employed by other military organizations (e.g., U.S. Army, Air Force, and Canadian Defense Forces) as an adjunct to pre-existing accident investigation and analysis systems. Furthermore, organizations such as the FAA and NASA are also currently exploring the use of HFACS as a complement to current investigative systems within civil aviation in an attempt to capitalize on gains realized by the military. Applications of HFACS have been shown to enrich the information obtained via the analysis of aviation accident databases, as well as to enhance the quality and quantity of human factor information gathered during actual investigations. Such information has facilitated the development of objective, data-driven intervention strategies that have been effective at reducing the risk of accidents due to human factor problems.

Conclusion - These improved processes and procedures for analyzing and preventing human error can serve as a foundation upon which to base a comprehensive human factors safety program and are applicable to the aviation industry worldwide.