

Measuring and Evaluating the Safety Management System

Mark A. Friend

School of Graduate Studies
Embry-Riddle Aeronautical University
Daytona Beach FL 32114

Corresponding author's Email: mark.friend@erau.edu

Author Note: Mark A. Friend is Professor in the School of Graduate Studies at Embry-Riddle Aeronautical University, and a Certified Safety Professional (CSP). Dr. Friend is the Co-Director of the FAA Center of Excellence for Technical Training and Human Performance. He also serves as Program Director of the NIOSH-supported--through the University of South Florida Sunshine Education and Research Center (ERC)--Master of Science in Occupational Safety Management Program on the Daytona Beach Campus.

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Abstract: The general objective for this research was to develop a model to measure and test SMS effectiveness. Various methods were explored through a review of a broad array of literature, both inside and outside the field of aviation; existing models used in aviation; and extensive interviews of 22 aviation safety experts. The model was developed using the Data Envelopment Analysis (DEA) method, based on data collected from personal interviews and surveys administered online. The reliability and validity tests indicated that the survey instrument was reliable and had a high level of convergent validity. DEA models were tested by Frontier Analyst software. The models produced efficiency scores of organizations, identified inefficient organizations, and determined improvements needed to increase efficiency scores.

Overall, four DEA models were developed for four SMS components. The models calculated efficiency scores for participating organizations and identified inefficient organizations and potential improvements needed for them to become more efficient. The method provided important results pertaining to an organization's SMS effectiveness, how it performs in comparison to other organizations, and the strength of its program components. Organizations' executives could use these results to determine their position in the industry, identify potential issues with SMS inputs and outputs, and develop corrective actions to improve their SMS effectiveness. Overall, the survey instrument and DEA model have been determined to work well and provide useful results to each participant. The small sample size of the responding organizations limits the findings and does not necessarily accurately depict the populations represented. A larger sample, including more organizations with a variety of types and sizes, is recommended for future research.