High Consequence Safety Research and Policy: The US Airline Application

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Abstract

The implementation of safety programs in Flight Operations has been successful since the Federal Aviation Administration formally introduced Safety Management Systems (SMS) procedures in 2000. The addition of safety programs like SMS into aviation organizations has been confirmed to improve safety culture, communication, and overall hazard mitigation. This research explores the changes and improvements that are made in maintenance programs where an SMS is formally implemented. In the United States it is legal for children under the age of twenty-four months to fly in commercial aircraft on the lap of a parent or guardian, while being unsecured or unrestrained. Throughout the history of aviation safety there have been no improvements, regulations, or laws put in place to ensure the safety of our Nation's youngest fliers. The Policy Research Construct (PRC) will be used as a proposal for the development of advocacy for regulatory change. Through Policy Research, recommendations can be made to improve safety and create formal regulatory changes to make SMS mandatory in all aviation maintenance programs operating within the United States.

High Consequence Safety Research And Policy: The Us Airline Application

Commercial air travel is the preferred method of travel in the United States. Large volumes of passengers and the risks involved in flight operations make commercial aviation a high-consequence industry. Due to safety concerns for passengers and the public, air travel in the United States is heavily regulated by the Federal Aviation Administration. The responsibilities of the FAA include the regulation of aviation to promote and improve safety (Rodrigues & Cusick 2012). Regulations that are created and required by the FAA define the minimum standards that manufacturers, maintenance technicians, certificated pilots, and operators must comply with.

Aviation Maintenance Safety Management Systems

Safety Management Systems, or SMS programs, are standardized approaches for aviation organizations to oversee safety and provide a systematic approach to achieving acceptable levels of safety risk (FAA, 2017). Organizations may participate in safety programs to ensure the safety of their employees, passengers, and the general public. The SMS structure was designed by the International Civil Aviation Organization (ICAO) to standardize the program across various countries and operations. The structure of a Safety Management Systems is composed of four functional components or "pillars." These pillars include Safety Policy, Risk Assessment, Safety Assurance, and Safety Promotion.

Safety policy. The first component of SMS, Safety Policy primarily demonstrates management's commitment to improving safety in the organization. This component defines methods, processes, and organizational structure in meeting safety goals and establishes management transparency. The approach, processes, and policies needed to meet safety objectives are fully outlined and documented, and employee reporting and resolution systems are

developed. Both employee and management accountability, as well as cross-organizational communication and cooperation, are imperative here.

Risk assessment. The second component of SMS consists of assessing acceptable risk and reviewing or determining the need for new or revised risk controls. Here, a formal process is developed. This process is typically composed of describing the system, identifying the hazards, assessing the risk, analyzing the risk, and finally controlling the risk.

Safety assurance. The third component of SMS involves evaluating and improving the effectiveness of the implemented risk controls and supports identifying new potential hazards. This pillar ensures compliance with the Federal Aviation Administration's regulations, standards, policies and directives, and with the SMS requirements. Here, insight is provided regarding opportunities or methods for improving safety and minimizing risk.

Safety promotion. The fourth and last component is SMS Promotion. This pillar, most importantly, includes providing SMS training to the organization's employees. Additionally, communication and other actions may be included as the organization advocates and encourages a strong, positive safety culture. At this level, every employee plays a vital part in the safety of the organization.

Currently, the Federal Aviation Administration (FAA) only requires authorized part 121 commercial air operators in the United States to develop and implement a Safety Management System. The FAA and ICAO have both released documents containing safety standards defined in safety management systems. However, the lack of research into the implementation and effectiveness of SMS in aviation maintenance has been mentioned by McDonald, Corrigan, Daly and Cromie in a study of four maintenance organizations entitled *Safety Management Systems and Safety Culture in Aircraft Maintenance Organizations* (2000). Additional challenges arise

when considering the field's general substandard safety culture and the poor adherence to SMS. Adding to that, maintenance professionals are both expected and required to perform the highest standard of work whilst working in an unsafe environment. Considering this, it becomes apparent that maintenance operations alone have their own internal challenges that affect the overall performance of an organization as a whole.

Lap Children Safety

In the United States it is legal for children under the of twenty-four months to fly in commercial aircraft on the lap of a parent or guardian, while being unsecured or restrained. Throughout the history of aviation safety many efforts have been made to improve the safety of passengers, to ensure their survival in the unlikely event of an incident or accident. However, there have been no improvements, regulations, or laws put in place to ensure the safety of our Nation's youngest fliers. Numerous accidents, both fatal and non-fatal, have proven that there is a need for change. Although many leaders in the aviation safety industry have tried to change this, nobody has been successful.

Current regulations. The Federal Aviation Administration (FAA) currently recommends that children be secured in a child restraint system (CRS) for the duration of the flight, to ensure the safety of young children. A CRS is defined as a hard-backed child safety seat that is government approved for both motor vehicles and aircraft. There are two FAA approved CRS devices that parents can use: government approved infant car seats and the CARES Harness. The current guidelines and regulations pertaining to use of child restraint systems on aircraft are outlines in Advisory Circular 120-87C and InFO 15013.

Policy Research Construct

This research will utilize the Policy Research Construct (PRC), as introduced by Chien-tsung Lu and Brent D. Bowen, 2012, as a new systemic policy-making model. Lu and Bowen gathered feedback on the policy construct in 2002, 2003, and 2004, from domestic and international scholars, and first introduced the model in the aviation security field. The Policy Research Construct (PRC) is implemented by conducting research and analysis on an existing social problem, in order to provide policymakers with action-oriented recommendations for fixing the problem. The PRC includes three policymaking phases: Policy Review, Policy Research, and Policy Action. The policy review phase of the model includes first identifying the aviation policy-related problem that needs change, identifying the policy issues and legislation, and finally conducting regulatory reviews and acquisition. The phase of policy research includes determining data collection tools to be used, conducting policy analysis, and examining the analytical findings. During the policy action phase of the model, pilot-testing is run, resolved, and evaluated, and finally recommendations of policy or regulatory change are presented to the appropriate body.

Instead of the traditional approach of treating each phase as a linear, one-time process, the model is intended to combine policy review, policy research, and policy analysis as a cyclic, discursive whole. Throughout the model, the user is to incorporate new information and either continue on the path outlined, or back-track as appropriate.

Policy Research Construct Applied to Safety Management Systems

More research is needed to determine if changes in the regulation safety in aircraft maintenance is feasible and valuable. In order for the research to be valuable, the safety of aircraft maintenance operations in both large and small operations will need to be explored. By

reviewing the policies currently in place, recommendations can be designed based on the needs of maintenance operators and if those changes will have any positive or negative effects.

Policy Research Construct Applied to Lap Children

In order to conduct policy research on the topic of lap children and accurately recommend change, extensive background research is needed. In order to be successful the researcher needs to have an understanding of the environment surrounding the issue and dangers of lap children. Due to the many failed attempts at regulatory change that have occurred in the past, research needs to be done on why these attempts failed and how to improve the recommendations made, in order to ensure change.

Conclusion and Intended Outcomes

Outcomes of this policy research include changes to both aviation maintenance SMS program requirements and lap children regulations.

Safety Management System Outcome

The intended policy outcome for Safety Management Systems is the requiring of FAA Part 145 Maintenance Repair Stations to have SMS programs by the Federal Aviation Administration. This would allow for improvements in the safety culture in maintenance operations. The goal is to improve and maintain safety culture in aviation maintenance organizations, and to preserve the safety of aircraft and the flying public.

Lap Children Outcome

The intended policy outcome would include regulatory change that makes it illegal for children under the age of twenty-four months to fly without an approved child restraint system in their own seat. It is time to make air travel safe for our nation's youngest travelers.

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