Features of Implementation of Safety Management System

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The article is devoted to the issue of implementation of safety management system. It is one of the most important areas in the field of air transport. The authors are presenting modern approach to the problem. Aspects of practical realisation of safety management in National Aviation University (Ukraine) are given.

1. INTRODUCTION

Aviation is remarkable for the giant technological leaps it has made over the last century. This progress would not have been possible without parallel achievements in the control and reduction of aviation's safety hazards. Given the many ways that aviation can result in injury or harm, those involved with aviation have been preoccupied with preventing accidents since the earliest days of flying. Through the disciplined application of best safety management practices, the frequency and severity of aviation occurrences have declined significantly [1].

Although major air disasters are rare events, less catastrophic accidents and a whole range of incidents occur more frequently. These lesser safety events may be harbingers of underlying safety problems. Ignoring these underlying safety hazards could pave the way for an increase in the number of more serious accidents.

2. ICAO REQUIREMENTS

Safety has always been the overriding consideration in all aviation activities. This is reflected in the aims and objectives of ICAO as stated in Article 44 of the Convention on International Civil Aviation (Doc 7300), commonly known as the Chicago Convention, which charges ICAO with ensuring the safe and orderly growth of international civil aviation throughout the world.

In establishing States' requirements for the management of safety, ICAO differentiates between safety programmes and safety management systems (SMS) as follows [1-7]:

- A safety programme is an integrated set of regulations and activities aimed at improving safety.
- A safety management system is an organized approach to managing safety, including the necessary organizational structures, account-abilities, policies and procedures.

A safety programme will be broad in scope, including many safety activities aimed at fulfilling the programme's objectives. A State's safety programme embraces those regulations and directives for the conduct of safe operations from the perspective of aircraft operators and those providing air traffic services (ATS), aerodromes and aircraft maintenance. The safety programme may include provisions for such diverse activities as incident reporting, safety investigations, safety audits and safety promotion. To implement such safety activities in an integrated manner requires a coherent SMS.

Given the total costs of aviation accidents, many diverse groups have a stake in improving the

management of safety. The principal stakeholders in safety are listed below [2]:

- aviation professionals and aircraft maintenance engineers;
- aircraft owners and operators;
- manufacturers (especially airframe and engine manufacturers);
- aviation regulatory authorities;
- industry trade associations;
- regional ATS providers (e.g. EUROCONTROL);
- professional associations and unions;
- international aviation organizations;
- investigative agencies;
- the flying public.

3. MODERN APPROACH TO SAFETY MANAGEMENT

With global aviation activity forecast to continue to rise, there is concern that traditional methods for reducing risks to an acceptable level may not be sufficient. New methods for understanding and managing safety are therefore evolving.

In order to keep safety risks at an acceptable level with the increasing levels of activity, modern safety management practices are shifting from a purely reactive to a more proactive mode. In addition to a solid framework of legislation and regulatory requirements based on ICAO SARPs, and the enforcement of those requirements, a number of other factors, some of which are listed below, are considered to be effective in managing safety.

It must be emphasized that this approach complements, or is in addition to, the obligations of States and other organizations to comply with ICAO SARPs and/or national regulations [2]:

- application of scientifically-based risk management methods;
- senior management's commitment to the management of safety;
- a corporate safety culture that fosters safe practices, encourages safety communications and actively manages safety with the same attention to results as financial management;
- effective implementation of standard operating procedures (SOPs), including the use of checklists and briefings;

- a non-punitive environment (or just culture) to foster effective incident and hazard reporting;
- systems to collect, analyse and share safety-related data arising from normal operations;
- reliable investigation of accidents and serious incidents identifying systemic safety deficiencies (rather than just targets for blame);
- integration of safety training (including Human Factors) for operational personnel;
- sharing safety lessons learned and best practices through the active exchange of safety information (among companies and States);
- systematic safety oversight and performance monitoring aimed at assessing safety performance and reducing or eliminating emerging problem areas.

No single element will meet today's expectations for risk management. Rather, an integrated application of most of these elements will increase the aviation system's resistance to unsafe acts and conditions. However, even with effective safety management processes, there are no guarantees that all accidents can be prevented.

4. PRACTICAL ASPECTS OF SAFETY MANAGEMENT AT THE NATIONAL AVIATION UNIVERSITY

In successful aviation organizations, safety management is a core business function – as in financial management. Effective safety management requires a realistic balance between safety and production goals. Thus, a coordinated approach in which the organization's goals and resources are analysed helps to ensure that decisions concerning safety are realistic and complementary to the operational needs of the organization.

The finite limits of financing and operational performance must be accepted in any industry. Defining acceptable and unacceptable risks is therefore important for cost-effective safety management. If properly implemented, safety management measures not only increase safety but also improve the operational effectiveness of an organization.

Safety management is evidence-based, in that it requires the analysis of data to identify hazards. Using risk assessment techniques, priorities are set for reducing the potential consequences of the

hazards. Strategies to reduce or eliminate the hazards are then developed and implemented with clearly established accountabilities.

The situation is reassessed on a continuing basis, and additional measures are implemented as required. The steps of the safety management process outlined in Figure 1.
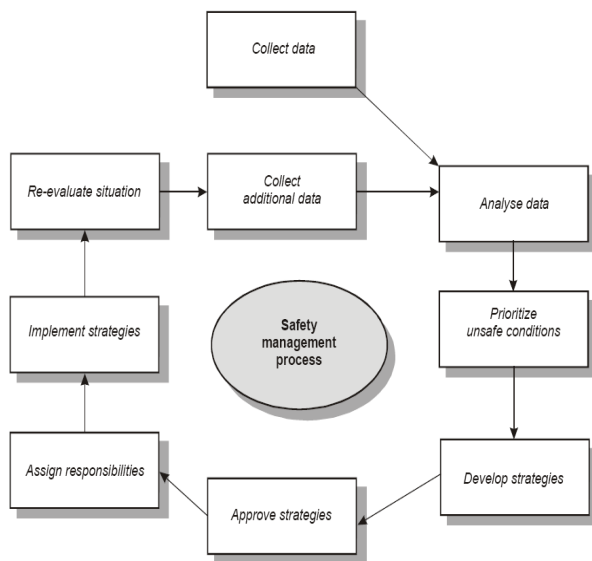

Figure 1. Structure of safety management process
Source:

At the National Aviation University (NAU) many activities, which correlated with development of the national Safety management system were performed:

- the team of NAU scientists created encyclopaedia "Safety of Aviation". This manual covers main aspects of safety of aviation (safety of flights and aviation security), Standards and Recommended practices implementation process, international and national aviation regulations, reliability of avionics and aviation facilities;
- the digital book "Decision making in aeronautical systems". This manual devoted to description of decision making process of aviation personnel. In this manual the structure of decision making, origins of errors, aspects of automation, algorithmization of decision making and implementation of decision making support systems are considered;
- the remote study course "Safety of Aeronavigation". This course is intended for remote study of students of National Aviation University via Internet. In this course the concepts of safety, hazards and risks in aeronautical system, safety management systems and measures of prevention and investigation of accidents are considered.

5. CONCLUSIONS

The Safety management involves hazard identification and the closing of any gaps in the defences of the system. Effective safety management is multidisciplinary, requiring the systematic application of a variety of techniques and activities across the aviation spectrum. It builds upon three defining cornerstones, namely:

- a comprehensive corporate approach to safety. This sets the tone for the management of safety. The corporate approach builds upon the safety culture of the organization and embraces the organization's safety policies, objectives and goals, and, most importantly, senior management's commitment to safety.
- effective organizational tools to deliver safety standards. Effective organizational tools are needed to deliver the necessary activities and processes to advance safety. This cornerstone includes how the organization arranges its affairs to fulfil its safety policies, objectives and goals, and how it establishes standards and allocates resources. The principal focus is on hazards and their potential effects on safety-critical activities.
- a formal system for safety oversight. This is needed to confirm the organization's continuing fulfilment of its corporate safety policy, objectives, goals and standards.

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