Quality, one of the most important factors in air traffic

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Abstrakt
Air transport, as one of the newest forms of transport, has undergone since its inception very rapid development. One such area that has seen tremendous progress is the quality of air transport. This area can be classified as. Security and also in recent years often mentioned the impact of air transport on the environment and especially the people. The rapid growth of air traffic, increase operational flight distances and heights affects the quality of the environment. Therefore, it is still greater attention to the problems associated with emissions of aircraft engines. Aircraft engines, like every other engine produce pollutants that affect the conditions of life on Earth. Influence of these conditions is reflected directly, air pollution, and indirectly, by the action of the physico-chemical state of the upper layers of the atmosphere.

Kľúčové slová
Quality, Availability, Security, Accidents, Environment

1. Introduction

Quality is an integral part of our lives. Exist in products and services but also in the quality of people and the overall quality of life. Quality is found wherever competition. It can effective provide the products and services, but also reduce costs and better compete for customers. Issue of quality systems is also actual in aviation. It is also seen in the policies of the State Transport Policy of the Slovak Republic. The introduction of a quality system and its certified, organization can present efforts to exactly established

procedures, so it will arrange observance established level of quality. In Europe, aviation is expending quickly. The last fifteen years has almost double. Introduction of the internal aviation market contributed significantly to accelerating the development. Plane has become normal means of transport and so, quality of aviation is very important.

2. Quality in aviation

Quality in aviation depends on several factors, for example security, accidents, environmental impact, speed, comfort, quality of service etc. In my thesis I will go about the first three, which are very important in determining the quality of aviation.
Principles of the State Transport Policy of the Slovak Republic also indicate: "Sustained increase quality of transport including the development of services in line with global trends in systemic enforcement changes of quality and its effective management" and "support the establishment and development of management systems and quality assurance in transport". These systems are built on the basis of certification of quality system independent organizations under the relevant EU policies.

2.1 Concept of creating quality systems

For building and improvement of quality management systems of organizations are now world using three concepts:

1. Concept of corporate standards:
   The need to create felt a lot of companies, mainly American companies already in the seventies in last century. Requirements for these systems were recorded to standards, which had its relevancy within the industry. Some companies are already orientate to the application of ISO or TQM principles and from this concept retreat.
2. Concept TQM:
   Concept Total Quality Management began to be used in seventies in last century for the systems of corporate management. This system is defined as constantly exploring customer satisfaction through an integrated system of tools, techniques and training. It means continuous improvement of organizational processes. The result is better quality of processes.
3. Concept ISO:
   This concept began in 1987, when International Organization for Standardization (ISO) published for the first time the set of standards, which were not deal to technical specifications for products or processes, but were orientated to the requirement of the system of quality. These standards have a universal character, they are only recommended and also they are a set of minimum requirements for the system of quality.

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2.2 Building a quality system for air carriers

Strictest requirements of the system of quality are imposed mainly on air section and technical section. For complete operation of the quality of system is useful to build the system of quality as a whole for the entire company. Because the system of quality solves problems of ensure the flow of information, mutual responsibility other and organizational activities, which are described detail and documented and so individual processes are regularly checked. Operator is required to establish a uniform system of

quality and define one manager of quality. Manager has to monitor compliance and adequacy of procedures, which are required to ensure safe operating procedures and airworthiness planes. Monitoring compliance includes the system of feedback to manager for ensure to corrective action. The system of quality has to contain a program for quality assurance, where are procedures to verify facts that all activities are conducted in accordance with all requirements, standards and procedures. Result is the highest level of safety regularity, reliability and services on board. Concept ISO is used by carriers. Through the concept of ISO, companies could build a reliable and functional system of quality.

2.3 Building a quality system in the air traffic serveces (ATS)

In 1960 was signed in Brussels Treaty establishing the EUROCONTROL to improve traffic management in European airspace. Slovak Republic as a full-member (1.1.1997) can vote in the highest bodies of EUROCONTROL. Full-member status is important because tasks in air traffic services in Europe. The harmonization of these services within the 29 Member States of EUROCONTROL is actually the solution and coordinating joint projects due to continued improvement of the quality of air traffic services. Building a quality system is a voluntary matter for the provider's ATS.
The implementation of the quality system addresses the issues of mutual responsibilities and accountability. Is clearly defined, who within the organization whom provides what services. It describes the various work activities. Implemented a system of quality must provide users with the necessary certainty and confidence that distributed aeronautical information or data meet the specified requirements for quality. The organization is very important motivation of people to the quality. It should begin by understanding the roles that individual sections deal with and their implications with consecutive activities. Every employee you should be aware of the consequences of shoddy work. Stimulating the quality will be on each employee and every employee has to feel that the work carried out is meaningful.

Certification:
Following the introduction the system of quality is the possibility that almost all organizations use, and certification of the quality management system by certification body. It is actually confirming the functionality of the quality management system by an independent third party, subject to certain requirements and a subsequent positive assessment of the certifying authority outside the organization can present a number of certificates.
The external certification authority issues certificates that are internationally valid and acknowledged by the Slovak Society for Quality. Internal certification bodies have been created by Slovak national accreditation system, but in the world are the unknown and the validity of the certificate is only in Slovakia.

3. Quality and availability

Quality includes the full range of passenger experience throughout the journey in the air transport, for example: access to the airport, the time spent at the airport as well as the services it provided, convenience and comfort on board and airport services, noise, fun, food on board an aircraft, flight punctuality. Vision and target of aviation after 2020 assumes a smooth flow of passengers the airport, at least wait before flight, any advice on waiting to check-in, eliminating delays, arrivals and departures.
Time spent at the airport by a vision of 15 minutes before departure and after arrival for short and medium lines and for long flights 30 minutes before the flight and after landing. Customer will have the opportunity to choosing their routes and services provided to it from a wide range. Conveniences on board the aircraft should meet passengers wishing to travel during work, as well as those who prefer entertainment, games, music, video, reading, or those who prefer to relax, sleep.

This will be fitted also comfortable deck aircraft, and the emphasis will be on reducing noise, vibration, turbulence interaction, better air conditioning. Nowadays, already we are seeing a growing number of airlines offering such services. Accuracy and times of departures and arrivals is a high priority to which customers will be able to rely. The aim is that 99% of flights (departures and arrivals) were in the interval of 15 minutes according to the timetable. Aviation after 2020 assumes operation with overall higher efficiency ATS, as well as the production and operation of aircraft maintenance, lower acquisition cost of aircraft, which will result in lower price which you will pay customer.

4. Security of aviation

One of the basic and also the most watched quantitative indicators of air transport safety in civil aviation, which has a decisive influence on the quality of the transport department. The safety of aviation is the most important element. The question is whether quality can ensure this element.
The role of the European Aviation Safety Agency is to assist the community in developing a uniform application of European standards for safety and environmental protection in the field of civil aviation. The proposal of law establishing common rules in the field of civil aviation, which proved to be necessary after the tragic events of 11 September 2001 in the United States, is particularly access control and checks of passengers, baggage and cargo at airports.
Experts in the field of aviation have addressed the issue of creating a common European airspace. It is expected that over the next ten years, air transport in the enlarged Union will double, and therefore it is necessary to fundamentally restructure the control and dispatching of air transport. They argue that the fragmentation of European airspace not only poses a danger to aviation safety, but also results in considerable flight delays, wasted fuel, and undermines the competitiveness of European airlines.

4.1 New requirements for airport security

With the increase in air traffic originate new needs. It is necessary to manage infrastructure more flexibly and create additional capacity, and control costs. It is also necessary to reduce delays and reduction the environmental impact. Increasingly frequent use of technologies capable of comprehensively managing all activities about flight allows you to respond to these challenges.
The efficacy and safety of air traffic management also depend on good interaction between organizations, staff and equipment on board aircraft, on the ground and in space. In an area where many stakeholders meets is essential to ensure the consistency of these requirements and ensure that they are applied uniformly and synchronously. It is necessary to introduce new rules and procedures allowing ensure an adequate level of safety in air systems.
Training and qualifications of staff also plays an essential role in safety. Pilots, air traffic controllers, the staff working on the design, manufacture and maintenance of aeronautical products, parts and equipment are or will soon be subject to common rules applicable to their qualifications, and if necessary, the licensing. It is possible that due to the evolution of technology will prove necessary to better standardize the functions performed by other staff. The Commission, if necessary, make appropriate proposals

4.2 Extending the tasks of the european aviation safety agency

The aircraft remains one of the safest means of transport thanks to the constant efforts of the aviation industry which has always put safety as a priority, which is and remains one of the highest in the world. The Commission has always sought to ensure that the creation of the internal market in air transport is flanked by development of common safety rules to ensure high and uniform standards in all Member States. Considerable progress in recent years observed, in particular the prevention of aviation accidents and incidents. Unfortunately, as is shown by the series of air crashes that happened during the summer of 2005, this level must continue to increase. To this tragic period does not turn in a regular trend of

increasing aviation safety, it is essential to continue efforts supporting this trend even intensify it. While aircraft flying within a unified market unlimited, safety standards are different in Member States.
The European Aviation Safety Agency has responsibility for the airworthiness and environmental compatibility of aeronautical. Its establishment in 2002 represented tremendous, but insufficient progress. Long series of accidents that occurred in aviation in 2005 shows that it is indeed necessary to continue the efforts to improve the general level of aviation safety.

5. Aviation accidents SR

Safety of Air Navigation, which is in all areas of civil aviation of premier, depends on the technical status of the ground installations, automation of air traffic management, quality security equipment, aircraft engineering and human factors. Expert investigations and analyzes of air accidents shows that of the factors affecting safety of aviation is increasingly becoming a critical human factor, which in various forms affect the course of almost all air incidents and accidents . It is considered that 70 to 80% of air accidents has caused human factor, although it is often referred to other cause.
Although serious accidents are large in scale aviation SR lately occur, the number of aviation incidents and accident considerable. Significant differences in the safety are occur and repeated for each group of operators. It can be concluded that this situation is directly proportional to the extent and quality of prevention, which are individual operators can provide. Their successful management requires a comprehensive approach in solving them.

5.1 Accidents in numbers

The human factor is involved in the development of aviation accidents significantly (70%) and other factors are negligible compared with him. However gratifying it may be that reached its peak in the period between 1997, 1999 and the trend is downward. Clearly it can be concluded that the human factor had in the period of highest proportion of accidents. Development of the number of accidents caused by human factor is an average of the accidents involved 70%. Evolution of the number of incidents caused by human factor is a decreasing trend in the average of 41% of incidents involved.
The main cause of confounding events was piloting techniques, inconsistent implementation of mandatory actions and wrong assessment of the meteorological situation. Very often it was pilot wrong distribution of attention, which resulted in an oversight power lines. Not only pilot error occurred to the occurrence of events. The vast majority of the accidents involved land just ground staff, and subtleties in handling aircraft. Technique shows the opposite trend and slowly rising number of incidents caused by its failure. On average, this number is about 32%. It is the fault powerplant, which form the bulk of technical reasons. Number of causes in management in recent years is rising slightly, it is moving around 5%. Significantly contribute to the failure on equipment failure and separation minimum between aircraft. A similar trend is also visible in the causes of the environment in which the total number of incidents involved 15%. We can see that it was mainly in 2001 and 2002, where there were many incidents in poor weather conditions and during clashes with birds.
All sorts of traffic problems, technical complexity of the aircraft itself, demands the use of aircraft and other reasons led ultimately to the fact that the gradual development of civil aviation aircraft equipment occurred to creating on-board systems that were designed to relieve the burden crew: from the simplest autopilots to the current systems of high automated control of the aircraft. Over time, like a man - seemingly pilot gets the status "controller board" that has no control of the aircraft almost nothing. Nevertheless, it is valid argument from the beginning. Even man's influence on the accident aircraft shows that even in this new position to pilot his great role, which in the absence of preparedness, especially in conflict situations it may occur to disastrous consequences.

The analysis of events clearly indicates the need to focus attention on the human factor, its activity clearly affects the safety of air traffic. Devote sufficient time and resources to raise awareness of safety and responsibility to oneself and also to other.

5.2 Terms of optimizing flight

Time and rapid development of technology necessarily affected the pilot's position. A gradual transition to a two-person crew in a large aircraft must be requested major changes in equipment and layout of the cockpit. Optimize the flight of aircraft is to address these key issues and requirements:

1. Increasing navigation accuracy

Navigational accuracy is a complex air traffic management solution in both the horizontal and vertical plane. This is a set of measures to increase airspace capacity over the initially limit the boundaries of thickening, mainly by reducing the spacing (horizontal and vertical). This means in particular the use of new, more accurate, but also more technically sophisticated navigation systems in both planes. These problems have been largely solved gradually since 1980 and currently bring significant operational, safety and economic outcomes.

2. Requirements for humans – Pilot

Since the original method, where crew members more or less separately executed each separately operate in managing and maintaining aircraft, respectively operation of systems and communications, the current two-member crew has this diverse set of activities to ensure its. Here is just an obvious high level of automation, which is now brought to the highest level it can be argued. Pilot might actually interfere with the operation of the aircraft only in emergency situations.

Here then is a source of new, completely different requirements for pilots and perfect physical and mental fitness, self-control and good theoretical knowledge since the very beginning of activity and the gradual acquisition of habits, leading to mastery practice in any critical situation through systematic cooperation of the two crew members in respect of all attributes of relations not only between people with each other and with strict consideration of the strengths and weaknesses in the relationship man – machine.

3. Improving safety and security

Seemingly it is the solution of technical problems. In fact, it is a complex technical, operational and organizational, economic, but also social issue in relation to the aircraft, crew, ground facilities, services, social environment, political situation and many other actors. Again, that does not resolve the sub problem at all mean noticeable progress. Very close follow-up (airplane - airport - passengers - company - politics) are mainly in marginal increments zillion questions clearly entitled to a continuous, often global processes, cooperation agreements and the need for new approaches, mutual respect and recognition.

These problems were addressed now commonly used systems, air traffic management (Flight Management System - FMS). He represents the highest degree of automation of existing transport aircraft. Solve the mutual relation not only control the aircraft, but also its navigation, planning, safety, economy and other related set of problems.

It should be emphasized that the FMS system is alive, evolving. Its widespread use has shown various shortcomings and operational problems, because innovation and new development steps are commonplace. Part of the new systems is the ground proximity warning system (Terrain Awareness and Warning System - TAWS), which significantly upgrades the capabilities of the system and can effectively minimize the risk of aircraft collision with terrain.

Flight management systems (FMS) are in any case important for various, often critical solutions to problems arising from the ever-increasing use of aircraft. The main benefits include mainly:

- increase the accuracy of the lead aircraft navigation,
- reducing the burden crew,
- increase flight safety,
- increase economies of aircraft.

If there is an increase navigation accuracy and reduces the burden on aircraft crew are basically fulfilled the basic requirements of the flight safety: compliance with specified routes, altitudes, flight modes and profiles, optimizing flight spare track compliance limit of multiples (years outside the flight envelope) and further - reducing crew workload through reliable, and rapid determination of optimal operating, replacement and emergency solutions and practices is an important benefits with regard to safety. Team-working crew is relieved by FMS series of routine work that contrast system performs accurately, quickly, reliably and efficiently at the border optimal solution. It is ultimately the economic effect (exactly summer route, the optimal amount given to the operating parameters, the choice of flight profiles, controlled operation and optimum utilization of power units etc.) leading to a clear economic benefits.

We can only assume that the new, the now famous and soon we applied the means for reducing the assumptions of threatening situations (eg, connection systems referred to FMS and TAWS), the level of security be increased. But it unchanged the man, and he remains a major factor and the main problem.

6. Impact of aviation on the environment

Air transport, allowing both passengers and freight to travel long distances in record time, has become an integral part of the company 21 century. At the same time contributes to climate change. Although the last 40 years, fuel efficiency has increased by more than 70% of the total amount of fuel continues to increase due to even higher growth in air traffic.

The consequence is the growing impact of aviation on climate: while the EU's total emissions covered by the Kyoto Protocol fell from 1999 to 2003 by 5.5%, greenhouse gas emissions from international aviation increased by 73%, which corresponds to an annual growth of 4.3% per annum.

Although air travel is still modest share of total greenhouse gas emissions (about 3%), the rapid growth undermines progress made in other sectors. If the growth continues as before, emissions from international flights from EU airports increased in 2012 by 150% compared to the level of 1990. This growth in emissions from international aviation EU would offset more than a quarter of the reductions required by the Community's target under the Kyoto Protocol. If this trend will continue, aviation happens in the longer term the main source of emissions.

6.1 Fuel consumption and its report

Fuel for aircraft often consist of more than 50% of take-off mass transport aircraft, the cost of fuel, depending on the length of lines is 25% to 45% of direct operating costs. The aircraft is the criterion fuel powertrains one of the important characteristics of not only the economy but also ecological characteristics.

We can assume that the negative impact on the environment is an adequate amount of consumed. Kerosene forms, as can be seen, only a small portion of products that are extracted annually from oil produced in the world. In the foreseeable future there will probably be no principled change in aircraft propulsion. The basis of aircraft engines remain thermal machines, the working medium is a mixture of fuel and air. There were also reports of the use of alternative fuels. Hydrocarbon fuels are and probably will remain the most affordable, easily accessible, good shelf life, good and safe energy sources.

6.2 Emissions

As the main problem remains the problem of air pollution. Part emissions, noise and smell are people directly perceived as intrusive, mostly too seriously accepted only near the airport, where the aircraft leaving noticeably less. Currently, as a harmful substance called all components are generated by the complete combustion (CO2, H2O) and those that arise from incomplete combustion (NOx, HC, soot, SO2). Part imitation of harmful substances by air is relatively small. As can be seen, the designers sooner or later technical solutions to manage, but it remains very much an unanswered question of secondary impacts on society. There is a need to monitor quality solutions in a complex, larger scale.
The future will increasingly depend on the extent and quality of education that humanity as a whole will be able to reach.

6.3 Effects of aviation on climate change

Commercial airplanes fly at altitudes of 8 to 13 km, the flight of release gases and particles which alter the atmospheric composition and contribute to climate change. Here are some of them and their effects on the environment. Carbon dioxide (CO2) is the greenhouse gas because it is emitted in large volumes and long residence time in the atmosphere. Increasing concentrations of CO2 is generally known, direct effect which is warming the earth.
Nitrogen oxides (NOx) have two indirect effects on climate. Nitrogen oxides produced under the influence of sunlight ozone, but they also reduce the ambient atmospheric concentration of methane. Both ozone and methane are strong greenhouse gases. The end result is a preponderance of the ozone effect of methane, thus warming the earth.
Water vapor released by aircraft has a direct greenhouse gas effect. However, given that it is quickly removed by precipitation the effect is small. However, water vapor emitted at high altitude often triggers the formation of condensation trails, which tend to warm the earth's surface. Moreover, such condensation trails may develop into. cirrus clouds (clouds of ice crystals). There is a suspicion that these clouds have a significant warming effect, but this remains highly uncertain. Sulphate and soot particles have a much smaller direct effect compared with other aircraft emissions. Soot absorbs heat and has a warming effect. Sulphate particles reflect radiation and have a slight cooling effect. In addition, they can influence the formation and properties of clouds.

6.4 ICAO policies to control aviation emissions

Whereas in question on the allocation without an agreement, the parties negotiating the Kyoto Protocol was agreed that the minutes include an explicit obligation for developed countries to limit or reduce emissions from aviation, working through the International Civil Aviation Organization (ICAO). The measures taken so far through ICAO have mainly to better understand the effects of aviation on the global climate. ICAO's 188 member countries failed to agree on regulatory standards or emissions charges applicable to CO2 emissions, and failed an attempt to identify and agree a suitable efficiency indicator for aircraft. However, ICAO has endorsed the concept of international open emissions trading scheme, which would be implemented through voluntary emissions trading or the incorporation of international aviation into the existing schemes.
The European Union is constantly involved in activities UNFCCC and ICAO and supports them, helping to global efforts to reduce emissions and increase participation in this effort. However, as explicitly stated in the policy statements agreed by all States Parties, it is unrealistic to expect ICAO to take global decisions on uniform, specific measures to implement all nations. It is also unlikely due to the fact that developing countries are not willing to commit to meeting more demanding policies, while not see clear examples they industrialized countries in this area. This is compounded by the fact that major industrial partners who are not bound by the Kyoto Protocol, accepted in this area no action.

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