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Impact of Regulatory Changes on Operating Procedures Design in Commercial Air Transport Operations

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Abstract: European aviation regulations have changed significantly over the past two decades. We summarized the regulations development and addressed its impact on operating procedures design in commercial air transport operations. One of the major negative consequences is a need to constantly update operations manuals. This creates challenges to the front-line staff as updates and revisions may be hard to follow. Pilots, cabin crew, dispatchers or agents who do not follow or are not aware of the latest operating procedures impose a safety hazard. We analyzed several operating procedures. Operating procedures must not only comply with current regulations; they also must be easy to understand and follow by their users. We are developing practices for more user-friendly design of Operations Manuals.

Keywords: commercial air transport; operations manual; operating procedures; AIR OPS

JEL Classification: L93; L52; R49

1. Introduction

It is important to understand challenges faced in daily commercial air transport operations. We explain decision-making process and resources used to solve both common and rare abnormal situations. One of such resources is the operations manual, which sets procedures and practices to be followed.

An operations manual of the highest quality is a valuable asset for any airline. The original goal of our research was to analyze Travel Service Airlines Operations Manual – Chapter 8 Operating Procedures: search for non-compliance with current regulations, identify weaknesses in readability and propose improvements.

During this analysis, we realized this is not a one-time task. We identified a need for a more systematic approach. We should develop practices for operating procedures design and updates. These practices must be simple and effective. Such practices are not tailored to Travel Service Airlines, thus any commercial air transport operator can benefit from them.

2. Regulatory Requirements

2.1 History of Regulations

Aviation industry faces tight regulation. Air transport is a global business. It would be ideal if we had one set of fixed regulations that would govern worldwide operations. Unfortunately, this is very unlikely to happen in foreseeable future. Each state has different or even unique environment. Some states may have a different point of view how to ensure an adequate level of safety. This causes states to create local regulations they deem optimal for their region. The International Civil Aviation Organization (ICAO) has been working on standardization for nearly 70 years. Joint Aviation Authorities was a similar type of organization established in 1970s in Europe. JAA's original intent was to regulate aircraft and power plant certification. Later they published regulations on flight crew training and licensing (JAR-FCL 1) and regulations on commercial air transportation (JAR-OPS 1).

JAR-OPS 1 was a regulation providing explicit rules on commercial air transport operations. The main disadvantage was its difficult enforceability. It was impossible to force European states to comply with JAR-OPS 1.

European Union identified the pitfall of enforceability and decided to issue a commission regulation. A 'commission regulation' is biding legislative act that does not need to be implemented by EU members, because it is immediately applied in its eternity across the European Union. So-called EU-OPS has been published as Commission Regulation (EC) No 859/2008 of 20 August 2008.

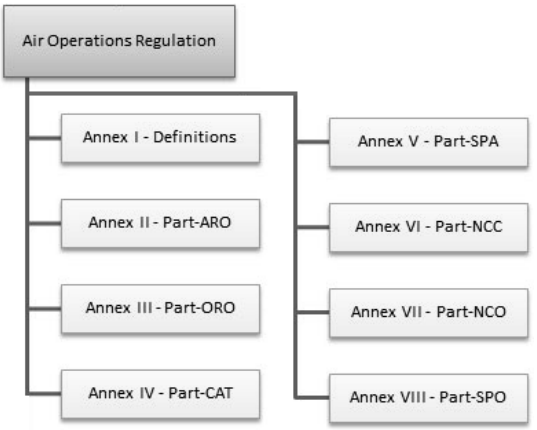
EU-OPS was very similar to JAR-OPS 1. The regulation structure is identical. EU-OPS brought changes to duty and flight time limitations, aerodrome operating minima and extended range operation twin engined aeroplanes (ETOPS). The major difference was that EU-OPS had been issued without any Acceptable Means of Compliance (AMC) and Interpretative/Explanatory Material. European Aviation Safety Agency (EASA) later published the AMC/IEM separately as Decision of the Executive Director of the Agency. The AMC/IEM was available in English language only. Many national authorities decided to translate and distribute the document to end users. Czech Civil Aviation Authority published the Czech translation as CAA-OLP-06/2008. EU-OPS was meant as a temporary solution before a transition to a new complex set of rules.

2.2 Binding Regulations

EASA has been developing a new complex set of rules from scratch. The new rules apply to air traffic in all EASA member states. These states include all European Union members, Norway, Switzerland, Lichtenstein and Iceland. The new rules set common and explicit requirements on the entire aviation industry including but not limited to flight crew licensing, aircraft certification, operator certification, airports and air traffic management.

Implementing Rules regulating air operations (AIR OPS, sometimes referred to as Part-OPS or EASA-OPS) are published as Commission Regulation (EU) laying down technical requirements and administrative procedures related to air operations.

AIR OPS is divided to 8 annexes as shown on the following schematic.



Schematic 1. AIR OPS Structure (EASA 2012)

Annex I contains definitions, Annex II (Part-ARO, Authority Requirements) describes requirements for national aviation authorities, including procedures for ramp checks. Annex II (Part-ORO, Organization Requirements) establishes requirements for air operators conducting commercial operations and non-commercial operations with complex motor-powered aircraft. Annex IV (Part-CAT, Commercial Air Transport) basically supersedes EU-OPS and JAR-OPS 3 and regulates all commercial air operations including helicopters, touring motor gliders etc. Annex V (Part-SPA, Specific Approvals) describes special operating authorization requirements for ETOPS, MNPS, LVO etc. The first five annexes were issued as Commission Regulation(EU) No 965/2012 of 5 October 2012.

Annex VI (Part-NCC) applies to non-commercial air operations with complex motor-powered aircraft. Annex VII (Part-NCO) regulates non-commercial air operations with other-than complex motor-powered aircraft. Both Annexes are parts of Commission Regulation (EU) No 800/2013 of 14 August 2013 amending Regulation (EU) No 965/2012.

Annex VIII (Part-SPO) lays down requirements on specialized operations such as glider towing, agriculture flights, aerobatic flights, aerial photography flights etc. It was issued as part of Commission Regulation (EU) No 379/2014 of 7 April 2015.

Acceptable Means of Compliance and Guidance Material is issued separately as Decision of the Executive Director of the Agency (this the same procedure which was used with EU-OPS).

Implementing Rules regulating air traffic evolve and must be amended. Revisions are however issued as new Commission regulations amending the original regulation. AMCs and GM must also be amended accordingly. It soon became almost impossible to have a good overview of current rules. As of now, there are 10 Commission regulations and over 40 Decisions in force. EASA identified the issue and published a document called ‘Easy Access Rules for Air Operations’. This is a consolidated version of Commission regulations and AMC/GM. This document is unofficial, however, very easy to use.

3. Value of Operations Manual

The primary objective of regulation in air transportations is to guarantee safe operations. Regulations say what is permissible and what is not; regulations may also give recommendations what is suitable or unsuitable. Regulations

are black and white. In real day-to-day operation, we can find occurrences in which all regulatory requirements are met and operation is still unsafe. The environment of air transportation is very dynamic and new challenges quickly arise. It is obvious, that it is impossible to build procedures to deal with any possible situation. We still need to set exact boundaries what we consider safe. The Operations Manual is used to achieve this goal. The Operations Manual is a set of some important practices on how to run an airline. It is very important that all procedures match the operational environment. Procedures which are too complicated or impractical are not being followed by many employees. It is simple to create a rule which complies with regulation, works in an artificial office environment, but in a real life scenario it is unfulfillable.

The Operations Manual influences work of many airline employees, including pilots, flight attendants, crew schedulers, dispatchers and also contract station managers, handling and gate agents. The Operations Manual is often used as a reference guide when dealing with abnormal situations. It is often accessed in time-limited situations. Every situation deviating from a routine standard requires extra attention and can possibly delay the flight. Any delay is undesirable. Even a five-minute delay caused by handling unusual bulky cargo has a negative impact on airline reputation and can cause financial loss. Airline staff usually deals with problems under significant pressure. An ability to quickly find a solution or an answer in the Operations Manual has a positive impact on operating costs and on safety.

4. Case Study

Travel Service is a charter airline with a principal place of business in Prague, Czech Republic. Travel Service is exposed to a rapid growth. Its fleet has tripled since 2008 and now counts over 45 aircraft. Apart from holiday charters Travel Service has entered a business jet market and operates four Cessna Citation Jets. Several foreign operating bases have been opened. Travel Service uses its spare capacity during winter season by deploying on ACMI contracts (Aircraft-Crew-Maintenance-Insurance – wet lease).

The above mentions regulatory changes affected Travel Service operating procedures. Every single regulatory change had to be reflected in the Operations Manual. The rapid growth also required adjustments to operating procedures. Frequency of these changes was very high; not all changes could have been promptly and accurately implemented. Some changes were only partially implemented by standalone company directives. It complied with regulatory requirements, but caused difficulties for end users. It became very difficult to track changes and navigate around the Operations Manual and company directives.

Travel Service operating procedures were analyzed during a three-year period commencing November 2009. The outcome was a draft of Chapter 8 Operating Procedures of the Travel Service Airlines Operations Manual. This draft is in accordance with AIR OPS and is designed to be user friendly.

4.1 Risk Assessment

We performed safety risk assessment of continuation of operation using the current Operations Manual. We did not follow the operator's safety management system as it was in an early stage of development and we wanted to perform an independent analysis. We used a three-step process described in AC 107-002 (Transport Canada, 2008):

- The hazard was identified as 'misunderstanding or misinterpretation of information from Travel Service Airlines Operations Manual – Chapter 8 caused by illegibility or ambiguity'.
- Safety risk severity was set to level 2 – the hazard can cause delay or induce minor financial cost.
- Safety risk probability was set to level 2 – the hazard is possible, but no occurrence has been discovered.

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Table 1. Risk Assessment Matrix

Severity	***5***	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	***2***	***3***	***4***	***5***
		Probability				

As shown in the risk assessment matrix, the level of risk is 4 and is considered 'low'. No hidden hazards exist and operations using the current manual may continue without restriction. Risk mitigation is desirable, but not time-critical.

4.2 General Comments

Simplicity, clarity and intelligibility of the Operations Manual have direct impact on effective problem solving. Human factor should be taken into consideration when drafting an Operations Manual. It is equally important as factual correctness of any procedure. Users rarely read the whole chapter or subchapter chronologically from the beginning to the end. They are usually focused on keywords. Sometimes users may even start reading in the middle of a sentence. Therefore, especially in time-critical situations, an important piece of information can be missed or misinterpreted. Such mistake can have serious consequences. An Operations Manual of the highest quality is a great source of information for smooth airline operation. To reach a high standard, we applied the following measures:

We deleted the Czech version – to avoid misinterpretation due to incorrect translation. It helped to simplify user orientation at the same time - there is no need to put large gaps between subchapters to align Czech and English text on the same level. An additional advantage is an increased font size with the same count of pages; so text legibility is better even in bad light conditions.

Company directives and new requirements of AIR OPS have been integrated.

Some parts were correct, but stylistic and graphical adjustments were made to ensure comprehensibility.

The content of every subchapter comprises a composition of different parts of AIR OPS and airline own rules. The effort is to keep all subchapters as brief as possible to cover defined content and to clearly explain operations issues at the same time.

4.3 Primary Contributions

Except for general improvement and better arrangement of chapter 8, we would like to highlight two examples of new procedures:

- Procedures for controlled rest of flight crew and flight attendants have been established. Controlled rest procedures for flight attendants are not common. Some airlines even prohibit flight attendants in flight rest. However, vigilance of flight attendants has an significant influence on safety. Suggested procedures are helpful in fight with sudden fatigue and improve the level of safety.

- Simple and effective procedures were established for a crew member incapacitation scenario. Current procedures were inconvenient and did not provide an actual solution to the abnormal situation. Unfortunately, crew member incapacitation is one of very frequent incidents in air transportation. Availability of appropriate procedures can positively contribute to dealing with unexpected situation.

5. Evaluation and Consequences

The analysis identified many issues and suggested solutions that have been implemented. It was the primary intention, however, it was a one-time task. Retrospectively, I assess the research as a partial success.

When Annex IV – Part-CAT was published as Commission Regulation, we expected a lasting and invariable set of rules would be created. Unfortunately, this was not the case. There is constant development of regulations that needs to be taken into consideration.

The expansion of Travel Service has not stopped either. Some departments were restructured. A new aircraft variant joined the fleet. A new aircraft type joined the fleet and two years later left again. It is understandable that operating procedures are being changed, new temporary directives are being created and operations manual is being revised. Therefore, it is again difficult to be well informed about latest operating procedures.

Other airlines face the very same issue – for example SmartLynx Airlines crews have to comply with numerous changes and many bulletins.

Commercial air transport operators are obligated to establish a compliance monitoring system. The IATA Operational Safety Audit (IOSA) also monitors compliance with regulations, additionally, it monitors airlines common practices. Audit outcomes and updates of regulations are foundations to next development of operating procedures. Compliance monitoring department is often overloaded by legislative requirements.

6. Conclusions

Aviation legislation lays down requirements on many processes used to develop operating procedures. These are subsequently approved and issued in the Operations Manual. Air transportation is rapidly evolving environment – businesswise and from the point of view of safety and regulatory requirements. This causes frequent changes to operating procedures.

The analysis of Travel Service Airlines Operations Manual – Chapter 8 Operating Procedures revealed two major issues: compliance with current regulations and user-friendliness. We suggested changes which aimed to mitigate both issues. We focused on human factor – we described how users access information from the Operations Manual. We searched for areas which could easily be misinterpreted. The outcome was a new version of Chapter 8. This version is easier to read and navigate around. It increases level of safety and reduces operating costs.

Further development showed that a more complex and systematic approach would be needed. Operations Manual revision is not a one-off task; it is a continuous process. Existing processes ensure regulatory compliance, however, user-friendliness is not a feature required by regulations since it is not easy to define what actually is user-friendly. Long term suitability of procedures can be determined only by extensive research and observations.

The industry critical segments are medium sized airlines (fleet size of approximately 20 to 70 aircraft). Such airlines are too big for personal information sharing and too small for tailored solutions. We continue our research on how to effectively keep all employees in the loop – not to get them overwhelmed by a large amount of revisions, keep operating procedures easy to follow and Operations Manual uncluttered.

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