



International Civil Aviation Organization

INFORMATION PAPER

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**English and
Russian only**

ACCIDENT INVESTIGATION AND PREVENTION (AIG) DIVISIONAL MEETING (2008) Montréal, 13 to 18 October 2008

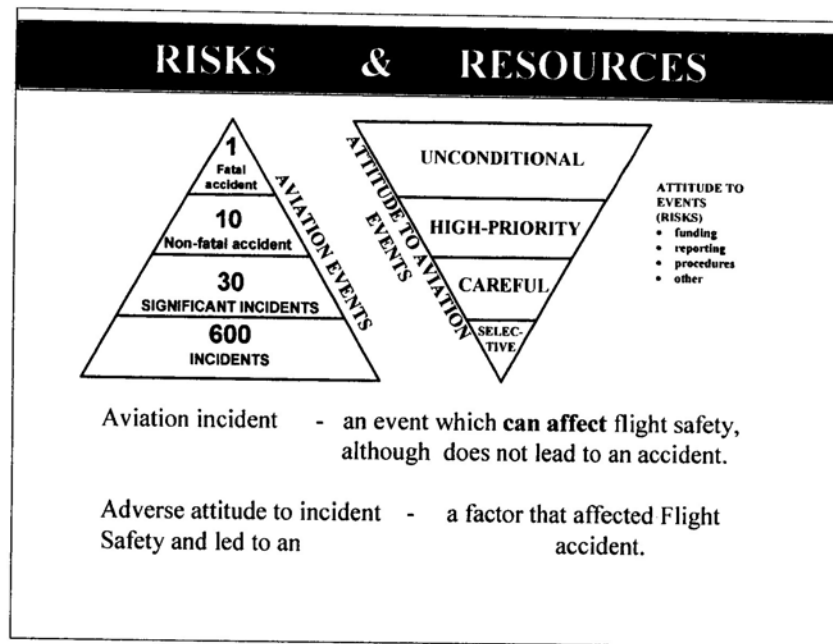
Agenda Item 2: Recent developments in investigation and prevention matters

ESTABLISHMENT AND INTRODUCTION OF ACCIDENTS PREVENTION AND FLIGHT SAFETY MANAGEMENT SYSTEM

1. INTRODUCTION

1.1 This paper explains information supporting the establishment and introduction of accidents prevention and flight safety management system.

The use of investigation process as a means to prevent accidents is certainly a logic, essential, proven and effective approach. Nevertheless, this is a passive method as it contemplates for **active steps** only after and on the condition that an aviation accident has actually occurred, i.e. when there is a subject matter to investigate. Whereupon, as practice shows, the extent of this activity is directly proportional to the "gravity" of occurrence.



The slide demonstrates how a type of aviation occurrence correlates with the attitude towards it. In the event of a catastrophe, it attracts the highest priority at all levels, at least initially. The attitude towards incidents is selective. It happens that some are not even appear in negative trend reports.

Thus, it turns out that, unless perceived the right way, an incident (being an event that **can jeopardize** flight safety but not eventually leading to an accident) **may "manifest" its hidden risk next time and affect safety ending up as an accident.**

An approach to the solution of this problem is advised in the ICAO Safety Management Manual, 2006 (Doc 9859), which recommends to evaluate **potential risk** of an event. This gives light to a logical proposal to supplement incident investigation procedures with evaluation of an incident's potential risk, thus providing the ability to take adequate preventive measures depending on the risk category.

The idea of **transition to proactive methods of safety management** has already been generally outlined in the **ICAO Accident Prevention Manual** (Doc 9422), a document that has been taken by a number of Russian airlines as the reference basis in establishing their flight safety system. First of all, introduction of a systems approach was required as a prerequisite to view any safety issues in the interdependence of three factors: "Man - Machine - Environment".

As can be seen, original developments in this direction have been initiated in Russia more than 10 years prior to publication of the **ICAO Safety Management Manual** and actual results of such flight safety management system have already been achieved.

Regarding the Safety Management Manual (Doc 9859), it should be emphasized that its publication has become a very important step in the theoretical and practical perceiving the safety concept, when the document publicly manifests the unattainability of an absolute 100% level of safety, but at the same time provides the philosophy and key recommendations on creation of a comprehensive safety control system. It is a clear and practically focused instrument for safety action. However, today it also raises some questions on application of provisions stated therein.

For example, definitions. The Manual mentions four terms:

- Safety Assurance;
- Accident Prevention;
- Risk Management;
- Safety Management.

What do they imply? Are they identical and equivalent? In our opinion, each of the above terms implies for a specific type of activity and a particular area of responsibility. This is the second question.

Third, what are we to do now with the ICAO Accident Prevention Manual (Doc 9422)?

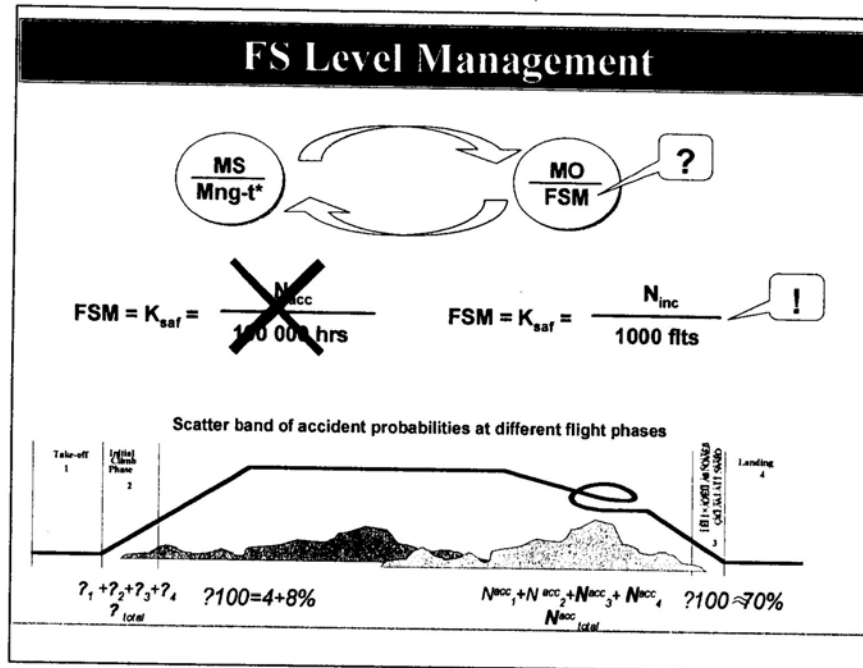
At close view of the Safety Management Manual (Doc 9859), it is obvious that the document has inherited the philosophy of accident prevention. However, some points still require answering.

Fourth, the safety management function should be structured as a normal management activity, like HR management, finance management, etc. If so, there is a reasonable proposal of the need for **education/training of safety management specialists**, in particular risk managers. Specialized **training with issuance of an appropriate diploma/certificate** is required.

Fifth, it is obvious that many countries and many operators have already accumulated certain experience in the field of safety management and accident prevention. Though Doc 9859 makes a reservation that it gives certain discretion of action and is not of a directive nature, it is desirable to **ensure and provide methodical guidance/support for the SMM** from ICAO as a consultation center on interpretation of the SMM and circulation of the best practices in the field of safety management.

Thus, we logically come to the issue of development and functioning of a safety management system.

In development of such system, it is necessary to start with a standard scheme: **Controlling Subject - Controlled Object**. Obviously, the controlling subject is represented by the airline's management team and senior airmen.



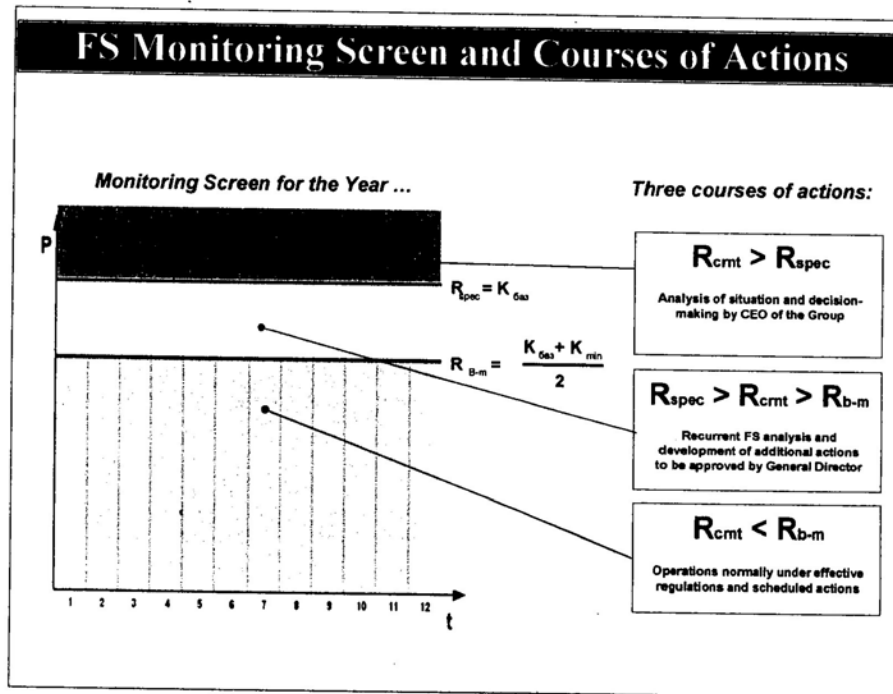
Flight safety, or more specifically the flight safety level, has been taken as a controlled object. As a criterion to measure this level, it would be possible to accept one of commonly recognized safety coefficients, e.g. number of accidents per 100,000 flying hours or per 100,000 flights, or other criteria. However, these parameters are acceptable to characterize safety status on a nation-wide or large region scale and are not suitable for operators because:

- firstly, an accident on an airline's scale is a quite rare event and sometimes fatal;
- secondly, it takes long time for an airline to fly hundreds thousands of hours or flights, thus impeding the efficiency of "online" management.

In consideration of these imperfections, one of the leading operators in Russia Volga-Dnepr Airlines has selected a parameter describing the number of **incidents per 1,000 flights**. Why **1,000 flights and not hours**. Because, as is known, about 70 percent of events occur during takeoff, initial climb and approach/landing phases, i.e. at phases accounting for only 4 to 8 percent of total flight duration. This parameter is more correct from the 'risk' point of view as the **risk is mostly connected with the number of flights rather than flying hours**.

The system has 2 levels of safety: **Acceptable Level and Reference Level**. These levels are calculated as basic key values, adjusted to account for expert evaluations, reviewed by the company's Flight Safety Committee and then incorporated into the **company's annual performance objectives**.

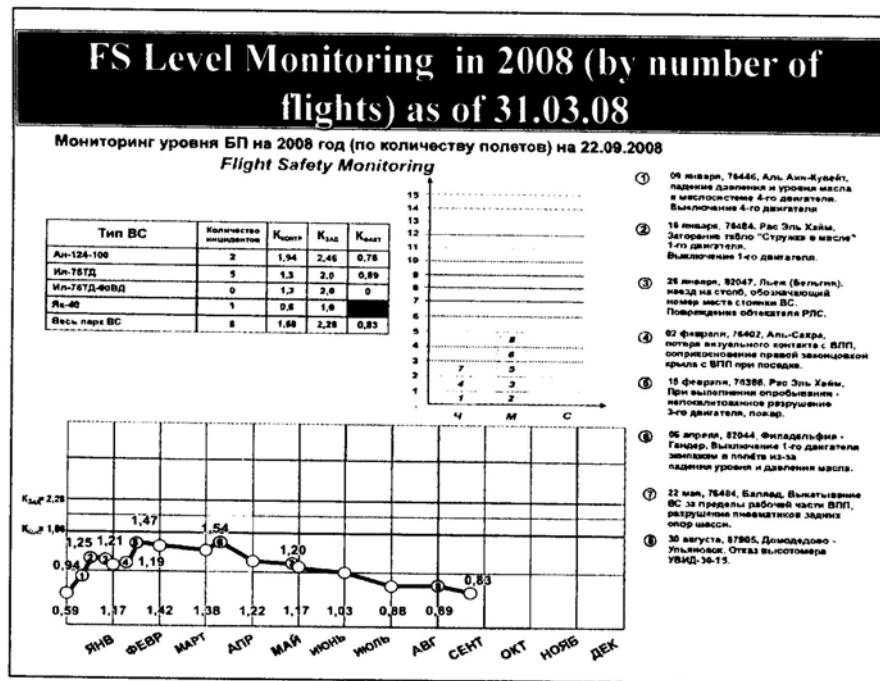
For the purpose of continuous safety monitoring, a Safety Monitoring Screen is prepared for a year, which depicts the acceptable and reference safety levels and the fields are "filled" in green, yellow and red accordingly.



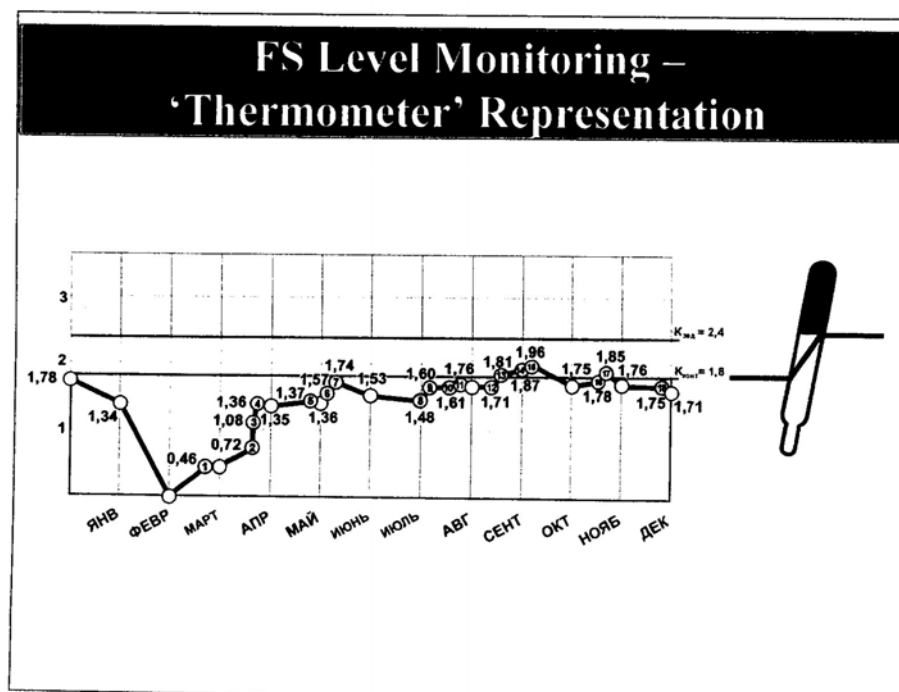
Then a **current safety level** is regularly calculated on a weekly basis and plotted on the screen. Such plotting, depending on which field the current level appears in, prompts to take necessary managerial action in order to bring the controlled object to preset borders. **Three rules of action** are effective here:

- **First:** if the current level value does not exceed the reference value, i.e. stays within the green field, activities are continued routinely (as planned);
- **Second:** if the current level value exceeds the reference value, i.e. climbs to the yellow field, this calls for an extraplanned safety analysis. Results of the analysis are reviewed at an extraordinary meeting of the Flight Safety Committee, where corrective actions and measures are worked out;
- **Third:** if such measures are insufficient and the current safety value protrudes into the red field, i.e. exceeds the acceptable level, then safety matters are brought up for attention and decision-making of top management.

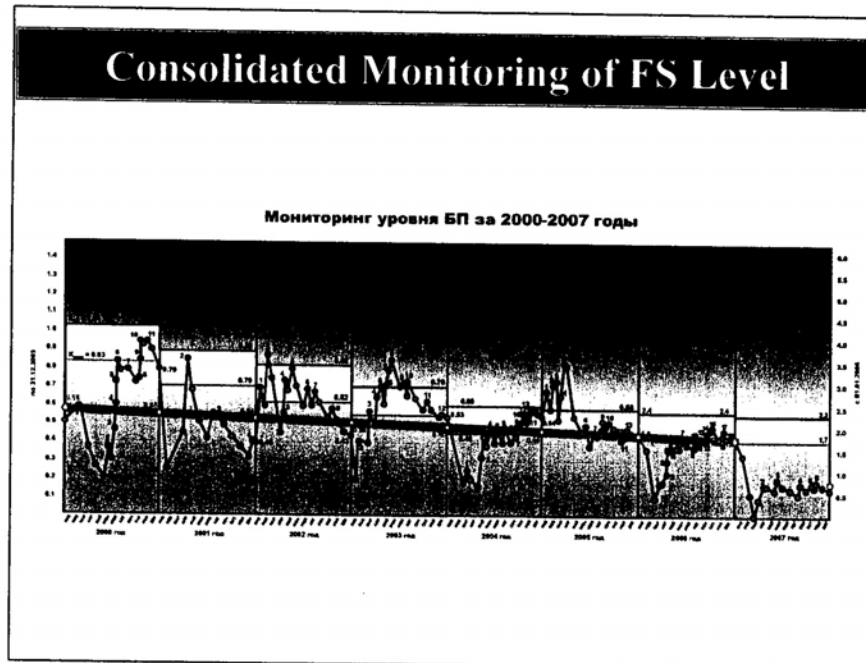
An example of an actual safety monitoring screen is shown on the slide.



The visual depiction of safety monitoring assists in another essential task – **involvement of senior management into accident prevention activities.** The advantage of this system is its simplicity and clarity.



It can be compared to a thermometer, which measures the company's "safety temperature". However, it is important to understand and bear in mind that monitoring of temperature of a sick person does not guarantee against a lethal outcome as the system does not eliminate the possibility of an aviation occurrence to happen. But it is definite that with the use of this system such possibility is considerably lower.



The slide provides combined monitoring results for 8 years, which evidently show the effect of introduction of this system.

The safety management system is continuously improved and perfected. Risk management procedures as well as a number of other measures are being currently worked out and the Russian delegation will be glad to share them with you in more detail.

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