

Annex B

Risk and Safety Benefit Analysis



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RISK AND SAFETY BENEFIT ANALYSIS

The following document (FCLTP/2-WP/18) was presented to the Air Navigation Commission (ANC) by the Flight Crew Licensing and Training Panel in response to the ANC's request.

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FLIGHT CREW LICENSING AND TRAINING PANEL

SECOND MEETING

Montreal, 31 January to 11 February 2005

Agenda Item 3 i): Develop recommendations for SARPs in Annex 1 for a multi-crew pilot licence (MPL), to include:

a) competency-based licensing and training requirements;

Report of Working Group C

**RISK AND SAFETY BENEFIT ANALYSIS FOR
THE MULTI-CREW PILOT LICENCE**

(Presented by the Rapporteur)

SUMMARY

This working paper contains a risk and safety benefit analysis for the multi-crew pilot licence (MPL). Action by the FCLTP is in paragraph 3.

1. INTRODUCTION

1.1 The Air Navigation Commission (ANC), at the 1st meeting of its 166th Session, reviewed the report of the FCLTP/1 and requested for the panel to elaborate on the safety and efficiency aspects of its proposal on the MPL. The draft risk and safety benefit analysis, as developed by the FCLTP Working Group C in conjunction with the ICAO Secretariat, and as subsequently amended by comments received from members of the working group, is contained in the Appendix to this paper.

2. MPL RISK AND SAFETY BENEFIT ANALYSIS

2.1 The table of analysis in the Appendix is divided up into three parts, to include risks and benefits that were identified in relation to the use of competency-based Standards, the reduced experience

requirements on actual aeroplane and the expanded use of a flight simulation training device (FSTD). In each part, the features of the licence are tabulated along with associated risks, specific and generic risk control measures and safety benefits. The specific risk control measures are described where appropriate in the table and the generic risk control measures are explained on the first page of the Appendix.

3. **ACTION BY THE FCLTP**

3.1 The FCLTP is invited to review and approve the draft risk and safety benefit analysis in the Appendix to this working paper for inclusion with the panel's proposal on the MPL.

DRAFT MPL RISK AND SAFETY BENEFIT ANALYSIS

Generic risk control measures include the following:

- a) **Flight Simulation Training Device (FSTD) Maturity/Sophistication.** Sophisticated FSTDs are currently in widespread use in all phases of training, including Zero Flight Time (ZFT) programs. The advantages, capabilities and limitations of FSTDs are well understood.
- b) **Current Training Practice.** All components contemplated for the MPL are being used today in aviation training. The only new element is the context in which they are used.
- c) **Assured Transfer of Learning.** It is reasonable to expect that the transfer of learning from FSTD to real flying environment will be similar to that which has been demonstrated in other types of flight crew training. This belief is not only based on the collective experience of the panel members but is also supported by several research studies on the learning transfer between synthetic devices and aeroplanes.
- d) **Use of Approved Training Organizations (ATOs).** Training will only be provided in approved training organizations.
- e) **Demonstration of Competency.** The new licence will be used in the airline industry, which is one of the most regulated and supervised industries. Before being a co-pilot on a transport aircraft, the new pilot will have to demonstrate the competency required to be issued with the MPL licence. He/she would then have to demonstrate to the operator that he/she is competent to discharge the assigned duties. Lastly, he/she would work under the supervision of a pilot-in-command. Any shortcomings in the training would become apparent at this stage.
- f) **Alternative Licensing Route.** The MPL offers an alternative to the existing licensing route to a co-pilot seat in a transport aeroplane. If a State does not believe that it is an appropriate approach in view of their national context, it has the option of not implementing it.
- g) **Simulated ATC Environment.** The new MPL course will encompass the requirement for a simulated ATC environment in FSTDs.

1. Use of competency-based Standards			
Features	Associated risk	Risk Mitigation	Safety Benefit
Competency-based licensing Standards	Competency-based licensing Standards are a new feature in ICAO and in many Contracting States.	<p><i>Specific Risk Control:</i> Development of detailed guidance material and seminars drawing on the experience of States that have already implemented competency-based standards in the PANS-TRG Document.</p> <p><i>Generic Risk Control:</i></p> <p>d) Use of Approved Training Organizations</p> <p>e) Demonstration of Competency</p> <p>Competency based training per se excludes the specification of hours requirements. The inclusion of aircraft and simulator hours is to be considered as the main risk control measure in this program.</p>	The development of competency-based Standards will define much better the competencies of pilots at all levels and will improve standardization worldwide.

2. Reduced experience on aircraft			
Features	Associated risk	Risk Mitigation	Safety Benefit
The experience (including solo time) on aircraft (aeroplanes, gliders, balloons see 2.4.1.1.3.2) will be reduced from 140h to a minimum of 60h, initially 70h (or more if directed by the Authority).	Reduced actual flight experience, the effect of which cannot be measured in the absence of experience in this area.	<p><i>Specific Risk Control:</i></p> <p>Close follow-up during initial implementation of the MPL by Contracting States and ICAO. Specific guidance to that effect could be prepared by the Panel and sent to States together with the proposal.</p> <p><i>Generic Risk Control:</i></p> <p>d) Use of Approved Training Organizations</p> <p>e) Demonstration of Competency</p> <p>f) Alternative Licensing Route</p>	The undefined flight experience will be substituted by approved and structured training on specified Synthetic Training Devices, by highly qualified instructors in an Approved Training Organization with an approved Quality System. Upset training will be mandatory. Instrument instruction and night flying will be included.
Solo flight time is reduced to those of the PPL (15 hours including 5 hours of cross-country).	Reduced flight experience, the effect of which cannot be measured in the absence of experience in this area. However, most of the existing ab-initio programmes have already reduced solo time to a minimum and replaced/complemented solo time by instructor supervised solo flights.	<p><i>Generic Risk Control:</i></p> <p>d) Use of Approved Training Organizations</p> <p>e) Demonstration of Competency</p> <p>f) Alternative Licensing Route</p>	

3. Expanded use of Flight Simulation Training Devices (FSTD)

Features	Associated risk	Risk Mitigation	Safety Benefit
<p>Flight simulation training devices (FSTD) will be used to a much larger extent (at least 180 hours) and at a much earlier stage than in current situations.</p>	<p>Transfer of learning from flight simulator to real flying environment in an <i>ab initio</i> course has not been evaluated at such levels.</p>	<p><i>Specific Risk Control:</i> Close follow-up during initial implementation of the MPL by Contracting States and ICAO. Specific guidance to that effect will be prepared by the panel and sent to States together with the proposal. These measures will be implemented through the proposed MPL Proof of Concept procedure.</p> <p><i>Generic Risk Control:</i></p> <ul style="list-style-type: none"> a) Flight Simulation Training Device (FSTD) Maturity/Sophistication. b) Current Training Practice. c) Assured Transfer of Learning. d) Use of Approved Training Organizations (ATOs). e) Demonstration of Competency. f) Alternative Licensing Route. g) Simulated ATC Environment. 	<p>Possibility to enhance training contents; possibility to go further in letting students make mistakes.</p> <ul style="list-style-type: none"> ▪ Environment is controlled and makes it possible for trained students to practice on an established set of conditions (such as cross wind, visibility, density altitude) that may or may not happen to exist when training is conducted on real aeroplanes. ▪ It is possible in a simulator to train the student in the functions of both PF and PNF. ▪ Some training manoeuvres can only be practiced on a simulator either because they are too dangerous or because they cannot be performed in a training session due to operating limitation (such as MTOW take-off). ▪ Possibility of recording of flight data to be used <ul style="list-style-type: none"> - during briefing and debriefing to enhance training quality - validation of Instructional System Design ▪ Reduced training accident risk ▪ Environmental benefits (noise/CO2/etc..) ▪ Reduced ATC congestion ▪ Reduced training costs (requirement for live training airport) ▪ Allows (simulated) training in high density airspace and at international airports ▪ Extensive training of manoeuvres which are essential for the ops of passenger transport aircraft are only possible in the simulator: TCAS, GPWS, Smoke and Fire, PAX evacuation etc ▪ Curriculum/Course structure will be stabilized, time scale become reliable and is independent from aircraft dispatch status ▪ Threat and Error Management can be trained realistically and in normal crew complement
	<p>Not all Flight simulators simulate ground effect well and landing and take-off skills acquired on a simulator may not be sufficient</p>	<p><i>Specific:</i> MPL requirements for 12 landings and take-offs on the aeroplane on which the first multi-crew type rating is issued. Annex 6, Part I requirements. <i>Relevant generic risk control measures:</i> a), b), d), e) and f)</p>	
	<p>As yet, the ATC environment is not realistically reproduced in FSTDs.</p>	<p><i>Specific Risk Control:</i> Indoctrination flight on jump seat (subject to security measures) and introduction of ATC environment in FSTDs.</p> <p><i>Generic Risk Control:</i></p> <ul style="list-style-type: none"> e) Demonstration of Competency. g) Simulated ATC Environment. 	