



**WORKING PAPER**

**ASSEMBLY — 40TH SESSION**

**TECHNICAL COMMISSION**

**Agenda Item 30: Other Issues to be considered by the Technical Commission**

**COMPETENCY-BASED TRAINING AND ASSESSMENT FOR AIRCRAFT ACCIDENT  
AND INCIDENT INVESTIGATORS**

(Presented by the United Arab Emirates)

**EXECUTIVE SUMMARY**

This working paper presents the advantages of applying competency-based training and assessment (CBTA) methodology for training aircraft accident and incident investigators, and the superiority that this methodology has to the traditional training techniques.

**Action:** The Assembly is invited to:

- a) note the contents of this working paper;
- b) consider the benefits of applying the competency-based training and assessment methodology (CBTA) on the training of aircraft accident and incident investigators; and
- c) encourage ICAO to promote the universal introduction of the CBTA methodology.

<i>Strategic Objectives:</i>	This working paper relates to the Safety Strategic Objective.
<i>Financial implications:</i>	Not applicable.
<i>References:</i>	AIGP Meeting Reports Doc 9756, <i>Manual of Aircraft Accident and Incident Investigation</i> , Part I — <i>Organization and Planning</i> , Part II — <i>Procedures and Checklists</i> , Part III — <i>Investigation</i> and Part IV — <i>Reporting</i> Amendment 5 of Doc 9868, <i>Procedures for Air Navigation Services — Training</i> (PANS-TRG) Doc 9941, <i>Training Development Guide — Competency-based Training Methodology</i> Doc 9962, <i>Manual on Accident and Incident Investigation Policies and Procedures</i>

**1. INTRODUCTION**

1.1 Investigators are the main pillar in the effective conduct of aircraft accident and incident investigations. The competencies of the human resources of an aircraft accident investigation authority (AIA) should be continuously improved to more effectively manage evolving investigation requirements and organisation strategy.

1.2 A recent review of investigation Final Reports indicates that some investigators lack important investigation competencies. Indicators of these deficiencies varied between poorly structured Final Reports, inadequate or poorly reasoned analyses, irrelevant conclusions, and ineffective safety recommendations.

1.3 Investigators training may not be the only solution for weak investigations, but it shall always be considered in improving the AIA investigation capabilities. A training needs analysis becomes essential when the organisation finds difficulty in advancing towards achieving its strategic objectives.

1.4 Cir 298 – *Training Guidelines for Aircraft Accident Investigators*, was issued in June 2003 and has not been updated since, in spite of significant changes that have occurred in investigation philosophies, procedures, techniques, and technology. The stagnant nature of this traditional investigation principle could not allow for genuine improvement of investigators' competencies and, consequently, several AIAs became outdated.

## 2. DISCUSSION

2.1 The rapid growth in aviation, and the increasing diversity of operations, require AIA investigation systems to adapt very efficiently to changing circumstances. An AIA should be diligent in achieving its investigation objectives by associating robust adaptation principles including individual development plans.

2.2 As has been discussed at the Aircraft Accident Investigation Panel (AIGP), alternatives to the traditional training methods are becoming essential. A study of the *evidence-based training (EBT)* solution was proposed, but after discussion, a conclusion was reached that the EBT approach was not the best method for investigator training.

2.3 *Competency-based training and assessment (CBTA)* was then proposed as an alternative to improve investigator training. This well-regarded methodology had shown that the outcomes of an organised training course, with defined objectives and assessment criteria, is one of the most efficient training solutions. A working paper was presented at the most recent AIGP/5 Meeting to apply the CBTA methodology contained in ICAO Doc 9868, *Procedures for Air Navigation Services — Training (PANS-TRG)*, as amended.

2.4 CBTA is based on the concept that competencies are transferable. In the design of a CBTA, a limited number of competencies are defined. Typically, an activity will involve several competencies, and competencies apply across a variety of activities and contexts. In the design of training and assessments, tasks and activities are incorporated because they are good candidates for facilitating, developing or assessing a single, or several competencies. Specific tasks may be used to develop specific competencies. Lack of specific competencies may be identified as root causes of the failure of the required level of performance of a task. (Doc 9868, Amendment 5, para 3.2.)

2.5 The transferability of competencies will build up a generation of investigators equipped with long lasting competencies based on well-defined training and assessment targets, achieved by clearly developed training syllabi that comply with the AIA objectives. However, it is one of success factors that CBTA is delivered by competent instructors prepared for such training methodology.

2.6 In general, CBTA applies the instructional systems design (ISD) process that begins by identifying the training specifications, then determining the competency model for a specific job adapted for the organisation work environment and the State's requirements. Thereafter, assessments and training plans are formed based on training and assessment material developed to enhance the trainee's competency level to the job requirements (see Figure 1. CBTA components). This process is featured for its robust feedback system which assures the flexibility and adaptability needed to accommodate changes in training circumstances, goals, and technology.

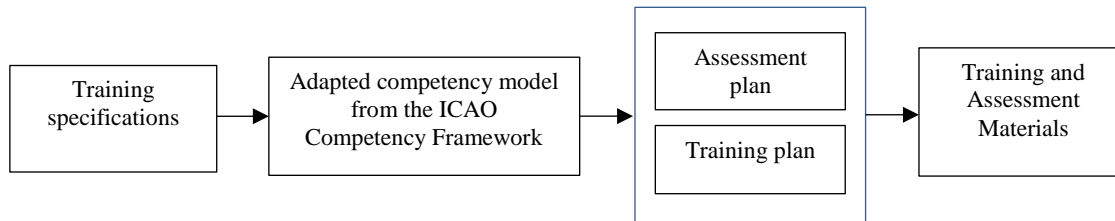


Figure 1. CBTA components

2.7 Developing an *ICAO Competency Framework* is considered to be the start of any CBTA. The *ICAO Competency Framework* covers a selected group of competencies for a given aviation discipline. Each competency has an associated description and observable behaviours (OBs). An OB is a single role-related behaviour that can be observable, but may or may not be measurable.

2.8 A draft *ICAO Competency Framework* was developed by the AIGP and is now in discussion for finalisation. The next steps will be determined based on the *Framework*. The drafted *Competency Framework* contained ten major competencies that are believed to cover the spectrum of the investigator job. An example competency is *analysing*, for which the investigator shall show the following OBs:

- a) verifies the collected data and evidence;
- b) utilises appropriate analysis models/techniques to identify and communicate relationships between findings;
- c) develops a sequence of events from data collected from various sources;
- d) applies an integrated process to analyse human factors data in order to identify relationships to crew performance;
- e) identifies systemic organisational deficiencies including the effectiveness of the safety management system and the State's safety programme and State regulatory authority oversight;
- f) connects the regulatory, oversight, and organizational systemic deficiencies that were contributory to the occurrence;
- g) develops risk-based safety recommendations; and
- h) identifies Safety Recommendations of Global Concern (SRGC).

(Note.— The draft ten competencies contained in the proposed *ICAO Competency Framework* for investigators are: *Assessment; Managing a safety investigation; Leadership and teamwork; Coping, adapting, and learning; Managing risks; Collecting data and controlling evidence; Interviewing witnesses; Analysing; Writing reports; and Communicating*. Each of the competencies has its own OBs).

2.9 Having determined the final *ICAO Competency Framework*, an *Adapted Competency Model* should be prepared by an AIA based on the *ICAO Competency Framework*, but adapted to the AIA particular operational and environmental context is needed. The *Adapted Competency Model*, with its associated performance criteria, provides a means of assessing whether trainees achieve the desired level of performance or not. However, the AIGP will decide on the due time, and based on a comprehensive study, whether to advance to this step or to end up with *ICAO Competency Framework*.

2.10 Sufficient guidance material shall be developed should the AIGP decide to continue the steps following the *ICAO Competency Framework*. The involvement of ICAO training specialist(s) is essential to assure that the right decision is made by the AIGP by applying the PANS-TRG principles and processes.

2.11 One of the main aspects that should be considered when selecting CBTA as a solution for training is the cost of developing the material and the appropriate implementation of training courses. For a CBTA to be realistic, and economically feasible, a group of States may share the training development and implementation costs. However, the CBTA should not be thought of as a replacement for the already existing traditional training delivered by States or by training centres around the world. CBTA is an optional solution with no compulsory requirement for the States to apply it.

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