



## **DANGEROUS GOODS PANEL (DGP)**

### **TWENTIETH MEETING**

**Montréal, 24 October to 4 November 2005**

### **BACKGROUND AND CONCEPT OF COMPETENCY-BASED STANDARDS**

(Presented by the Secretary)

#### **1. INTRODUCTION**

1.1 The purpose of this paper is to provide the panel with background information on the development of competency standards. The paper briefly describes the origin of competency-based approaches to training and assessment, their characteristics and the elements of a competency framework.

#### **2. BACKGROUND**

2.1 Key features of competency-based training programmes can be traced back to the first half of the 20<sup>th</sup> century when the need to train large numbers of people in a relatively short time during the two World wars was prevalent. Systems engineering methodologies were later applied to the design of training curricula in the late 1950s and 1960s with a view to implementing performance-based training programmes in the United States. During that time two tools to design this type of training were developed in the military and vocational training domain. There were the instructional systems design (or development), otherwise known as ISD, and the Systems Approach to Training (SAT). These tools were further refined in the 1970s with developments in mastery learning and criterion-referenced testing. These developments focussed on the need for assessments to be based on observable and measurable behaviours or outcomes. The influence of these tools and methodologies expanded worldwide in the 1980s and 1990s. Today, ISD and SAT are widely used and provide the analytical tools to develop competency-based training in industry.

2.2 Competency-based approaches to training and assessment typically include the following features:

- a) the justification of a training need through a systematic analysis and the identification of indicators for evaluation;

- b) the use of job and task analysis to determine performance standards, the conditions under which the job is carried out, the criticality of tasks, and the inventory of skills, knowledge and attitudes;
- c) the identification of the characteristics of the trainee population;
- d) the derivation of training objectives from the task analysis and their formulation in an observable and measurable fashion;
- e) the development of criterion-referenced, valid, reliable and performance-oriented test;
- f) the development of curriculum based on adult learning principles and with a view to achieving an optimal path to the attainment of competencies;
- g) the development of material-dependent training; and
- h) the use of a continuous evaluation process to ensure the effectiveness of training and its relevance to line operations.

2.3 Competency-based standards can be described through a hierarchical structure consisting of competency units, competency elements and performance criteria. A competency unit is a discrete function, which encompasses a range of competency elements. A competency element is defined as a task that has a triggering event and a terminating event that clearly defines its limits, and that describes an observable outcome. Performance Criteria are simple, evaluative statements on the required outcome of a competency element. They describe the criteria used to judge if the required level of performance has been achieved.

2.4 The competency standard also includes a range of variables and an evidence and assessment guide. The range of variables describes the conditions under which the competency unit must be performed. An evidence and assessment guide provides detailed information that an instructor or an evaluator can use to determine if a candidate meets the requirements of the competency standard.

### 3. COMPETENCY-BASED APPROACHES IN ICAO

3.1 ICAO has been using a competency-based approach to training and assessment for over a decade in the TRAINAIR Programme. This approach was also used and further enhanced through the work of the Flight Crew Licensing and Training Panel. One of the outcomes of this panel has been the development of a draft *Procedures of Air Navigation Services – Training* (PANS-TRG) document. This document, under final considerations by States, describes the methodology to develop competency standards. This methodology is presently being applied in the development of competency standards for other safety and security-critical aviation personnel.