International Civil Aviation Organization

DGP-WG/26-WP/30
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WORKING PAPER

DANGEROUS GOODS PANEL (DGP) WORKING GROUP MEETING (DGP-WG/26)

Centurion, South Africa, 26 to 30 October 2026

Agenda Item 2: Managing air-specific safety risks and identifying anomalies (REC-A-DGS-2029)
2.2: Develop proposals, if necessary, for amendments to the Technical Instructions for the *Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2029-2030 Edition

REPORT OF THE ICAO DGP WORKING GROUP ON TRAINING

(Presented by T. Muller)

SUMMARY

This working paper reports on the work of the Dangerous Goods Panel (DGP) Working Group on Training (DGP-WG/Training) following the panel's thirtieth meeting (DGP/30, 6 to 10 October 2025). It recalls the revised version of the *Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment* (Doc 10147) presented at DGP/30, provides an update in the context of the ANC job card on dangerous goods training and invites DGP-WG/26 to review the revised guidance and provide comments to support the next phase of work.

Action by the DGP-WG is in paragraph 5~~2~~.

1. INTRODUCTION

1.1 The Dangerous Goods Panel (DGP) Working Group on Training (DGP-WG/Training) has been reviewing the *Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment* (Doc 10147) in response to feedback from States, operators and training organizations concerning the practical implementation of the dangerous goods training provisions. While Doc 10147 provides comprehensive guidance, it can be perceived as overly theoretical and difficult to apply in practice. The working group has therefore focused on making the guidance more practical and easier to implement, while maintaining the underlying competency-based principles set out in Part 1;4 of the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284).

1.2 An important aspect of this work has been to clarify the relationship between the requirements in the Technical Instructions and the supporting guidance in Doc 10147. The Technical Instructions require employers to ensure that personnel are competent to perform the functions for which

they are responsible. Doc 10147 provides one possible approach to achieving that competence and is not intended to exclude other methodologies that meet the provisions of the Technical Instructions.

1.3 At DGP/30, DGP-WG/Training presented a substantially revised version of Doc 10147 (see paragraph 10.3 of the DGP/30 report. The panel was invited to review the proposed revisions and provide comments. The panel expressed its appreciation for the work undertaken and members were encouraged to provide further feedback to the rapporteur through correspondence.

2. WORK PRESENTED TO DGP/30

2.1 The revised draft presented to DGP/30 was the result of a structured review undertaken by DGP-WG/Training. The working group reviewed the dangerous goods training provisions in the Technical Instructions and did not identify any gaps. It agreed however that further revision of Doc 10147 was necessary to support the practical implementation of the training provisions. Comments received from States, operators, training organizations and individual members were consolidated and considered by the working group, and agreed changes were incorporated into a revised version of Doc 10147.

2.2 The principal revisions presented to DGP/30 focused on clarifying the status and flexibility of Doc 10147; enhancing practical guidance; simplifying and streamlining content; improving alignment and terminology consistency; and introducing guidance on adapted competency models.

2.3 In particular, the revised draft clarified that Doc 10147 presents one approach to competency-based training and assessment and does not preclude the use of other approaches that meet the requirements of the Technical Instructions. It provided clearer steps for developing a competency-based training and assessment programme, reformatted the dangerous goods task list and task/knowledge matrix, removed redundant material, harmonized terminology and introduced concise guidance on developing an adapted competency model from the generic ICAO framework.

2.4 DGP/30 was invited to review the revised draft and provide comments, with panel members also invited to provide feedback to the rapporteur through correspondence following the meeting. The revised draft presented to DGP/30 is reproduced in Appendix A to this working paper for further consideration by DGP-WG/26.

3. ANC JOB CARD AND WORK PROGRAMME

3.1 The ANC job card on dangerous goods training, reproduced in Appendix B to this working paper and approved by the Air Navigation Commission in February 2026, provides the broader framework and timeline for the further work of DGP-WG/Training. It identifies that existing guidance material supporting implementation of the dangerous goods training provisions is overly complicated and challenging to understand, as it is considered too theoretical.

3.2 The job card identifies work to review the training provisions in the Technical Instructions and the supporting guidance in Doc 10147, i.e. to identify inconsistencies or gaps that may result in inadequately trained personnel; to simplify Doc 10147 to support practical implementation; and, if necessary, to amend the training provisions in the Technical Instructions to eliminate identified gaps while avoiding the addition of prescriptive provisions.

3.3 The job card identifies the fourth quarter of 2027 for delivery and effectiveness of the relevant work, with applicability in fourth quarter of 2029. The substantial drafting and conceptual work undertaken prior to DGP/30 means that DGP-WG/Training remains well positioned against this timeline.

4. PROGRESS SINCE DGP/30 AND FURTHER WORK

4.1 Limited additional substantive comments on the revised version of Doc 10147 have been received since DGP/30. Given the extent of the revisions and the importance of ensuring that the resulting guidance can be applied practically by States and industry, DGP-WG/Training considers that further technical review by panel members would be valuable before progressing towards finalization.

4.2 The revised draft is therefore presented again to DGP-WG/26 (see Appendix A to this working paper). Members are particularly invited to consider whether the revised guidance is sufficiently practical and understandable; whether it appropriately communicates the flexibility available in implementing competency-based training and assessment; whether any inconsistencies or gaps remain between Doc 10147 and the training provisions in the Technical Instructions; whether the proposed guidance supports implementation without becoming unnecessarily prescriptive; and whether there are further areas requiring simplification or clarification.

4.3 Feedback on these matters would assist DGP-WG/Training in validating the approach taken in the revised draft and identifying the remaining work required under the ANC Job Card. It would also provide a basis for determining whether further work is needed in relation to the Technical Instructions or other ICAO dangerous goods training material.

4.4 DGP-WG/Training remains well positioned against the timelines identified in the ANC Job Card. Substantive input from DGP-WG/26 at this stage would assist the working group in progressing the work towards the fourth quarter of 2027 deliverables.

5. ACTION BY THE DGP-WG

5.1 The DGP-WG is invited to:

a) review and provide comments on the revised version of Doc 10147 presented in Appendix A;

b) identify any remaining areas where the guidance could be made more practical, clear or flexible, including any inconsistencies or gaps between Doc 10147 and the training provisions in the Technical Instructions; and

c) provide any additional direction necessary to support the further work of DGP-WG/Training towards the deliverables identified in the ANC Job Card (see Appendix B to this working paper).

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APPENDIX A

DRAFT REVISED VERSION OF *GUIDANCE ON A COMPETENCY-BASED APPROACH TO DANGEROUS GOODS TRAINING AND ASSESSMENT* (DOC 10147)

FOREWORD

A safe and efficient air transport system is dependent on a competent workforce. ICAO has recognized that this can be achieved through the implementation of a competency-based approach to training and assessment. The *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284, "Technical Instructions") require that employers ensure personnel are competent to perform any function for which they are responsible prior to performing it. A competency-based approach to training and assessment is an effective way to ensure this requirement is met.

This document provides detailed guidance ~~in implementing a~~ on an approach for the development and implementation of competency-based ~~approach to dangerous goods~~ training and assessment ~~for personnel involved in~~ specifically for the safe transport of ~~cargo, mail, passengers and baggage~~ dangerous goods by air. It builds upon the more general principles outlined in ~~T~~the *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868) ~~contains greater detail on competency-based training and assessment~~ which addresses competency-based training concepts based on the knowledge, skills and attitudes (KSA) approach. While Doc 9868 offers an important methodology, Doc 10147 proposes a way among others to implement those concepts into specific tools, frameworks, and task lists adapted to dangerous goods functions that, if used, must be tailored (see 1.1.2). Doc 10147 provides one possible approach to competency-based training and assessment and is therefore not mandatory; likewise, the analyse, design, develop, implement and evaluate (ADDIE) model is presented only as an example of an instructional design framework that organizations may use, without being obligatory.

A new guidance document to support implementation of Annex 18 — *The Safe Transport of Dangerous Goods by Air* is planned for publication in 2029. It will include broad guidance on dangerous goods training and assessment, including overarching policy and operational elements. That material will serve as high- level guidance, while Doc 10147 will consist in more detailed guidelines by providing an example of method for implementation of competency-based training and assessment related to dangerous goods.

BENEFITS OF COMPETENCY-BASED TRAINING AND ASSESSMENT FOR THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR

The main benefit of a competency-based approach to training and assessment is its potential to encourage and enable personnel to reach their highest level of capability while ensuring a basic level of competence as a minimum standard. It does this by:

a) targeting specific training needs;

b) supporting continuous learning and performance improvement;

c) gearing towards learning rather than simply passing a test;

d) ensuring the integration of the knowledge, skills and attitudes (KSA) needed to perform effectively; and

e) establishing sufficient, well-trained and competent instructors.

Ensuring personnel are able to perform their functions competently is critical to any organization. A competent workforce reduces the costs caused by poor performance or miscommunication of job expectations. The consequences of employing an incompetent dangerous goods workforce can be especially damaging, as this could result in costs and delays in shipment, and even more critically, it could result in the introduction of safety risks. As an example, identifying, classifying, packing, marking, labelling and documenting dangerous goods for transport are critical to the safe transport of dangerous goods by air. The operator depends on these functions being performed competently by those preparing and offering a consignment for transport so that the operator in turn will be aware of the hazards posed and can take the necessary steps to mitigate the risk to the aircraft and its occupants. If personnel performing these functions are not trained to perform them competently, unknown risks may be introduced into air transport. Accepting dangerous goods for air transport requires an operator to verify that dangerous goods are properly prepared for transport through the use of a checklist. If personnel accepting dangerous goods are not trained to competently perform this function, they may accept improperly prepared shipments of dangerous goods into air transport thereby putting the aircraft and its occupants at risk. Alternatively, they may unnecessarily reject properly prepared shipments resulting in delays of shipments and increased costs to the shipper and the operator.

A competency-based approach to training and assessment ensures that trainees know what tasks they are expected to perform competently, and evaluators know what performance to assess.

FUNCTION-SPECIFIC TRAINING

The Technical Instructions state that personnel must be trained commensurate with the functions for which they are responsible. These responsibilities are determined by the specific functions the personnel perform and not by their roles or job titles. Concentrating on functions and responsibilities rather than a role, a job title or job description ensures that a person is competent to perform the function in compliance with the Technical Instructions. For example, entities such as ground handling companies and freight forwarders may need personnel to perform some functions that are typically performed by shippers or operators. Ground handling and freight forwarder personnel would need to be trained to perform these functions competently regardless of their role or job title.

In smaller operations, personnel may perform many functions such as accepting dangerous goods and loading and securing dangerous goods on board an aircraft. They would need to be trained to perform all of these functions competently. In larger operations, personnel may perform only a small number of functions. They would need to be trained only to perform those specific functions competently.

The depth of training each person receives should be appropriate to the functions performed. This could range from a familiarization level to an expert level for certain personnel.

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Field Cod

GLOSSARY

ACRONYMS AND ABBREVIATIONS

ADDIE	Analyse, design, develop, implement and evaluate
ANC	Air Navigation Commission
CAA	Civil Aviation Authority
COMAT	Company Material
ISD	Instructional Systems Design
KSA	Knowledge, skills and attitudes
NOTOC	Notification to Captain
SARPs	Standards and Recommended Practices
SMS	Safety Management Systems
SRM	Safety Risk Management
SSP	State safety programme
ULD	Unit load device

DEFINITIONS

When the following terms are used in this document, they have the following meanings:

Adapted competency model. A group of competencies with their associated description and performance criteria adapted from an ICAO competency framework that an organization uses to develop competency-based training and assessment for a given role.

Attitude. Refer to point 1.2.4.5.

Competency. A dimension of human performance that is used to reliably predict successful performance on the job. A competency is manifested and observed through behaviours that mobilize the relevant knowledge, skills and attitudes to carry out activities or tasks under specified conditions.

Competency-based training and assessment. Training and assessment that are characterized by a performance orientation, emphasis on standards of performance and their measurement, and the development of training to the specified performance standards.

Competency standard. A level of performance that is defined as acceptable when assessing whether or not competency has been achieved.

Conditions. Anything that may qualify a specific environment in which performance will be demonstrated**.**

Function. Action or activity proper to a person with expected results (such as a person responsible for operating the aircraft and the person in charge of loading and unloading).

ICAO competency framework. A competency framework, developed by ICAO, is a selected group of competencies for a given aviation discipline. Each competency has an associated description and observable behaviours.

Knowledge. Refer to point 1.2.4.3

Observable behaviour. A single ~~role~~ function-related behaviour that can be observed and may or may not be measurable.

Performance criteria. Statements used to assess whether the required levels of performance have been achieved for a competency. A performance criterion consists of an observable behaviour, condition(s) and a competency standard.

Role. The official position that somebody has or is expected to have in an organization. A person assigned to a role may be entrusted with several functions (e.g. a role "Pilot" with the functions of "operating the aircraft" and "loading and unloading").

Skill. Refer to point 1.2.4.4.

Task. Refer to point 1.2.4.2.

Chapter 1

INTRODUCTION

1.1 GENERAL

1.1.1 This document provides guidance in implementing a dangerous goods competency-based training and assessment programme for personnel involved in the transport of cargo, mail, passengers and baggage by air.

1.1.2 Since ICAO regions and member States have differing regulatory, operational, technical and organizational environments, ~~it~~ and since Stakeholders have their own specificities and constraints, this document does not prescribe a "one-size-fits-all" training programme. Instead, it provides an approach among others and generic tools to develop dangerous goods training programmes that ~~can~~ may or may not be used and, if so, which must be adapted for specific needs. It is based on the more detailed material provided in the *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868).

1.2 COMPETENCY-BASED TRAINING AND ASSESSMENT CONCEPTS

1.2.1 Goal

The goal of competency-based training and assessment is to produce a competent workforce by providing focused training. It does so by identifying key competencies that need to be achieved, determining the most effective way of achieving them and establishing valid and reliable assessment tools to evaluate their achievement.

1.2.2 History

Competency-based training is a concept and methodology that was developed during the 1950s and entered the mainstream sometime in the 1980s. Competency-based training has been applied in many different contexts and professions and, therefore, it is understandable that there are many different definitions of "competence" and "competency-based training". This section elaborates the competency concepts as they are used in this document.

1.2.3 What is a competency?

1.2.3.1 A competency is a dimension of human performance that is used to reliably predict successful performance on the job. It is manifested and observed through behaviours that mobilize the relevant knowledge, skills and attitudes to carry out activities or tasks under specified conditions.

1.2.3.2 A competency standard is a level of performance that is defined as acceptable when assessing whether or not competency has been achieved.

1.2.4 Task, ~~K~~knowledge, skills and attitudes

1.2.4.1 Developing the knowledge, skills and attitudes (KSA) required to perform a task is a critical feature of competency-based training and assessment.

1.2.4.2 ***Task.*** A task is a set of actions that form part of the overall purpose of a job, broken down into their component parts. Each task is linked to a clearly defined high-level objective and can be divided in sub-tasks. It forms part of a sequence of operations necessary for the successful performance of a job. Performing a task requires more than just a single competence, as it requires the acquisition and application of several of them (knowledge, skills and attitudes).

1.2.4.~~2~~.3 ***Knowledge.*** Knowledge is specific information required to enable a learner to develop and apply the skills and attitudes to recall facts, identify concepts, apply rules or principles, solve problems, and think creatively in the context of work. Knowledge is an outcome of the learning process, whether learning occurs in formal or informal settings. There are different types of knowledge: declarative (e.g. facts and raw data), procedural (e.g. categorized/contextualized and application of conditional if-then rules), strategic (e.g. synthesis, inference to guide resource allocation for decision making, problem solving and behavioural action), and adaptive (e.g. generalization, innovation, and invention).

1.2.4.~~3~~.4 ***Skills.*** A skill is an ability to perform an activity or action. It is often divided into three types: motor, cognitive and metacognitive skills. A motor skill is an intentional movement, involving a motor or muscular component, that must be learned and voluntarily produced to proficiently perform a goal-oriented task. A cognitive skill is any mental skill used in the process of acquiring knowledge, such as reasoning, perception and intuition. A metacognitive skill relates to the ability of learners to monitor and direct their own learning processes ("thinking about thinking"); for example, planning how to approach a given learning task, monitoring comprehension and evaluating progress toward the completion of a task.

1.2.4.~~4~~.5 ***Attitudes.*** Attitude is a persistent internal mental state or disposition that influences an individual's choice of personal action toward some object, person or event and that can be learned. Attitudes have affective components, cognitive aspects and behavioural consequences. To demonstrate the "right" attitude, a learner needs to "know how to be" in a given context.

1.2.4.~~5~~.6 Examples of KSA applicable to dangerous goods personnel include:

Knowledge	—	The nine classes of dangerous goods
	—	Information required on the dangerous goods transport document
	—	Components of an acceptance check
Skills	—	How to determine if the substance/material is dangerous goods
	—	How to complete the dangerous goods documentation
	—	How to check a package (e.g. can it be accepted for transport?)
Attitude	—	Being motivated to ensure safety and to comply with applicable regulations
	—	Wanting to adhere to regulations in asking relevant and effective questions
	—	Appreciating feedback from team members (e.g. adapts when faced with a situation where no guidance or procedure exists)

~~1.2.4.6 Performing a dangerous goods task may require different levels of KSA, depending on the complexity of the specific task and the operational environment. A level of proficiency is a means to determine how critical the employee's knowledge, skill or attitude is for the successful completion of a task. If used, the concept of a level of proficiency can be very useful in determining the main areas to focus on during training and assessment. In order to determine the level of proficiency of the employee's knowledge, skill or attitude, the employer should take into account the complexity of the task or sub-task, its criticality and the employee's autonomy in performing it. KSAs may be developed over time and with practice, thus enabling qualified personnel to take on more difficult tasks with greater responsibility.~~

1.2.5 Principles of competency-based training and assessment

A competency-based approach to training and assessment is based on the following principles:

a) relevant competencies are clearly defined for a particular role;

b) there is an explicit link between competencies and training, required performance on the job, and assessment;

c) competencies are formulated in a way that ensures they can be trained for, observed and assessed consistently in a wide variety of work contexts for a given role;

d) trainees successfully demonstrate competency by meeting the associated competency standard;

e) each stakeholder in the process including the employer (e.g. shipper, freight forwarder, ground handling agent and operator), instructor, trainee, training organization and regulator has a common understanding of the competency standards;

f) clear performance criteria are established for assessing competence;

g) evidence of competent performance is valid and reliable;

h) instructors' and assessors' judgements are calibrated to achieve a high degree of inter-rater reliability;

i) assessment of competencies is based on multiple observations across multiple contexts; and

j) to be considered competent, an individual demonstrates an integrated performance of all the required competencies to a specified standard.

1.2.6 ICAO competency framework, adapted competency model and task list

1.2.6.1 Traditional approaches to training development involve the breakdown of jobs into tasks. For each task there is a related objective, an assessment and associated elements in a training plan. A limitation of this approach is that each task must be taught and assessed. In complex systems, or when jobs evolve rapidly, it may not be possible to teach and assess each task. Moreover, learners may demonstrate the ability to perform tasks in isolation without being competent in their job. Competency-based training and assessment is based on the concept that competencies are transferable. In the design of a competency-based training and assessment programme, the purpose of the training and tasks associated with this purpose are identified and a limited number of competencies are defined. In the design of training and assessments, tasks and activities are incorporated because they are useful for facilitating, developing or assessing a competency or competencies. Typically, a task will involve several competencies, and competencies may apply across a variety of tasks and settings. Specific tasks may be used to develop specific competencies. The lack of specific competencies may be identified as a root cause of failure in the performance of a task. A generic, high-level list of tasks ("task list") typically performed by dangerous goods personnel is provided in Chapter 4 of this document. Employers may use this list as a tool for developing specific training specifications for their personnel. The training and assessment record required by the Technical Instructions should detail the task(s) and sub-task(s) from the task list for which competency has been demonstrated in order to facilitate verification that appropriate training and assessment have been completed.

The following struck-out text is moved to new Chapter 6:

1.2.6.2 Generic, high-level competency frameworks for aviation personnel have been developed by ICAO and included in the PANS-TRG and various ICAO documents. A competency model provides a means of defining competencies by identifying those needed for a given role, describing them, and providing criteria for each. ~~Generic, high-level competency frameworks for aviation personnel have been developed by ICAO and included in the PANS-TRG and various ICAO documents.~~ ~~They are intended as a framework on which customized competency models can be developed. An ICAO competency framework for dangerous goods personnel is presented in Chapter 3 of this document. It provides a set of competencies that are typically needed to perform the dangerous goods tasks identified in the task list provided in Chapter 4. Employers may adapt this framework into competency models that meet the regulatory, operational, technical and organizational environments within which their personnel perform their tasks. This customized model is identified as an *adapted competency model*, which is then used to develop competency-based training and assessment for a given role. Guidance on developing an adapted competency model is provided in Chapter 2.~~ Its use, although optional, can be useful and is described in Chapter 6.

1.2.7 Interaction between the different concepts

1.2.7.1 A competency-based approach involves many different concepts:

a) the notions of task, knowledge, skills and attitudes are defined in Chapter 1.2.4;

b) their interaction are described in Chapters 3, 4 and 5 ;

c) the training needs analysis is addressed in Chapter 2, paragraph 2;

d) the competency framework is detailed in Chapter 3; and

e) guidance on developing an adapted competency model is provided in Chapter 6.

1.2.7.2 At first the interactions between these concepts may seem difficult to understand. Figure 1-1 summarizes these interactions in a simplified way.

Insert the following new figure:

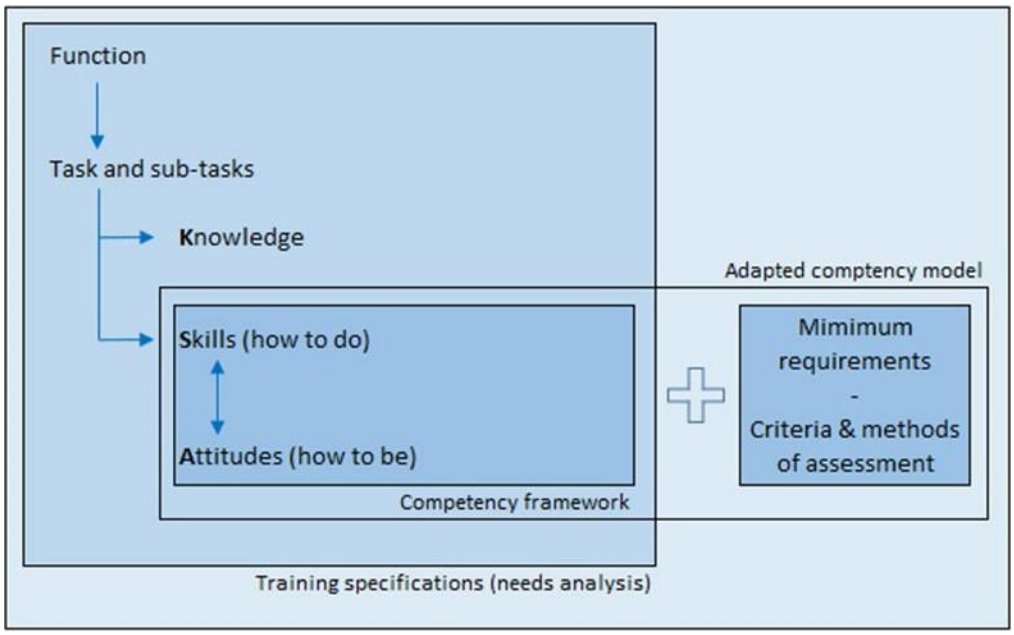


Figure 1-1. Interactions between CBTA concepts

~~**1.3 DEVELOPING COMPETENCY-BASED TRAINING AND ASSESSMENT**~~

~~Instructional systems design (ISD) is a systematic process for designing and developing training. Several valid ISD models exist which may be used to design competency-based training and assessment. The analyse, design, develop, implement and evaluate (ADDIE) framework is generic to all ISD models. Chapter 2 provides guidance for designing dangerous goods competency-based training and assessment using the ICAO competency framework for dangerous goods personnel and the ADDIE model.~~

~~1.4~~1.3 ROLES AND RESPONSIBILITIES IN A COMPETENCY-BASED APPROACH TO TRAINING

1~~.4~~.3.1 Employer

1~~.4~~.3.1.1 A training programme includes elements such as design methodology, initial and recurrent training, assessment, instructor qualifications and competencies, training records and evaluation of its effectiveness. Employers need to determine the purpose and objective of the competency-based training programme based on the functions for which their personnel are responsible. Employers should ensure that training is designed and developed to establish clear links among the competencies to be achieved, the learning objectives, assessment methods, and course materials.

1~~.4~~.3.1.2 The employer must study the target population (future trainees) with a view to identifying the KSA that they already possess, to collect information on preferred learning styles, and on the social and linguistic environments

of prospective trainees. The target population may be a mixture of experienced and newly recruited personnel, groups differing in age, etc. All these components could have an impact on the design of the training. Employers must also consider the domestic and international regulatory requirements that apply to their operations.

1.4.3.1.3 Some employers may utilize third parties for assistance. This approach may be the most suitable for employers who do not have the resources to train their personnel in house. While utilizing third parties may be cost effective, the deciding factor in selecting a third party should be whether or not the training needs are being addressed, and not costs alone. The potential for third parties to cater to the training needs of multiple employers and not address all required competencies of each specific employee needs to be taken into account. Employers remain responsible for ensuring their personnel are competent to perform their functions prior to performing them even if certain aspects of the training programme have been delegated to third parties.

1.4.3.1.4 Employers should liaise directly with the regulator to ensure that the latter's requirements are taken into account prior to proceeding with the development of competency-based training.

1.4.3.2 Instructor

In competency-based training, the instructor facilitates the trainee's progression towards the achievement of competencies. Instructors also support continuous improvement by collecting information about the effectiveness of the training materials. Examples of instructor competencies can be found in Part I, Chapter 3 of the PANS-TRG.

1.4.3.3 Trainee

In competency-based training, trainees are active participants in their learning process and in the achievement of competencies, as opposed to being passive recipients of knowledge. The competency-based training programme provides them with a clear idea of their learning path towards competency through the training programme and beyond. The competency-based training should directly contribute to improving their performance on the job. The trainees' feedback is essential to ensure that competency-based training is effective.

1.4.3.4 Regulator

1.4.3.4.1 There are important differences between the ways the regulator would oversee a traditional training programme versus a competency-based training programme. In a traditional training programme, the regulator may assess the course components and final test against knowledge elements and not on the competencies that need to be acquired. The fact that all knowledge components are addressed or appear to be included in a course and that all trainees have passed the required test does not necessarily mean that they can competently perform their assigned functions.

1.4.3.4.2 Where competency-based training has been implemented, regulators should oversee the training programme to ensure that it actually produces personnel who can perform the functions for which they are responsible in a specific operational setting and in compliance with the national regulatory framework. The *Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284SU) provides guidance on overseeing dangerous goods training programmes.

1.51.4 RELATIONSHIP BETWEEN COMPETENCY-BASED TRAINING AND ASSESSMENT AND SAFETY MANAGEMENT

1.5.4.1 ~~Before delving into competency-based training and assessment, it is important to understand its relationship to safety management. Safety is ICAO's guiding and most fundamental strategic objective. Annex 19~~

~~contains Standards and Recommended Practices (SARPs) dedicated to safety management. The foundation of safety management is the implementation of a State safety programme (SSP) by States and safety management systems (SMS) by service providers listed in 3.3.2 of Annex 19, which includes operators of aeroplanes or helicopters authorized to conduct international commercial air transport. An operator's SMS addresses the aviation activities that are related to the safe operation of the aircraft in accordance with Annex 6, Part I or Part III. These aviation activities include the carriage of dangerous goods. States may also recommend that other entities involved in air transport such as freight forwarders and ground handling agents develop and implement SMS. Other entities may also voluntarily implement SMS.~~

~~1.5.2 Implementing SMS requires that all personnel understand the safety philosophy and embrace a disciplined and standardized approach for SMS. Personnel need to know their roles and responsibilities and have the requisite competencies to perform their functions within the SMS. To ensure that personnel have the knowledge, skills and abilities to support SMS, training activities should follow the competency based approach. Other entities in the dangerous goods transport chain should be encouraged to implement a similar safety system.~~

~~1.5.3 The "Swiss Cheese" Model of accident causation proposes that complex aviation systems are extremely well defended by layers of defences, making single point failures rarely consequential in such systems (see paragraph 2.3 of the *Safety Management Manual (SMM)* (Doc 9859)). The model illustrates that accidents involve successive breaches of multiple system defences and that all accidents include a combination of both active conditions (actions or inactions that have an immediate adverse effect) and latent conditions (conditions that exist in the aviation system well before a damaging outcome is experienced). Doc 9859 identifies training as one of the three main groups of defences in aviation and identifies deficiencies in training as a latent condition.~~

~~1.5.4 Continuous improvement is a component of both safety management and competency based training and assessment. Data from different sources should be utilized to enhance the training programme and address any deficiencies. For entities that also have an SMS, their competency based training and assessment programme should be integrated with the continuous improvement cycle of their SMS.~~Competency-based training and assessment plays a key role in supporting an organisation's safety management system (SMS) by helping ensure that personnel are trained to perform their functions competently, with a clear understanding of safety principles. As outlined in *Annex 19 – Safety Management* and the *Safety Management Manual (SMM)* (Doc 9859), SMS requires a proactive and systematic approach to identifying and managing operational safety risks. Dangerous goods activities fall under the scope of aviation operations governed by SMS requirements, as per Annex 6 — *Operation of Aircraft*.

1.4.2 In this context, competency-based training and assessment acts as a preventive defence mechanism. The "Swiss-Cheese" model of accident causation highlights how deficiencies in training can be latent conditions that contribute to safety events. A robust competency-based training and assessment programme helps reduce such risks by identifying and addressing competency gaps before they manifest operationally.

1.4.3 Both competency-based training and assessment and SMS emphasize continuous improvement. Performance and safety data (such as audit findings, incidents, assessment results) should be used to adjust training programmes and address shortcomings. Integrating competency-based training and assessment with SMS ensures that training remains relevant, risk-informed, and responsive to the operational environment.

1.4.4 Additional operational insights — including the importance of adapting training to operational risks, incorporating behaviour-based observations, and using SMS outputs to inform training needs — are addressed throughout this document (see 2.2, 2.3.2.13 and 6), and further elaborated in Doc 9859. These insights support practical implementation and demonstrate how training and safety management mutually reinforce each other.

Chapter 2

DEVELOPMENT AND IMPLEMENTATION OF COMPETENCY-BASED DANGEROUS GOODS TRAINING AND ASSESSMENT PROGRAMMES

2.1 GENERAL

This chapter provides a step-by-step guide for organizations intending to establish competency-based training and assessment that is specific to their environment and requirements. It makes use of the ICAO competency framework and the ADDIE (analyse, design, develop, implement and evaluate) instructional design model.

2.2 COMPONENTS OF A COMPETENCY-BASED TRAINING AND ASSESSMENT PROGRAMME

2.2.1 The ~~goal~~ objective of competency-based training in dangerous goods ~~training and assessment is to provide a competent workforce for the safe and efficient transport of dangerous goods by air. The following components, which are illustrated in Figure 2-1, are essential to achieving this goal:~~ is to ensure that personnel acquire and apply knowledge, skills and attitudes (KSA) to perform their assigned functions safely and efficiently.

~~a) a training specification that describes the purpose of training, the task list and the requirements that must be fulfilled when designing the training;~~

~~b) a competency model adapted from the ICAO competency framework for a given role;~~

~~c) an assessment plan providing the process and tools for gathering valid and reliable evidence at different stages during training;~~

~~d) a training plan describing the training required to achieve the competencies. It includes but is not limited to a syllabus (including KSA, milestones, lesson plans and schedules); and~~

~~e) training and assessment materials and human, material and organizational resources needed to implement training and assessment plans.~~ The following components, which are illustrated in Figure 2-1, are essential to achieving this goal:

a) *Training specification.* Developed through a training needs analysis, describing the functions, associated tasks/sub-tasks, and competencies to be achieved;

b) *Assessment plan*. Defining how competence will be evaluated, including methods, conditions, success criteria, and evidence requirements;

c) *Training plan*. Describing how training will be delivered, including the syllabus, milestones, delivery methods, and resources;

d) *Training and assessment materials*. Tools, manuals, scenarios, and other resources required to implement the assessment and training plans; and

e) *Evaluation of the programme*. Procedures for measuring the programme's effectiveness and identifying improvements, ideally integrated with the organisation's continuous improvement processes or safety management system (SMS).

Note 1.— An adapted competency model is a group of competencies with their associated description and performance criteria adapted from an ICAO competency framework. It provides a means of assessing whether trainees achieve the desired performance. Its use, although optional, can be useful and is described in Chapter 6.

Note 2..— The evaluation of the effectiveness of the overall training program should be integrated with a continuous improvement cycle such as through an SMS when applicable (see 1.4).

2.2.2 The remainder of this chapter focuses on the development of these components ~~through the ADDIE instructional design model~~.

Replace existing Figure 2-1 with the following:

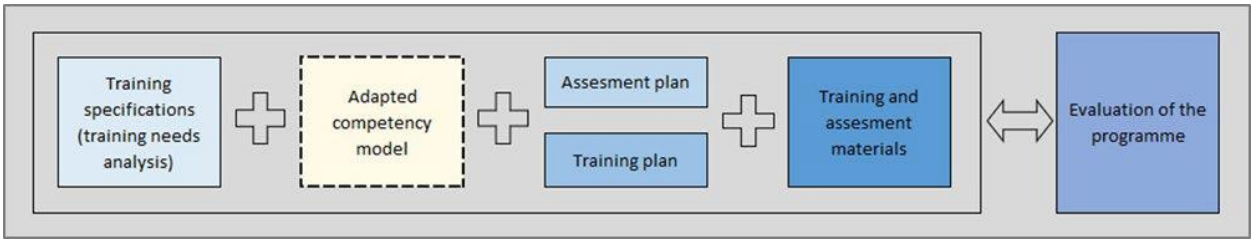


Figure 2-1. Components of a ~~C~~competency-based training ~~components~~ and assessment programme

2.3 BUILDING A COMPETENCY-BASED DANGEROUS GOODS TRAINING AND ASSESSMENT PROGRAMME ~~USING THE ADDIE MODEL~~

2.3.1 General

2.3.1.1 The different steps that need to be taken to build a competency-based training and assessment programme can be summarised as follows:

a) Analysis:

1) Review applicable regulatory requirements;

2) Identify the operational functions and related tasks;

3) Map the operational environment and constraints (technical, organizational, contextual); and

4) Define the required competencies (knowledge, skills, and attitudes) based on tasks and functions.

b) Design and development:

1) Define assessment conditions and success criteria for each competency;

2) Conduct a training needs and gap analysis (from current to target proficiency);

3) Develop a detailed training syllabus including structure, sequence, and milestones;

4) Design the assessment plan (types, timing); and

5) Develop training materials and tools (such as manuals and scenarios);

c) Implementation:

1) Define logistical and human resource requirements (such as instructors, assessors, facilities and tools); and

2) Establish procedures for certification, monitoring, and recordkeeping;

d) Evaluation and improvement:

1) Implement tools to evaluate program effectiveness and identify deficiencies; and

2) Plan continuous improvement actions based on evaluation results.

2.3.1.2 This approach is based on the ADDIE model and represents one competency-based training compliant method among others (such as the Kirkpatrick Model, Dick & Carey Model and 4C/ID).

2.3.2 Detailed steps

Note.— Additional details in line with the ADDIE method can be found in Appendix A to this chapter.

2.3.2.1 *Analysis*

1) *Review applicable regulatory requirements*. This initial step ensures that the training program complies with all relevant legal, regulatory, and industry-specific standards. Regulations may stem from national authorities, international bodies (such as ICAO, regional agencies), or internal company policies. Reviewing them helps establish the framework within which the program must operate and guarantees the recognition and validity of the training and certification process.

2) *Identify the operational functions and related tasks*. This step involves a thorough analysis of the operational roles potentially involved in the (non)transport of dangerous goods that the training program will target. Each role is broken down into its functions and core tasks and responsibilities. By understanding what individuals in these roles actually do on the job, the training can be directly aligned with operational realities. This alignment is crucial for ensuring relevance and improving transfer of learning to the workplace.

A generic list of dangerous goods task is provided in the Chapter 4. Appendix A to Chapter 5 provides some examples of functions with tasks and skills that could be associated. It is important to note that these materials are provided for guidance purposes only and shall be customised according to the organization specificities. For example, additional functions may be defined such as “Operational point of contact for DG”, “Personnel responsible for the preparation of COMAT shipment” and “Personnel in charge of booking and selling”.

3) *Map the operational environment and constraints (technical, organizational, contextual).* Training must be contextualized. This step maps out the environment in which the trainees will operate, including technical systems (such as equipment and tools), organizational structures (such as hierarchy and workflows), and contextual factors (such as remote locations, cultural influences and shift work). Understanding these constraints and influences allows for realistic training design and helps avoid developing materials or methods that are impractical or misaligned with operational reality.

4) *Define the required competencies (knowledge, skills, and attitudes) based on tasks and functions*. Each task identified must be translated into measurable competencies. Competencies include the technical knowledge (what to know), procedural and manual skills (what to do), and attitudes or behaviours (how to act). This competency framework becomes the backbone of the training program and is key for both curriculum development and assessment. Competency statements should be precise, observable, and aligned with the desired performance outcomes.

A matrix associating the different tasks with the potential knowledge they entail is provided in Chapter 5. Chapter 4 provides a list of tasks, sub-tasks and associated skills.

A list of attitudes and associated observable behaviours is described in the chapter 3.

Performing a dangerous goods task may require different levels of KSA, depending on the complexity of the specific task and the operational environment. Implementing levels of proficiency is an optional means to determine how critical the employee's knowledge, skills or attitudes are for the successful completion of the tasks. If used, the concept of a level of proficiency can be very useful in determining the main areas to focus on during training and assessment. In order to determine the level of proficiency of the employee's knowledge, skill or attitude, the employer should take into account the complexity of the task or sub-task, its criticality and the employee's autonomy in performing it. KSAs may be developed over time and with practice, thus enabling qualified personnel to take on more difficult tasks with greater responsibility.

2.3.2.2 *Design and development:*

1) *Define assessment conditions and success criteria for each competency*. To ensure the validity of assessments, it is essential to define under what conditions each competency will be evaluated (e.g. in a simulator, on-the-job, via oral exam) and what constitutes successful performance. This includes performance standards (e.g. 80% accuracy), timing, and any specific tools or scenarios to be used. Clear success criteria ensure transparency and consistency across assessors and help learners understand expectations.

2) *Conduct a training needs and gap analysis (from current to target proficiency)*. This diagnostic step compares the current capabilities of the target audience with the required competencies. It helps determine which areas need training and to what extent. The analysis can be conducted using interviews, surveys, competencies assessments, or performance reviews. The results inform the scope, depth, and duration of the training program, and help prioritize content based on importance and impact.

3) *Develop a detailed training syllabus including structure, sequence, and milestones*. A structured syllabus outlines how the training will unfold over time. It includes the order of modules, estimated durations, delivery methods (e.g. classroom, e-learning, hands-on), and key milestones or checkpoints for learner progression. The sequence should support a logical learning progression—

from foundational knowledge to complex skill application—and include opportunities for practice and feedback.

4) *Design the assessment plan (types, timing)*. Competency-based training requires assessment of the trainees' progress until they are competent to perform their assigned function. A trainee's assessment may be completed using a variety of tools including observation of job performance, tests, or other practical exercises. In order for assessment tools to be effective, they must be valid and reliable both in terms of being an appropriate measure of the competency being assessed and of obtaining consistent results when administered by different raters and ratings.

The primary method for assessing performance is the conduct of practical assessments, because the focus is on an integrated performance of competencies. Practical assessments can be formative, whereby instructors provide feedback to trainees on their progress toward the interim or final competency standard, or summative, whereby trainees demonstrate competence at defined points during the training which may include or be the end of training. It may be necessary to supplement practical assessments with other forms of evaluation such as examinations, oral assessments, projects or simulation. Detailed guidance on typical assessment methods is provided in PANS-TRG, Attachment C to Chapter 2.

The assessment of dangerous goods personnel can be accomplished in a variety of ways. Some common examples of how to accomplish an assessment would be to utilize a written test, online test, oral test, observed practical exercises, online practical exercises and observation of on-the-job performance by fully trained personnel.

An employer of personnel performing dangerous goods functions might choose to utilize one assessment method or a combination of assessment methods, as long as the assessment confirms that the personnel have acquired the necessary competencies to perform the assigned dangerous goods functions. The employer therefore establishes the assessment plan with all the specific details that would need to be accomplished to determine whether competence has been achieved by the trainee.

Employers electing to send personnel to third-party training providers also need to establish an assessment plan for ensuring that competence has been achieved by the trainee. The employer may incorporate the third-party provider's assessment into its established assessment plan. Even if the employer does not deliver any of the training itself, it can still choose to assess the trainees in the workplace to ensure they can perform their assigned tasks competently and incorporate that process into the assessment plan.

5) *Develop training materials and tools*. Once the syllabus and assessment plan are defined, specific training materials and tools, such as manuals and scenarios, must be created or selected. These may include learner manuals, instructor guides, presentation slides, job aids, role-play scenarios, simulation exercises, and digital resources. Materials should be aligned with defined competencies and tailored to the audience's learning preferences. Where possible, incorporate authentic tasks and examples that mirror real job challenges.

2.3.2.3 *Implementation*

1) *Define logistical and human resource requirements*. Effective delivery requires careful planning of resources such as instructors, assessors, facilities and tools. This step identifies all logistical needs, including training venues, equipment, software, and materials. It also determines the human

resources required—qualified instructors, subject matter experts, and assessors—with associated selection criteria.

2) *Establish procedures for certification, monitoring, and recordkeeping.* To maintain the integrity and credibility of the training program, formal procedures must be established. Certification processes define how competence is officially recognized. Monitoring includes regular oversight to ensure consistency and adherence to standards. Recordkeeping involves storing documentation such as assessment results, attendance, certificates, and instructor logs, and must comply with data protection and audit requirements.

2.3.2.4 *Evaluation and improvement:*

1) *Implement tools to evaluate program effectiveness and identify deficiencies.* Evaluation should occur at multiple levels: reaction (learner satisfaction), learning (knowledge/skill acquisition), behaviour (on-the-job performance), and results (operational impact). This step includes the selection or development of evaluation tools—surveys, quizzes, interviews, performance metrics—and a plan for how data will be collected and analysed. Identifying deficiencies or gaps in training is essential for ongoing improvement.

The SMS represents a very important source of information about the effectiveness of the procedures applied and, consequently, the training provided (see 1.4).

2) *Plan continuous improvement actions based on evaluation results.* Training should not be static. Based on evaluation findings, improvement actions should be planned and implemented. This may involve revising materials, retraining instructors, changing delivery methods, or updating competencies based on operational changes. A continuous improvement cycle ensures the program remains effective, relevant, and responsive to learner and organizational needs.

Appendix A to Chapter 2

ADDITIONAL DETAILS LINKED TO THE ADDIE MODEL

A. INRODUCTION

Instructional systems design (ISD) is a systematic process for designing and developing training. Several valid ISD models exist which may be used to design competency-based training and assessment. The analyse, design, develop, implement and evaluate (ADDIE) framework is generic to all ISD models. Chapter 2 provides guidance for designing dangerous goods competency-based training and assessment this appendix provides further information using the ADDIE model.

The ADDIE model is a generic process traditionally used by instructional designers and training developers to build effective training tools. It consists of five phases: analysis, design, development, implementation, and evaluation. PANS-TRG refers to these phases as "workflows" as illustrated in Figure ~~2-2~~ 2A-1. ~~This section provides a detailed overview of the first two workflows (ANALYSE and DESIGN) and a general overview of the remaining three (DEVELOP, IMPLEMENT and EVALUATE).~~

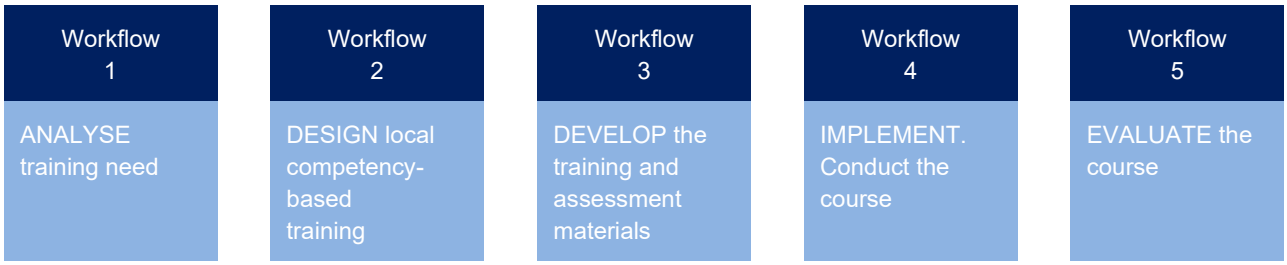


Figure ~~2-2~~ 2A-1. Competency-based training and assessment workflows

The following sections provide a generic and summarized overview of the ADDIE workflows and additional elements to the ones provided in 2.3.2. PANS-TRG, Doc 9868 contains greater detail on the use of the ADDIE model.

B. BUILDING A COMPETENCY-BASED TRAINING AND ASSESSMENT PROGRAMME USING THE ADDIE MODEL

~~2.3.2~~1. Workflow 1 — Analyse training need

~~2.3.2.1~~1.1 The first phase in the development and implementation of a competency-based training programme is to determine what the training needs are specific to the employer's environment and requirements through a training needs analysis. Figure ~~2-3~~ 2A-2 illustrates a detailed overview of this workflow. The output of this workflow is a training specification, which includes the purpose of the training and the detailed operational, technical, regulatory and organizational requirements that need to be fulfilled when designing the training. PANS-TRG lists a number of questions that should be answered to ensure the training specification provides sufficient detail (see PANS-TRG, Chapter 2, Attachment C). Some of these questions are specific to flight training, but most would also apply to dangerous goods training.

~~2.3.2.2~~1.2 This phase includes the development of a task list. A generic list of tasks and sub-tasks typically performed by personnel performing dangerous goods functions is provided in Chapter 4. A complementary flowchart illustrating the typical processes of performing these tasks is provided in the Appendix to Chapter 4. The employer may need to adapt the task list in Chapter 4 to reflect the specific tasks performed by its personnel.

Delete the first two horizontal elements of the following diagram, as indicated by the blue strikeout lines:

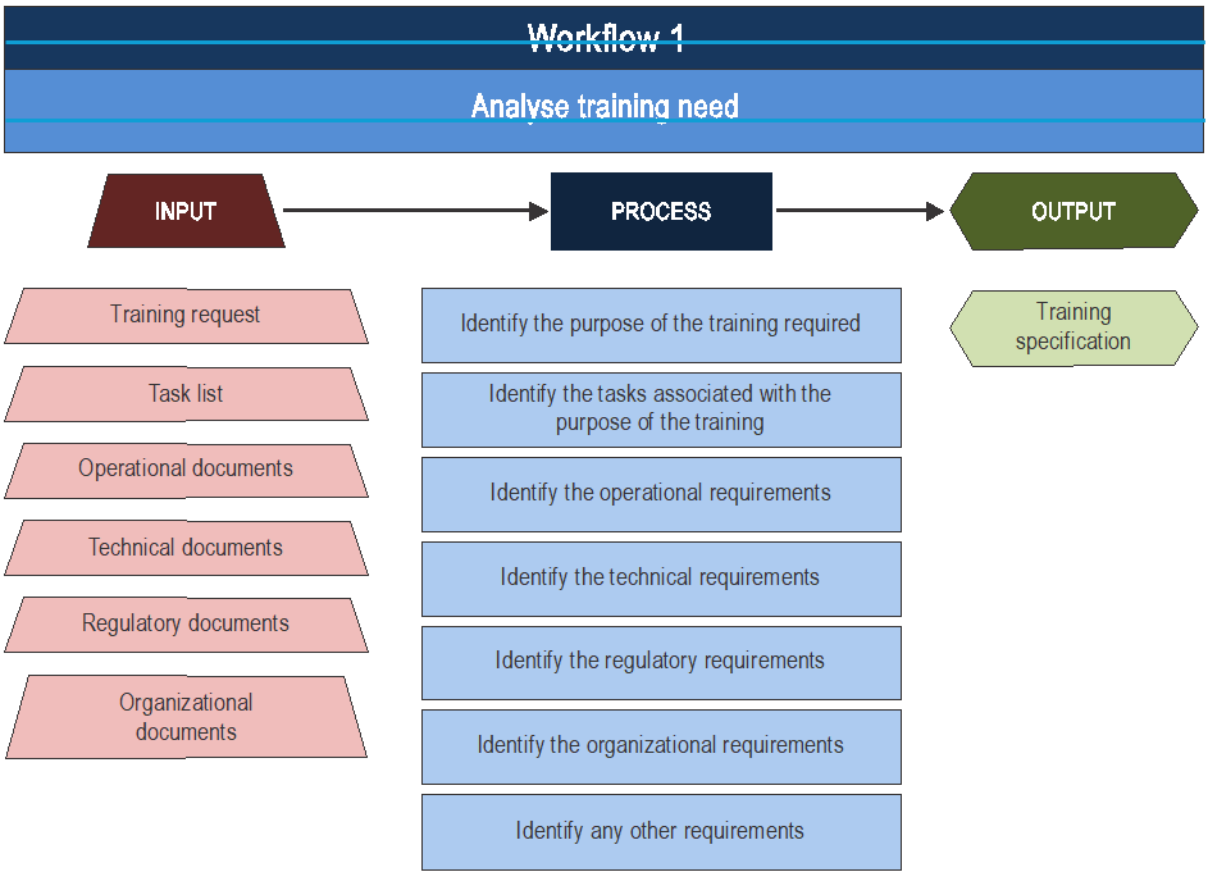


Figure ~~2-3~~ 2A-2. Workflow 1 — Analyse training need

~~2.3.3~~2. Workflow 2 — Design local competency-based training and assessment

~~2.3.3.1~~2.1 The second phase in the development and implementation of a local competency-based training and assessment programme is its design. This is done taking into account the training specifications identified in Workflow 1 and will involve:

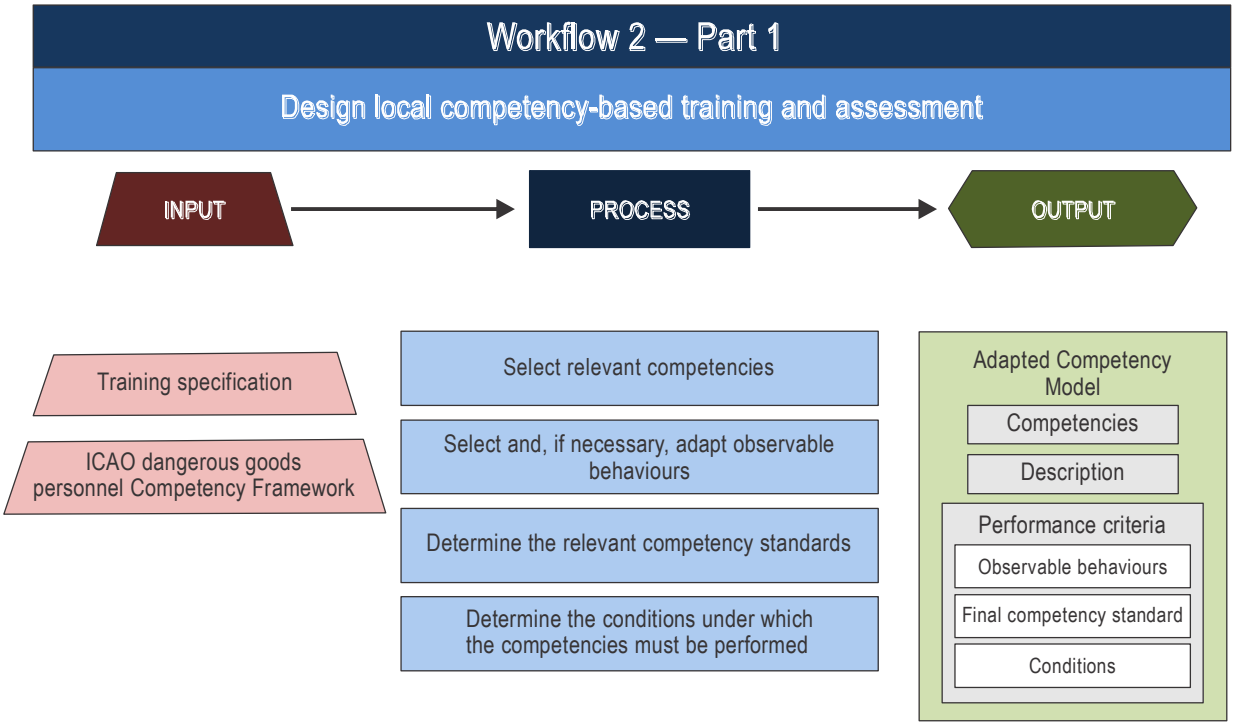
~~a) establishing an adapted competency model that addresses the training specification identified in Workflow 1;~~

~~b~~a) designing an assessment plan that will be used to assess the competence of trainees (for this purpose an adapted competency model may be used, see chapter 6); and

~~c~~b) designing a training plan that will enable the development and delivery of the training course.

~~Figures 2-4 and 2-5 illustrate this workflow in two Parts: Part 1 (Figure 2-4) deals with the design of the adapted competency model, and Part 2 (Figure 2-5) deals with the design of the assessment and training plan.~~

Delete Figure 2-4 from this chapter. It is moved to new Chapter 6:



~~Figure 2-4. Workflow 2, Part 1 — Design local competency-based training and assessment~~

The following is *moved* to new Chapter 6:

~~2.3.3.2 *Designing the adapted competency model*~~

~~2.3.3.2.1 A dangerous goods competency model should be adapted from the generic ICAO competency framework provided in Chapter 3 to meet the organizational competency requirements using the information contained in the training specification. The adapted model should include the following elements (Table 2-1 may be used as a template for an adapted competency model):~~

~~a) *A list of competencies and a description of each*. A generic ICAO competency framework provides a set of competencies that would typically be needed to perform the dangerous goods tasks listed in the task list that was developed when analysing the training needs (Workflow 1). The vast majority of adapted competency models will contain similar lists of competencies, but there may be a need to add or remove a competency depending on the employers' own operational and organizational environments.~~

~~b) *Performance criteria for assessing competency* including:~~

1) ~~*Observable behaviours for each competency.* The generic ICAO competency framework provides a comprehensive list of observable behaviours associated with each of the competencies. Appropriate observable behaviours may be selected from it, adapted from it, or added to it.~~

2) ~~*Competency standards and conditions used to assess competency*. Competency standards apply to all observable behaviours and relate to compliance with the standards and procedures and rules and regulations as described in relevant documents (e.g. national rules, the Technical Instructions, local operations manuals). In some instances, there may be specific standards associated with a particular observable behaviour.~~

Delete the first two horizontal elements of the following diagram, as indicated by the blue strikeout lines:

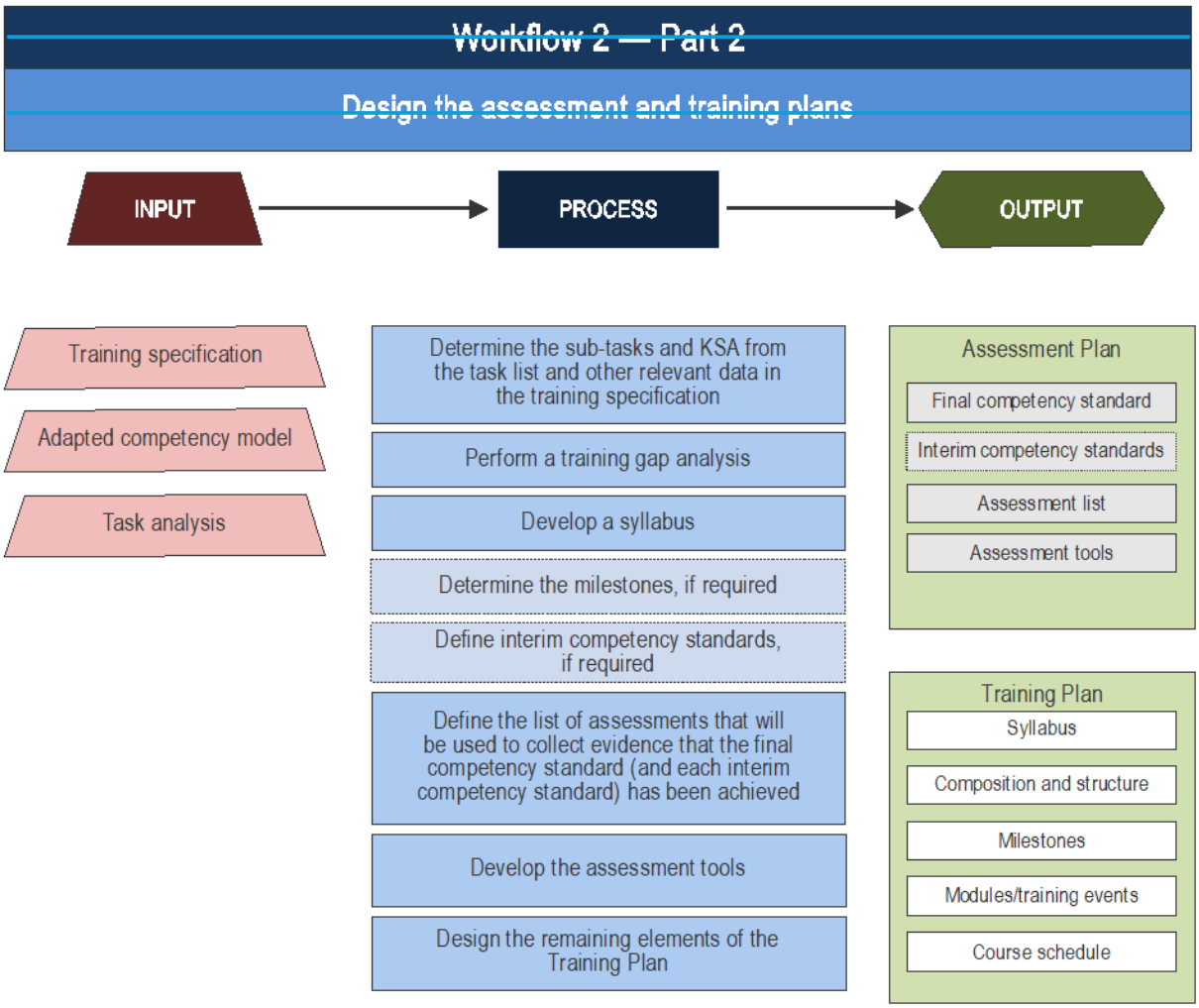


Figure ~~2-5~~ 2A-3. Workflow 2~~, Part 2~~ — Design the assessment and training plans

~~2.3.3.2.2~~2.2 Conditions that are specific to the environment in which performance will be demonstrated may need to be considered in relation to the competency standard. These include the nature and complexity of the tasks, conditions relating to tools and systems or equipment, and conditions relating to the level of support or assistance a trainee can expect from the instructor or assessor.

~~2.3.3.2.3~~2.3 During the early stages of training, trainees may expect active coaching and teaching from the instructor. However, as the trainee progresses towards the final competency standard and gains more confidence in performing independently, the instructor will take on a more passive role and may only give occasional advice on how to improve efficiency or intervene in instances where safety may be compromised. Consequently, the condition description of the final competency standard might be that the trainee would be expected to be performing independently without assistance from the instructor.

~~2.3.3.2.4~~2.4 As part of the progression towards the final competency standard, it may be necessary to establish interim competency standards.

Table 2-1 is moved to new Chapter 6:

~~Table 2-1. Template for an adapted competency model~~

~~*Adapted competency*~~	~~*Description*~~	~~*Performance criteria*~~		
		~~*Observable behaviour*~~	~~*Competency assessment*~~	
~~*Adapted competency 1*~~	~~Description 1~~	~~OB 1~~	~~Final competency standard~~	~~Conditions~~
		~~OB 2~~		
		~~OB n~~		
~~*Adapted competency 2*~~	~~Description 2~~	~~OB 1~~	~~Final competency standard~~	~~Conditions~~
		~~OB 2~~		
		~~OB n~~		
~~*Adapted competency 3*~~	~~Description 3~~	~~OB 1~~	~~Final competency standard~~	~~Conditions~~
		~~OB 2~~		
		~~OB n~~		

~~2.3.3.3~~2.5 *Designing an assessment plan*

~~2.3.3.3.1 Competency based training requires assessment of the trainees' progress until they are competent to perform their assigned function. A trainee's assessment may be completed using a variety of tools including observation of job performance, tests, or other practical exercises. In order for assessment tools to be effective, they must be valid and reliable both in terms of being an appropriate measure of the competency being assessed and of obtaining consistent results when administered by different raters and ratings.~~

~~2.3.3.3.2~~2.5.1 The purpose of the assessment plan is to detail how competence is going to be determined. Prior to developing the assessment and training plans, it is important to consider:

a) The following principles of competency-based assessment:

1) *Clear performance criteria are used to assess competence.* ~~The~~ An adapted competency model may be used to establish~~es~~ these performance criteria (see Chapter 6).

2) *An integrated performance of the competencies is observed.* The trainee undergoing assessment must demonstrate all competencies and their seamless interaction with each other.

3) *Multiple observations are undertaken.* Multiple observations must be carried out to determine whether or not a trainee has achieved the interim and/or final competency standard.

4) *Assessments are valid.* ~~All of the components that comprise the adapted competency model must be assessed.~~ There must be sufficient evidence to ensure that the trainee meets the competency specified by the interim and/or final competency standard. ~~The trainee must not be asked to provide evidence for, or be assessed against, activities that are outside the scope of the adapted competency model.~~

5) *Assessments are reliable.* All assessors should reach the same conclusion when performing an assessment. All assessors should be trained and monitored to achieve and maintain an acceptable level of inter-rater reliability.

~~b) *Typical assessment methods*. The primary method for assessing performance is the conduct of practical assessments, because the focus is on an integrated performance of competencies. Practical assessments can be formative, whereby instructors provide feedback to trainees on their progress toward the interim or final competency standard, or summative, whereby trainees demonstrate competence at defined points during the training which may include or be the end of training. It may be necessary to supplement practical assessments with other forms of evaluation such as examinations, oral assessments, projects or simulation. Detailed guidance on typical assessment methods is provided in PANS-TRG, Attachment C to Chapter 2.~~

~~c) *The concept of milestones.* When the duration or the complexity of a course is such that it makes pedagogic sense to check that a trainee is progressing towards competence at an acceptable pace, the course may be divided into milestones. Milestones are cohesive building blocks of learning that are organized into a logical sequence that generally progress from the simple to the complex. Each milestone is comprised of both training and assessment(s). Milestones build on one another; therefore, a trainee would need to successfully complete the training and assessment for the first milestone before proceeding to the next one. An example of milestones might be training in a classroom as the first and training as part of on-the-job training as the second.~~

~~d) *Final competency standard and interim competency standards.* If training has been divided into milestones, it will be necessary to define interim competency standards for each milestone.~~

~~e) The relationship between the adapted competency model and the training and assessment plans is described in 2.3.3.5.~~

~~2.3.3.3.3~~2.5.2 The assessment plan details:

a) the final competency standard associated with the final milestone;

b) the interim competency standard associated with each milestone (if required);

c) the list of assessments (formative and summative assessments, examinations, oral assessments, etc.) required for each of the milestone(s) that has been defined;

d) when assessments should take place;

e) the tools to be used to collect evidence during practical assessment;

f) the pass marks for projects, examinations or oral assessments;

g) if required, the minimum number of formative assessments to be undertaken prior to starting summative assessments; and

h) the number of observations required to assess performance for the interim and final competency standards.

~~2.3.3.3.4~~2.5.3 Additional administrative procedures may be necessary in the implementation of the assessment plan in relation to:

a) who is authorized to perform a specific task or assessment;

b) roles and responsibilities of personnel during the conduct of assessments;

c) assessment procedures (preparation, conduct and post-assessment);

d) conditions under which assessments are to be undertaken;

e) record-keeping; and

f) actions to be taken if a trainee fails a competency assessment.

Normally these procedures are described in a training and procedures manual.

~~2.3.3.3.5 The assessment of dangerous goods personnel can be accomplished in a variety of ways. Some common examples of how to accomplish an assessment would be to utilize a written test, online test, oral test, observed practical exercises, online practical exercises and observation of on the job performance by fully trained personnel.~~

~~2.3.3.3.6 An employer of personnel performing dangerous goods functions might choose to utilize one assessment method or a combination of assessment methods, as long as the assessment confirms that the personnel have acquired the necessary competencies to perform the assigned dangerous goods functions. The employer therefore establishes the assessment plan with all the specific details that would need to be accomplished to determine whether competence has been achieved by the trainee.~~

~~2.3.3.3.7 Employers electing to send personnel to third-party training providers also need to establish an assessment plan for ensuring that competence has been achieved by the trainee. The employer may incorporate the third-party provider's assessment into its established assessment plan. Even if the employer does not deliver any of the training itself, it can still choose to assess the trainees in the workplace to ensure they can perform their assigned tasks competently and incorporate that process into the assessment plan.~~

~~2.3.3.4~~2.6 *Designing a training plan*

~~2.3.3.4.1~~2.6.1 The purpose of the training plan is to detail:

a) the composition and structure of the course;

b) the syllabus;

c) milestones (if required);

d) modules, training events and their delivery sequence; and

e) the course schedule.

2.3.3.4.2 The training plan will be used by the training designer(s) to create the training and assessment materials.

~~2.3.3.5 *Relationship between the adapted competency model and the assessment and training plans*~~

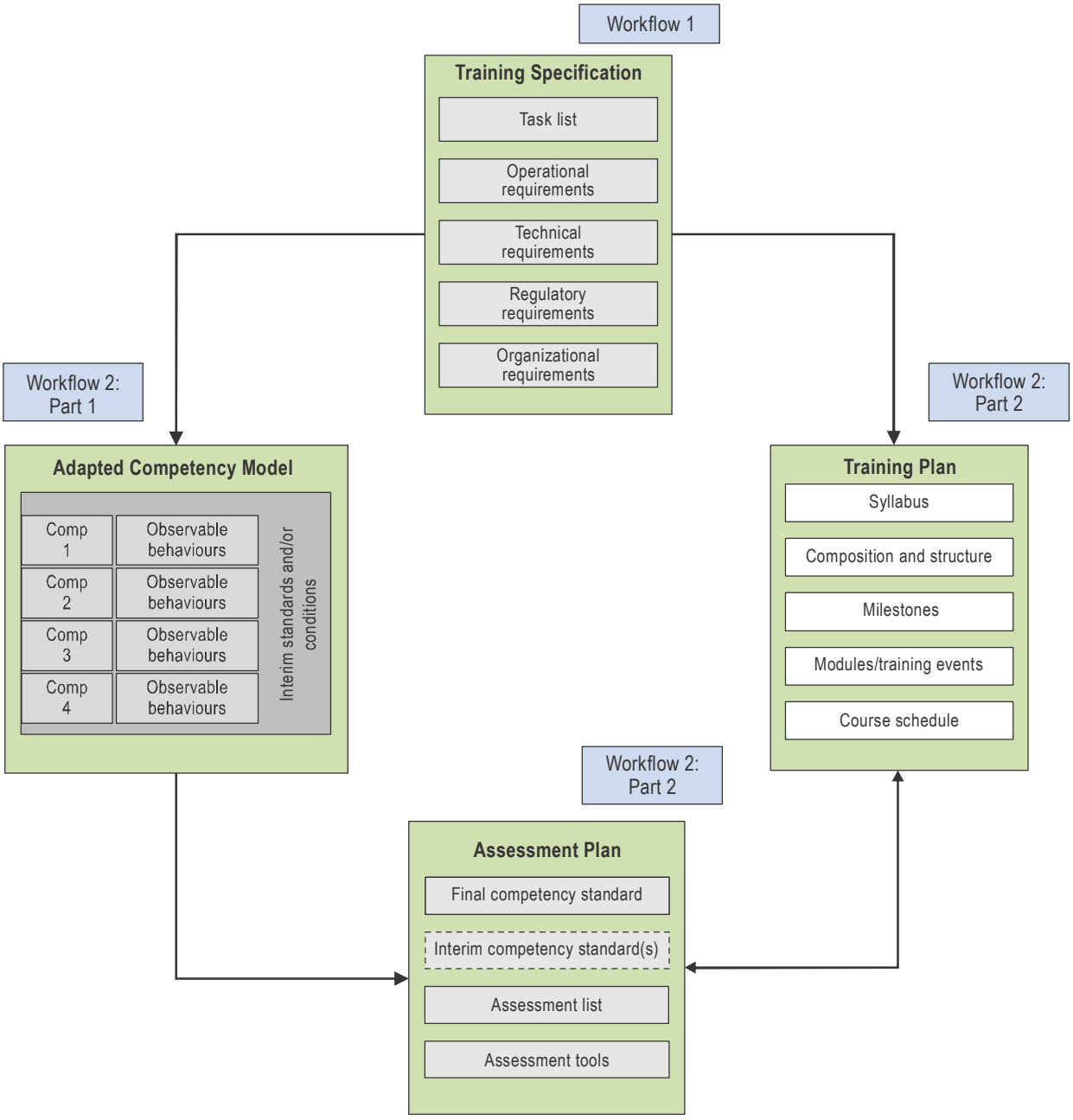
~~2.3.3.5.1 The training specification developed in Workflow 1 (see 2.3.2) serves as the common basis for the development of the adapted competency model and the training and assessment plans. The task list is generally used to aid the selection of the observable behaviours from the generic competency framework provided in Chapter 3. The operational, technical, regulatory and organizational requirements aid the development of the conditions and standards that will apply to the competencies and observable behaviours.~~

~~2.3.3.5.2 The same task list and requirements are used to develop the training plan. The training plan is used to prepare the trainees to undertake assessment to determine if they are competent in accordance with the adapted competency model. The adapted competency model and the training plan are used to develop the assessment plan.~~

~~2.3.3.5.3 The syllabus in the training plan is composed of training objectives derived from tasks and sub-tasks as well as the underlying KSA necessary to perform them. The KSA are determined on the basis of the task list in conjunction with operational, technical, regulatory and organizational requirements. Chapter 5 provides a generic task/knowledge matrix table that can be used as a tool to map out the knowledge necessary to perform specific tasks. Tasks corresponding to the list provided in Chapter 3 are listed across the columns of the table and subject matter (knowledge) is listed down the rows. The employer should indicate what knowledge is needed for a particular task within the organization with a check mark at the point at which the task element and the knowledge element intersect. To facilitate this process, some knowledge components have been blacked out if they are considered to be completely irrelevant to specific tasks. The level of knowledge and/or skills necessary will differ depending on the task. For example, the person accepting dangerous goods will not require the same level of knowledge and/or skills related to classification as someone who is classifying dangerous goods.~~

~~2.3.3.5.4 When assessing whether competence has been achieved, the adapted competency model, not the syllabus, is referenced. Consequently, the performance criteria are used to assess if competence has been achieved, and the tasks/sub-tasks that are carried out by the trainee are the "vehicle" for enabling the assessment to be conducted. Figure 2-6 illustrates the relationship between Workflows 1 and 2.~~

Delete Figure 2-6:



~~Figure 2-6. Relationship between Workflow 1 and Workflow 2~~

~~2.3.4~~2.3 Workflow 3 — Develop the training and assessment materials

The third phase in the development and implementation of a competency-based training and assessment programme is the development of the training and assessment materials. Development is based on ~~the adapted competency model and~~ the training and assessment plans. Training and assessment materials include but are not limited to training notes, exercise briefings, practical exercises, case studies, presentations, video clips, self-test quizzes, examinations, assessments and assessment tools. Figure ~~2-7~~ 2A-4 illustrates a detailed overview of this workflow.

Delete the first two horizontal elements of the following diagram, as indicated by the blue strikeout lines:

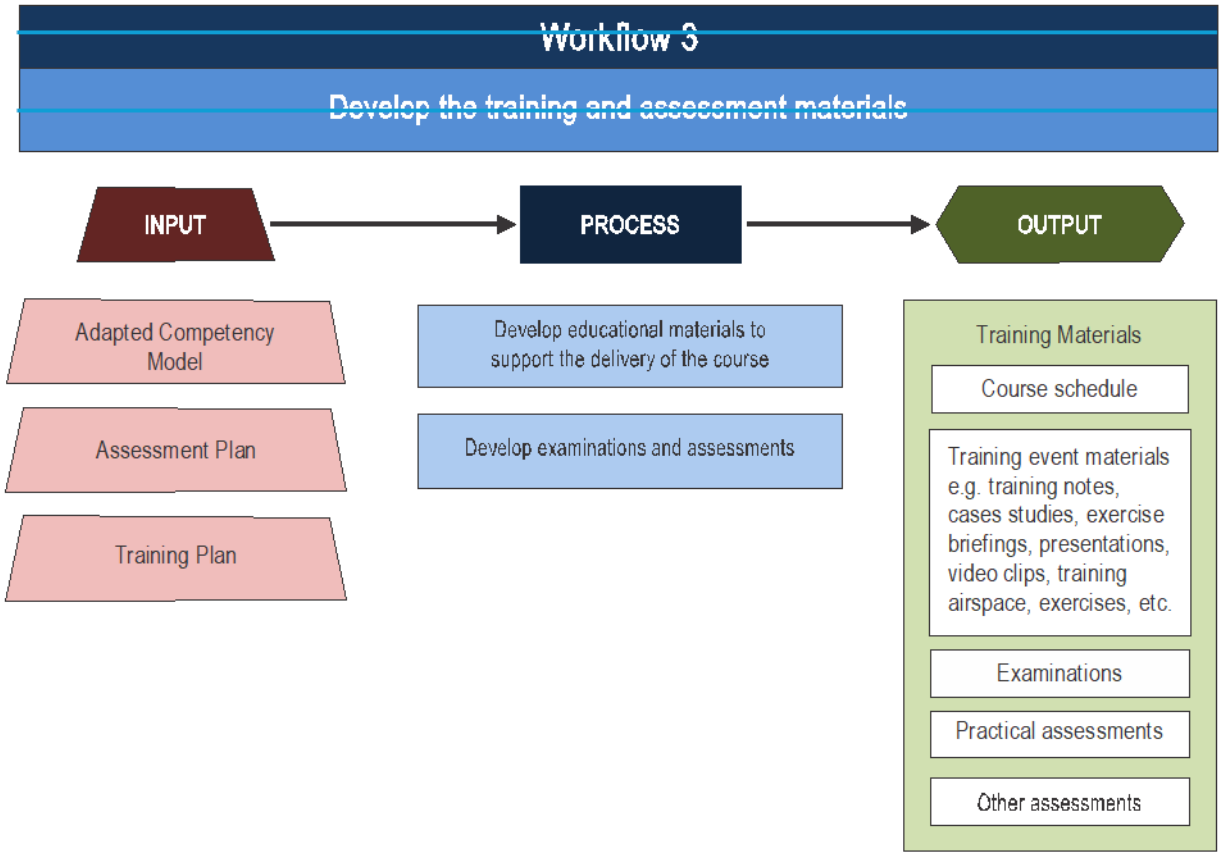


Figure ~~2-7~~ 2A-4. Workflow 3 — Develop the training and assessment materials

~~2.3.5~~2.4 Workflow 4 — Conduct the course in accordance with the training and assessment plans

The fourth phase in the development and implementation of a competency-based training and assessment programme is conducting the course in accordance with the training and assessment plans. This involves delivering the training; monitoring the progress of the trainees; providing timely and continuous feedback on their performance; diagnosing deficiencies in the training and addressing them in a timely manner; and carrying out assessments according to the assessment plan. The goal of this phase is a competent employee. Figure ~~2-8~~ 2A-5 illustrates a detailed overview of this workflow.

Delete the first two horizontal elements of the following diagram, as indicated by the blue strikeout lines:

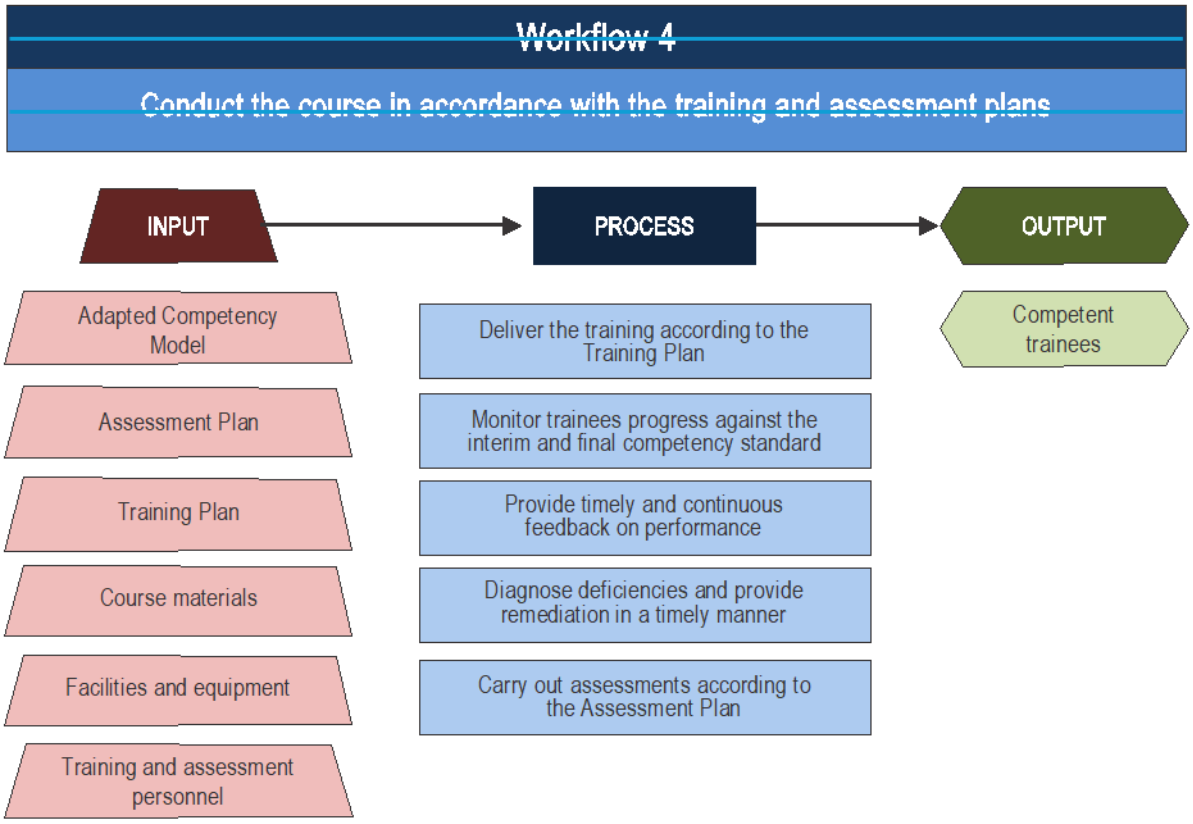


Figure ~~2-8~~ 2A-5. Workflow 4 — Conduct the course in accordance with the training and assessment plans

~~2.3.6~~2.5 Workflow 5 — Evaluate the course including the training and assessment plans

The employer is responsible for ensuring the effectiveness of the training programme. At the end of a period of training, feedback on performance on the job from trainees, instructors, assessors and employers should be gathered to determine the effectiveness of the training and assessment in supporting the progression of learning towards competence in the workplace. Evaluation of the training should be based on valid and reliable evidence such as course results, trainee feedback, instructor feedback, audit reports, and occurrence reports. This evaluation may lead to changes or improvements being made to the competency-based training and assessment design. Figure ~~2-9~~ 2A-6 illustrates a detailed overview of this workflow.

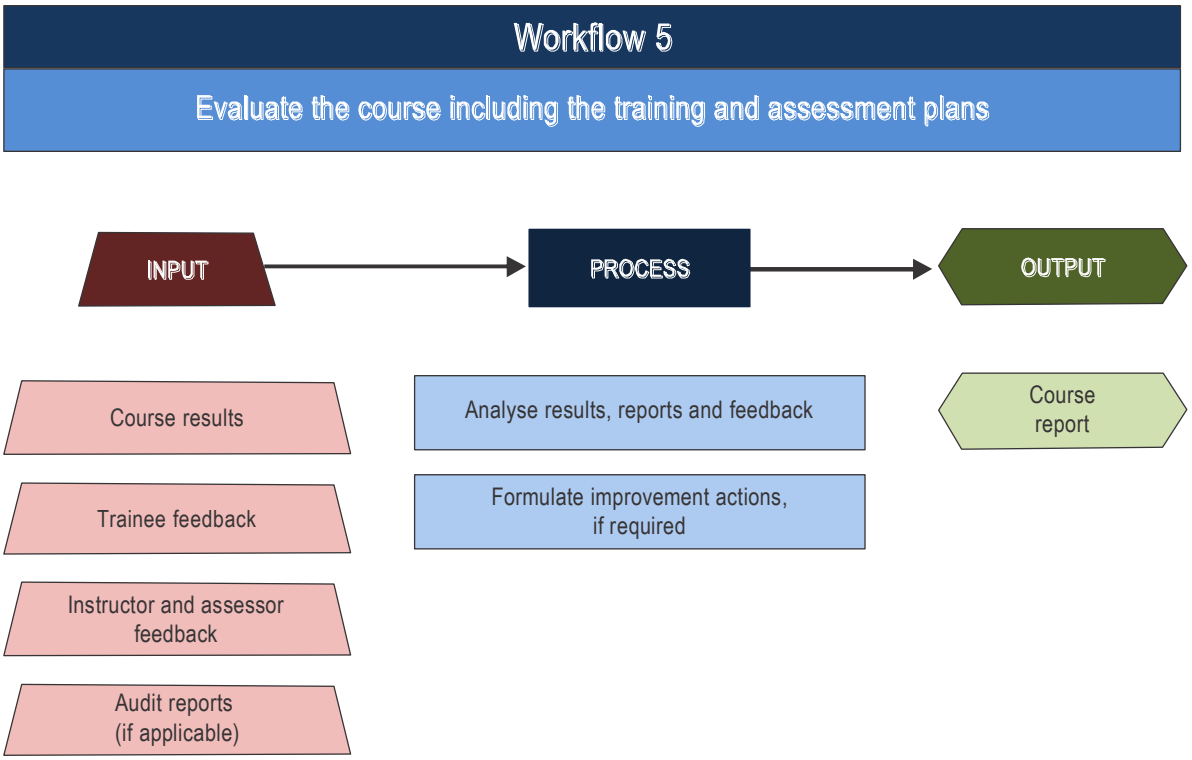


Figure ~~2-9~~ 2A-6. Workflow 5 — Evaluate the course including the training and assessment plans

Chapter 3

GENERIC COMPETENCY FRAMEWORK FOR DANGEROUS GOODS PERSONNEL

This chapter contains a generic ICAO competency framework for dangerous goods personnel as described in Chapter 2. ~~Employers implementing competency-based training and assessment should adapt the framework into an adapted competency model based on their specific requirements. The adapted competency model should include the elements listed in Table 3-1.~~

Table 3-1. Generic ICAO competency framework for dangerous goods personnel

Generic competency	*Description*	*Observable behaviour*
Application of procedures and compliance with regulations	Identifies and applies appropriate procedures in accordance with published operating instructions and in compliance with applicable regulations	Identifies where to find procedures and regulations
		Follows relevant procedures in a timely manner
		Complies with applicable regulations
		Applies relevant procedural knowledge
Communication	Communicates through appropriate means in the work environment, in both normal and non-normal situations	Ensures the recipient is ready and able to receive information
		Selects appropriately what, when, how and with whom to communicate
		Conveys messages clearly, accurately and concisely
		Confirms that the recipient correctly understands important information
		Listens actively and demonstrates understanding when receiving information
		Asks relevant and effective questions
		Completes accurate reports as required by operating procedures
		Announces deviations from normal or intended conditions
		Correctly uses and interprets non-verbal communication
Leadership, teamwork and self-management	Demonstrates effective leadership, teamwork and self-management	Encourages team participation and open communication
		Demonstrates initiative and provides direction when required

Generic competency	*Description*	*Observable behaviour*
		Engages others in planning
		Considers inputs from others
		Gives and receives feedback constructively
		Addresses and resolves conflicts and disagreements in a constructive manner
		Exercises decisive leadership
		Admits mistakes and takes responsibility for own performance, detecting and resolving own errors
		Carries out instructions when directed and applies effective intervention strategies when necessary
		Confidently intervenes when important for safety
		Self-evaluates the effectiveness of actions
Problem-solving and decision-making	Identifies problem precursors and resolves actual problems using decision-making techniques, in a timely manner	Seeks accurate and adequate information from appropriate sources
		Identifies and verifies what and why things have gone wrong
		Employs proper problem-solving strategies
		Perseveres in working through problems while prioritizing safety
		Uses appropriate and timely decision-making techniques
		Sets priorities appropriately
		Identifies and considers options as appropriate
		Monitors, reviews and adapts decisions as required
		Identifies, assesses and manages risks and threats to safety effectively
		Adapts when faced with situations where no guidance or procedure exists
		When an event conducive to startle is encountered, recognizes and manages the situation

Generic competency	*Description*	*Observable behaviour*
Workload management	Maintains available workload capacity by prioritizing and distributing tasks using appropriate resources	~~Exercises self-control in all situations~~
		Plans, prioritizes and schedules tasks effectively
		Manages time efficiently when carrying out tasks
		Offers and gives assistance, delegates when necessary
		Seeks and accepts assistance, when appropriate
		Monitors, reviews and cross-checks actions conscientiously
		Verifies that tasks are completed to the expected outcome
		Manages and recovers from interruptions, distractions, variations and failures effectively while performing tasks

Chapter 4

DANGEROUS GOODS TASK LIST

This chapter contains a generic list of tasks typically performed by dangerous goods personnel as described in Chapter 1, 1.2.6. It is an indicative list provided as guidance. More tasks may need to be added or removed depending on the scope of the employer's operations. The employer should therefore adapt this task list to reflect the specific tasks performed by its personnel.

Generic dangerous goods task list

1. Classifying dangerous goods

    1.1 Evaluate substance or article against classification criteria

        1.1.1 Determine if it is dangerous goods
        1.1.2 Determine if it is forbidden under any circumstances

    1.2 Determine dangerous goods description

        1.2.1 Determine class or division
        1.2.2 Determine packing group
        1.2.3 Determine proper shipping name and UN number
        1.2.4 Determine if it is forbidden unless approval or exemption is granted

    1.3 Review special provisions

        1.3.1 Assess if special provision(s) is applicable
        1.3.2 Apply special provision(s)

2. Preparing dangerous goods shipment

    2.1 Assess packing options including quantity limitations

        2.1.1 Consider limitations (de minimis quantities, excepted quantities, limited quantities, passenger aircraft, cargo aircraft only, special provisions, dangerous goods in the mail)
        2.1.2 Consider State and operator variations
        2.1.3 Determine if all-packed-in-one can be used
        2.1.4 Select how dangerous goods will be shipped based on limitations and variations

    2.2 Apply packing requirements

        2.2.1 Consider constraints of packing instructions
        2.2.2 Select appropriate packaging materials (absorbent, cushioning, etc.)
        2.2.3 Assemble package
        2.2.4 Comply with the packaging test report when UN specification packaging is required

2.3 Apply marks and labels

2.3.1 Determine applicable marks
2.3.2 Apply marks
2.3.3 Determine applicable labels
2.3.4 Apply labels

2.4 Assess use of overpack

2.4.1 Determine if overpack can be used
2.4.2 Apply marks if necessary
2.4.3 Apply labels if necessary

2.5 Prepare documentation

2.5.1 Complete the dangerous goods transport document
2.5.2 Complete other transport documents (e.g. air waybill)
2.5.3 Include other required documentation (approvals/exemptions, etc.)
2.5.4 Retain copies of documents as required

3. Processing/accepting cargo

3.1 Review documentation

3.1.1 Verify dangerous goods transport document
3.1.2 Verify other transport documents (e.g. air waybill)
3.1.3 Verify other documents (exemptions, approvals, etc.)
3.1.4 Verify State/operator variations

3.2 Review package(s)

3.2.1 Verify marks
3.2.2 Verify labels
3.2.3 Verify package type
3.2.4 Verify package conditions
3.2.5 Verify State/operator variations

3.3 Complete acceptance procedures

3.3.1 Complete acceptance checklist
3.3.2 Provide shipment information for load planning
3.3.3 Retain documents as required

3.4 Process/accept cargo other than dangerous goods

3.4.1 Check documentation for indications of undeclared dangerous goods
3.4.2 Check packages for indications of undeclared dangerous goods

4. Managing cargo pre-loading

    4.1 Plan loading

        4.1.1 Determine stowage requirements such as the prohibition on carriage within a cabin occupied by passengers or on the flight deck, package orientation, securing to prevent movement, accessibility
        4.1.2 Determine segregation, separation, aircraft/compartment limitations

    4.2 Prepare load for aircraft

        4.2.1 Check packages for indications of undeclared dangerous goods
        4.2.2 Check for damage and/or leakage
        4.2.3 Apply stowage requirements (e.g. segregation, separation, orientation)
        4.2.4 Apply ULD tags when applicable
        4.2.5 Transport cargo to aircraft

    4.3 Issue NOTOC

        4.3.1 Enter required information
        4.3.2 Verify conformance with load plan
        4.3.3 Transmit to loading personnel

5. Accepting passenger and crew baggage

    5.1 Process baggage

        5.1.1 Identify forbidden dangerous goods
        5.1.2 Apply approval requirements

    5.2 Accept baggage

        5.2.1 Apply operator requirements
        5.2.2 Verify passenger baggage requirements
        5.2.3 Advise pilot-in-command

6. Transporting cargo/baggage

    6.1 Load aircraft

        6.1.1 Transport cargo/baggage to aircraft
        6.1.2 Check packages for indications of undeclared dangerous goods
        6.1.3 Check for damage and/or leakage
        6.1.4 Apply stowage requirements (e.g. segregation, separation, orientation, securing and protecting from damage)
        6.1.5 Verify that NOTOC reflects against aircraft load
        6.1.6 Verify passenger baggage requirements
        6.1.7 Inform pilot-in-command and flight operations officer/flight dispatcher

    6.2 Manage dangerous goods pre- and during flight

        6.2.1 ~~Detect~~ Identify presence of dangerous goods not permitted in baggage
        6.2.2 Interpret NOTOC (only applies to an approved operator)

6.2.3 Apply procedures in the event of an emergency

~~6.2.4 Inform flight operations officer/flight dispatcher/air traffic control in the event of an emergency~~

~~6.2.5 Inform emergency services of the dangerous goods on board in the event of an emergency~~

6.3 Unload aircraft

6.3.1 Apply specific unloading considerations

6.3.2 Check packages for indications of undeclared dangerous goods

6.3.3 Check for damage and/or leakage

6.3.4 Transport cargo/baggage to facility/terminal

7. ~~Collecting~~ Reporting safety data

7.1 Report dangerous goods accidents

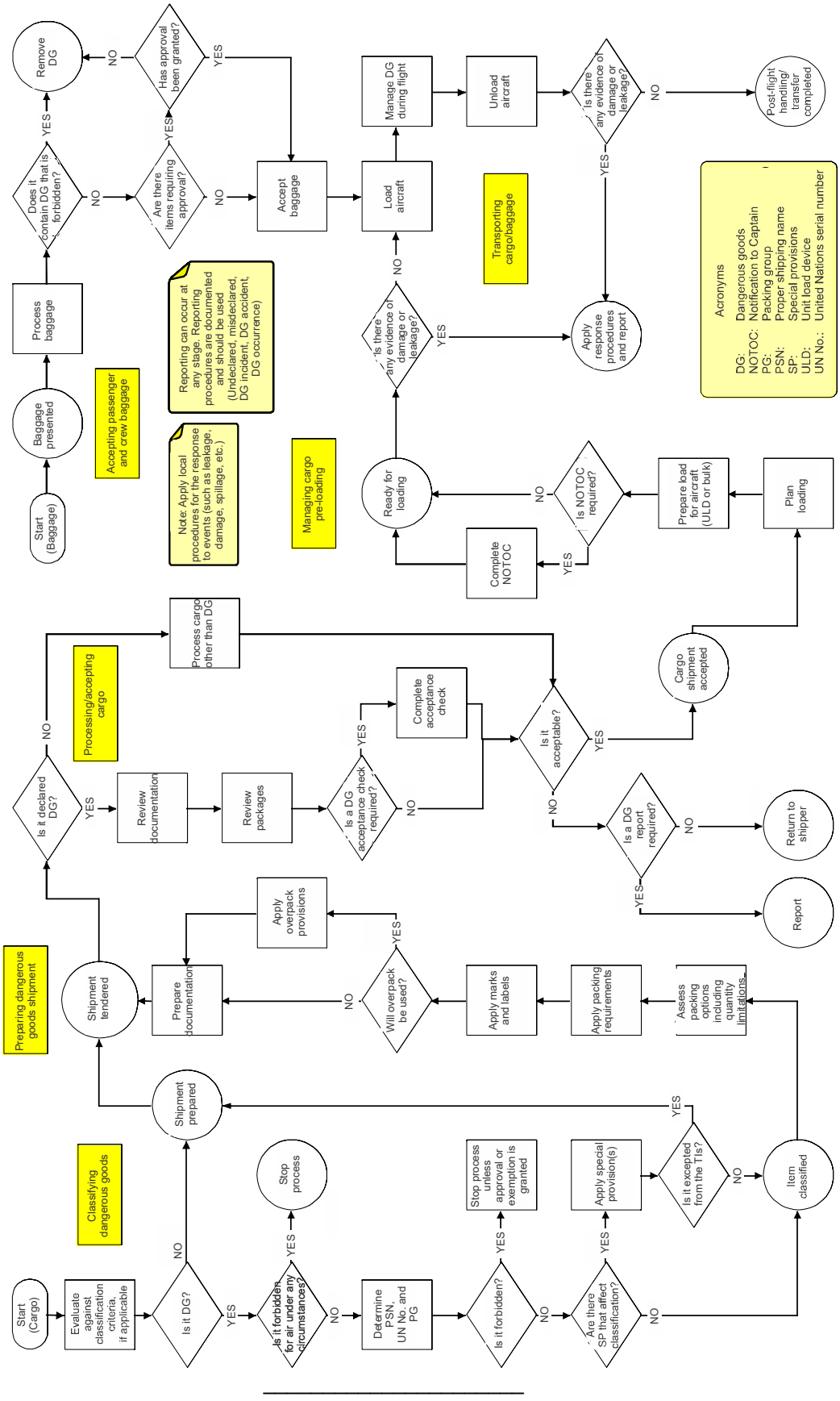
7.2 Report dangerous goods incidents

7.3 Report undeclared/misdeclared dangerous goods

7.4 Report dangerous goods occurrences

Appendix A to Chapter 4

DANGEROUS GOODS FUNCTIONS — PROCESS FLOWCHART


Start (Cargo)
Evaluate against classification criteria, if applicable
Is it DG?
NO
YES
Is it forbidden for air under any circumstances?
YES
Stop process
NO
Determine PSN, UN No. and PG
Is it forbidden?
YES
Stop process unless approval or exemption is granted
NO
Are there SP that affect classification?
YES
Apply special provision(s)
NO
Is it excepted from the TIs?
YES
NO
Item classified
Classifying dangerous goods
Shipment prepared
Assess packing options including quantity limitations
Apply packing requirements
Apply marks and labels
Will overpack be used?
YES
Apply overpack provisions
NO
Prepare documentation
Shipment tendered
Preparing dangerous goods shipment
Is it declared DG?
NO
YES
Review documentation
Review packages
Is a DG acceptance check required?
YES
Complete acceptance check
NO
Is it acceptable?
YES
NO
Is a DG report required?
YES
Report
NO
Return to shipper
Cargo shipment accepted
Process cargo other than DG
Processing/accepting cargo
Plan loading
Prepare load for aircraft (ULD or bulk)
Is NOTOC required?
NO
YES
Complete NOTOC
Ready for loading
Managing cargo pre-loading
Is there any evidence of damage or leakage?
YES
Apply response procedures and report
NO
Load aircraft
Transporting cargo/baggage
Manage DG during flight
Unload aircraft
Is there any evidence of damage or leakage?
YES
NO
Post-flight handling/ transfer completed
Has approval been granted?
YES
NO
Remove DG
Does it contain DG that is forbidden?
YES
NO
Are there items requiring approval?
YES
NO
Accept baggage
Process baggage
Baggage presented
Start (Baggage)
Accepting passenger and crew baggage
Reporting can occur at any stage. Reporting procedures are documented and should be used (Undeclared, misdeclared, DG incident, DG accident, DG occurrence)
Note: Apply local procedures for the response to events (such as leakage, damage, spillage, etc.)
Acronyms
DG: Dangerous goods
NOTOC: Notification to Captain
PG: Packing group
PSN: Proper shipping name
SP: Special provisions
ULD: Unit load device
UN No.: United Nations serial number

Chapter 5

TASK/KNOWLEDGE MATRIX TOOL

This chapter contains a generic task/knowledge matrix table that can be used as a tool to map out the knowledge that is necessary to perform specific tasks. Tasks corresponding to the task list provided in Chapter 4 are listed across the columns of the table and knowledge elements are listed down the rows. The employer should indicate what knowledge is needed for a particular task within the organization with a checkmark at the point at which the task element and the knowledge element intersect. To facilitate this process, some cells in the table have been shaded. These shaded cells identify knowledge elements that would normally be irrelevant to the corresponding task and for which a checkmark would not normally be necessary.

Template for determining the knowledge that should be possessed by personnel performing specific tasks

Note.— The numbers under "Dangerous goods tasks" refer to tasks and sub-tasks from Chapter 4. The titles of the tasks are replicated in a legend below the following table.

Dangerous goods knowledge	*Dangerous goods tasks*																							
	1. Classifying dangerous goods			*2. Preparing dangerous goods shipment*					*3. Processing/ accepting cargo*				*4. Managing cargo pre-loading*			*5. Accepting passenger and crew baggage*		*6. Transporting cargo/ baggage*			*7. Collecting safety data*			
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	4.1	4.2	4.3	5.1	5.2	6.1	6.2	6.3	7.1	7.2	7.3	7.4
Scope and applicability																								
Limitation of dangerous goods on aircraft																								
Definitions																								
Training																								
Dangerous goods security																								
General provisions concerning radioactive material																								
Reporting of dangerous goods accidents, incidents and other occurrences																								
Classification — General																								

Dangerous goods knowledge	*Dangerous goods tasks*																						
	1. Classifying dangerous goods			*2. Preparing dangerous goods shipment*					*3. Processing/ accepting cargo*				*4. Managing cargo pre-loading*			*5. Accepting passenger and crew baggage*		*6. Transporting cargo/ baggage*			*7. Collecting safety data*			
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	4.1	4.2	4.3	5.1	5.2	6.1	6.2	6.3	7.1	7.2	7.3	7.4
Classification — Class 1																								
Classification — Class 2																								
Classification — Class 3																								
Classification — Class 4																								
Classification — Class 5																								
Classification — Class 6																								
Classification — Class 7																								
Classification — Class 8																								
Classification — Class 9																								
Dangerous goods list — General																								
Dangerous goods list — Arrangement																								
Special provisions																								
Dangerous goods in limited quantities																								
Dangerous goods packed in excepted quantities																								
Packing Instructions — General																								
Packing Instructions — Class 1																								
Packing Instructions — Class 2																								

Dangerous goods knowledge	*Dangerous goods tasks*																						
	1. Classifying dangerous goods			*2. Preparing dangerous goods shipment*					*3. Processing/ accepting cargo*				*4. Managing cargo pre-loading*			*5. Accepting passenger and crew baggage*		*6. Transporting cargo/ baggage*			*7. Collecting safety data*			
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	4.1	4.2	4.3	5.1	5.2	6.1	6.2	6.3	7.1	7.2	7.3	7.4
Packing Instructions — Class 3																								
Packing Instructions — Class 4																								
Packing Instructions — Class 5																								
Packing Instructions — Class 6																								
Packing Instructions — Class 7																								
Packing Instructions — Class 8																								
Packing Instructions — Class 9																								
Preparing dangerous goods shipment — general																								
Package markings																								
Labelling																								
Documentation																								
Packaging applicability, nomenclature and codes																								
Marking of packagings other than inner packagings																								
Requirements for packagings																								

Dangerous goods knowledge	*Dangerous goods tasks*																							
	1. Classifying dangerous goods			*2. Preparing dangerous goods shipment*					*3. Processing/ accepting cargo*				*4. Managing cargo pre-loading*			*5. Accepting passenger and crew baggage*		*6. Transporting cargo/ baggage*			*7. Collecting safety data*			
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	4.1	4.2	4.3	5.1	5.2	6.1	6.2	6.3	7.1	7.2	7.3	7.4
Packaging performance tests																								
Requirements for the construction and testing of cylinders and closed cryogenic receptacles, aerosol dispensers and small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas																								
Packagings for infectious substances of Category A																								
Requirements for the construction, testing and approval of packages for radioactive material and for the approval of such material																								
Acceptance procedures																								
Storage and loading																								
Inspection and decontamination																								
Provision of information																								
Provisions concerning passengers and crew																								

Dangerous goods knowledge	*Dangerous goods tasks*																						
	1. Classifying dangerous goods			*2. Preparing dangerous goods shipment*					*3. Processing/ accepting cargo*				*4. Managing cargo pre-loading*			*5. Accepting passenger and crew baggage*		*6. Transporting cargo/ baggage*			*7. Collecting safety data*			
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	4.1	4.2	4.3	5.1	5.2	6.1	6.2	6.3	7.1	7.2	7.3	7.4
Provisions to aid recognition of undeclared dangerous goods																								
Helicopter operations																								

Tasks

1. Classifying dangerous goods

    1.1 Evaluate substance or article against classification criteria
    1.2 Determine dangerous goods description
    1.3 Review special provisions

2. Preparing dangerous goods shipment

    2.1 Assess packing options including quantity limitations
    2.2 Apply packing requirements
    2.3 Apply marks and labels
    2.4 Assess use of overpack
    2.5 Prepare documentation

3. Processing/accepting cargo

    3.1 Review documentation
    3.2 Review package(s)
    3.3 Complete acceptance procedures
    3.4 Process/accept cargo other than dangerous goods

4. Managing cargo pre-loading

    4.1 Plan loading
    4.2 Prepare load for aircraft
    4.3 Issue NOTOC

5. Accepting passenger and crew baggage

    5.1 Process baggage
    5.2 Accept baggage

6. Transporting cargo/baggage

    6.1 Load aircraft
    6.2 Manage dangerous goods pre- and during flight
    6.3 Unload aircraft

7. ~~Collecting~~ Reporting safety data

    7.1 Report dangerous goods accidents
    7.2 Report dangerous goods incidents
    7.3 Report undeclared/misdeclared dangerous goods
    7.4 Report dangerous goods occurrences

Appendix A to Chapter 5

EXAMPLE ADAPTED TASK LISTS FOR CERTAIN WELL-DEFINED ~~ROLES~~ FUNCTIONS

A. INTRODUCTION

The examples below indicate the tasks from the task list provided in Chapter 4 that personnel responsible for certain well-defined functions would typically perform and for which training and assessment would therefore be required. Personnel would need to have relevant knowledge to competently perform these tasks. The task/knowledge matrix tool provided in Chapter 5 may be used as a guide for determining what knowledge is needed for a given task. The examples in this appendix and the task/knowledge tool provided in Chapter 5 may be used for designing training programmes. However, they should not be considered as mandatory. Additional training and assessment may be required for personnel assigned additional responsibilities, and less training and assessment may be required for personnel assigned fewer responsibilities than those presented in these lists. The employer is responsible for ensuring employees are competent to perform the functions for which they are responsible and must therefore ensure that training programmes are designed to accomplish this. Dangerous goods training programmes are subject to State approval in accordance with national regulations, policies and procedures.

B. PERSONNEL RESPONSIBLE FOR PREPARATION OF DANGEROUS GOODS CONSIGNMENTS

Training and assessment for personnel preparing dangerous goods consignments for transport may be tailored to address only those classes, divisions or even UN numbers that they prepare for transport. Training and assessment may also be limited to address only the specific tasks personnel perform. For example, where personnel are only responsible for the packing, marking and labelling of packages and overpacks, training and assessment may be tailored to address just those tasks. Personnel would need to have relevant knowledge to competently perform these functions. The task/knowledge matrix tool provided in Chapter 5 may be used as a guide for determining what knowledge is needed. The following are tasks personnel responsible for preparation of dangerous goods consignments typically perform and for which training and assessment would therefore be required:

1. Classifying dangerous goods

1.1 Evaluate substance or article against classification criteria

- 1.1.1 Determine if it is dangerous goods
- 1.1.2 Determine if it is forbidden under any circumstances

1.2 Determine dangerous goods description

- 1.2.1 Determine class or division
- 1.2.2 Determine packing group
- 1.2.3 Determine proper shipping name and UN number
- 1.2.4 Determine if it is forbidden unless approval or exemption is granted

1.3 Review special provisions

1.3.1 Assess if special provision(s) is applicable
1.3.2 Apply special provision(s)

2. Preparing dangerous goods shipment

2.1 Assess packing options including quantity limitations

2.1.1 Consider limitations (de minimis quantities, excepted quantities, limited quantities, passenger aircraft, cargo aircraft only, special provisions, dangerous goods in the mail)
2.1.2 Consider State and operator variations
2.1.3 Determine if all-packed-in-one can be used
2.1.4 Select how dangerous goods will be shipped based on limitations and variations

2.2 Apply packing requirements

2.2.1 Consider constraints of packing instructions
2.2.2 Select appropriate packaging materials (absorbent, cushioning, etc.)
2.2.3 Assemble package
2.2.4 Comply with the packaging test report when UN specification packaging is required

2.3 Apply marks and labels

2.3.1 Determine applicable marks
2.3.2 Apply marks
2.3.3 Determine applicable labels
2.3.4 Apply labels

2.4 Assess use of overpack

2.4.1 Determine if overpack can be used
2.4.2 Apply marks if necessary
2.4.3 Apply labels if necessary

2.5 Prepare documentation

2.5.1 Complete the dangerous goods transport document
2.5.2 Complete other transport documents (e.g. air waybill)
2.5.3 Include other required documentation (approvals/exemptions, etc.)
2.5.4 Retain copies of documents as required

7. ~~Collecting~~ Reporting safety data

7.1 Report dangerous goods accidents

7.2 Report dangerous goods incidents

7.3 Report undeclared/misdeclared dangerous goods

7.4 Report dangerous goods occurrences

C. PERSONS RESPONSIBLE FOR PROCESSING OR ACCEPTING GOODS PRESENTED AS GENERAL CARGO

Personnel responsible for processing goods presented as general cargo should be competent to perform tasks aimed at preventing undeclared dangerous goods from being loaded on an aircraft. They may work for freight forwarders, ground handling agents or operators. Personnel would need to have relevant knowledge to competently perform these tasks. The task/knowledge matrix tool provided in Chapter 5 may be used as a guide for determining what knowledge is needed. They may need additional knowledge and be capable of performing at a more advanced skill level depending on the actual responsibilities assigned. The following are tasks aimed at preventing undeclared dangerous goods from being loaded on aircraft that such personnel would typically perform and for which training and assessment may be required.

3. Processing/accepting cargo

3.4 Process/accept cargo other than dangerous goods

- 3.4.1 Check documentation for indications of undeclared dangerous goods
- 3.4.2 Check packages for indications of undeclared dangerous goods

6. Transporting cargo/baggage

6.2 Manage dangerous goods pre- and during flight

- 6.2.3 Apply procedures in the event of an emergency

7. ~~Collecting~~ Reporting safety data

7.1 Report dangerous goods accidents

7.2 Report dangerous goods incidents

7.3 Report undeclared/misdeclared dangerous goods

7.4 Report dangerous goods occurrences

D. PERSONNEL RESPONSIBLE FOR PROCESSING OR ACCEPTING DANGEROUS GOODS CONSIGNMENTS

The following are tasks personnel responsible for processing or accepting dangerous goods consignments typically perform and for which training and assessment would therefore be required.

3. Processing/accepting cargo

3.1 Review documentation

- 3.1.1 Verify dangerous goods transport document
- 3.1.2 Verify air waybill
- 3.1.3 Verify other documents (exemptions, approvals, etc.)
- 3.1.4 Verify State/operator variations

3.2 Review package(s)

3.2.1 Verify marks
3.2.2 Verify labels
3.2.3 Verify package type
3.2.4 Verify package conditions
3.2.5 Verify State/operator variations

3.3 Complete acceptance procedures

3.3.1 Complete acceptance checklist
3.3.2 Provide shipment information for load planning
3.3.3 Retain documents as required

6. Transporting cargo/baggage

6.2 Manage dangerous goods pre- and during flight

6.2.3 Apply procedures in the event of an emergency

7. ~~Collecting~~ Reporting safety data

7.1 Report dangerous goods accidents

7.2 Report dangerous goods incidents

7.3 Report undeclared/misdeclared dangerous goods

7.4 Report dangerous goods occurrences

E. PERSONS RESPONSIBLE FOR HANDLING CARGO IN A WAREHOUSE, LOADING AND UNLOADING UNIT LOAD DEVICES AND LOADING AND UNLOADING AIRCRAFT CARGO COMPARTMENTS

The following are tasks personnel responsible for handling cargo in a warehouse, loading and unloading unit load devices, and loading and unloading passenger baggage and aircraft cargo compartments typically perform and for which training and assessment would therefore be required.

4. Managing cargo pre-loading

4.2 Prepare load for aircraft

4.2.1 Check packages for indications of undeclared dangerous goods
4.2.2 Check for damage and/or leakage
4.2.3 Apply stowage requirements (e.g. segregation, separation, orientation)
4.2.4 Apply ULD tags when applicable
4.2.5 Transport cargo to aircraft

6. Transporting cargo/baggage

6.1 Load aircraft

6.1.1 Transport cargo/baggage to aircraft
6.1.2 Check packages for indications of undeclared dangerous goods
6.1.3 Check for damage and/or leakage
6.1.4 Apply stowage requirements (e.g. segregation, separation, orientation, securing and protecting from damage)
6.1.5 Verify that NOTOC reflects against aircraft load
6.1.6 Verify passenger baggage requirements
6.1.7 Inform pilot-in-command and flight operations officer/flight dispatcher

6.2 Manage dangerous goods pre- and during flight

6.2.3 Apply procedures in the event of an emergency

6.3 Unload aircraft

6.3.1 Apply specific unloading considerations
6.3.2 Check packages for indications of undeclared dangerous goods
6.3.3 Check for damage and/or leakage
6.3.4 Transport cargo/baggage to facility/terminal

7. ~~Collecting~~ Reporting safety data

7.1 Report dangerous goods accidents

7.2 Report dangerous goods incidents

7.3 Report undeclared/misdeclared dangerous goods

7.4 Report dangerous goods occurrences

F. PERSONS RESPONSIBLE FOR ACCEPTING PASSENGER AND CREW BAGGAGE, MANAGING AIRCRAFT BOARDING AREAS AND OTHER TASKS INVOLVING DIRECT PASSENGER CONTACT AT AN AIRPORT

The following are tasks personnel responsible for accepting passenger and crew baggage, managing aircraft boarding areas, and other functions involving direct passenger contact at an airport typically perform and for which training and assessment would therefore be required.

5. Accepting passenger and crew baggage

5.1 Process baggage

5.1.1 Identify forbidden dangerous goods
5.1.2 Apply approval requirements

5.2 Accept baggage

5.2.1 Apply operator requirements
5.2.2 Verify passenger baggage requirements
5.2.3 Advise pilot-in-command

6. Transporting cargo/baggage

6.2 Manage dangerous goods pre- and during flight

6.2.3 Apply procedures in the event of an emergency

7. ~~Collecting~~ Reporting safety data

7.1 Report dangerous goods accidents

7.2 Report dangerous goods incidents

7.3 Report undeclared/misdeclared dangerous goods

7.4 Report dangerous goods occurrences

G. PERSONNEL RESPONSIBLE FOR THE PLANNING OF AIRCRAFT LOADING

The following are tasks personnel responsible for planning of aircraft loading (passengers, baggage, mail and cargo) would typically perform and for which training and assessment would therefore be required.

4. Managing cargo pre-loading

4.1 Plan loading

4.1.1 Determine stowage requirements such as the prohibition on carriage within a cabin occupied by passengers or on the flight deck, package orientation, securing to prevent movement, accessibility
4.1.2 Determine segregation, separation, aircraft/compartment limitations

4.3 Issue NOTOC

4.3.1 Enter required information
4.3.2 Verify conformance with load plan
4.3.3 Transmit to loading personnel

H. ~~FLIGHT CREW~~PERSONEL RESPONSIBLE FOR OPERATING THE AIRCRAFT

The following are tasks the flight crew would typically perform and for which training and assessment would therefore be required.

6. Transporting cargo/baggage

6.2 Manage dangerous goods pre- and during flight

6.2.1 ~~Detect~~ Identify presence of dangerous goods not permitted in baggage
6.2.2 Interpret NOTOC (only applies to an approved operator)
6.2.3 Apply procedures in the event of an emergency
~~6.2.4 Inform flight operations officer/flight dispatcher/air traffic control in the event of an emergency~~
~~6.2.5 Inform emergency services of the dangerous goods on board in the event of an emergency~~

7. ~~Collecting~~ Reporting safety data

7.1 Report dangerous goods accidents

7.2 Report dangerous goods incidents

7.3 Report undeclared/misdeclared dangerous goods

7.4 Report dangerous goods occurrences

I. ~~FLIGHT OPERATIONS OFFICERS AND FLIGHT DISPATCHERS~~PERSONS RESPONSIBLE FOR FLIGHT PREPARATION

The following are tasks flight operations officers and flight dispatchers would typically perform and for which training and assessment would therefore be required.

6. Transporting cargo/baggage

6.2 Manage dangerous goods pre- and during flight

6.2.2 Interpret NOTOC (only applies to an approved operator)
6.2.3 Apply procedures in the event of an emergency
~~6.2.5 Inform emergency services of the dangerous goods on board in the event of an emergency~~

J. ~~CABIN CREW~~ PERSONEL RESPONSIBLE FOR ATTENDING TO PASSENGERS IN THE AIRCRAFT

The following are tasks the cabin crew would typically perform and for which training and assessment would therefore be required.

5. Accepting passenger and crew baggage

5.2 Accept baggage

5.2.1 Apply operator requirements
5.2.2 Verify passenger baggage requirements
5.2.3 Advise pilot-in-command

6. Transporting cargo/baggage

6.2 Manage dangerous goods pre- and during flight

6.2.1 ~~Detect~~ Identify presence of dangerous goods not permitted in baggage
~~6.2.2 Interpret NOTOC~~
6.2.3 Apply procedures in the event of an emergency
~~6.2.4 Inform flight operations officer/flight dispatcher/air traffic control in the event of an emergency~~
~~6.2.5 Inform emergency services of the dangerous goods on board in the event of an emergency~~

7. ~~Collecting~~ Reporting safety data

7.1 Report dangerous goods accidents

7.2 Report dangerous goods incidents

7.3 Report undeclared/misdeclared dangerous goods

7.4 Report dangerous goods occurrences

K. PERSONNEL RESPONSIBLE FOR THE SCREENING OF PASSENGERS AND CREW AND THEIR BAGGAGE, CARGO AND MAIL

The following are tasks that personnel responsible for the screening of passengers and crew and their baggage, cargo and mail would typically perform and for which training and assessment would therefore be required.

3. Processing/accepting cargo

3.4 Process/accept cargo other than dangerous goods

3.4.2 Check packages for indications of undeclared dangerous goods

5. Accepting passenger and crew baggage

5.1 Process baggage

5.1.1 Identify forbidden dangerous goods

Chapter 6

GUIDANCE ON DEVELOPING AN ADAPTED COMPETENCY MODEL

6.1 GENERAL

The first sentence below is reproduced from 1.2.6.2, with the modifications shown. The remainder of the paragraph is moved from 1.2.6.2, with the modifications shown.

An adapted competency model provides a means, among many others, of defining competencies by identifying those needed for a given role, describing them, and providing criteria for each. ~~Generic, high-level competency frameworks for aviation personnel have been developed by ICAO and included in the PANS-TRG and various ICAO documents. They are intended as a framework on which customized competency models can be developed. An ICAO competency framework for dangerous goods personnel is presented in Chapter 3 of this document.~~ It provides a set of competencies that are typically needed to perform the dangerous goods tasks identified in the task list provided in Chapter 4. Employers may adapt this framework into competency models that meet the regulatory, operational, technical and organizational environments within which their personnel perform their tasks. This customized model is identified as an *adapted competency model*, which is then used to develop competency-based training and assessment for a given role. ~~Guidance on developing an adapted competency model is provided in Chapter 2.~~ Figure 6-1 deals with the design of the adapted competency model:

Table 6-1 is moved from Chapter 2 with the modifications shown, i.e. *delete* the first two horizontal elements of the following diagram, as indicated by the blue strikeout lines:

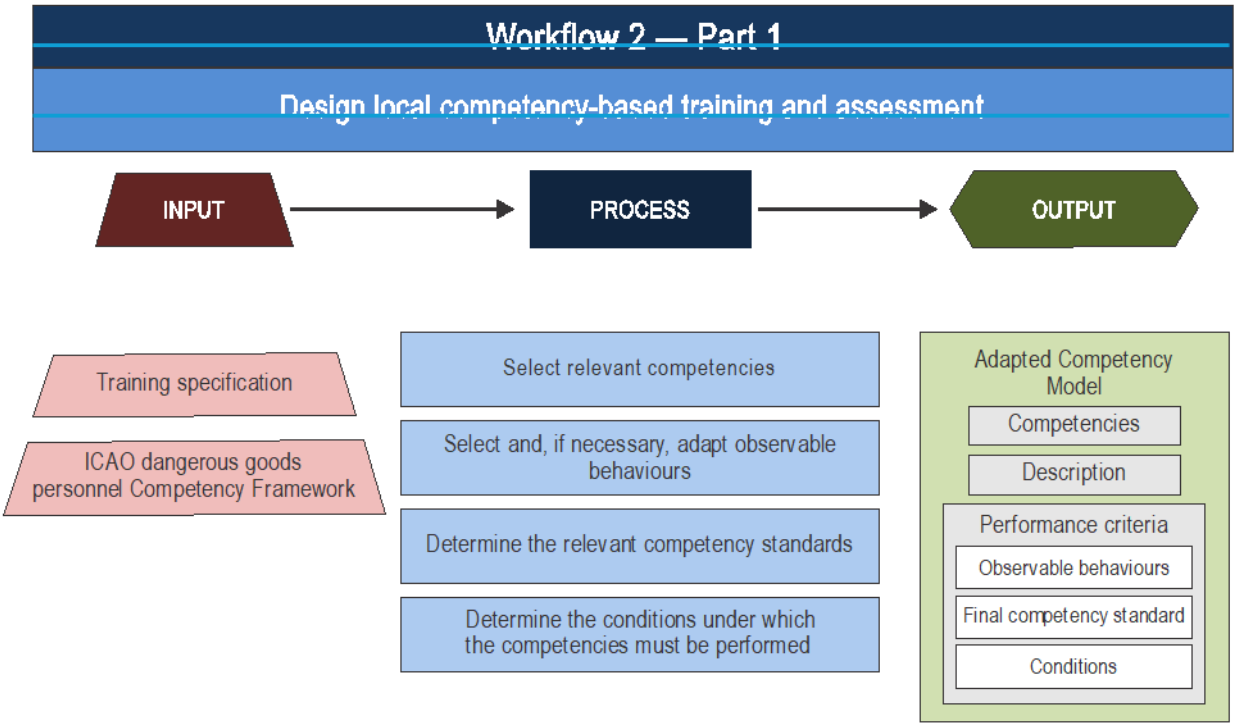


Figure ~~2-4~~ 6-1. ~~Workflow 2, Part 1 —~~ Design ~~local~~ of adapted competency ~~based training and assessment~~ model

The following is *moved* from Chapter 2 with modifications as shown::

~~2.3.3.2~~6.2 *Designing the adapted competency model*

~~2.3.3.2.1~~6.2.1 A dangerous goods competency model ~~should~~ can be adapted from the generic ICAO competency framework provided in Chapter 3 to meet the organizational competency requirements using the information contained in the training specification. The adapted model should include the following elements (Table ~~2-1~~ 6-1 may be used as a template for an adapted competency model):

a) *A list of competencies and a description of each*. A generic ICAO competency framework provides a set of competencies that would typically be needed to perform the dangerous goods tasks listed in the task list that was developed when analysing the training needs (see 2.3 — Workflow 1). The vast majority of adapted competency models will contain similar lists of competencies, but there may be a need to add or remove a competency depending on the employers' own operational and organizational environments.

b) *Performance criteria for assessing competency* including:

1) *Observable behaviours for each competency.* The generic ICAO competency framework provides a comprehensive list of observable behaviours associated with each of the competencies. Appropriate observable behaviours may be selected from it, adapted from it, or added to it.

2) *Competency standards and conditions used to assess competency*. Competency standards apply to all observable behaviours and relate to compliance with the standards and procedures and rules and regulations as described in relevant documents (e.g. national rules, the Technical Instructions, local operations manuals). In some instances, there may be specific standards associated with a particular observable behaviour.

Table ~~2-1~~ A6-1. Template for an adapted competency model

Adapted competency	*Description*	*Performance criteria*		
		Observable behaviour	*Competency assessment*	
Adapted competency 1	Description 1	OB 1	Final competency standard	Conditions
		OB 2		
		OB n		
Adapted competency 2	Description 2	OB 1	Final competency standard	Conditions
		OB 2		
		OB n		
Adapted competency 3	Description 3	OB 1	Final competency standard	Conditions
		OB 2		
		OB n		

~~2.3.3.5~~6.3 Relationship between the adapted competency model and the assessment and training plans

~~2.3.3.5.1~~6.3.1 The training specification developed in Workflow 1 (see 2.3.2) serves as the common basis for the development of the adapted competency model and the training and assessment plans. The task list is generally used to aid the selection of the observable behaviours from the generic competency framework provided in Chapter 3. The operational, technical, regulatory and organizational requirements aid the development of the conditions and standards that will apply to the competencies and observable behaviours.

~~2.3.3.5.2~~6.3.2 The same task list and requirements are used to develop the training plan. The training plan is used to prepare the trainees to undertake assessment to determine if they are competent in accordance with the adapted competency model. The adapted competency model and the training plan are used to develop the assessment plan.

~~2.3.3.5.3~~6.3.3 The syllabus in the training plan is composed of training objectives derived from tasks and sub-tasks as well as the underlying KSA necessary to perform them. The KSA are determined on the basis of the task list in conjunction with operational, technical, regulatory and organizational requirements. Chapter 5 provides a generic task/knowledge matrix table that can be used as a tool to map out the knowledge necessary to perform specific tasks. Tasks corresponding to the list provided in Chapter 3 are listed across the columns of the table and subject matter (knowledge) is listed down the rows. The employer should indicate what knowledge is needed for a particular task within the organization with a check mark at the point at which the task element and the knowledge element intersect. To facilitate this process, some knowledge components have been blacked out if they are considered to be completely irrelevant to specific tasks. The level of knowledge and/or skills necessary will differ depending on the task. For example, the person accepting dangerous goods will not require the same level of knowledge and/or skills related to classification as someone who is classifying dangerous goods.

~~2.3.3.5.4~~6.3.4 When assessing whether competence has been achieved, the adapted competency model, not the syllabus, is referenced. Consequently, the performance criteria are used to assess if competence has been achieved, and the tasks/sub-tasks that are carried out by the trainee are the “vehicle” for enabling the assessment to be conducted. ~~Figure 2–6 illustrates the relationship between Workflows 1 and 2.~~

REFERENCES

1. Annex 18 — *The Safe Transport of Dangerous Goods by Air*

2. Annex 19 — *Safety Management*

3. *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868)

4. *Safety Management Manual (SMM)*, Doc 9859, 4th Edition, 2018.

5. *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Technical Instructions) (Doc 9284)

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APPENDIX B

ANC JOB CARD FOR DANGEROUS GOODS TRAINING

DGP.009.01	Dangerous goods training
Source	DGP/30
Problem Statement	Existing guidance material to support implementation of dangerous goods training provisions is overly complicated, theoretical and challenging to understand which leads to ineffective implementation and negatively affects safety.
Specific Details	New training provisions in the Technical Instructions became mandatory in 2023 after a two—year transition period. The revised provisions support a competency-based approach to dangerous goods training and assessment as a methodology that can be used to ensure personnel are competent to perform functions for which they are responsible. They are not intended to exclude other methodologies that would achieve the same intent. Supporting guidance is contained in Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment (Doc 10147). Industry members implementing competency-based training and assessment for dangerous goods and State regulators overseeing dangerous goods training programmes indicate that the material is overly theoretical and challenging to understand, thereby complicating practical implementation. A study conducted by the DGP Working Group on Training based on this feedback identified the need to simplify the guidance with the aim of facilitating practical implementation of the training provisions in the Technical Instructions. There are concerns that the guidance material is too prescriptive leading to a perception by States and industry that it is a requirement for implementation of the training provisions in the Technical Instructions when this is not the intent. Efforts need to be taken to eliminate this incorrect perception and not to add to it. The addition of prescriptive provisions needs to be avoided.
GANP/GASP Link	GASP Goal 1 Target 1.1
Expected Benefits	Improved safety because of a more competent dangerous goods workforce globally
Reference Documents	DGP-WG/24 Report (paragraph 4.2.2) DGP/30 Report, Agenda Item 10 Doc 9284, Technical Instructions for the Safe Transport of Dangerous Goods by Air Doc 10147, Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment
Primary Expert Group:	Dangerous Goods Panel (DGP)

	WPE No.	Document Affected or Actions Needed	Description of Amendment proposal or Action	Supporting Expert Group	Status	Expected dates:		
						Delivery	Effective	Applicability
✓	10874	Actions	Review training provisions in Doc 9284 and supporting guidance in Doc 10147 to identify inconsistencies or gaps that result in inadequately trained personnel	PTLP	On-schedule	Q4 2027	-	Dec 2027
✓	10875	Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment (Doc 10147)	Simplify guidance to support dangerous goods training allowing for practical implementation and to maintain alignment with latest edition of Doc 9868 procedures.	PTLP	On-schedule	Q4 2029	-	Dec 2030

For Information purposes (to be completed by the Secretariat)				
GLOBAL IMPLEMENTATION ACTIONS				
Status:	**Priority:**	**Initial Issue Date:**	**Date Approved by ANC:**	**Session / Meeting:**
Approved	To be determined	19 February 2026	19 February 2026	231-6
RATIONALE				
- AN-WP/9905				

— END —