

APPENDIX H—DANGEROUS GOODS TRAINING GUIDELINES—COMPETENCY-BASED TRAINING AND ASSESSMENT APPROACH

△ H.0 Introduction

This appendix has been created and reviewed by the IATA Dangerous Goods Training Working Group (DGTWG) supported by the IATA Dangerous Goods Board (DGB) (see appendices G.1 and G.2) with the objective of assisting designers and developers establishing dangerous goods training programs under the competency-based training approach as described in Subsection 1.5.

These guidelines present an industry consulted benchmark that can be used by new or established dangerous goods training programs. Readers must bear in mind that the main principle of this approach is to provide training covering knowledge and skills that allow the employees to perform their job function at the required performance level that satisfies safety and is commensurate with their responsibilities. These guidelines are in full alignment with 1.5, however the employer or those acting on their behalf must tailor the material found in these guidelines to reach the level of competency required for each function identified.

△ H.1 General Background

H.1.1 A safe and efficient air transport system is dependent on a competent workforce. IATA recognized that this objective can be achieved through the implementation of a competency-based approach to training and assessment programs. As per 1.5.1.2.1 employers are required to ensure personnel are competent to perform any function for which they are responsible prior to performing them. A competency-based approach to training and assessment is an effective way to ensure this requirement is met.

H.1.2 This document provides guidance to employers or those acting on their behalf on how to implement a competency-based approach to a dangerous goods training and assessment program. Dangerous goods training is applicable to personnel that perform functions aimed at ensuring that dangerous goods are transported in accordance with these Regulations.

H.2 Competency-Based Training and Assessment Principles

H.2.1 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 and the level of proficiency to be achieved, determining the most effective way of achieving them and establishing valid and reliable assessment tools to evaluate their achievement.

△ **H.2.2** 1.5.1.2.1(b) states that personnel must be trained to competently perform the function for which they are responsible. These responsibilities are determined by the specific functions personnel perform and not by their job titles. Concentrating on functions and responsibilities rather than a job title or description, means that the training provided ensures that a person is competent to perform the function in compliance with the 1.5. For example, entities such as ground service providers and freight forwarders, may need personnel to perform some functions that are typically performed by shippers or operators. The ground service and freight forwarder personnel must be trained to perform these functions competently regardless of their job title.

△ **H.2.3** In smaller operations, personnel may perform many functions such as accepting dangerous goods and loading and securing dangerous goods on board an aircraft. The training provided to these persons must address all functions so that they can competently perform all these functions. In larger operations, personnel may only perform a small number of functions. They would only need to be trained to competently perform those specific functions.

H.2.4 For the purpose of these guidelines competency is defined as “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 four **competency factors**: knowledge, skills, attitudes and experience to carry out tasks and sub-tasks under specified conditions to achieve a particular **level of proficiency**. A competency framework with associated performance criteria provides a means of assessing whether trainees achieve the desired level of proficiency. A competency framework is described in subsection H.5 and an associated task list for dangerous goods personnel is illustrated in Table H.5.C.

H.2.4.1 The four competency factors are described as:

- (a) **Knowledge:** is the theoretical or practical understanding of a subject. It is a means to understand and know the principles.
- (b) **Skills:** are developed through training or on the job application. It is something that has been learned and put into practice.
- (c) **Attitude:** is the key differentiator on a competency approach. One may have knowledge, skills and experience. However what is the overall approach when doing so? It speaks more to the commitment than to the quality, the outcome or, the profession. What is your benchmark compared to others on the same environment?
- (d) **Experience:** is related to the applied knowledge and skills: How often? Where? When? In which contexts is the combination of the rest of the elements applied to.

FIGURE H.2.A
Competency Factors



Note:

* Experience is not one of the traditional KSA factors, but one that proves the improvement in the competency from one level of proficiency to the next.

H.2.4.2 The criteria to determine the level of proficiency must consider the complexity of tasks and context, the range of work (routine, predictability, and dependencies) and the level of autonomy in performing the tasks.

The basic consideration to determine the right level of proficiency should then be considered as follows:

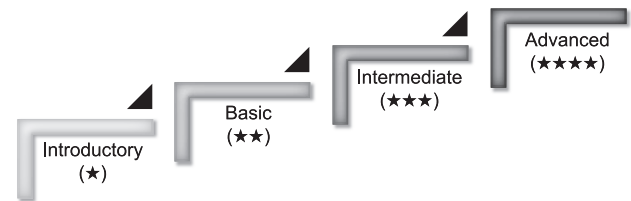
Introductory (★): simple work activities, most of it routine and predictable. Guidance is required. The final product is highly supervised.

Basic (★★): various work activities, various contexts. The individual has some responsibility or autonomy and there is limited guidance needed. Spot check results are reviewed for quality but not in detail.

Intermediate (★★★): broad range of activities, complex and non-routine context. High confidence in results, work tested against broader business context. Significant personal autonomy. Team authority in some areas (e.g. supervisor).

Advanced (★★★★): broad range of work. Complex technical and professional activities in a wide variety of contexts. From substantial to wide scope for personal autonomy. Regional and divisional authority in some areas. Regarded as a consultant in some areas.

FIGURE H.2.B
Levels of Proficiency



H.2.5 Assessment is a critical feature of competency-based training, it ensures that training is efficient and effective in developing the level of proficiency/competency required to perform the function competently.

H.3 Benefits of Competency-Based Training and Assessment for the Safe Transport of Dangerous Goods by Air

H.3.1 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 achieves this by:

- (a) targeting function 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 knowledge, skills, attitudes and experience needed to perform a job at the required level of proficiency;
- (e) supporting the application of safety management systems (SMS); and
- (f) establishing sufficient, well-trained and competent trainers.

H.3.2 Ensuring personnel can competently perform their functions is critical to any organization. A competent workforce reduces cost caused by poor performance or miscommunication of job expectations. An incompetent dangerous goods workforce could result in costs and delays in shipment. 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 competently performed by those preparing and offering a consignment for transport so that they are aware of the hazards posed and the required measures to mitigate them. If personnel performing these functions are not trained to competently

perform them, unknown risks may be introduced into air transport.

As another example, 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 unnecessarily reject properly prepared shipments thereby delaying shipments and increasing costs to the shipper and the operator. Alternatively, personnel not trained to competently perform this function may accept improperly prepared shipments of dangerous goods into air transport thereby introducing risks to the aircraft and its occupants.

H.3.3 A competency-based approach to training and assessment ensures trainees know what they are expected to competently perform and trainers to know what competencies to assess.

H.4 Roles and Responsibilities in a Competency-Based Approach to Training

H.4.1 Employer

H.4.1.1 A training program 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 program 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, learning objectives, assessment methods, and course materials.

H.4.1.2 The employer must study the target population (trainees) with a view to identifying the knowledge, skills and attitudes 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.

H.4.1.3 Some employers may utilize third-party training providers for assistance, either for the full implementation of the training program, or only for certain elements. This approach may be the most suitable for employers who do

not have the resources to train their personnel in-house. While utilizing third-party training providers may be cost effective, whether the training needs are being addressed needs to be the deciding factor in selecting a third-party training provider. Employers remain responsible for ensuring its personnel are competent to perform their functions prior to performing them even if certain aspects of the training program have been delegated to third parties.

H.4.1.4 Employers should liaise directly with the regulator to ensure that the latter's requirements are considered prior to proceeding with the development of competency-based training.

H.4.2 Trainer

In competency-based training, the instructor facilitates the trainee's progression towards the achievement of competencies. Instructors also collect information about the effectiveness of the training materials which supports continuous improvement. More details on trainers competencies are found in H.5.7.

H.4.3 Trainee

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

H.4.4 Regulator

H.4.4.1 There are important differences between the way the regulator would oversee a traditional training program versus a competency-based training one. In a traditional training program, the regulator assesses 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 all trainees have passed the required test does not necessarily mean that they can perform their assigned functions competently.

H.4.4.2 Where competency-based training has been implemented, regulators should oversee the training program to ensure that it 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.

H.5 Framework to Implement Competency-Based Training and Assessment Programs for Dangerous Goods

H.5.1 Phase 1—Analysis

H.5.1.1 The main objectives of this important phase are:

- (a) to define the problem to be addressed and determine if there is a need for a training program. Dangerous goods training is a regulatory requirement mandated in Appendix I.1.5. Therefore, determining the need for training is covered by this requirement.
- (b) to establish the job function requiring the training program, the employee's competencies and the level of proficiency required, and
- (c) to determine the employee's concerns and challenges when performing their tasks as well as their motivations to learn.

H.5.1.2 The following step on this first phase is to perform a **training needs analysis (TNA)** to establish the competencies specific to an employer's function, environment and requirements. An employer conducts a training needs analysis to determine the results that the training needs to achieve and what resources exist to achieve these results. This critical step will ensure that the training fits the employer's purpose and is effective. This should include the purpose of the training along with operational, technical, regulatory and organizational requirements.

The organizational requirement should be measurable against key performance indicators that validate the performance of the employees.

To perform a proper TNA there should be a job analysis and various inputs (see H.5.1.2 and H.5.1.3), some of which have already been created by subject matter experts and are offered in these guidelines:

H.5.1.2.1 The identification of the specific job function and the different tasks, sub-tasks is the start of the process. The identification of general high-level functions has already been done and is reflected in Figure H.5.B—Dangerous Goods Functions—Process Flowchart. This flow chart represents major areas that are clustered into high level tasks. Based on that flow chart these guidelines provide a list of well-established functions involved in the flow of cargo and passenger baggage where dangerous goods training is required. This list is not exhaustive, but it provides the main functions found in the supply chain. It is important to remember that a function is not a job title but one that describes the core responsibility of an employee in their function. Additionally, a job function may include various tasks and sub-tasks which may be common to different job functions, see examples in H.6.

H.5.1.2.2 Establishing a list of tasks, sub-tasks and performance criteria is next in the analysis phase. This is done by breaking down the job to facilitate the output of a task matrix. This input part of the TNA is also been provided in these guidelines in Table H.5.C. By using this tool, the employer or training program designer and

developer can customize the training needs per function relevant for a particular job.

(a) **Tasks:** establishing the tasks to be performed by the employee. Based on the flowchart in Figure H.5.B, the following high-level major tasks apply:

- 0—Understanding the basics of dangerous goods;
- 1—Classifying dangerous goods;
- 2—Preparing a dangerous goods shipment;
- 3—Processing/accepting cargo;
- 4—Managing cargo pre-loading;
- 5—Accepting passenger and crew baggage;
- 6—Transporting cargo/baggage; and
- 7—Collecting safety data.

It is important to reiterate that a particular function may include various major tasks that an employee needs to fulfil to be competent when performing their function.

(b) **Sub-tasks:** once the employee function(s) and tasks have been identified the next step is to determine the sub-tasks suitable for that specific function(s). This step is important in setting the scope of the knowledge, skills and experience required of the person performing the function. A sub-task is considered to be an action to be performed when completing a task, the action should be measured by predefined performance criteria;

(c) **Performance criteria (PC):** refers to smaller actions and behaviour that will help measuring whether the knowledge and the skills have been acquired to the required level. The PC are helpful in defining key performance indicators to evaluate against, see H.5.2.1—Design an assessment plan. Identifying the performance criteria (PC) will directly provide information on the observable behaviours that the trainee should be able to demonstrate.

H.5.1.2.3 Identifying the level of proficiency is an essential part of the process as it will directly provide information to the training designer and the employee about the level of knowledge, skills that will be assessed and therefore the level of proficiency to be expected at completion of the program.

Once the function, tasks, sub-tasks and PC have been identified in the matrix (see Table H.5.C) then the level of proficiency should be assigned to each of them answering to the basic question: what is the level of the four competency aspects expected from the employee or trainee at the training program conclusion? Another aspect to be considered in assigning the level of proficiency/competency is: what is the core job function and responsibilities of the employee? The closer the task is to the core responsibilities the higher the level of proficiency/competency should be.

The following table illustrates the relationship between the different elements of competency (knowledge, skills, experience and attitude) and the level of proficiency. For easy understanding a "stars" coding system has been used to identify that the higher the level of proficiency, the higher the level of competency factor applies and therefore the higher number of stars assigned.

TABLE H.5.A
Level of Proficiency in Terms of Competency Factors

Competency Factor	Level of Proficiency			
	Introductory	Basic	Intermediate	Advanced
Knowledge	1	2	3	4
Skills	1	2	3	4
Experience	0	1	2	3
Attitude	3	4	4	4
Coding	★	★★	★★★	★★★★

Note:

To assign the right level of proficiency bear in mind the concepts described for each level as described in H.2.4.2 and the four competency factors as described in H.2.4.1.

H.5.1.2.4 With this basic understanding of the interrelation between the four competency factors, the level of proficiency and the clear breakdown of function, tasks, sub-tasks and performance criteria, the tool illustrated in Table H.5.C can be used to provide a standardised way to establish the TNA.

H.5.1.2.5 A range of benchmarked TNAs for well-defined functions is provided for industry guidance under H.6 where tasks, sub-tasks, performance criteria and the level of proficiency has already been considered. All tasks and sub-tasks included for each well-defined function can be identified in the flowchart in Figure H.5.B.

H.5.1.3 Taking into consideration various characteristics of the target population provides valuable details for designers and developers on assigning the appropriate resources, e.g. method of delivery, assigning the right instructor or instructional method, choosing the appropriate training aids, sizing the level of difficulty of the assessment, etc. to be used in the training program.

H.5.1.3.1 Population type—The first consideration is whether the trainees will be a primary population, which means they will be primarily using the training to perform their job. In other words, the training program or part of it is their core activity. This can also be reflected in the designation of the level of proficiency/competency during the TNA. For trainees that meet the conditions of Appendix I.1.5.1.1.1 dangerous goods training is a primary requirement, therefore the considerations in H.5.1.2.2 apply.

Otherwise the trainees fit into a secondary population type which consists of trainees which have an indirect input in the system performance but will not be actually performing the tasks and sub-tasks related to a particular function e.g. sales teams, booking teams, management, SMS team members.

These guidance materials concentrate on the primary target population.

H.5.1.3.2 Frequency of training, obtaining and maintaining the competency—In terms of the frequency and the specific circumstances, these may be determined by regulatory requirements whether international or national and by business and corporate needs. These characteristics have a direct impact in the considerations of the

target population and their level of competency, contents, method of delivery and other aspects highly important in the design and development phases.

Dangerous goods initial and recurrent training are required by the regulations:

(a) **Initial training** must be provided prior to a person performing their responsibilities related to the transport of cargo or managing passenger and baggage. Effectively and unless otherwise required by the national authorities, it refers to the first time a trainee receives dangerous goods instructions according to their function or a new function if gaps have been identified.

(b) **Recurrent training** must be provided within 24 months of previous training to ensure knowledge is current. However, if recurrent training is completed within the final 3 months of validity of previous training, the period of validity extends from the month on which the recurrent training was completed until 24 months from the expiry month of that previous training.

However, there are situations in which there are irregularities in the job continuity of an employee. In this case, an intervention is needed to ensure the competency of the employee and any potential gaps to be covered before restarting their job function. The following table is a proposal of actions to be taken into consideration:

Period of Absence	Suggested Action
Up to 3 months	Provide the employee with regulatory or business requirements changes or updates and ensure understanding of these changes.
Between 3 and 12 months	In addition to the above, undergo one practical assessment for example “on the job session” or simulation. The employer must provide a brief observation report for the employee with any identified gaps to be filled and with information to be complemented in order to reach the currently required competency and proficiency level again.
More than 1 year	Recurrent training program

When choosing the method of training delivery, the type of assessment must be considered. The assessment plan must be fit for purpose considering how the knowledge and practice of the skill have been delivered during the training. Ultimately the assessment must demonstrate that the employee can perform the job function competently, and that the objectives of the training program have been achieved.

In determining the assessment, it is important to take into account what resources exist to achieve these results or what resources need to be found to accomplish the desired result. The following phase in these guidelines covers assessment in more detail.

H.5.1.3.3 Language has a big impact in acquiring the competency and the pace of the training. Additionally, it could be a good reason for choosing one or another method of delivery in the design phase. For example, digital learning or self-paced solutions benefits trainees where the language of delivery is not their mother tongue.

H.5.1.3.4 Other characteristics:

- entry level in terms of education, previous vocational/operational training, work experience;
- learning styles (age, education level, pace, experience, delivery method, etc).

H.5.2 Phase 2—Design Competency-Based Training and Assessment (CBTA)

The second phase in the implementation of a competency-based training and assessment program is its design. This is done taking into account the training specifications identified in Phase 1 (see paragraph H.5.1.3) and will involve:

- designing an assessment plan that will be used to assess the competence of trainees;
- designing a training plan that will enable the development and delivery of the training course.

H.5.2.1 Designing an assessment plan

H.5.2.1.1 The purpose of the assessment plan is to detail how the competency is going to be measured. A training program without a solid, defined assessment plan could be ineffective and costly to an organization. A well-defined and constructed assessment plan allows:

- (a) For the employer to prove the level of competency of their employees and justify it for regulatory purposes, operational and technical requirements.
- (b) For the instructor to have a status of the knowledge transfer and the skills application of the trainees.
- (c) For the employee to gain the confidence of their competency and to focus on the areas of knowledge that may require reinforcement and the skills that must be further developed.

In basic terms, the assessment plan describes how competency is measured.

H.5.2.1.2 The assessment plan details:

- (a) the final competency standard associated with the function;
- (b) the interim competency standard associated with each task (if required);
- (c) the list of assessments (formative and summative assessments, examinations, oral assessments, etc.) required for each of the task(s) that have 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.

H.5.2.1.3 Competency-based training requires assessment of the trainees' progress until they are competent to perform their assigned function. CBTA encourages assessment throughout the learning cycle. Instead of an assessment at the end of the training, assessments should be included throughout a training event or class. This concept allows for ongoing "checks" and confirmation that learning is occurring. This approach provides the trainer the inputs to adjust or review the training plan to fit the competencies as needed. It provides the trainee instant feedback and confirmation that learning is occurring. In CBTA, assessment of the trainee's progress continues until they are competent to perform the function. Traditional assessment methods that wait until the end of the learning event are too late in the learning process. 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 people.

H.5.2.1.4 CBTA encourages the use of different types of assessment, as each trainee is different and learns in different ways. The key is to accurately determine if the transfer of knowledge was completed and the competency has been achieved by the trainee. Common examples are:

- (a) written or online test;
- (b) oral test;
- (c) observation of task;
- (d) practice questions or "group answered" questions;
- (e) simulated exercises.

H.5.2.1.5 Program designers or instructors may choose one or a combination of methods to complete their learning assessments. It is important to have an assessment plan that appropriately outlines what the employee needs to achieve and accomplish with the training according to the TNA performance criteria determined. An assessment plan should start by determining major key performance indicators which will measure if the task is satisfactorily achieved. The TNA established by using the Dangerous Goods Tasks List in Table H.5.C can be followed when deciding what to measure against. The table below represents an example of an assessment plan. Note that the assessment type should be appropriate for each task, the core sub-tasks and the key performance indicator established to measure the proficiency. The table below offers an example based on the function: "Personnel responsible for processing or accepting dangerous goods consignments" (see the TNA under H.6.3).

TASK/MODULE	KPI (Key Performance Indicator)	ASSESSMENT TYPE
0 - Understanding the basics of dangerous goods	Able to identify different hidden dangerous goods and take the correct actions in emergency circumstance	Quizzes and task observation
3 - Processing/accepting cargo	100% Able to accept/reject accurately "x" (where x is a number) of shipments containing dangerous goods independently	a. Simulation including documentation (AWB, DGD, Approval) and packaging by fulfilling the complete checklist. b. Job shadowing for 2 weeks with peer reports.
7 - Collecting safety data	90% accuracy on actioning the correct emergency response procedure in "x" (where x is a number) dangerous goods incident scenarios	Group discussions and presentation.

H.5.2.1.6 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 people. 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.

H.5.2.1.7 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 their established assessment plan, but it's up to the employer to determine how they measure the effectiveness of the training and competency of the trainee. Even if the employer does not deliver any of the training themselves, they can still choose to assess the trainee in the workplace to ensure they can perform their assigned tasks competently and incorporate that process into their assessment plan.

H.5.2.1.8 Additional administrative procedures may be necessary in the implementation of the assessment plan in relation to: who is authorized to perform a specific task or assessment, record keeping, actions to be taken if a trainee fails a competency assessment, etc.

H.5.2.2 Designing a training plan

H.5.2.2.1 The training plan is to details the:

- (a) composition and structure of the program;
- (b) modules, training events and their delivery sequence;
- (c) delivery format (type of training, media, etc);
- (d) syllabus;
- (e) milestones (if required); and
- (f) program schedule.

H.5.2.2.2 The training plan will be used by the training developer(s) to create the training and assessment materials. The result of the TNA is the driver to decide the type of training that applies to achieve the performance criteria PC identified. However it is possible that regulat-

ory requirements will provide details about the content needed for the program.

H.5.2.2.3 In terms of deciding about the delivery format the complexity and variety of job functions should be considered. The more tasks an individual function has, the more in depth and variety of methods of delivery should be used. In general terms CBTA favours the use of a blended approach when deciding about the types of training to incorporate in a program. The mix of types of training should be based on the level of proficiency assigned to a task/sub-tasks in the TNA.

The size of the classroom recommendation applicable to both classroom instructor lead and virtually instructor lead classroom is between 12 to 15 participants but maximum 20 participants.

H.5.2.2.3.1 Common types of dangerous goods training currently being used are:

- (a) **Classroom instructor lead:** this is the classical training delivered in a physical location common for all participants and guided by an instructor face to face. It requires the physical displacement of both the trainer and the trainees.
- (b) **Virtually instructor lead classroom:** this type or training allows participants to join the instructor remotely in a virtual location/classroom with help of a technology platform. It is intended to be interactive and must offer the opportunity of participation from the trainees in the form or chats, polls, screen sharing, etc. There are many providers facilitating this technology for example Skype for business, WebEx, Adobe Connect, Saba Meeting, Blackboard, Zoom and many others.

Not to be confused with a webinar which is used mainly for a promotional or information distribution purpose and a bigger audience, 30 participants or more.

- (c) **e-learning:** also known as computer-based training (CBT) is commonly used as a self-paced and individual approach. Traditionally the trainee uses a device/tool (computer, tablet or mobile) at a distance or at a designated location and can potentially be asked to fulfil the training in a determined period or completely at their own pace. It usually incorporates assessments in the form of quizzes, exercises and may or may not include the final assessment.
- (d) **Distance learning (self-study):** a self-paced and individual approach. Traditionally the trainees use the course material (reading material, videos, presentations, notes) at their disposal which is usually provided and learn at their own pace. The trainee may or may not be given opportunities to interact with a coach or instructor during the learning time. They may be also asked to fulfil the training in a determined period or completely at their own pace. Assessments are usually proctor interventions at a determined location.
- (e) **Applications (smart devices):** these are programs designed to run in smart devices that can provide several ways to deliver the content such as videos, reading material, games, and polls. These tend to be highly interactive and engaging, providing immediate feedback and gratification.

- (f) **Virtual simulation:** this is a way to create the real working environment in a virtual simulation. Especially useful when the real environment is not available or has access restrictions for personnel who are not fully trained. It also provides the opportunity to introduce the work environment prior to working in one as well as to test potential situations that may not frequently occur.
- (g) **On-the Job training (OJT):** it refers to performing the activity or function expected either supervised at an appropriate level, while doing the job or after the fact by analysing the results of the task at hand.
- (h) **Group discussions & tutorials:** also known as case scenarios, trainees are provided information and are asked to express their opinion or perform an activity to further discuss or comment in the form of feedback, or for more than one person to solve.

The list above is not exhaustive neither is any of the methods to be chosen in isolation, in fact many of the functions may work very well in combination and may support one another.

H.5.2.2.3.2 The following table illustrates the application of this step, this blended delivery method approach example based on the function: “Personnel responsible for processing or accepting dangerous goods consignments” (see the TNA under H.6.3). For each task the level of proficiency should be considered to decide which type of training is most appropriate, note that more than one type of training may be combined to achieve the PC.

H.5.2.2.3.3 It is important to keep in mind that the assessment at the end of the training should be appropriate for the level of proficiency and the type of training chosen:

TASK/MODULE	LEVEL OF PROFICIENCY	TYPE OF TRAINING
Understanding the basics of dangerous goods	Introductory	E-learning
Processing/accepting cargo	Intermediate	Classroom instructor lead Virtual simulation
Collecting safety data	Basic	Group discussion & Tutorial Applications (scenarios)

Note:

Both the list above and the table provided are some examples of the different types of methods of delivery that can be used. The type selected can vary depending on the preferences and resources of the employers and/or training providers.

H.5.2.2.4 Relationship between the TNA and the assessment and training plans

H.5.2.2.4.1 The same task list and requirements are used to develop the training plan. The training plan is used to prepare the trainee to undertake assessment to determine if they are competent in accordance with the performance criteria.

H.5.2.2.4.2 The syllabus in the training plan is composed of training objectives derived from tasks and sub-tasks as well as the underlying knowledge, skills, attitudes and experience necessary to perform them. The knowledge, skills, attitudes and experience are determined on the basis of the task list in conjunction with operational, technical, regulatory and organizational requirements. 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, it will depend on the level of proficiency established.

H.5.2.2.4.3 When assessing whether competence has been achieved, the TNA, 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.

H.5.3 Phase 3—Develop the Training and Assessment Materials

H.5.3.1 The third phase in the development and implementation of a competency-based training and assessment program is the development of the training and assessment materials. Development is based on the outcome of design phase for the content and the assessment. It is important to validate development against the analysis phase and it must address the concerns and challenges identify for the employees when performing their tasks. It will follow the output of the training and assessment plans.

H.5.3.2 Content course development should be listed in terms of resources that can be provided for the trainees and content essentials to be thought by the trainer. The content thought by the trainer should be planned as an experience and aimed to maximize the interaction time for instance presentations, exercises, case practical exercises, role play, etc. The static resources should be planned to support the learning and help to perform the learners job better such as content that is easily available when needed for instance: checklists, videos, briefings.

H.5.3.3 The assessment materials can include but are not limited to case studies, simulations, pre self-test or surveys, progress checks, quizzes, and formal exams.

H.5.4 Phase 4—Conduct the Program in Accordance with the Training and Assessment Plans

Editorial Note:

This aspect of the guidance is in development

H.5.5 Phase 5—Evaluate the Training and Assessment Program

H.5.5.1 The employer is responsible for ensuring the effectiveness of the training program. 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.

H.5.5.2 There are three main purposes for evaluating training program effectiveness:

- (a) **Improve training program**—Continuous improvement is desirable in any area, but in the context of Dangerous Goods Training programs is particularly relevant, since training is not one single event, but repeats throughout the trainee’s career. It is expected that competences are maintained at a minimum while accompanying regulatory updates and evolutions. Therefore, improving the training program brings benefits not only for future participants, but also improves the experience of those already following it.
- (b) **Confirm training effectiveness**—Prove that we are indeed training the right competencies and at the right level of proficiency, in other words that the program meets the expectations of the employer and the employee. H.5.2.1—“Design an assessment plan” addresses the needs and methods to evaluate a specific trainee. However, if the training is not being effective, unexpected negative results can be due to an issue in the training program, rather than individual differences.
- (c) **Provide evidence of the added value**—Training program evaluation helps to explain how training is supporting the business. Considering the investment necessary in training, a link should be made between the resources and costs involved versus the actual added value. It must justify how were specific issues solved and further avoided, it must demonstrate shared best practices, new business implemented, etc. Additionally, since business evolves, the training needs assessment should not be a one-time event but reviewed systematically to ensure that employers keep providing the right training for the current business and/or prepare for potential business growth.

H.5.5.3 In this context, the evaluation of the training program, benefits:

- the training providers by allowing them to offer products of higher quality and adjusted to the business needs;
- the employer by providing assurance that the training program is delivering the expected—competent work force—and that is linked to the business needs (adds value);
- the employee by taking into consideration their experience and addressing their real/on the job needs;
- the appropriate national authority by providing assurance that the training needs are in line with the regulations and the employer needs, which is a basic principle of CBTA.

H.5.5.4 Responsibility of Training Program Evaluation

H.5.5.4.1 In order to fulfill the above-mentioned objectives, both the employer and training providers should conduct Training Program Assessments. When these are one and the same organization (in-house training), the responsibility should lie with the Training Program Designer and all three purposes of training program evaluation can be pursued. This is also the situation that allows for a largest variety of evaluation tools and also makes it easier to apply to all four competency factors.

H.5.5.4.2 If the training is provided by a third party, then the training provider should use the training contract to clearly describe the objectives that must be measured against. Third party training providers should focus on purposes H.5.5.2 (a) and (b) of training program evaluation. Training providers have at their disposition several classical tools for achieving this (e.g. surveys, interviews with Instructors), but under CBTA approach a much closer dialogue should be built with the employer in order to ensure that the expected service is being effectively delivered. This supports employers benefiting of their services to achieve purpose H.5.2.2 (c) of the evaluation. This dialogue output should be included in the training contract; the results measured against it and the tools used will largely depend on this.

H.5.5.4.3 Even if training is provided externally, it is still in the best interest of the employer to evaluate the program effectiveness, but focusing mainly on point number H.5.2.2 (b) and (c).

Example: Training provider is contracted to train and assess the knowledge factor of acceptance checks. But the skills and attitude part training and assessment are the responsibility of the employer, then the training program knowledge evaluation should sit with the training provider, and the employer should cover all the four competence factors.

H.5.5.5 Examples of possible tools for training program assessment:

Training program evaluation can sound like a daunting enterprise. However, a number of different tools with different levels of sophistication can be used, depending on the type of organization (employer, training provider, etc.) and size. Below are a few evaluation tools and use examples of how they can be used in this context:

H.5.5.5.1 Survey/Evaluation forms—these are the easiest tools to use and therefore can be used by any type of organization. Post-training surveys should be directed to both trainers and trainee’s alike. For trainees, questions like: “Was the training relevant to your job?”, or “Was the training level of difficulty adequate?”, “Was the material interesting and engaging?”, “Was the trainer knowledgeable and helpful?” can be used to determine the perceived level of relevancy and adequacy of the training program.

For trainers, questions like: “Were the training objectives clear?”, “Were you aware of the training contract?”, “Was the material helpful and adequate for the training goals?”, “Was there sufficient variety of methods used to make the training engaging?”, “Did trainees follow easily and without struggling?”.

The issue with many of these evaluation forms is that many people don't take the time to answer it or tend to provide overly positive answers. Training programs evaluations should have this in consideration and 1) ensure that surveys are anonymous and 2) the necessary attention is provided to lower results, even when these are provided by small numbers of respondents. Even if the surveys should be anonymous by default, a question can be included to ask if the person is willing to provide contact details for further information.

Another variation that trainees might prefer is the "before and after quiz". Trainees might be more willing to participate in a quiz at the beginning of the training module/session and then repeat it at the end. Although this quiz can be used to measure individual progress, it can focus on the actual effectiveness of the training, particularly when applied to Attitude : Did changes occur due to training?

Example 1: if trainees respond that the content is not relevant for the trainee's job, then this should trigger a review of the training needs assessment versus training content. Extra content might be justified from a cost/benefits point of view, but training program designer and evaluator must be aware of the impact.

Example 2: if trainees respond before training they would not know how to react to a dangerous goods hazard label, and if after training they respond: "I would call my dangerous goods colleague", then we can conclude that not only those individuals reached the training goals, but also the training program is being effective.

H.5.5.5.2 Interviews—these can be complementary to the above surveys/forms and provide a deeper insight. For example, when a specific area is showing lower results, several calls/specific emails can be set in order to request more information to both trainees and trainers alike. Interviews are a good way to receive feedback from trainers, since they have a better overview on what is working well and/or the needs improvement in the training program because they usually receive direct feedback from the trainees and have a better overview on the wider audience. Training providers should also consider arranging interviews with the Employers, specifically the direct managers of the people who underwent training.

Example 1: if some trainees respond that the level of difficulty is too high, then some participants can be chosen to be called and ask them: which parts did they struggle with? How to better support them?, and how they expect this support to impact on their job?

Example 2: if a trainer reports difficulty during the training, then it is useful to understand if the materials are sufficient, if there should be more time, more repetition or a different method may work better.

H.5.5.5.3 Training Assessment results and analysis—As mentioned before, if a less than good result is obtained by one individual, this is probably due to that individuals particular situation. However, training assessment results should be analysed for trends on what particularly works well and what can be an indicator that the training objectives, materials or methods are not meeting the actual objectives. Training assessment

results should therefore be bundled and analysed, preferably on the same modular way that the training is designed.

Example 1: if a standard knowledge classical test shows that a significant percentage of trainees provide a wrong answer a particular question, this must trigger a review of the training design on that specific area.

Example 2: If on the job observations shows that employees struggle with a task or an activity, or recurrent questions are asked of colleagues on how to deal with a specific situation, it should be captured in the observation checklists and analysed to determine if this is necessary to be covered by the training program or to be tackled differently.

H.5.5.5.4 Incident trends—unlike the previous 3 tools, this tool is only available for employers (not for training providers). However, we find this a useful source of information for the training program improvement. Implementing a Safety Management System implies that an organization is able to understand what the root cause of incidents was and correct both process, procedures and training thereof. Incident analysis determines if the failures were due to process issues, procedures gaps, willingly ignorance of processes and procedures, lack of competence (knowledge, skills, information), etc. If the conclusion is lack of competence, then this information must be actioned to the Training Designer and Training Program evaluator, so that the necessary adjustments can be conducted.

H.5.5.5.5 On the job Observations—although on the job observations have been mentioned mainly from a perspective of trainee assessment, they can also be used to evaluate the training program. This is desirable after implementation of a new training program and at repeated intervals. Does the training program design match the goals, i.e. is the TNA still holding true? These observations should not focus on the individual, but on the program design and TNA. Preferably by observing teams working. On the job observations also provide an opportunity for interviews (both open questions and directive): aiming to hear the team's point of view in terms of training requirements and assessment.

H.5.5.6 The training program assessment should not limit itself to one of the competency factors, instead it should covers all four levels: Knowledge; Skills; Attitudes; Experience.

H.5.5.6.1 Knowledge

- Specific learning objectives: what is the percentage of passing/failure rate in post training evaluations? Analysis of the knowledge gap, i.e. the expected knowledge to be obtained for a particular level of proficiency and the knowledge demonstrated by the individual performing the job, is this difference an individual gap or a training program gap (e.g. evaluation contains several questions on lithium battery shipment preparation, but a significant percentage of students is unable to correctly answer these can demonstrate that training is not focusing enough or effectively on that topic).

Possible tools: Training Assessments Results Analysis

- How participants react to the training. Do they find the training engaging and relevant to their job function? It is important to measure reactions as it helps to understand how well the training is received by the participants.

Possible tools: Surveys and Interviews

- Is the knowledge that is expected matching the job function description? (e.g. was there a comparison made between the function analysis and the knowledge components in the training program?)

Possible tools: Training Assessments Results Analysis, Incident Analysis and “On the Job” observations.

- Is the training program built in such a way that allows further progression in the level of knowledge? Is there a differentiation between the mastery levels? (e.g. the same training program can have different level of exercises and allow for students to choose themselves, within an adequate range for their function)

Possible tools: Surveys and Interviews

H.5.5.6.2 Skills. Evaluating the Training Program in the area of Skills, will allow to verify if:

- Does the training program allow for increased autonomous application of the knowledge?
- Are trainees able to transfer the knowledge to real life situations?
- How much has their skill increased?

Possible tools: before and after quizzes, interviews, Training Assessments Results Analysis if these are conducted on a practical manner rather than on a classical test method.

H.5.5.6.3 Attitude

- Does the training (either classic, blended, or on the job) focus on expected attitudes, in particular on how to react/what to do in exceptional situations (e.g. damaged shipments; unsure on how to respond to a particular difficult situation or shipment; to whom to reach out to in case of help needed)

Possible tools: Incidents analysis, interviews to employers/direct managers; “On the Job” observations.

H.5.5.6.4 Experience

- Performance evaluations of employees should focus on the aspect of competency to perform the job and provide feedback to the training developers.
- Is the training program supporting the further development of the employees, if necessary or desirable?

Possible tools: Interviews to employers/direct managers and trainers.

H.5.6 Training and Assessment Records

H.5.6.1 Training records are necessary for the following stakeholders:

- (a) **employee:** to enable proof of acquired competency in certain functions and their respective tasks and therefore support job mobility and avoid unnecessary training duplication;
- (b) **employer:** to manage work force and ensure employees are competent to perform the tasks they are required in a specific function; it can be used to make critical operational decisions for the organization based on the skill set available;
- (c) **auditors/inspectors:** to inspect that the employee is competent to perform the job function; and
- (d) **training providers:** to provide proof that training has been followed and assessment has been completed.

H.5.6.2 The assessment records serve as formal information of several aspects important to all the parties mentioned above:

- when training was provided;
- who attended the training;
- training provider;
- most recent training session;
- when there was an assessment;
- to prove which tasks are covered by the training/assessment;
- achieved proficiency level.

H.5.6.3 In a CBTA approach it is possible to separate the training from the assessment, for example an employer can make use of a training provider for the instruction but perform the assessment internally. Therefore, it is important that the training records are clear on what is being covered.

H.5.6.4 The following is the minimum data to be kept in the training records:

- (a) Name of employee/trainee;
- (b) Unique identifier of the employee (if applicable);
- (c) Function(s) and/or tasks from the task list that have been covered by the training program;
- (d) Month of completion (training and assessment if done in different dates);
- (e) Validity;
- (f) Type of training (see H.5.2.2.3.1);
- (g) Type of assessment (see H.5.5.5);
- (h) Training provider name and address.

H.5.6.5 The following is also recommended data that should be kept in a training record or trainees's files to be provided upon request:

- (a) Name of the instructor (if applicable) or training provider;
- (b) Unique facilitator identifier (if applicable);
- (c) Unique course/session identifier;
- (d) Employer (optional, normally used when the employer provides their own training programs);
- (e) Location (if applicable);

- (f) Language (optional);
- (g) Task list (TNA) and proficiency level that were assessed;
- (h) Competency level achieved (this could be expressed in terms of proficiency level as explained under Table H.5.A, “Level of Proficiency in Terms of Competency Factors”).

H.5.6.6 Training records must be kept in a secure manner by training providers and employers for a minimum of 36 months. They should be kept digitally and in such a manner that data can be easily assessed and reports easily generated.

H.5.6.7 Training records must be made available upon request to the participant or appropriate national authority. However, when providing/reproducing training records, privacy law requirements must be considered, therefore certain information fields should not be shown (e.g. facilitator name) and treated with the appropriate confidentiality standards.

H.5.7 Establish Trainer Qualifications and Competencies

H.5.7.1 When an employer or a training organization decides on the person transmitting and accompanying the acquisition of the knowledge and developing of skills two areas must be considered: the regulatory requirements and the desirable level of proficiency of the person(s) delivering the training program.

H.5.7.2 From the regulatory perspective the regulations on dangerous goods must be observed. These require, unless otherwise provided for by the appropriate national authority, that instructors of initial and recurrent dangerous goods training:

- (a) must demonstrate or be assessed as competent in instruction and in the function(s) that they will instruct prior to delivering such dangerous goods training;
- (b) instructors delivering initial and recurrent dangerous goods training must at least every 24 months deliver such a course, or in the absence of this attend recurrent training;
- (c) instructors must receive and understand updates to dangerous goods information and be made familiar with those changes by attending training or other means on an annual basis or as the Regulations are modified,
- (d) organisations must ensure that the instructor receives updates to the Regulations and training material any time there are changes in the regulations or at least on an annual basis with the issuance of each edition of the DGR.

H.5.7.3 For a desirable level of proficiency it is strongly recommended that in addition to the requirements listed above (see I.1.5.3), the instructor of dangerous goods courses should have as a minimum the following qualifications:

- (a) instructors should demonstrate “advanced” proficiency level related to the functions they are dealing with according to Table H.5.A–Level of Proficiency in Terms of Competency Factors;

- (b) where applicable, an instructor must also have current knowledge of local State civil aviation dangerous goods regulations, and proof of approval as dangerous goods instructor by the State of the operator if required.
- (c) it is recommended that instructors have three (3) years working knowledge and experience in dangerous goods and safety operations or experience in cargo operations, including performing the function they are training on;
- (d) an alternative to this working experience is a dedicated training program for instructors, which would supplement the requirements. Proof from the employer that the instructor has undergone such a program, or a program approved by the State of the operator is required;
- (e) instructors should also undertake a “hands-on”/“on the job” experience program (i.e. job shadowing) in a variety of functions requiring dangerous goods training. Undergoing this practical activity at least every 2 to 3 years is highly recommended. This is particularly important if the item above applies, but even with experience from time to time it is best if instructors spend time in the operation to observe the trainee behavior in the job place.

H.5.7.4 New instructors of dangerous goods, where possible, should design and co-facilitate dangerous goods courses together with an established training designer/instructor.

In this particular case and in addition to soft skills courses required, the approach known as “oil” (Observe. Interact. Lead) is a very effective way of building instructional competency:

- (a) Observe: attend course (intended to hold) as observer;
- (b) Interact: by preparing a course and co-facilitate together with an established training designer/instructor; and
- (c) Lead: individually take on the delivery of a full course and ideally lead or establish a full training program.

H.5.7.5 For instructors, feedback is recommended to measure their performance using for example checklists, (i.e. experienced instructor sits-in on 1-2 courses where a new instructor is delivering the course), capturing the information helps to provide feedback on performance which then should lead to recommendations to implement changes.

H.5.7.6 When the employer or the training organization uses other methods of delivery without an instructor leading it, such as e-learning or distance learning it is equally important to consider the competency of such methods in the same two areas: the regulatory requirements and the desirable level of proficiency of the chosen method.

H.5.7.7 In practical terms, if needing to evaluate a non-instructor lead option it is highly recommended:

- (a) From the regulatory perspective the regulations on dangerous goods must be observed, and the method must be approved or recognized by the appropriate national authority of the State in which the trainee's work place is located.

- (b) Consider all the above requirements for the content developers and those individuals involved in the development of the tools.
- (c) Satisfactory answers to the following considerations are important: is there a clearly defined process for the design and development of the training? Is the provider of the method well recognized by the local stakeholders?
- (d) Establishing a service level agreement in terms of evaluation of the program and content update is a key consideration.

H.5.7.8 It is important to mention that IATA strongly recommends the use of a blended approach for dangerous goods training programs. This means that using a unique method of delivery like face-to-face classic classroom delivery, e-learning, distance learning and others in isolation is not a good example of CBTA. It will not be considered as a whole training program but instead as a portion of a program.