CAAS
Civil Aviation Authority of Singapore

Advisory Circular

COMPETENCY-BASED DANGEROUS GOODS TRAINING PROGRAMME

GENERAL

Advisory Circulars (ACs) are issued by the Director-General of Civil Aviation (DGCA) from time to time to provide practical guidance or certainty in respect of the statutory requirements for aviation safety. ACs contain information about standards, practices and procedures acceptable to CAAS. An AC may be used, in accordance with section 11 of the Air Navigation Act 1966 (ANA), to demonstrate compliance with a statutory requirement. The revision number of the AC is indicated in parenthesis in the suffix of the AC number.

PURPOSE

This AC provides guidance to demonstrate compliance with, and information related to, establishing a competency-based dangerous goods training programme in accordance with the ICAO Technical Instructions (TI) for the Safe Transport of Dangerous Goods by Air and the requirements to be fulfilled when applying for a dangerous goods training programme approval in accordance with Division 1 in Part 3 of the Air Navigation (92 – Carriage of Dangerous Goods) Regulations, ("ANR-92").

APPLICABILITY

This AC is applicable to:
- An AOC holder operating an aeroplane in accordance with Air Navigation (121 – Commercial Air Transport by Large Aeroplanes) Regulations 2018 ("ANR-121");
- An AOC holder operating an aeroplane in accordance with Air Navigation (135 – Commercial Air Transport by Helicopters and Small Aeroplanes) Regulations 2018 ("ANR-135");

- A ground handling agency in Singapore that accepts, handles, loads, unloads, transfers, process cargo, mail, stores or passengers on behalf of a foreign air operator or an AOC holder;
- An agency in Singapore that performs checking in of passengers on behalf of a foreign air operator or an AOC holder;
- An agency in Singapore that performs security screening of cargo, mail, stores passengers or baggage on behalf of a foreign air operator or an AOC holder; and
- A shipper of dangerous goods including any packer, freight forwarder or person that undertakes the responsibilities of a shipper of dangerous goods.

RELATED REGULATIONS

This Advisory Circular relates specifically to:
- Regulation 153 of ANR-121;
- Regulation 149 of ANR-135; and
- Division 1 in Part 3 of ANR-92.

RELATED ADVISORY CIRCULARS
- Nil

CANCELLATION

This AC supersedes AC 92-3-1 (Rev 0) dated 30 December 2022. In this revision, a new Appendix C has been inserted as guidance for shippers and its agent intending to outsource dangerous goods training of various well-defined functions to training service providers.

EFFECTIVE DATE

This AC is effective from 12 January 2024.

OTHER REFERENCES
- ICAO Doc. 10147, Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment
- IATA Dangerous Goods Regulations Manual
- IATA Dangerous Goods Training Guidance – Competency-based Training and Assessment Approach

1 INTRODUCTION

1.1 Regulations 19(2)(a) and 22(1)(a) of ANR-92 require organisations involved in the transport of dangerous goods by air to establish and maintain a dangerous goods training programme for its personnel having responsibilities in the processing and handling of cargo, mail, stores, passengers or baggage. Regulations 153 of ANR-121 and Regulations 149 of ANR-135 require AOC holders to establish and maintain dangerous goods training programmes that are approved by the Director-General of Civil Aviation.

1.2 The safe transport of dangerous goods by air is dependent on a competent workforce. With effect from 1 January 2023, all dangerous goods training programmes used to train and assess the competency of personnel involved in the transport of dangerous goods by air have to be competency-based as specified in the ICAO TI.

1.3 The goal of competency-based training and assessment is to produce a competent workforce by providing focused training on the job function of personnel. 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. Such training programmes should contain elements such as design methodology, assessment, initial and recurrent training, instructor qualifications and their competencies, training records and evaluation of the effectiveness of training.

1.4 This AC provides guidance to those organisations that are required to establish and maintain dangerous goods training programmes in developing and implementing competency-based dangerous goods training programmes for its personnel involved in the transport of cargo, mail, stores, passengers and baggage by air.

2 ROLES AND RESPONSIBILITIES IN A COMPETENCY-BASED APPROACH TO DANGEROUS GOODS TRAINING

Organisations

2.1 Organisations (e.g. shippers, freight forwarders, ground handling service providers and AOC holders etc.) are responsible for identifying dangerous goods job functions performed by its personnel, determining the purpose and objective of the training programme and ensuring that the design and development of the training programme components will result in personnel acquiring the competencies necessary to perform their job functions.

2.2 To fulfil its responsibilities, organisations should study its target population (trainees) to identify the knowledge, skills and attitudes they already possess, gather information on preferred learning styles, their social and linguistic environments and other demographics (e.g. age, level of education, experience etc.). Since these factors may affect learning and the acquisition of new competencies, they should be considered when designing various components of the training programme.

2.3 Due to various considerations, such as the size of the organisation, the nature and complexity of its job functions, cost effectiveness and the availability of resources to provide in-house training, organisations may engage the services of third-party training

service providers to provide training to its personnel. Organisations may outsource the full implementation of the training programme to a training service provider or limit it to only the core dangerous goods training course. Regardless of arrangements, the employer remains responsible for determining the training needs of its personnel.

2.4 When doing so, organisations should be mindful that fulfilment of training needs should be the primary factor in deciding the suitability of a training service provider, and not cost alone. Organisations remain responsible for ensuring their personnel are competent to perform their job functions prior to performing them even if certain aspects of the training programme have been delegated to third parties.

Instructors

2.5 Instructors refer to persons qualified to facilitate or conduct training events (e.g. the core dangerous goods course, simulation, on-the-job training etc.) within a competency-based dangerous goods training programme. Instructors play an important role and are responsible for communicating the knowledge, imparting skills, cultivating the desired attitudes in performing the job function and monitoring the progress of trainees towards achieving the required competencies. Instructors may also provide feedback to help improve the effectiveness of the training.

Assessors

2.6 Assessors are expected to conduct dangerous goods competency assessments in accordance with the assessment plan and to utilise the assessment tools as specified in the plan to document evidence and outcomes of assessments. To fulfill its role, assessors have to be familiar with the competency of each task in the job function of the training programme, observe the performance of trainees and subsequently determine if trainees have achieved the required competencies base on their performance during the assessments. Assessors may also provide feedback to help improve the effectiveness of the training.

Trainees

2.7 Trainees refer to personnel of organisations performing one or more dangerous goods job function and requiring training to achieve the competencies needed to perform their job at the workplace. In a competency-based training programme, trainees are responsible for participating actively in the learning process to compliment the efforts of instructors. This is as opposed to trainees being passive recipients of knowledge. The competency-based training programme provides trainees with a clear idea of their learning path towards competency through the training programme and beyond. The training should directly contribute towards improving their performance on the job. Trainees' feedback is also essential to ensure that the competency-based training is effective.

3 COMPONENTS OF A COMPETENCY-BASED TRAINING AND ASSESSMENT PROGRAMME

3.1 When Figure 3.1 is a graphical illustration of the essential components of an effective competency-based dangerous goods training programme:
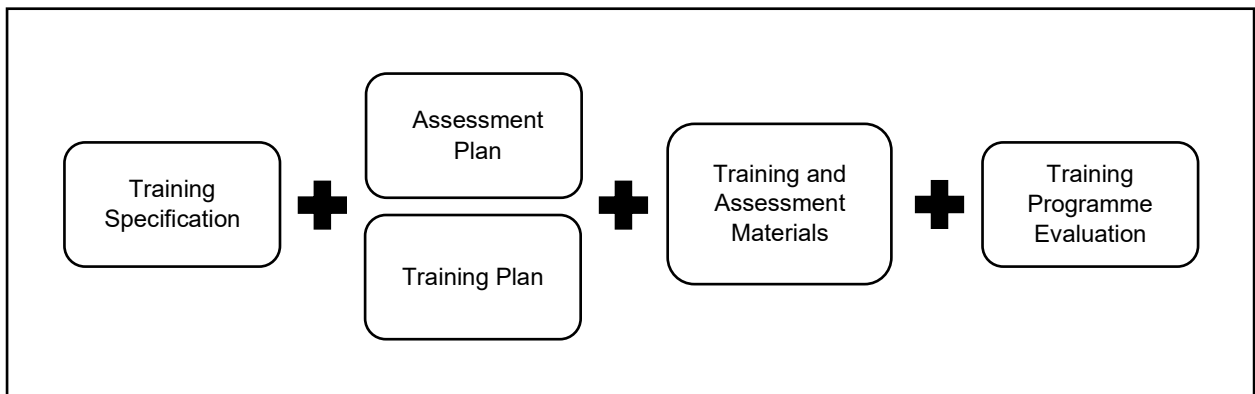
Figure 3.1 - Competency-based training components

3.2 The essential components of a competency-based training and assessment programme are as follows:

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

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

(c) a training plan describing the training required to achieve the competencies;

(d) training and assessment materials and human, material and organisational resources needed to implement training and assessment plans; and

(e) a process to evaluate the effectiveness of the training programme.

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

4.1 Establishing a competency-based dangerous goods training programme takes on a phase approach following the ADDIE (analyse, design, develop, implement and evaluate) instructional design model as illustrated in Figure 4.1.

Figure 4.1 - Competency-based training and assessment workflows

<u>Phase 1 – Analyse Training Needs</u>

4.2   In this phase, organisations should determine the training needs of personnel performing one or more dangerous goods related job function at the workplace through a training needs analysis. The training needs should be specific to t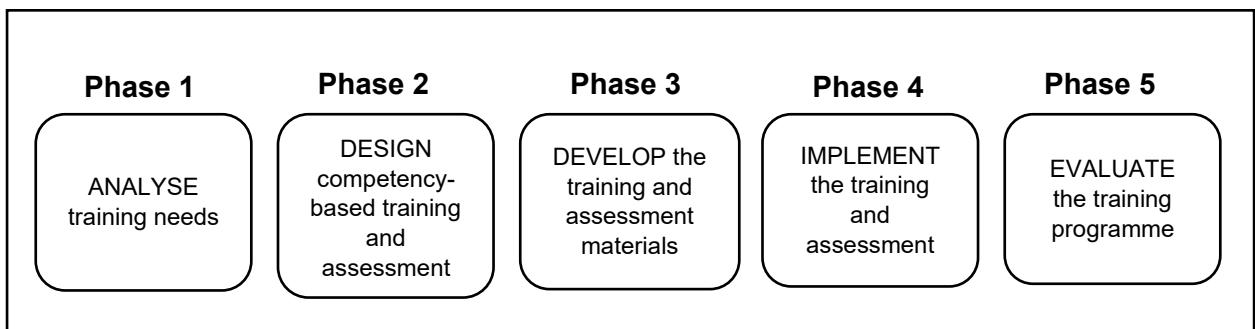he organisation's working environment and its internal procedures for the processing and handling of dangerous goods intended for transport by air and including preventing undeclared/mis-declared dangerous goods from inevitably being offered for transport by air. The analysis should also consider the demographical characteristics of its personnel which may affect the design of the training programme and the choice of training delivery methods. Appendix A illustrates a typical dangerous goods process flowchart for the processing and handling of cargo, mail, passengers and baggage. This flowchart also identifies the dangerous goods job functions performed by shippers, air operators and their agents and which organisations may use to identify the job function(s) performed by its personnel.

4.3   Through a detailed analysis of the job function involved, the tasks list applicable to the job function should also be developed. Appendix B contains a generic list of tasks and sub-tasks typically performed by personnel of shippers, air operators or their agents having responsibilities in the transport of dangerous goods by air. Since personnel performing dangerous goods functions are likely to perform at least one or a combination of such tasks and their sub-tasks, organisations should adapt the task list based on the job function of its personnel. Upon establishing the list of task and sub-tasks, the competency factors (i.e. knowledge (K)[1], skills (S)[2] and attitude (A)[3]) required to perform each task and sub-task should also be determined. When determining competency factors, organisations should consider the level of proficiency appropriate to the tasks to be performed and which may range from introductory to advanced.

4.4   The IATA Dangerous Goods Regulations Manual contain examples of adapted task lists and the level of proficiency for certain well-defined functions applicable to shippers, air operators and their agents. However, organisations should note that the tasks shown in those lists are recommendations and may not align with the actual job functions of its personnel. Depending on the scope of its personnel's responsibilities in the handling of dangerous goods intended for transport by air, organisations may need to adjust the magnitude of training and assessments accordingly. Ultimately, the organisation remains responsible in ensuring that its personnel are competent in performing the job functions for which they are responsible for, and its training programmes are designed to accomplish this.

4.5   In addition to the task lists, organisations should also analyse documents related to dangerous goods transport regulations and its standard operating procedures in the processing and handling of dangerous goods intended for transport by air at its workplace. Such information should be incorporated into the training programme to

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[1] **Knowledge** is the 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.

[2] **Skills** are the abilities to perform an activity or action. It is often divided into three types: motor, cognitive and metacognitive skills.

[3] **Attitude** is a persistent internal mental state that influences an individual's choice of personal action toward some object, person or event and that can be cultivated.

ensure the competency of its personnel in complying with the regulations and in adhering to its procedures when performing their job function at the workplace.

4.6 The output of this phase is a training specification that describes the following:
- purpose of the training;
- job function involved;
- training needs of personnel involved;
- tasks list and their required competency factors for the job function involved;
- operational, technical, regulatory, and organisational requirements that needs to be fulfilled when designing the training; and
- frequency of the training.

4.7 Figure 4.2 illustrates an overview of the workflow in Phase 1.
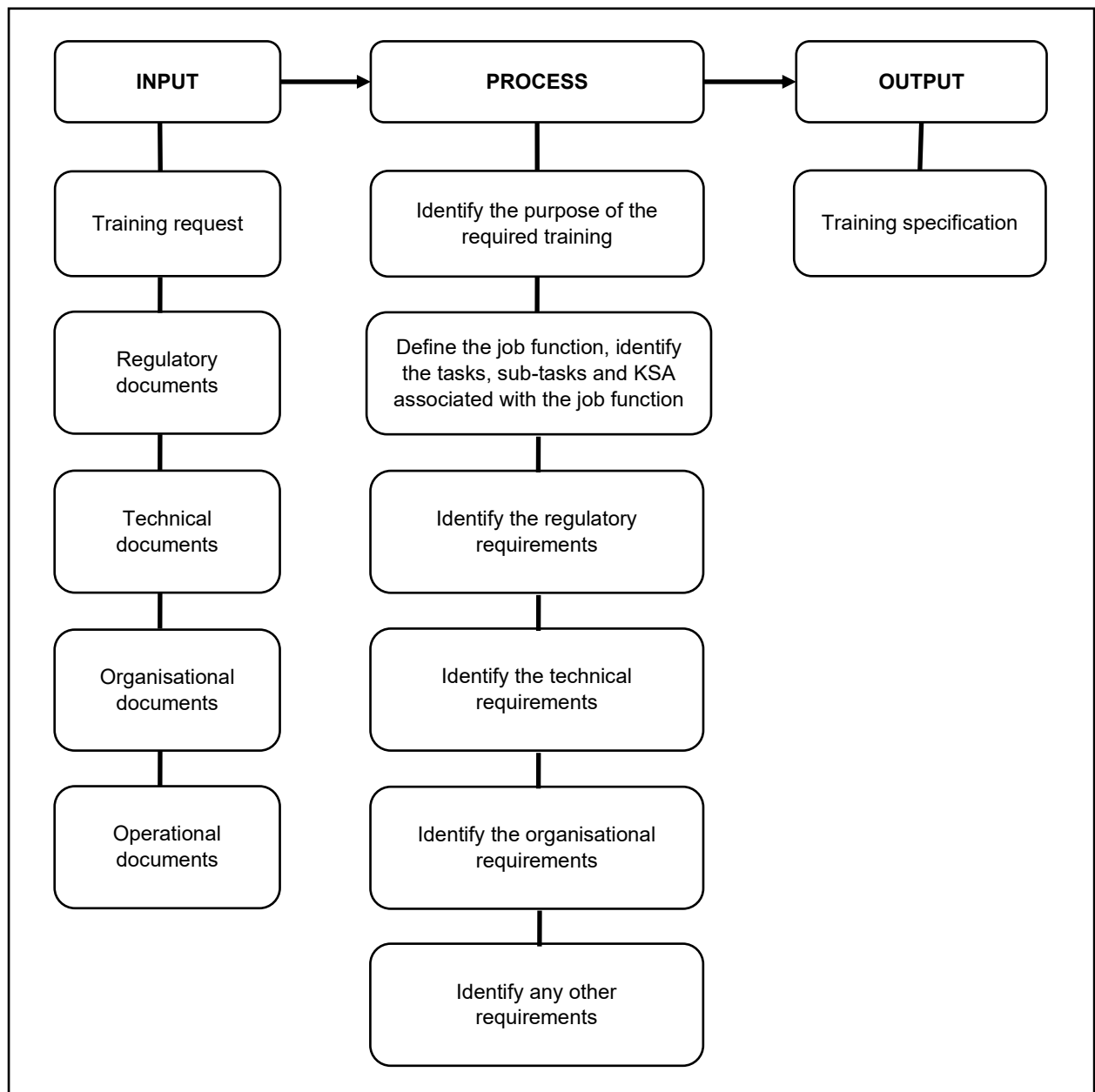
Phase 2 – Design Competency-Based Training and Assessment

4.8   This phase consists of 2 major components:
•   Design an assessment plan that will be used to assess the competency of trainees; and
•   Design a training plan that will enable the development and delivery of the training.

Designing an Assessment Plan

4.9   An assessment plan serves to document details of assessments necessary to determine if trainees have achieved the desired competencies.

4.10   The following principles should be considered when developing assessments within a competency-based training programme:

•   *Clear performance criteria, that are objective and measurable, should be used to assess competence.*

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

•   *Multiple observations are undertaken.* Multiple observations should be carried out to determine if a trainee has achieved the interim and/or final competency standard.

•   *Assessments are valid.* All job function related tasks identified in the training programme should be assessed. There should be sufficient evidence to ensure that the trainee meets the competency specified by the interim and/or final competency standard. The trainee should not be asked to provide evidence for, or be assessed against, activities that are outside the scope of the job function identified in the training specification.

•   *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.

4.11   An assessment plan should consist of the following elements:
•   the final competency standard associated with the job function;
•   the interim competency standard associated with each milestone, if the training has been divided into milestones;
•   the list of assessments (formative and summative assessments, examinations, oral assessments, etc.) required for each of the task(s) that have been defined;
•   when assessments should take place;
•   the tools to be used to collect evidence during practical assessments;
•   the pass marks for projects, examinations or oral assessments;
•   if required, the minimum number of formative assessments to be undertaken prior to starting summative assessments; and
•   the number of observations required to assess performance for the interim and final competency standards.

4.12 To ensure consistency in implementation, an assessment plan may contain the following administrative procedures:
- Identification of personnel authorised to perform a specific task or perform assessment;
- Roles and responsibilities of personnel during the conduct of assessments;
- Assessment procedures (preparation, conduct and post assessment);
- Conditions for undertaking assessments;
- Keeping of records; and
- Actions to be taken when a trainee fails a competency assessment.

4.13 When assessing competencies, there are several assessment methods that may be considered. They include, but are not limited to, written test, oral test, online test, observation of practical exercises performed by the trainee, online practical exercises, and observation of on-the-job performance by the personnel after completion of their training. These methods may be used alone or in combination to confirm that trainees have acquired the necessary competencies for the intended job function. However, when assessing an integrated performance of competencies, practical assessments should be the primary method of choice. Such assessments may take place in either a simulated or operational environment and may consist of both formative and summative types of assessments.

4.14 Due to duration of the training programme or complexity of the combination of tasks within a job function, the training programme may be divided into milestones. Milestones that are logically sequenced and spaced can be used to monitor trainees' progress towards competency at an acceptable pace. Interim competency standards should be defined for each milestone which should consist of training and assessment(s). Trainees would be expected to successfully complete a milestone before allowing to advance to the next milestone in the sequence of the training programme.

4.15 Organisations engaging the services of external training service providers to train and assess its personnel should develop assessment plans to ensure that its personnel, having job functions in the handling and carriage of dangerous goods by air, have achieved the required competencies to fulfill their responsibilities at the workplace. Organisations should determine if the assessments provided by training service providers are adequate in assessing that its personnel have attained the required competences or otherwise developed competency assessments to assess trainees at the workplace and incorporate them into its assessment plan. Such an assessment plan may also consist of a combination of both assessments from the training service provider and assessments at the workplace developed by the organisation.

Designing a Training Plan

4.16 The purpose of a training plan is to detail the training required to fulfil the training specification and to prepare trainees to undertake the competency assessments detailed in the assessment plan.

4.17 A training plan should consist of the following elements:
- Composition and structure of the training programme
- Syllabus
- Milestones (if required)
- Modules, training events and their delivery sequence;

- Method of delivering the training; and
- Course schedule.

4.18 It should be noted that the training plan should not be limited to the core dangerous goods training course but should also include components applicable to on-the-job training and assessments at the workplace. When completed, the training plan may be used to develop training and assessment materials.

4.19 When deciding on the method of delivering the training, factors such as demographics of trainees, frequency of training and complexity of the job function should be considered. Common methods of training delivery include:
- physical classroom instructor led;
- virtual classroom instructor led;
- e-learning;
- distance learning (self-study);
- virtual simulation;
- group discussions; and
- on-the-job training.

These methods may be used in combination to deliver the training objectives.

4.20 Figure 4.3 illustrates an overview of the workflow in Phase 2.
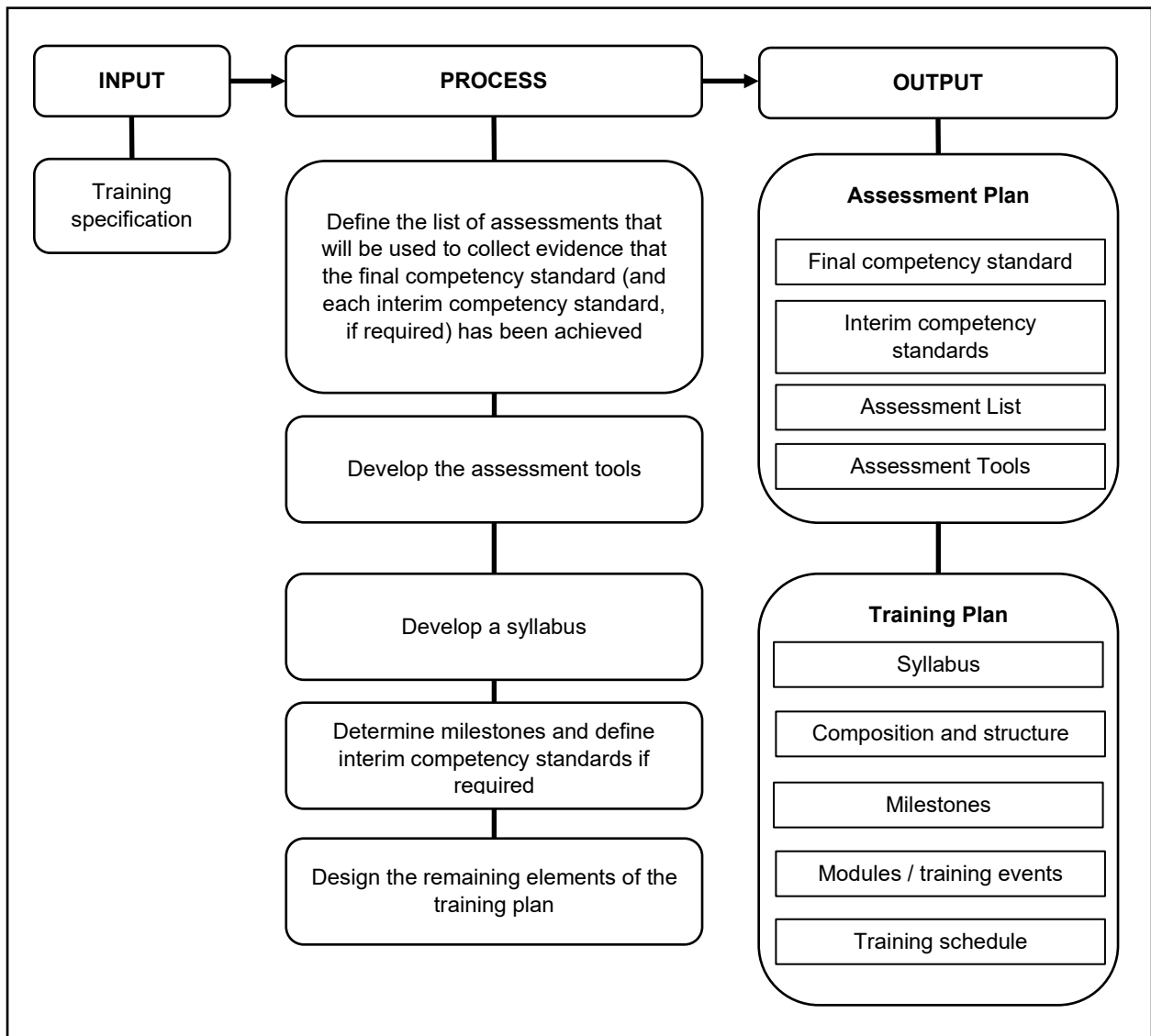
Figure 4.3. Design competency-based training and assessment

Phase 3 – Develop the Training and Assessment Materials

4.21 This phase focuses on the development of training and assessment materials based on the assessment plan and the training plan developed in Phase 2. Such materials would include, but are not limited to:

- training notes;
- trainees' handbook;
- practical exercises;
- case studies;
- presentations;
- video clips;
- self-test quizzes;
- examinations;
- on-the-job observations;
- practical assessments; and
- assessment tools.

4.22 Training and assessment materials should not be limited to only the core dangerous goods course but should also include materials applicable to training events such as on-the-job training and assessments at the workplace.

4.23 Figure 4.4 illustrates an overview of the workflow in Phase 3.
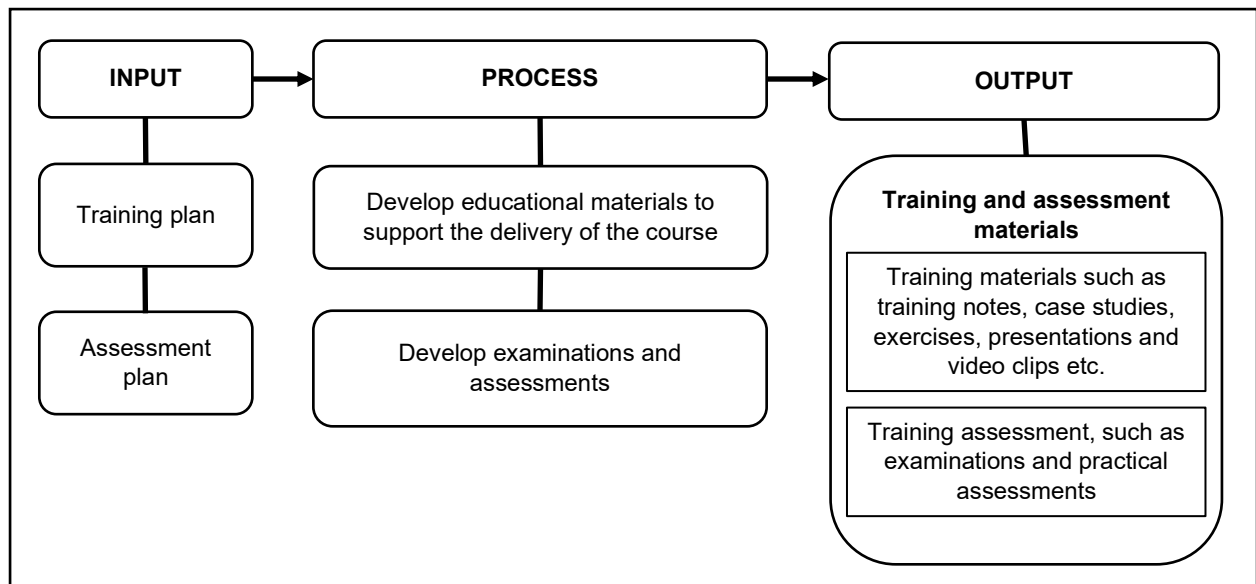
Figure 4.4. Develop the training and assessment materials

Phase 4 – Train and Assess According to the Training and Assessment Plans

4.24 This phase focuses on delivering the training and conducting the competency assessments according to the plans developed in the earlier phases. When delivering the training, trainees' learning progress should be monitored against the interim and final competency standards. Timely and continuous feedback regarding their performance should be given to trainees. Any learning deficiencies identified should also be addressed in a timely manner.

4.25 At the end of the training and upon the successful completion of all assessments, trainees should be competent in performing their assigned job function. If assessment results show that trainees are not yet competent, the affected trainees' learning gaps should be identified. Additional support and opportunities in the form of exercises, on-the-job practices and coaching should be provided to the affected trainees prior undertaking further competency assessments.

Phase 5 - Evaluate the Competency-Based Training Programme including the Training and Assessment Plans

4.26 The competency-based training programme should be reviewed by the organisation on a periodic basis to ensure its effectiveness. After training is completed, feedback on job performance of trainees at the workplace should be gathered from trainees, instructors, assessors and organisations (in the case of training programmes developed by training service providers). Such feedback may be in the form of course results, audit reports, inspection reports, documented observations of trainees' job performance at the workplace, written evaluation by trainees, instructors or assessors and occurrence reports involving personnel that were trained and assessed to be competent under the

training programme. Such reports should be evaluated with a view to amend or revise various components of the training programme (e.g. assessment plan, training plan, training and assessment materials etc.) to better support the learning progression and competency of personnel in performing the intended job function.

5 APPLICATION FOR APPROVAL OF DANGEROUS GOODS TRAINING PROGRAMMES

5.1 AOC holders, in complying with Regulation 153 of ANR-121 and Regulation 149 of ANR-135, as well as organisations identified in regulation 19(1) of ANR-92 complying with Regulation 20(2) of ANR-92, will need to submit the following documents of its competency-based dangerous goods training programmes for CAAS' review and approval:

(a) Training specification containing the information as specified in paragraph 4.6;

(b) Assessment plan containing the information as specified in paragraph 4.11 and 4.12;

(c) Training plan containing the information as specified in paragraph 4.17;

(d) Training and assessment materials including, but not limited to the materials identified in paragraph 4.21;

(e) Procedures to evaluate the effectiveness of the training programme; and

(f) Evidence of an evaluation of the training programme completed in accordance with the procedures mentioned in item e) (for applicants seeking a renewal of CAAS' approval of its competency-based training programme only).

5.2 Training programme documents should be accompanied by a letter of application on the applicant's company letterhead specifying the title of the training programme and the job function of the personnel involved. Applicants may submit their training programme to CAAS via email at CAAS_dangerousgoods@caas.gov.sg.

6 OUTSOURCING DANGEROUS GOODS TRAINING TO TRAINING SERVICE PROVIDERS FOR WELL-DEFINED FUNCTIONS

6.1 Organsations are responsible for identifying the job functions of its personnel involved in preparing, handling and transporting dangerous goods by air. ICAO has identified a list of functions typically performed by such personnel and termed them as *"well-defined functions"*. Organisations may refer to ICAO Doc. 10147, *Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment* and IATA's *Dangerous Goods Training Guidance – Competency-based Training and Assessment Approach* for a list of well-defined functions and their associated tasks.

6.2 Many dangerous goods training service providers in Singapore have based their dangerous goods training programmes on such well-defined functions and their associated tasks. Should a shipper or an agent determine that the functions performed by its personnel match those well-defined functions, it may outsource the dangerous goods training of such personnel to these training service providers.

6.3   For a shipper or an agent intending to outsource training of its personnel performing well-defined dangerous goods functions, additional guidance can be found in Appendix C - *Outsourcing Dangerous Goods Training for Personnel of Shippers and its Agents Performing Well-Defined Functions*.

APPENDIX A – Dangerous Goods Functions – Process Flowchart

Classifying dangerous goods

Start (Cargo) → Evaluate against classification criteria, if applicable → Is it DG?
- NO → Shipment prepared
- 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) → Is it excepted from the TIs?
        - YES → Shipment prepared
        - NO → Item classified
      - NO → Item classified

Preparing dangerous goods shipment

Shipment prepared → Shipment tendered → Prepare documentation → Will overpack be used?
- YES → Apply overpack provisions → Prepare documentation
- NO → Apply marks and labels → Apply packing requirements → Assess packing options including quantity limitations → Item classified

Processing/accepting cargo

Is it declared DG?
- NO → Process cargo other than DG → Is it acceptable?
- YES → Review documentation → Review packages → Is a DG acceptance check required?
  - YES → Complete acceptance check → Is it acceptable?
  - NO → Is it acceptable?
    - YES → Cargo shipment accepted
    - NO → Is a DG report required?
      - YES → Report
      - NO → Return to shipper

Managing cargo pre-loading

Ready for loading → Is there any evidence of damage or leakage?
- NO → Load aircraft
- YES → Apply response procedures and report

Complete NOTOC → Is NOTOC required?
- YES → Ready for loading
- NO → Prepare load for aircraft (ULD or bulk) → Plan loading

Accepting passenger and crew baggage

Start (Baggage) → Baggage presented → Process baggage → Does it contain DG that is forbidden?
- YES → Remove DG → Has approval been granted?
  - NO → Remove DG
  - YES → Accept baggage
- NO → Are there items requiring approval?
  - YES → Has approval been granted?
  - NO → Accept baggage → Load aircraft

Transporting cargo/baggage

Load aircraft → Manage DG during flight → Unload aircraft → Is there any evidence of damage or leakage?
- YES → Apply response procedures and report
- NO → Post-flight handling/ transfer completed

Note: Apply local procedures for the response to events (such as leakage, damage, spillage, etc.)

Reporting can occur at any stage. Reporting procedures are documented and should be used (Undeclared, misdeclared, DG incident, DG accident, DG occurrence)

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

0.   Understanding the basics of dangerous goods

0.1.   Recognising the applicability of dangerous goods regulations
  0.1.1. Understanding the definition
  0.1.2. Recognise the legal framework (global, national)
  0.1.3. Identify the application and scope
  0.1.4. Differentiate hazard and risk

0.2.   Understanding the general limitations
  0.2.1. Develop a sense of forbidden dangerous goods
  0.2.2. Recognise potential hidden dangerous goods
  0.2.3. Familiarise with passenger provisions

0.3.   Identifying roles and responsibilities
  0.3.1. Clarify the individual and collective role of the supply chain stakeholders
  0.3.2. Understand the passenger's responsibilities
  0.3.3. Recognise the impact of State & operator variations

0.4.   Understanding the importance of classification and packaging
  0.4.1. Identify the general information about classes, divisions
  0.4.2. Understand general principles of packing groups
  0.4.3. Consider multiple hazards

0.5.   Understanding hazard communication
  0.5.1. Recognise the basic marking requirements
  0.5.2. Recognise the basic labelling and requirements
  0.5.3. Identify the required documentation

0.6.   Familiarising with basic emergency response
  0.6.1. Create awareness about general emergency procedures
  0.6.2. Understand the employer's emergency response requirements

1.   Classifying dangerous goods

1.1.   Evaluate a 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.   Comply with the instructions provided by the packaging manufacturer when UN specification packaging is used
    2.2.3.   Select appropriate packaging materials (absorbent, cushioning, etc.)
    2.2.4.   Assemble package

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 shipper's declaration for dangerous goods
    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 shipper's declaration for dangerous goods
    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

3.4. Process/accept cargo other than dangerous goods
    3.4.1.   Check documentation for indications of hidden/undeclared dangerous goods
    3.4.2.   Check packages for indications of hidden/undeclared dangerous goods

4.   Managing cargo pre-loading

4.1. Plan loading
    4.1.1.   Determine stowage requirements
    4.1.2.   Determine segregation, separation, aircraft/compartment limitations

4.2. Prepare load for aircraft
    4.2.1.   Check packages for indications of hidden/undeclared dangerous goods
    4.2.2.   Check for damage and/or leakage
    4.2.3.   Apply stowage requirements (i.e. segregation, separation, orientation, securing and protecting from damage)
    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, when applicable

6.   Transporting cargo/baggage

6.1. Load aircraft
    6.1.1.   Transport cargo/baggage to aircraft
    6.1.2.   Check packages for indications of hidden/undeclared dangerous goods
    6.1.3.   Check for damage and/or leakage
    6.1.4.   Apply stowage requirements (i.e. segregation, separation, orientation, securing and protecting from damage)
    6.1.5.   Verify that NOTOC against aircraft load

6.1.6.   Provide NOTOC information to pilot-in-command and flight operations officer/flight dispatcher

6.2.   Manage dangerous goods prior to and during flight
6.2.1.   Detect and address 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 the NOTOC 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 hidden/undeclared dangerous goods
6.3.3.   Check for damage and/or leakage
6.3.4.   Transport cargo/baggage to facility/terminal

7.   Collecting 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 C – Outsourcing Dangerous Goods Training for Personnel of Shippers and its Agents Performing Well-Defined Functions

1.1   This appendix provides guidance to shippers and its agents (freight forwarders, packers, logistics service providers etc. fulfilling the shipper's responsibilities on behalf of shippers) intending to outsource or procure dangerous goods training courses from training service providers in Singapore for well-defined dangerous goods functions performed by its personnel.

1.2   Before assigning its personnel to perform functions in the transport of dangerous goods by air, safety regulations obligate shippers and its agents to ensure that these personnel undergo initial dangerous goods training and are assessed to be competent in performing the tasks associated with those functions. To maintain their competency, these personnel are also required to undergo recurrent training and assessment within 24 months of the previous training and assessment.

1.3   Due to various reasons such as resource, efficiency and cost considerations, organisations may choose to outsource dangerous goods training instead of developing and maintaining training programmes in-house.

<u>Well-Defined Functions Typically Performed by Shippers and its Agents</u>

2.1   Prior to selecting a suitable training course offered by training service providers, shippers and freight forwarders should first identify the dangerous goods functions performed by its personnel. A list of well-defined dangerous goods functions typically performed by personnel of shippers and freight forwarders is as follows:
- Personnel responsible for preparing dangerous goods consignments;
- Personnel responsible for classifying dangerous goods for transport;
- Personnel responsible for processing or accepting goods presented as general cargo;
- Personnel responsible for processing or accepting dangerous goods consignments; and
- Personnel responsible for handling in a warehouse, loading and unloading unit load devices (ULDs).

2.2   The well-defined functions listed above correspond with the functions under the references 7.1 to 7.4 of the *IATA Dangerous Goods Training Guidance – Competency-based Training and Assessment Approach.* Consequently, training service providers may quote these references when identifying knowledge training courses associated with these functions.

<u>Dangerous Goods Training Courses Offered by Training Service Providers and their Scope of Contents</u>

3   Most dangerous goods training service providers in Singapore are accredited by IATA under its *Competency-Based Training and Assessment (CBTA) Center* accreditation programme. Under this programme, training service providers develop and conduct generic knowledge training courses applicable to the well-defined functions identified in paragraph 2.1 of this appendix, covering the relevant contents for each function as

guided by IATA. The typical contents and duration of training courses for each function is shown in the tables in paragraph 7 of this appendix.

<u>Duration of Courses Applicable to Well-Defined Functions</u>

4   The recommended duration of training for initial and recurrent courses applicable to each well-defined function, as shown in the tables in paragraph 7, takes into consideration the scope and volume of contents and assumes that personnel undergoing training will eventually be expected to handle various classes of the dangerous goods within their assigned job function at the workplace. This duration also takes into consideration the time needed to cover the knowledge contents to a level of depth commensurate with the well-defined job function.

<u>Other Factors Influencing Choice of Training Service Provider</u>

5   Other factors that may influence an organisation's choice of training service providers include:
*   *Instructional Methods* – Some training service providers offer face-to-face instructor led training while others offer virtual classroom training. Suitability of instructional methods may be affected by factors such as complexity of the course contents and demographics of personnel undergoing training. Organisations are encouraged to gather feedback from its personnel, including those who have undergone training, to determine the suitability of instructional methods for its personnel.
*   *Course Instructors* – Course instructors should be sufficiently qualified and experienced in conducting the course. As a minimum, they should meet the instructor qualifications as specified in the current edition of the IATA dangerous goods regulations manual. Organisations are encouraged to enquire with the training service provider the qualifications and relevant experience of its instructors and obtain feedback from past participants of the course.
*   *Cost* – Although organisations should consider the cost of personnel attending training and compare the fees of courses offered by training service providers, cost should not be the sole criteria in determining the choice of courses offered by training service providers.

<u>On-The-Job Training</u>

6.1   Shippers and its agents should note that courses offered by training service providers for well-defined functions are generic in nature with a focus on the knowledge acquisition of safety requirements associated with the handling of dangerous goods performed by personnel responsible for those job functions. Such courses usually do not cover the specific procedures established by each organisation to achieve compliance with safety regulations and may not provide for sufficient time for participants to acquire the critical skills necessary to fulfil their responsibilities.

6.2   To ensure that personnel acquire the competencies (knowledge, skills and attitude) necessary to fulfil their job responsibilities, organisations should arrange for newly hired personnel to undergo a period of on-the-job (OJT) training following the completion of knowledge training. OJT provides newly hired personnel with the opportunity to apply their knowledge and demonstrate their skills in a controlled environment under the

guidance of a mentor or senior employee competent in performing the job function. Following OJT, organisations should assess that its personnel have acquired the competencies applicable to the job function prior to deploying the new staff at the workplace.

7   Typical dangerous goods knowledge training course contents of well-defined functions applicable to shippers and its agents and their recommended duration of training are as follows:

Functions: Personnel Responsible for Preparing Dangerous Goods Consignments & Personnel Responsible for Classifying Dangerous Goods for Transport

Recommended Duration of Training: Initial Training – 4 to 5 days Recurrent Training - 3 days			
Typical Course Contents by Tasks and Sub-tasks			
0	Understanding the basics of dangerous goods		
	0.1	Recognising the applicability of dangerous goods regulations	
		0.1.1	Understand the definition
		0.1.2	Recognise the legal framework (global, national)
		0.1.3	Identify the application scope
		0.1.4	Differentiate hazard and risk
	0.2	Understanding the general limitations	
		0.2.1	Develop a sense of forbidden dangerous goods
		0.2.2	Recognise potential hidden dangerous goods
		0.2.3	Familiarise with passenger provisions
	0.3	Identifying roles and responsibilities	
		0.3.1	Clarify the individual and collective role of the supply chain stakeholders
		0.3.3	Recognise the impact of State & operator variations
	0.4	Understanding the importance of classification and packaging	
		0.4.1	Identify the general information about classes, divisions
		0.4.2	Understand general principles of packing groups
		0.4.3	Consider multiple hazards
	0.5	Understanding hazard communication	
		0.5.1	Recognise the basic marking requirements
		0.5.2	Recognise the basic labelling and requirements
		0.5.3	Identify the required documentation
	0.6	Familiarising with basic emergency response	
		0.6.1	Create awareness about general emergency procedures
		0.6.2	Understand the employer's emergency response requirements
1	Classifying dangerous goods		
	1.1	Evaluate a substance or an article against the 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	Identify and follow the instructions provided by the packaging manufacturer when UN specification packaging is used
		2.2.3	Select appropriate packaging materials (absorbent, cushioning, etc.)
		2.2.4	Assemble package
	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	Assess use of overpack
		2.4.2	Apply marks if necessary
		2.4.3	Apply labels if necessary
	2.5	Prepare documentation	
		2.5.1	Complete the Shipper's Declaration
		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

Function: Personnel Responsible for Processing or Accepting Goods Presented as General Cargo

Recommended Duration of Training:			
Initial Training - 1 day			
Recurrent Training – 0.5 to 1 day			
Typical Course Contents by Tasks and Sub-tasks			
0	Understanding the basics of dangerous goods		
	0.1	Recognising the applicability of dangerous goods regulations	
		0.1.1	Understand the definition
		0.1.2	Recognise the legal framework (global, national)
		0.1.3	Identify the application scope
		0.1.4	Differentiate hazard and risk
	0.2	Understanding the general limitations	
		0.2.1	Develop a sense of forbidden dangerous goods
		0.2.2	Recognise potential hidden dangerous goods
		0.2.3	Familiarise with passenger provisions
	0.3	Identifying roles and responsibilities	
		0.3.1	Clarify the individual and collective role of the supply chain stakeholders
		0.3.3	Recognise the impact of State & operator variations
	0.4	Understanding the importance of classification and packaging	

		0.4.1	Identify the general information about classes, divisions
		0.4.2	Understand general principles of packing groups
		0.4.3	Consider multiple hazards
	0.5	Understanding hazard communication	
		0.5.1	Recognise the basic marking requirements
		0.5.2	Recognise the basic labelling and requirements
		0.5.3	Identify the required documentation
	0.6	Familiarising with basic emergency response	
		0.6.1	Create awareness about general emergency procedures
		0.6.2	Understand the employer's emergency response requirements
3	Processing/accepting cargo		
	3.4	Process/accept cargo other than dangerous goods	
		3.4.1	Check documentation for indications of hidden/undeclared dangerous goods
		3.4.2	Check packages for indications of hidden/undeclared dangerous goods
7	Collecting safety data		
	7.1	Report dangerous goods accidents	
	7.2	Report dangerous goods incidents	
	7.3	Report undeclared/mis-declared dangerous goods	
	7.4	Report dangerous goods occurrences	

Function: Personnel Responsible for Processing or Accepting Dangerous Goods Consignments

Recommended Duration of Training: Initial Training – 4 to 5 days Recurrent Training – 3 days			
Typical Course Contents by Tasks and Sub-tasks			
0	Understanding the basics of dangerous goods		
	0.1	Recognising the applicability of dangerous goods regulations	
		0.1.1	Understand the definition
		0.1.2	Recognise the legal framework (global, national)
		0.1.3	Identify the application scope
		0.1.4	Differentiate hazard and risk
	0.2	Understanding the general limitations	
		0.2.1	Develop a sense of forbidden dangerous goods
		0.2.2	Recognise potential hidden dangerous goods
		0.2.3	Familiarise with passenger provisions
	0.3	Identifying roles and responsibilities	
		0.3.1	Clarify the individual and collective role of the supply chain stakeholders
		0.3.3	Recognise the impact of State & operator variations
	0.4	Understanding the importance of classification and packaging	
		0.4.1	Identify the general information about classes, divisions
		0.4.2	Understand general principles of packing groups
		0.4.3	Consider multiple hazards
	0.5	Understanding hazard communication	
		0.5.1	Recognise the basic marking requirements
		0.5.2	Recognise the basic labelling and requirements
		0.5.3	Identify the required documentation
	0.6	Familiarising with basic emergency response	
		0.6.1	Create awareness about general emergency procedures

		0.6.2	Understand the employer's emergency response requirements
3	Processing/accepting cargo		
	3.1	Review documentation	
		3.1.1	Verify Shipper's Declaration
		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 State/operator variations
		3.2.2	Verify labels
		3.2.3	Verify packaging 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
7	Collecting safety data		
	7.1	Report dangerous goods accidents	
	7.2	Report dangerous goods incidents	
	7.3	Report undeclared/mis-declared dangerous goods	
	7.4	Report dangerous goods occurrences	

Function: Personnel Responsible for Handling Cargo in a Warehouse, Loading and Unloading Unit Load Devices

Recommended Duration of Training: Initial Training - 1 day Recurrent Training – 0.5 to 1 day			
Typical Course Contents by Tasks and Sub-tasks			
0	Understanding the basics of dangerous goods		
	0.1	Recognising the applicability of dangerous goods regulations	
		0.1.1	Understand the definition
		0.1.2	Recognise the legal framework (global, national)
		0.1.3	Identify the application scope
		0.1.4	Differentiate hazard and risk
	0.2	Understanding the general limitations	
		0.2.1	Develop a sense of forbidden dangerous goods
		0.2.2	Recognise potential hidden dangerous goods
		0.2.3	Familiarise with passenger provisions
	0.3	Identifying roles and responsibilities	
		0.3.1	Clarify the individual and collective role of the supply chain stakeholders
		0.3.3	Recognise the impact of State & operator variations
	0.4	Understanding the importance of classification and packaging	
		0.4.1	Identify the general information about classes, divisions
		0.4.2	Understand general principles of packing groups
		0.4.3	Consider multiple hazards
	0.5	Understanding hazard communication	
		0.5.1	Recognise the basic marking requirements
		0.5.2	Recognise the basic labelling and requirements
	0.6	Familiarising with basic emergency response	

		0.6.1	Create awareness about general emergency procedures
		0.6.2	Understand the employer's emergency response requirements
4	Managing cargo pre-loading		
	4.1	Plan the load	
		4.1.1	Determine stowage requirements
		4.1.2	Determine segregation, separation, cargo compartment limitations
	4.2	Prepare load for aircraft / ULD	
		4.2.1	Check packages for indications of hidden/undeclared dangerous goods
		4.2.2	Check for damage and/or leakage
		4.2.3	Apply stowage requirements (i.e. segregation, separation, orientation, securing and protecting from damage)
		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 hidden/undeclared dangerous goods
		6.1.3	Check for damage and/or leakage
		6.1.4	Apply stowage requirements (i.e. segregation, separation, orientation, securing and protecting from damage)
		6.1.5	Verify aircraft load against NOTOC
		6.1.6	Provide NOTOC information to pilot-in-command and flight operations officer/flight dispatcher
	6.3	Unload aircraft / ULD	
		6.3.1	Apply specific unloading considerations
		6.3.2	Check packages for indications of hidden/undeclared dangerous goods
		6.3.3	Check for damage and/or leakage
		6.3.4	Transport cargo/baggage to facility/terminal
7	Collecting safety data		
	7.1	Report dangerous goods accidents	
	7.2	Report dangerous goods incidents	
	7.3	Report undeclared/mis-declared dangerous goods	
	7.4	Report dangerous goods occurrences	