

2nd Edition

**LEARNER'S  
GUIDE**



**TECHNICAL COMPETENCY UNIT**



**ADM.TEC  
010.2**

Coordinate Supply Chain and Logistics  
Operations



**ASCEND**

ASEAN Standards and Certification  
for Experts in Disaster Management

## ASEAN Standards and Certification for Experts in Disaster Management

# COORDINATE SUPPLY CHAIN AND LOGISTICS OPERATION

ADM.TEC.010.2

## Learner's Guide



ONE **ASEAN**  
ONE **RESPONSE**

The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967. The Member States are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam. The ASEAN Secretariat is based in Jakarta, Indonesia.

The "ASEAN Standards and Certification for Experts in Disaster Management (ASCEND)" is under Priority Programme 5: Global Leadership of the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme 2021-2025 that envisions ASEAN as a global leader in disaster management.

The publication of this document is part of the "ASEAN Standards and Certification for Experts in Disaster Management (ASCEND) Toolboxes Development for Five (5) Professions" project.

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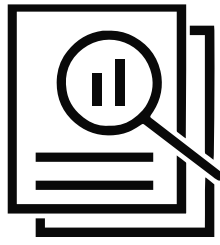
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ASCEND Programme and  
Toolbox:  
**Introduction**



**ASCEND**

## 1.1 The ASCEND Programme

Southeast Asian governments, through the ASEAN Committee on Disaster Management (ACDM), continue to invest in strengthening disaster management systems for a more secure and resilient region. However, the compounding risks and increasing uncertainty of disasters in our new climate reality threaten to set back the socioeconomic development gains of ASEAN societies. Widespread and recurring disaster damages and losses can overwhelm national capacities and worsen regional transboundary effects.

The Declaration on One ASEAN One Response (OAOR) at the 2016 ASEAN Summit in Vientiane, Lao PDR, reaffirms ASEAN's vision to move towards faster and more integrated collective responses to disasters inside and outside the region. However, ASEAN's past experiences responding to large-scale disasters showed that realising the OAOR can be challenging. Various responders from different countries, institutions, organisations, and companies seek to contribute to the overall response. Their goodwill is appreciated, and several provide much-needed assistance. However, ASEAN and affected Member States sometimes found it challenging to determine what knowledge and skills responders have and how they can effectively contribute to national and regional efforts.

Learnings from past experiences and shared commitment to realising the OAOR vision increased the need to develop regionally recognised Competency Standards and a certification process for disaster management professionals. The increased support led to initiatives that eventually created the ASEAN Standards and Certification for Experts in Disaster Management (ASCEND) Programme. ASCEND is now part of Priority 5: Global Leadership of the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme 2021-2025, a programme that envisions ASEAN as a global leader in disaster management.

## 1.2 The objectives of ASCEND

- To ensure disasters across the region are met with competent disaster management professionals in order to reduce the loss of life, respond effectively, recover more quickly, and decrease risks throughout the ASEAN region wherever possible. Note: In cases of extraordinary, diminished capacities, non-certified persons may be utilised at the discretion of the AMS in compliance with local governance/rules/laws.



- To establish a guide for the certification of disaster management professionals across the ASEAN Member States. The disaster management professionals will be certified in a competency-based assessment to perform tasks across all strategic components of AADMER, i.e. risk assessment and awareness, prevention and mitigation, preparedness and response, and recovery.
- To ensure disaster management professionals can work interchangeably and cooperatively both in their home country and in all AMS.

## 1.3

# Advantages and benefits of an ASCEND certification

### For ASEAN

The ASCEND certification enables ASEAN Member States to efficiently manage emergencies and disasters by fostering a regional network of competent professionals. It equips ASEAN countries to recognise the expertise of incoming assisting teams if needed. Simultaneously, it streamlines resource mobilisation for assisting countries while upholding the ASEAN Standards.

### For the AHA Centre

With ASEAN's rapid development and vulnerability to natural hazards, it requires a skilled workforce of disaster management professionals. The ASCEND certification can bridge the existing knowledge and skills gaps, promoting stronger cooperation and interoperability among disaster managers in the region.

### For disaster management professionals

The ASCEND certification serves as a valuable credential for disaster management professionals, providing evidence of their expertise and qualifications. It also helps organisations to determine the capabilities of certificate holders in performing critical job functions of specific occupations in the disaster management sector.



**1.4**

## The ASCEND Toolbox

A set of technical requirements must exist before it is possible to implement the ASCEND programme in participating ASEAN Member States. The first requirement is the ASCEND Competency Standards, containing forty-three (43) regionally recognised core and technical competencies in selected disaster management professions. The Competency Standards outline the work elements and performance criteria that guide the certification of disaster management professionals across the region.

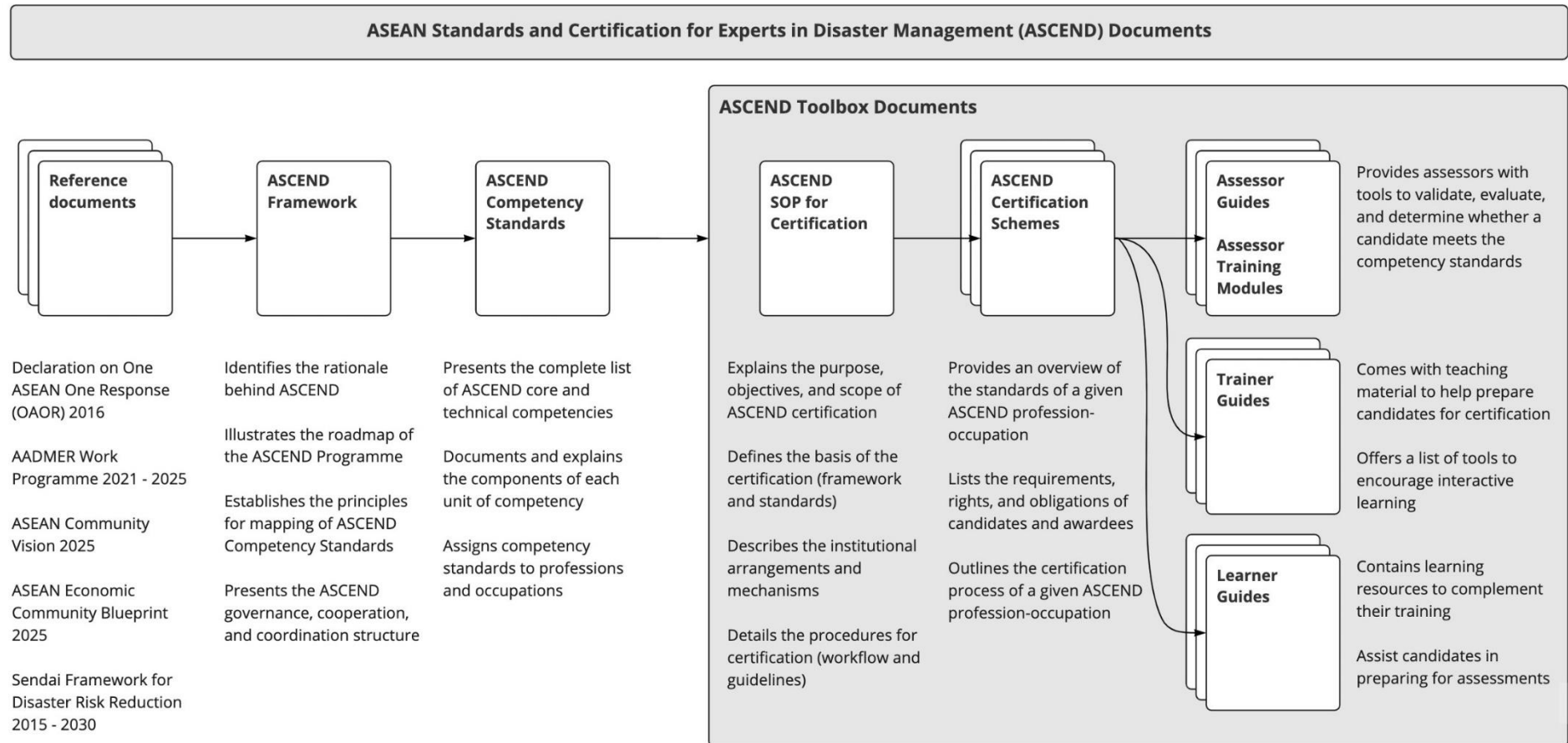
Another requirement is the development of an ASCEND Toolbox for five professions. These professions are Rapid Assessment, Humanitarian Logistics, Information Management, Water, Sanitation and Hygiene (WASH), and Shelter Management. The ASCEND Toolbox consists of an SOP, Certification Schemes, Assessor Guides, Trainer Guides, and Learner Guides. The ASCEND Competency Standards, approved by the ASEAN Committee on Disaster Management, are the primary basis of the Toolbox documents.

The SOP defines the basis of ASCEND, describes the institutional arrangements and mechanisms, and details the certification procedures. Certification Schemes present an overview of the standards of each profession-occupation and certification requirements, the rights and obligations of candidates and certificate holders, and general guidelines on the certification process. Assessor Guides provide assessors with tools to validate, evaluate, and determine whether a candidate meets the Competency Standards. Trainer Guides come with PowerPoint slides and presenter notes to help trainers prepare candidates for certification. It also offers a list of tools trainers may use to encourage interactive learning. Learner Guides assist candidates in preparing for ASCEND certification in their chosen disaster management profession and occupation. It contains learning resources and complementary readings to help prepare them to undergo the required assessment.

The ASCEND Toolbox documents can assist the ASEAN Member States to identify, build the capacity of, and mobilise competent disaster managers across Southeast Asia to help reduce disaster risks and disaster losses in the region through timely and effective response.



Figure 1: Overview of ASCEND Toolbox Documents





# The Learner Guide: Introduction for Candidates



**ASCEND**

Welcome, and thank you for your interest in pursuing an ASCEND certification. This Learner Guide is for you to read. It contains learning resources and helps you prepare for the required assessments: oral interviews, written tests, and observation checklists.

## Competency-based learning and assessment

**Competency** is the attitude and ability to use or apply one's experience, knowledge, and skill sets to perform critical job functions in a defined work setting.

*Table 1: Competency areas and descriptions*

Competency area	Description
<b>Experience</b>	Refers to the qualifications of the candidate that make them eligible to pursue certification. It includes the candidate's formal education, work experience, professional training, and job-relevant life experiences.
<b>Knowledge</b>	Refers to what the candidate needs to know to make informed decisions on how to perform the work effectively.
<b>Skills</b>	Refers to the ability of the candidate to apply knowledge to complete occupational tasks and produce work outcomes or results at the standard required.
<b>Attitudes</b>	Refers to associated beliefs, feelings, motivations, and values that influence a candidate to make decisions and act according to occupational standards and the professional work setting.

There is one Learner Guide for each unit of competency. The Competency Standards and Unit Descriptor section of this document outlines the content you will be studying – broken down into elements and performance criteria that will be covered during training and assessed using competency-based methods. This Guide contains a glossary of terms, a list of abbreviations,



readings and activities, a self-assessment checklist, and information about the oral interviews and written tests.

**Competency-based methods** help ensure that the ASCEND certification process is relevant, valid, acceptable, flexible, and traceable – in alignment with the ASEAN Guiding Principles.

The relevance principle confirms that the ASCEND certification reflects the current professional needs in the disaster management sector. The validity principle relates to the consistency and equitability of the assessment process. The acceptability principle is about aligning the ASCEND certification to other disaster management professional standards and good practices. The flexibility principle refers to the responsiveness of the ASCEND certification to changes or differences in disaster management work settings and job requirements. The traceability principle ensures that evidence is sufficient to grant the ASCEND certification.

**Competency-based assessment (CBA)** is the process of evaluating whether a professional is qualified and competent to perform in a particular occupation. CBA is used to determine if the candidate's experience, knowledge, skills, and attitudes meet the standards and performance criteria defined in a unit of competency.





# ASCEND Competency Standards and Unit Descriptor



**ASCEND**

**3.1**

## Competency standards

Competency standards are a set of industry-accepted benchmarks that define the experience, knowledge, skills, and attitudes professionals need to perform well in an occupation. It also reflects the requirements of work settings and considers the developments in the disaster management profession.

**3.2**

## ASCEND Competency Standards

The ASCEND Competency Standards identify the key features of work in selected disaster management professions and performance standards professionals need to meet to be deemed competent. It also provides the list of the forty-three (43) core and technical competencies that serve as the basis for defining the regionally recognised disaster management qualifications across the ASEAN Member States. The five (5) professions covered by the ASCEND Competency Standards include Rapid Assessment, Humanitarian Logistics, Information Management, WASH, and Shelter Management. Under these professions are five (5) categories of occupations: Manager, Coordinator, Officer, Promoter, and Engineer. Overall, there are fifteen (15) profession-occupation combinations (e.g., humanitarian logistics manager, information management coordinator, WASH promoter).

Each ASCEND Competency Standard has its dedicated Toolbox documents: an SOP, Certification Scheme, Assessor Guide, Trainer Guide, and Learner Guide. Only one SOP applies to all profession-occupation combinations covered by the ASCEND certification. The Certification Schemes, one for each of the profession-occupation combinations. Both these documents align with the AQRF Level Descriptors, Section 4: Guiding Principles and Protocols for Quality Assurance of the AGP, and ASEAN Disaster Management Occupations Map. The Certification Schemes also outline the ASCEND competencies under selected professions and occupations, eligibility criteria, basic requirements and rights of candidates, and obligations of certification holders. Assessor Guides describe the components of particular competency standards and offer tools to determine the candidate's qualifications. Trainer and Learner Guides expound on a given competency standard's elements and performance criteria for learning and assessment preparation purposes.

The ASCEND Toolbox documents can assist the ASEAN Member States to identify, build the capacity of, and mobilise competent disaster managers across Southeast Asia to help reduce disaster risks and disaster losses in the region through timely and effective response. The Toolbox documents may



also serve as a reference for ASEAN Member States' seeking to develop and implement national-level competency-based certification processes based on their respective capacities and needs. The ASCEND Competency Standards and its derivative Toolbox documents will be reviewed and updated every five (5) years to ensure they reflect changes in the disaster management profession and remain relevant. Table 2 describes its main components.

*Table 2: Components of the ASCEND Competency Standards*

Component	Description
<b>Unit title</b>	Describes the critical work function to be performed in an occupation
<b>Unit number</b>	<p>A coding system to organise the units of competency. It also indicates the types of competency standards.</p> <ul style="list-style-type: none"> <li>▪ ADM.<b>COR</b>.000.0 are core competencies. These are general professional knowledge and skills related to international humanitarian principles and disaster management standards, including ASEAN mechanisms and procedures.</li> <li>▪ ADM.<b>TEC</b>.000.0 are technical competencies. These are specific knowledge and skills needed to perform effectively in work areas under their chosen disaster management profession and occupation.</li> </ul>
<b>Unit description</b>	Provides information about the critical work function covered by the unit.
<b>Elements</b>	Presents the occupational tasks required to perform the critical work function in the unit.
<b>Performance criteria</b>	Lists the expected outcomes or results from the occupational tasks to perform and the standard required.



**3.3**

## Unit descriptor

**Unit title** : **Coordinate Supply Chain and Logistics Operations**

**Unit number** : **ADM.TEC.010.2**

**Unit description** : This unit deals with skills and knowledge required by a logistics coordinator to understand overall logistics operations, focusing on the knowledge about implementation of procurement, storage, transportation and site preparation to meet the distribution plan during the response operations.

### **Element 1.** **Implement transport plan**

#### **Performance Criteria**

- 1.1 Coordinate transportation operation
- 1.2 Assess fleet availability
- 1.3 Establish supply route

### **Element 2.** **Implement storage plan**

#### **Performance Criteria**

- 2.1 Assess storage locations
- 2.2 Establish storage requirement
- 2.3 Coordinate warehouse management operations

### **Element 3.** **Initiate and implement sourcing and procurement processes.**

#### **Performance Criteria**

- 3.1 Analyse requirements and prepare a sourcing plan
- 3.2 Initiate sourcing and procurement process



## 3.4

# Glossary of Terms and List of Abbreviations

Terms and abbreviations	Descriptions
<b>AADMER</b>	ASEAN Agreement on Disaster Management and Emergency Response
<b>ACDM</b>	ASEAN Committee on Disaster Management
<b>AGP</b>	ASEAN Guiding Principles
<b>AHA Centre</b>	ASEAN Coordinating Centre for Humanitarian Assistance on disaster management
<b>AMCs</b>	Annual Maintenance Contracts
<b>AMS</b>	ASEAN Member States
<b>AQRF</b>	ASEAN Qualifications Reference Framework
<b>ASCEND</b>	ASEAN Standards and Certification for Experts in Disaster Management
<b>ASEAN</b>	Association of Southeast Asian Nations
<b>CBA</b>	Competency-Based Assessment
<b>CBM</b>	Cubic Meter
<b>CBT</b>	Counter Balance Truck
<b>CCTV</b>	Closed-Circuit Television
<b>CMMS</b>	Computerised Maintenance Management System
<b>Demurrage</b>	A charge payable to the owner of a chartered ship in respect of failure to load or discharge the ship within the time agreed.
<b>EDP</b>	Electronic Data Processing
<b>GIO</b>	Goods Issue Orders
<b>GRN</b>	Goods Received Note



<b>ISO</b>	International Organization for Standardisation
<b>KNFA</b>	Korean National Fire Agency
<b>LCA</b>	Logistic Performance Index Logistics Capacity Assessment
<b>MRA</b>	Mutual Recognition Arrangement
<b>MT</b>	Metric Ton
<b>NGO</b>	Non-Governmental Organisations
<b>NM</b>	Nautical Miles
<b>OAOR</b>	One ASEAN One Response
<b>SF</b>	Stowage Factor
<b>SOP</b>	Standards Operating Procedures
<b>UHF</b>	Ultra High Frequency
<b>UN</b>	United Nations
<b>VHF</b>	Very High Frequency
<b>VSAT</b>	Vital Systems Assessment Test.
<b>WASH</b>	Water, Sanitation and Hygiene
<b>WBS</b>	Worldwide Baggage Services





# Unit Readings and Activities



ONE ASEAN  
ONE RESPONSE

## ASCEND

**4.1****Element 1. Implement transport plan****1.1 Coordinate transportation operation****A. Introduction**

Humanitarian agencies seek to maximise the impact of emergency response by meeting urgent needs and preventing further damage. Response or lead time reduction is an important consideration. Any reduction in the lead time can significantly positively impact the beneficiaries. Determining the quickest way, the right type of transportation to distribute aid, and managing vehicle routing is critical to any emergency response.

The primary challenge in vehicle routing is to find out the shortest time path between origin and destination. Unlike the usual vehicle routing problems, the emergency vehicle routing problem minimises the sum of arrival times instead of minimising the cost.

Network design includes defining the routes and allocating the available resources (primarily vehicles and tasks such as structure stabilisation and roadway repair). The network's performance is evaluated by network vulnerability and reliability analysis. Vulnerability analysis examines the connectivity between all origin-destination pairs following a disaster. Network reliability analysis evaluates the stability of a transportation network under different circumstances.

**B. Selecting external service providers**

Humanitarian response organisations have increasingly begun to rely on external transport providers. An external transport provider is defined as any third-party who can carry or identify vessels that can carry cargo through commercial means. In the event third-party transport providers are contracted, there has to be a structured approach to the selection process, similar to other forms of procurement, and subsequent monitoring and control of the provider or providers selected. There are a number of important issues to be considered to ensure that a reputable provider, who will provide an adequate level of service at an acceptable cost, is sourced. The criteria for selection will vary from organisation to organisation. Some factors that may influence the selection of transport service providers are:



- Carrier characteristics and capacity.
- Proven efficiency.
- Timeliness of delivery.
- Known integrity, reputation and reliability.
- Good relationships with other carriers.
- Financial viability to cover costs of providing the service.
- Ability to provide a multi-modal service, if need be.
- Presentation of timely reports and correct invoices.
- Licensed by the government to conduct customs clearance formalities and be up-to-date on changes in customs requirements.
- Own or have access to a bonded warehouse to protect and control shipments in transit.
- Own a trucking fleet for inland transport and have access to specialised vehicles when needed such as container trucks, low-bed trailers, tankers, etc.
- flexible in their availability at short notice, also outside of office hours and on public holidays.
- Have influence in the transport market, with port authorities, etc.
- Experienced in successfully handling duty exemption arrangements for humanitarian organisations.
- Have an office in the port area or nearby.
- Have at least a country-wide, preferably a multi-country regional network.
- Use technology effectively, including a good telecommunications system and, preferably, a computerised tracking system that allows visibility of where shipments are at a given time.

## C. Transport mode

### 1. Road transport

#### **Road transport options:**

- Vehicles: Cars, 4 Wheel Drives, Trucks (small/large), Trailers, Bicycles, Hand carts, etc.
- Animals: Camels, Donkeys, Mules, Yaks, Horses, etc
- People: Porters, Locals, etc.

#### **Road transport considerations:**

- Primary, secondary, village roads and tracks
- Security concerns and measures for particular routes or locations. Will the routes become impassable due to floods, snow, landmines or insecurity?



- The types and sizes of cargo trucks that can pass on each road type/route (noting seasonal variations)
- Bridges: types and capacities, weight limits
- Fuel
- Potentially dangerous overhangs like steep hills and tunnels
- River crossings or ferries with expected delays, tolls, etc.,
- Present and foreseeable bottlenecks and possibilities to overcome them to increase the efficiency of the operation

## 2. Rail transport

### **Rail transport considerations:**

- Condition of rail tracks
- Present level of cargo movement: any anticipated changes
- Major transit points: location, wagon capacity, sidings, storage capacity
- Reliability and security of cargo movements
- Type and number of usable cargo rail-wagons
- Type and number of usable locomotives
- Rate of through-put from points of origin to storage facilities
- Procedures at transit points
- Security concerns and measures for specific routes or locations
- Type and access to fuel
- Present and foreseeable bottlenecks

In many countries, existing transport services do not have a large spare capacity or may not serve the area where IDPs are located. Where a suitable rail network exists, this can be an effective way of moving supplies. However, many railway systems are either congested or short of rolling stock (the locomotives and carriages used by railways), resulting in long delays. In most cases, onward movement by road to the final destination will be necessary.

## 3. Water transport

As soon as the arrival of relief supplies by sea is known, arrangements should be made for clearance and priority cargo handling. In principle, relief supplies should be loaded only on vessels with the capacity for self-discharge directly onto trucks. Arrangements for the onward movement of the supplies and any necessary interim storage must also be made well in advance of the estimated time of the ship's arrival.



## Water transport considerations:

### Port

- Permissible vessel specifications for bulk and bagged cereal
- Cargo handling equipment – numbers and capacity of cranes and forklifts
- Discharge rates to warehouses, trucks, rail wagons, barges
- Location, number of quays
- Present level of functioning
- Superintendence, shipping and forwarding agencies present and their fee rates
- Current and foreseeable bottlenecks, possibilities to overcome them and increase efficiency
- Customs procedures, handling costs, taxes
- Security concerns

### River corridors

- Draught, speed of current, permissible vessel specifications and carrying capacity (with seasonal variations), tides
- Customs and other considerations where a river marks an international frontier
- Local norms/practices for contracting river transport
- Available boats, barges, tugs, canoes
- River width, length, hazards (rapids)

## 4. Air Transport

When there is no road infrastructure in place or the existing road infrastructure is severely damaged or destroyed by a disaster, humanitarian logistics operations may use air transport.

### Types of air transport often used in humanitarian operations:

- Aeroplanes
- Fixed-wing, Cargo planes, Water Planes
- Helicopters
- Airdrop, External Lift

### Air transport considerations:

- Runway length, width, surface, load classification and orientation
- Location and height of any obstructions along the runway or in approach/departure zones
- Present and potential weather constraints (e.g., fog, strong winds)



- Aircraft types that can operate
- Available navigation aids and support
- Availability of night lighting and the reliability of power supplies
- Operating hours: the level of sustainable activity, times when relief aircraft can be best accommodated
- Air operations that are present and occur regularly
- Customs procedures

### Range and payload capabilities of helicopters used in humanitarian logistics:

The table below gives an indication of the payload capability and range for a cross-section of helicopters:

TYPE OF HELICOPTER	MAX RANGE	PAYLOAD KG	PAYLOAD KG
	Nautical Miles (NM)	Max Range	For < 100 NM
Bell 206L-4	320	200	645
Ecureil 350 B2	350	N/A	900
Bell 212	200	N/A	2,000
Sikorsky S-76C	180	650	1,500
Super Puma L1	432	2,543	4,470
Super Puma L2	450	3,044	4,902
Super Frelon SA 321	450	3,800	5,200
Super Puma 332 C1	360	N/A	4,500
MI-8	270 / 518	N/A	3,000
MI-17	307	N/A	3,000 – 4,000
MI-26	432 / 1,036	N/A	20,000

### Range and payload capabilities of aircraft used in humanitarian logistics:

TYPE OF AIRCRAFT	MAX RANGE	MAX PAYLOAD	MAXIMUM CAPACITY
	(KM)	(Tons)	(M <sup>3</sup> )
Hercules C130	3,700	20.4	130
Antonov AN12	2,100	18.0	90
Antonov AN124	6,500	120.0	850
Ilyushin IL76	3,800	45.0	180
Boeing 707	4,700	42.0	210
De Haviland Buffalo	3,400	6.2	N/A
Twin Otter	1,700	2.3	N/A



## 5. Other modes of transport

- In some emergency operations and situations, the only possible means of transport is by an animal, for example, the final transportation to remote villages.
- Managing a caravan of animals is not easy; the best way to deal with this is to rent them from an owner. Therefore, the owner will be in charge of all logistical aspects of the “convoy”.
- Animals eat and drink. Ensuring that sufficient food and water are available en route is essential.

The goods being moved must be packaged in relation to the weight that a particular animal can carry. For information, the table below shows the animals used most frequently in such situations and their approximate work rates. These may vary locally because of climatic or other local conditions.

### Animal load capacity and daily work rate as a mode of transport:

ANIMAL	LOAD CAPACITY	MAX PAYLOAD
	(KG)	(HOURS)
Elephant	500 kg	5-8 hours
Donkey	50 kg (mountain work)	8 hours
Mule	50 kg (mountain work)	8 hours
Llama	50-80 kg	8-10 hours
Horse	60 kg	6 hours
Bull	150-250 kg	8-10 hours
Camel	150-250 kg	-
Yak	70 kg	-

## E. Planning and Scheduling Movement

Routine movements, taking place on a regular basis, need to be planned at the outset. Non-routine movements occurring on an ad-hoc basis will have to be planned when the need arises. Ideally, movements should be planned and managed by a transport office or dedicated focal point responsible for determining the appropriate routing for the goods, allocating resources (owned or contracted) and informing the destination of the estimated delivery time. During movement, designated focal points will track the progress of the goods and update delivery times accordingly. They will also manage the staff involved in the movement and deal with any issues that arise. They will also handle any problems that occur during the movement, liaising with contractors, freight forwarders and shippers as required. The transport office may have to produce the required



documentation to cover transit. Alternatively, they will be responsible for collecting the required documents together for dispatch.

In addition to identifying the primary methods of transport, emergency operation agencies should consider the smaller intermediary steps. As an example, even though an agency may be able to identify an international air transport method into a country, will there be available trucks to adequately pick up and transport cargo from the airport of reception? The same applies to multiple steps in the process, including the ability to identify adequate warehouse space, the ability to understand and comply with import regulations, and the general ability to accommodate all steps of the supply chain, not just the one step in question. Frequently, aid organisations operate in a “push” model early in a disaster, and persons associated with organising upstream transport do not necessarily take directions from or even communicate with the persons engaged in downstream planning. Proper planning throughout all stages is vital to a good transport strategy.

## 1.2 Assess fleet availability

### A. Introduction

Generating relief goods distribution and transportation plans is challenging, and several issues must be addressed. Some variables—such as supply, demand, number of vehicles, and capacities—vary in time due to changes in available information.

Commonly, the first relief goods transported to affected locations are from inventories of pre-packaged goods as part of disaster preparedness.

The availability of emergency resources, including vehicles and supplies, is always limited. As more information is shared, more relief goods may be donated and sent to affected countries, increasing the available supplies.

Some essential transportation resources such as airports, seaports, railways, and roads may be destroyed during the initial period. Any restoration attempts change the availability status of such vital nodes.



## B. Determining the type of transport needed

- The nature of the supplies to be transported.
- The weight and volume of the load.
- The destination: distance, form of access to the delivery point (by air, water, land), and the condition of the access routes.
- The urgency of the delivery.

The calculation procedure below shows a simple procedure for estimating the number of vehicles needed, whether trucks, boats, or planes, to transport a load with a known weight and deadline for delivery.

### Calculation procedure:

- How many tons must be moved? By when?
- How long will the vehicles take to take a load from the delivery point to the reception point and return? (Do not overestimate the speed and include loading and unloading.)
- What load capacity does the vehicle have?

**No. of possible trips per vehicle = Period / Duration of round trip**

**No. of loads = Total no. of tons / Vehicle capacity**

**No. of vehicles = No. of loads / No. of trips**

**Add 25% extra time for contingencies.**

The calculation procedure above is based on the weight of the load. However, one must also account for volume—the space occupied by the packages depending on their shape and size. Suppose vehicles of different load capacities are used in operation. In that case, estimates for each vehicle need to be recalculated. Similarly, if the supplies go to different destinations, each requires its own calculation.

In cases where complex goods are required, their volume and weight must be considered. It is better to consider the **STOWAGE FACTOR (SF)**. Stowage Factor (SF) is the volume occupied by one unit of mass (weight) when stowed in cargo space.

**Stowage factor (SF) = Volume (cbm) / Weight (mt)**



- SFs are approximate values, and the actual space taken up by a parcel of cargo will depend on the following: care taken in stowing it, the shape of the compartment, the type of dunnage used, the form of packing, the need for greater or lesser segregation from other cargo in the same compartment and even the season in which the cargo is loaded.
- SFs are therefore applicable at the planning stages before cargo is loaded. It can help determine how best to load the cargo on board the vessel or in a container to maximise the space used with maximum safety.
- If the stowage factor of the consignment is **lower** than the average stowage factor of the vehicles, the **weight will be the limiting factor**.
- If the stowage factor of the consignment is **higher** than the average stowage factor of the vehicles, the **volume will be the limiting factor**.
- **Broken stowage** is lost cargo space due to the contour of the hull of a vessel and/or the shape of the cargo. Dunnage, ladders, and stanchions are examples of **broken stowage**. **Broken stowage** is shown as a percentage figure, which estimates the space that will be lost.

**Example:** We will load a box with the following characteristics:

- Weight: 0.4 MT, Dimensions: 1.5m x 1.6m x 0.75m = Volume of 1.8 cubic meters (CBM). So, the stowage factor is  $1.8/0.4 = 4.5$ .
- On the other hand, a 25 MT truck with a capacity of 42 cubic meters will have a stowage factor of **1.68**.
- So, in this case, the **volume** will be the limiting factor.

## C. Commercial vs non-commercial transport

Non-commercial or free transport, sometimes offered by government agencies, military, other organisations, or volunteer groups, reduces the cost of the operation. In general, however, the owners of these transport services do not assume responsibility for the safety of the goods. It makes sense to use free transport because it reduces the operational cost. Sometimes, this is the only means available, but organisations should take special security measures to protect the load.

In conflict areas, humanitarian organisations may be unable to use military transportation resources without compromising their independence. The decision to accept the services of the armed forces is highly political. It will also depend on the donors funding the humanitarian organisation. Cooperation can lead to a closer association between humanitarian



organisations and the political and military objectives of armed forces and increase insecurity for humanitarian workers.

Some humanitarian organisations believe that armed forces should not be involved in the provision of humanitarian assistance. Others think that humanitarian organisations should accept military assistance if they are overwhelmed.

Likewise, sharing transportation resources with other humanitarian organisations may have substantial political implications, especially if humanitarian organisations providing transportation services do not strictly respect their neutrality towards all conflict parties. Cooperation with one party to the conflict may make it impossible to safely operate within the area under the control of an opposing party and, therefore, erode impartiality in the conflict.

Each type of commercial shipping service has a different calculation method, as listed below:

- **Airfreight, road transport and courier services.**  
Charged per kilo. However, if goods in relation to their weight occupy a lot of space, the charge will be over the volume weight. This is often the case for bicycles and furniture.
- **Airfreight and road transport.**  
The volume ratio is 1:6 or 1 metric ton 1000:6 = 166.66 kilos. This means that 167 kilos should not exceed the space of 1 cubic meter. If a consignment of bicycles and furniture weighs 167 kilos (1.73 cubic meters). Consequently, charge is over:  $1.73\text{M}^3 \times 166.66 = 288$  volume kilos. WBS will establish which of the two is the highest (actual or volume weight).
- **Courier services.**  
The volume ratio is 1:5 or 1 metric ton 1000:5 = 200 kilos. This means that 200 kilos should not exceed the space of 1 cubic meter. If a consignment has an actual weight of 200 kilos and takes space for 1.73 cubic meters, the charge is over:  $1.73\text{M}^3 \times 200 = 346$  kilos volume weight. WBS will establish which of the two is the highest (actual or volume weight).
- **Sea freight.**  
The volume ratio is 1:1. 1 metric ton equals 1000 kilos. The actual weight is also needed, but sea freight is always calculated over the volume. Here's a website that helps shippers to calculate freight density and ratio: <https://logistics.icalculator.info/density-calculator.html>



Different types of contracts have their own advantages and disadvantages. Therefore, it is essential to evaluate the special requirements of the shipment and carefully review what is included in the fare (e.g., loading and offloading, the driver's fees). When planning to hire a firm's transport services, it is helpful to consider the issues outlined in the table below.

TYPE OF CONTRACT	ADVANTAGES	DISADVANTAGE
<b>By the ton or ton/km</b>	Client pays for the transport of the goods regardless of the time the trip takes, or whether the truck is full or not. The cost of the service is clearly agreed upon from the start.	<ul style="list-style-type: none"> <li>● The carrier might include other clients' loads in shipment, which may compromise the safety of supplies.</li> <li>● The driver might use a less direct route to add kilometres to the bill.</li> </ul>
<b>Per vehicle per journey</b>	Client has exclusive use of the vehicle(s).	<ul style="list-style-type: none"> <li>● The carrier might not be interested in filling each vehicle to its maximum capacity, thereby multiplying the number of trips.</li> <li>● The size of the vehicle might not correspond to the size of the load.</li> </ul>
<b>Per vehicle per day</b>	Exclusive use of the vehicle. Usually, it is the best option for short trips.	<ul style="list-style-type: none"> <li>● The carrier might choose to "take it easy" on each trip.</li> <li>● If the truck needs repairs, the daily fee might still be applicable unless stipulated otherwise in the contract.</li> </ul>



## D. Ownership of transportation

Like commercial organisations, humanitarian organisations can use private contracts or common carriage to distribute humanitarian assistance goods within the supply network.

Humanitarian organisations may rely entirely on their own transportation resources, complement them with commercial resources or rely entirely on commercial transportation capacities. However, if the organisation chooses to use its own resources, proper strategic planning for transportation management must occur before humanitarian assistance programs commence.

In-house as well as outsourcing transportation both have advantages and disadvantages. Transportation assets such as vehicles, ships, and aircraft are expensive and require careful selection and obtaining funds for purchasing these assets. Operating vehicle fleets, especially aircraft, requires skilled and experienced staff such as fleet or air operations managers. Moreover, operating vehicle fleets depend on the capacity to provide fuel, maintenance, and repair services in the field.

Humanitarian organisations that manage transport operations also need to ask themselves whether logistics and supply network management is part of their core function. The increasing competition among humanitarian organisations and the pressures of donors require humanitarian organisations to concentrate available resources on their key activities and areas of expertise. Areas where humanitarian organisations do not have any comparative advantage over other organisations that can provide the same service should be outsourced.

Many commercial organisations have more experience and expertise in transportation management than humanitarian organisations. However, they generally lack the willingness, experience, and capacity to operate in disaster-affected or conflict areas.

Outsourcing transportation services gives humanitarian organisations access to sophisticated assets that donors may be unwilling to provide. It also allows them to focus on humanitarian work instead of spending lots of time and effort managing supply networks.



TRANSPORTATION	ADVANTAGE	DISADVANTAGE
<b>In-house transportation</b>	<ul style="list-style-type: none"> <li>● Independence from shortages of commercial transportation capacities.</li> <li>● Able to mitigate costs from (unreasonable) price increases.</li> <li>● Closer control over routing and scheduling.</li> <li>● Better control over transported consignments.</li> <li>● Higher acceptance by conflict parties.</li> <li>● Often easier to communicate.</li> </ul>	<ul style="list-style-type: none"> <li>● Large investment in purchasing assets.</li> <li>● Inflexibility for increasing or reducing transportation capacities.</li> <li>● Fixed costs independent of utilisation.</li> <li>● Inflexibility (assets may not be suitable for all operations).</li> <li>● High costs and delays for moving transportation means to other operations.</li> <li>● Requires skilled and experienced staff for maintaining and operating.</li> <li>● Cost inefficiency because of lack of backloads.</li> <li>● May not be a core competency.</li> </ul>
<b>Outsourcing transportation to commercial carriers</b>	<ul style="list-style-type: none"> <li>● Great flexibility in transportation capacities.</li> <li>● Flexibility in choice of types of means of transportation.</li> <li>● More experience.</li> <li>● Familiarity with national legislation and regulations.</li> <li>● Familiarity with the geography of the country.</li> </ul>	<ul style="list-style-type: none"> <li>● Possible unavailability of carriers.</li> <li>● Conflict parties may refuse entry into conflict areas.</li> <li>● Requires knowledge of the transportation market.</li> <li>● Poor control over consignments and risk of theft.</li> </ul>



	<ul style="list-style-type: none"> <li>● Familiarity with road and weather conditions.</li> <li>● Greater cost-efficiency (load consolidation).</li> <li>● No need for investment in assets.</li> <li>● No need to manage assets and staff.</li> <li>● Reduces the complexity of supply network management.</li> <li>● Knowledge of exact transportation costs.</li> <li>● Possibly offer tracking and tracing services.</li> <li>● Outsourcing of risks associated with damage and loss of transportation means.</li> <li>● Support the domestic economy.</li> </ul>	<ul style="list-style-type: none"> <li>● Carrier may refuse transportation to and in unsafe areas.</li> <li>● Lack of commitment to a specific customer.</li> <li>● Dependency on unreliable services.</li> <li>● Transportation delays by load consolidation from different customers.</li> <li>● May have limited choice of transportation means and unit loads.</li> <li>● Lack of knowledge of handling specific humanitarian goods (medicines, VSAT, etc.)</li> <li>● Complete interruption of humanitarian assistance in case the carrier suspends services.</li> <li>● Dependence on overall requirements for transportation capacities.</li> <li>● May have lower safety standards and higher risks.</li> <li>● Risk of sharing transportation resources with other (unknown) customers.</li> <li>● Lack of influence on the neutrality of the carrier.</li> </ul>
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## E. Summary

- The selection of the means of transportation to be used based on current availability, especially during the emergency response period, requires precise calculations and quick decision-making.
- The selection of the means of transportation to be used based on current availability, especially during the emergency response period, requires precise calculations and quick decision-making.
- In the early phase of emergency response and conflict zones, humanitarian organisations may be faced with the only shipping option via non-commercial transport provided by the military or other actors. Before making a decision, it is worth considering the advantages and disadvantages, especially the impact on the reputation of the availing humanitarian organisation.
- Choosing between in-house transport or commercial transporters depends on the humanitarian organisation's core function, capacity, budget, and needs.

## 1.3 Establish supply route

### A. Introduction

Humanitarian logistics planning involves identifying the optimal distribution routes so that aid and relief reach affected communities as quickly as possible to minimise suffering. It is essential to consider the different modes of transport and supply routes when designing preparedness plans. Efficient planning should achieve a robust yet flexible relief distribution mechanism suited to operating in disaster-affected areas.

### B. Selecting the route

Selecting the route to be taken depends on the kind of transport available, the urgency of the delivery, and the delivery schedule (i.e., making partial deliveries at intermediate points). The following are factors to consider when selecting the route:

- The safest route must be chosen as a general principle even if it is not the fastest or shortest one.
- When deciding on the route, it is important to identify key services along the way, such as places where one may obtain fuel, food, mechanical repairs, or medical care.



- It is essential to identify potentially insecure conditions, such as roads in bad condition, landslide-prone areas, or sectors where armed elements are known to operate.
- Any change or deviation from the agreed-upon route and any other special situation that may arise during the trip must be communicated immediately to the nearest base, whether it is the point of departure, the delivery point, or a base in between.

## C. Decision-making basis

The route taken for distributing goods and travelling with the team will likely be different from one operation to another. It all depends on the needs, budget, security factors, availability of resources and supporting infrastructure.

An assessment (e.g., LCA conducted in the preparedness phase or a rapid assessment immediately after a disaster) can provide essential information. The points from the logistics assessment that form part of the analysis of determining distribution and travel routes are:

### 1. Context

- Countries and areas where humanitarian assistance is necessary.
- Geography, topography, and climate.
- Nature of the conflict and emergency.
- Locations where immediate needs are expected to be the greatest.
- Location of border crossings, seaports and aerodromes.

### 2. Security

- Risk of criminality (theft, robbery, murder, etc.).
- Risk of armed banditry (kidnapping, high jacking, etc.).
- Risk of lawlessness (riots, looting, etc.).
- Conflict-related risks (shooting, explosive devices, mines, artillery, aerial bombing, etc.).
- Presence and availability of a police force.
- The general discipline of the combatants.
- Military operations in the area.
- The attitude of parties in conflict towards humanitarian organisations and their programs.
- Vicinity of offices, warehouses, and workshops to military installations.



- Transportation infrastructure security (roads, seaports, aerodromes, railheads, etc.).
- The security risk of driving at night.
- Military use of transportation infrastructure (roads, aerodromes, seaports, etc.).
- Natural hazards (floods, tornados, earthquakes, landslides, avalanches, etc.).
- Dangers from industrial installations (dams, power plants, nuclear plants, etc.).

### **3. Communications systems**

- Availability, capacity, reliability, and coverage of public mail services.
- Availability, capacity, reliability, and coverage of private mail services (courier services).
- Availability, reliability, and cost of mobile telephone networks.
- Availability, reliability, and cost of satellite telephony.
- Availability, reliability frequencies, and coverage of VHF and UHF networks.
- Availability, reliability frequencies, and coverage of HF networks.
- Availability and quality of maintenance and repair services for communications equipment.
- Regulatory licensing authorities for radio equipment.
- Available radio frequencies.
- Communication infrastructure of civilian authorities.

### **4. Utilities**

- Availability, reliability, and cost of fuel (gasoline, diesel).
- Distribution system for fuel.
- Source of fuel and dependency on importation

### **5. Distribution management**

- Location of stores, distance from beneficiaries and system of distribution.
- Main routes and distribution network (location of suppliers, warehouses, and beneficiaries).
- Number of beneficiaries serviced.
- Delivery frequency.

### **6. Transportation**

- For all modes of transportation, the infrastructure (roads, bridges, seaports, aerodromes) and the means of transportation (vehicles, vessels, aircraft) need to be considered.



- Availability, services, and costs of freight forwarding agents.
- Possibility and infrastructure for intermodal transportation.

### **Road transport**

#### Infrastructure:

- Geography of road network (map) and passable roads.
- Location, capacity, storage facilities, and handling equipment at transfer points (Seaports, inland ports, railheads, airports).
- Possibility and capacity of intermodal transportation (loading and unloading of ISO shipping containers).
- Quality of roads and usability in different seasons (rain, snow, etc.).
- Roads being passable for cars, four-wheel drive vehicles, small and heavy trucks.
- Restrictions on weight, axle load, length, or height of vehicles (especially at bridges and in tunnels).
- Impassable routes (e.g., due to floods, construction work) and any damages.
- Availability of bypasses for damaged road sections and weight limitations.
- Type of roads (tracks, paved roads, highways, etc.) and maximum load.
- Maximum average speed for travelling with vehicles.
- Location of bridges.
- Quality and reliability of bridges.
- Load capacity of bridges.
- Location of tunnels.
- Maximum width and height of vehicles allowed in tunnels.
- Breakdown services for vehicles.
- Availability and quality of workshops (for repair and maintenance).
- Availability of lubricants and replacement parts.
- Traffic control and emergency services.
- Type, availability, and price of fuel.
- Geography of fuel distribution network.

#### Means of transportation:

- Availability, number, type, capacity, and maximum payload of commercial vehicles.
- Cost for renting, leasing, and buying vehicles.
- Insurance of cargo for commercial transport.



- Transportation capacity of government authorities, military, and other humanitarian organisations.
- Availability and cost of drivers.
- Freight rates per ton/km.

### **Rail transport**

#### Infrastructure:

- Geography of single- and double-track railway network and location of stations.
- Conditions of the tracks.
- Location and condition of bridges.
- Damaged and blocked rail sections.
- Power source (electricity, diesel, coal) of locomotives.
- Availability of cargo handling equipment.
- Capacity for transporting and handling containers.

#### Means of transportation:

- Type and condition of railway carriages.
- Capacity of the railway network.
- Reliability of railway services.
- Freight cost per ton/km.
- Timetables and transport times.

### **Sea transportation**

#### Infrastructure:

- Location of seaports.
- Depth of approach channels.
- Availability of tugboats.
- Size, accessibility, and capacity of seaports.
- Availability, number and sizes of berths, piers, and wharves, as well as turning basins.
- Landing fees, cargo handling and other charges.
- Possibility of night operations.
- Capacity of equipment (e.g., cranes) for the handling of cargo.
- Possibility and capacity for container handling.
- Availability, services, and cost of brokers.
- Availability, type, capacity, and cost of storage facilities.
- Availability, cost, and capacity of local labour.
- Working hours of the port.
- Type, availability, and cost of fuel.
- Accessibility of seaports and connection with road and railway networks.



Means of transportation:

- Availability, type, capacity, and cost of ships.
- Freight costs for sea transport.

### **Inland sea transportation**

Infrastructure:

- Geography of canals, rivers, and lakes.
- Restrictions posed by bridges and locks.
- Availability, capacity, and cost of locks.

Means of transportation:

- Availability, type, capacity, and cost of vessels.
- Availability, type, capacity, and cost of barges.

### **Air transportation**

Infrastructure:

- Location (coordinates), elevation and name of airstrips, aerodromes and heliports or helicopter landing sites.
- Responsible authorities and contact person.
- Direction, type (grass, dirt, paved, asphalt concrete), length and width, and the condition of runways.
- Maximum load (size of aircraft) which can use the runway.
- Availability and condition of runways and approach lighting.
- Seasonality of accessibility (rainy season, wintertime, fog, etc.).
- Possibility of night operations, available facilities, and conditions.
- Availability of parking areas for (cargo) aircraft.
- Availability and condition of taxiways, parking areas as well cargo handling areas.
- Availability of storage facilities (if not at the airfield, distance from the airport).
- Availability of lighting of cargo handling areas for night operations.
- Availability and capacity of cargo handling equipment and operators.
- Facilities for (mandatory) aircrew rest.
- Availability and services of the terminal building.
- Availability, type, quantity, and condition of cargo handling equipment (forklift trucks, scissor lifts, cargo dollies, trucks, etc.).
- Availability of operators and fuel for cargo handling equipment.
- Availability, quantity, and quality of firefighting equipment.
- Landing fees.
- Hours of operation.



- Availability of navigational aids for guiding aircraft.
- Availability of meteorological monitoring equipment (temperature, wind direction, wind speed, clouds, etc.).
- Availability, reliability, and type of communication facilities.
- Possibility of communication from the ground with an aircraft in flight.
- Availability, quality and cost of aviation fuel quantities and quality.
- Availability of start-up equipment, including operators and fuel.
- Availability of maintenance operations (facilities, staff, hours).
- Distance and connection to major road networks and railheads.

#### Means of transportation:

- Availability of local air carriers and their rates (fixed and rotary-wing aircraft).
- Availability of aircraft, their capacity and operating range.
- Name and services of owners and agents.
- Availability of local aircraft, pilots, and maintenance staff.
- Local regulations for pilots (maximum flight hours, rest periods, etc.).

#### Civil aviation:

- Authorities in charge of the airspace.
- Possibility of obtaining overflight and landing clearances.
- Availability of air traffic control services.
- Permission for civilian and military aircraft to land.
- Working hours of aerodrome staff and the possibility of operating 24 hours.
- Landing fees and block charges.
- Availability of custom clearance.

## F. Summary

- The route taken for distributing goods and travelling with the team will likely be different from one operation to another. It all depends on the needs, budget, security factors, availability of resources and supporting infrastructure.
- An assessment (e.g., LCA conducted in the preparedness phase or a rapid assessment immediately after a disaster) can provide essential information.
- Combined modes of transport (such as sea–road, air–rail, and air–road) may improve the performance of humanitarian relief distribution systems. Multi-modal transportation can be a solution when resources are scarce in the immediate aftermath.



**4.2****Element 2. Implement storage plan****2.1 Assess storage locations****A. Introduction**

Relief goods are stored until they can be distributed or used. The storage process aims to protect relief goods until they can be handed over to beneficiaries. An organised system must be in place to keep track of the type and quantity of supplies and their location in the warehouse, including reserve stockpiles for future needs.

Organising a warehouse to function correctly means complying with current standards for protecting the quality and security of the products shipped. Some warehouses are specially designed to facilitate storage, having the necessary space and characteristics for the safe loading, offloading, and handling of the merchandise. However, in most emergencies, one has to settle for available spaces—often schools, community centres, gyms, and the like, that are not designed for storage.

**B. Types of warehouses****Based on purpose:**

- Central warehouse (country operations central storage).
- Transit warehouse (short-term storage between the origin of goods and their final destination). A “transit warehouse” can be part of a central warehouse. In such a case, space for transit stock should be marked.
- Field site/office warehouse (field site storage).
- Distribution point storage (storage of commodities for distribution and remaining stock managed by program staff).
- Bonded warehouses (for storage of duty/tax-free goods, not formally imported – pre-positioned stocks for global or regional responses, transit stocks for another country, or stocks that require a long time to get duty-free import permits).

**Based on the managing party:**

- Organisation warehouse (managed by internal organisation staff)
- 3rd party commercial warehouse (managed by a commercial company)
- 3rd party non-commercial warehouse (managed by the Logistics Cluster, UN Agency, Government entity, or another NGO).



## C. Main criteria for an ideal warehouse

Below are the main criteria which must be considered when selecting an area for an aid warehouse:

- **Secure area:** the selected area must be safe from all kinds of threats such as natural hazards or security disturbances
- **Contamination-free soil:** the land allocated for the food aid warehouse must be free from all kinds of contamination and toxic substances. For example, the area allocated should never be used by a cement factory.
- **Open ground:** it must be an open ground area and must not be around a busy community area
- **Clean surroundings:** it must be clean from trash, bushes, pollution, and contamination
- **Solid structure and firm floor:** a solid structure building for warehouse
- **Ventilated and dry:** the warehouse must have adequate ventilation and no leaks when it rains
- **Protection against extreme weather:** the warehouse must have good ventilation for dry seasons and should provide adequate equipment such as tarpaulins and pallets.
- **Protection against animals and insects:** the warehouse must be free from infestation from common pests such as rodents, weevils, and other pests usually found in and around food aid warehouses.
- **Accessible to trucks:** the warehouse must be in an open area or in an industrial area with good road access for heavy vehicles to come into and exit the warehouse compound. Also, there should be enough space to manoeuvre in the warehouse compound.
- **Access for loading and unloading:** the warehouse must provide the facilities for loading and offloading activities (Loading and offloading docks must be available). It is also advisable that the warehouse gate be at least 6 (six) meters wide.
- **Storage capacity:** the warehouse must have an elevation of between 1 and 1.5 meters from the ground. A high and continuous flow of incoming commodities into the warehouse is likely to occur during the peak operation period. It should also have an adequate storage capacity to accommodate the incoming commodities. Warehouse managers and storekeepers must calculate the warehouse's storage capacity and inform senior management about the available storage capacity.
- **Sanitary facilities:** facilities such as toilets are considered very IMPORTANT for warehouse activities for hygiene purposes. Adequate and clean warehouse toilets for staff, warehouse labourers, and



transporters/truckers must always be available within the warehouse compound.

- **Electricity:** provision of adequate lighting is essential for warehouse security. It facilitates the operation of electricity-powered equipment such as computers and storage and handling equipment if available.
- **Secure from theft:** the warehouse must be secure from theft with sufficient security guards, adequate lighting, and a strong perimeter fence/wall.

It is challenging to find an ideal warehouse that matches all of the points above, especially during the emergency phase. Sometimes we have to weigh which points are more critical and sacrifice one criterion to get the other.

## D. Storage facility selection during emergencies

When selecting storage facilities, the most important factor is that they must be large enough to accommodate required stocks and ancillary facilities. The possibility of adding extensions inside or outside the facility must also be considered during the planning stage.

The layout of the storage facility can significantly influence how flexible a given space is. A storage facility with many small rooms has the least flexibility. Buildings and storerooms with widely spaced columns and wide-span structures are more expensive to build. However, they are much more flexible when the layout of storage facilities needs to change.

High storerooms allow for increasing storage capacity by increasing the height of storage equipment later (although this may be expensive). But this may require more energy for heating and cooling. For any given surface area, buildings with a square footprint have the least wall surface and therefore minimise costs for heating and cooling. Moreover, square buildings minimise overall travelling distances. Ideally, the length of the building should not exceed twice its width.

Storage facilities must be structurally sound to provide the required protection of relief goods and have sound foundations and walls. Avoid timber structures because they are less durable, prone to damage by termites, and pose an increased fire risk.

Tents or prefabricated structures can be set up quickly, especially during emergencies. But they should only be used temporarily and in modest



climates. They are challenging to heat or cool and offer no protection against intrusion.

ISO shipping containers are unsuitable for storing healthcare goods and should be used only as a last resort. The narrow aisle limits stock access and prevents efficient use of available space. Items are usually scattered around. ISO shipping containers also offer poor insulation and quickly heat up in the sun.

One-storey buildings are preferred as construction costs are lower and easier to maintain. The capacity to carry weights is lower for upper floors than for the ground floor. Materials handling is also easier and cheaper for unloading and loading where no powered vertical handling (lifting) is required. To minimise costs for heating, cooling and ventilation, the internal height of storerooms should not be higher than necessary for accommodating the storage equipment.

Suppose only buildings with more than one storey are available. In that case, the ground floor should accommodate stocks. Upper storeys of a building can be used for offices, utilities and building services.

## **E. Ownership of storage facilities**

The strategic decision-making process of commercial organisations on whether to outsource or not the building and operation of storage facilities also apply to humanitarian organisations.

Outsourcing storage to commercial operators offers the advantage of not having to invest in building facilities, not having to carry significant risks of damage or destruction, and having the flexibility of changing locations if needed at a lower cost. However, humanitarian organisations have little control over stocks at a high risk of theft or confiscation.

Outsourcing also makes humanitarian organisations dependent on commercial organisations, jeopardising the reliability and consistency of supplying humanitarian assistance programmes. Handing over stocks to third parties in a country where security is weak may result in further losses. Using the same storage facility by other customers implicated in the conflict may also pose security risks. Furthermore, warehouses owned and operated by commercial companies are unlikely to be available in less developed countries with poor infrastructure, especially in a conflict zone.



In some cases, humanitarian organisations may be able to use the storage facilities of (government) authorities or other humanitarian organisations.

Alternatively, humanitarian organisations can operate private warehouses. Since building facilities require time, possible options for lease or purchase facilities during emergencies. Ownership requires significant investment that donors are often reluctant to fund. It also reduces the flexibility of relocating facilities. Purchasing storage facilities may be an option for setting up international or regional distribution centres in relatively safer and stable countries.

The most practical alternative is for humanitarian organisations to lease (rent) existing facilities, including the storage and materials handling equipment and operate them with their staff. This option usually does not require large investments. If facilities are available immediately, the risk of damage and destruction of storage facilities remains with the owner, but humanitarian organisations maintain control over staff and stocks.

Leasing storage facilities can maintain the flexibility of relocating facilities if the security conditions deteriorate or because the locations of humanitarian assistance programmes change. Another option is to maximise facilities on site. For instance, the storage of healthcare goods directly at the assisted healthcare facility avoids establishing and maintaining separate storage.

The disadvantage of leasing storage facilities is that capacities may remain unused without reducing fixed costs if storage reduces. A warehouse lease agreement with the owner is needed to avoid disputes. This formal contract must be drafted by a professional lawyer with a good knowledge of the laws and legal system in the country.

## F. Summary

- Organising a warehouse to function correctly means complying with current standards for protecting the quality and security of the products shipped.
- Some warehouses are specially designed to facilitate storage, having the necessary space and characteristics for the safe loading, offloading, and handling of the merchandise.
- However, in most emergencies, one has to settle for available spaces—often schools, community centres, gyms, and the like, that are not designed for storage.



## 2.2 Establish storage requirement

### A. Introduction

After choosing the right location and infrastructure for a warehouse, the next step is to operate the warehouse optimally. The warehouse needs to have proper staffing and suitable equipment to function well.

### B. Staffing

The staff positions listed below are either directly or indirectly responsible for running operations in the warehouse:

#### **Stock Owner**

A stock owner is an organisational staff member assigned by senior management who is responsible for authorising stock releases per activity, project, or location.

This responsibility may be assigned to:

- Project Manager/Budget Holder for overall project commodities
- Field Office Manager/Coordinator and Technical staff
- Other appointed staff for a specific activity level or geographic location

#### **The stock owner is responsible for:**

- Ensuring that the assigned stock levels and decision-making about stock dispatches/transfers and replenishment are in line with project objectives and the agreed distribution plan/utilisation plan.
- Authorising stock releases through Goods Issue Orders (GIO).
- Authorising write-offs for stocks due to loss, damage, or shelf-life expiration.
- Ensure that all stocks are dispatched for distribution during the project life cycle or are retained/disposed of/transferred according to the agreed and approved disposition plan.
- Any stock transferred under their management.
- Perform periodic spot checks of stored goods count, impact on quality, and general storage conditions, or delegate staff to do the spot checks.
- Participating in a complete physical inventory or delegating staff for this purpose.
- Review any Loss and Damage Reports for stock under their management, and ensure any item write-off is properly approved and documented.
- Be part of or delegate staff to perform quality control.



### **Supervisor of Warehouse Manager (Operation / Logistics Manager)**

Responsible for ensuring:

- Policies and procedures related to commodity management are in place in all warehouses, and the staff is trained and adheres to procedures.
- Warehouses meet in-country legal requirements.
- Spare keys for every warehouse in the country are kept safe for emergency access if the Warehouse Manager is absent, and enforce one key holder policy.
- Warehouse teams are adequately resourced, trained, supported, and managed.
- Sufficient resources are budgeted to enable warehouse operations.
- All warehouse managers are reporting on stock status accurately and timely.
- The pipeline of incoming commodities and current stock levels in the warehouse are aligned to avoid warehouse overflow (a contingency plan for additional temporary storage space may be needed).
- Warehouses are regularly inspected through spot check counts, commodity visual inspection, and storage conditions checks.
- Proper planning for annual physical stock counts with Warehouse Managers and Stock Owners with minimum disruption to ongoing projects.
- Improvements in storage facilities, warehouse management processes or staff performance are addressed.
- Documentation is available, organised, reconciled, and archived upon project closure.
- Low levels of damaged/spoiled/expired items through timely disposition/destruction.
- Other activities related to warehouse management as indicated in this Guide

### **Warehouse Manager**

Every warehouse must have a dedicated Warehouse Manager who is responsible for:

- Implementation of warehouse procedures in all warehouse operations.
- All commodities are stored in their respective storage/warehouse and accountable for keeping the correct quantity and preserving the condition of items during storage.
- All staff, volunteers, and casual labourers work in the warehouse, including visitors.
- Safeguarding the warehouse key and restricting access to warehouses. A spare key is kept in the office safe in a sealed envelope in case of emergency.



- Ensuring the warehouse is kept secure at all times and adequately locked when leaving the premises.
- Appropriate storage conditions for all commodities, including temperature and humidity control and isolation of dangerous goods and goods that no longer fit the end-user (i.e. damaged/expired goods).
- Monitoring stored item's shelf life, reporting stock level per item.
- Alerting Stock Owners of short shelf-life items through timely sharing of Stock Reports.
- Maintain accurate and up-to-date stock records by item and project for all commodity transactions and share stock report updates regularly and on demand.
- Ensuring the safety and security of staff in warehouse, warehouse operations, facilities, and commodities.
- Availability and maintenance of appropriate handling equipment, packing materials, cleaning materials, and protective equipment and supplies.
- Conducting capacity building and training for warehouse staff to perform their duties safely and in line with warehouse procedures.
- Ensuring warehouse is well-maintained, cleaned, disinfected, dry, well-organised and pest/rodent free.
- Stacking and organising stocks properly and optimising warehouse indoor/outdoor space use.
- Pack shipments with appropriate padding to reduce the risk of damage during transportation.
- Receive good's physical count (preparation of GRN) and coordinate Quantity Control processes
- Conduct Quality Control in the absence of technical staff.
- Report any losses or damages of commodities, process stock adjustments, and alert stock owners of discrepancies.
- Release of goods in line with approved Goods Issue Orders (GIOs).
- Liaise with Logistics to arrange goods in line with authorised stock releases and prepare appropriate documentation to escort shipment (Waybill, etc.).
- Oversaw the loading of commodities and documented cargo handover to the transporter/recipient.
- Stocks checks and control counts, verifying any impact on items quality/end-use suitability.
- Management of warehouse staff.
- Other activities related to warehouse management are indicated in this guide.



### Warehouse Staff

Assist Warehouse Manager in warehouse-related duties:

- Implement warehouse policies and procedures.
- Accountable for proper handling of commodities during warehouse operations.
- Responsible for own safety during warehouse operations.

The following duties cannot be performed by warehouse staff:

- Authorising stock release (it is Stock Owner responsibility)
- Independent physical count or warehouse inspection (warehouse staff can only assist this process performed by a party external to warehouse operations)
- Stock disposition decision (Stock Owner and Senior Management responsibility)
- Transfer of stock from one project to another without authorisation from the Stock Owner
- Staff involved in procuring items (received in a warehouse) cannot issue GRN (perform count, quality control) or be responsible for the custody of such items.

## C. Equipment and material required in the warehouse

Some essential equipment and materials are required to ensure that the warehouse functions correctly. It is essential to understand that the selection of any warehouse equipment must balance the operational efficiency and the cost to obtain the equipment. At the same time, there is a need to meet the overall requirements of the operation within constraints imposed by warehouse size, warehouse layout, product, and processes. The following are some examples:

Item No	Description: Storage and Handling	Remarks
1	Platform scale (500kg non-digital)	Recommended for transshipment point
2	Platform scale (300kg non-digital)	Recommended for EDP, quality control
3	Scale (25-50kg)	Recommended for reconditioning/repacking
4	Forklift or CBT (Counter Balance Truck)	Electric/diesel 2.5 to 3 MT
5	Hand forklift	1 to 2 MT
6	Wheelbarrows	
7	Hand Trolley	



8	Pallets	Standard size 0,9 x1,2 m or 1,23m x 1,23 m
9	Plastics sheeting	
10	Storage cabinets with locks	Security of valuable equipment and chemicals
11	Tarpaulins	To collect spillage and for reconditioning
12	Ladders	Industrial type, metal, avoid locally made wooden ones
14	Storage tents	
15	Bolt cutters	To remove customs seals from containers
<b>Item No</b>	<b>Description: Reconditioning Equipment and Supplies</b>	<b>Remarks</b>
1	Empty plastics bags	Different sizes for sugars, etc.
2	Empty jute bags	Different sizes
3	Hand-held stitching machine	Electric with spare part and thread
4	Needles and thread	
5	Buckets	
6	Brooms	
7	Shovel	
8	Funnels	
9	Liquid containers (Jerry cans)	Plastic
10	Sieves/screens	
11	Scoops	
12	Rubber gloves	
13	Scale	Platforms for 300 kg
14	Tarpaulins	For work area to collect spillage
<b>Item No</b>	<b>Description: Cleaning Equipment</b>	<b>Remarks</b>
1	Brooms	
2	Brushes	
3	Shovel/ dustpan	Square
4	Waste disposal/Garbage bags	
5	Work gloves	
6	Dusk mask	Disposable
7	Soap and detergent	
8	Dust cloth	
9	Drip pans	
<b>Item No</b>	<b>Description: Maintenance Tools</b>	<b>Remarks</b>
1	Toolbox	Hammer, screwdrivers, pliers, etc.
2	Measuring tapes	Different length
3	Electric drill	
4	Saw	
5	Safety goggles	
6	Work Gloves	Cotton



Item No	Description: Exterior Cleaning Equipment	Remarks
1	Lawn mowers	Gasoline
2	Power grass cutters	
3	Manual cutters	
4	Safety goggles	
5	Work gloves	
6	Wheelbarrow	
7	Rakes	
8	Shovel	
9	Pick	
10	Machetes	
11	Axes	
Item No	Description: Quality Control Equipment and Supplies	Remarks
1	Sampling spears	
2	Moisture meters	
3	Sampling bags	
4	Liquid containers	
5	Thermometer	
Item No	Description: Pest Control Equipment and Supplies	Remarks
1	Fumigation tarpaulins	
2	Sand snakes	Made locally (e.g., from old tarpaulins)
3	Spraying machines	
4	Respirators/Face masks	
5	Spraying chemicals and	
6	other fumigations chemicals	
7	Protective clothing and other	
8	Fumigation equipment	
Item No	Description: Safety Equipment and Supplies	Remarks
1	First aid kits	
2	Stretcher	
3	Safety harnesses	
Item No	Description: Safety/Firefighting Equipment	Remarks
1	Generators	As main/back up supply
2	Spotlights	
3	Fencing	
4	Door Locks/Padlocks	
5	Security Alarms	
6	Flashlight/Torches	With Battery
7	VHF radios w/Battery	Battery charges
8	Fire extinguishers	
9	Smoke Detectors	
10	Water supply	



Item No	Description: Other Equipment and supplies	Remarks
1	Water Tanks-Drinking water	For drinking and nondrinking supplies
2	Toilets	
3	Fuel tanks	Standby Fuel supply in Drum
4	Heaters	For cold weather conditions to keep liquid commodities from freezing

## D. Summary

Ensuring that the chosen warehouse with the right infrastructure and location can operate optimally is important. The warehouse needs to have proper staffing and suitable equipment to function well to achieve this.

## 2.3 Coordinate warehouse management operations

### A. Introduction

A warehouse needs to have a sound management system and ensure that all activities in the warehouse support the organisation's objectives. This often requires implementing structured and standardised rules.

Good warehouse and storage management practices provide the conditions for running efficient warehouse operations. The security and safety of staff, facilities, assets, and goods must be maintained. Storage facilities have to be kept clean, and stock records must be accurate.

Objectives of warehouse and store management:

- Security of stores and warehouses as well as stored goods.
- Safety of staff and prevention of accidents.
- Availability of qualified staff and maintaining adequate staffing levels.
- Cleanliness of stores and warehouses.
- Keeping good order of stock.
- Protection of goods from vermin and pests.
- Maintenance of building, facilities, storage, and materials handling equipment.
- Accurate record-keeping.
- Preventing theft of goods.



- Preventing deterioration of goods caused by inappropriate storage conditions.
- Preventing expiry of goods in stock.

This section focuses on system security and maintenance management. Other topics are covered in other Learner Guides.

## B. Safety and security management

**Safety:** Health/safety of personnel and visitors, protection against accidents

**Security:** Physical security of warehouse and its contents, protection against thefts

### 1. Safety

Safety is often not taken as seriously as it should be until an accident occurs. National regulations on safety may not exist or may not be enforced. Nevertheless, it is the responsibility of warehouse managers to prevent injuries to staff as far as possible. In many countries where humanitarian organisations work, staff are not covered by health insurance. Apart from the injury and possible disabilities, injuries, which lead to the loss of capacity to work, can lead to the loss of livelihood for the staff member and their family.

#### Staff safety

Possible safety risks for warehouse staff:

- Handling of goods
  - Injuries from lifting or carrying (too) heavy loads.
  - Injuries from falling, tripping and slipping while carrying loads.
  - Injuries from falling from ladders, steps and storage equipment.
  - Injuries by falling objects (goods, storage equipment, etc.).
  - Crush injuries (especially the hands and feet) from pallets or goods.
  - Injuries from splinters or protruding nails on timber pallets.
- Materials handling equipment
  - Injuries from vehicles (e.g., getting hit by a reversing forklift)
  - Injuries from operating materials handling equipment (forklift trucks, etc.).
- Dangerous goods
  - Exposure to dangerous goods.
  - Explosion of gases or fires of flammable liquids.
- Electrical faults



- Injuries by faulty electrical appliances (lighting, heating, cooling equipment, etc.).

Injuries can be prevented through various measures as listed below. Safety measures should be considered as early as during the building or setting up of storage facilities.

Measures to prevent occupational injury:

- Staff
  - Provide proper shoes and gloves.
  - Train staff not to lift loads heavier than 25 kg manually.
  - Provide appropriate and sufficient materials handling equipment for handling heavy loads.
  - Provide suitable ladders and steps for reaching goods off the floor.
  - Immediately remove spilt liquids (water, oil, fuel, etc.) to prevent slipping.
  - Issue safety guidelines and sanctions for non-compliance.
- Equipment
  - Fit floors with non-slip surfaces.
  - Carefully maintain storage equipment (especially pallets).
  - Regularly inspect materials handling equipment for any faults.
  - Maintain materials handling equipment.
  - Train staff in the proper use of materials handling equipment.
  - Create dedicated areas for materials handling equipment and pedestrians.
- Dangerous goods
  - Ensure proper storage of dangerous goods.
  - Handle dangerous goods according to the manufacturer's instructions.
  - Train staff on measures in case of mishandling of dangerous goods.
- Electrical installations
  - Ensure installation by qualified electricians.
  - Maintain electrical equipment.

A complete and regularly stocked first aid kit must be available and placed in a visible and easily accessible. Emergency washing facilities may be needed to handle dangerous goods.



### Fire safety

Warehouses can be prone to fire hazards, especially if many items they store are flammable, such as cardboard packaging and pallets made of wood.

Possible causes of fires in storage facilities:

- Cigarette fire.
- Use of open fire (heating, cooking, welding equipment, etc.).
- Electric faults (lights, electric heaters, cooling equipment, voltage stabilisers).
- Overheating of electrical equipment.
- Lightning.
- Dangerous goods (flammable and explosive goods).

Measures must be taken to prevent fires from breaking out. The priority is to ensure the early detection of fires and the staff safely escapes before fighting fires and preventing their spread. Taking out insurance will limit the financial damage. The warehouse manager should be responsible for fire safety, and his duties should be laid down in their job description. All staff members, as well as security guards, should be aware of the measures.

Measures to prevent fires and limit damages:

- Preventing fires from spreading
  - Strictly prohibit smoking anywhere in medical storage facilities.
  - Dedicate smoking areas outside the warehouse.
  - Prohibit littering and keep stores clean.
  - Remove any rubbish from medical storage facilities (at least daily).
  - Separate storage of packaging material.
  - Ensure proper installation of electrical wiring and electrical equipment.
  - Carefully maintain electrical equipment.
  - Ensure proper installation and regular maintenance of heaters.
  - Proper installation and handling of kerosene and gas refrigerators.
  - Store highly flammable goods separately in metal closets and outside the main building.
  - Keep all doors inside medical storage facilities closed.
- Detection of fires
  - Install smoke detectors in all storerooms.
  - Installation of fire alarm system.



- Ensure that security guards carry out regular rounds at night and on weekends.
- Measures for fighting fires
  - Mark escape routes.
  - Provide instructions on how to behave in case of fire and contact the fire brigade.
  - Provide appropriate and sufficient firefighting equipment.
  - Provide equipment for fighting electric fires.
  - Regularly inspect firefighting equipment.
  - Train staff in the proper use of firefighting equipment.
  - Regularly perform fire drills.

In large stores, wall hydrants with hoses and nozzles must be installed and powered by a reliable water supply or dedicated water tanks. Carbon dioxide or powder fire extinguishers for electrical fires are often positioned near refrigeration equipment.

Extensive facilities require automatic sprinkler systems. These sprinkler systems must be carefully planned and installed by specialised technicians. The goal is to ensure that it can efficiently fight fires and does not cause unnecessary damage to the stock. A good water source must be available, or there may be a need to install a dedicated water tank.

### **Safety from electrical hazards**

Faulty electrical wiring, installations or equipment can cause electrocution and fire. There are measures to prevent or at least reduce safety risks, as seen below:

- Switch off any equipment when not in use.
- Cut the power supply to the store during the night and at weekends (provided no refrigerators, fire or burglar alarms are connected).
- Never attach cables directly to electrical sockets. Use only correctly fitting plugs.
- Inspect equipment and plugs before using electrical equipment.
- Do not connect too many appliances to one electrical socket.
- Do not use broken electrical equipment (especially broken plugs).
- Switch off electrical equipment when overheating is noticed.
- Keep electrical sockets and appliances dry.
- Prevent spraying of water on electrical installations, especially during cleaning.
- Never handle electrical equipment or appliances with wet hands or gloves.
- Never touch light switches with wet hands.



- Do not install electric appliances near water sources (sinks, taps, etc.).
- Use extension cords of sufficient dimensions to prevent overheating.
- Check extension cords before use and repair immediately if damaged.
- Arrange extension cords in ways that they will not get damaged by pallets, tools, forklift trucks or vehicles.
- Ensure that only professional electricians carry out any electrical installations or equipment work.
- Outdoor lighting must be purpose-built equipment and protect electric circuits from water (rain, snow, dew).
- Use adequate tools and materials for repairs.
- Never bridge fuses in electrical equipment.
- Regularly check and service fuses.
- Regularly inspect all electric appliances.
- Remove old and unused electrical installations and equipment.
- Repair any broken casings of electrical equipment immediately.
- Repair any loose contacts immediately.
- When inspecting or repairing, switch off and disconnect any electrical equipment from the power source.
- Switch off (or remove) fuses before any work on electrical installations.

Fuses are essential safety devices that cut off power when equipment is in danger of overheating or electric circuits are overloaded by connecting too many appliances. Fuses also switch off the power supply in short circuits and help prevent fires.

## 2. Security

The challenge is how to balance security and visibility (the organisation's presence and its work). Attempts should be made not to attract unnecessary attention. Avoid placing large signboards if the risk of theft is high.

The logistics team should coordinate with the security team to determine the optimal arrangements to ensure that the staff, premises, and commodities are safe.

Applying physical security measures (e.g., fence/wall, bars on windows, secured doors/locks), technology (e.g., CCTV camera, centralised alarms), and dedicated security staff can help lower theft risk.



### Measures to prevent theft:

- Limit and control access
  - Control of all visitors and staff at the main gate.
  - Control of access to the warehouse (especially through loading bays).
  - Control of access to stores.
  - No visit from friends and family members.
- Control on exit
  - Records of any goods which leave the warehouse as well as the compound.
  - Parking of all visitor vehicles outside the compound.
- Physical barriers
  - Keep all storerooms locked when no staff is present.
  - Keep keys locked in a key box.
  - Lock controlled and valuable healthcare goods in cupboards.
  - Maintain door locks as well as bars on windows and other openings.
  - Attach seals to locks when the warehouse is closed.
  - Purchase goods in tamper-evident packaging.
  - Seal parcels.
- Detecting theft
  - Regular independent physical stock counts.
  - Follow up on any irregularities between physical stocks and stock records.
- Other measures
  - Clearly define who has the authority to release stock.
  - Keep store tidy and in good order.
  - Pay staff decent salaries that are enough to live on.
  - Destroy expired or damaged goods.

## C. Warehouse Maintenance

All productive, well-run warehouses have one thing in common: regularly maintained. Like a clean household, every warehouse needs some sort of regular schedule to keep everything on track. This means routine inspections, regular cleanings, safety checks, and much more for warehouses.

### 1. Preventive maintenance

You can prevent most workplace hazards by putting the following measures into practice:



- **Recruitment and training**
  - Ensure that you hire workers who understand the warehousing system basics and are certified when operating equipment such as forklifts or cranes.
  - Conduct safety drills, such as fire and evacuation drills, regularly. It will prepare your warehouse personnel to remain calm during real emergencies and respond automatically to resolve such situations.
  - Promote awareness of safety practices followed by pioneers in your industry to keep your warehouse personnel well-informed.
- **Safety equipment and precautions**
  - Ensure safety equipment, such as helmets, industrial boots, etc., are used at all times.
  - Ensure that the necessary hazard mitigation equipment, such as sprinkler systems, fire extinguishers, etc., is installed in your warehouses in the right places. Having such systems in place will give your team the necessary buffer to identify, control, and prevent any compromising incidents from occurring.
  - Clearly label hazardous zones highlight exits and assembly points. Have the warehouse layout diagrams posted on all floors and levels.
  - Ensure all warehousing floors are free of slip and trip hazards. Fix pits and cracks as soon as possible. All employees' collective responsibility is to keep the floor free of stray cords, liquids, and any other potentially hazardous items.
- **Hygiene and pest control**
  - With large doors and several windows, your warehouse can become an easy target for pests like birds, rodents, and insects constantly searching for food and shelter. If left unchecked, they can infest your workplace, destroy your stored goods, and hamper daily activity. You can prevent such instances with some preparation:
    - Draft a pest control plan.
    - Carry out routine site inspections.
    - Set up a cleaning routine, pick a section, temporarily move the goods, and clean your storage areas and bins.
    - Periodic rearrangement of goods can also make it difficult for pests to settle in.
    - Hire a pest control professional if you need more protection.



## 2. Planned maintenance

Periodic maintenance can minimise equipment downtime and reduce maintenance costs. Below are some basic maintenance guidelines for keeping warehouses running at total capacity:

- **Have a maintenance plan**
  - Certain parts of warehouse equipment (e.g., forklift, mechanical seals, wear rings) have an operational lifespan. Anything beyond that operational lifespan must be replaced or renewed to keep the equipment functioning properly. The more machinery you have, the more management is needed to keep them in good condition. It is vital to create a maintenance plan to regularly monitor and service your equipment. When drafting a maintenance plan, you must make sure of two things:
    - The equipment downtimes during service should not affect regular operation.
    - If you have multiple units of critical equipment, scheduling all of them for maintenance at the same time will heavily disrupt your workflow. It can even bring your regular activities to a complete halt. Instead, make sure to assign service routine times to each piece of equipment so they do not overlap.
- **Stay vigilant**
  - Carry out inspections and manage checklists to document the condition of your equipment. For complex and expensive equipment, it is often better to employ/hire technicians or have AMCs (Annual Maintenance Contracts) with equipment service providers.
  - A CMMS software (Computerized Maintenance Management System) can be handy for large warehouses with lots of equipment. They can store information on a company's maintenance procedures, indicate the status of their machinery, track the availability of spare parts, and generate reports.

## D. Summary

- A warehouse needs to have a sound management system and ensure that all activities in the warehouse support the organisation's objectives. This often requires implementing structured and standardised rules.
- Good warehouse and storage management practices provide the conditions for running efficient warehouse operations. Storage facilities have to be kept clean, and stock records must be accurate. The security and safety of staff, facilities, assets, and goods are also maintained.



- The warehouse's safety and security measures can enhance productivity, reduce accidents, increase donor trust, and reduce operational costs.
- Carrying out regular inspections and maintenance helps determine the condition of buildings, particularly their electrical installations, locks, roof, and structural integrity. Conduct the necessary repairs or replacements as soon as possible to prevent damages or losses from getting worse.

## 4.3

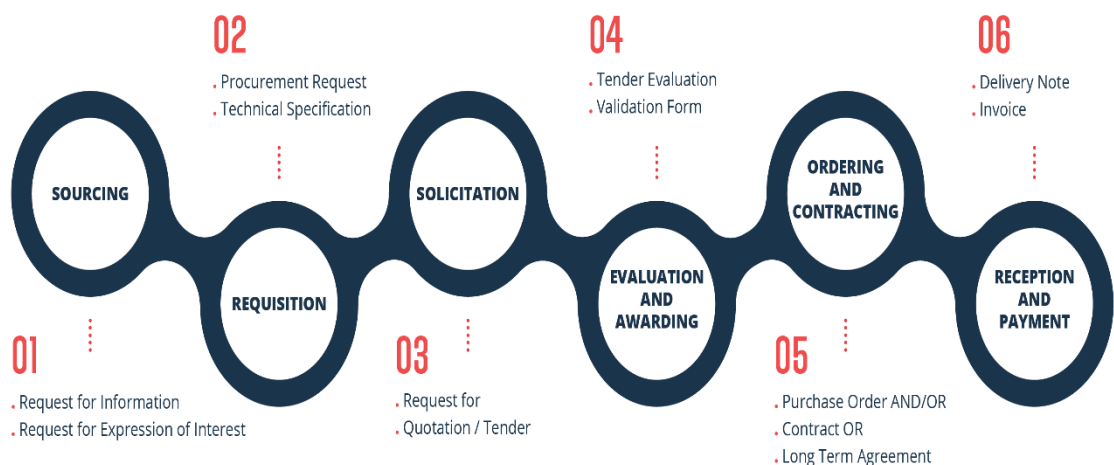
# Element 3. Initiate and implement sourcing and procurement process

## 3.1 Analyse requirements and prepare a sourcing plan

Logistic Cluster communities have established good practices in the procurement process that consists of six basic steps:

1. Sourcing and Identifying Vendors
2. Product/Service Requisition
3. Solicitation
4. Evaluating and Awarding
5. Ordering and Contracting
6. Reception and Payment

The figure below is a good illustration of Logistic Cluster's Procurement Process:



## A. Sourcing and Identifying Vendors

Market research is used to identify suppliers, assist in the development of Technical Specifications, TORs and SOWs, ascertain freely available pricing information (e.g., company catalogues) and obtain information on available technology (WFP Goods and Services Procurement Manual, 2020).

In order to support the process of procurement, it is convenient to have a supplier database from which quotes are requested. If no such database exists, it is advisable to create one. A supplier database needs to be updated routinely, and agencies may look to platforms or sources of information such as:

- Specialized journals
- Chambers of Commerce
- Business meetings and seminars
- Professional associations
- External supplier rosters
- Online communities
- Yellow pages
- Search engine research
- Others

Agencies may wish to follow a formal process when identifying suppliers. Many agencies issue official documents, including:

- Request for Information (RFI)
- Request for Expression of Interest (EOI)

These formal requests should be based on templates that will allow users to build a more accurate view of the product or service and their availability in the context of operation.

## B. Product and Service Requisition

Any purchase requisition should cover the technical specifications; as described below.

### 1. Physical goods

- a. Photographs
- b. Material components



- c. Performance needs (e.g. storage space of a computer, volume of a bucket)
- d. Quality standards (e.g. ISO)

## 2. Construction

- a. Blueprints
- b. Maps
- c. Bill of materials/material construction components

Product requisition functions as the official form that is mandatory to be filled out for a purchase. The PR is where the different members involved in the procurement process combine and validate the details, turning requests into actual procurement:

- The requesting unit undertakes that all information included in the PR is accurate and sufficient. Attaching detailed specifications if necessary.
- The procuring unit undertakes to provide the requested goods or services as established in the PR, with respect to quality, price, and lead time.
- The financial unit undertakes to release the available funds.

One of the best ways to ensure that each request is well presented, understood and agreed upon among all the units involved in the process is to create a coordination space to do it. The usual coordination tool is the implementation of a recurrent meeting between requesters, heads of unit, and the procurement team where the requests can be discussed and validated.

## C. Product and Service Requisition, and Material Specifications

When soliciting material goods, it's advisable to include as much technical information as possible about the material specifications, laid out in a clear and transparent format that is easy to understand but difficult to misinterpret. Furthermore, the material specifications should be included in solicitations, contracts with suppliers, and instructions to third-party inspection companies. Material specifications might include:

- Unit measurements (weight, volume).
- Packaging measurements (weight, volume).
- Colouring/Visual appearance.
- Chemical composition.
- Conformity to specific ISO standards.



- Strength/durability.
- Packaging and handling specifications.
- Branding and marking specifications.

In addition, the example for material specifications can be found in the [ICRC/IFRC Catalog](#) as can be seen as follows:

Samples for testing purposes	<p>Samples of blankets must be from compressed bales.</p> <p>All criteria are to be passed on the same sample.</p> <p>(Samples of compressed bales are to be prepared with only five blankets folded once more than in normal bales, at a 60% compression ratio, and to remain compressed for one week minimum before testing).</p>
Colours	Other than black, red, or white, dark uniform colour.
Size	150 x 200cm +3%/-1%. To be taken on the flat stabilised sample, without folds.
Weights	500g/m <sup>2</sup> minimum maximum 1000g/m <sup>2</sup> weight determined by total weight/total surface.

## 3.2 Initiate sourcing and procurement process

### A. Initiating communication with the procurement team

After the identification of potential procurement sources, formal communication should be initiated to the organisation's procurement team. The communication, or procurement request, usually consists of:

- The requesting unit
- The requirements, including the criteria for evaluation



- The quantity
- The estimated cost or the maximum authorised amount to be spent (if possible)
- The delivery date and location
- Confirmation that funds are available

## B. Preparing solicitation document

Once the potential suppliers have been selected (or before launching an open bidding process), solicitation documents must be carefully prepared.

Solicitation documents shall describe the needs of the procurement team to the providers of the procurement sources. Procurement teams will only choose from the options offered by the providers, but what is offered largely depends on how and what the providers have been asked to offer. Specifications of required products or services must be clear, and the terms of the requested bid must be well defined.

Supplier selection criteria must be established and communicated clearly and in advance to suppliers, ensuring equal treatment. It is important to take time to establish and/or understand the selection criteria since the supplier selection criteria cannot be modified or changed, once communicated to the suppliers.

The documents involved in the solicitation process can be different depending on the type of competition that applies and the nature and complexity of the goods and services being procured. It is important that all documentation contains details on procedural, technical, financial and contractual components, which suppliers must follow when submitting their offers. These documents are based on templates, customised to fit the specificity of the procedure undertaken and completed with the details applicable to each solicitation. Following is the generic format of the solicitation documents:

<b>Content</b>	<b>Description documents</b>
What is required	<ul style="list-style-type: none"> <li>• Depending on the nature:               <ul style="list-style-type: none"> <li>○ For goods; Technical specifications or statement of work (SOW) (Functional,</li> </ul> </li> </ul>



	<p>conformance and performance Specifications for products).</p> <ul style="list-style-type: none"> <li>○ For services; Terms of Reference (TOR) (background, objectives, deliverables, standards to be met, performance evaluation method, timelines, etc.).</li> <li>○ For construction works or services; Statement of works (SOW) shall provide all information required to allow the contractor to undertake the works (e.g., location, time schedules for the execution of the works, relevant information about the construction site and other technical requirements that are deemed necessary).</li> <li>○ Quantities</li> </ul> <ul style="list-style-type: none"> <li>● Expected Delivery Conditions; times, locations, Incoterms</li> </ul>
Instruction to suppliers	<ul style="list-style-type: none"> <li>● Instructions for preparation and submission, submission language.</li> <li>● Timing: deadline for submission, offer validity and expected award times.</li> <li>● Details of pre-bid where applicable. (meetings/site visits, and/or samples/demonstrations).</li> <li>● Provision of prototype samples of products was required.</li> <li>● Method of evaluation and evaluation criteria, including permitting third-party inspection companies where required.</li> <li>● Payment terms.</li> <li>● Contact information.</li> </ul>
The applicable Terms and Conditions	<ul style="list-style-type: none"> <li>● Ethical policies to be adhered to by the supplier.</li> <li>● Special conditions applicable as; Termination; Trade Terms; Inspection; Warranties; Rights and Obligations; Remedies; Subcontracting; etc.</li> </ul>



## C. Evaluating and awarding the offers

Evaluation and awarding is a process of analysing incoming offers in a fair and transparent manner. The offers should be evaluated using the criteria and specifications of previously communicated PRs/bid solicitations, or any other part of the process prior to receiving bids. Common offer evaluation criteria might include:

- Competitive prices.
- Ability to meet specifications and standards.
- Product availability and ability to meet the requested delivery date.
- Product and service quality.
- Performance and durability of products.
- Reliable delivery methods.
- Quality control methods and practices.
- Technical and leadership skills.
- Ability to provide niche or unique products and / or to design concepts.
- Financial stability and credit.
- Payment conditions/requirements.
- Compatibility with existing products.
- Distribution/storage facilities and adequate resources.
- Availability of spare parts.
- Guarantee, insurance, and supply commitment.
- Proven ability and experience.
- Availability of service support resources.
- Previous experience and demonstrated performance in supplying the products/services to be purchased (to be verified in previous certificates of compliance. So, “bad past experiences” must be documented).
- Security.

Moreover, the evaluation criteria should be objective, unambiguous, reliable, fair, and balanced. To be able to present the evaluation results, it is common practice to make a summary document, either in the form of a comparative table or a full report, that has to be signed by all the members of the evaluation panel. Any summary document must have a reasoned recommendation on the supplier selection and contain as many explanations as necessary about this selection.



Once the proposal to award a supplier has been validated, the selection of the suggested supplier should be validated by the agency's requisite internal approval process. The award decision should be communicated to the winning supplier, and unsuccessful suppliers shall be notified, establishing a mechanism to debrief them and take note of any possible complaints.

## D. Ordering and Contracting

Each order has to be formalised through a contract, Purchase Order(PO), or other official award document.

- Pre-orders (POs) are a financial commitment that confirms the purchase details (Units, quantity, price, delivery time Location, etc.), formalising the order. The PO is used for simpler orders, one-off purchases and smaller amounts, where there is no need to define any complex situation and/or where the purchase represents low risks for the organisation.
- Contracts are legally binding agreements between the organisation and the suppliers. They define the Terms and Conditions for the goods and services provided, as well as the signatories related rights and obligations. Contracts are used when there is a need to specify the conditions in a complex order (partial deliveries, different timings or locations, special conditions of the product, high financial volume or potential risk for the organisation, etc) and always for a work or a specialised service.

There are a variety of formats and types of contracts used for different types of services and goods, and different delivery schedules. A list of some of the more common types might include:

- **Cost-plus contract**  
A buyer agrees to reimburse a seller for expenses it incurs when completing work. This contract type is common where expenses relating to the completed work can vary.
- **Cost-reimbursement contract**  
When the buyer and seller agree to a total amount, usually paid at the completion of a project or at another specified date, the seller typically provides an estimation of total costs, which is what is communicated to the buyer in the form of a budget. In the event the seller reaches the total cost before completion they may seek



approval from the buyer to continue with the project or cease work. Additional costs, or materials or activities outside of budget would require a contract modification to continue. This type of contract might be necessary when cost flexibility is a requirement for a project, or if the scope of work is difficult to determine or if the project itself is at high risk. This type of contract is common for a sub-contracted service, such as a fully managed warehouse.

- **Fixed-price contract**

An agreement between the buyer and seller to pay a specific amount of money for determined goods or services. The cost of the goods or services remains the same, regardless of how long it takes to complete or provide them. This type of contract is typical for securing air or sea shipments.

- **Time and materials contract**

An agreement is one whereby a buyer agrees to pay a seller for the time the seller spends on the project and the expenses the seller incurs throughout the project. This type of contract is common for construction projects.

- **Unit price contract**

An agreement between a seller and buyer to pay for a project by units of the job, such as specific duties or a specific product. If the seller is providing a service, the seller breaks the project up into units before beginning to work on it. Unit price contracts can establish a baseline for a product or service, but not define the number of units, or even necessarily the time frame over which the units will be purchased. This type of contract is common for buying stand-alone units of a specific product, such as a physical good or a single commonly obtained service.

- **Aleatory contract**

An agreement between parties to perform a service or provide a product if a certain event occurs. The parties only have the obligation to fulfil the action if the pre-determined event happens. This type of contract is common for insurance policies.

Some agencies may prefer the use of some form of a Long-Term Agreement (LTA), where a supplier is pre-vetted using a standard solicitation process but has an open-ended contract for the delivery of goods and services. Requesting agencies holding LTAs with



vendors can use simple notifications for procurement needs, such as a PO, specifying units, quantities, delivery details, and other important information. The theory behind an LTA is that a single supplier used for routine procurement can be completed and vetted once in a pre-set period of time instead of having to bid every time.

The act of signing the PO - and the organisation's Terms and Conditions - by the supplier makes the PO become a simplified contract. An organisation should establish a threshold beyond which the relationship can no longer be formalised through a PO, and a contract becomes necessary. Irrespective of the procurement method, each organisation's Terms and Conditions (TC) must be applied, and it is advisable to attach TCs to all contracts and POs.

## **E. Reception and payment**

The order documents (PO or contract) must clearly indicate the delivery conditions. Delivery conditions detail who will assume responsibility for moving goods, when and where the responsibility for the products is transferred, and all the necessary details to plan transport and logistics.

The transfer of responsibility between the seller/carrier and the agency is an important moment in the procurement process. The transfer of responsibility can be done at the manufacturer/seller premises or be undertaken fully by the supplier, who will be responsible for transporting the cargo to the agreed destination. An agreed destination can be either an agency's premises, warehouse, or, in special cases, directly to the beneficiaries. The most standard method of defining the method and location of the transfer of responsibilities is through defining Incoterms in the procurement contract. Incoterms are only applicable for international procurement; however, the transfer of responsibility in domestic procurement may need to be spelled out explicitly. In every case, the transfer of responsibility has to be clearly recorded through the standard set of shipping documents.

For simpler deliveries, or when the supplier delivers to the final destination, it is common to use a Delivery Note that must contain at least the following:

- The name and contact details of the seller.
- Name and contact details of the purchaser.
- Date of issue.
- Date of delivery of the goods.



- A description of the goods contained in the order.
- The quantity of each type of goods.

When goods are delivered, the recipient should perform a physical inspection of the packages against all delivery documents to ensure that they fully conform to the requirements of the contract, by checking the following:

- **The Quantity** - The number received is the same as the one written in the documents and corresponds to the number requested in the PO.
- **The Quality** - That the product received is in the conditions mentioned in both the shipping documents and matches what was defined in the procurement contract, is not damaged and corresponds to the ordered specifications.

If any discrepancy is found in the quantity or quality, it should be recorded in writing on the delivery documents. Without written statement taken at the time of delivery it will be very difficult to claim later the products did not conform to the order.

The transfer of responsibility becomes effective when the representative of the organisation signs the Delivery Note. The signed Delivery Note, the PO, and the Commercial Invoice will be the minimum mandatory documents required to process payment. In the case that the supplier/carrier is not able to provide any delivery document nor even a Delivery Note, agencies may wish to create and sign a Goods Received Note (GRN), formalising the transfer of responsibility of cargo and stating any discrepancies. Agencies generating their own GRNs should still request the delivering supplier or the supplier's duly appointed transporter to countersign.





# Self-assessment Checklist



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## Self-assessment Checklist

Please use the checklist below to help you determine whether you are prepared to be assessed in this unit of competency. The boxes without tick mark indicate that there may be some areas you need to work on to become ready for assessment.

### Instructions

Please tick (✓) the box if your answer is yes

### Questions

Have I read the Learner Guide and understood its contents?

Have I attended, participated in, and completed all training sessions and activities?

Have I reviewed the learning resources to reinforce what I've learned in training?

Am I able to demonstrate my understanding of each element and performance criteria of this unit of competency by writing a summary in my own words?

Am I able to communicate how my experience, knowledge, skills-sets, and attitudes make me qualified and competent enough to perform the job related to this unit of competency?





# Oral Interview and Written Test Guide



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## Oral Interview and Written Test Guide

This section guides candidates on how to communicate, demonstrate, or present evidence, responses, and their work in a professional manner. There are three primary ways the candidates will be assessed: through observation, oral interview, and written test. The assessor will determine the final assessment methods and tools depending on several factors like the local context, professional needs, and the like.

### On observations

Assessors will observe the candidate over a period of time to collect evidence of their capability to meet the required standards and performance criteria. Assessors may attend selected learning sessions, if any, to witness how candidates complete their activities and participate in exercises. In doing so, assessors can get a sense of the candidate's key strengths and areas for improvement concerning the unit of competency. It will benefit candidates by ensuring their work is always complete and presentable.

### On oral interview

Assessors will conduct oral interviews to confirm and evaluate the candidate's experience, knowledge, skills, and attitudes regarding the unit of competency under assessment.

Please review the Unit Readings and complete the Self-assessment Checklist in this document. It may include verification questions about what you learned from the training content and material. It may also include competency questions about your knowledge and skills. Assessors may ask you what knowledge or skill you will use or apply to address a specific occupational issue or problem. Candidates need to think about how they will carry out their critical job functions in a defined work setting.

Finally, the interview may also include behavioural questions that focus on attitudes. Assessors may ask for examples of what you will do when a particular situation happens or when circumstances change. Candidates will need to support their answers with reflections on their own or other's experiences and the lessons learned from those.



## On written tests

Assessors will also present a written test to candidates to confirm whether candidates learned and understood the training content and material concerning the unit of competency under assessment.

Accuracy, brevity, and clarity are the ABCs of good writing. The first thing candidates are suggested to do is answer the questions as accurately as possible. It helps structure your response and sharpen your main points in an outline before writing them down. Candidates are advised to use short and simple sentences and paragraphs. The key messages and transitions between your sentences and paragraphs must be clear. Your answers need to be easy to read and understand. It includes removing and leaving out irrelevant material. Candidates are also expected to write coherently and logically so that readers can follow their thoughts.

Proofread and correct errors in your work before submitting it. How you format your work also matters. If you are using a computer, please check whether your indentions, margins, spacing, listings (bullets, numerical sequencing), and page numbers are in order.

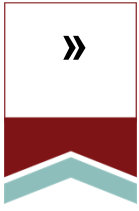




# Recommended Readings



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## Recommended Readings

Emergency Preparedness and Disaster Relief Program - Pan American Health Organization. (2001). *Humanitarian Supply Management and Logistics in the Health Sector*. Accessible [here](#)

Humanitarian Logistic Cluster 2024. Procurement Process. Accessible [here](#).

IFRC 2024. IFRC Catalog. Accessible [here](#).



## Learning Resources

McGuire, G. (2015). *Handbook of Humanitarian Health Care Logistics: Designing the Supply Network and Managing the Flows of Information and Health Care Goods in Humanitarian Assistance during Complex Political Emergencies in low-resource settings*. Accessible [here](#)





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ASEAN Standards and Certification for Experts in Disaster Management

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