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Mini MBA Humanitarian Logistics and Supply Chain: supplying fast, well and fairly

Course handout · Week 6 : Warehouses and stock management: capacity, turnover, inventories and losses

A programme of exactly 3 months (12 weeks, 144 hours) to lead a humanitarian supply chain: mapping and landed cost, demand forecasting and safety stocks, procurement and competitive bidding, Incoterms and contracts, transport, warehouses and inventories, fleet and fuel, customs and exemptions, prepositioning and distributions, health products and the cold chain, performance, costs and the environment, constrained contexts and data protection. Corrected numerical exercises, three monthly exams with case studies, and a verifiable diploma from the Humanitarian Academy.

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Week 6 : Warehouses and stock management: capacity, turnover, inventories and losses

Objectives

- Size and organise a humanitarian warehouse (floor area, height, aisles, security, hygiene).
- Run reliable stock management: stock cards, FEFO, inventories, reconciliations and indicators.
- Analyse losses and inventory discrepancies, and decide on actions (investigation, write-off, destruction).

Sizing a warehouse

The **floor area required** is calculated from the maximum volume to be stored, the permitted stacking height and a coefficient for aisles and work areas.

Method. Net storage area = volume / usable stacking height. Gross area = net area / utilisation rate (often 60 to 70%, the rest for aisles, receiving, dispatch, quarantine and the office).

Example. Maximum stock: 800 t of food in bags. Density: about 1.4 m³ per tonne for bagged cereals, i.e. 1,120 m³. Safe stacking height: 2 m (pallets on the floor, without racking). Net area = 1,120 / 2 = 560 m². With 65% utilisation: 560 / 0.65 ≈ 862 m², i.e. a warehouse of about 900 m², or two mobile storage units of 10 × 32 m (320 m² each), which on their own would not be enough.

Criteria for choosing a building: year-round truck access, stable and dry floor, watertight roof, ventilation, security (fence, guarding, lighting), no flood risk, distance from conflict areas, and written agreement from the owner (lease).

Organising space and security

Basic rules of a humanitarian warehouse:

- **Pallets** under all goods, at least 50 cm from the walls, with aisles for inspection and pest control.
- **Separate zones**: receiving, storage, order picking, dispatch, quarantine (damaged items or items awaiting inspection), hazardous products (fuel, chlorine), temperature-controlled products.
- **One location per item and per batch**, with a label or a stack card.
- **Hygiene and pests**: regular cleaning, traps, fumigation of food according to procedures by trained personnel.
- **Fire safety**: suitable extinguishers, no smoking, fuel stored separately.
- **Access control**: a single entrance, entry log, keys managed by two people.

> The "two-person" rule: no stock receipt or issue without a document signed by the storekeeper and a second person (driver, requester or supervisor).

Stock documents

The system, on paper or computerised, relies on documents that are reconciled with one another:

- **Goods received note** (with the waybill and the receiving report).
- **Goods issue note** or delivery note, based on an approved request.
- **Stock card** per item (bin card): receipts, issues, balance, at each movement, placed on the stack.
- **Ledger or database** kept by someone other than the storekeeper.
- **Transfer notes** between warehouses.

The physical balance, the stock card balance and the ledger balance must be identical. An unexplained discrepancy is a warning sign: a recording error, an unrecorded movement, or theft.

Issuing methods: **FIFO** (first in, first out) for items without an expiry date; **FEFO** (first expired, first out) for all perishable items: food, medicines, therapeutic foods. Under FEFO, a batch received later but expiring sooner is issued first.

Inventories and discrepancies

A distinction is made between the **full physical inventory** (all items, at least once a year and at each project closure or change of storekeeper) and the **cycle count** (a few items each week, prioritising high-value or at-risk items).

The inventory is carried out by a team that includes a person from outside the store, without first showing the theoretical balance to the counters ("blind" counting).

Discrepancy example. Ledger: 1,250 blankets. Count: 1,180. Discrepancy: −70, i.e. 5.6%. Checks: issue notes not entered (2 are found, for 40 blankets), data entry errors (none), transfers in progress (none). Residual discrepancy: 30 blankets (2.4%) to be explained through an investigation, above the organisation's tolerance threshold (for example 0.5% for non-food items). Follow-up: written report, investigation, then write-off approved at the right level; if theft is suspected, reporting in accordance with the anti-fraud policy.

Stock indicators

A few indicators are enough to manage a warehouse:

- **Stock turnover** = annual issues / average stock. A turnover of 2 means that the average stock corresponds to 6 months of issues.
- **Months of stock** = stock / average monthly consumption.
- **Stock-out rate** = number of days an item is unavailable / days in the period.

- **Stock accuracy** = item lines with no discrepancy at inventory / lines counted.
- **Losses and expiries** in value and as a percentage of issues.
- **Occupancy rate** of the warehouse.
- **Dormant stock**: items with no movement for more than 6 months.

Example. Annual issues 3,600 t; average stock 900 t. Turnover = 4; average stock = 3 months of issues. For food with a 12-month shelf life, this is acceptable. For a stock of health items with a 6-month shelf life, 3 months of average stock leaves little margin: monitor dates under FEFO.

Damaged and expired items, and disposal

Unfit items follow a strict procedure:

- Immediate **quarantine**, labelled "do not distribute".
- **Assessment** by a committee (logistics, programme, and for food or medicines, a specialist or a health authority).
- **Decision**: repair, repackaging, alternative use (for example food unfit for human consumption used as animal feed, only after analysis and in accordance with the rules), or destruction.
- **Destruction** documented in an official report, with witnesses, photos and, where necessary, the presence of the authorities, in compliance with environmental standards (controlled incineration of medicines, for example).
- **Informing the donor** when the items were funded by it, according to the contract.

Losses due to poor management (unsuitable storage, no FEFO) may be declared ineligible by the donor. Losses due to documented force majeure (flooding, looting) are generally accepted if they are reported promptly.

Exercise: diagnosing a district warehouse

Situation. Warehouse with 600 m² of floor area, stacking at 2 m, target utilisation rate 65%. At peak it must store 700 t of food (1.4 m³ per tonne). Annual inventory: 42 item lines counted, 36 with no discrepancy. Annual food issues: 2,100 t; average stock: 700 t. 3.5 t of flour have expired: the issue notes show that batches received later were distributed first. The ledger is kept by the storekeeper himself.

Tasks. 1) Is the warehouse large enough? 2) Stock accuracy and turnover. 3) Probable cause of the expiry and consequence. 4) Three measures.

Answer. 1) Volume 700 × 1.4 = 980 m³; net area 490 m²; gross area 490 / 0.65 ≈ 754 m²: about 150 m² are missing at peak (solution: mobile storage unit or additional warehouse, or staggering deliveries). 2) Accuracy = 36 / 42 ≈ 86%; turnover = 2,100 / 700 = 3, i.e. 4 months of average stock. 3) FEFO (and probably FIFO) not applied; the loss is likely to be judged ineligible because it is due to poor management. 4) Apply and monitor FEFO (stack cards with dates, issues validated by a supervisor); separate ledger keeping (assistant or finance) from physical custody; monthly cycle counts of perishable items with a report to the logistics manager.

Key takeaways

- Gross area = volume / stacking height / utilisation rate (60 to 70%).
- Pallets, separate zones, quarantine, access control and the two-person rule.
- FEFO for everything that expires; physical stock, stock card and ledger must match.
- Blind inventory with an outside person; any discrepancy above tolerance is explained and approved.
- Turnover = annual issues / average stock; monitor dormant stock and expiries.

Quiz

1. Volume to store 600 m³, stacking 2 m, utilisation 60%. Gross area required:
   A. 300 m²
   B. 360 m²
   C. 500 m²
   D. 1,000 m²

2. Annual issues 1,200 t, average stock 400 t. The turnover is:
   A. 3
   B. 0.33
   C. 4
   D. 800
3. Batch A received in January, expires in December; batch B received in March, expires in August. Under FEFO, the first to be issued is:
   A. Batch A
   B. Batch B
   C. Both in equal shares
   D. The heaviest
4. Ledger 2,000 units, count 1,960. The discrepancy is:
   A. −4%
   B. −0.2%
   C. +2%
   D. −2%
5. Why count "blind" during an inventory?
   A. To go faster
   B. So that the counters are not influenced by the theoretical balance
   C. Because the lighting is poor
   D. To avoid filling in forms

Quiz answers : 1. C · 2. A · 3. B · 4. D · 5. B