



SAFETY SERVICES ORGANISATION



Session 5.1

Introduction to Inventory Management

**IATG Foundation Course:
Ammunition Accounts Module**



Lesson Objectives

At the end of this lesson you should be able to:

- Describe the principles of inventory management
- Explain the need to keep accurate accounts for ammunition
- Describe the framework required for effective inventory management
- Explain the pitfalls of poor inventory management
- Explain the associated safety concerns arising from poor ammunition inventory management

Aims of inventory management

To ensure:

- the safety of personnel;
- the efficient use of the ammunition stockpile;
- the timely and reliable detection of losses or diversions; and
- the controlled issue and use of ammunition.

Inventory Management functions

- forecast ammunition stockpile levels and requirements;
- record and numerically monitor stockpile levels (ammunition accounting);
- monitor the amount of physical storage space available;
- monitor the condition of the ammunition stockpile);
- ammunition procurement and replenishment;
- allow ammunition turnover;
- establish and record the financial costs of the ammunition stockpile and its maintenance;
- calculation of net explosive quantities and
- ensure that compatibility group mixing rules are being followed.

Through Life Management

- **Stocks must be managed effectively due to:**
 - Their high costs
 - Strategic National assets
 - They are battle winning capabilities

Through Life Management

- The TLM is a systems approach looking after ammunition
- Within this component is a Munitions Life Assessment (MLA)
- MLA takes into account the ageing process involving the effect of environmental storage conditions

Munitions Life Assessment (MLA)

- Represents Value for Money
- Improves safety
- Records the conditions under which ammunition has been stored, used and then returned to storage which helps to make decisions to extend the shelf life or otherwise of ammunition
- Enables asset tracking of ammunition
- MLA requires a data capture methodology
- Requires a Surveillance and In-Service Proof system in place



Benefits of MLA

- increased safety through a better understanding of failure modes;
- consistent performance of ammunition;
- increased reliability of ammunition;
- reduction in logistic and administrative requirements through improved asset tracking;
- improvement in the technical surveillance system by using environmental data to better target surveillance requirements;
- more accurate life-planning of ammunition; and
- an improvement in behaviour in the care of ammunition and the development of an 'ethos of explosive safety' at all levels.



Improvement of in-service life

- The life of ammunition can be extended;
- Life improvement measures planned in advance of introduction into service can significantly increase service life;
- Mid-life stage introduction of life improvement measures can still increase service life;
- Reduction of overall life cycle costs of the ammunition; and
- Improved confidence in predicting the whole life of the ammunition.



Ammunition Accounting

- **Definitions**

- Ammunition Accounting
- Lot
- Batch
- Batch Key Identifier
- ADAC (Ammunition Descriptive Asset Code)

Introduction

- **Why do we need to have good ammunition accounting?**
 - To manage the [national] stockpile
 - To easily detect losses
 - To allow turnover of stock
 - To assist with Bans and Constraints
 - Assist with storage planning

Types of Ammunition Stockpile

- **Stockpiles must be clearly identified by quantity and location.**
- **Stocks are segregated into:**
 - Operational stock: For routine operations
 - War Reserves: For external conflicts or general war
 - Training: Used to support routine training. This is usually a percentage of a Nation's War Reserve
 - Experimental: For research and development organisations
 - Production: Held by those Nations with a production facility and generally awaiting sale
 - Ammunition awaiting disposal: Unserviceable, unstable or surplus stock
- **The sum of these is the [National] Stockpile**



Roles within Ammunition Accounting

- **Accounting systems require a hierarchy of roles to ensure effective management including:**
 - A management department
 - Ammunition Storage units
 - Ammunition Technical Inspection Units
 - Ammunition Training units
 - Ammunition Inspectorate
 - User units

Responsibilities within Ammunition Accounting

- Policy development
- Procurement capability
- Creation and maintenance of storage units
- Develop a system of technical inspections of ammunition holdings
- Maintain an overview of stock levels
- inspection regime for explosive limits licences
- Ensure the security of stocks
- Ensure that ammunition is accounted for at all levels and records kept
- Conduct regular checks and audits on stocks
- Investigate ammunition incidents and accidents
- Provide a disposal capability

Ammunition Organisation Responsibilities

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Ammunition storage unit responsibilities

- implement the ammunition accounting system;
- ensure the security of ammunition stocks;
- accurately account for ammunition
- Maintain records should be maintained for the whole in-service life of the ammunition and 10 years beyond *
- stock check ammunition;
- implement the system for the issue and receipt of ammunition.
- liaise to ensure the efficiency of in-service ammunition processing; and
- maintain accurate records on the technical condition of ammunition in storage for the whole in service life of the ammunition and 10 years beyond.



Accounting

- **Ammunition must be accounted for by:**
 - Specific types
 - Quantities
 - Lot
 - Batch
 - Location
 - Condition



Accounting

Ammunition Stack Tally Card							
IATG Form 03.10							
ESH		3		ADAC		34638-27C	
Ammunition Type		Shell 155mm HE L15		Lot/Batch		GD 0215 217	
Condition Code		A2		Remarks		For Operational use only	
Date	Issue/Receipt Voucher Number	Received	Issued	Balance	Signature	Name	Grid Locator Reference
03/02/16	RV 16/0021	1,036	_____	1,036	Insert signature	Verity	B4,B5,B6, C5 to C11
07/04/16	Stock check	_____	_____	1,036	Ditto	Booth	B4,B5,B6, C5 to C11
09/05/16	IV 16/0154	_____	220	816	Ditto	Verity	B4,B5,B6, C5 to C9
15/06/16	RV 16/0102	96	_____	912	Ditto	Root	B4,B5,B6, C5 to C10
29/06/16	Stock check	_____	_____	912	Ditto	Booth	B4,B5,B6, C5 to C10



Accounting Checks

- Stocktaking and audits are essential to identify discrepancies and theft
- Trained staff are required who understand ammunition packing and markings
- Staff conducting the stock check must not be provided the details from the main ammunition account
- Reconciliation of accounts is conducted separately by the accountant and the stock checking staff



Storage - Terminology

- **Unit of Space (UOS):**

- The volume of most pallets or unit load containers (ULC)
- Equals about 1 cubic metre and a weight of 1 tonne
- Simplifies storage planning by easing the calculation of storage space and ensures that stock checks and audits are easily conducted



Storage – Stacking Rules

- **Standard storage requirements:**
 - Safe stacking height of 3-4 pallets – in general
 - 2m between aisles for MHE access
 - 500mm air gap from the ESH wall to ammunition stacks

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Additional Storage Space Requirements

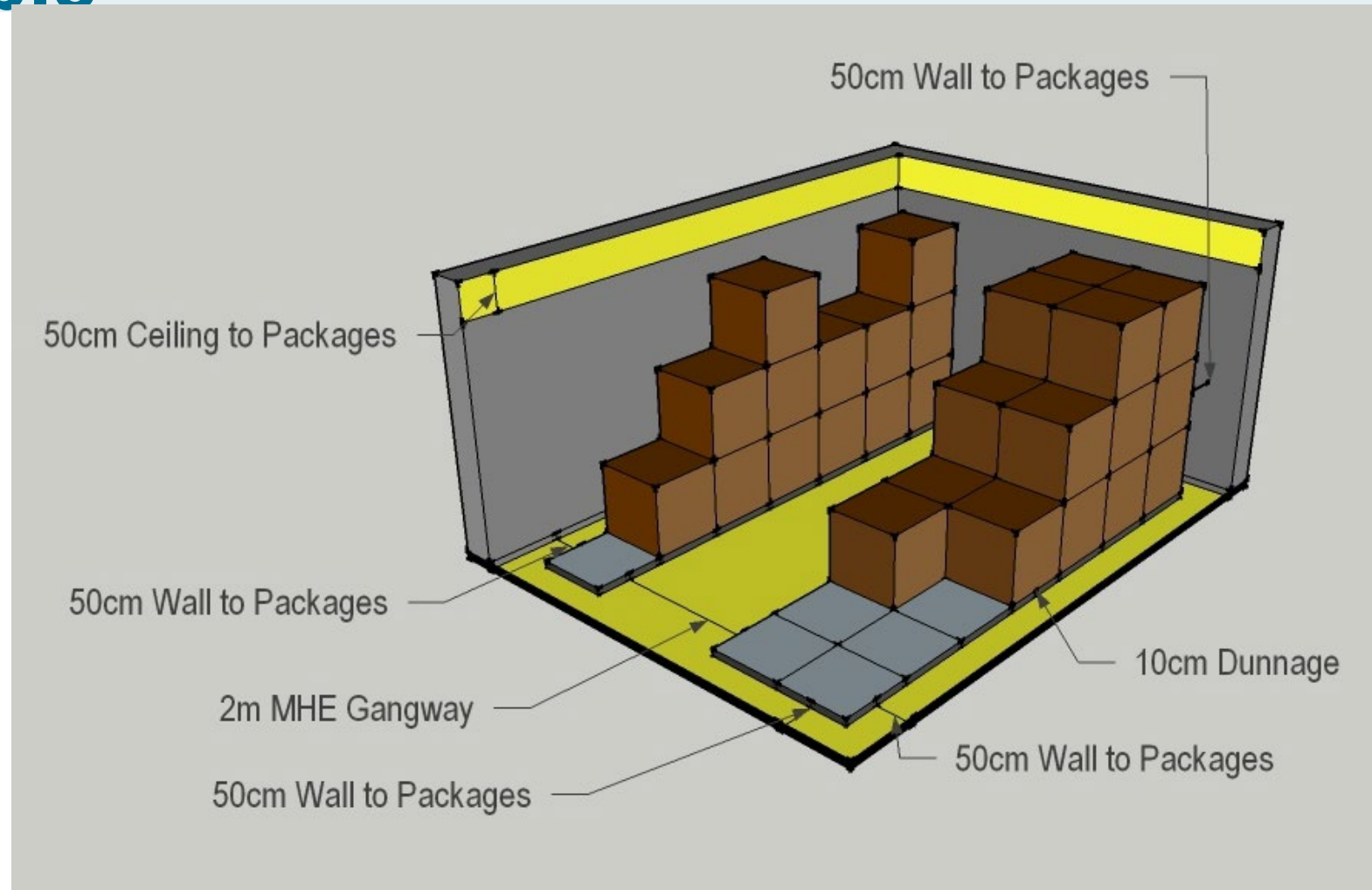
100mm from the floor

Aisles wide enough for handling
(Usually 2m for MHE, 1m for a palletiser)

20mm air gap around each pallet



Calculation of Storage Space Requirements - Example



Calculation of Storage Space Requirements - Example

ESH DETAILS	FIGURES	COMMENT
ESH width	6m	
ESH length	8m	
ESH height	3.7m	
ESH volume	177.6m ³	
Height of dunnage	0.1m	From the floor
MHE gangway	2m	Up the middle
Gap from walls	0.5m	From each face
Gap from ceiling	0.5m	From top package
Available ESH width	3m	6-(2x0.5)-2
Available ESH length	7m	7-(2x0.5)
Available ESH height	3m	3.7-0.1-0.5. Rounded down to nearest meter/pallet
Maximum theoretical UOS	63 UOS	3x7x3



Locating stock

Ammunition Depot:				Greentown			
ESH		21		Date:		23/11/09	
Grid	1	2	3	4	5	6	7
A							
B							
C							
D							
E							
F							
G							
H							
J							
K			X				
L							
M							



Storage space issues

- **Bulking out**
- **NEQ out**
- **Space Vs mixing Natures and/or HCC**

ADACs

- **Ammunition Descriptive Asset Codes (ADAC) simplifies the counting of ammunition types by reducing the number of ammunition descriptions when multiple components are packaged together eg. 155mm shell with fuzes**
- **Two Types:**
 - Generic 5 digit code eg. '18400 Mortar Bomb 81mm HE'
 - Specific 7 digit code eg. '18400-36 Mortar Bomb 81mm HE L36A1'



Condition Codes

- When accounting for ammunition, it is important to recognize that Stocks are also classified by the physical condition of the ammunition e.g. Unserviceable stock or stocks for disposal

Condition Type Code	Condition Sub-Type Code	Ammunition Status
A		▪ Serviceable stocks available for use.
	A1	▪ Available for issue.
	A2	▪ Available for issue, but subject to a minor constraint.
	A3	▪ Available for issue subject to national technical authority approval.
B		▪ Stocks banned from use pending a technical investigation.
	B1	▪ Banned for use, but cleared for routine storage and movement.
	B2	▪ Banned for issue and use, and not cleared for movement.
	B3	▪ Awaiting manufacturer's quality assurance reports.
	B4	▪ Shelf life expired.
C		▪ Stocks unavailable for use pending technical inspection, repair, modification or test
	C1	▪ Minor processing or repair only required.
	C2	▪ Major processing or repair required.
	C3	▪ Awaiting inspection only ex-unit.
	C4	▪ Manufacturers processing or repair awaited.
	C5	▪ Force regeneration processing required.
D		▪ Stocks for disposal.
	D1	▪ Surplus, but serviceable stocks.
	D2	▪ Unserviceable stocks.



Questions

Lesson Objectives

You should now be able to:

- Understand the need to keep accurate accounts for ammunition
- Have knowledge of the framework required for effective accounting of ammunition
- Realise the pitfalls of poor ammunition accounting.
- Understand the associated safety concerns arising from poor ammunition accounting.



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