

Chapter 7 From Replenishment to Despatch

- Replenishment 補貨
- Value-adding service 加值服務
- Stock management 庫存管理
- Inventory counting 盤點
- Security 保全
- Returns processing 回收處理
- Despatch 出貨

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1. Replenishment

- The result of a poor replenishment process is order shortages, increased picking times and therefore increased cost per pick and an overall reduction in service level. 補貨作業不當的影響
- Real-time WMSs will recognize the need to replenish pick locations ... before the next wave of orders arrive ... **WMS**控制時機與數量 (168)
- Although real time dictates that replenishment and picking can occur simultaneously, there are issues of worker safety 員工安全問題 (169)
- Replenishment can take place during breaks or after picking has been completed for the day. 補貨時段安排

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2. Value-adding Services

Value-adding services include the following:

- (re)labelling; pricing; tagging and kimballing;
- (re)packing; bundling, as in 'buy one, get one free' offers;
- reconfiguration;
- sub-assembly;
- repair and refurbishment.



Postponement not only saves time but reduces inventory holding by reducing the total number of SKUs held in stock. 延遲生產

Sufficient space needs to be made available ..., if the height of the warehouse allows it, is above the despatch bays on a mezzanine floor. 需有適當場所 (170)

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3. Stock Management

TABLE 7.1 Stock classification

Classification	Description	% of stock items
A	Fast-moving stock	20%
B	Medium-moving items	35%
C1	Slow-moving items	
C2	Very slow-moving but <u>required for cover</u>	45%
O	Obsolete or non-moving stock	
S	Special or one-off purchases	
X	Non-stock or non-standard items	

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Stock Management

The goal is to identify the items in the **C to X** categories and act accordingly.

- Return to seller if the contract allows. 退回原供應商
- Sell to staff at a discount. 出清給員工
- Sell the item at a highly discounted rate ... via companies who specialize in selling overstocks and obsolete items. 暢貨中心
- Assess whether it is cost effective to break the item down into its constituent parts. 拆解並回收
- Donate to charities. 捐贈
- Dispose of the product as cheaply as possible. ... it will release space to store other faster-moving product in its place. 丟棄

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Stock Management

Stock turn (**Inventory Turnover**)

= cost of goods sold ÷ average cost of goods stored 多種品項

= Annual throughput in units ÷ average number of units held in stock

↑
如何計算？

年週轉率 vs. 月週轉率

150 +: world class using just-in-time techniques;

120 +: chilled foods;

18 +: retail;

10~30: manufacturing;

<3: maintenance stores.



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4. Record Keeping

The physical warehouse must match the “paper” warehouse

Problems: 偷竊、過期毀損、記錄遺漏、儲位錯誤、退貨

Solution: 保全、記錄電腦化、盤點(counting)

即時自動資料收集: 條碼與掃描器、RFID

庫存盤點為物料管控的主要功能，還有成本計算與稅務用途。

依實施範圍分為全面盤點(full count)與循環盤點(cycle count)，

依實施時間分為定期盤點(periodic count)與永續盤點(perpetual count)

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Full Counting

- 訂定時程與進度
- 訓練並分配人員工作與責任
- 確定盤點的物料與所在的位置
- 確定物料的度量衡單位
- 盤點前停止所有物料搬運與記錄變更
- 盤點前不洩漏現有庫存紀錄(blind count)



A full stock count usually necessitates the closure of the warehouse for a period of time difficulty in reconciling the discrepancy as it could have occurred over 11 months ago. (173)

<https://www.youtube.com/watch?v=GfKoDuoLW2o> drone

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Cycle Counting

循環盤點—每隔一段時間針對部分庫存進行盤點，在短時間內完成以避免盤點工作影響正常的業務。



1. 進行時間短，減少對正常業務的影響
2. 可由倉儲人員單獨負責與完成
3. 可配合ABC分類，對重要品項加強庫存管理

The accuracy of the counts will also determine the frequency. A high error rate should result in more frequent counts ... Each discrepancy needs to be investigated ... ensure that there is no repeat of the problem. (174)

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Cycle Counting with ABC Classification

	A	B	C
品項數量	240	900	5000
盤點週期	每月一次	每季一次	每年一次
每週盤點數量	60	75	100

盤點進度

	Week 1	Week 2	Week 3	Week 4	Week 5
一月	A1	A2	A3	B1	
二月	A1	A2	A3	B2	
三月	A1	A2	A3	B3	C1
四月	A1	A2	A3	B1	

8 % of A items counted weekly (once per quarter)

4 % of B items counted weekly (twice per annum)

2 % of C items counted weekly (once per annum)

A items $\pm 0.2\%$ B items $\pm 1\%$ C items $\pm 5\%$

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5. Security

Loading docks and platforms tend to be the most vulnerable areas ..., in partnership with an outsider, a delivery driver for example. 内神通外鬼 (176)

- appropriate recording of inbound and outbound products;
- authorizations for all despatches;
- accurate audit trails;
- regular stock checks;
- the use of appropriate storage equipment; and
- vigilance.

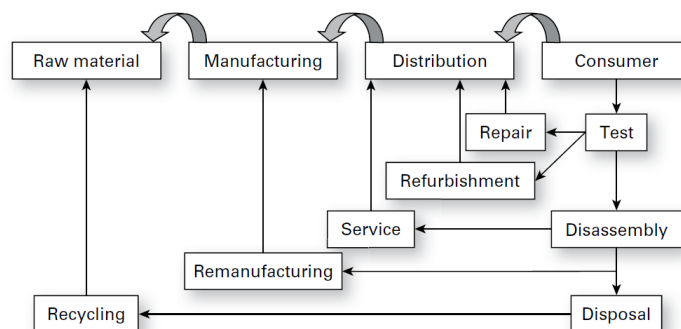
Not only is product security important but also the protection of data. The data needs to be backed up daily and the backup files stored offsite. 資安

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6. Returns Processing

Returns processing, or reverse logistics, involves the handling of product returns, transit packaging and surplus items. The processes associated with this operation include repair, reuse, refurbishment, recycling and disposal.

FIGURE 7.1 The returns cycle (courtesy of University of Huddersfield)



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Returns Processing

- Doing nothing about returns ... take up space, are difficult to count during stock takes, difficult to value and, could be back on sale 退貨的多重損失
- The increase in **e-retailing** has also seen a significant increase in the level of returns into the warehouse. Catalogue retailing ..., set up returns-processing areas to not only receive the items but also clean them, iron them and pack them for resale.. 網購的退貨率高 (178)
- This type of warehouse needs to be set up very differently from a stockholding facility. Space needs to be set aside for sortation, return stock into the supply chain ..., or dispose of it efficiently 作業型態不同於傳統倉儲 (179)

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7. Packing and Shipping

Receiving → Putaway → Storage → Order Picking → **Shipping**

Management Issues

包裝成本 vs. 損壞風險

出貨內容準確性

出貨效率與成本



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Problems in Shipping Operation

- Documents 出貨/領料文件不完備
- Quantities 出貨內容與數量差異
- Packaging 包裝不妥導致破損
- Delay 裝載延誤或錯誤
- Billing 帳務處理疏失 (記錄錯誤或遺漏)

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Final Checks

- The need to check every order before it leaves the warehouse may well be a requirement for very high value products and products such as pharmaceuticals... 高價品與藥品
- Companies need to measure the accuracy performance of their pickers ... A picking team that is constantly achieving > 99.9 % accuracy ... 揀貨準確率與查核率 (181)

X24 ⑤	Lidocaine				
	Xylocaine®				
	2% (5 ml/amp)				
多劑量	多劑型	外觀相似	藥名相似	數量/月	
					
另有劑量: 2% (20 ml/vial); 1% (5 ml/amp)					
另有外用: 2% (30 gm/tube)					

- ① 學名
- ② 商品名
- ③ (④) 強度(規格)
- ⑤ 儲位
- ⑥ 提醒圖示
- ⑦ 院內其他多劑型



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Container Design

- 容器過大增加成本與損壞風險
- 容器強度要能保護內部的品項
- 容器標示要易於辨識與追蹤
- 容器尺寸應配合貨櫃與運輸工具
- 容器要易於堆疊與搬運，清空時要易於收藏
- 容器要能回收並重複使用



Shipment Protection

利用環保的貨墊、貨品保護裝填物、保麗龍(styrofoam, 聚苯乙烯)等來減少產品在運輸途中的可能傷害



Automated void fill system
<http://www.youtube.com/watch?v=CzuLy7WcRM8>



設計包裝時要考量下列項目

依照買主的要求來決定包裝標示，要注意下列事項：

(a) 主要標示 (Shipping Mark)

- ①買主名稱 ②到達港口名稱 ③重量 ④貨物尺寸(L×W×H)
- ⑤生產國 (Made in Taiwan) ⑥內容物簡介 ⑦貨件編號

(b) 次要標示 (Care Mark) 為保護貨物並確保搬運人員的安全

- ①對於存儲條件很差且大多是室外儲存的目的地，應該為需要室內儲存的貨物指定防潮標記 (KEEP AWAY FROM RAIN)。
- ②貨物處理上的標記，包括指示貨物重心的標記 (CENTER OF GRAVITY) · 指示懸吊位置的標記 (SLING HERE)
- ③四面全部貼標示比較好。
- ④內容簡潔，並用圖形標記貨物的處理方式。



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Unit Load Stabilization

Pallet loads need to be configured to ensure that product damage is minimized, cubic capacity is fully utilized, load stability is ensured and the configuration is acceptable to the receiving location. (183)

- Unit load過大過重將影響裝卸貨效率，裝卸過程容易碰撞
- Unit load過小過輕將增加運送成本，運送過程容易搖晃
- Unit load的重量與形狀儘量一致
- Unit load的長寬超出棧板，容易擦撞邊緣
- 紙箱堆疊方式影響穩定性與紙箱承載損壞



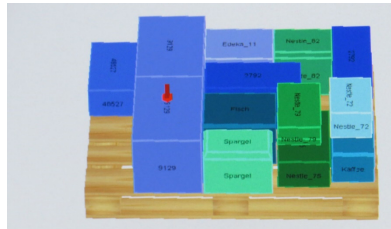
Packaging Systems - Pallet Patterns

<http://www.youtube.com/watch?v=4klq3I3tZPw&hd=1>

<https://www.youtube.com/watch?v=mCnTiescOXU>

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機器手臂進行貨箱堆疊



www.youtube.com/watch?v=KzopQMvbLMk

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Shipping

- Many operations are now taking orders late into the evening and dispatching that same night for next-day delivery. ... **cut-off time** for internet orders of 10 pm for next-day delivery. (183)
- Work plans are now centred around the latest despatch time for orders, and managers work backwards ... to meet these deadlines. 時間控制 (183)
- Depending on the method of picking ..., sufficient space needs to be available at the loading bays ... allow for checking. (183)
- Many companies have grids marked out on the warehouse floor at the despatch area to replicate the floor area of the largest vehicle. 裝車規劃

Titus Warehouse - Packing & Shipping
<http://www.youtube.com/watch?v=RL4ZX70cZ7A>

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8. Dock Management

A yard management system (YMS) can improve inbound and outbound scheduling, increase visibility of trucks ... the safety and security of both vehicles and operators. (184)

- 出貨碼頭的設計類似進貨碼頭，甚至共用設施
- 碼頭利用率與整貨空間影響出貨準確率
- 指派距離最近的碼頭以減少搬運
- 整貨區域應清楚劃分並明顯標示
- 裝載前應測量查核貨品的體積與重量
- 安排裝車順序以提高裝載量或方便後續卸貨
- 保護貨品在運送過程不因晃動而損壞
- Advanced Shipping Notice

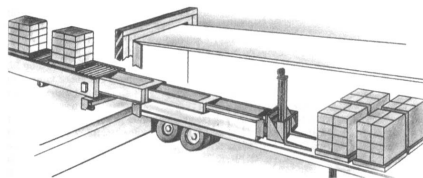
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Loading

- 企業自有的貨車駕駛 vs. 第三方貨車駕駛

Direct Loading

- 整板的貨物可由堆高機或拖板車直接送進出貨的貨櫃內
- 零散的貨箱可利用輸送帶，送進出貨的貨櫃內



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Documentation

Despatch documentation and labelling needs to be completed to ensure compliance with customer requirements and government legislation ... can result in non-shipment, seizure, fines or delays. (185)

- advanced shipping notice;
- **manifest**; 貨品清單
- shipping labels;
- Bill of Lading; 提貨單
- **commercial invoice**;
- shipper's export declaration; 出口申報單
- export packing list;
- certificate of origin;
- export licence;
- inspection certificate;
- insurance certificate.

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Summary and Conclusion

- Well-timed replenishment will ensure an efficient pick operation
補貨的重要性
- A timely and accurate despatch ensures that customer lead times are achieved or at times surpassed. 出貨準時與內容正確
- The warehouse's ability to undertake value-adding services enables the manufacturer to postpone transfer activities from the retail store back to the warehouse, freeing up valuable sales time. 加值服務
- Stock counting and security are fundamental to the integrity of products stored in the warehouse. 庫存盤點

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