

# UNCTAD MONOGRAPHS ON PORT MANAGEMENT

*A series of monographs prepared for UNCTAD in collaboration  
with the International Association of Ports and Harbors (IAPH)*

**7**

## **Steps to effective shed management**

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## NOTE

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## INTRODUCTION TO THE SERIES

In the ports of industrialized countries, operating systems and personnel development are based on skills acquired through experience, on emulation of other industries and on the innovation which is easily undertaken in advanced industrial environments. These means are generally lacking in developing countries, and port improvements occur only after much deliberation and often through a process of trial and error. Some means are required by which ports in developing countries can acquire skills that are taken for granted in countries with a long industrial history, or can learn from the experience of others of new developments and how to meet them.

Formal training is one aspect of this, and UNCTAD has devoted considerable effort to developing and conducting port training courses and seminars for senior management and to preparing training materials to enable middle-management courses to be conducted by local instructors. It was felt that an additional contribution would be the availability of clearly written technical papers devoted to common problems in the management and operation of ports. The sort of text that will capture an audience in the ports of developing countries has to be directed at that very audience, and very few such texts exist today.

Following the endorsement of this proposal by the UNCTAD Committee on Shipping in its resolution 35 (IX), the UNCTAD secretariat decided to seek the collaboration of the International Association of Ports and Harbors, a non-governmental organization having consultative status with UNCTAD, with a view to producing such technical papers. The present series of UNCTAD Monographs on Port Management represents the results of this collaboration. It is hoped that the dissemination of the materials contained in these monographs will contribute to the development of the management skills on which the efficiency of ports in developing countries largely depends.

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FOREWORD

When UNCTAD first decided to seek the co-operation of the International Association of Ports and Harbors in producing monographs on port management, the idea was enthusiastically welcomed as a further step forward in the provision of information to managements of ports in developing countries. The preparation of monographs through the IAPH Committee on International Port Development has drawn on the resources of IAPH member ports of industrialized countries and on the willingness of ports in developed countries to record for the benefit of others the experience and lessons learnt in reaching current levels of port technology and management. In addition, valuable assistance has been given by senior management in ports of developing countries in assessing the value of the monographs at the drafting stage.

I am confident that the UNCTAD monograph series will be of value to management of ports in developing countries in providing indicators towards decision-making for improvements, technological advance and optimum use of existing resources.

The International Association of Ports and Harbors looks forward to continued co-operation with UNCTAD in the preparation of many more papers in the monograph series and expresses the hope that the series will fill a gap in the information currently available to port managements.

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Chairman  
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Port Development  
IAPH

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## INTRODUCTION

1. The operation of transit sheds situated alongside conventional cargo wharves is an important aspect of port management. Effective shed management will provide an efficient flow of cargo out of the port, ensure a faster turn-around time for ships and prevent congestion, which is so commonly heard of in ports. Managing transit sheds effectively will result in more temporary storage space being available and higher berth availability. To achieve this requires a planned and systematic approach involving good initial design, a co-ordinated management strategy and efficient day-to-day management.

2. This monograph defines the transit shed, examines its role and importance in the operation of a port, and outlines some consequences of poor shed management. The various factors or steps required for effective management are discussed in three main chapters.

3. In discussing these various steps, emphasis is placed on objectives and principles. Chapter II deals with the design of transit sheds. The correct design of transit sheds is important and is one of the first requisites for the efficient running of a transit shed. Correct design in the preliminary stage will ensure not only sufficient storage space but also ease of operations, efficiency of cargo transfer and also safety of the workers. The chapter deals with such topics as shed location, size and general dimensions. Practical suggestions on required sizes, number of doors and dimensions, ventilation and lighting are highlighted.

4. The various factors necessary for the efficient management of transit sheds are examined in chapter III. Since transit sheds are used only for temporary storage, the tariff policy on storage rentals has to be established accordingly. The tariff structure should be designed in such a way that cargo is encouraged to move out of the shed as fast as possible. With regard to space management, it is imperative that space be utilized effectively and cargo properly and logically stacked to facilitate easy location and fast removal. Although it may be desirable to deliver most of the cargo from the transit shed in a short time-frame, in practice this is not always achievable. It is therefore always prudent to provide back-up areas and sheds where cargo may be moved to and stored in the event of spill-over. Even though this involves extra handling of cargo, it is sometimes necessary, not only to prevent congestion but also to create more space in transit sheds, especially when unexpected peaks or delays occur. Sufficient mechanical handling equipment must be made available, as the efficient and prompt movement of cargo depends on it. With regard to manpower, the shed superintendent must ensure that shed staff are well-organized and trained to perform the tasks required. Adequate staff must be provided to drive the equipment, process paperwork and perform storekeeping and housekeeping tasks. A simple and effective system should be drawn up and procedures properly documented so as to train and guide the staff in discharging their duties. Since transit sheds, as opposed to open storage areas, are provided to store cargo safely, proper security must be enforced to prevent theft and pilferage. Security patrols, frequent spot checks, built-in checks in documentation procedures and stiff penalties for culprits caught are the many measures that can be implemented.

5. While chapter III highlights the various steps which a shed superintendent can take in improving performance, one has to recognize that

these are internal factors which are well within his control. In managing transit sheds there are also external factors which are not within the superintendent's jurisdiction. Such factors are discussed in chapter IV. They include accurate information on ship arrival schedules, timely receipt of a cargo's particulars, efficient customs clearance, and the establishment of free zones. Although these factors are not within the shed manager's control, it is possible for the manager to discuss them with the relevant parties concerned so as to reduce their adverse impact as much as possible.

### I. ROLE AND IMPORTANCE OF TRANSIT SHEDS

6. The transit shed to be discussed in this monograph is defined as a building used for receiving, storing and handling various types of cargo "in transit". This is in contrast to buildings which are designed for storage of goods over a long period. The latter are commonly referred to as warehouses.

#### A. Function of transit sheds

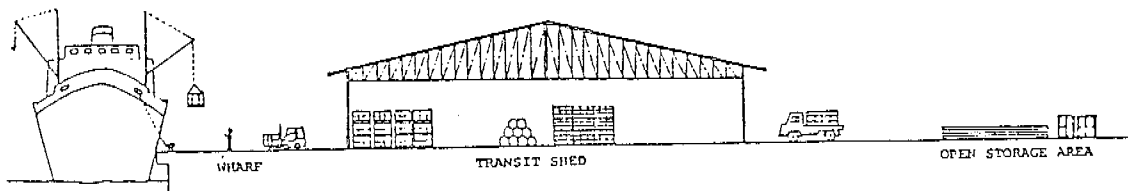
7. Transit sheds are normally constructed adjacent to a ship's berth (see figure 1). They are provided by ports for three main purposes:

(a) To provide a buffer zone to harmonize the faster ship-shore flow with the slower shore-inland movement. This buffer zone also allows import cargo to be broken down into small consignments before being delivered by road or rail to the consignees. Similarly, export cargo can be consolidated in the transit shed before the ship arrives to ensure that sufficient cargo is available to load the ship at a steady rate and in the proper order to facilitate discharge at the next ports of call;

(b) To provide safe storage for the cargo while awaiting certain administrative formalities such as customs clearance or the processing of shipping documents;

(c) To provide protection for the cargo against weather and also to store high-value cargo safely. Most ports today provide covered transit sheds alongside all general cargo berths. Where such sheds are not provided, special reasons are evident.

Figure 1. Location of a transit shed



#### B. Need for transit sheds

8. The concept of the transit shed as a buffer is an important one. Two kinds of activities are carried out on either side of the shed, namely loading or discharging on one side and delivering or receiving cargo on the other, and



these activities take place at varying rates and often simultaneously. An efficient buffer allows both activities to be carried out smoothly and without any hindrance.

9. There are two methods by which cargo can be loaded or discharged, namely direct and indirect handling. In the direct method, cargo is discharged directly from the vessel onto the transportation equipment, such as trucks, or vice versa in the case of exports. In the indirect method, the discharged cargo is brought into the transit shed and then collected by the consignee later from the shed. Although the direct method would be preferred on cost grounds, in most cases it may not be operationally feasible to use this method. For instance, delays and cargo hold-ups often arise in connection with import permits, allocation of foreign currency, letters of credit, customs formalities, etc., and traders are unable to take delivery of the cargo immediately. Also, timing and accurate co-ordination of the transportation facility is important, as any slip-up will increase vessel turn-around time. For example, any delay in the arrival of the cargo-transporting trucks for direct loading will delay the departure of the ship and hold up valuable berthing space. Other factors such as working capital, downtown storage charges vis-a-vis port storage, and limited storage capacity in the trader's own premises may discourage a trader from taking cargo directly from the port. Hence, the indirect method with the transit shed is more often used.

#### C. Consequences of poor shed management

10. Since a transit shed acts as a buffer, it should not be full when a vessel is discharging cargo. Good shed management is necessary to ensure that sufficient storage space is always present, otherwise congestion can occur. Congestion in sheds has two immediate adverse effects:

(a) The vessel's discharging rate is slowed down, leading to an increase in the vessel's turn-around time and reduced berth availability;

(b) The cargo may have to follow an alternative, more costly route, for example it may first have to be discharged into a barge and later transferred from the barge back to the transit shed when space becomes available. This will increase the cost of cargo handling.

11. Additional handling of cargo may occur as cargo has to be transferred from one shed to another due to shortage of storage space. Distribution costs may also increase as a result of additional interest to be paid on the capital tied up in the cargo, increased insurance premiums for cargo damaged or deteriorated, and additional costs associated with a shipper's failure to meet delivery dates. Overall, on a national scale, congestion in sheds can ultimately increase freight rates as congestion surcharges and demurrage payments are imposed.

12. On the other hand, transit sheds should not be under-utilized. Low shed utilization is also poor management. Big empty sheds are signs of sub-optimization of valuable shed space, especially as it may cost as much as \$US 1 million to construct a transit shed. A well managed transit shed must therefore be able to provide enough space not only for the entire import cargo of an incoming vessel but also for undelivered consignments from two or three preceding vessels. Space should also be provided for export cargo so that such cargo can be organized, consolidated or assembled in proper order prior to loading.

## II. DESIGN OF TRANSIT SHEDS

13. This chapter deals with the broad design requirements of transit sheds.

14. Transit sheds are found in ports all over the world and they vary in size and configuration. However, whatever the peculiarities of transit sheds in the various ports, the basic objective in their design should be to provide sufficient storage and safe custody for cargo and to complement efficiently the cargo handling operation at the wharf and behind the shed. Cargo in transit sheds is always on the move, unlike cargo in long-term warehouses, and this salient characteristic must be kept uppermost in mind when working out shed design.

### A. Location

15. The transit shed, being used as a buffer for import and export cargo, should be located adjacent to a ship berth. Sufficient space should be provided on both sides for roads or rail tracks if they are used and for temporary storage of some imported heavy loads before they are transferred to open storage in the rear. Sufficient space should be provided on the front side of the shed (i.e. facing the vessel), since, if the shed is sited too near to the berth, it will impede the off-loading of cargo from the vessel. On the other hand, if the shed is too far from the berth, the cargo will have to travel a longer distance. It is therefore necessary to consider various factors such as the type, capacity and speed of mechanical equipment used at the wharf apron and the method of handling (e.g. whether cargo sorting is to be done outside or inside the shed) in deciding the location of the shed. In general a good average distance is about 30 metres from the edge of the wharf apron.

### B. Size and capacity

16. The size and capacity of transit sheds vary considerably in different ports, according to the volume and types of cargo handled, density of cargo, transit time, stacking height, method of handling, climate and other factors. UNCTAD uses a mathematical model to assist port planners in determining the storage areas for transit sheds, as well as for open areas and warehouses. 1/

17. In the calculation of shed size, the port planner needs to determine or estimate the annual tonnage of cargo likely to pass through the storage areas, average transit time, density of cargo and average stacking height. The average transit time is defined as the average number of days which elapse between the time a consignment is placed in the store and its removal from the store. With these estimates, the required storage area is determined from holding capacity, holding volume and stacking area required. An example using the above-mentioned mathematical model is as follows:

#### Assumptions

- (i) Annual tonnage handled by shed = 250,000 tons
- (ii) Average transit time = 7 days
- (iii) Density of cargo = 1.0 ton per cu. m.
- (iv) Average stacking height = 2 m

Calculation:

- (a) Holding capacity required (See note 1) =  $\frac{\text{Annual tonnage handled through store} \times \text{av. transit time}}{365}$   
=  $\frac{250,000 \text{ tons} \times 7 \text{ days}}{365}$   
= 4,795 tons
- (b) Net holding volume required =  $\frac{\text{Holding capacity required}}{\text{Density of cargo}}$   
=  $\frac{4,795}{1.0} = 4,795 \text{ cu. m.}$
- (c) Gross holding volume required (See note 2) = 1.2 x net holding volume required  
= 1.2 x 4,795 cu. m.  
= 5,754 cu. m.
- (d) Av. stacking area required =  $\frac{\text{Gross holding volume required}}{\text{Av. stacking height}}$   
=  $\frac{5,754 \text{ cu. m.}}{2 \text{ m}} = 2,877 \text{ sq. m.}$
- (e) Av. storage area required (See note 3) = 1.4 x av. stacking area required  
= 1.4 x 2,877 sq. m.  
= 4,028 sq. m.
- (f) ∴ Design storage area = Av. storage area required x (1 + reserve capacity safety factor/100)  
= 4,028 sq. m. x (1 + 40/100)  
= 5,639 sq. m.  
say 5,600 sq. m.

Note (1) The number of times the contents of a store are turned over during one year is equal to 365 divided by the average transit time.

(2) From the net holding volume the gross volume is calculated by providing a 20 per cent allowance. This allowance is for broken stowage, i.e. for the additional space needed when consignments are taken apart and the various items placed separately.

- (3) The average storage area required in a transit shed is calculated by making a 40 per cent allowance for space used for other purposes such as alley-ways, offices within the storage area, a cargo inspection area and social amenities.

18. Some years ago, H.J. Deane used a "cargo densities" approach to determine shed capacities. <sup>2/</sup> He postulated that storage space should be related to the capacity of the vessels to be berthed at the quays. The relationship is such that the evacuation per linear foot of berth should be the same as the contents of the ship per linear foot. Although the space occupied by cargoes varies between wide limits, depending upon its type, packing and stowage, he has compiled a table of "cargo densities" for vessels of various sizes. Using this, the space occupied by the cargo per foot run of the length of the ship can be computed. Knowing the shed length, the average stacking height and the allowances made for passageways, the shed width can then be estimated.

19. Small transit sheds require less manpower and allow better control of cargo stored. With a smaller quantity of cargo in a shed, the chances of cargo mixing is reduced. Although it is less likely that a small transit shed would result in wastage in terms of having a large area of unused space (as compared to big sheds), the lack of space may cause spill-over of cargo.

20. If financially viable and operationally feasible, big sheds provide more flexibility in the use of space, better mobility and better unit costs. Lately, the trend is towards the construction of cost effective, optimum-design big sheds known as portal-frame type sheds. This type of shed is constructed with light metal sheets supported only by two columns on the side walls. They are popular because basic shelters can be provided for cargo at minimal cost. Furthermore, these sheds are column-free and allow maximum utilization and flexibility.

### C. General dimensions

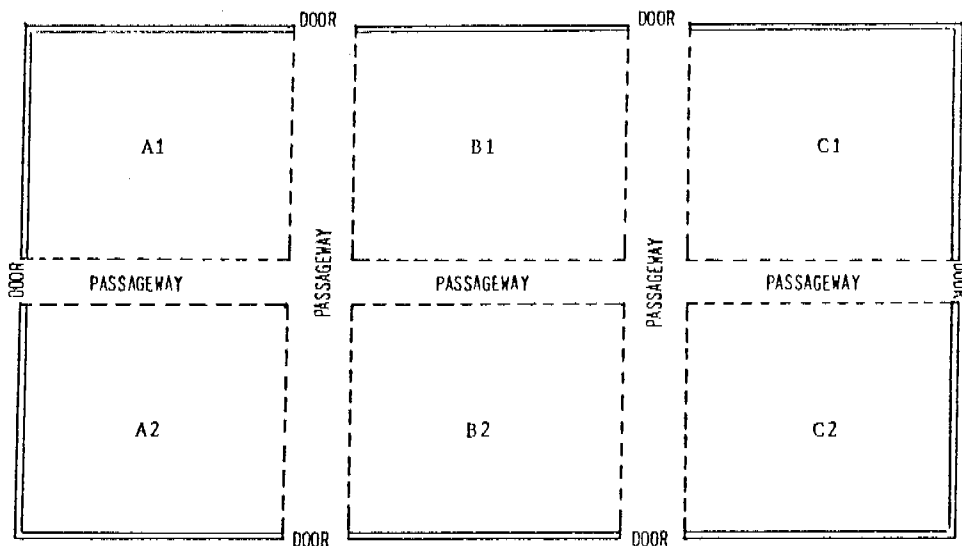
21. As a rough rule of thumb, the minimum shed length is normally the distance between the extreme hatches of the vessels serviced. For sea-going general cargo ships, the average for this minimum is about 120-150 metres. The width of the shed can be determined once the total area requirement and the length are known. The width may sometimes be restricted by the space available, and in this case an adjustment has to be made. The width is normally about 30 to 40 metres. However, a study made by a committee of the American Association of Port Authorities has suggested greater widths ranging from 45 to 76 metres, depending on the amount of space available, the nature of the cargo to be handled and other general local conditions. <sup>3/</sup> Among the arguments put forward were:

(a) Mechanized cargo-handling equipment is used more frequently nowadays. This, together with the rapid disappearance of the hand truck, makes the additional cost of transporting cargo within a wider transit shed insignificant;

(b) The increased size of vessels has led to increased tonnages. This often results in a larger residue of cargo being left in the shed by a preceding ship. Hence more space is needed for the assembly of cargo for the succeeding ship.

22. One important consideration when designing storage space within a transit shed is the need to provide for passageways and alley-ways. These not only provide unobstructed access for forklift trucks but also facilitate identification of cargo and allow easy removal. Cargo stacking bays should be designed in such a way that the paths between all doorways facing each other are cleared and all cargo is conveniently accessible and easily identifiable (see figure 2).

Figure 2. A typical layout of a transit shed



At the time of the design of the transit shed, it is also important that the method of cargo handling and mode of transportation be known so that special peculiarities in working methods, if any, can be catered for. Today, however, most general cargo is handled by forklift trucks. The shed width should therefore be chosen to allow easy movement of such equipment.

23. Conveyor systems may be used for general or bulk cargo. For general cargo, the shed should be designed to cater for the installation of conveyor tracks or belts within the shed. For bulk cargo, the shed should not have too many openings and should cater for top or side loading of cargo.

24. Many European and United States terminals are equipped with multi-storey transit sheds. Although multi-storey transit sheds may in particular situations be preferred for special uses such as passenger accommodation and long-term storage of cargo, the one-storey building is still the predominant type today. The one-storey shed is preferred because it simplifies movement of cargoes, does not require costly and space-consuming ramps or elevators and need not have expensive foundations. On the other hand, high-priced waterfront property in certain locations may make it more economical to construct multi-storey transit sheds.

25. Should a multiple-berth terminal decide to have its berths leased out or to allow operation of individual berths by separate organizations, it may be better to build an individual transit shed on each berth. With this type of configuration, the spacing between transit sheds should be carefully established to give the greatest flexibility in cargo handling.

26. The overhead clearance required to stack cargo and to operate mechanical handling equipment will be the main consideration when establishing the height of a transit shed. A minimum clear height of six to eight metres is normal. To prevent damage caused by high loads or forklift trucks, all piping, electrical conduits and lighting fixtures should be kept above the low points on roof framing systems. As shed walls are not built to withstand loads against them, "leaning" of heavy loads against the walls could cause considerable damage.

D. Service facilities behind the shed

27. The design of the transit shed will have to take into account the mode of transfer of the cargo into and out of the shed. In most cases, either road vehicles or rail cars are used.

28. In the case of road vehicles, forklifts can be used to lift cargoes on or off trucks. Alternatively, for tailgate delivery and loading, platforms can be constructed along the rear of the shed. Adjustable truck ramps or dock-boards can be incorporated into the design so that the platform adjusts itself automatically to the truck-bed level of a particular truck. This ensures easy access by forklifts and leads to more efficient handling of the cargo.

29. In many terminals, cargo is transported to and from the ship by rail. The design of shed layout for terminals with rail transport facilities will have to incorporate the requirements of the railroad trackage.

30. When cargo at transit sheds is to be loaded onto or unloaded from rail cars, it is necessary, for efficient handling, to align the loading dock and car floor at the same level by depressing the rail tracks. One method is to place the tracks in a depressed well inside the shed. This arrangement brings the cargo nearer to its storage place, but it cuts the floor area into two and equipment travelling inside the shed has to use portable bridges to span the well. These wells are also hazardous to men and machines. The other method which is more common is to build a platform along the rear of the shed.

E. Doors

31. For operational efficiency, an ideal transit shed should have plenty of wide doors to allow mechanical handling equipment easy and quick access to the interior of the shed. However, doors, being areas where cargo enters or leaves the shed, determine the demarcation of passages and alley-ways. The more doors there are, the larger will be the area allocated for passages, hence reducing the available space for storage. A compromise has to be reached.

32. In practice, the number of doors should at least equal, if not exceed, the number of hatches on the vessel being worked. There should be doors both at the front of the transit shed, i.e. the side facing the vessel, and at the back. It is also desirable to have doors at both ends. For ease of movement and to enable cargo-handling equipment to have direct and uninterrupted access from the ship's side right through the transit shed to the rear of the shed, and vice versa, it is desirable that doors at the front and back of the transit shed be constructed directly opposite each other. The alternative layout of furnishing doors in alternate bays has also been tried out in some

ports such as the Port of Portland, Oregon. Some port operators prefer this arrangement, as they can provide storage of cargo in the closed bays and move cargo through the bays with door openings.

33. Door sizes vary. However, bigger doors lead to ease of operations and fewer accidents. If mechanical equipment, e.g. forklift trucks, mobile cranes, etc., are used in the transit shed, doors should be wide (not less than 4.5 metres) and high enough (about 5 metres) to allow the passage of this equipment when carrying a load, i.e. with jibs in the up position.

34. The lintels of transit shed doorways are particularly exposed to damage by runabouts, forklift trucks, motor transport, etc. One way to counter this problem is to construct some form of protective guards in front of the doorway lintels. These guards can be concrete, stone posts or short lengths of rail and should be set in such a way that they take the impact of any collision which may occur.

35. Doors should not be hung on hinges fixed to the lintels of the doorway. This method takes up space and causes possible obstruction to the movement of cargo. Three types of doors are common. The first is the rolling steel door, which consists of a series of horizontal hinged steel leaves placed in guides on both vertical sides. The door opens by sliding up the guides, with the leaves rolling round a cylindrical drum roller. Manual and motorized operations are both available. The second is the "overhead" type, which is usually made in large sections, or leaves, and slides upwards in guides on each vertical edge to a horizontal overhead position. Both these types of doors are kept in the overhead position when open and are therefore less vulnerable to damage. The third type of door is the sliding type. This consists of a horizontal overhead track and a simple rigid door. The overhead roller track suspension is preferred to ground tracks, as the ground tracks increase fatigue for forklift drivers and also easily become clogged with foreign matter, thus impeding the closing of the door. Since it slides laterally, the sliding door requires "stowage" space in the adjacent bays.

## F. Lighting

### 1. Natural lighting

36. Wherever possible, the design of transit sheds should allow the maximum inflow of natural light so that this will be the main (although not necessarily the only) source of light during the daytime. This can be done by constructing skylights or translucent wall panels. There should be an adequate number of skylights to provide equal distribution of light throughout the transit shed. Windows or translucent plastic siding may be installed in the sidewalls to supplement lighting. This may be less effective, however, as high stacking of cargo may interfere with sidewall lighting.

### 2. Artificial lighting

37. Artificial lights must be installed to supplement or replace natural light. The lighting level of a minimum of 10-foot candlepower is generally considered sufficient for a transit shed. Light fixtures should be located to provide an even distribution of light throughout the transit shed and their placement must be such that high stacking of cargo in some areas will not affect the light in adjacent areas.

38. For watchmen or inspectors whose responsibility entails making tours of inspection, it may be necessary to install a separate group of lights to assist them in their rounds. The light switches can be arranged so that if work is being done in only one area of the transit shed, only that section is lit.

### 3. Types of fixtures

39. Three types of lighting fixtures can be used for general lighting of transit shed, namely:

- (a) Incandescent;
- (b) Fluorescent;
- (c) Mercury vapour.

### G. Security area

40. To prevent pilferage or theft of high-value cargo such as liquor, furs, jewellery and antiques, "security lockers" may be constructed to store such items. These lockers are normally enclosed rooms, and items stored there are kept away from public view. The size and location of such security lockers will vary according to the types and volume of valuable cargo handled. Normally, there should be a large door to allow cargo handling equipment to enter.

41. Customs lock-up areas, which are areas where highly dutiable cargo is stored temporarily before examination, may also be provided.

### H. Safety measures

42. The design of the transit shed should include appurtenances and other devices to prevent or minimize accidents. The types of protective safeguards used will depend on the mode of operations and types of equipment used in the transit shed.

43. For floor and door openings, depressed areas, drive ramps, etc., it is possible to install guard rails, handrails or concrete curbs. A heavy steel or concrete guard should be placed around the lower one or two metres of all main columns in the transit shed. These will protect the columns from damage by vehicles or cargo handling equipment. Concrete or partial wood sheathing can be added to the lower portions of the wall. Electrical panels mounted on walls or columns and water piping should be protected by some form of guard frame to maintain them in safe operating condition.

44. There should be proper and effective precautions against fire in all sheds. Emergency apparatus, e.g. fire-fighting equipment, should be colour coded. Electrical apparatus should also be painted so that it will stand out. Clear direction signs should be displayed and instructions for the use of such equipment should be easily accessible. Safety clearance lines should be clearly drawn. It may be useful to have floor lines delineating passageways, cargo bays, etc. These lines should be further supplemented by overhead "bay designation" signs.



## I. Ventilation

45. To ensure that workmen in transit sheds work safely and productively, adequate ventilation must be provided. The installation of ventilators is normally guided by local building code requirements. The choice of size, location and type of ventilator is determined by the required rate of air changes inside the transit shed.

46. Most building codes require ventilation through the roof. Any of the following three types of ventilator may be used:

- (a) The individual ventilator, round gravity type;
- (b) The continuous ridge ventilator, gravity type;
- (c) The mechanical ventilator with positive forced-draft fan.

## J. Offices and washrooms

47. Under normal circumstances, the shed superintendent, the storekeeper and other shed personnel will have their offices situated within the transit shed. The size and location of such offices will depend on staffing requirements and the operating flow of the transit shed.

48. In many places, shed offices are built above lock-ups where valuable cargo are kept. This arrangement not only provides an additional measure of security for the cargo in the lock-up but also economizes on floor space.

49. For the convenience of workers and to prevent unnecessary time loss through movement to and from washrooms and toilets, sanitation facilities should be situated as close to working gangs as possible. They may be provided either in the transit shed itself or in an adjacent building. The size of facilities will depend on the size of the working population and is usually stipulated by specific local health and sanitation codes. If necessary, shower rooms may also be provided.

## III. MANAGEMENT AND ORGANIZATION OF TRANSIT SHEDS

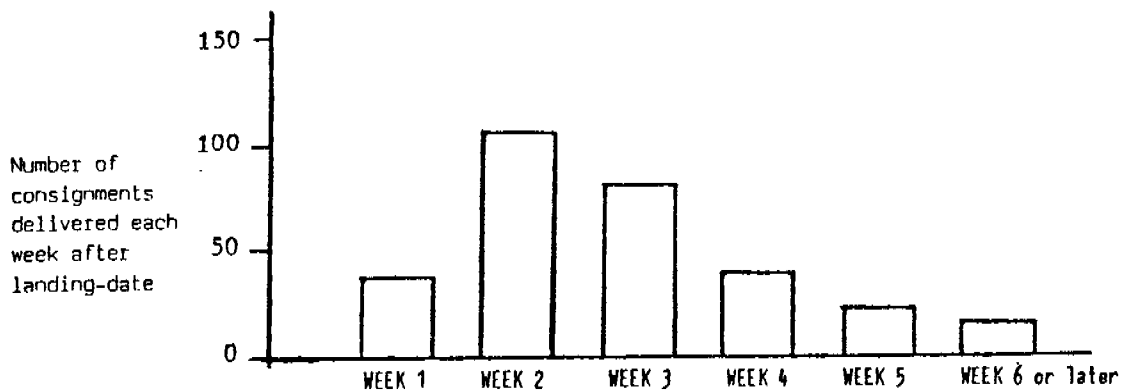
50. This chapter discusses the various factors involved and the steps to be taken in organizing and managing a transit shed effectively. Whatever management style is adopted, the important point that has to be borne in mind is that the transit shed is a buffer area holding cargo for a short period of time. Accordingly, the various management measures taken must be directed towards achieving this objective, otherwise congestion in sheds will result. Efficiency requires a co-ordinated and rational pricing structure, the availability of men and equipment, an efficient storage and location plan, and a simple and effective operating system. Despite proper planning there may be times when delays in delivery and unusual peaks give rise to a more congested shed, resulting in spill-overs. Accordingly, back-up sheds have to be provided for such contingencies. Since transit sheds provide safe custody of cargo, vigilance and a proper system to ensure safety and security of cargo are essential.

A. An effective tariff structure

51. Since transit sheds are buffer areas and provide only temporary storage to cargo, it is imperative that the cargo be moved out as fast as possible to make space for more cargo. The management of the port must therefore ensure that the fiscal policy or rate structure be designed to achieve this objective.

52. Before a structure can be worked out, it may be desirable to study the pattern of cargo transit times in the shed. The length of time import cargo typically spends in a transit shed is shown in figure 3 (export cargoes tend to stay in storage for shorter periods than imports).

Figure 3: Typical pattern of the length of time cargo spends in transit



53. The typical pattern is for the larger proportion of the cargo to be removed in the first two weeks. However, at the third week there is still a substantial amount of cargo remaining in the shed. Delivery of this remaining cargo takes place over weeks 3, 4 and 5, and even at week 6 some cargo still remains. Although the actual pattern varies slightly from port to port depending on local trading habits, the basic pattern is the same. Congestion occurs when the bulk of the deliveries are shifted to the later weeks.

54. In order to manage transit sheds efficiently, it is desirable that cargoes be delivered promptly, otherwise the effective storage capacity is reduced. To this end it is desirable that cargo be delivered in the first week or even in the first few days if possible. The tariff structure on store rents should, therefore, be designed to meet this objective.

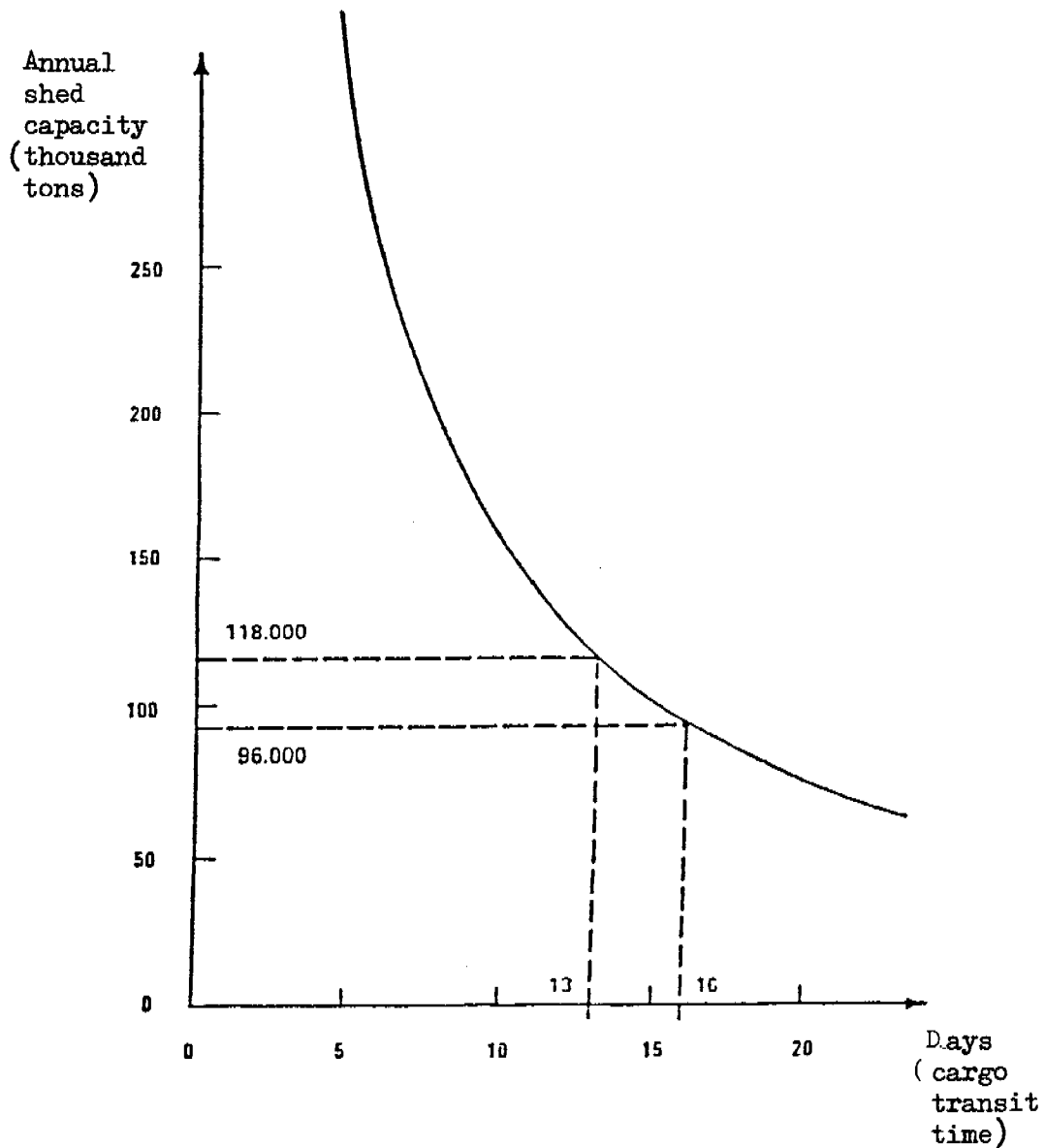
55. The structure should be such that for a short period, lasting a few days up to even a week, no charges are levied. After expiry of this free store rent period, storage charges should be imposed and they should even escalate as the cargo stays longer. The principle used in determining the structure should be two-fold. Firstly, the free store rent period encourages the consignees to take delivery within this period. Secondly, the escalating charges discourage long stays and penalize the consignee as his cargo stays longer in the shed.

56. In determining rates, the store rent of nearby warehouses must also be compared. Rates have to be high enough to ensure that users do not use the transit sheds as cheap warehouses. It has been reported that in an Asian

port, the demurrage rates for transit sheds storage were quadrupled to make it unprofitable for consignees to use the transit sheds for warehousing. <sup>4/</sup> The result was that congestion was considerably reduced.

57. The important of reducing average transit times for cargo in the shed is evident from a case quoted in an UCTAD seminar given in 1973. A reduction of transit time from 16 to 13 days can increase the annual shed capacity from 96,000 tons to approximately 118,000 tons, an increase of about 23 per cent, (see figure 4).

Figure 4: Relationship between cargo transit time and annual shed capacity



Source: Lecture on storage capacity, UCTAD seminar on "Systematic Methods of Improving Berth Throughput", Singapore, 3-13 December 1973.

B. Proper use of space and storage of cargo

58. One of the first steps in managing a transit shed efficiently is to ensure that the space in the shed is effectively utilized and cargo properly stacked. Proper organization of the shed and effective stacking of the cargo will result in good storekeeping, easy location and identification of the cargo, and safer and faster removal.

59. To use the space in the shed effectively does not mean 100 per cent utilization. This is not possible, as space is taken up for passageways, aisles, office space and cargo ventilation (see figure 5). However, maximum use can be made of the remaining valuable space by clearly defining and maximizing the layout of cargo bays, as well as using high stacking. The latter practice although desirable, should not be overdone at the expense of safety and fire risks.

Figure 5: Cargo stored in a section of transit shed



60. Proper storage and use of space can be achieved by:

- (a) A systematic shed layout with clearly defined bays and passageway;
- (b) Well-defined working rules on how high and in what manner the cargo may be stacked and under what conditions, when to use block stow or where to store fast and slow moving cargo;
- (c) A simple and well controlled cargo location system;
- (d) A proper stock-taking and cargo removal programme; and
- (e) Suitable handling and stacking equipment.

1. A systematic shed layout

61. All the space in the shed must be properly allocated and marked to facilitate easy location or tracking of cargo and provide well-defined areas for stacking. Bays must be provided for import, trans-shipment export and damaged cargo. An alpha-numeric coding system may be painted boldly at various points so that every one see it easily. Floor lines delineating passageways and cargo bays should be painted clearly. These lines may be supplemented by overhead "bay designation" signs. To enable cargo operations to be carried out without hindrance, import and trans-shipment cargo should be stored in the part of the shed facing the landward side, while export cargo should be stored facing the quayside. All the cargo must be stored according to shipments and commodities, followed by markings and types of packing. The cargo markings should face outward and upward for easy identification.

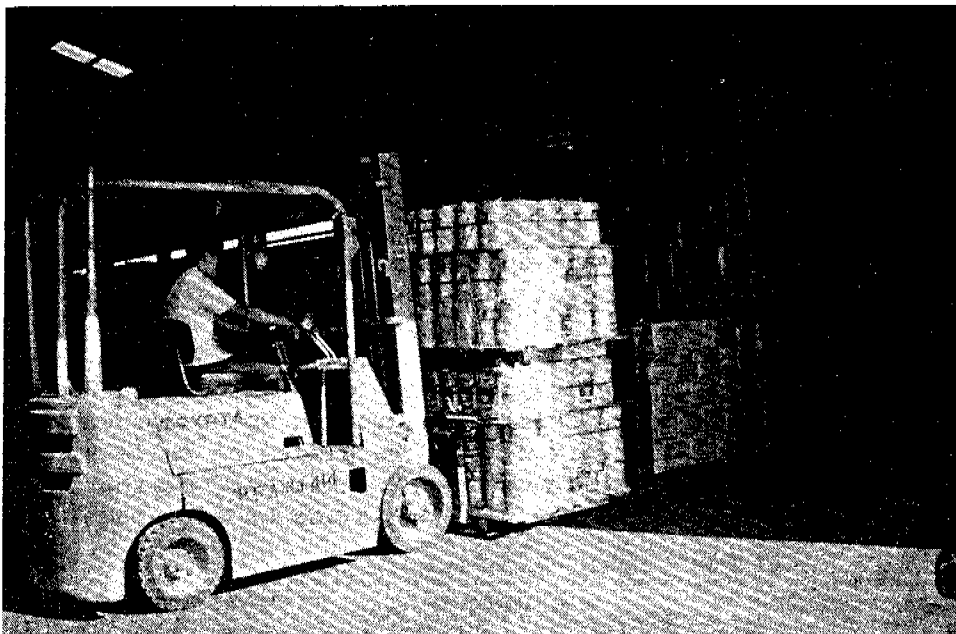
62. A passageway or aisle must be provided for the mechanical equipment to move around. The space to be provided depends on the types of mechanical equipment used, e.g. forklifts, pallet trucks, etc.

2. Stacking and stowage

63. Each port should set its own working rules as to how high and how carefully various categories of cargo should be stacked and under what conditions. In addition, workers should be told what stowage plan to use and where to store fast and slow moving cargo. Proper stacking will ensure safety in handling, easy identification and quick removal.

64. The utilization of air space depends on how high the cargo can be stacked. The level of stacking depends on the nature, characteristics and weight of cargo. Palletized cargo, cartons, bales and bagged cargo can easily be stacked three or four pallets high (see figure 6). For cases and crates it is advisable to restrict the height to two pallets high. The climate of the country must also be considered. For instance, bales of cotton can become combustible when stored in a poorly ventilated shed in a tropical country. It is therefore advisable for such cargo not to be stored more than five metres high and not less than one metre away from the shed wall.

Figure 6: Palletized cargoes stacked in transit shed



65. Pallets of cargo should be stacked two in a row side by side. A passage or aisle of about half a metre is to be left on both sides to allow checking and easy location of cargo and its markings. However, for large quantities of homogeneous cargo, stacking can be done as a block. It is also necessary to ensure that fragile cargo is not stacked next to heavy goods, while edible foodstuff animal feed should not be stacked next to chemicals/fertilizers, coffee should be separated from fruits, and onions and other commodities with a strong smell should be stored away from food. Damaged cargo should be stored in front of or at least near to the shed office to prevent any attempt at pilferage.

66. There are various choices with regard to stacking patterns. The following are some of the basic rules that can be adopted:

(a) Bagged cargo should always be cross-stacked on a pallet to prevent bags from slipping and falling off;

(b) The topmost tier of cartons on a pallet should be cross-stacked to prevent columns of cartons from falling;

(c) The top surface of a pallet of cargo must be level otherwise another pallet cannot be stacked on top or the column of cargo will not be upright, with a possibility of collapsing;

(d) Stacking of packages must follow cargo symbols indicated on the packaging, e.g. with the right side up as indicated by an arrow.

67. In cases of small consignments involving many crates or cartons of expensive equipment, the introduction of racks may enhance space utilization, improve work productivity and reduce damage. This is particularly important in the case of small ports in developing countries.

### 3. Cargo location

68. It is common for a large amount of unproductive time to be spent trying to locate cargo in transit sheds. Sometimes, the shed superintendent may not be aware of the existence of a particular cargo and a consignee may have to locate his own consignment. In such a situation, consignees may indiscriminately throw around packages that do not belong to them, and many packages can be damaged in this way. The extra time spent in locating cargo also delays deliveries of the cargo, thus tying up valuable space.

69. Efforts should be made by the transit shed staff to provide consignees with information as to where their cargo is stored in the shed. To achieve this a scheme must be designed where predefined lots in the transit shed are allocated to various cargo consignments. Shipments from different dischargers must be segregated. If possible, each consignment should be indicated in the plan. When such information is made available and indicated on the location board, it will alleviate the frustration encountered by port users.

70. Likewise predefined lots should also be assigned for export cargo. This is especially important for shippers with large consignments, since delays are caused when other cargo has to be shifted to provide space for such consignments. If possible, all cargo should be placed on pallets, since this facilitates the movement of cargo in greater quantities. Furthermore, the cargo can be stacked higher, thus maximizing the use of air space.

#### 4. Stock-taking and cargo removal

71. Stock-taking of cargo discharged to the transit shed should be carried out after a certain period. This is to establish the quantity of cargo lying in the shed so that action can be taken to remove it as soon as possible to create storage space for the next vessel. The stock-taking will also identify overlanded cargo, shortlanded cargo and cargo which could not be located by the consignees. Once the cargo is identified, the consignees or the shipping agents should be informed accordingly to enable them to clear it. Each port may have different deadlines for stock-taking. As a guide, if a vessel discharges 400 tonnes of general cargo, stock-taking will be done four days after the completion of cargo discharge. Other periods are suggested as follows:

501 to 1,000 tonnes	-	5 days
1,001 to 2,000 tonnes	-	6 days
2,001 to 3,000 tonnes	-	7 days
above 3,000 tonnes	-	8 days

To avoid any cargo congestion in the transit shed, it may be necessary to remove cargo to a back-up shed or warehouse.

72. Proper records must be maintained on stock-taking and cargo removal. Cargo labels may be used to identify the different consignments or lots lying in the shed or for removing.

#### 5. Handling and stacking equipment

73. Mechanization is one of the important factors in increasing shed efficiency. When labour costs are cheap, the port management can rely on readily available human resources. However, in developed countries, land and labour are costly, and therefore mechanical handling is necessary to reduce costs. For general cargo, the use of forklift trucks with a lifting capacity of two to three tonnes is sufficient. These trucks are used for moving cargo to or from the shed and to or from the ship. They are also used for unloading and loading cargo from or onto lorries. The use of mechanized handling also gives the ability to stack heavier cargo and the flexibility to stack it higher. In addition, cargo handling and movement will be faster and more efficient.

74. The choice of equipment for the transit shed depends on the volume and type of cargo and on the co-ordination with the cargo-handling cycle time at the quay. The amount of equipment needed must be synchronized with the cycle time of the equipment and the ship's hook.

75. Not all cargo can be placed on pallets or handled by the standard fork of the forklift. Special handling devices or attachments therefore have to be fixed onto the forklift, for example drum attachments for drums, paper clamp attachments for reels of paper and extended forks for bulky cargo. Such special attachments must be made available in the shed.

76. The pallet truck is sometimes used as a complementary machine to the forklift truck. It is used for picking up and conveying pallet loads but will not do stacking. Where stowing is required in restricted areas without the need for stacking, pallet trucks are very handy.

77. Roller runways can be used when it is necessary to handle a good run of homogeneous packages over distances. A roller runway is not suitable for bagged cargo, however, unless boards are provided to prevent the bags from being caught in the runway. Roller runways can also hinder the movement of other equipment in the area. Where the chances of this occurring are slim, they are useful in speeding up handling, particularly when ground surfaces are poor.

C. Provision of back-up areas or sheds

78. Ideally cargo stored in the transit shed should be cleared by the port users within a few days. This question has been dealt with in chapter III.A, where tariff structures were discussed. Despite appropriate measures, a substantial percentage of cargo still remains after the free store rent period. Whatever reasons consignees may have for not taking early delivery, the shed superintendent must have the authority to move this cargo to a back-up shed, otherwise the effective storage area will be reduced. Hence, the provision of back-up areas such as covered sheds, open storage areas, warehouse and hardstanding areas is an important factor in the efficient running of transit sheds.

79. Open storage space is required for heavy or bulky cargo that does not need protection from the weather. Such cargo includes vehicles, tractors, machinery, timber, pipes and steel frames, which can be left in the open without danger of damage or theft. Lubricating oils, acid and asphalt in drums are also stored in open storage areas, as it is dangerous to store them in covered sheds because of the possibility of fire or leakage. The open storage area can be located at the rear or side of transit sheds (see figure 7). The size of the open storage area depends on the volume of such cargo handled, the cargo turnover and the availability of land.

Figure 7. Cargo stored in an open area





80. The advantages of using back-up sheds or warehouses as "buffer" areas are as follows:

(a) The location of warehouses is not subject to as many restrictions as that of transit sheds. They may therefore be constructed in areas where land operating costs are lower;

(b) Warehouses can be used to store longer-standing cargo, which often comprises cargo in poor or damaged condition;

(c) The warehouse can also be used for the storage of unclaimed cargo awaiting disposal.

81. How large the back-up sheds should be, how many should be built, and how far away they should be from the transit sheds depends on many factors such as volume and types of cargo to be handled, density of cargo, transit time and stacking height. Guidelines on how to determine the storage area are discussed in chapter II.B. However, although back-up facilities provide a further buffer for cargo overflow, the percentage of cargo transferred should be carefully controlled, otherwise sooner or later back-up sheds will also face problems. Moreover, removal to back-up sheds involves additional costs to the port authority and this is another reason for carefully monitoring the quantities of cargo transferred. The rate structure should ensure that most cargo is already removed from the transit shed without there being any need to resort to this back up. As an added disincentive to consignees who do not remove cargo quickly, the removal charges can also be billed to them.

#### D. Adequate back-up handling equipment

82. Handling equipment, whether land trucks or forklift trucks, is required to assist port workers in transferring the cargo from the quay to the transit shed and from the shed to a delivery truck or railwagon or vice versa. The supply of mechanical equipment depends on the policy of the port. In many ports, mechanical equipment is supplied for ship's operations, as well as shed activities. There are other ports where the equipment is supplied by the commercial sectors and still others where it is supplied by contractors appointed by the ship's agents. In order to achieve a high level of service to port users and a proper utilization of the transit shed, it is important that the port authority or controlling body should have some control over the availability of this equipment, otherwise any breakdown without adequate replacements will result in a slowing down of quay-side and transit shed operations. In some ports, it has been reported that shortage of mechanical equipment, which renders it difficult to cover the full area of the sheds, is one of the main causes of cargo congestion in transit sheds. 5/

83. As a rule of thumb, a forklift truck is normally allocated to work together with a gang of labour on each ship's hatch. Whenever a forklift truck is temporarily not being used, it should be deployed to assist in shed activities such as cargo removal, restacking, loading or unloading of cargo from trucks. A central body should be set up to control such deployment. Adequate stand-by forklift trucks must also be available in case of machine unavailability as a result of breakdowns, preventive maintenance, etc.

84. Sufficient numbers and adequate back-up of mechanical handling equipment will keep cargo moving faster. Hence the transit shed will be able to

achieve better utilization of storage space, a faster and higher volume of cargo turnover, a consistent level of operator's productivity through reduction in fatigue, less damage to cargo and better industrial safety.

E. Manpower management

85. Work organization and good human relations play a significant part in work efficiency. Each member of staff should know his role and duties and understand how they interact with those of his colleagues in achieving the shed's objectives. At the same time, the management will have to ensure that the workforce is effectively deployed. Effective manpower management encompasses the following:

- (a) Proper organization;
- (b) Allocation of adequate manpower;
- (c) Assigning the right man to the right job;
- (d) Fair distribution of workload.

1. Proper organization

86. Manpower in transit sheds must be well organized to enable each member of the staff to be aware of his role and duties. The aim is to accomplish most effectively the work required to meet the port's objectives. To achieve this, we need to consider the following five main steps:

- (i) Activity analysis: all activities in the transit shed must be clearly defined. They must be interrelated and shown to meet the transit shed's objectives, e.g. receipt of inward cargo, release of cargo to consignees, control, stacking of cargo, etc;
- (ii) Establishment of decision pattern: this defines the decisions to be made at each level and is necessary to avoid any ambiguity in decision-making;
- (iii) Preparation of organizational structure: an organization chart illustrates the formal control structure, each person's span of control and their interrelationships;
- (iv) Formulation of job descriptions: once the organizational structure is established, the parameters of each job in the organization must be defined in terms of its scope, limitations and measures of performance to enable each member of staff to know his area of responsibility, what is required of him and how he and his superior officer can assess his performance;
- (v) Man specification: having described the job position, the next step is to specify the type of person needed to adequately fulfil the role. The specifications include experience, educational qualifications, personal qualities and key strengths.

## 2. Allocation of adequate manpower

87. Deploying adequate manpower does not mean supplying a large labour force. It means employing the right number of workers to the best advantage, assisted by proper facilities and equipment.

88. It is difficult to lay down what the required labour force is in a transit shed. It depends on the size of the shed, the volume of cargo handled, the type of cargo and packaging, the manner of stowage, the availability of mechanical equipment, the simplicity/complexity of documentation procedures and local labour practices. Another essential factor is the type of functions performed by the transit shed and the shed's working hours. Certain ports maintain a strict control over the handling of cargo in the shed by providing their own labour and mechanical equipment. If job demarcation practices or insufficient training are prevalent, a larger workforce would be required. For ease of deployment and efficiency, a port authority should strive for a situation where the workers can form an interchangeable and flexible group. For example, as far as possible, workers should be deployed to work in the transit shed when activity on the wharf is low. Forklift trucks working on the wharf should also be deployed during slack times to help shippers or consignees with loading or unloading as the case may be.

89. It is common for shippers and consignees to expect shed workers and forklift trucks to be made available on the spot whenever they are required. Although such an approach may provide the best service, it is not advisable, as it is unsystematic and will adversely affect the utilization of the manpower and forklift trucks. In providing drivers for forklift trucks, there is always a compelling desire to cater for the peak, which usually occurs when consignees and shippers bunch together during the day for services. However, this is not efficient, as men and equipment will be underutilized during troughs. An optimum level therefore has to be found.

90. Men and mechanical equipment should be deployed, if possible, one day before the actual operation. This is to enable the logistics or allocation unit to have sufficient time to ensure proper planning and allocation of men and mechanical equipment. In addition, if the workers are told of their deployment for the next day's job, they can report to the shed directly. This will reduce the unproductive time involved in having to report to the muster station and then to the allocated shed. Hence, it is necessary for port users to submit their orders one day before.

## 3. Assigning the right man to the right job

91. Assigning the right man to the right job is important. Proper training must be provided to all workers before they are allocated to jobs, because the skill required in cargo handling is in many ways unique, unlike the case of workers in manufacturing or service industries where skills are transferrable among industries. For instance, a mechanical equipment driver needs to pass a certain competency test before he is allowed to drive certain types of equipment, e.g. forklift trucks, freightlifters, cranes, etc. Untrained or unqualified workers will not only give poor performance, they will also cause damage to cargo and endanger their colleagues' lives.

#### 4. Fair distribution of work

92. Uneven distribution of the workload leads to low performance, low utilization and poor workflow. It is common to see port users arriving at the shed at the same time to process their documents before handling the cargo. It is the duty of the storekeeper to ensure that sufficient clerical support is present to expedite the processing of documents. The clerical staff should also be flexible enough to assist each other at the counters to reduce the customers' waiting time. Likewise, the shed foreman in charge of the forklift truck drivers must ensure that none of them are left idle. They should assist each other to even the workload. In order to distribute the workload evenly, planning of the manpower resources must be done beforehand. For this to be possible, shippers and consignees will have to submit their detailed labour and mechanical equipment requirements beforehand. For example, requirements can include details of tonnages and type of cargo to be handled, e.g. delivery of 100 pallets of canned food.

93. Thus, for a transit shed to function well, it must have an effectively deployed labour force. However, it is essential to bear in mind that no labour force can give of its best and produce the best result without being properly organized and deployed and utilized to the fullest capacity.

#### F. Performance indicators

94. It is beneficial to set up performance indicators to measure the efficiency of a shed. From these indicators, the shed superintendent will be able to identify the areas where performance has fared badly so that the necessary remedial action can be taken. The indicators may be prepared on a monthly basis and cover such items as volume and types of cargo handled, percentage of cargo delivered or cleared within a certain period (e.g. three days and seven days), number of packages shortshipped, number of packages shortlanded, number of packages still lying in the shed after a certain number of days (e.g. 21 days and 31 days) and the time waited by port users for the supply of forklift trucks or other equipment/facilities (e.g. less than 15 minutes, 15-30 minutes, etc.).

#### G. Simple documentation procedures

95. With the increasing complexity of port operations due to expansion, developments and governmental control, paperwork has increased tremendously. Problems are also aggravated by other factors such as:

(a) New procedures which are introduced or existing procedures which are changed in an unplanned manner just to meet the demands of immediate circumstances;

(b) Application of incorrect solutions to ill-defined problems. For example, a delay in processing a document may be remedied by an increase of staff, but the problem may be caused by a poorly designed form which takes an unnecessarily long time to complete.

As a result, it is not surprising to see port users forming queues at the shed office to pay port charges and to clear documents.

96. Hence, simplification of all formalities, including billing of various services, should be the main objective of an effective administrative system. A simple documentation procedure will result in faster movement of cargo, reduction of traffic and cargo congestion in the shed, better utilization of shed space and reduction of clerical staff requirements.

97. Computerized systems have also been installed at ports in developed countries to simplify shipping, delivery and billing systems. Such computerized systems must be justified by a feasibility study showing their efficiency and cost benefits. Expertise and trained personnel must also be available to maintain the system.

98. Whatever systems are to be adopted, it is important that good procedures be provided to ensure a smooth workflow, adequate control, economy and better co-ordination.

99. If all staff in the transit shed were aware of the correct way of doing things, there would be no need for written procedures. However, this is not the case. Procedural changes are introduced and new staff are recruited now and then. Written procedures are therefore required for the following reasons:

(a) The best methods can be determined:

Work is often not done in the best way. In the process of drawing up written procedures, a detailed examination and analysis of procedures has to be carried out to ensure that the various steps are absolutely necessary and in the right sequence. By going through the procedures, the approving authority also ensures that the best method is recorded;

(b) Standardization can be achieved:

Once written procedures are established, a standardized practice is possible at the various sheds. Port users will not be confused by different sets of procedures at different sheds. The standard procedures will also lessen the burden of management. Not all functions can be covered by written procedures, but those that are become far more manageable;

(c) Changes can be implemented more effectively:

Revisions and modifications of procedures are inevitable because of changes in organization and systems improvement and for other reasons. Written procedures provide the most effective means of making these changes. The personnel who are affected will have in writing the procedures that are being changed and the new procedures. Written procedures are far more effective than verbal instructions;

(d) The management function can be made more effective:

Written procedures covering the main functions and principles of shed management reduce the number of variable situations management must deal with. Ways to handle many of the repetitive problem areas will be defined and predetermined courses of action can be followed. Hence management can concentrate its time and effort on improving methods and procedures and spend less time on handling repetitive problems;

(e) Jobs can be more clearly defined:

Jobs are more clearly defined and allocated to various staff members. The analyst who draws up the procedures will of course consider the even distribution of workload

(f) New staff can be trained:

Step-by-step procedures will not only guide the new staff in their duties, they will also indicate how a role is interrelated with other job positions to achieve the common objective of the transit shed.

100. A good procedures manual should have the following characteristics: it should be easy to read and understand, concise but complete, easy to change, conveniently cross-referenced, authoritative and up to date. Finally, even though procedures are written down, they cannot be effective unless they are enforced and supported by the management.

#### H. Security measures

101. Theft and pilferage of cargo from transit sheds is a common problem faced by port authorities. The causes and reasons are varied. Generally, the losses can be attributed to three main groups, mainly:

- (a) Individuals or petty thieves;
- (b) Organized groups;
- (c) Computer thefts and frauds.

Improved physical security can help to reduce pilferage and organized thefts. However, the same is not true of computer system thefts.

102. One of the main measures to be taken is to institute stiff penalties for offenders when they are caught. For the purposes of prevention, a port can be declared a protected area so that port security personnel can have special powers, including the right to search without warrant. For control, entry passes should be issued only to persons who have legitimate business in the port. Frequent checks can be conducted in the transit sheds by the port security personnel. These personnel can be equipped with VHF radio sets for communication. Shed staff also have to be vigilant and look out for irregular activities. The security personnel at the point of delivery (such as gates) have to be thorough in checking cargo identities such as descriptions and marks and numbers. Since marks and numbers can be changed in cases where the port has trans-shipment trades, it is imperative that changes, if required, be properly authorized and physically controlled.

103. Other than physical checks, documentation or administrative systems can be drawn up in such a way as to provide built-in controls to countercheck information provided in order to combat organized crime. However, although it may be desirable to prevent crimes and incorporate as much control as possible to deter crimes, the superintendent has to balance this against having too cumbersome a system which will ultimately affect port efficiency and the level of service.

#### IV. OTHER EXTERNAL FACTORS

104. The steps contributing to effective shed management discussed in chapter III are internal factors all well within the control of the man in charge. However, there are factors which are external to the shed superintendent and therefore not within his control but which have a significant bearing on the effective management of the shed. These factors will be discussed and the steps to be taken will be examined in this chapter. They concern:

- (a) Ship arrival schedules;
- (b) Timely receipt of cargo particulars;
- (c) Customs clearance;
- (d) Effects of public holidays;
- (e) Establishment of free zones.

##### A. Ship arrival schedules

105. Early knowledge and confirmation of vessel arrivals will enhance the administrative efficiency of the port in general and will improve the planning of the transit shed in particular. However, the accuracy of this information depends on various factors, one of which is the vessel performance in the last port of call. With an accurate confirmation of ship arrival, the port is able to plan and co-ordinate operational activities such as pilotage, tug operations, berthing and stevedoring. It is also possible to plan and evenly distribute the workload in transit sheds, preventing possible cargo accumulation in some sheds, or if the vessel has to be berthed next to a shed that is already full, timely action can be taken to rail the cargo to a back-up shed. The latter case can occur in some countries where certain festivals or festivities cause seasonal peaks and hence above-average cargo levels in sheds. With accurate arrival information, the shed superintendent can also plan equipment and labour requirements. In particular, if specialized equipment is needed, it can be ordered in advance.

##### B. Timely receipt of cargo particulars

106. Timely receipt of cargo particulars is also important in deciding which transit shed is to be used, the amount and location of the space needed, and the numbers of cargo handlers and equipment required.

107. If possible, cargo manifests should be forwarded to the port at least one week before the arrival of a ship. This will allow ample time for planning. For certain vessels and lines which habitually provide the information late, the port authority will have to discuss their problem with the shipping agents/lines concerned and stress to them the importance of timely receipt of information in their planning.

##### C. Customs clearance

108. Many cases have been reported where customs delays have been a major problem in transit shed clearance. These delays relate to such factors as

organizational deficiencies, outmoded procedures, loopholes in customs laws and regulations, lack of adequately trained staff, delays in the lodgement of customs entries by consignees or agents, customs delays in the physical examination of cargo, and disputes between consignees and customs on the amount of duty payable. Where customs procedures are slow and cumbersome, delays in delivery will result, increasing the chances of congestion. Although this is beyond the control of the port authority, the latter should take steps to discuss the problem with customs authorities and shipping agents to reduce the delays. For instance, it has been reported that an Asian port approached the customs to rationalize, simplify, and expedite their documentation and appraisal procedures to improve the overstrained port facilities. Together with other measures taken, this produced a substantial improvement in cargo clearance, and the frequent congestion has been reduced. 6/

109. Attempts should be made to draw a line between the functions of the port authority and those of the customs to ensure that functions do not overlap, since duplication of work can result in gross inefficiency. The customs should confine their role to tax levying and anti-smuggling measures and should not be involved more than necessary. Joint efforts should be made to rationalize activities and streamline systems, thus leading to more effective shed management.

D. Effects of public holidays

110. Cargo congestion at transit sheds can be due to the closure of the port or transit shed over a period of time, e.g. over a long stretch of public holidays. The President of the Maritime Services Board, Sydney, has warned of a possible cargo build-up on the Sydney wharves during the Christmas-New Year holiday period. 7/ Resources could be strained, as many importers close their warehouses. To avoid such situations, it is advisable for sheds to be opened during public holidays, or at least for a few hours each day, depending on the cargo situation.

E. Establishment of free zones

111. One way of simplifying procedures and reducing customs documentation is to establish a free zone in the port, or transform the main part of the port into a free zone. This has the other advantages of attracting more traffic and trans-shipment cargo. With the establishment of a free zone, cargo can be handled, stored, mixed, blended, repacked, manufactured or reshipped without the intervention of customs officials. In the zone, for goods of foreign origin it is not necessary to pay customs dues, make customs declarations or provide guarantees. Thus the loading and discharging procedures are simplified by the absence of customs formalities. This is particularly beneficial for trans-shipment and re-export cargo, because such cargo can be moved from one transit shed to another, imported and reshipped with no administrative formalities, except for those relating to safety and health.



## V. CONCLUSIONS

112. Efficient ports form the backbone of the prosperity of most developing countries. There is, therefore, an urgent need to improve port performance. However, the emphasis should be laid not so much on the size of a port or the number of berths, but rather on high efficiency at each berth, efficiency that will be achieved by correct functional design and by proper organization of port operations, of which the transit shed is a part. In the case of sheds that are old and inefficient to operate, it may be more economical to demolish them and to replace them with modern ones.

113. This monograph describes some of the essential steps aimed at achieving a more effective management of transit sheds. As conditions and circumstances differ from port to port, only major general factors have been highlighted. It is not the intention to give specific solutions to specific problems, as these depend on individual circumstances and have to be evaluated taking local conditions into account.

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1/ Port Development: A Handbook for Planners in Developing Countries (United Nations publication, Sales No. E.84.II.D.1.).

2/ Henry F. Cornick, Dock and Harbour Engineering, vol.3 (London, Charles Griffin and Co.Ltd., 1960).

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4/ R.P. Holubowicz (ed.), Progress in Cargo Handling (Maryland, Cornell Maritime Press Inc., 1962).

5/ R.P. Holubowicz (ed.), op. cit.

6/ R.P. Holubowicz (ed.), op.cit.

7/ Port and Harbours, March 1975, p.49.

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