

MANUAL
on a uniform system of port statistics
and performance indicators

3rd edition

Prepared by the

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MANUAL

on a uniform system of port statistics and performance indicators

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and the Port Management Association of Eastern and Southern Africa
and funded by the United Nations Development Programme
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This revision incorporates a new packaging code and
excludes Part Two which has not been altered.

PORT STATISTICS AND PERFORMANCE INDICATORS

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Assistance for modernization and harmonization of port statistics and introduction of performance indicators in eastern and southern African ports (RAF/80/023)

BACKGROUND

1. In 1977 the President of the Ministerial Conference of West and Central African States on Maritime Transport officially requested the United Nations Organization to assist the Port Management Association of West and Central Africa in the implementation of a uniform system of port statistics and performance indicators.
2. As a result of this official request the United Nations Development Programme (UNDP) agreed to finance a project (RAF/78/011) to be executed by the United Nations Conference on Trade and Development (UNCTAD) in association with the Economic Commission for Africa (ECA).¹
3. A manual was developed in early 1979 for use in the seminar which took place from 18-23 June 1979 in Douala (Cameroon). The objective of providing a manual was to give sufficient guidance to enable participating port authorities themselves to prepare uniform statistical information and to present common performance indicators.
4. In developing the statistical schemes contained in the manual the UNCTAD experts found a very wide interest for port statistics and performance indicators in other port authorities and port organizations, which were not participating in the UNDP project, as they were not members of the Port Management Association of West and Central Africa. In fact, the requests to obtain a copy of the manual were so numerous that the proposal was made to UNDP to publish the manual for general circulation to all interested ports. Upon agreement from UNDP the original manual was edited in particular with a view to make it generally applicable to all world ports. The version published remains, however, very close to the manual presented at the Douala seminar.²
5. The point should be stressed that the schemes presented in the manual were extensively discussed both with the World Bank staff and the United Nations Statistical Office and that both organizations gave their support to the proposed schemes.
6. When the results of this project were presented to the Port Management Association of Eastern Africa (PMAEA) meeting in 1979 in the Seychelles, the Association members expressed interest in the implementation of a similar scheme for their ports. A project document was drawn up by UNCTAD and transmitted to UNDP and ECA. UNDP asked that the project document be endorsed by three governments of the region.
7. At the council meeting of the PMAEA held in Maputo in October 1980, the project document was signed by the Minister for Ports and Surface Transports, Mozambique. This signature, together with the signatures of the Minister for Transport and Communications, Kenya, and the Minister for Transport and Tourism, Seychelles, provided the three signatures requested. UNDP gave its formal approval for the project in March 1981.
8. Letters were sent to participating ports to request the appointment of liaison officers and the collection of a sample of the statistics presently maintained by the port authorities. By the end of August, liaison officers had been appointed for the Sudan, Somalia, Kenya, Seychelles and Mauritius. A full sample of statistics had also been received from the Sudan, Kenya, Seychelles and Mauritius. Reminder cables were sent at that time to the other participating countries - namely

¹ In addition a portion of the project was financed from the Port Project Trust Fund provided by the Governments of Norway, Denmark and the Netherlands.

² This note should be read with the manual on a uniform system of port statistics and performance indicators, UNCTAD/SHIP/185.

Comoros, Djibouti, Ethiopia, Madagascar, Mozambique and Tanzania. By November, liaison officers were appointed for all countries.

9. A preliminary examination of the sample of statistics already collected within the region showed a wide variation in the statistics being maintained. Some ports are already maintaining performance indicators for port operations while others maintain records only on ship and cargo traffic. As well, some ports record tonnages in freight tons while others in weight or DWT tons. The growth of container traffic is also noted and a uniform method of recording container traffic is required. Also, this growth strengthens the need to include statistics on equipment performance and utilization.

10. Within the region, the ports of Assab (Ethiopia) and Tamatave (Madagascar) have already taken steps to implement the scheme. The Marine Transport Authority did this at Assab on a temporary basis for the application of UNCTAD's Berth Throughput Methodology to study the factors limiting the productivity of the port. Also, the 'Societe d'Exploitation' from the port of Tamatave has introduced a computerized adaptation of the scheme. Their experience will assist us in the implementation of the scheme within the region.

11. Our experience with the scheme in West and Central Africa has shown us how important the interest and involvement of top management is in the implementation of the scheme. The best way to assure the preparation of timely statistics is for senior managers to press for the reports to assist them in their decision-making. Thus the statistics should highlight areas where management can take action to improve operations. For example, an analysis of the duration and causes of delays to ship working will allow managers to concentrate on the most important stoppages. If alerted to changes in the volume of traffic or in its presentation, management will be able to take steps to change the facilities in an appropriate fashion. Also the identification of shippers which have long staying cargoes will allow management to concentrate their efforts on those users abusing this port service.

12. During the implementation of the scheme in West and Central Africa a number of difficulties were encountered primarily in the rapid collection of accurate information. In some ports the organisation responsible for cargo handling and the organisation responsible for statistics were different and exchange of information was limited. One of the purpose of this report is to outline an alternative method of data collection which gives up some of the detail but is simpler and still allows the calculation of the performance indicators. As well, new sections on equipment availability and delivery of cargo are introduced as these are both problem areas for many port authorities in developing countries. Closely linked to cargo delivery is the control of storage space and in particular the monitoring of containers in the port area. This has prompted the introduction of a section on container monitoring within the port area.

SHIFT SUMMARY REPORT

13. The time sheet has been used as the input document to determine the time at berth that the ship has been worked, gang hours worked (gross and net), manhours worked (gross and net) and tonnage worked. As well the time sheet can be used to calculate productivities for different cargo classes, the modal split (flow of cargo through the different routes of the berth) and equipment allocation. However, the time sheet should be prepared by the operation department and not the statistical unit; thus it is a source document. One of the difficulties for the operations department is the availability of qualified staff to record the information and at the moment of discharge or loading to know the actual weight of cargo worked especially for break bulk general cargo.

14. An alternative method for ports not using a time sheet would be for the operations units to pass the following information to the statistics cell which should have a copy of the ships manifest:

- a. shift summary report;
- b. gang idle time report;
- c. out turn report (difference between manifest and cargo discharged) or landed tallies;
- d. shipping orders;
- e. cargo shifted report.

From this information the time that the ship is worked at berth, gang hours worked (gross and net), manhours worked (gross and net) and tonnage worked can be calculated. All reports are essential for the operation of the port. The first for payroll calculations, the second and and fifth for extra cargo handling charges, and the third and fourth for port dues on cargo. From this information the labour handling summary can be completed.

15. A proposed format for the shift summary report and the gang idle time report are shown. The ship foreman will have a record keeper or time keeper assigned to him who will complete these forms. The gang idle time report is identical to the gang idle time section of the time sheet. Both reports are to be certified by the stevedore's and the ship owner's representative.

16. The shift summary report is completed for each shift with one line for each gang on board. The hatch number or numbers that each gang works is recorded and the approximate tonnage worked is marked in the appropriate column or columns (discharged, loaded, and shifted). The start of work and finish of work are recorded as is the number of men in each gang. By gang we mean all the men involved in the cargo handling operation from the hold to the storage place of the cargo in the port. When one gang on shore is working more than one hook, the men in the shore gang should be split evenly among the gangs on board.

17. The equipment allocated at the beginning of the shift is to be noted on the form as well. In the 'remarks' section of the form observations on ship working are to be entered, for example, floating crane was used for 2 hours to discharge heavy-lifts from hold 3.

SHIFT SUMMARY REPORT

Port: _____ Date: _____ Ship name: _____

Berth No. _____ Shift No: _____ Rotation No: _____

Hatch No.	Tons worked			Gang hours worked		No. of men
	Discharged	Loaded	Shifted	Start	Finish	

Equipment allocated:

Remarks:

Stevedore's _____ Ship's officer: _____
representative:

EQUIPMENT AVAILABILITY

Introduction

18. At most ports successful cargo handling operations are dependent on the availability and use of mechanical equipment. This dependence on mechanical equipment will continue and increase. It is essential therefore that port management takes a close and constant watch over the condition and efficient use of its equipment. For this, regular information is needed concerning availability, maintenance and use of machines.

19. The prime object of this seminar is to explain a system of recording information concerning port operations and presenting it effectively so that managers can have readily available a basic set of indicators to aid them in the exercise of their responsibilities. Guided by the information provided by these indicators port management can assess the efficiency of their port's operations and can initiate action to improve performance and if necessary investigate any apparent problem areas so that they can be eliminated.

20. It is not the purpose of this seminar to suggest what action management should take to make the best use of the information provided by the statistics that are recommended. There is, however, one point of difference as far as equipment is concerned ; whereas all ports keep records of their cargo handling operations (for purposes other than for statistical record e.g. tallying, billing, payment of labour etc) some ports appear to keep few, if any, records of the maintenance of their equipment and some do not even seem to have any system of organised maintenance of their equipment.

21. It has therefore been thought useful to include in this lecture some general information concerning the general subject of maintenance with suggestions for a system of organising and recording the maintenance of mechanical cargo handling equipment.

Maintenance policy

22. Maintenance has been defined (in British Standard 3811, 1964) as:-

"work undertaken to keep or restore every facility to an acceptable standard at an acceptable cost"

and the same British Standard has the following other definitions, most of which are relevant to this outline of maintenance policy:-

"Planned maintenance. Work organised and carried out with forethought, control and records"

"Preventive maintenance. Work intended to prevent the failure of a facility"

"Corrective maintenance. Work intended to restore a facility to the required standard"

"Running maintenance. Preventive maintenance implemented with the facility still in service"

"Shutdown maintenance. Work only implemented when the facility is out of service"

"Breakdown maintenance. Work implemented after failure of the facility but based on advance planning"

"Emergency maintenance. Work necessitated by an unforeseen breakdown in planning"

Availability and reliability of cargo handling equipment are vital to any port because of their relation to the uninterrupted discharge and loading of ships. For this reason it is recommended that all ports should introduce and follow a comprehensive maintenance policy incorporating planned, preventive and corrective maintenance (as defined above).

23. The essentials of a comprehensive maintenance policy (which to be effective must of course be supported by adequate stores and maintenance facilities) are:-

(a) that ports only purchase machines that are the products of manufactures of established reputation worldwide and are models that have proved themselves in ports where conditions are similar to conditions in their own port;

(b) the manufacturer undertakes as part of the contract to supply the equipment to make factory trained personnel at the port during the acceptance period for initial servicing and for the training of the port's operating and maintenance personnel;

(c) special care is taken to maintain operating surfaces in good condition and any damaged surfaces restored to good condition without delay;

(d) there is a grading and pay structure for those responsible for the operation and maintenance of cargo handling equipment that is commensurate with the responsibilities involved;

(e) there is trained and competent supervision of operating and maintenance;

(f) a comprehensive planned maintenance system is introduced and given the fullest possible support by management at all times

Comprehensive planned maintenance system

24. A comprehensive planned maintenance system should include the following elements:-

(a) a planned replacement policy;

(b) the systematic purchase and stocking of spare parts;

(c) planned maintenance programmes;

(d) a record of each machine of the work done and its cost.

Planned replacement policy

A planned replacement policy is important. Its purpose is to ensure that a machine is replaced (and that funds have been set aside for the purchase of a replacement) before its availability for service drops and/or the costs of keeping it in service become uneconomic. There are several ways in which a policy can be decided, some simple and some rather complicated, and most depend on past records of machine use. If reliable records of past use are not available it is recommended that until full records have been kept for some years of machine use and operating costs, a simple system based on an expected useful "life" be used. Experience of operating cargo handling equipment in ports in hot countries has shown that it is prudent to make provision for the replacement of forklifts after five years; the "life" of a mobile crane may be a little longer.

Planned provision of spare parts

In order to maintain any machine properly it is essential to have available a reliable and adequate supply of spare parts. Any order for new machines should include a requirement that they should be accompanied by a supply of spare parts as recom-

mended by the manufacturers as appropriate for the conditions under which the machines will be operated; the quantity of spares will usually be what the manufacturer considers will be needed for say two or three years operation or may be expressed as a percentage (usually between 10% and 15% of the price of the machines). After a year's operation the responsible engineer will be able to assess the rate at which the various kinds of spares are being used and decide the requirement of further spare part orders accordingly. The aim must always be to have spares available to ensure that machines are not kept out of service for long periods owing to lack of spares. Shortage of cargo handling equipment due to unserviceability is very damaging to the efficiency and reputation of the port.

Spare parts purchased for fitting to expensive mechanical handling equipment must be parts made or approved by the manufacturers of that equipment.

Planned maintenance programme

A suggested outline for a planned maintenance programme is given in Annex 1.

Equipment availability

25. While the maintenance of mechanical equipment is the responsibility of the engineers the availability and reliability of the machines is of direct concern to the department responsible for cargo handling operations. It is this department that uses the machines to carry on the port's business. It is essential that this department is kept informed of the availability of machines so that they can be allocated to work and warned in advance when machines should be taken out of service for routine maintenance.

26. It would be the responsibility of the engineer responsible for the maintenance of cargo handling equipment to inform the operating department at least once every day about the availability of the various items of mechanical handling equipment and also give notice as to when machines will be required for routine maintenance in accordance with the maintenance programme. This can conveniently be done by means of a form showing the following information:-

TYPE	=	whether forklift (FL), mobile crane (MC) etc
No.	=	identifying number e.g. F1 (for forklift #1)
MAKE	=	e.g. Hyster, Jones, Clark
CAP(t)	=	capacity of the machine e.g. 3.5 (tons)
A	=	available for service (tick if available)
UM	=	under planned maintenance (tick)
Usince	=	unserviceable since (insert date machine became unserviceable)
EDA	=	estimated date machine under UM or Usince will become serviceable
DM	=	approximate date machine will be required for next routine maintenance
ALLOC	=	this column left blank by engineers (it is for the use of the operations department)
REMARKS	=	

The type, number, make and capacity should be printed on the form as well as the headings.

EQUIPMENT AVAILABILITY as at 13 June..... 1982

TYPE	No.	MAKE	CAP	A	UM	Usince	EDA	DM	ALLOC	REMARKS
MC	C 1	Coles	11t	✓				12/6		
	C 2	Coles	11	✓				17/6		
	C 3	Coles	11			12/6/82	?			awaiting spare
	C 4	Coles	11	✓				24/6		
	C 5	Jones	15		✓			15/6		
	C 6	Jones	15	✓				18/6		
	C 7	Jones	15	✓				25/6		
	C 8	Jones	15	✓				30/6		
	C 9	Jones	35	✓				7/7		
	C10	Jones	40		✓			17/6		
FL	F 1	Hyster	3.5t			4/3/82	✓			awaiting disposal
	2	Hyster	3.0			4/3/82	✓			
	3	Hyster	3.5	✓				15/7		
	4	Hyster	3.5	✓				10/7		
	5	Hyster	3.5		✓			15/6		
	6	Hyster	3.5	✓				14/6		
	7	Hyster	3.5	✓				18/6		
	8	Hyster	3.5	✓				20/6		
	9	Hyster	3.5	✓				22/6		
	10	Hyster	3.5	✓				24/6		
	11	Hyster	3.5		✓			17/6		
	12	Hyster	3.5			3/6/82	?			awaiting survey (accident)
	13	Hyster	3.5	✓				30/6		
	14	Hyster	3.5	✓				1/7		
	15	Hyster	3.5	✓				3/7		
16	Hyster	3.5	✓				3/7			
17	Hyster	3.5	✓				7/7			
18	Hyster	3.5	✓				9/7			
19	Hyster	3.5	✓				11/7			
20	Hyster	3.5	✓				12/7			
21	Hyster	5	✓				17/6			
22	Hyster	5	✓				10/7			
23	Hyster	9		✓			15/6			
24	Hyster	9	✓				21/6			
25	Hyster	9	✓				29/6			
26	Hyster	9	✓				7/7			
27	Hyster	20	✓				1/7			
28	Hyster	20	✓				14/7			
TR	T 1	Mercury	LD			7/5/82	✓			awaiting write-off
	2	Mercury	LD			18/5/82	?			awaiting spare
	3	Mercury	LD		✓			15/6		
	4	Mercury	LD			7/5/82				awaiting write-off
	5	Douglas	HD	✓				3/7		
	6	Douglas	HD	✓				6/7		
	7	Douglas	HD	✓				9/7		
	8	Douglas	HD	✓				12/7		
	9	Douglas	HD		✓			15/6		
	10	Douglas	HD	✓				17/6		
	11	Douglas	HD	✓				20/6		
	12	Douglas	HD	✓				23/6		
	13	Douglas	HD	✓				26/6		
	14	Douglas	HD	✓				30/6		

(Prepared by Engineering Dept.)

27. All the above information is needed by the operations department so that the machines stated by the engineer as being available can be allocated to carry out the work of the port. In some ports there would be a board in the operations manager's office or in a control room showing all this information so that it is instantly readable and changes (such as shifting of machines from one area to another) can be recorded as decisions are made. In some ports it might be decided not to have a board and rely only on circulation of copies of the form; however, one or the other (or both) will be indispensable as a planning and recording facility at the routine daily meetings held in most ports to plan the next day's work and the allocation of cargo handling equipment to meet the requirements of ship working and landside delivery.

28. In large ports where there are a considerable number of machines a simple summary showing the total number of each type available for allocation will be sufficient for the purposes of the daily working meeting at which the areas will submit their requirements for machines for the next working period; this may be done verbally or on a form depending on the custom of the port. These will be added together and the operations manager will see to what extent availability will meet demand. For this purpose and for deciding how many machines can be provided for each area the machine numbers are not necessary; a decision will be made for example, that Berth 7 will have 4 Hyster 3ton forklifts, 1 Jones 15ton crane and 3 Douglas tractors and nine trailers and the meeting will not be concerned with which individual machines are involved. However, from that point onwards the decision of the meeting has to be translated into more specific instructions and the allocation of the machines entered on the form.

29. From the point of view of management it is important to know how efficient is the operation and maintenance of the port's mechanical equipment which, in addition to being essential to the efficient operation of the port, represents a major financial investment. Management needs to know about demand, availability and use of equipment and the cost of its operation; this seminar will not deal with the recording and analysis of costs.

30. At this stage the following items of information are available; the total mechanical cargo handling equipment held by the port and the availability for service of that equipment (i.e. from the form), the equipment requested by the areas of the port for the next work period and the equipment allocated at the working meeting against those requests. These facts can be gathered by the Statistical unit and presented to management in the form of weekly or monthly returns to show, for example:

- level of availability of equipment (compared with total fleet);
- incidence and duration of unserviceability;
- demand for equipment and extent to which met.

An example of this form is given after the next paragraph.

31. It will be realised that this is very basic information. It is, however, information that any port can produce no matter how limited its resources and it does give management a bare minimum of information about the port's equipment. It is, of course, possible to produce much more detailed information for example by recording the actual time each machine is working (perhaps showing normal time and overtime or by shift) as, indeed, some ports do and if this degree of detail can be obtained it is an advantage. However, the four items of information listed in the previous paragraph provide a base to which other, more detailed, information can be added; if a figure in the basic information appears to require explanation it could be the subject of a special one-off exercise.

DAILY EQUIPMENT ALLOCATION

13 JUNE

1982

Equipment	Berth 1		Berth 2		Berth 3		Berth 4		Area A		Area B		Totals		
	R	A	R	A	R	A	R	A	R	A	R	A	R	AV	A
M/Crane 11t	/		-		1	1	/		1	1	-		2	3	2
" 15t	/		-		-		/		2	2	1	1	3	4	3
" 35t	/		-		-		/		/	/	0	1	0	1	1
" 40t	/		-		-		/		/	/	1	0	1	0	0
Forklift 3t															
" 3.5t	2	2	6	5	4	4	4	4					16	15	15
" 5t	/		0	1	-	/	-				1	1	1	2	2
" 9t	/		/		-	/	-				2	2	2	3	2
" 20t	/		/		-	/	-		2	2			2	2	2
tractor LD	/		/		-	/	/						0	1	0
" HD	3	3	/		3	3							6	9	6
Trailer 3t	/	/	/		/								0	7	0
25t	9	9			9	9							18	29	18

(prepared by Operations)

EQUIPMENT - WEEKLY AVAILABILITY AND USAGE SUMMARY

7th June week beginning1982

TYPE	STRENGTH	DAYS														U/S ON DAY 7 QTY SINCE EDA	REMARKS			
		1		2		3		4		5		6		7						
		H	AV	R	AV	H	AV	R	AV	R	AV	R	AV	R	AV					
M/grane 11t	4	1	4	0	4	2	4	4	1	4	1	4	1	4	2	4	1	12/6/82	?	awaiting spares
" 15t	4	2	4	2	4	3	4	4	2	4	3	4	3	4	3	4	3			
" 35t	1	0	1	1	1	1	1	1	0	1	0	1	0	1	0	1	0			
" 40t	1	0	1	1	1	1	1	1	1	1	0	1	0	1	0	1	0			
Forcift 3t	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4/8/82	-	awaiting dispatch
" 3.5t	18	14	16	17	16	18	16	16	17	16	16	16	16	16	16	16	16	3/6/82	?	accident
" 5t	2	3	2	2	0	0	0	1	1	2	0	2	2	2	2	2	2			
" 9t	4	3	3	4	3	3	4	4	4	4	3	4	4	4	2	3	2			
" 20t	2	1	2	2	2	2	2	2	1	2	1	2	2	2	2	2	2			
Tractor LD	4	0	1	1	0	0	1	1	0	1	0	1	0	1	0	1	0	7/5/82	-	awaiting write off
" HD	10	6	10	10	8	8	9	9	5	10	4	9	9	10	9	9	9	18/5/82	-	awaiting write off
Trailer 3t	9	0	7	7	0	0	7	7	0	7	0	7	7	7	7	7	7	7/5/82	-	awaiting write off
" 25t	30	18	29	29	24	24	29	29	15	29	12	29	29	29	29	29	29			

(Prepared by Statistics Section)

CARGO CLEARANCE

32. Congestion in a port area invariably causes problems. Working space in sheds and open storage areas becomes limited and obstructed; mechanical equipment moving cargo between ship's side and stowage on land cannot move freely, turn-round is slowed and the discharge of ships is affected; the chance of landed cargo being overstowed, and possibly damaged, is increased. Ships are delayed and the port is blamed. Quite often it would appear that the port itself does not fully understand how serious an evil congestion can be. One of the dangerous things about congestion is that it is not something that happens suddenly like an earthquake or a tidal wave; congestion usually builds up gradually like drifting sand and by the time it is realised that it could cause an obstruction to free movement it has reached a stage where it will be difficult to remove.
33. Generally, ports do not cause the congestion; it does not occur because of something they have done wrong. Congestion is caused by more cargo coming into the port area than goes out; not once or twice on isolated occasions but steadily and over a long period. Of course it can be said that port authorities are not responsible for collecting cargo from their ports; that is the responsibility of importers. Often road and rail links between the port have not kept pace with the expansion of the economy. That is very true. Inadequate transport, delays caused by Customs and Government departments, lack of adequate warehousing facilities outside the port area and importers' financial problems, to name only a few causes of slow clearance, are mainly to blame but the one place that will have to take all the blame is the port. For that reason among others it is advisable that the port should make sure it is aware of any build-up or even a possible build-up of cargo in the port area so that port users can be pressed to clear their cargo and government departments warned of the possibility and dangers of a congested port.
34. Port authorities generally maintain up to date information about cargo discharged from and loaded to ships; their efficiency is usually judged by the speed of discharge and loading and the overall time a ship has to spend at the port. Furthermore delays to ships usually cause vigorous protests from shipowners and may result in higher freight rates thus increasing the cost of a country's seaborne trade. Complaints from importers about delays in delivery of cargo are less frequent (importers are often happy for their cargo to remain in the port) and generally carry less weight. Perhaps it is for these reasons, among others, that many port authorities do not pay as much attention to the rate at which import cargo leaves the port as they do to the rate at which it is discharged from the ship. This is unwise. The speed of delivery has a direct effect on the speed of discharge.
35. Quays and the open and covered areas adjacent to the quays are intended for the rapid transfer of cargo between ships and land transport. Ample unobstructed space close to the discharging ship for all the cargo to be landed provides the best conditions for the fastest uninterrupted landing of cargo; small pockets of space dispersed throughout a congested transit shed or open stacking area make for more difficult working and generally have an adverse affect on the speed of discharge. All this is of course realised by port authorities but, for the reasons given earlier, they often seem to believe that there is little they can do because so many outside agencies and factors apparently outside their control are involved. This is understandable; it is also the wrong approach. The chances are that they can do quite a lot.
36. The first and most important thing to do is to watch closely and continuously the ratio of the tonnage discharged from vessels to the tonnage delivered from the port area. All ports keep statistics of tonnages discharged from and loaded to ships; it would seem that not so many keep statistics of tonnage of import cargo delivered from the port area. Those that do not do this at present would be well advised to begin now to keep appropriate statistics. This should not present a problem; the information must exist and, for example, the routine analysis of delivery orders or gate passes could provide the basis for the desired statistics. The aim is to show side by side the tonnage discharged (including direct delivery ex ship) during a given period, weekly or monthly, with the tonnage delivered from the port area (again including the cargo delivered direct ex ship) for the same

period. In all but the smallest ports it would be an advantage and not be difficult to show the tonnages for the various areas of the port as well as for the port as a whole.

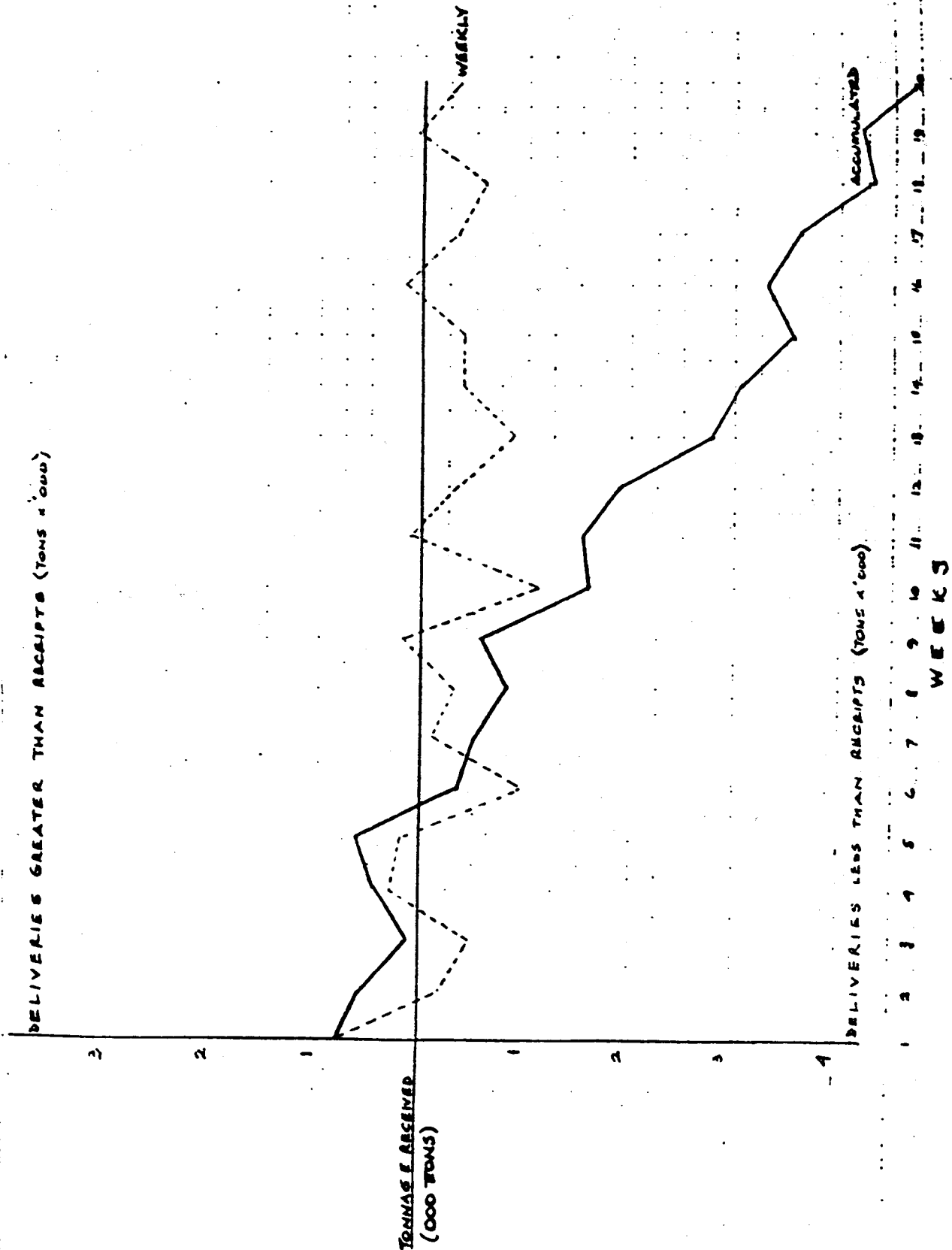
37. Statistics give the facts - in figures - but do not always have the effect on the reader that is needed; sometimes a diagram is necessary to stress what the figures say. Also, statistics are historical and sometimes a projection into the future based on the figures is necessary. This applies in the present case. A port cannot wait until the statistics show that congestion has reached crisis proportions; an early warning system is needed.

38. A simple way of doing this is to plot on a chart the amount in tons each week by which the cargo leaving the port is greater or less than the tonnage coming into the port; on the same chart can be plotted the accumulated increase or decrease. The cargo coming into the port would be the import cargo landed plus any export cargo brought into the port for shipment; the cargo leaving the port would comprise import cargo delivered from the port area plus export cargo loaded to ships; direct delivery cargo would be included as cargo in and out. An example of a chart is given in the figure on the following page. A similar chart should be kept for containers (by number of TEUs) regardless of whether loaded or empty. Another method of checking cargo coming in against cargo going out would be to calculate the theoretical optimum capacity of the sheds and open stacking areas of the port and compare each week the actual tonnage against the optimum. The calculation of optimum shed and open stowage capacity is not a subject for this seminar. The chart described above would give a sufficiently clear picture whether trouble through congestion lies ahead.

39. The degree of concern a port management should feel when faced with a situation like that shown in the above figure would depend on local circumstances but no port, however large, can over a period take in more cargo than it delivers without incurring congestion leading to a loss in efficiency. In any port a trend of more cargo in than out for any appreciable length of time should be a signal for action and suggestions as to possible forms of action are given below.

40. As soon as this stage has been reached the port should give notice to importers (and the Chamber of Commerce if there is one) and warn them that congestion is building up and seek their cooperation in the early and speedy removal of cargo. It could be advisable to see if Customs can help for example over the early disposal of old cargo. If these measures do not provide a satisfactory solution to the problem the port should inform its Ministry about the situation and its likely effect and seek their help for example in arranging the clearance of any outstanding government cargo. As a general measure to reduce the chances of cargo building up the port would be wise to review their tariff as far as rent is concerned. In far too many ports the 'free time' after discharge is too long (3-5 days should suffice under most conditions) and the rate of rent charged too low to begin with and does not rise quickly enough. Rents on landed cargo are often referred to as 'penalty rents' because they are intended to penalise port users who misuse transit sheds and areas by using them for storage; if rents are to penalise and, better still, deter they must be high.

GRAPH OF CARGO CLEARANCE



CONTAINER MONITORING

Introduction

41. In the section on cargo clearance the importance of keeping the port area uncongested with cargo was stressed. It is essential that management is equally aware that port areas can become congested not only with cargo but also with empty containers. The space required for an empty container is identical to the space required for a full one. Also empties are more likely to spend longer in the port area and therefore place a greater demand on storage space. However empties are often stacked higher than full containers which reduces the requirements for storage area.

42. With the container traffic sheets the concept of FCL and LCL containers was introduced. For the port operator an LCL container was one that was stripped or stuffed in the port - thus the container changes from being full to empty or vice versa. Empty containers in a port are normally either LCL discharged containers which have been stripped and are waiting either to be loaded on a ship or for cargo, or FCL discharged containers which have been delivered inland from the port and are then returned empty for loading to a ship.

43. Every port which handles containers requires a container control office to steer, track and locate containers in the port area. Each container has a unique registration (four letters and seven digits, for example CGMU 222020-2). This registration can be used as the basis for monitoring each container similar to a car registration plate. The container control office is concerned with:

- containers being discharged or loaded to a vessel;
- container being received for export or delivered in the case of imports;
- containers being shifted within the port area.

44. The tracking and locating of containers which pass through the port area can be carried out manually by the aid of control cards. This manual proposes a scheme with one control card per container but the final format will depend on each port's individual requirements.

Inward control card

45. The control system for the discharge of containers is presented first. Information from the bay plan or sequence sheets is transferred to an inward control card (one card per container) prior to the vessel's arrival. Control cards should be designed and printed to suit a system which will allow easy identification in terms of:


- import
- FCL/LCL
- Operator
- Reefer/hazardous

46. One solution to accomplish this would be:

	FCL	-	Yellow card
Imports	LCL	-	Red card

47. Coloured stickers could refer to each major ship operator. Reefer or hazardous cargo could be indicated by marking on the sticker an 'R' for reefer cargo and for hazardous cargo the IMO (IMCO) hazardous class number.

INWARD CONTROL CARD

 Sticker	Container No: _____	20'
	Vessel: _____	35'
	Seq. No: _____	40'
	Type: _____	
	Date discharged: _____	
	Date delivered/ stripped: _____	
	Commodity: _____	
	Weight: _____ Height: _____	
	Seal No: _____	
	Locations: 1) _____	
2) _____ 3) _____		
4) _____ 5) _____		

Outward control card

48. An outward container arriving at the port should be accompanied by appropriate documents such as an Export Permit and an Interim Receipt. The Interim Receipt provides the base information for all further documentation of the container for its passage through the port and on to the carrying vessel. The following details are recorded on the outward control card:

- port of destination;
- container number;
- name of vessel;
- vessel sequence number;
- weight and height of container;
- commodity;
- type of container;
- seal number;
- shipper;

49. The outward control card is the same size as the inward control card but the format of the information is different. This allows cards to be easily sorted by port of discharge. The control should be designed to suit a system which will allow easy identification in terms of :

- export;
- operator;
- reefer/hazardous.

50. To accomplish this one solution would be:

Outward - Green card
 Operator - Coloured sticker

Reefer or hazardous cargo would be marked on the operator's sticker as done on the inward control card.

51. The control cards can be placed on a board which represents the storage areas of the port. The location of the card on the board then represents the location of the container in the port. The cards may also be used with the container traffic sheets for compiling information on container movements through the port and to calculate the length of stay of the container for billing purposes.

OUTWARD CONTROL CARD

Sticker

Disch. port: _____ 20'
 Container No: _____ 35'
 40'

Vessel: _____

Seq. No: _____

Weight: _____ Height: _____

Commodity: _____

Type: _____ FCL/LCL

Date received: _____

Date stuffed: _____

Date loaded: _____

Seal No: _____

Shipper: _____

Locations: 1) _____

2) _____ 3) _____

ANNEX 1

AN OUTLINE FOR A PLANNED MAINTENANCE SYSTEM

Introduction

1. In order to obtain the maximum benefit from a fleet of modern cargo handling equipment it is essential that there should be a system of planned maintenance which should include all activities necessary to plan, control and record all work performed for the purpose of keeping mechanical equipment to an acceptable level of serviceability. The three basic requirements of a planned maintenance system are:

- a. a programme of regular maintenance for the plant and equipment;
- b. a means of ensuring that the programme is fulfilled;
- c. a method of recording and assessing results.

Records system

2. The maintenance of proper records is of great importance and indeed is the foundation of a sound maintenance system. An efficient records system includes a programme that sets out the work that has to be done at regular intervals on each machine (as recommended by the manufacturer or decided by the Mechanical Superintendent) and records when the regular services have been carried out and the labour and spare parts involved. It also records the amount of unplanned work (e.g. breakdown or accident) and its cost in man hours and materials so that from these records it is possible to draw lessons for the future purchasing of equipment, the stock of spare parts to be held, etc. Five basic documents are recommended for a planned maintenance system:

- a. Register of Equipment;
- b. Maintenance Schedule for each item in the Register of Equipment;
- c. Master Plan of work to be carried out over a given period;
- d. Work Specifications for each activity to be carried out;
- e. Vehicle Maintenance Record.

These documents are dealt with in turn.

Register of Equipment

3. A comprehensive register of all plant is an essential base for planning maintenance. Each item in the Register must be positively identified by:

- a. the name of the item;
- b. description of the item;
- c. reference numbers e.g. chassis number, machine number (if any) or registration number;
- d. engine - make, type (e.g. 4.203) and number;
- e. ancilliary equipment, if any (e.g. sideshift, fly jib);
- f. date of manufacture and of entry into service;
- g. any special maintenance needs.

4. Most equipment registers are kept in card index form or in an Equipment Register file. It is recommended that a loose-leaf card ring-book be compiled and that in addition to the master Equipment Register (which should be retained by the Mechanical Superintendent) an additional copy should be kept for every day reference in the workshop and copies should be made for the information of other officers such as the Traffic Manager and Chief Accountant. It will be convenient to group together in the register the various types of equipment e.g. forklifts, tractors etc.

Maintenance Schedules

5. The purpose of a Maintenance Schedule is to list the routine maintenance that is needed for each separate item of equipment in the Equipment Register. It is recommended that a master Maintenance Schedule be prepared for each item of plant in a loose-leaf card ring-book with a separate card for each item. Here too it is advisable to group the various types of equipment together. Additional copies of the Schedule and of individual sheets should be prepared as required (e.g. see the Vehicle Maintenance Record).

6. A Maintenance Schedule sheet for an item of equipment should include the following information:

- a. frequency of the work to be done;
- b. details of the work to be done;
- c. grade of labour required;
- d. estimate of time the work will take.

The details will vary for each different type and model and will be a matter for decision by the Mechanical Superintendent in the light of the manufacturers' recommendations.

Master Plan

7. Most mechanical equipment requires routine maintenance at predetermined intervals e.g. by hours or miles of operation or weekly, monthly, annually. The purpose of the Master Plan is to show clearly in advance when routine maintenance is due and equally to show when that maintenance is carried out. There are several ways in which the Master Plan (which in effect acts as a diary) can be kept. For the number of machines that will be involved it is recommended that a Planning Board be used.

Planning Board

8. A suitable Planning Board is a very helpful visual aid to effective preventive maintenance. It provides a simple method of showing what services should be undertaken, when they should be undertaken and when they have been carried out. Coloured symbols can be used instead of or in conjunction with the letters A, B and C shown in the example, if required. A suitable board can be made from materials obtainable locally e.g. a blackboard, peg-board or, perhaps, a sheet of rigid plastic, but it is recommended that one of the display systems specially designed and marketed for the purpose be ordered as they are clearer and more durable. The planning boards and similar aids (generally on plastic or metal (magnetic or non-magnetic) backing) have a great variety of suitable symbols. A metal type is recommended for use in a mechanical workshop.

9. The Planning Board would show all of the machines the maintenance section is responsible for servicing, when they are due for service and the type of services; when the service has been duly carried out the symbol for the type of service (e.g. A, B or C or the equivalent colour) could be replaced by a special symbol showing that the work has been done. Each month the Mechanical Superintendent would inform the Traffic Manager of the machines due for service during the coming month and the dates on which the service should take place so that the machines can be made available for service; naturally, to cater for operational fluctuations in demand, the programme must be applied by mutual agreement so that the requirements of mainte-

nance and operations can be accommodated providing always, of course, that routine maintenance is not missed.

Work specification

10. Although manufacturers vary in the recommendations they make for the frequency and extent of servicing required in connection with their machines the variations for similar types of machines are usually not great; most of the port's machines will in any case have the same type of engine. It is therefore recommended that a simple basic preventive system be introduced in the mechanical section based on daily, monthly, half-yearly and yearly maintenance services and that a standard Work Specification be devised for each type of service. Suggested Work Specifications for each type of service are covered in the following paragraphs but it is emphasised that they are only intended to show the range of work for each service as a guide for the Mechanical Superintendent who will be responsible for drawing up the final Work Specifications.

Daily Check

11. This daily service will be no more than a visual check and topping up service which should take place before the start or after the finish of the days work.

12. It is recommended that the list should be printed on a cardboard tag which can be tied or attached by means of a rubber band when the machine is received at the workshops. The mechanic carrying out the check should enter amounts of fuel and oil supplied and put a tick against each satisfactory item and a cross against any item where he has noticed a defect; any defect should be reported to the foreman so that the machine can be set aside for repair. Once the foreman is satisfied and has recorded that the check has been carried out and the fuel and oils used, the Daily Check List should be discarded; it need not be retained.

Monthly Service

13. The Monthly Service, which often corresponds to 200 hours of service, is a simple but very important service because it includes the essential lubrication and checks on filters, the hydraulic system etc; for that reason all the jobs included in the Monthly Service are included in the Half-yearly Service. A standard Work Specification - Monthly Service sheet should be used for this service. Any work arising from item 12 on the sheet should be entered with details of mechanic's time and spare parts and materials used. After the service has been completed the Monthly Service sheet should be filed with the Maintenance Record of the machine concerned.

Half-yearly Service

14. The Half-yearly Service, which often corresponds to 1000 hours of service, should be carried out in the fifth, sixth or seventh month since the machine entered service or was last given an Annual Service. The three months spread avoids "bunching" and allows for the actual timing of vehicles being made available for service to be agreed between the operating and maintenance sections. A standard Work Specification - Half-yearly Service will include all the items prescribed for the monthly service. Any work not specified should be entered on the sheet with details of mechanic's time and spare parts and materials used. After the service has been completed the Half-yearly Service sheet should be filed with the Maintenance Record of the machine concerned.

Annual Service

15. The Annual Service, which often corresponds to 2500 hours of service, should take place six months after the machine had its last Half-yearly Service. A standard Work Specification - Annual Service sheet includes the work prescribed for the Half-yearly Service (and so for the Monthly Service). Any work not specified on the sheet should be entered on the sheet giving details of mechanic's time and spares and any materials used. The Annual Service should be filed in the same way as the other service sheets.

Standard Work Specification/Service Sheets

16. It will be seen that among the work to be carried out at the various periodical services listed above, some items e.g. those referring to masts, carriage assemblies and overhead load guards, can only refer to forklifts but it is recommended that the same Work Specification sheets be used for all machines (except cranes) for each of the periodical services as this is simpler than separate and different specifications for each type and make of machine to be serviced. For most diesel engined machines whether tractors, forklifts or lorries the basic maintenance requirements will be the same. When a periodic service sheet calls for attention to a mast assembly, for example, and the machine to be serviced is a lorry or a tractor the inappropriate item can be deleted. However, for cranes different Work Specification sheets will be necessary and these should be prepared in conjunction with the makers' recommendations and with any safety regulations relating to wires and hooks that may be in force or introduced.

Emergency maintenance and other unplanned work

17. All work carried out during the services described above will be recorded on the service sheets. Work carried out at any other time, e.g. because of accident or breakdown, must also be recorded. This should be done by means of a Work Order.

Vehicle Maintenance Record

18. A record should be kept for each vehicle of the maintenance that should be carried out (i.e. in accordance with the Maintenance Schedule) and the maintenance actually carried out. It is recommended that this can be done most simply and effectively by having in the office of the Mechanical Superintendent a filing cabinet in which could be kept a file for each vehicle. In the file would be kept a copy of the Maintenance Schedule for the vehicle and the Work Specification sheet for each service would be placed in the file at the completion of each service. The Work Order for any other work carried out on the vehicle would be filed in the same way. In view of the fact that the Vehicle Maintenance Record and the Work Specification sheets are working documents in an oily environment it is suggested that plastic file covers should be used.

ANNEX 2

CONFERENCES SERVING EASTERN AND SOUTHERN AFRICA (*)

Code(**)	Conference
001	Red Sea and Gulf of Aden/US Atlantic and Gulf Rate Agreement
002	Red Sea and Gulf of Aden/USA Conference
003	South and East Africa/USA Conference
004	Southern Africa/Canada Rate Association
005	United States/South and East Africa Conference
101	Brazil/South and East Africa/Brazil Tariff Rate Agreement
102	River Plate/South and East Africa/River Plate Freight Agreement
103	South and East Africa/South America Rate Agreement (SEASARA)
201	Association of Conference Lines
202	Beira/Europe Conference
203	Conference Internationale Madagascar, Comores, Reunion, Maurice
204	East Africa/Europe Conference
205	Entente de Fret Maurice/Europe Continentale
206	Ethiopia, Djibouti and Aden Continent Rates Agreement
207	Europe South and South-East African Conference
208	Europe/East African Conference
209	"Red-Med" Rate Agreement
210	South Africa/Europe Conference
211	Sudan-UK and Continental Freight Rates Agreement
212	UK/Assab and Djibouti Lines' Agreement
213	UK/Berbera Lines' Agreement
214	UK/Mauritius Conference
215	UK-Sudan Conference
216	United Kingdom/Massawa Lines Agreement
301	East African Coastwise Conference
302	South Africa/West Africa Freight Agreement
401	East Africa/Far East Freight Conference
402	Far East/East Africa Freight Conference
403	Far East/Gulf of Aden and Red Sea Ports Conference (CIMACOREM)
404	South Africa/Far East Freight Conference
405	South Africa/Far East Freight Agreement (SAFERA)
501	East Africa-Middle East Rate Agreement
502	South Africa and Mozambique-Middle East Rate Agreement
503	South Africa and Mozambique-Persian/Arabian Gulf Freight Agreement
601	East Africa/Australia Freight Conference
602	Association of Lines Southern Africa/New Zealand
603	Southern Africa/Australia Tariff

(*) Croner's World Directory of Freight Conferences

(**) Region - alphabetic sequence (0xx - North America: 1xx - South America: 2xx - Europe: 3xx - Africa: 4xx - Far East: 5xx - Middle East: 6xx - Australia)

SECTION 1

Introduction to the manual

Introduction to the Manual for a uniform system
of port statistics and performance indicators
for the ports of West and Central Africa

General Background

In 1977 the President of the Ministerial Conference of West and Central African States on Maritime Transport officially requested the United Nations Organisation to assist the Port Management Association of West and Central Africa in the implementation of a uniform system of port statistics and performance indicators.

As a result of this official request the United Nations Development Programme (UNDP) agreed to finance a project to be executed by the United Nations Conference on Trade and Development (UNCTAD) in association with the Economic Commission for Africa (ECA)*. The project was assigned the number RAF/78/011 by UNDP and consists of six phases, namely:

- phase 1 - appointment of a liaison officer in each participating port.
- phase 2 - preparation of a full sample of the statistics collected on a standard basis by each participating port.
- phase 3 - visit by a team of UNCTAD experts to the participating ports in order to analyse the type and quality of the statistical material collected in phase 2.
- phase 4 - a comparative analysis of all collected statistical information, the development of the appropriate statistical model and the elaboration of a set of uniform performance indicators.

* In addition a portion of the project was financed from the Port Project Trust Fund provided by the Governments of Norway, Denmark and the Netherlands.

phase 5 - the organization of a seminar bringing together all correspondents and their assistants to explain and discuss the proposed schemes and their implications.

phase 6 - assistance to participating ports in the actual introduction of the proposed schemes.

The present manual was developed in early 1979 (phase 4) for use in the phase 5 seminar which took place from 18-23 June 1979 in Douala (Cameroon).

The objective of providing a manual was to give sufficient guidance to enable participating port authorities themselves to uniformize the statistical information and to present common performance indicators.

In developing the statistical schemes contained in this manual the UNCTAD experts found a very wide interest for port statistics and performance indicators in other port authorities and port organizations, which were not participating in the UNDP project, as they were not members of the Port Management Association of West and Central Africa. In fact in the past few months the requests to obtain a copy of the manual were so numerous that the proposal was made to UNDP to publish the manual for general circulation to all interested ports. Upon agreement from UNDP the original manual was edited in particular with a view to make it generally applicable to all world ports. The version contained in this volume remains, however, very close to the manual presented at the Douala seminar.

Finally, the point should be stressed that the schemes presented in this manual were extensively discussed both with the World Bank staff and the United Nations Statistical Office and that both organizations gave their support to the proposed schemes.

Preliminary Research

As already indicated the manual was developed by members of the UNCTAD's Ports Section from early February through May 1979, based on their findings during the preliminary visits to the participating ports, as well as on the contents of the previously published UNCTAD studies on port statistics and performance indicators. The latter include the following:

- Port Statistics : Selection, collection and presentation of port information and statistics (TD/B/C.4/79/Rev.1) New York, 1971.
- Berth Throughput : Systematic methods for improving general cargo operations (TD/B/C.4/109 and Add.1) New York, 1973.
- Technological Change in Shipping and its Effects on Ports : Selection, collection and presentation of statistical information concerning container and barge operations in ports (TD/B/C.4/129/Supp.3) Geneva, 1976.
- Port Performance Indicators : (TD/B/C.4/131 and Supp.1/Rev.1) New York, 1976.

Major features of the statistical scheme

On this broad theoretical basis a statistical scheme was developed which is characterized by three major features:

- 1) it is a system of operational statistics allowing the development of a set of performance indicators for monitoring port performance.

- ii) it is a system developed for implementation by a central statistical cell or department; the input information has to be supplied by organizations or firms which are either external or belong to the port authority, (for example stevedoring companies, cargo-handling firms, the harbour master's office, ships' agents, and any other port-related body disposing of port operational information).

- iii) it is a system which is based on the notion of selected data processing. A limited number of performance indicators are automatically processed and made available. The amount of data collected is much more extensive. However this information will only be analysed whenever a specific request is put forward. For example, as a standard indicator the port productivity per vessel call is calculated. For every ship calling this value will be available and per month an average value as well as a frequency distribution can be presented to the port authority's top management. However, the productivity obtained in the handling of bagged cargo working from ship into barge during a certain month is a performance figure that will not be produced unless specifically requested. The statistical scheme has however the potential to provide such information on a vessel call basis, for whatever time period this may be required.

As a result the port introducing the proposed statistical scheme will dispose of a considerable amount of information when needed, without being burdened by time-consuming and ineffective analyses. The scheme provides for a selected number of PRIMARY INDICATORS which allow the port management to monitor performance. When further information is required on the why, when and how of the results shown by

the primary indicators the selected data collection technique allows the port statistical cell to produce all the additional information, which can be classified as SECONDARY INDICATORS.

Contents of the manual

The present manual consists of two major parts: the first part presents the statistical scheme, the forms developed for introduction of the scheme and the instructions for completion of the forms. In this first part, and with a view to facilitate the filling-in and processing of the forms, a set of codes has also been included. In the second part of the manual sets of practical exercises have been included which were developed to assist the port statistical officers in the introduction of the scheme, and can be used to train personnel from the statistical units. The instructions contained in the first part can be most effectively assimilated by cross reference to the exercises. For the purpose of these exercises a fictitious port (Port Laedi) is presented which allows the general utilization of the exercises without reference to specific local conditions.

Coverage of the scheme

The scheme was purposely limited to the following main port operational aspects:

- (i) the cargo-handling services provided between ship and shore (conventional/bulk/container)
- (ii) the relation between total port traffic and berth throughput
- (iii) the berth occupation
- (iv) traffic statistics on container movements

The transit storage and warehousing function and the delivery and receipt of cargo are excluded as is the port navigational service.

Also the scheme is limited initially to port operational indicators, with an expansion to equipment maintenance information and finance indicators a logical second and third step following the successful implementation of the operational indicators.

The present scheme is based on manual collation and compilation of statistics, but electronic data processing could be used to analyse and prepare statistics from the appropriate forms, where prepared for EDP, for example punched on to cards. It is important to stress in this connexion the fact that the major difficulty of any statistical scheme is the timely as well as the accurate collection of data. Use of EDP could help to solve at least partly the first difficulty; it would still be vital for management to establish a schedule where deadlines and staff are clearly identified.

The manual which is now proposed to be generally made available serves as a guide but the actual improvement of port statistics in any given port will depend on the commitment and motivation of management and on the efforts of the statistical cell to collate and analyse the information and present it in the shortest possible delay.

Conclusions

Ports are an indispensable service industry for a nation's economy. They provide the service of transferring cargo from one mode of transport to another. As a service industry many ports, particularly in developing countries, experience a monopoly position with a relatively fixed hinterland. While this means that the level of service provided does not necessarily affect the volume of traffic, the level of service certainly can affect the cost of transportation. A poor level of

service can increase the cost of transportation through port congestion surcharges, demurrage payments, higher insurance premiums, and even general freight rate increases.

Another cause of increased transportation cost can be the over-investment in facilities. The high fixed capital charges require either higher tariffs or subsidies in an attempt to cover costs. Thus the port industry is one that requires management to follow a path between over and under investment in an effort to minimize transportation costs.

Although less typical for developing countries, at least in the past, port competition becomes an increasingly important feature of the issues facing port management. With the introduction of more flexible cargo types such as containers, cargo routings are much more adaptable to needs and circumstances. Thus ports will require a much stricter control on their operational efficiency in comparison with potential competitors.

For all these reasons port management continuously needs reliable information, particularly port performance indicators covering the major operational areas.

This need was recognized early by the UNCTAD Ports Section and led to the research studies mentioned previously in this introduction. However the salient feature brought out in developing the manual is the very close inter-relationship that out of necessity exists between the various activities of the UNCTAD Ports Section, namely research, technical assistance and training. Effectively the UNDP financed project RAF/78/011 does combine in a unique way the original search for a more efficient and complete port statistical system, the urgency to train competent staff to apply the techniques and systems, and finally the actual implementation and monitoring of results. It is possibly an

example that could be followed by similar type projects covering other port-related fields such as pricing, planning and manpower management.

Port authorities who are interested in receiving assistance in implementing the statistical scheme or other projects which receive the financial support of UNDP are requested to contact UNCTAD, Palais des Nations, Geneva, Switzerland or their local UNDP Resident Representative.

SECTION 2

Time sheet

Labour handling summary

Idle time summary

Monthly gang idle time form

Primary indicator form

INSTRUCTIONS FOR COMPLETING THE TIME SHEET

1. PURPOSE

1.1 The purpose of the time sheet is to record the labour and equipment used by the stevedore(s) as requested by the ship to unload, load or shift cargo. All operations undertaken by the stevedore(s) on a per-shift basis are recorded on the time sheet. The number of time sheets will therefore be equal to the number of shifts worked on the ship. The manifest and extra services requests are used by the stevedore(s) for invoicing and the time sheet to evaluate his performance.

1.2 The time sheet also is used to record the output of the stevedore(s) services as the tonnage handled per broad type of packaging and cargo nature as well as the type of operation for each category.

The monitoring of this activity enables the calculation of labour productivity (gang and man hours) and the vessel working intensity (the number of hours the vessel is worked while at berth).

1.3 The time sheet will be completed for handling activities on all ship types except for cellular container vessels for which a separate set of documents has been established.

2. SOURCES

The sources of the time sheet are basically the physical operations performed by the stevedore on that particular ship per shift based on the tally vouchers/sheets. A control source of tonnage handled for discharging and loading can be obtained from the ship's manifest ^{1/} on a consignment basis.

The sources of the headings are from port Harbour Masters' Log (Reg. Sequence No., Ship type, Agency) and Stevedore (name, berth, time sheet No., date, shift and sheet No.).

^{1/} On condition that shifted cargo is excluded from any comparison with the manifest.

3. SPECIAL INSTRUCTIONS FOR FILLING OUT TIME SHEET

3.1 Information on heading

BERTH No. }
MOORING No. } The number of the berth or the mooring at which the ship is worked should be filled in for the related shift. Where applicable the appropriate zone can be added.

TIME SHEET No. This number is assigned by the Stevedore

DATE The date will mention in order: the day, month and year of the shift

SHIFT

In this box the shift title will be mentioned,

e.g.

Shift : 0600 - 1400 hours

: 1400 - 2200 hours

: 2200 - 0600 hours

or : 0800 - 1600 hours

: 1600 - 2400 hours

or whatever title the various shifts are commonly given in the port according to normal shift-time practices; the normal working time span of the shift will be indicated from to

This does not include overtime. This information is therefore on a 24 hour/per day basis. In the case where a shift overlaps into another day (in normal hours or in overtime) it will be recorded on the day on which that shift commenced, e.g.

Shift from 2200 on 2 April 1979
to 0600 on 3 April 1979
or Shift from 1600 on 2 April 1979
to 2400 on 2 April 1979
+ 1 hour overtime

will be recorded under 2 April

STEVEDORE Name of the stevedore working the vessel.

SHIP NAME The name of the vessel is marked in full.

**REGISTRY
SEQUENCE No.**

The number given to the vessel for the call when registered by the Harbour Masters Office. Each vessel will be assigned an unique number on arrival. The number is also called the rotation number.

SHIP TYPE

The appropriate two letter code appertaining to the type of ship will be filled in here (see code pg 125)

AGENCY

Name of the ship's agent.

SHEET



Is the sequential number given to each sheet used per ship call:



x = sheet number

y = total number of sheets filled in for the ship's cargo handling operation. This number is filled in after ship working is completed.

Normally there will be one sheet per shift and thus the total number of sheets will correspond to the total number of shifts. However a shift may require a supplementary sheet and in that case it would be numbered sequentially (in this case the number of sheets would be greater than the number of shifts).

3.2 Operational information

This information will be indicated in the main rectangular box, under the column titles as follows: (in a line from left to right)

3.2.1 Hatch - Indicate the hatch number worked. All elements appertaining to this hatch during the relevant shift will be filled out on this line. The hatch can be interpreted as synonymous to the hold in the case where a ship has as many holds as hatches. If several hatches are being worked during the shift by several gangs then the other hatches will be listed in sequential order and their corresponding operations indicated on separate lines. Thus there is one line per gang i.e. if two gangs were working on hatch 1 two entries would be required for this hatch.

3.2.2 Information relating to Labour

3.2.2.1 Gross Hours : Normal : Here will be recorded the scheduled number of normal paid hours a gang is made available by the stevedore to the ship for handling per shift. The qualifying adjective "gross" means that in this column no deductions are made for delays whatever the cause.

Gross Hours : O/T : The same remarks are valid as above except that in this column will be recorded the number of hours a gang is made available for overtime. This could be either after the end of the shift or for a whole shift (nights,

Sundays, holidays).

This information indicates the unit time-span that a gang is available for normal or overtime hours regardless of the number of men employed.

e.g. : a normal shift working from 0600 to 1400 with 2 hours overtime on the same hatch No.1 for 2 gangs of 18 men each will still only be recorded here as:

Hatch	Gross Hours		No. gangs
	Normal	O/T	
1	8	2	1
1	8	2	1

At a further stage, for invoicing the relevant stevedore caused delays would be deducted before billing to the ship's agents.

The gross hours correspond to the time labour is paid to handle as per wage category : normal or overtime.

When several hatches are worked simultaneously during the shift and/or when more than one gang worked on one hatch the total will give the total number of gross gang hours worked per ship.

3.2.2.2

Number of gangs: a numeric entry of "1" will be recorded per gang per line. The team of men aboard ship and the corresponding team on shore make up a gang.

3.2.2.3

Ship - Number of men : indicate the total number of men made available by the stevedore in the

sub-division of the gang working on board excluding the tally clerk(s) but including where appropriate foreman, winchmen, deck and shore crane operators, derrick operators, etc. (except where ship's crew operates ship's gear).

Ship - Tally : indicate number of tally clerks made available on ship.

Shore - No. Men : same as above for shore gang sub-division including foreman, horizontal transfer equipment operators and mobile yard crane operators, but excluding tally clerk(s).

Shore - Tally : indicate number of tally clerks made available on shore.

3.2.2.4 Total Men: indicate the total number of men in the gang by adding the preceding four columns (No. of men + Tally on ship and shore).

3.2.2.5 Net hours : normal : indicate the net hours each gang worked per hatch during normal paid hours. This equals the gross normal gang hours less the delay hours incurred during the scheduled time as recorded in the delay box (bottom part of form).
Net hours : O/T : indicate the net hours each gang worked per hatch during overtime hours. This equals the gross gang overtime hours less the delay hours incurred during overtime as recorded in the delay box below. In some cases a whole shift will be paid overtime (nights, Sundays, holidays).

The total net hours equals the gross hours less the total delay gang hours.

It is essential here to allocate a line per cargo type handled to enable cargo type productivity calculations.

e.g. If the gang works during a normal 8 hour shift for 7 hours (1 hour delay) of which 4 hours unloading fertilizer and 3 hours loading peanuts the column will read as follows:

No. gang		Net hours		Cargo
		Normal	O/T	
1		4	-	Fertilizer
		3	-	Peanuts

3.2.3. Information relating to Cargo handling

Cargo handling (code) - This element is to be recorded in a two figure combination as explained in the code catalogue (see pg.126).

(1)

The first digit refers to the type of cargo handling operation concerned:

- Discharging or loading are understood here as the physical handling operations.

It is irrelevant whether cargo is for trans-shipment or transit.

- Shifting via shore means shifting cargo from hatch to hatch by using the shore as an intermediary handling stage.

- Shifting on ship means shifting usually inside the same hatch (or to an adjacent hatch) without cargo being displaced off board.

(ii) The second digit refers to the handling mode/
destination.

1 and 2 For example, "indirect warehouse" (1) means the transfer of cargo to/from warehouse. It is necessary to distinguish between the quay transit-shed (2) and the warehouse which is used for long term storage.

3. "Indirect open storage" means goods are transferred from the quay to an open-storage area reserved for that purpose (or vice versa, if loading).

4. "Operational zone" means that goods are placed in an area NOT designed for storage, i.e. an operational area such as the quay apron, traffic lanes, railway lines or any area which could hinder normal cargo handling activities. This is normally done on a temporary basis and is acceptable provided the stay is short and goods will be moved by port equipment, i.e. equipment under the control of the port.

5. "Road" means goods are loaded from or discharged into waiting road vehicles whether these vehicles are on quay side for direct handling by quay cranes or ship's gear or necessitate an intermediary step by horizontal transfer equipment.

6. "Rail" : idem for rail waggons as for "road" - see above.

7. "Barge" means goods are transferred to or from a barge or lighter (excluding another ship, see 8)

which is either berthed alongside - direct barge
or berthed further along the wharf - indirect
barge necessitating an intermediary shore transfer.
In the case of direct barge operations, the barge
may accompany the goods (LASH).

8. "Direct other ship" refers to goods transferred/
trans-shipped from one vessel to another vessel
berthed alongside (excluding barges and lighters).
9. "Direct floating" refers to floating cargo which
is discharged into or loaded from the sea (e.g.
logs).
0. "Not applicable" - Use only for shifting.

3.2.4 Information relating to cargo

3.2.4.1 Packaging Code. The purpose of this code is to simplify
compilation. It is not intended to explicit each and every
type of packaging but solely to regroup the main types of
cargo packaging handled. The elements of the code are based
on the UN draft recommendations on codes for types of cargo
and have been changed from the codes originally proposed in
the Manual (see page 127).

0. NO CARGO UNIT (LIQUID BULK GOODS): includes liquids, lique-
fied gases, molten or slurried solids suitable for contin-
uous mechanical handling.
1. NO CARGO UNIT (SOLID BULK GOODS): includes fine powders,
granular particles, large lumpy dry solids suitable for
continuous mechanical handling.
2. LARGE CONTAINERS: goods loaded in/on a freight container
20ft or more in external length, includes lift van, swap
body, flat, moveable tank or similar article of transport
equipment.
3. OTHER CONTAINERS: goods loaded in/on a freight container
less than 20ft in external length and 1 cubic meter or more
in internal volume.
4. PALLETIZED: goods loaded on a deck; includes disposable
one-way pallets, box-, tank-, post-, rack-pallets not
exceeding 1.25 m² deck area, slip sheets, airmode pallets,
bricks, ingots suitably assembled for fork-lift handling.

5. PRE-SLUNG: goods supplied with a sling (or slings) of various materials and of various designs; includes packaged timber, flexible intermediate bulk containers.
6. MOBILE SELF-PROPELLED UNITS: includes road motor vehicles (lorries, buses, cars) and accompanying trailers, semi-trailers, caravans engaged in goods or passenger transport, motorised road, agricultural, industrial vehicles moving in trade, live animals 'on the hoof', foot passengers.
7. OTHER MOBILE UNITS: non-self-propelled vehicles and equipment on wheels; includes unaccompanied trailers, semi-trailers, rail wagons, ship-borne barges engaged in goods transport, caravans, and other road, agricultural, industrial vehicles and ship-borne port-to-port trailers.
8. RESERVED:
9. OTHER CARGO UNITS: goods not elsewhere classified; includes single packages (boxes, drums, sacks), single loose unpackaged goods (logs, pipes, coils, reels), loads abnormal in shape, mass or dimension (locomotives, pressure cylinders, yachts).

3.2.4.2 Packaging type. In this column the precise type of cargo packaging should be written in e.g. bags, pallets, bundles, drums, length in feet for containers, vehicles, etc.

3.2.4.3 Nature. In this column will be indicated the precise nature of each cargo handled. e.g. cement, wheat, wood, etc.

3.2.4.4 Number of units. On the line corresponding to each different cargo nature will be marked in this column the number of units handled e.g. for breakbulk non-unitized cargo, how many bags, drums, etc. for unitized cargo, how many pallets, slings, etc. for containers, number of units.

For further precision in the case of a Ro/Ro vessel as opposed to a conventional vessel the special case box on the lower left hand corner of the time sheet will be filled in by marking the appropriate cargo in section a), and in the case

of containers marking in the number handled.

Also in this box section b) for conventional vessels the number of containers handled will be indicated.

Whenever containers are handled by a conventional vessel the Container Traffic Sheet will also be completed (see Section 4 on Container Traffic Sheets).

3.2.4.5

Tonnage. Corresponding to each unit the appropriate tonnage will be indicated either in weight or in freight/volume metric tons. When containers are handled their total unit weight (or gross weight) will be recorded, whatever the type and whether empty or full.

3.2.5 Information relating to equipment used

This information is important for equipment utilization calculations. These columns will be filled in for each gang employed. A cross will indicate if "ship's gear" is used. The maximum number of "shore cranes" used will be indicated. The column "forklifts" refers to the number of forklift trucks with a rated capacity less than 5 tons used by that gang. Where forklift trucks of a rated capacity equal or greater than 5 tons are used, the number employed will be noted in the column "others" and the number and rated capacity specified in "other services rendered". Side loaders also belong to this category and are to be specified. The number

of "tractors" and "trailors" used will be indicated in the subsequent columns. In the column marked "others" all equipment not previously mentioned will be indicated in numbers, whilst specifying the type and capacity in the "other services rendered" area.

e.g. 1 Mobile crane of 50T

1 Straddle carrier

2 Mobile liquid pumps

3.2.6 Information relating to delays : Recorded per hatch

01. "Ship not at berth" whereas the gang has been requested and is therefore available but idle.
02. "Opening/closing hatches" referring also to the same operation for ramps, cisterns, tanks, cold storage doors and any other form of cargo protection to be displaced for working access. If this operation is undertaken in overtime it will be specified as an "other service rendered" for the precise number of men employed per hatch and not as idle time (usually for closing hatches). In this case the corresponding hours worked will be included in the gross and net total man hours columns in the labour handling summary form (but does not concern gang hours as the entire gang is invariably not used for this operation).
03. "Preparing derrick" will include preparing winches and accessory lifting equipment.
04. "Unlashing and lashing" refers to cargo of all types.

If this operation is undertaken in overtime it will be specified as an "other service rendered" for the precise number of men employed per hatch and not as idle time. In this case the corresponding hours worked will be included in the gross and net total man hours columns in the labour handling summary form (but does not concern gang hours as the entire gang is invariably not used for this operation).

05. The type of gear concerned by "breakdown of ship's handling gear" should be specified.
06. "Laying/lifting dunnage" or any other material on which cargo is stored.
07. "Cleaning". If this operation is undertaken during overtime, use same principle as for 02 and 04 above.
08. "Warping" is when the vessel warps within the same area worked by the allocated gang(s) during a shift or if the same gang resumes work in another area to where the vessel has warped.
09. "Trimming" applies to bulk carriers. If this operation is undertaken during overtime, use the same principle as for 02, 04 and 07 above.
10. "Ballasting/deballasting" in case this operation holds up handling.
11. "Damaged goods" whether import or export goods.
12. "Labour strife" meaning momentary absence of workforce for industrial action (slowdowns, strikes, etc.)

13. "Waiting for labour during shift". Labour absent at any time during scheduled shift.
(Not to be confused with 23 "Late start" when labour is present).
14. "Waiting for shore handling equipment" - specify type e.g. cranes, forklifts, tractors, trailers, straddle carriers, shore pumps, hoppers, conveyor belts etc. whose absence impedes the handling operations.
15. "Waiting for goods/cargo" to load.
16. "Waiting for lorries" to discharge goods.
17. "Waiting for rail waggons" to discharge goods.
18. "Waiting for barges" or lighters to discharge or load goods.
19. "Waiting for customs clearance" and/or related documents.
20. "Waiting for health clearance" from sanitary authorities.
21. "Silo full" or any other shore receptacle such as tanks, cisterns, etc.
22. "Early finish" meaning the team finishes work before the scheduled shift time expires.
23. "Late start" meaning the team is available at the beginning of a shift but for independent reasons pertaining to ship (other than those listed here) the gang was not able to work.
24. "Meal break" as agreed.

25. "Breakdown shore crane/bulk handling equipment".
Specify the lifting equipment concerned which stop handling operations. Also refers to bulk handling equipment of all types.
26. "Breakdown horizontal shore transfer equipment" only if this breakdown stops handling operations. Specify equipment concerned.
27. "Meteorological conditions" of any nature.
This delay includes the corresponding time needed to temporarily cover and then uncover the holds' hatches (i.e. tarpaulins, etc.)
28. Tidal conditions preventing the working of the vessel.
29. Bunkering or loading ships supplies if this stops handling.
30. Accident (excluding breakdowns) which stops handling.
99. Miscellaneous. Any other delay cause not above-mentioned. Specify.

For each delay the number of gangs and men involved will be recorded enabling the calculation of total delay gang hours and man hours in the last two columns of the boxes.

Use box on left before box on right of sheet.
Where extra space is needed, use a second sheet with identical heading (except sheet No.)

4. USE

- 4.1 It is relevant to mention that many analyses can be made by multiple combinations of the various elements contained in the time sheet (such as commodity classes, cargo handling or packaging categories, etc.). It is imperative to keep in mind the wide variety of information that will be extracted from the time sheet which is the basic source document for cargo handling in the port. Therefore accuracy is the key to successful future analysis and utilisation (for billing, or performance indicators, for example). Inaccuracy of this basic data will inevitably lead to invoicing litigations and to erroneous statistics resulting in worthless indicators.
- 4.2 Once the handling operations are terminated the stevedoring services will pass the set of time-sheets corresponding to each ship worked to the statistical unit in order to exploit the data contained therein.
- 4.3 On the one hand the results of gross and net gang and man hours as well as tonnage will be shown on a per-shift and total basis in the labour handling summary, which is in turn one of the basic documents for performance indicator calculations on the primary indicator form, on a per-ship call basis.
- 4.4 On the other hand a summary of idle time incurred by major cause regroupings will be made for each ship-call in gang-hours for a further condensed compilation through the gang idle time summary sheet and pie-chart. Both these documents are explained in the following sub-sections.

INSTRUCTIONS FOR COMPLETING THE LABOUR HANDLING SUMMARY

1. PURPOSE AND SOURCE

The labour handling summary is used to collate the results of labour handling as shown in the time sheets of a vessel's call at port.

All elements of this summary are based on the time sheet. This form would normally be completed by the statistical unit.

2. SPECIAL INSTRUCTIONS FOR COMPLETION

2.1 This summary is to be completed on a line per shift basis.

The date of each sequential shift will be marked in the first column. Subsequently the shift No. and the corresponding berth occupied will be marked.

2.2 "Time one or more gangs available at berth". This is the maximum time-span any of the gangs were actually made available by the stevedore.

For example if there were three gangs made available for the first shift 0600 - 1400 and the gangs worked as follows:

- gang 1 : 0600 - 1300 (early finish) = 7 hours
- gang 2 : 0600 - 1400 (normal shift) = 8 hours
- gang 3 : 0600 - 1500 (1 hour overtime) = 9 hours

then on the line of this first shift, in the column under reference would be marked 2 ^{1/}

^{1/} If this overtime hour was used for operations such as hatch closing (delay 02), or for delays 04, 07 and 09, and only part of the gang was employed, it still would be counted as an extra gang hour in the time-span.

Hence this line refers to the maximum time-span during any shift that a gang was available, whether in normal time or in overtime. The idle time incurred is therefore irrelevant, the gang being nevertheless available.

2.3 "No. of gangs" : Refers to the number of gangs worked per shift, regardless of their size or composition.

2.4 "Total gross gang/hours" : This is the combined total of the normal overtime gross hours columns per time sheet (i.e. per shift). There will be a separation between normal and overtime gang hours, the latter being marked on the line underneath normal hours and underlined. For example:

If 3 gangs each worked during a shift in normal time 8 hours and of which only 2 gangs each worked 2 hours overtime the column would be filled in as follows:

No. shift //	No. gangs	Total gross gang/hours
1	3	24
		<u>4</u>

2.5 "Idle time (gang/hours)" refers to the total of the delay box of the time sheet in gang/hours per shift.

2.6 "Total net gang/hours" are the actual gang hours worked per shift and can be obtained by adding the totals of normal and overtime net gang hours from the time sheet. As a check subtracting idle gang hours from the total gross hours will give the total net gang hours.

2.7 "Total gross man/hours" refers to the gross man hours worked per shift or rated man hours, no delays/idle time deducted. In this particular case, as the composition of gangs may vary, this information must be calculated from the time sheet.

For each hatch the total number of men will be multiplied by the gross hours worked, distinguishing normal and overtime hours as per instructions above.

Subsequently these per-hatch total gross man hours will be totalized to give the per-shift gross man hours, which will be indicated in the corresponding labour handling summary column.

When applicable the extra gross man hours indicated in the "other services rendered" area, will be added to this total.

For example: if there are 2 gangs (A and B) of 20 and 22 men each, working on hatches 1 and 2 respectively for 8 hours and 9 hours (of which 1 hour overtime) and if only four men had been kept on from gang B for an additional hour to close hatch 2 the calculations would be as follows:

hatch 1	gang A	20 x 8 =	160m/h (normal)	}	= 336 m/h normal
hatch 2	gang B	22 x 8 =	176m/h (normal)		
hatch 2	gang B	22 x 1 =	22m/h (overtime)	}	= 26m/h O/T
hatch 2	gang B	4 x 1 =	<u>4m/h (overtime)</u>		
			362 gross man/hours		

shift	Total gross man/hours
1	336
	<u>26</u>

As previously for gross gang hours, the gross man hours worked in overtime will be separated from normal time and underlined.

- 2.8 "Idle time (man/hours)": As for gang hours, the total idle time incurred in man/hours per shift will be obtained from the delay box in man/hours on the time sheet. As before the normal idle time man/hours will be separated from the overtime idle hours.
- 2.9 "Total net man/hours" refers to the actual man/hours worked and is obtained by subtracting the corresponding idle time man/hours, normal and overtime, from the gross man/hours.
- 2.10 "Tonnage" : Cross box of metric tons, weight or freight where applicable.
- "Discharged" is the total tonnage discharged per shift as is indicated in the shift time sheet in the
- "Cargo handling" column by the first digit 1 of the code.
- The same applies for "Loaded", first digit being 2,
- for shifted via shore, the first digit being 3,
- for shifted ship, the first digit being 4.
- The "total" tonnage column is the total handled per shift by adding the four preceding columns together.
- 2.11 All operational columns in this form must be totalled per ship call, thereby supplying the elements to fill in the primary indicators form.

GANG IDLE TIME

SUMMARY SHEET

PORT :

GANG IDLE TIME
SUMMARY SHEET
(per ship call)

SHIP NAME :
REG. SEQUENCE No. :
SHIP TYPE :
AGENCY :

Date: from to

Refers to month

CAUSE (code)	IDLE GANG HOURS	TOTAL
01		
02		
03		
04		
05		
06		
07		
08		
09		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
99		
		TOTAL

INSTRUCTIONS FOR COMPLETING THE GANG IDLE TIME SUMMARY SHEET

1. PURPOSE AND SOURCE

The purpose of this sheet is to collate per delay cause the number of gang/hours of idle time incurred during a ship call.

The source of information is the time sheet delay box. The form would normally be completed by the statistical unit.

2. SPECIAL INSTRUCTIONS FOR COMPLETION

This sheet is completed for every ship call. The month to which the sheet refers is the month in which the last handling operation took place (i.e., date of last time sheet). In each line corresponding to a delay cause the gang/hours incurred for all the shifts worked will be filled in. These delays will be summed to give the total delay for that cause. The sum of these totals will equal the "idle time (gang hours)" column total of the labour handling summary.

3. USE

This summary indicates the main causes of delay and can be used by management to identify where action will result in the greatest improvement. The sheet is also used to compile the monthly gang idle time form.

MONTHLY GANG
IDLE TIME FORM

PORT:
MONTH:

MONTHLY GANG
IDLE TIME
FORM

SHEET



GANG IDLE TIME IN HOURS RELATED TO:													
Reg. Seq. No.	Ship Movements	Preparation Ship		Goods	Labour		Ship/Port Equipment Breakdown		Shore Transport	Meteo	Misc.		Total
		02	07		11	12	24	05			25	16		27	19	29
Refers to Codes	01	03	09	15	13		14	26	17		20	30	Σ
	08	04	10		22		21		18		23	99	
		06									28		
TOTAL MONTH													

INSTRUCTIONS FOR COMPLETING THE MONTHLY GANG IDLE TIME FORM

1. PURPOSE AND SOURCE

This document regroups on a monthly basis the main categories of delay causes incurred in gang hours on all ships worked.

The gang idle time summary sheets are used by the statistical unit to complete this form.

2. SPECIAL INSTRUCTIONS FOR COMPLETION

All the vessels having worked during the month of reference (as stipulated in the heading of the gang idle time summary sheet per ship call) will be listed by their registration sequence number in the first column.

The subsequent columns regroup the 31 delay causes into 8 main categories.

By using the gang idle time summary sheet (per ship call), each column of the line will be completed.

For example if during a ship call handling was impeded for

2 gang hours because of waiting for lorries (code 16) and
2 gang hours because of waiting for waggons (code 17), the
the figure 4 will be filled in under "Shore transport".

A total of each line will be calculated in the last column. This line total must correspond to the total of all delays on the gang idle time summary sheet for that vessel.

Each column of this sheet will be totalled in gang/hours.

3. USE

The totals of each column will be used to establish the performance indicator pie chart of labour delay causes per month for the port.

PORT: _____ PRIMARY INDICATORS FORM _____ SHIP NAME: _____
 PORT OF CALL: LAST _____ REFERS TO MONTH: _____ REC. SEQUENCE No: _____
 NEXT _____ BERTHS UTILIZED: _____ SHIP TYPE: _____
 AGENCY: _____

TYPE OF SERVICE	LLOYD'S REG. No.	LENGTH	POSITION
SHIPPING LINE	GRT	BREADTH	CODE
CONFERENCE	NRT	MAX. DRAUGHT IN	
TYPE OF TRADE	DMT	MAX. DRAUGHT OUT	
FLAG	YEAR BUILT	CAPACITY TEU	
		No. HOLDS	

SHIP MOVEMENT RECORD		DATE	TIME	CODE	POSITION
<p>PRODUCTIVITIES</p> <p>PORT $9 \div 1$ T/H</p> <p>BERTH EFFECTIVE $9 \div 2$ T/H</p> <p>BERTH RATED $9 \div 3$ T/H</p> <p>GANG HOUR EFFECTIVE $9 \div 4$ T/CH</p> <p>GANG HOUR RATED $9 \div 6$ T/CH</p> <p>MAN HOUR EFFECTIVE $9 \div 7$ T/MH</p> <p>MAN HOUR RATED $9 \div 8$ T/MH</p>					
<p>RATIOS</p> <p>PORTION OF TIME AT BERTH $3 \div 2$</p> <p>GANGS AVAILABLE $4 \div 3$</p> <p>AVERAGE GANGS PER SHIP PER SHIFT $7 \div 4$</p> <p>AVERAGE MEN PER GANG $5 \div 4$</p> <p>PORTION OF IDLE GANG TIME $5 \div 4$</p>					

PRE-BERTHING/SAILING DELAYS		FROM DATE	TO DATE	DURATION HOUR	CAUSE (CODE)
DISCHARGED	TONNAGE				
LOADED	No. OF CONTAINERS				
SUB-TOTAL					
SHIFTED					
TOTAL 9					

INSTRUCTIONS FOR COMPLETING THE PRIMARY INDICATORS FORM

1. PURPOSE AND INFORMATION SOURCES

1.1 The primary indicators form summarizes the information on each call of the ship at the port and is the central document for the statistical unit. The source documents required to complete this form are the declarations of arrival and departure, the forms recording the movements within the port, Lloyds Register of Ships (or equivalent publication) and the labour handling summary. (See Figure 1). This form is to be completed by the statistical unit as soon as possible after the departure of the vessel. To reduce the effort of recording information certain codes are used.

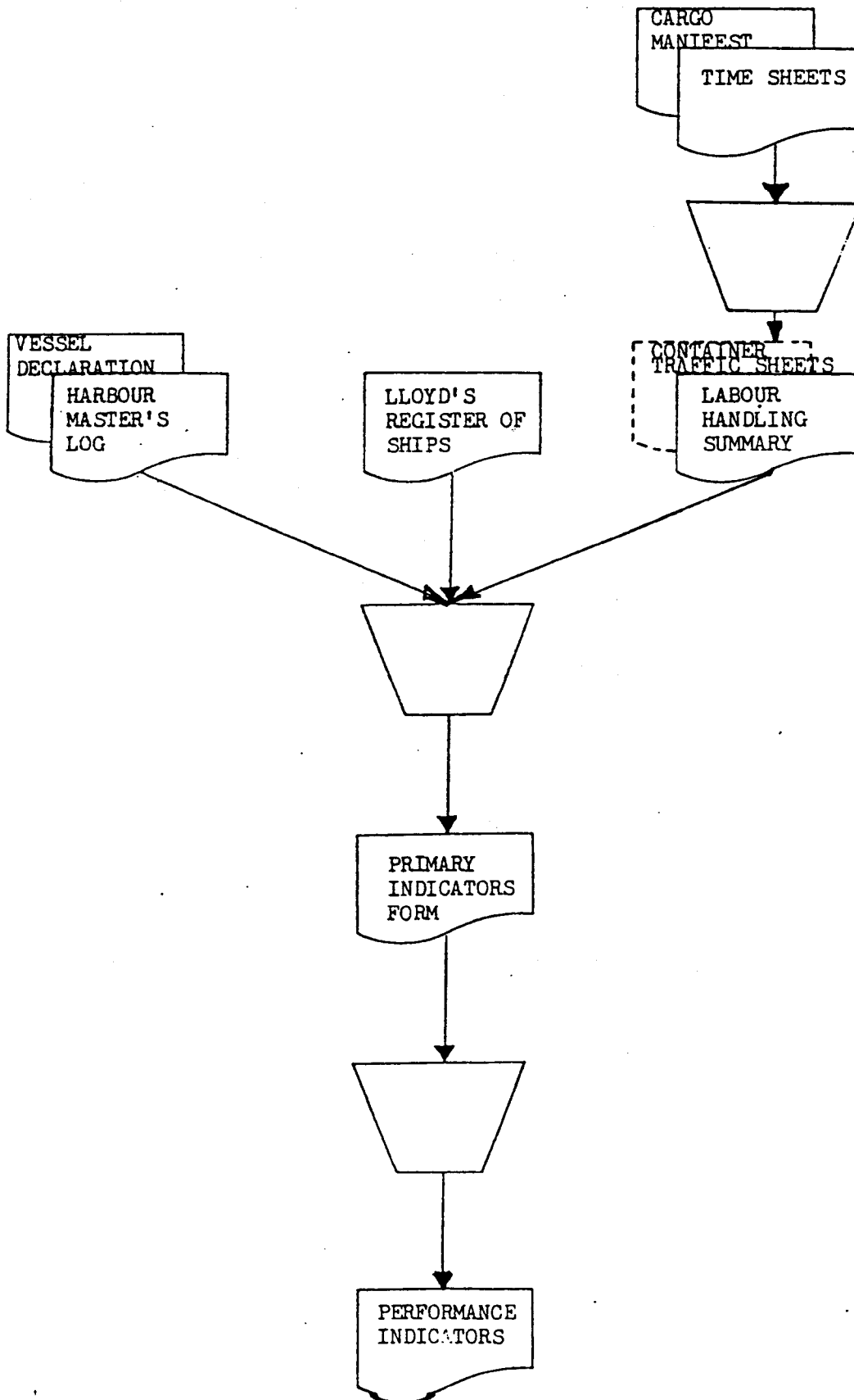
1.2 The following codes are used on this form and are included in section 5 entitled Catalogues of Codes.

- i) Catalogue of ship types.
- ii) Catalogue of type of service.
- iii) Catalogue of conferences.
- iv) Catalogue of type of trade.
- v) Catalogue of countries (flags).
- vi) Catalogue of ship movements.
- vii) Catalogue of berthing/sailing delay causes.

2. SHIP CALL INFORMATION

2.1 This information is contained on the uppermost section of the form and its purpose is to identify the port and the ship. The registration sequence number is assigned by the Harbour Master's Office to all vessels making use of port services. This number identifies the ship call and is to be used by all services in the

FIGURE 1



port. For barges or lighters which work cargo to or from the berth a registration sequence number may not be assigned by the Harbour Master's Office. In this case the registration number is to be left blank. The ship type codes are given in the catalogue of codes. A general cargo vessel carrying containers on deck is to be classified as a GC vessel.

- 2.2 The last and next port of call are the scheduled ports of call. In the case of a congested port when a vessel comes from port A, registers and then sails to port B before returning to the queue, the last port of call which was scheduled was port A. Thus port B, the last physical port of call, will not be mentioned.
- 2.3 For this form the month the vessel sails from the port is the reference month. For example a vessel which arrives in February and also berths in February but finishes working and leaves the port in March will be included with the March data and the entry on the form would be 03. Thus a vessel which arrives after another vessel but clears the port before the earlier arrival, could be included in one month and the earlier vessel in a later month.
- 2.4 The number of the berth or berths used during the ship call is recorded. Each berth or stream mooring is given a unique two digit number. In the event the vessel overlaps on two berths enter the berth number which has the greater length of the vessel. If the lengths on each berth are equal enter both. Also for a vessel which is double banked or abreast of another vessel at berth, enter the berth number of the berthed vessel and specify that the vessel is double banked.

2.5 The agency is recorded to allow performance analysis by agency. Each port could develop an agency code if they so wish. Also the agency will be the source of information not otherwise available, for example the type of service and if applicable the conference the vessel is sailing for.

3. SHIP CHARACTERISTICS

3.1 The ship characteristics section of the form commences with the type of service and ends with the number of holds. The objective of this section is to record the trading and physical characteristics of the vessel.

3.2 The code for the type of service is entered as is the name of the shipping line and the code for the conference, the latter if it is a liner service. In the event a code does not exist for the conference the entry 99 should be temporarily made and the conference specified. On a regional basis a code will be allocated to the new conference when convenient. This information is obtainable from the ships agent and can be obtained before the vessel berths.

3.3 The type of trade code indicates whether the vessel is engaged in deep sea, international coastal or national coastal trade for this call.

3.4 The flag or country code is based on the ISO (International Standards Organization) two digit alpha^{country} code. The catalogue of codes is in alphabetic sequence by the country's English name.

3.5 Lloyd's register number is assigned to the vessel for its life. The number therefore does not change when the vessel changes name.

- 3.6 Two sets of gross, net and dead weight tonnage often exist for the same vessel. The first set, the lower figures, refer to the open shelter deck (OSD) condition and the second set, the higher of the two, refer to the closed shelter deck (CSD) condition. When the condition is not specified by the ships master the higher tonnage figure is to be used. The figure ^{for deadweight tonnage} is to be given in metric tons or tonnes.
- 3.7 The last two digits of the year of construction are to be entered on the form. Thus for a vessel built in 1976 enter 76.
- 3.8 The lengths and breadths of vessels are required in order to determine the average and maximum length of quay required for a berth and average and maximum outreach required for shore cranes. The figures to be used are the overall length and the extreme breadth. The figures are to be rounded to the nearest metre.
- 3.9 The maximum incoming and outgoing draughts of the vessel are obtainable from the Harbour Masters Office. The figures are to be rounded to the nearest tenth of a metre. Thus for a vessel with a maximum incoming draught of 7 metres 45 centimetres, the appropriate entry on the form would be 7.5.
- 3.10 For a container vessel the number of containers per length is given in the Register of Ships. The number of TEU (Twenty foot Equivalent Units) is to be calculated and this number entered on the form. Thus a container vessel with space for 350 20-foot containers and 50 40-foot containers would have a TEU capacity of 450.
- 3.11 The number of holds (Ho) is given in the Register of Ships. Care needs to be taken in order not to confuse this with the number of hatches (Ha).

4. SHIP MOVEMENT RECORD

4.1 The purpose of this record or table is to record each major event in the call of the vessel at port. A ship movement code (see catalogue of codes) is used and is illustrated in "Figure 2: Breakdown of Ship's Time in Port". All times are recorded using the 24 hour clock, thus 6 p.m. is 18.00 hours. The position refers to the location of the vessel at the time of the event. Typical locations could be the anchorage^(i.e. ⚓) and individual berths which would be specified with a berth number. When leaving the berth or harbour do not specify a position.

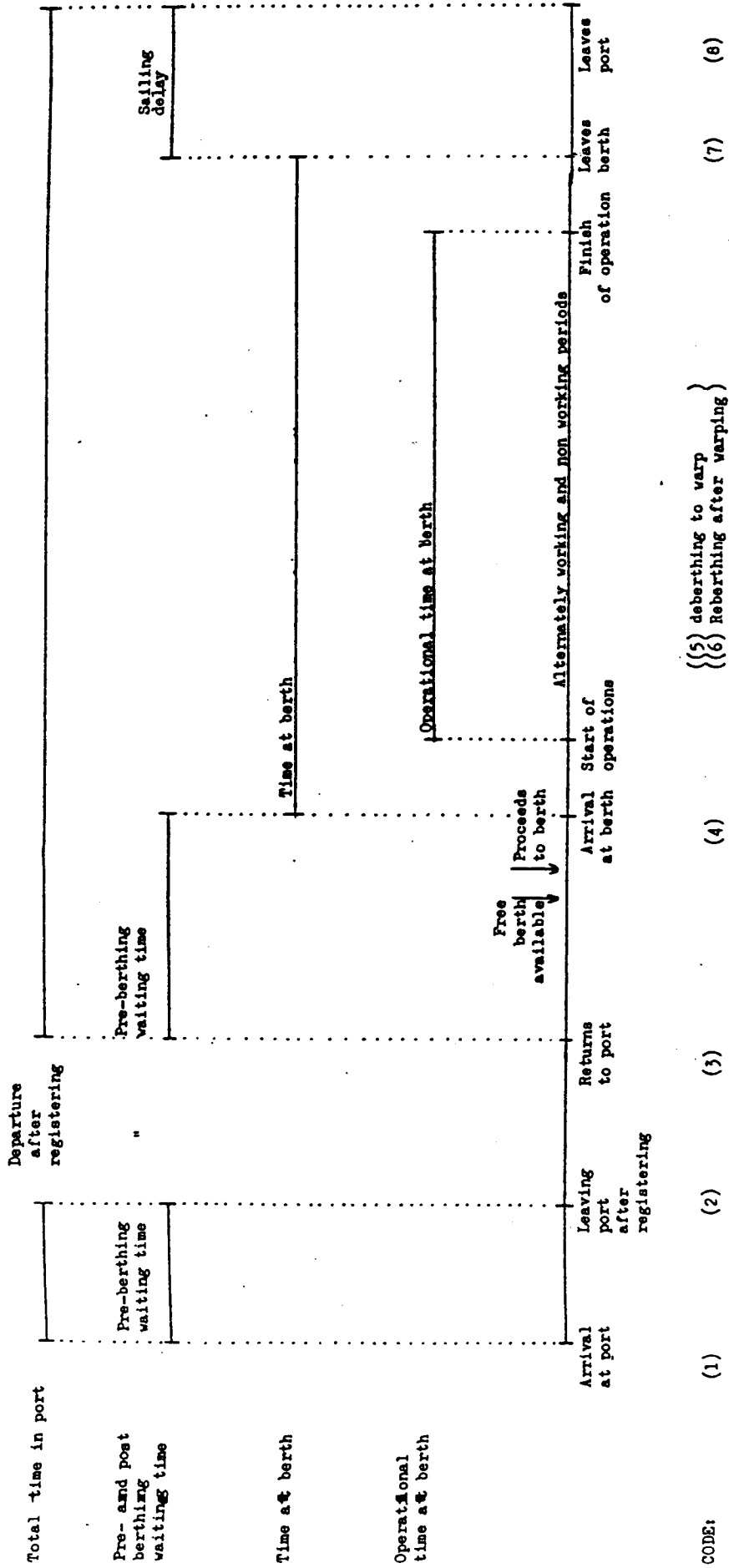
4.2 Each completed ship call will thus require a minimum of four entries, namely: arrival at port (Code 1), arrival at berth (Code 4), leaving berth (Code 7) and leaving port (Code 8).

5. PRE-BERTHING/SAILING DELAYS

5.1 The objective of this table is first to calculate the duration of each of the delays based on the ship movement record and secondly to record the reason for the delays. The duration of the delay can be rounded to the nearest hour. In the event several causes for the delay exist, the time for each cause is to be noted. Thus if a ship waits 12 hours because there is no berth, and then 2 hours for lack of a pilot two entries will be made.

5.2 The pre-berthing delays in port are totalled and transferred to the third entry in the section on ship time and labour information. The sailing delay entries however are to record the duration and reason for delays once the vessel has finished operations. Thus a sailing delay could be caused while the ship was still at berth if

FIGURE 2
BREAK-DOWN OF SHIP'S TIME IN PORT



the vessel had to wait for the pilot or tugs. As sailing delays can occur both at berth and after leaving berth the total sailing delay is not recorded. The important information is rather the cause of the delay.

6. SHIP TIME AND LABOUR

6.1 This section of the form is the one starting with "Time in Port" and ending with "Total Net Man Hours". The time in port is the physical time the vessel spends in the port during the ship call. If the vessel has not left the port, this time is the difference between the departure (Code 8) and the arrival (Code 1) of the vessel.

6.2 The total pre-berthing delay is the interval between arrival (Code 1) and berthing (Code 4). Waiting time in port refers to the time that the ship is physically in the port waiting. It is the pre-berthing delay minus the interval between leaving port after registering (Code 2) and returning to port (Code 3). When the vessel does not leave port during this interval these two entries are the same.

6.3 The time at berth is the interval between arrival at berth (Code 4) and leaving berth (Code 7) minus any time for shifting.

6.4 The remaining eight entries come directly from the labour handling summary. The "Time gangs available" refers to the total of the column "Time one or more gangs available at berth". The "Total

no. of gangs worked" refers to the total of the column "No. gangs". The totals for the next six columns are similarly transferred to the appropriate entry on the primary indicator form.

- 6.5 For the special case of a container vessel there will be no labour handling summary. The container terminal time sheets and container terminal performance report will be used. In this case cranes replace gangs. Thus the "time gangs available" becomes the time cranes available which can be calculated from the time sheets. The total gross crane hours are the total crane/hours made available on the container terminal performance report. The idle crane hours are the total time deductions from the container terminal performance report. The entries on man hours are not applicable for a container terminal.

7. CARGO INFORMATION

- 7.1 The labour handling summary and the container traffic sheets are required for completing this section of the form. Ideally all the ports of the sub-region would use metric weight tons for their tonnage figures. However as certain ports base their tariff on metric freight tons, their statistics are also based on this measurement of tonnage. Therefore if the tonnage figures are in freight tons this should be clearly indicated on the form.
- 7.2 The total for shifted cargo is made up of cargo shifted via shore and shifted within the ship. The tonnage shifted via shore shown on the labour handling summary is to be doubled as it is cargo handled twice. Thus if 30 tons are shifted via shore

and 20 tons within the ship the total shifted cargo entry is 80 tons (30 + 30 + 20).

7.3 When containers are worked from or to a general cargo vessel, the number of units is also entered. In this case the weight of the containers are included in the tonnage figures. The number of containers worked will be taken from the container traffic sheets. The same remarks which were made for shifted cargo also apply for shifted containers.

7.4 In the special case of a container terminal, the net tonnages of the cargo worked will be entered rather than the gross. The performance calculations are however based on units rather than tonnage.

8. PERFORMANCE CALCULATIONS

8.1 The performance calculations are the average figures obtained per ship call. Thus to establish the port productivity the total tonnage (9) is divided by the time in port (1) to give tons per hour. The effective productivities are the actual productivities obtained while the rated productivities are the productivities which would have been obtained had there been no idle time. For a container terminal the productivities are in units per hour.

8.2 The man-hour productivities are a rough estimate of the labour cost of cargo handling in man-hours per ton. For more detailed analysis of productivities one has to consult the time sheet.

For a container vessel working at a container terminal the man-hour calculations are not applicable.

8.3 The ratios calculated give an indication of the intensity of working, the average number of gangs per ship, the average size of gang and the portion of gang idle time. A more detailed analysis of gang idle time is made with the monthly gang idle time form.

SECTION 3

Berth throughput and port traffic
Weekly register of berth occupation
Berth occupancy form
Cargo manifest summary

INSTRUCTIONS FOR COMPLETING THE BERTH THROUGHPUT/PORT TRAFFIC FORMS

1. PURPOSE AND INFORMATION SOURCES

1.1 The primary functions of ports are to receive ships and, in the case of a commercial port, to make possible the transfer of cargo from one mode to another, at least one of which is maritime. The amount of cargo thus transferred which we define as port traffic is an important statistic. In addition cargo is often double handled, and this additional handling is also to be taken account of in the berth throughput but not in the port traffic.

To establish the actual cargo handling demand the two cargo flows, the berth throughput and the port traffic, must be distinguished. The tonnage figures are assumed to be metric tons unless otherwise specified.

1.2 The source documents for determining the cargo flows are the time sheets and the cargo manifests. On the time sheets either a cargo handling code or a narrative statement specifies the operation. The time sheets are completed on the quay for each shift and for each ship. They allow the recapitulation of the total movement of cargo by mode. This information can be tabulated per ship, per berth or per zone. The cargo manifest is also required to identify trans-shipment and transit cargo. The form will be completed by the statistical unit.

2. BERTH THROUGHPUT CARGO : DEFINITION

2.1 Comprises the number of handling activities involved for tonnage using the port facilities, regardless of its final destination but divided into loaded, discharged, trans-shipped and shifted cargo. Double-banked vessels working away from berth into triple-banked vessels are excluded from berth throughput. Although this last operation still requires port resources it could equally take place at moorings and thus is not counted in that berth throughput but would be included in mooring throughput.

2.2 The berth throughput allows the evaluation of the present demand of a traditional break-bulk berth. It is also the basis to quantify the additional throughput possible through operational or organisational changes and through minor investment. The recording of double-handling allows management to monitor the amount of tonnage thus handled.

3. BERTH THROUGHPUT INSTRUCTIONS

3.1 The following cases deserve special mention:

- i) shifting in hold: cargo handling in the hold to re-group and re-classify merchandise in order to facilitate the subsequent loading or unloading operations. The total cargo shifted will be counted in the berth throughput, but not in the traffic figures;
- ii) shifting from hold to hold : this operation involves the transfer of cargo from one hold to another via the quay. The objective of the operation could be to reorganize the

consignments, to prepare a hold for a new loading, to separate non-compatible cargoes or to improve the trim of the ship for the following call. The tonnage thus handled is not in the port traffic but the tonnage is doubled in the berth throughput;

- iii) discharging into or loading cargo from a vessel at quay to a lighter alongside the vessel: this cargo is included in both berth throughput and port traffic. However in berth throughput the same cargo will be counted twice if the lighter has been used as a supplementary berth; for example, if the above lighter when loaded (cargo discharged from vessel) subsequently re-berths for unloading on to quay this same cargo will be included for the second time in berth throughput but not in port traffic as it has already been counted once (vessel unloading into barge);
- iv) discharge of cargo on the quay from a vessel which is double banked to vessel at quay: the cargo is included in both counts once only;
- v) discharge of cargo from a vessel abreast of a vessel at quay to a barge alongside the abreast vessel: the cargo is not included in the berth throughput but is included in ~~the mooring throughput and~~ the port traffic. However if the barge is subsequently discharged at the berth the tonnage is then counted in the berth throughput;
- vi) reloading of cargo discharged by error: there will be two movements, loading and unloading included in the berth throughput but no movement is included in the port traffic;
- vii) transfer of cargo from one vessel to another (for example because of equipment breakdown or cancellation of a call): the tonnage worked will be treated as trans-shipment cargo

and counted twice if the operation is via the quay and once if directly into another ship. This cargo is not included in the port traffic;

viii) trans-shipment: when trans-shipment is via the quay, the tonnage will be counted twice in the berth throughput, both times under trans-shipment. When trans-shipment is direct from one ship to another, the tonnage will only be counted once as only one gang is involved. For port traffic whether national or international cargo, the tonnage is included only one time under trans-shipment from the discharging vessel.

3.2 The columns are totalled at the end of each week and at the end of each month the weekly totals are summed to allow the preparation of the berth throughput graph.

4. PORT TRAFFIC: DEFINITION

All goods that have used the port for a conveyance switch constitute the port traffic flow.

As the handling resources are here irrelevant, the goods considered in port traffic will be counted only once as long as they make use of the port as a transfer centre. Shifting will therefore be excluded as well as erroneously discharged goods subsequently reloaded. Port traffic statistics are therefore not influenced by the number or type of handling operations performed.

5. PORT TRAFFIC: INSTRUCTIONS

5.1 Port traffic statistics divide cargo into three broad classes:

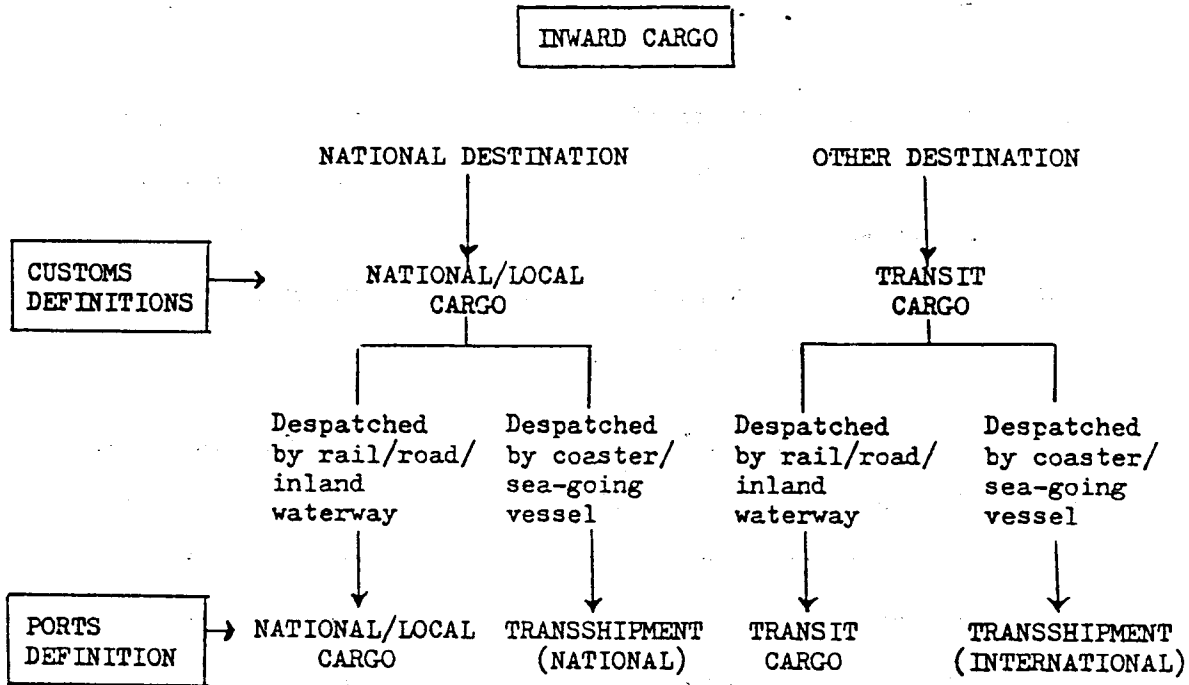
- i) Inward cargo either for national use or transit cargo continuing to foreign destination by land or inland waterway;
- ii) Outward cargo either of national origin or transit cargo arriving in port from a foreign destination via land or inland waterway;
- iii) Trans-shipment cargo either national or international (foreign bound) and only counted when discharged.

5.2 Various contradictory definitions of the term "transit cargo" are often simultaneously used. The definition from the customs point of view puts the emphasis on the fact that the cargo has either no national destination or origin. Thus cargo coming into the country will require dispatch to all onward destinations, by any one of the following modes: road, rail, inland waterway, coaster or sea-going vessel. For a port authority the important aspect is whether the cargo not originating or destined for the country will be dispatched either by road/rail/inland waterway - which is then called
in transit cargo
or by coaster/sea-going vessel - which is then referred to as
trans-shipment cargo.

5.3 Trans-shipment cargo, however, has a slightly wider meaning because it may also refer to national cargo which is transferred from one vessel (coaster/deep-sea vessel) to another vessel (coaster/deep-sea vessel) thus indicating that cargo is transferred between a country's national ports.

5.4 The distinction between transit cargo and trans-shipment cargo for inward-bound traffic can be illustrated as follows:

Figure 1



The same applies for outward bound cargo. In this manual the port's definition is used.

5.5 Also general cargo and bulk tonnage are to be separated. This is achieved by the appropriate selection of port zones for each berth throughput/port traffic form. The tonnages recorded will be the gross tonnages, i.e. including the weight of the packaging. For a more detailed breakdown of traffic by main commodities the cargo manifest can be used or as a second choice the customs declaration.

WEEKLY REGISTER OF BERTH OCCUPATION

PORT:

WEEKLY REGISTER OF BERTH OCCUPATION

ZONE:

BERTH:

DATE FROM:

TO:

HOURS	MONDAY				TUESDAY				WEDNESDAY				THURSDAY				FRIDAY				SATURDAY				SUNDAY							
	1*	2*	3*	4*	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
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24																																
TOTAL																																

*CODE: 1 - vacant; 2 - occupied not working; 3 - occupied working;
4 - occupied not workable

INSTRUCTIONS FOR COMPLETING THE WEEKLY REGISTER OF BERTH
OCCUPANCY

1. PURPOSE AND INFORMATION SOURCES

- 1.1 The purpose of this register is to collect information on berth utilization in order to determine the amount of time the berth is vacant and the amount of active time and inactive time when the berth is occupied.
- 1.2 The register will be completed by the quay superintendent based on his observations and supplemented by discussions with the Harbour Master's Office and the stevedoring company.

2. SPECIAL INSTRUCTIONS

- 2.1 One weekly form is required for each berth in the port. The form begins on Monday. One can distinguish four possible situations. First, the berth is vacant (code 1) if there are no ships occupying the quay. Judgement will have to be used when vessels on adjacent berths overlap the berth in question as to whether it is occupied or not. It can be considered occupied if the next vessel in the queue cannot berth.
- 2.2 The other three situations occur when the berth is occupied. Situation 2 is when there is a ship at berth but no work is scheduled. Thus, for example, if a vessel berthed at 0600 and the day shift began at 0800 and finished at 1700 and no other working occurred until the next day, the berth would be in a state 2 for a total of 9 hours, 2 hours in the morning, and 7 hours in the evening.

2.3 The third situation is when there is a ship at berth and work is scheduled. In the above example the berth would be in situation 3 from 0800 to 1700 or 9 hours. If two small vessels occupied the same berth and one was working and the other not the berth would be considered in situation 3.

2.4 The fourth situation is when the berth is occupied by a non-workable vessel, i.e. a vessel not engaged in a cargo handling operation. Thus the following vessels would put the berth into situation 4:

- i) passenger vessel;
- ii) naval vessel;
- iii) any vessel alongside only for repairs;
- iv) any vessel alongside only for bunkering or supplies;
- v) dredger.

2.5 The form is completed by filling in the appropriate columns for each day. As a check the sum of the four situations is 24 hours.

INSTRUCTIONS FOR COMPLETING THE BERTH OCCUPANCY FORM

1. PURPOSE AND INFORMATION SOURCES

1.1 The purpose of this form is to allow the tabulation of the weekly berth occupancy for a group of berths or zone both in hours and percentage. The information source is the weekly register of berth occupation and the form is completed by the statistical unit. A more detailed calculation of berth occupancy based on the ship length of each vessel is possible. This can be obtained from the primary indicators form and the weekly register of berth occupation. The resulting values cannot however be used in relation to Queuing Theory, as they underestimate the occupancy of the berths. For example if a berth of 150 metres in length was occupied during 24 hours by a vessel of 130 metres long, the occupancy figure based on length would be 87%. However, in reality the berth is fully occupied.

2. SPECIAL INSTRUCTIONS

2.1 The daily breakdown of berth utilization in hours from the weekly register of berth occupation is grouped together for each zone under the four headings: vacant; occupied not working; occupied working; and occupied not workable. For example, if one zone had three berths, there would be three entries each of one line made for the zone and 21 entries made for the week. The column for each heading is totalled and divided by the total number of berth hours available. In the above example with three berths in the zone there would be 504 berth hours available. (24 hours per day per berth x 3 berths per zone x 7 days per week).

- 2.2 For the special case of calculating the berth occupancy based on ship length the time at berth is adjusted by a factor based on ship length and berth length. For example if a ship of 80m. occupies a berth of 160m. for 12 hours and is not working, the equivalent entry for the occupied not working column is $12 \times 80/160 = 6$ hours. Likewise if a ship of 200m. occupies a berth of 150m. for 15 hours and is working, the equivalent entry for the occupied working column is $15 \times 200/150 = 20$ hours.
- 2.3 The percentages are calculated as before by dividing the total of each column by the total number of berth hours available. For the example with 3 berths, the berth hours available would be 504.

PORT :

CARGO MANIFEST SUMMARY

SHIP NAME:

REG. SEQUENCE No :

REFERS TO MONTH :

SHIP TYPE:

FLAG:

ORIGIN	DESTINATION	NUMBER OF CONSIGNMENTS	INWARD CARGO		OUTWARD CARGO		TRANS-SHIPMENT CARGO	
			WEIGHT (tons)	MEASURE- MENT m ³	WEIGHT (tons)	MEASURE- MENT m ³	WEIGHT (tons)	MEASURE- MENT m ³

INSTRUCTIONS FOR COMPLETING THE CARGO MANIFEST SUMMARY

1. PURPOSE AND INFORMATION SOURCES

- 1.1 The purpose of this form is to collect data necessary for analysis of trade patterns, cargo flows, and average consignment size. The source document is the cargo manifest. The form is completed by the statistical unit. The form could be modified to allow it to be used as the input document for billing of port dues on cargo.

2. SPECIAL INSTRUCTIONS

- 2.1 After identifying the ship call by name, registry sequence number, ship type, and flag, one entry in either inward, outward or trans-shipment columns is made for each group of consignments having the same origin and destination.
- 2.2 This is basic data and the level of detail could be expanded by recording information of the type of commodity (SITC) and the consignee. As an initial step, however, the level of detail is judged adequate.

SECTION 4

Container statistics matrix

Container traffic sheets

Container terminal time sheet

Container terminal performance report

CONTAINER STATISTICS MATRIX
(BOTH FOR UNITS AND TONNAGES)

EMPTY			FULL						
TRANS-SHIPMENT	OUTWARD	INWARD	TRANS-SHIPMENT	OUTWARD		INWARD			
				LCL	FCL	LCL	FCL		
								4'	20 FOOT
								8'	
								8'6"	
								+ 8'6"	
								4'	40 FOOT
								8'	
								8'6"	
								+ 8'6"	

CONTAINER STATISTICS MATRIX

In the ports' industry it is generally felt that container statistics present much less difficulties to select, collect and analyse than is the case for conventional general cargo statistics. If it is true that at first sight the number of cargo classes can be reduced to the extreme single "container class", it is equally true that such far pushed simplification does not provide the container terminal manager and/or the port authority with the kind of information they require to measure performance or decide on future investments.

... The attached "container statistics matrix" illustrates the complexity of the statistical information concerning container traffic, and the need to be able to relate such characteristics as for example full container with export cargo, FCL, length of container and height. On purpose and in order to simplify the container types have been left out, but in certain cases these should also be taken into account. This information can be collected on one form but the complexity would be such that mistakes and omissions would be unavoidable. Therefore three container traffic sheets are proposed as working documents. These concentrate only on the most relevant and significant relationships.

PORT :
BERTH No :

SHIP NAME :
REG. SEQUENCE No :
SHIP TYPE :
AGENCY :

CONTAINER TRAFFIC SHEET ONE

NUMBER OF UNITS HANDLED

..... FOOT CONTAINERS

	INWARD	OUTWARD	TRANS-SHIPMENT (IN ONLY)	TOTAL
FULL				
EMPTY				
TOTAL				

..... FOOT CONTAINERS

	INWARD	OUTWARD	TRANS-SHIPMENT (IN ONLY)	TOTAL
FULL				
EMPTY				
TOTAL				

..... FOOT CONTAINERS

	INWARD	OUTWARD	TRANS-SHIPMENT (IN ONLY)	TOTAL
FULL				
EMPTY				
TOTAL				

INSTRUCTIONS FOR COMPLETING THE CONTAINER TRAFFIC

SHEET ONE

1. PURPOSE AND INFORMATION SOURCES

1.1 To allow the calculation of total number of containers and total number of TEU

inward, outward or trans-shipped in a port.

1.2 This form does not show the total container moves carried out (see container terminal performance report).

1.3 Information to complete this form to be taken from the ship's manifest or equivalent document.

1.4 This form is used for all vessels carrying containers.

2. SPECIAL INSTRUCTIONS FOR COMPLETION

2.1 This form has to be filled in per vessel call.

2.2 The traffic is recorded by

container length (20 foot - 30 foot - 35 foot -
40 foot and where applicable 10 foot)

2.3 "Full" means the container contains cargo; this does not mean the container has been filled to its full weight or cube capacity.

2.4 "Empty" containers are containers which are moving without any freight paying cargo.

2.5 Trans-shipment containers are mentioned once, only on the incoming vessel sheet and not on the outgoing vessel sheet. Thus the actual number of trans-shipment containers handled is recorded and not the number of moves. The trans-shipment throughput is thus twice the total number mentioned (mark the short-term discrepancies!)

2.6 On this form no distinction is made between captive and transit traffic.

3. MAIN INDICATORS

3.1 The "container traffic sheet one" permits the calculation of the following indicators:

- * No. of units handled : grand total of the totals of all container lengths (performance).
- * Proportion of 10 foot, 20 foot, 30 foot, 35 foot, 40 foot containers handled out of total number of containers handled.
- * No. of TEU handled ^{1/} (capacity requirements)
- * No. of inward containers received full
- * No. of inward containers received empty
- * No. of outward containers shipped full
- * No. of outward containers shipped empty
- * No. of trans-shipment containers shipped full
- * No. of trans-shipment containers shipped empty
- * Proportion of empty and full containers and of total number of containers handled
- * Containers handled per type of ship

3.2 These indicators are calculated per ship call and then totalled on a week/month or year basis as required.

^{1/} To obtain the number of TEU's handled weight the totals of each of the container lengths as follows:

- 10 foot container by 0.5
- 20 foot container by 1.0
- 30 foot container by 1.5
- 35 foot container by 1.75
- 40 foot container by 2.0

PORT :
BERTH No:

SHIP NAME :
REG. SEQUENCE No:
SHIP TYPE :
AGENCY :

CONTAINER TRAFFIC SHEET TWO

TONNAGE (net weight)

	INWARD	OUTWARD	TRANS-SHIPMENT (IN ONLY)	TOTAL
20'				
40'				
TOTAL				

CONTAINER TYPE (in units)

	20'				40'			
	4'	8'	8'6	+8'6	4'	8'	8'6	+8'6
Dry								
Insulated								
Refrigerated								
Flat rack								
Liquid bulk								
Open top								
Bulk container								
.....								
.....								

FCL - LCL (in units)

		INWARD *	OUTWARD	TOTAL
FCL	Through B/L			
	Port B/L			
LCL				

* INCLUDES TRANS-SHIPMENT CARGO

INSTRUCTIONS FOR COMPLETING THE CONTAINER TRAFFIC

SHEET TWO

1. PURPOSE AND INFORMATION SOURCES

1.1 To allow the calculation of the total containerized net tonnage (gross weight minus tare (container) weight) for inward, outward and transhipped cargo in a port.

1.2 To provide terminal operators with information on the use of

- (i) container types
- (ii) various container lengths
- (iii) various container heights

In particular to allow the terminal operators a better insight in the composition of the container flow and as such to allow them to make a justified decision when acquiring new handling equipment or when deciding on a new terminal lay-out.

1.3 To obtain an indication of the packing and unpacking activity for containers (that is, the number of LCL or CFS containers) in the port to judge better the related staff and equipment requirements. The number of FCL containers moving through the port on 'through bills of lading' should also be noted.

1.4 Information to complete this form to be taken from the ship's manifest or equivalent document.

1.5 This form is used for all vessels carrying containers.

2. SPECIAL INSTRUCTIONS FOR COMPLETION

This form has to be filled in per vessel call

2.1 "Tonnage" section

2.1.1 Only "net weights" are recorded. The tare weight of the

container is excluded.

2.1.2 Ports handling other container lengths than 20 foot or 40 foot in considerable numbers, will have to provide additional columns for these lengths.

2.1.3 The "tons" used are metric tons of 1,000 kg unless otherwise specified.

2.1.4 If freight tons are normally also used these can be marked but only as additional information.

2.1.5 On this form no distinction is made between captive and transit traffic.

2.2 "Container Type" section

2.2.1 This information needs only recording for container lengths of 20 foot, 30 foot, 35 foot and 40 foot.

2.2.2 The "height" class + 8'6 covers all containers of 9'0, 9'6 and exceeding 9'6.

2.2.3 Containers type which are not specifically mentioned but are frequently handled can be added to the listing.

2.2.4 In this section "over-sized" containers are not considered a special group. They will be classified under one of the main types. For example a 20 foot flat rack-8'6 high but overwidth will be entered in the column flat rack, 20 foot, 8'6.

2.3 "FCL- LCL" section ^{1/}

2.3.1 Only container units are counted

2.3.2 Almost always trans-shipment containers are FCL.

2.3.3 Empty containers (other than trans-shipment) are not entered in this section.

3. MAIN INDICATORS

3.1 "Tonnage" section

- * Total net cargo tonnage inward
- * Total net cargo tonnage outward
- * Total net cargo tonnage trans-shipped

3.2 "Container Type" section

- * Proportion of any type of container handled out of total number or out of any specific sub-group.

For example: proportion of refrigerated containers out of total number of containers handled.

For example: proportion of 8' high containers out of all 20' long containers handled.

Etc.

- * Possibility to determine trends in the use of container type, container lengths, container heights.

^{1/} For the Port Authority a narrow definition of FCL/LCL applies. FCL containers are not packed or unpacked in the port area. LCL-containers are however packed and unpacked in the port area, either by the port authority staff or by the terminal operator.

3.3 "FCL-LCL" section

- * Proportion of FCL versus LCL containers, broken down in inward/outward
- * Proportion of through B/L FCL to total FCL units

4. MAIN INDICATORS WHEN COMBINING "TRAFFIC SHEET ONE" AND "TRAFFIC SHEET TWO"

- * Average net weight per inward container, broken down per container length.
- * Average net weight per outward container, broken down per container length.

CONTAINER TRAFFIC SHEET THREE

PORT:
 BERTH No.:

SHIP NAME
 REG. SEQUENCE No.
 SHIP TYPE
 AGENCY

CONTAINER TRAFFIC SHEET THREE

CAPTIVE AND TRANSIT TRAFFIC

NUMBER OF UNITS AND TONNAGES HANDLED

	NATIONAL		TRANSIT		TOTAL	
	INWARD *	OUTWARD *	INWARD *	OUTWARD *	INWARD *	OUTWARD *
FULL 20' TONNAGE	/	/	/	/	/	/
FULL 40' TONNAGE	/	/	/	/	/	/
TOTAL UNITS	/	/	/	/	/	/
TOTAL TONNAGE						

* Number of units:

Through B/L

Port B/L

UNCTAD PORTS SECTION

UNDP PROJECT RAF/78/011

INSTRUCTIONS FOR COMPLETING THE CONTAINER TRAFFIC

SHEET THREE

1. PURPOSE AND INFORMATION SOURCES

1.1 This form needs only to be filled in by those ports for which the transit traffic represents a significant portion of total traffic.

1.2 It is important to make the distinction between transit traffic and trans-shipment traffic based on the following definitions:

* transit traffic = goods received in a port en route and from which they have to be transferred and dispatched to their ultimate foreign destination by rail, road or river craft.

* trans-shipment traffic = the transfer of goods from a sea-going vessel to another sea-going vessel before the place of final destination has been reached.

1.3 The form permits the calculation of the total number of containers and the corresponding tonnage that a port handles as transit traffic and for which special operating conditions may have been specified. If required the transit traffic may be subdivided into country of destination for inward cargo and country of origin for outward cargo.

2. SPECIAL INSTRUCTIONS FOR COMPLETION

2.1 Only the number of full containers is recorded.

2.2 In this sheet the trans-shipment containers are not included.

2.3 The national traffic refers to container cargoes with national destinations.

2.4 The total inward and outward traffic (national and transit) should

correspond to the sum of all inward and outward cargo on container traffic sheets one (number of units handled) and two (tonnage net weight).

2.5 The number of units is divided to show the number of boxes moving through the port on a through B/L and those on a port B/L.

3. MAIN INDICATORS

The "container traffic sheet three" permits the calculation of the following indicators:

- * Proportion of number of transit containers out of total inward and outward.
- * Proportion of number of TEU in transit out of total TEU inward and outward.
- * Proportion of transit tonnage out of total tonnage inward and outward.
- * Average weight of transit container
 - inward 20' and 40'
 - outward 20' and 40'

CONTAINER TERMINAL TIME SHEET

INSTRUCTIONS FOR COMPLETING THE CONTAINER

TERMINAL TIME SHEET

1. PURPOSE AND INFORMATION SOURCES

- 1.1 This form is filled in by the Container Terminal supervisors responsible for the vessel's operation (during consecutive shifts this may be filled in by various supervisors).
- 1.2 To provide the terminal operator with a summary statement of the handling operations, and consequently for use as a basic document for invoicing and collecting of statistics.
- 1.3 Based on the stowage plans and vouchers marked by the tally clerks.

2. SPECIAL INSTRUCTIONS FOR COMPLETION

- 2.1 Mark per crane all moves carried out during a working period in the accurate sequence in which they took place.
- 2.2 Group only moves of similar nature (e.g. discharged X full 20 foot containers, closed Y hatch covers, etc.)
- 2.3 Mention separately the correct unlashng and lashing times and the number of men employed, as this will normally be invoiced as a separate activity.
- 2.4 When containers are shifted the net weight of the containers should be marked on the time sheet.
- 2.5 In case other than containers are handled describe the cargo and mark on the time sheet the total time taken for the operation.
- 2.6 For each crane and each cause idle times are recorded, both the

actual time period and the duration in hours (e.g. crane No. 3
idle due to damaged container stuck in the cell guides from
0900 - 0930 i.e. duration half an hour).

CONTAINER TERMINAL PERFORMANCE REPORT

PORT:
BERTH No:

SHIP NAME:
REG. SEQUENCE No:
SHIP TYPE :
AGENCY:

CONTAINER TERMINAL PERFORMANCE REPORT

REFERS TO MONTH

ARRIVAL DATE/TIME AT BERTH:

SAILING DATE/TIME FROM BERTH:

$$\text{TERMINAL PERFORMANCE} = \frac{\text{NUMBER OF TOTAL MOVES}}{\text{DISPATCH TIME} - \text{AGREED TIME CORRECTIONS}} = \text{MOVES/HOUR}$$

<u>Moves:</u>	Containers discharged	.....
	Containers loaded	.....
	Containers shifted on board	.....
	Containers discharged and reloaded (2 moves)	.....
	Hatch-covers discharged and reloaded (2 moves)	.....
	<u>Total moves</u>	<u>.....</u>
<u>Dispatch time:</u>	Total time from landing gangway until lashing finished	.....hrs
(ship operational)	Total crane/hours made available: No of cranes x hours scheduled plus overtime	.....
<u>Time corrections:</u>	* <u>Time deductions for delays caused by terminal operator</u> e.g. operational delays, equipment breakdowns, mealbreaks, etc.	.....
(total idle time)	* <u>Time deductions due to external factors</u> e.g. fog, storm, main power supply failure, customs clearance, health inspection etc.	.....
	* <u>Delays caused by shipping line:</u>	
	Late arrivals	.....
	Lack of information	.....
	Damaged containers	.....
	Off-standard containers	.....
	Miscellaneous	.....
	<u>sub-total</u>	<u>.....</u>
	<u>Total time deductions</u>	.....
	<u>Agreed time corrections:</u>	
	$\frac{\text{total time deductions (crane/hours) x dispatch time}^{1/}}{\text{total crane/hours made available}}$	.....hrs
	<u>Dispatch time - agreed time corrections</u>	<u>.....hrs</u>

1/ In the exceptional case where the time one or more cranes are scheduled is less than the dispatch time, replace the dispatch time by the crane time in this equation to calculate the agreed time correction. If the crane or cranes have not been allocated because of the fault of any other party than the terminal operator there will be a additional adjustment of the total time lost because of non allocation of the cranes. If it is the fault of the terminal operator there will be no further adjustment.

INSTRUCTIONS FOR COMPLETING THE CONTAINER TERMINAL
PERFORMANCE REPORT

1. PURPOSE AND INFORMATION SOURCES

- 1.1 This form is filled in by the statistical unit.
- 1.2 To allow the terminal operator and the shipping line to judge the performance of the terminal.
- 1.3 To allow the terminal operator an assessment of the net working time and the main idle time causes.
- 1.4 To permit the terminal operator a correct evaluation of the total number of moves required for the handling of a given number of containers.
- 1.5 Information to complete this form to be taken from the "Container Terminal Time Sheet".
- 1.6 This form is used for all vessels carrying containers and handled at specialized container berths.

2. SPECIAL INSTRUCTIONS FOR COMPLETION

- 2.1 Stipulate clearly and separately
 - * total number of containers discharged
 - * total number of containers loaded
 - * total number of containers shifted on board
 - * total number of containers shifted via the quay
 - * total number of hatch-covers taken off and put in place
(also include number of lashing frames where applicable.)

2.2 When calculating the dispatch time exclude all time between landing gangway and until lashing finished, which has been lost due to a late start for which the shipping line is responsible (e.g. because no gangs were requested upon arrival of the ship).

2.3 Time corrections

Three types of delays have been included in the form:

- * those caused by terminal operator
- * those due to external factors
- * those caused by shipping line

Some delays cannot be easily classified under any of the three types without additional information. For example late arrival of a container causes a delay in the ship operation. Is this due to external factors (i.e. late arrival of truck and thus responsibility of trucker) or to the shipping line? (accepting the container after closing date).

2.4 The time taken in handling other than containers (e.g. buses, yachts, locomotives, etc.) should be added to "delays caused by shipping line" under "miscellaneous".

2.5 The agreed time correction is obtained by converting the total time deductions (expressed in crane hours lost) into ship hours at berth by using the formula:

$$\frac{\text{total time deductions (crane/hours)} \times \text{dispatch time}}{\text{total crane/hours made available}}$$

The value of "total crane/hours made available" is obtained from the container time sheets (number of cranes available x hours worked).

3. MAIN INDICATORS

3.1 The container terminal performance report permits the calculation of the following indicators:

- * terminal performance, i.e. the number of moves per net dispatch hour
- * output per 24 hours (terminal performance x 24 hours)
- * total idle time
- * total non-productive moves out of total moves (i.e. total of containers shifted on board and via quay plus number of hatch-covers discharged and reloaded divided by total moves).

SECTION 5

Presentation of performance indicators for management use

Flowcharts

Codes

PRESENTATION OF PERFORMANCE
INDICATORS FOR MANAGEMENT USE

PERFORMANCE INDICATORS

1. The attached histograms and charts are suggested as a form of presentation to management of the various information that has been compiled on port operations.

2. The first two histograms on port traffic and berth throughput are prepared from the weekly berth throughput/port traffic forms and are measures of output.

3. The next three histograms, ship turnround time, productivity (port and berth) and productivity (gang hours), are prepared by tabulating the primary indicator forms. When a standard cost per man hour is known, the labour cost per ton of cargo handled can be calculated.

4. To calculate average productivities it is important to note that the average is given by dividing the sum of the throughput by the sum the labour input (hours at berth, or hours in port). The average is not to be calculated by dividing the sum of individual productivities by the number of vessels.

5. This can best be illustrated by taking an hypothetical example for berth productivity. Two ships are worked in port as follows:

Ship	Tonnage	Time at Berth (days)	Productivity (tons/day)
A	10000	25	400
B	1000	5	200
Total	11000	30	

6. The effective berth productivities for ships A and B are 400 and 200 tons per day respectively. The average berth productivity is $11000/30$ is 367 tons per day and not 300 tons per day. If we were to take 300 tons per day as the average we would expect 11000 tons of cargo would take 36.7 days to be worked. This is not correct as the tonnage took 30 days.

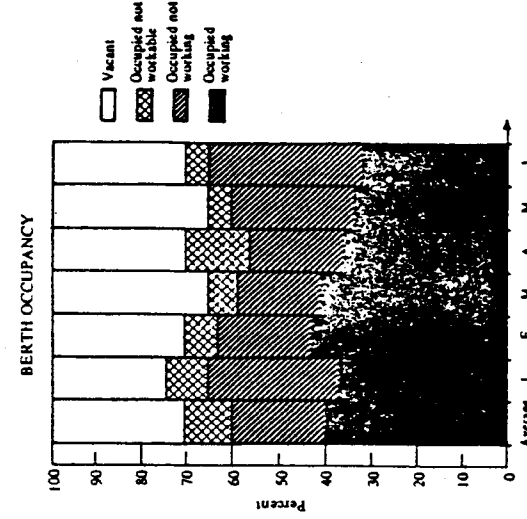
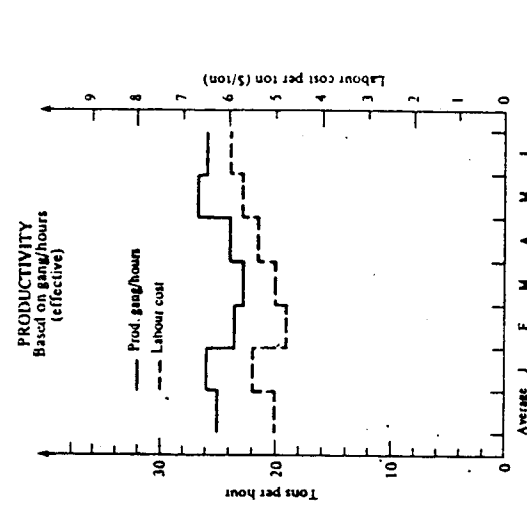
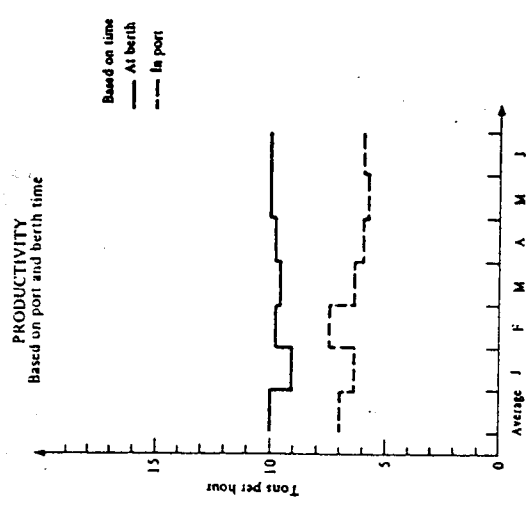
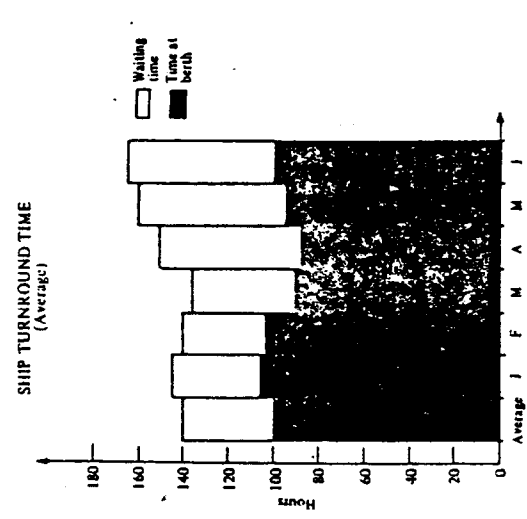
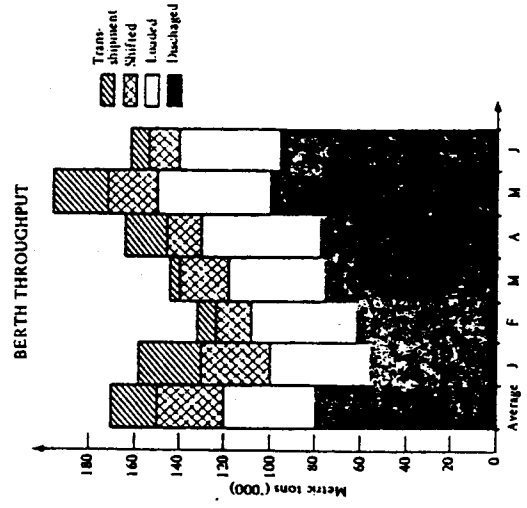
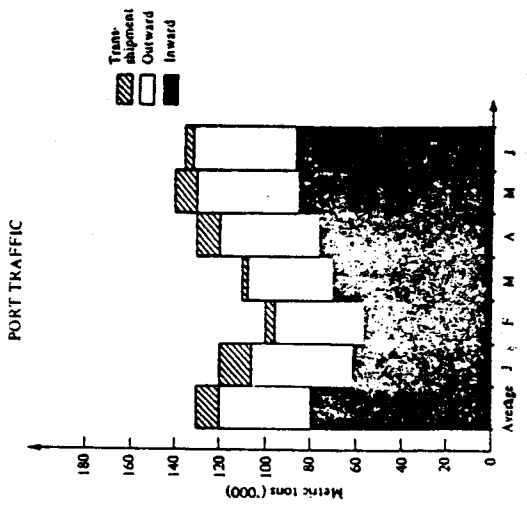
7. Finally the berth occupancy histogram is prepared from the weekly berth occupancy form.

8. The idle time analysis charts are prepared from the monthly gang idle time form for conventional cargo or from the container terminal performance report for the container terminal.

PERFORMANCE INDICATORS
CONVENTIONAL BREAK BULK

MONTH : JUNE 78

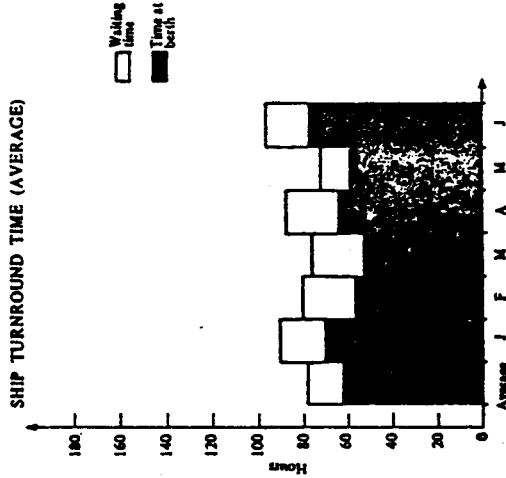
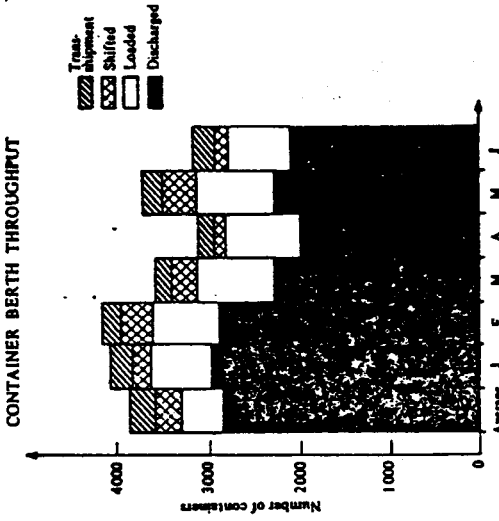
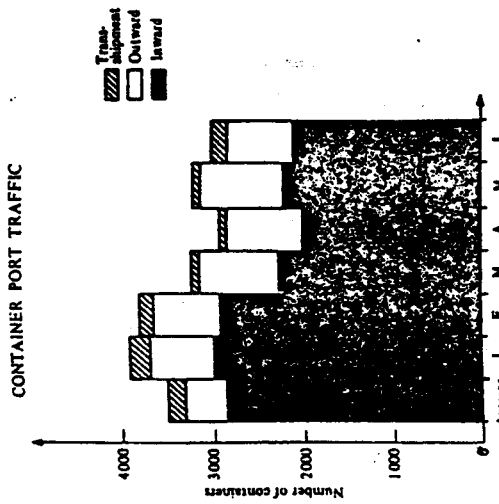
ZONE : PORT LAEDI



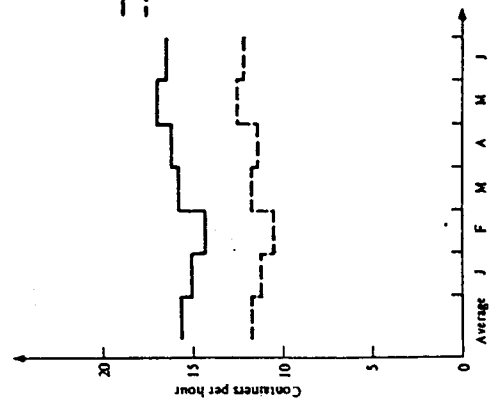
ZONE : PORT LAEDI

PERFORMANCE INDICATORS
CONTAINERS

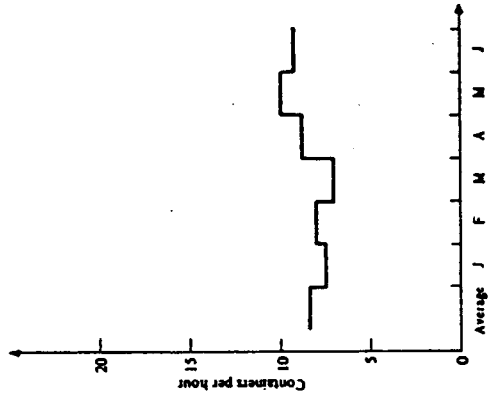
MONTH : JUNE 78



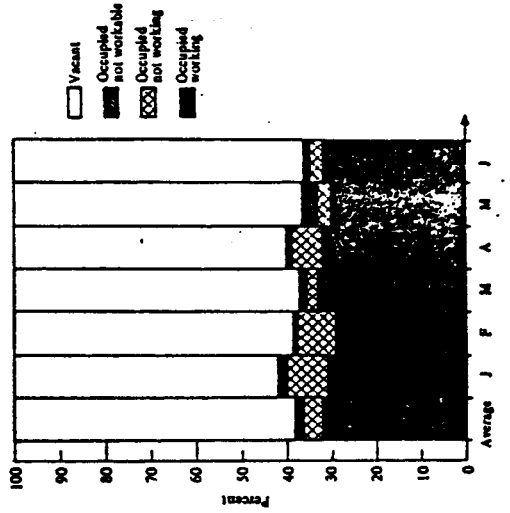
PRODUCTIVITY
(Based on Port and Berth time)



PRODUCTIVITY
(Based on effective crane hours)



BERTH OCCUPANCY



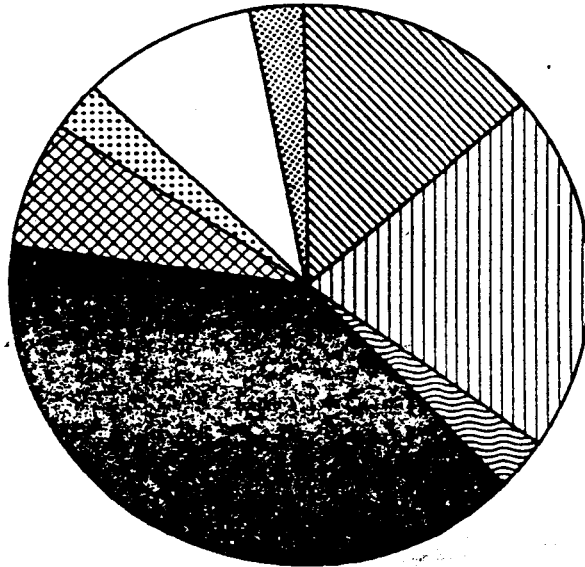
PERFORMANCE INDICATORS
IDLE TIME ANALYSIS









MONTH : JUNE 78

PORT : LAEDI

CONVENTIONAL

ZONE : A

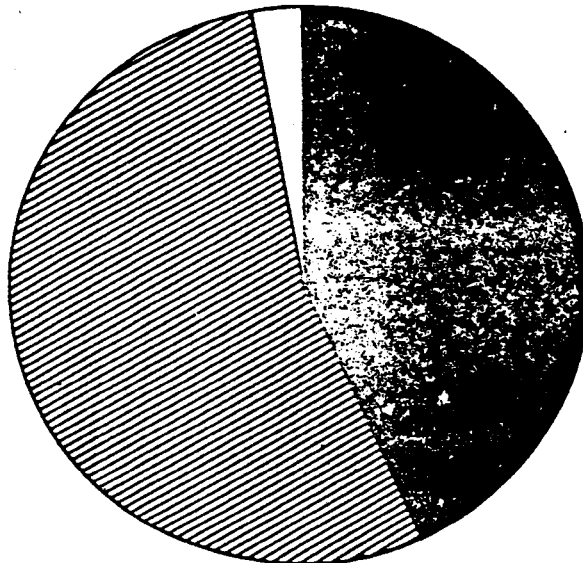





-  Ship movement
-  Ship preparation
-  Cargo
-  Labour
-  Equipment
-  Transport
-  Weather
-  Misc.

Total gang hours idle : 860
Last month : 905

CONTAINER

ZONE : C



-  Terminal operator
-  Shipping line
-  External factors

Total crane hours idle : 130
Last month : 112

FIGURE 1

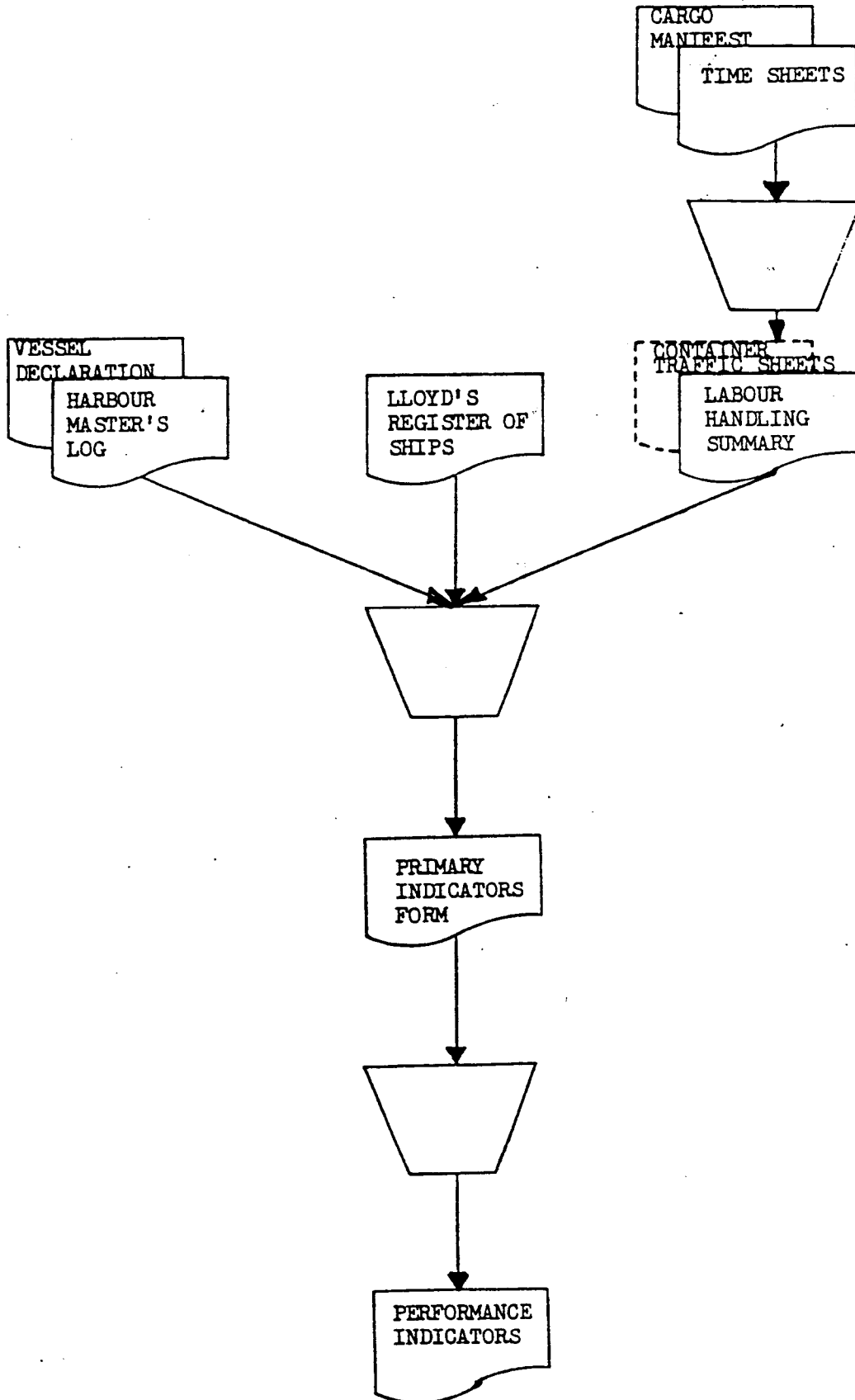


FIGURE 2

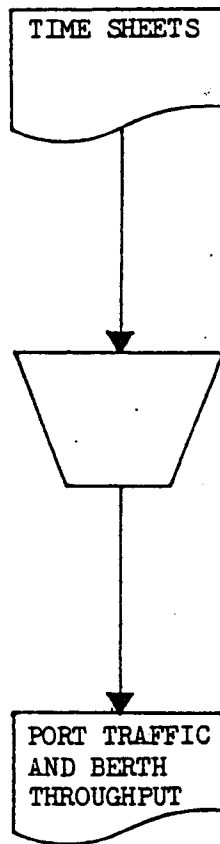


FIGURE 3

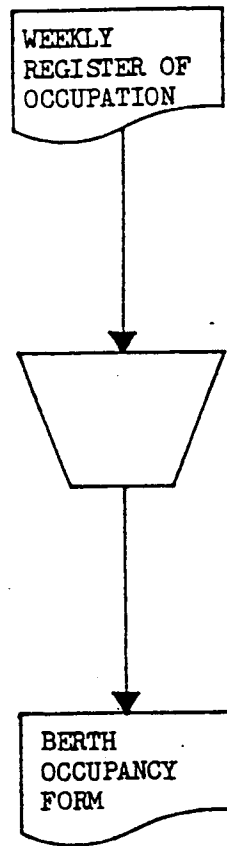


FIGURE 4

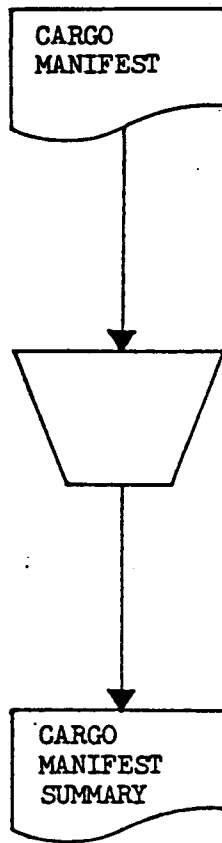
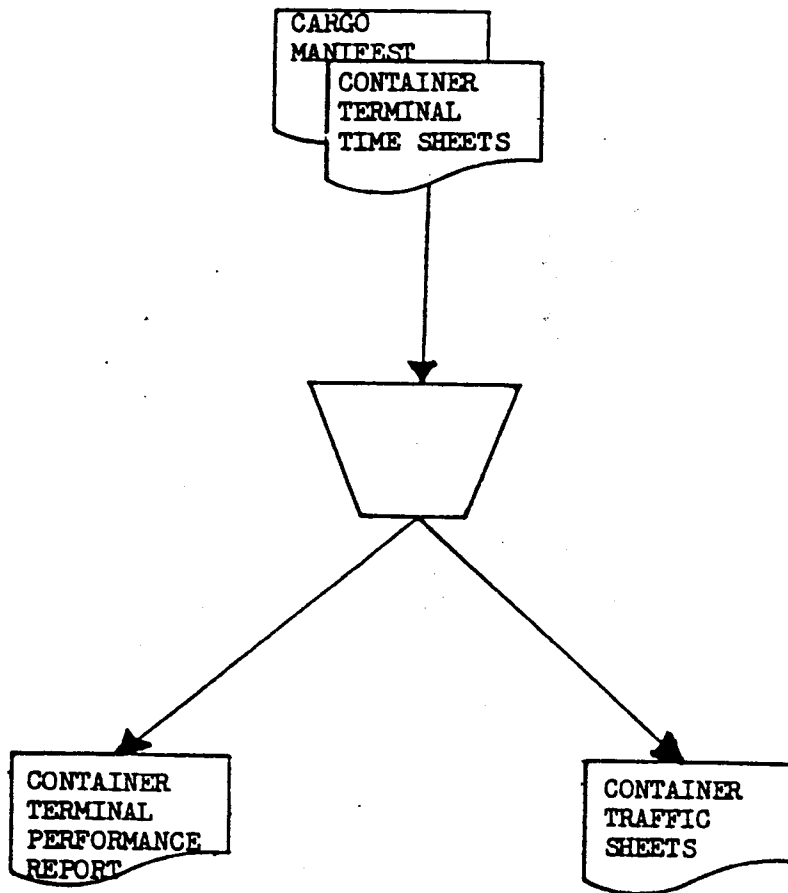


FIGURE 5



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Catalogue of ship type
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Catalogue of packaging
Code of delay causes
Catalogue of type of service
Catalogue of conferences
Catalogue of type of trade
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Catalogue of ship movements
Catalogue of pre-berthing and sailing delay causes

Catalogue of ship types

<u>Code</u>	<u>Ship type</u>
GC	General cargo
CO	Container cellular
BU	Bulk
OR	Ore
TK	Tanker
BC	Barge carrier
RO	Ro-Ro
GP	Gas carrier LPG
GN	Gas carrier LNG
OO	Ore-oil
OB	OBO
CM	Container/multipurpose
CR	Container/Ro-Ro
CB	Container/barge carrier
PA	Passenger (cruise)
LT	Lighter/barge
LC	Livestock Carrier
OT	Other

Cargo handling code

(Code in two combined figures)

First digit (operation)

Second digit (mode)

1 Discharging	1 Indirect warehouse
2 Loading	2 Indirect transit shed
3 Shifting via shore	3 Indirect open storage
4 Shifting on ship	4 Operational zone
	5 Road
	6 Rail
	7 Barge ^{1/}
	8 Direct other ship
	9 Direct floating
	0 Mode not applicable ^{2/}

^{1/} Goods with or without barge

^{2/} This will only apply when shifting cargo

Catalogue of packaging

<u>Code</u>	<u>Broad packing classification</u> 1/
0	Liquid bulk
1	Solid bulk
2	Large containers
3	Other containers
4	Palletized
5	Pre-slung
6	Mobile, self-propelled units
7	Other mobile units
8	Reserved
9	Other cargo units

1/ Based on the UN draft recommendations on codes for types of cargo, see pages 24 and 25.

Code delay cause

01	Ship not at berth		
02	Opening/closing hatches <u>1/</u>		
03	Preparing derricks		
04	Unlashing/lashing		
05	Breakdown ship's handling gear <u>2/</u>		
06	Laying/lifting dunnage		
07	Cleaning		
08	Warping		
09	Trimming		
10	Ballasting/deballasting		
11	Damaged goods		
12	Labour strife		
13	Waiting for labour during shift		
14	Waiting for shore-handling equipment <u>2/</u>		
15	Waiting for goods/cargo		
16	Waiting for lorries <u>5/</u>		
17	Waiting for wagons		
18	Waiting for barges <u>3/</u>		
19	Waiting for customs		
20	Waiting for health clearance		
21		Storage full <u>4/</u>	
22		Early finish	
23		Late start	
24		Meal break	
25		Breakdown shore crane/bulk handling equipment <u>2/</u>	
26		Breakdown horizontal shore transfer equipment	
27		Rain, wind, meteorological conditions	
28		Tide	
29		Bunkering, ship's supplies	
30		Accident	
99		Miscellaneous <u>2/</u>	

1/ or ramps, cisterns/tanks, frigo-doors etc.

2/ specify (i.e. loading wrong cargo, awaiting orders)

3/ or lighters, other ship

4/ Silo, hopper, cistern, tanks, etc.

5/ For direct delivery

UNCTAD PORTS SECTION

UNCTAD PROJECT RAF/78/011

Catalogue of type of service

<u>Code</u>	<u>Type of service</u>
1	Liner
2	Charter
3	Tramp
9	Other

Catalogue of conferences (West African) ^{1/}

<u>Code</u> ^{2/}	<u>Conference</u>
01	American - West African Freight Conference
02	U.S. Great Lakes and St. Lawrence River Ports - West African Agreement
10	Brazil/Mediterranean/Brazil Freight Conference
11	River Plate/Mediterranean/River Plate Freight Conference
20	CEWAL (Associated Central West Africa Lines)
21	COWAC (Continent West Africa Conference)
22	Italian - West Africa Conference
23	OTRAMA (Organisation du Trafic Mediterranée - Afrique de l'Ouest)
24	United Kingdom (West Africa Lines Joint Service)
30	CIMACOREM (Conf. Int. Madagascar Comores Reunion Maurice)
31	South Africa/West Africa Freight Agreement
40	Far East/Canary Is., Spanish Sahara and Mauritania Freight Conference
41	Japan/West Africa (Angola/Cameroon Range) Freight Conference
42	Japan/West Africa (Nigeria/Senegal Range) Freight Conference
43	West Africa (Angola/Cameroon Range)/Far East Freight Conference
44	West Africa (Nigeria/Senegal Range)/Far East Freight Conference

^{1/} Croner's World Directory of Freight Conferences

^{2/} Region - alphabetic sequence (0x - North America, 1x - South America,

2x - Europe, 3x - Africa, 4x - Far East)

Catalogue of type of trade

<u>Code</u>	<u>Type of trade</u>
1	Foreign deep sea
2	Foreign coastal
3	National coastal

Catalogue of countries

<u>Code</u>	<u>Country</u>	<u>Numeric code</u>
AF	AFGHANISTAN	004
AL	ALBANIA	008
DZ	ALGERIA	012
AS	AMERICAN SAMOA	016
AD	ANDORRA	020
AO	ANGOLA	024
AQ	ANTARCTICA	010
AG	ANTIGUA	028
AR	ARGENTINA	032
AU	AUSTRALIA	036
AT	AUSTRIA	040
BS	BAHAMAS	044
BH	BAHRAIN	048
BD	BANGLADESH	050
BB	BARBADOS	052
BE	BELGIUM	056
BZ	BELIZE	084
BJ	BENIN	204
BM	BERMUDA	060
BT	BHUTAN	064
BO	BOLIVIA	068
BW	BOTSWANA	072
BV	BOUVET ISLAND	074
BR	BRAZIL	076
BQ	BRITISH ANTARC. TERRIT.	080
IO	BRITISH INDIAN OCEAN TER.	086
VG	BRITISH VIRGIN ISLANDS	092
BN	BRUNEI	096
BG	BULGARIA	100
BU	BURMA	104
BI	BURUNDI	108
BY	BYELORUSSIAN SSR	112
CM	CAMEROON, UNITED REPUBLIC OF	120
CA	CANADA	124
CT	CANTON AND ENDERBURY ISLANDS	128
CV	CAPE VERDE	132
KY	CAYMAN ISLANDS	136
CF	CENTRAL AFRICAN REPUBLIC	140
TD	CHAD	148
CL	CHILE	152
CN	CHINA	156
CX	CHRISTMAS ISLAND	162
CC	COCOS (KEELING) ISLANDS	166
CO	COLOMBIA	170
KM	COMOROS	174
CG	CONGO	178
CK	COOK ISLANDS	184
CR	COSTA RICA	188
CU	CUBA	192
CY	CYPRUS	196
CS	CZECHOSLOVAKIA	200
DK	DENMARK	208
DJ	DJIBOUTI	262
DM	DOMINICA	212
DO	DOMINICAN REPUBLIC	214
NQ	DRONNING MAUD LAND	216

SOURCE: ISO 2-letter alphabetic country code - ISO 3166 - 1974 with amendments.

Catalogue of countries

<u>Code</u>	<u>Country</u>	<u>Numeric code</u>
TP	EAST TIMOR	626
EC	ECUADOR	218
EG	EGYPT	818
SV	EL SALVADOR	222
GQ	EQUATORIAL GUINEA	226
ET	ETHIOPIA	230
FO	FAEROE ISLANDS	234
FK	FALKLAND ISLANDS (MALVINAS)	238
FJ	FIJI	242
FI	FINLAND	246
FR	FRANCE	250
GF	FRENCH GULANA	254
PF	FRENCH POLYNESIA	258
FQ	FRENCH SOUTH. AND ANTAR. TERR.	260
GA	GABON	266
GM	GAMBIA	270
DD	GERMAN DEMOCRATIC REPUBLIC	278
DE	GERMANY, FEDERAL REPUBLIC OF	280
GH	GHANA	288
GI	GIBRALTAR	292
GE	GILBERT ISLAND	296
GR	GREECE	300
GL	GREENLAND	304
GD	GRENADA	308
GP	GUADELOUPE	312
GU	GUAM	316
GT	GUATEMALA	320
GN	GUINEA	324
GW	GUINEA BISSAU	624
GY	GUYANA	328
HT	HAITI	332
HM	HEARD AND MCDONALD ISLANDS	334
HN	HONDURAS	340
HK	HONG KONG	344
HU	HUNGARY	348
IS	ICELAND	352
IN	INDIA	356
ID	INDONESIA	360
IR	IRAN	364
IQ	IRAQ	368
IE	IRELAND	372
IL	ISRAEL	376
IT	ITALY	380
CI	IVORY COAST	384
JM	JAMAICA	388
JP	JAPAN	392
JT	JOHNSTON ISLAND	396
JO	JORDAN	400
KH	KAMPUCHEA, DEMOCRATIC	116
KE	KENYA	404
KP	KOREA, DEM. PEOPLE'S REP. OF	408
KR	KOREA, REPUBLIC OF	410
KW	KUWAIT	414
LA	LAO, PEOPLE'S DEMOCRAT REP.	418
LB	LEBANON	422
LS	LESOTHO	426

Catalogue of countries

<u>Code</u>	<u>Country</u>	<u>Numeric code</u>
LR	LIBERIA	430
LY	LIBYAN ARAB JAMAHIRIYA	434
LI	LIECHTENSTEIN	438
LU	LUXEMBOURG	442
MO	MACAU	446
MG	MADAGASCAR	450
MW	MALAWI	454
MY	MALAYSIA	458
MV	MALDIVES	462
ML	MALI	466
MT	MALTA	470
MQ	MARTINIQUE	474
MR	MAURITANIA	478
MU	MAURITIUS	480
MX	MEXICO	484
MI	MIDWAY ISLANDS	488
MC	MONACO	492
MN	MONGOLIA	496
MS	MONTSERRAT	500
MA	MOROCCO	504
MZ	MOZAMBIQUE	508
NA	NAMIBIA	516
NR	NAURU	520
NP	NEPAL	524
NL	NETHERLANDS	528
AN	NETHERLANDS ANTILLES	532
NT	NEUTRAL ZONE	536
NC	NEW CALEDONIA	540
NH	NEW HEBRIDES	548
NZ	NEW ZEALAND	554
NI	NICARAGUA	558
NE	NIGER	562
NG	NIGERIA	566
NU	NIUE	570
NF	NORFOLK ISLAND	574
NO	NORWAY	578
OM	OMAN	512
PC	PACIFIC ISLANDS TRUST TER.	582
PK	PAKISTAN	586
PA	PANAMA	590
PZ	PANAMA CANAL ZONE	592
PG	PAPUA NEW GUINEA	598
PY	PARAGUAY	600
PE	PERU	604
PH	PHILIPPINES	608
PN	PITCAIRN ISLANDS	612
PL	POLAND	616
PT	PORTUGAL	620
PR	PUERTO RICO	630
QA	QATAR	634
RE	REUNION	638
RO	ROMANIA	642
RW	RWANDA	646
SH	ST HELENA	654

Catalogue of countries

<u>Code</u>	<u>Country</u>	<u>Numeric code</u>
KN	ST KITTS-NEVIS-ANGUILLA	658
LC	ST LUCIA	662
PM	ST PIERRE AND MIQUELON	666
VC	ST VINCENT	670
WS	SAMOA	882
SM	SAN MARINO	674
ST	SAO TOME AND PRINCIPE	678
SA	SAUDI ARABIA	682
SN	SENEGAL	686
SC	SEYCHELLES	690
SL	SIERRA LEONE	694
SG	SINGAPORE	702
SB	SOLOMON ISLANDS	090
SO	SOMALIA	706
ZA	SOUTH AFRICA	710
RH	SOUTHERN RHODESIA	716
ES	SPAIN	724
LK	SRI LANKA	144
SD	SUDAN	736
SR	SURINAM	740
SJ	SVALBARD AND JAN MAYEN ISL.	744
SZ	SWAZILAND	748
SE	SWEDEN	752
CH	SWITZERLAND	756
SY	SYRIAN ARAB REP.	760
TW	TAIWAN, (PROVINCE OF)	
TZ	TANZANIA	834
TH	THAILAND	764
TG	TOGO	768
TK	TOKELAU	772
TO	TONGA	776
TT	TRINIDAD AND TOBAGO	780
TN	TUNISIA	788
TR	TURKEY	792
TC	TURKS AND CAICOS ISLANDS	796
TV	TUVALU	798
UG	UGANDA	800
UA	UKRAINIAN SSR	804
SU	UNION OF SOVIET SOC. REP.	810
AE	UNITED ARAB EMIRATES	784
GB	UNITED KINGDOM	826
US	UNITED STATES	840
PU	US MISC. PACIFIC ISLANDS	849
VI	US VIRGIN ISLANDS	850
HV	UPPER VOLTA	854
UY	URUGUAY	858
VA	VATICAN CITY STATE (HOLY SEE)	336
VE	VENEZUELA	862
VN	VIETNAM	704
WK	WAKE ISLAND	872
WF	WALLIS AND FUTUNA ISLANDS	876
EH	WESTERN SAHARA	732
YE	YEMEN	886
YD	YEMEN, DEMOCRATIC	720
YU	YUGOSLAVIA	890
ZR	ZAIRE	180
ZM	ZAMBIA	894

Catalogue of ship movements

<u>Code</u>	<u>Event</u>
1	Arrival at port
2	Departure after registering for place in queue*
3	Return to port after previous registration*
4	Berthing/mooring (when vessel arrived at berth)
5	Deberthing to shift to another berth*
6	Reberthing after shifting from another berth*
7	Leaving berth/mooring
8	Leaving port

* When applicable

Catalogue of pre-berthing and sailing delay causes

<u>Code</u> ^{1/}	<u>Cause of delay</u>
01	Berth or mooring not available
02	Pilot not available
03	Tug not available
10	Instructions received from ship's agent
11	Documents not available
12	Pre-berthing payments not made
13	Ship not ready to sail
20	Cargo not available
21	Hazardous cargo
22	Prohibited cargo
30	Customs clearance not completed
31	Health clearance not completed
32	Immigration clearance not completed
40	Weather conditions
41	Tide
99	Others (specify)

^{1/} 0x - port related cause; 1x - ship-related cause; 2x - shipper related; 3x - customs, health or immigration related; 4x - weather or tide related.