TRAFFIC FORECASTING

The essence of port traffic forecasting is to find out:

(a) What kinds and tonnages of commodities will move through the port?

(b) How will these commodities be packaged and carried as maritime cargo?

(c) What ship types, tonnages and frequency of calls will this result in?

Traffic forecasting requires a combination of commercial and economic knowledge and the mathematical techniques are of minor importance and can often be omitted entirely. Far more important is the need to bear constantly in mind the very high degree of uncertainty in any forecast, and to take steps to minimize the risk which this causes.

Any forecast of future trade will be uncertain, and ports are particularly vulnerable in view of their long planning time-scale and limited ability to influence demand. All forecasts should be linked with the overall national development plans. Furthermore, maritime trade is going through a period of rapid change which critically affects the volumes and types of traffic likely to use any port. Errors in forecasting can be serious, and the consequences of overestimating and underestimating are not equal. To over-build may add only a few dollars, at most, per ton to freight costs, but to under build may cause congestion leading to additional costs of $100 per ton.

Even when all precautions have been taken to reach realistic and well-reasoned forecasts, the remaining uncertainty usually produces a wide variation of possible levels of traffic when projected several years in the future to the date of commissioning and beyond, and even greater uncertainty in the long-term master plan.

All forecasts are thus to be treated with caution. It is hoped that the actual traffic level will be closer to the central forecast than to the upper or lower forecasts, but the risk that it will not be is normally too great a one for a port management to accept. This applies both to volume and to type of traffic. Thus the range of variation in the traffic forecast will usually be the first concern of an investment sensitivity analysis of the kind discussed in chapter II. The planner can do a great deal to minimize this risk by searching for a design solution which is robust-one that is a good investment under a variety of possible future traffic. To do this he must be able to construct a number of different scenarios describing these alternatives. The port management can reduce the risk further by introducing an operational system which can respond to changes in traffic, together with an information system which gives a clear signal when the response is needed.

**Scenario writing**

A traffic scenario is a consistent description of the whole of the future traffic likely to come to the port and the way it will build up. It assumes that the port does nothing to prevent the traffic arriving, but encourages it by providing reasonable facilities. For each cargo category, the probable volumes under different circumstances and the possible alternative types of technology that may be used in carriage and handling are all considered. Several scenarios are then drawn up, each fully self-consistent, resolving any clashes between forecasts for different trades and permitting a reliable estimate to be made of the resources needed.

The scenario-writing team should include an operational manager. It is an appropriate task for the traffic manager of the port. The planner must consult the traffic department early in the project and participation of the traffic manager is a useful way of doing that. Representatives of shippers’ and shipowners’ interests should also be invited to participate, if possible as full members of the team. If the scenario-writing team is formed entirely of local staff who have not recently travelled outside the region, it would be advisable for a small group to visit modern ports at the far end of their main trade routes to become familiar with possible future developments.

It will not be possible for the scenario writing to take place until after the routine analysis of traffic data, an examination of numerical trends and the making of simple projections. These are the data on which the scenario is based. But the team should be aware of the danger of reaching conclusions from extrapolation of past figures. For example, a team looking only at past traffic figures may ignore the potential export traffic of mineral products from undeveloped mines whose potential for production and export to overseas markets have been definitely established. The possible high volume of such exports will markedly affect port development.

**Control statistics**

It is the task of the traffic forecaster to provide both a central trend forecast and also a system of watching at given intervals to see when the actual traffic begins to deviate from this forecast. At, say. Yearly intervals “signposts” will direct the management either to carry on as planned or to change direction, depending on the degree of deviation from the forecast. This approach can be simple and very powerful. It requires:

(0) The regular collection of a small number of essential traffic statistics to serve as a control;

(h) Giving a port manager (e.g. the head of the permanent planning group. where this exists) the responsibility for reactivating the planning process when predetermined deviations from forecast are reached.

20.5. *Since* any one port investment project may take up to five years to complete, it is possible that within this period the deviation from forecast will exceed the acceptable level. In that case the planning procedure should be repeated, starting from the state which had been reached in the project. Some form of readjustment will usually be possible even at a fairly advanced stage.

The most useful control statistics available from the ship and shift records which should be kept are, as appropriate to each terminal:

(a) The total tonnage handled;

*(b)* The average ship turn-round time;

(c) The average tonnage loaded and discharged per ship;

(d) The volume of special traffic handled at a multipurpose terminal (i.e. the percentages of containers and roiro units, of bulk and bagged bulk shipments and of loads on pallets and pre-slung and pre-packaged loads);

(e) The percentage of ships with a specified type of equipment such as shipboard cranes or stern ramps;

cf) The average ship length;

(g) The maximum draught on arrival and maximum ship length.

With the exception of the last item, it is preferable to use the three-month moving average for the control statistics.

**Combining the uncertainty in separate factors**

207. Where a traffic forecast is being prepared from a detailed analysis of the factors involved, which are combined (either by addition or by multiplication) to produce the final figure, care has to be taken in dealing with optimistic and pessimistic estimates of each separate factor. Clearly, if there are three independent factors affecting the forecast, then the probability of it turning out that all three have a high value or all three a low value is very small. There are simple statistical methods of calculating this overall probability. These methods are given in annex II. section C, of the handbook, and should be used where appropriate.

**The forecasting procedure**

A systematic procedure for carrying out a detailed port traffic forecast is illustrated in figure 15 and the tasks involved are listed in table 6. For minor investments. a review of the traffic forecast is advisable to check on the revenue expected; a simplified procedure as shown in figure 16 is reasonable.

TABLE 6

The forecasting procedure

I. Analyze past traffic

I 1 Define routes conferences~. etc

1.2 Choose cargo classification

1.3 Tabulate

1.4 Calculate trends and analyze their causes

1.5 Extract seasonal effects

2 Review market influences on traffic and technological trends

2.1 Survey shipper‘opinions. (public and private)

2.2 Survey shipping companies plans

3. Estimate systematic traffic growth rates

3.1 GNP-linked cargoes

3.2 Special cargoes

3.3 Regional/hinterland trends

4. Investigate expected traffic-Influencing events

4.1 Industry plans

4.2 Agricultural plans

4.3 Transport lmksltransit pohaes

5. Combine all information into alternative growth and technology scenarios

5.1 Identify principal scenario themes

5.2 Combine all data for each theme

S.3 Remove numerical inconsistencies

5.4 Write scenarios

6. For each scenario, tabulate annual forecasts in each traffic class

6.1 Tonnages (weight tons)

6.2 Numbers/sires of ships

6.3 Seasonal effects

Weight measurement ratio for storage purposes should also be recorded for each traffic class.



