

4) Conclusions and Recommendations

This part presents the year 2005 highway network, that is, the road plan which will likely be required at the conclusion of the planning horizon.

(1) The Year 2005 Highway Network

The approach adopted toward development of the highway network embraces temporal infrastructure deficiencies identified in the analyses, a more limited program of motorway development and the progressive upgrading of existing roads at a rate which is sensitive to the availability of financial resources.

Facilities deemed necessary to meet 2005 demand are included in the recommended highway network (Fig. 5.2.2). Those portions of the road system which should initially be constructed to motorway standard have been limited to the A-1 route from Torun to the CSFR border, the A-2 route from the German border to East of Warsaw and the A-4/A-12 routes from the German border to East of Krakow. This results in four motorway links with Germany including the existing Szczecin motorway, a strategy consistent regional development with development of the network on the German side of the border and also one which strengthens Poland's road connections with the European Community.

The indicated sections of motorways should be directly constructed without progressing through various stages of upgrading existing road because:

- (a) They are part of the three most important international arteries within Poland;
- (b) They are the corridors within which the most rapid domestic growth is forecast to occur; and
- (c) In the A-1 and A-4 corridors much of the motorway infrastructure is already partly in place, and substantial lengths of inter-regional roads have already been improved to four lane standard. The latter can effectively be converted in motorway function.

The Eastern part of Poland appears, at initial inspection, to be already devoid of higher order roads with exception of the Rzeszow - Przemysl - Lvov axis. These corridors are difficult to predict given uncertainties in economic growth, political stability and a general lack of road planning in Poland's Eastern neighbors. The traditional "politically approved" crossing at Terespol, which historically accommodated sizable traffic volume, may or may not retain that role in the future.

The relative proximity of Grodno, Vilnius and Kaunas may dictate a shift of demand toward Poland's Northeast - indeed, longer trips to Moscow could be made equally well via Terespol or a more northeasterly border crossing. Conditions at the Eastern border will require on-going monitoring to determine if additions to the proposed interim network are justified.

The indicated four lane inter-regional roadway links are intended as rural highway type facilities. Inter-regional multi-lane links in the proposed 2005 network can be achieved much more economically via provision of a second carriageway, selective urban bypasses, junction improvements, removal of at-grade railway crossings and upgrading of substantial bridges. Where the improvement is on line, the route would initially remain an all-purpose road, although on heavily trafficked sections it may be necessary to restrict access or construction of parallel service roads.

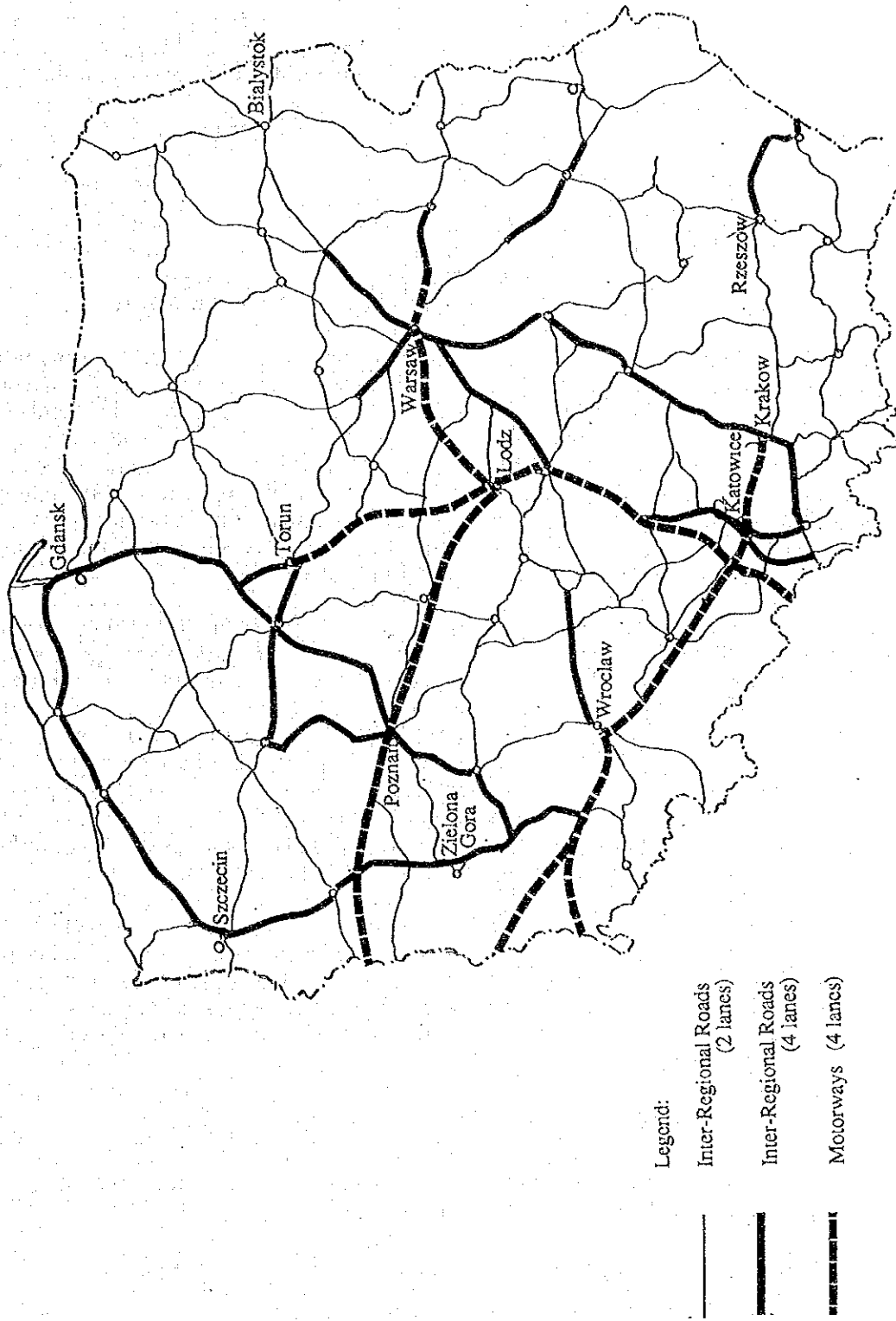


Fig. 5.2.2 Proposed 2005 Highway Network

Where an off-line bypass is required, local studies should be undertaken to determine the volume of through traffic. In some instances, where traffic projections support this, bypasses could initially be constructed to a single carriageway standard but the alignment should be consistent with future motorway provision and access from abutting property to the bypass restricted. Such bypasses, either dual or single carriageway, could then be singled as express roads and, at such time as the four lane capacity of the route is exceeded, could be incorporated into a later motorway scheme.

(2) Network Performance

Assignment of 2005 demand onto the proposed 2005 network suggests that, from an overall perspective, good performance can be achieved (Table 5.2.2). The overall volume to capacity of the proposed 2005 net is as high as 0.71 while the over-saturation conditions (1.14) exhibited by the 1990 highway network.

Heaviest forecast volumes are expected in the three motorway corridors including the A-1 route from Torun to the CSFR border, the A-2 route from the German border to East of Warsaw and the A-4/A-12 routes from the German border to East of Krakow. Other sizable volumes are likely in the Szczecin -Gdansk/Gdynia corridor, Szczecin - Zielona Gora, Bydgoszcz/Torun - Zielona Gora corridor, as well as several corridors emanating from Warsaw. The apparently heavy external volumes near Terespol and Suwalki should be treated with caution because this demand is likely to shift or diffuse depending on subsequent developments at the Eastern border and within Poland's Eastern neighbors.

Several sections of the motorways are forecast to absorb 50,000 vehicles per day, total in both directions (Fig. 5.2.3). Such volumes stress the capacity of a four-lane motorway although, in reality, some traffic would be drawn off to paralleling regional roads or frontage roads. Nevertheless, this supports the proposition that, particularly in light of demand beyond 2005, acquired motorway right-of-ways should ultimately permit a six-lane section, as should design standards incorporated into key facilities such as bridges. The section between Katowice and the CSFR border on A1 Route has less traffic volume than the other sections of that route. However, the existing capacity of the section is estimated to be far exceeded by the traffic demand, thus requiring additional motorway capacity.

The vehicle trip matrixes contain inter-voivod trips; thus trips within a voivod or a city do not reach the network. This will, in some instances, result in a higher road utilization than forecasted. For example, the estimated A-4 inter-voivod volume between Katowice West and Katowice East interchanges is modest; however, utilization of this segment is actually likely to be high once short distance inter-urban trips are considered.

(3) Staged Implementation Program

The proposed 2005 highway plan has been broken into three stages of implementation. This prioritization recognizes:

- (a) demands posed by increasing traffic volumes;
- (b) evolution of regional development patterns; and
- (c) cost effectiveness.

Table 5.2.2 Network Sufficiency Evaluation of Proposed 2005 Network

Case I: 2005 Demand on 1990 Network

| Road Type (1) | Road Kilometers | | MILLION PCU Kilometers | | PCU Hours (0000) | | Volume to Capacity (2) |
|---------------|-----------------|---------|------------------------|---------|------------------|---------|------------------------|
| | Number | Percent | Number | Percent | Number | Percent | |
| 1 | 1,095.0 | 9.5 | 19.265 | 7.3 | 32.794 | 4.5 | 1.17 |
| 2 | 9,520.5 | 82.3 | 205.215 | 77.5 | 345.973 | 79.7 | 1.20 |
| 3 | 729.0 | 6.3 | 29.515 | 11.1 | 43.472 | 10.0 | 0.92 |
| 4 | 225.1 | 1.9 | 10.822 | 4.1 | 12.274 | 2.8 | 0.92 |
| Total | 11,569.6 | 100.0 | 264.817 | 100.0 | 434.513 | 100.0 | 1.14 |

Case II: 2005 demand on proposed 2005 network

| Road Type (1) | Road Kilometers | | MILLION PCU Kilometers | | PCU Hours (0000) | | Volume to Capacity (2) |
|---------------|-----------------|---------|------------------------|---------|------------------|---------|------------------------|
| | Number | Percent | Number | Percent | Number | Percent | |
| 1 | 993.0 | 7.2 | 8.251 | 3.2 | 12.872 | 3.5 | 0.55 |
| 2 | 8513.8 | 61.8 | 107.195 | 41.0 | 167.944 | 46.2 | 0.70 |
| 3 | 2760.5 | 20.0 | 85.150 | 32.6 | 115.894 | 31.9 | 0.70 |
| 4 | 1503.3 | 10.9 | 60.975 | 23.3 | 66.961 | 18.4 | 0.78 |
| Total | 13770.6 | 99.9 | 261.571 | 100.1 | 363.671 | 100.0 | 0.71 |

- (1) Road Type 1 = regional road (2 lanes) ; Type 2 = inter-regional road (2 lanes); Type 3 = inter-regional road (4 lanes); Type 4 = motorway (4 lanes).
- (2) Average system-wide (all links included) volume to capacity ratio at Level of Service C/D.

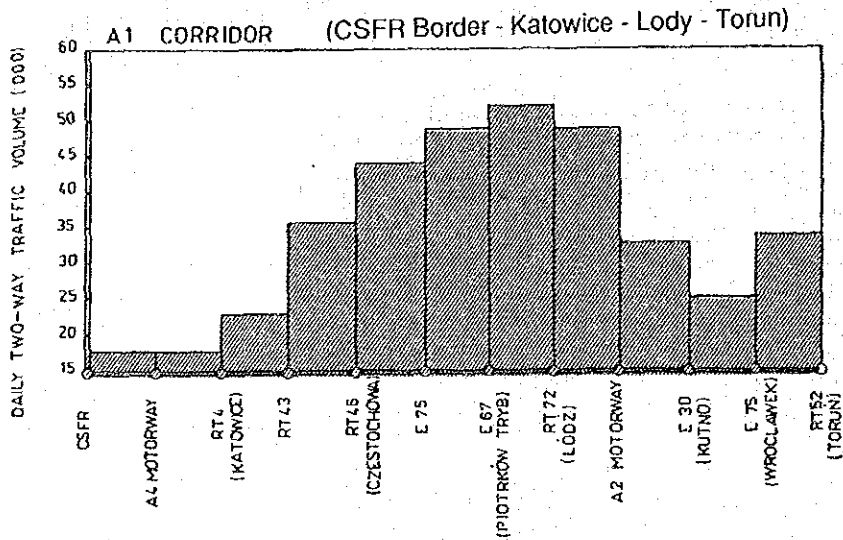
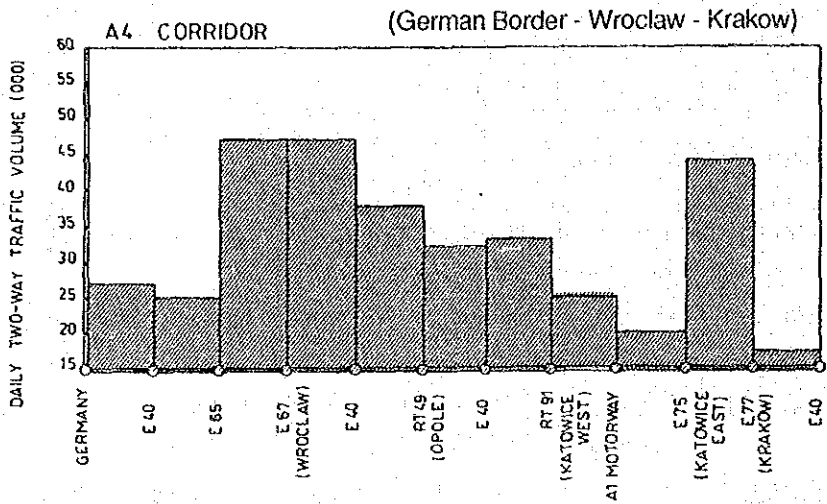
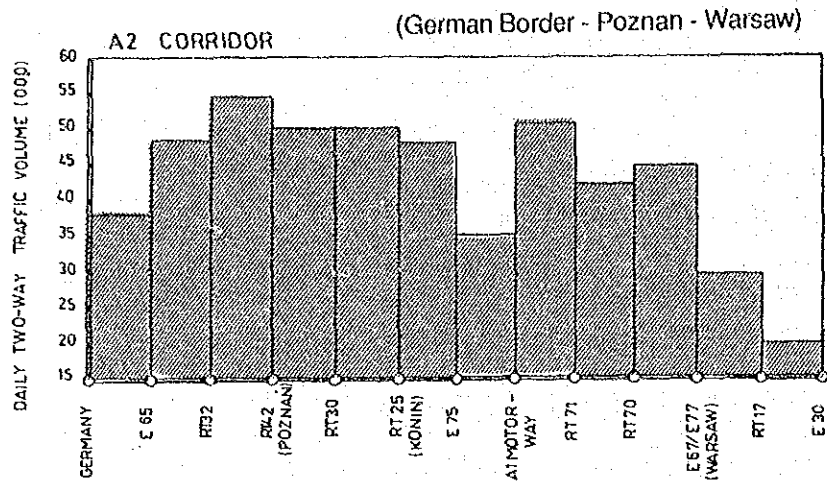


Fig. 5.2.3 Estimated Annual Average Daily Traffic on Major Motorways, 2005

Thus, projects with the highest priority (Phase 1) are situated in high demand corridors; several take advantage of existing infrastructure, particularly motorway segments and multi-lane inter-regional roads (Fig. 5.2.4). The initial phase also includes bypasses for major cities (Lodz, Poznan, Warsaw and Gdansk) which, in some cases, are incorporated into the motorway schemes during subsequent Phase 2 and 3.

The motorway projects proposed in the Phase 1 likely exceed the financial resource availability and construction work capacity if the traditional systems are applied. To expedite the project implementation, road financing system as proposed needs to be established quickly while the ongoing restructuring of the GDDP administration should be accelerated for attaining higher efficiency of planning, designing and construction including effective private participation to the process. In the Phase 1, priority should be given first to bypass construction, second to upgrading of existing sections, and third to the sections of new construction.

The proposed program of improvements concentrates in those corridors which are forecast to be heavily trafficked in the future. Clearly there will be other location specific parts of the network where unsatisfactory conditions exist, particularly:

- (a) lack of bypasses;
- (b) substandard bridges or ferry crossings; and
- (c) inefficient border crossings.

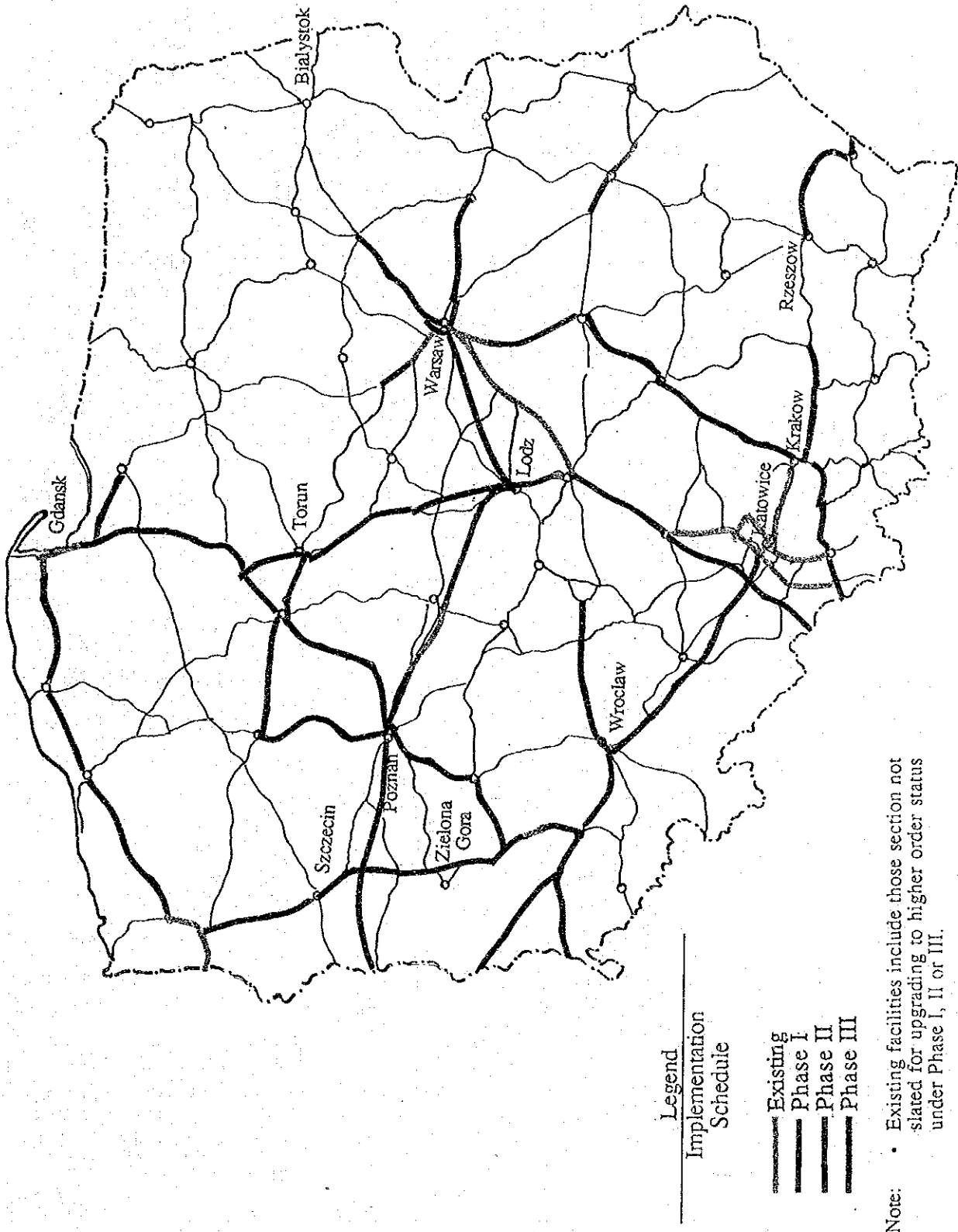
GDDP must take the lead in preparing a program of improvements to alleviate such problems. The priority awarded to schemes within these programs should be determined by economic and environmental evaluations.

5) Projects Cost Estimation

The total cost of the interim highway network is estimated at US\$2,644 million and US\$3,060 million for motorway and inter-regional road projects, respectively (Table 5.2.3). The cost estimates for motorway construction have been based on the GDDP document "Information on Motorway Construction in Poland" produced in May 1991. From this document the average estimated cost of motorway construction is around US\$2.6 million per route kilometer. Given the wide range of possible improvements included in the upgrading of inter-regional roads to four lane (rural highway) status, no attempt has been made to estimate the cost of individual sections. For estimation purposes, an overall average cost of US\$1.5 million per route kilometer has been used.

The prioritization of projects into specific phases facilitates correlation with availability of funding. Thus, as funds become available, phases implementation may proceed rapidly with speed dependent upon amount of funds available. Further, certain projects (such as motorways) may be accelerated even more should innovate financing schemes be adopted. Two points are important in this regard.

- (a) Build, operate and transfer (BOT) concessions offer a unique opportunity to involve the private sector in the construction of higher order roads, generally motorways (typically as toll roads). While this option should be pursued with unflagging vigor, it must concurrently be pointed out that a number of problems remain to be resolved in this regard, including legal, contractual and financial aspects of such matters within the Polish legal system.



Legend
Implementation
Schedule

- Existing
- Phase I
- Phase II
- Phase III

Note:

- Existing facilities include those section not slated for upgrading to higher order status under Phase I, II or III.
- Facility Alignments are Approximate

Fig. 5.2.4 Phased Development of Proposed Highway Network

Table 5.2.3 Road Development Costs and Phasing

| Motorway Projects and Phasing (2) | L'th (km) | Cost (MILLN US\$) | Inter-Regional Roadway Projects by Route and Phasing (3) | L'th (km) | Cost (MILLN US\$) |
|---|-----------|-------------------|--|-----------|-------------------|
| Phase I: | 416 | 655 | Phase I: | 339 | 510 |
| A- 1 Eastern Bypass of Lods to Strykow | 38 | 96 | 2 Northern bypass of Warsaw | 10 | |
| A- 1 Upgrade Piotrkow Trb. to Czstchowa | 68 | 57 | 3 Swiebozin to Klobuczyn | 82 | |
| A- 2 Konin to Strykow | 98 | 202 | 5 Poznan to Leszno | 78 | |
| A- 2 Bypass of Poznan | 15 | 39 | 7 Zakroczym to Plonsk (complete) | 25 | |
| A- 4 Upgrade Krzywa to Wroclaw | 93 | 67 | 7 Grojec to Radom | 53 | |
| A- 4 Kucharzowice to Gliwice | 71 | 150 | 7 Kielce to Jedrzejow | 24 | |
| A- 4 Complete Krakow - Katowice sec'n (with southrn bypass of Krakow) | 33 | 44 | 7 Southern bypass of Gdansk (1) | 20 | |
| | | | 10 Torun to Bydgoszcz | 47 | |
| Phase II: | 425 | 1,047 | Phase II: | 459 | 690 |
| A- 1 Kowal to Torun | 75 | 188 | 1 Bypass Swiecie | 13 | |
| A- 2 Swiecko to Poznan | 157 | 380 | 3 Szczecin to Swiebodzin | 161 | |
| A- 2 Strykow to Warsaw | 103 | 202 | 3 Lubin to Legnica | 28 | |
| A- 4 Wroclaw to Kucharowice | 43 | 90 | 4 Krakow to Brzesko | 45 | |
| A- 4 Gliwice to Katowice | 47 | 187 | 6 Wejherowo to Slupsk | 87 | |
| | | | 17 Lublin to Kurow | 31 | |
| | | | 34 Leszno to Route 3 | 56 | |
| | | | 96 Wadowice to Bielsko-Biata | 38 | |
| Phase III: | 395 | 942 | Phase III: | 1,239 | 1,860 |
| A- 1 Strykow to Kowal | 79 | 498 | 1 Gdansk to Swiecie | 108 | |
| A- 1 Czestochawa to CSFR border | 139 | 432 | 1 Swiecie to Torun | 45 | |
| A- 2 Poznan to Wrzesnia | 40 | 104 | 1 Bielsko to Biala to Cieszyn | 31 | |
| A- 4 Krzywa to Zgorzelec | 50 | 105 | 2 Warsaw to Siedlce | 71 | |
| A-12 Krzywa to Olszyna | 87 | 103 | 4 Brzesko to Tarnow | 29 | |
| | | | 4 Rzeszow to Medyka | 100 | |
| | | | 5 Swiecko to Poznan | 167 | |
| | | | 6 Slupsk to Goleniow | 175 | |
| | | | 7 radom to Kielce | 65 | |
| | | | 7 Jedrzejow to Krakow | 79 | |
| | | | 8 Wroclaw to Prusak | 105 | |
| | | | 11 Pila to Poznan | 109 | |
| | | | 96 Route 7 to Wadowice | 31 | |
| | | | 7 Gdansk to Elbtog | 51 | |
| | | | 18 Warsaw to Ostorow Maz. | 73 | |
| Grand Total | 1,236 | 2,644 | | 2,037 | 3,060 |

Note:

- (1) The completion of the Kwiatkowskiego route in Gdynia should also be undertaken as part of the first phase of improvements.
- (2) Motorways proposed with 2 x 2 lane freeway-standard cross-section. However, right-of-way acquisition and design criteria to permit ultimate 3 x 2 lane section is encouraged.
- (3) Inter-Regional Roads proposed as 2 x 2 lane high-order facilities of "rural highway" standard.

- (b) Since estimates of future national funding for road construction are not available, a staged approach to implementation of road projects is required. Thus, construction schedules can, in future, readily be linked with available funds and not necessarily with "artificial" time frames.

6) International Integration

The current network of European main traffic arteries ("E" routes) only includes two routes crossing Poland's Eastern border. These are the E30 at Terespol and the E40 at Medyka. In recognition of the fact that Poland now has four Eastern neighbors, it is recommended that consideration be given to the extension of the "E" route system as follows:

- (a) E28 to be extended from Gdansk to Elblag then across the Russian border to Kaliningrad;
- (b) E67 to be extended from Warsaw to Bialystok then across the Belorus border;
- (c) New route from E67 at Ostrow Mazowiecki across the Lithuanian border beyond Suwalki; and
- (d) New route from Warsaw through Lublin to the Ukainian border at either Hrebenne or Dorohusk.

International linkages at the Western border will, following implementation of the proposed highway network, be enhanced. Thus, Poland's land connections to Germany and other EC nations will be well served. Specifically,

- (a) The E28 and E65 corridors already connected with the Berlin - Szczecin (E28) Autobahn;
- (b) The A2 motorway will connect with the Berlin - Frankfurt (Oder) Autobahn (E30); and
- (c) The A4/A12 motorway will connect with the Berlin - Cottbus (E36) and Dresden - Goerlitz (E40) Autobahns.

The A1 motorway to the Southern (CSFR) border will provide linkage to the Brno - Olomouc - Ostrava (E462) corridor and the East-West Hradec Kralove - Olomouc - Poprad (E442) corridor.

Polish design standards are generally compatible with those of Western Europe. The main recommendation in this context is that along those sections of the network recommended for improvement pavements should be designed to withstand axle loadings of 11.5 tons, which is understood to be maximum axle loading permitted in EC countries beginning 1992.

5.2.3 Road Maintenance

1) Issues

In the past, road development has been more stressed than maintenance. Even now, road maintenance budget is often switched over to development budget. These two aspects of development and maintenance are equally important for keeping road traffic efficient and safe. However, under the extremely limited financial availability, more emphasis should be given to road maintenance for best utilizing existing road assets. It should be understood that once maintenance is ignored for some years, it necessitates a huge amount of investments for rehabilitation or complete reconstruction of existing roads. Thus, current maintenance practices should be reviewed and improved so as to maintain the existing assets with less financial burden to the national budget.

Under the shortage of maintenance budget, GDDP needs to address: (1) rationalization of existing maintenance practices and labor forces; (2) improvement of quality of maintenance works; and (3) prioritization of urgent maintenance works.

In order to improve the efficiency of road maintenance work, a new scheme of contracting out maintenance works was introduced in March 1992. However, there remain various obstacles to impede the contracting out practice including the GDDP's organization for maintenance, vehicle depots, warehouses, depots for machines and materials, all of which do not effectively support the contract works. Because of these factors, contract works still remain as a small portion of the total maintenance work. Excessive facilities and labor forces are still kept in GDDP.

GDDP has prepared road maintenance manuals. However, actual maintenance works do not follow them, resulting in quality difference by regions and projects. Low quality of maintenance works will result in early deterioration of pavement and structure, requiring additional budget for restoration. This is likely because of the lack of authorization of the manuals and irrelevant supervision of the works. This is observed by the lack of work schedule and no particular measures to avoid inconvenience to the traffic as well as possible damage to the workers.

Priority maintenance works need to be clearly identified to secure the minimum requirement for budget allocation. At the moment, however, there is no particular pavement management system (PMS) for identifying the urgent projects. In addition, maintenance budget is prepared by "Planning and Analysis Department" without full understanding of the requirements of the Maintenance Department.

Road patrols, cleaning and winter maintenance are inadequate. These works should be strengthened to keep smooth traffic flows.

2) Improvement Measures

(1) Administration for Road Maintenance

The contract maintenance in Poland reportedly accounts for about 30 % of the total maintenance works. Main contract works are:

- (a) Large scale works with machines and equipment;
- (b) Works requiring special knowledge and technique; and

- (c) Repair works after temporary repairs are performed by the government's site office.

GDDP has been restructuring its organization with an emphasis on privatization of state enterprises and some of their own offices. At the same time, it is also necessary to introduce measures to reduce excessive employment inherited from the old regime. Maintenance organization of GDDP is a possible target in this regard.

The maintenance organization should be restructured as stipulated in "Investment in Development" by Warren C. Baum by way of:

- (a) cutting back surplus unqualified workers;
- (b) increasing training of managers, supervisors, machinists and other skilled staff; and
- (c) relying more on competitive contracting with private firms.

The existing maintenance organization of the GDDP comprises Head Office and Regional Offices (17 offices) which contain District Offices (171) and Site Offices (652). Under this hierarchical structure, responsibilities for maintenance works are distributed to each office horizontally and vertically. The existing maintenance structure suggests involvement of duplicated responsibilities between tiers and less autonomy in the lower tiers while existence of a large number of offices suggests unnecessarily large holding of facilities, machinery, materials and work forces. Reduction of unqualified workers should be sought in line with the restructuring of maintenance organization to reduce the management tiers and number of offices.

Managers, supervisors, machinists and other skilled staff are expected to play an increasingly important role in introducing contract maintenance. Maintenance works need to be classified into direct and contract maintenance works. The latter further needs to be contracted, supervised and inspected in accordance with a time schedule. The staff need to be trained to comply with these requirements with a focus on maintenance project management.

Competitive contracting with private firms is a useful tool to improve the efficiency of maintenance works compared with direct maintenance. However, it depends on the existence of private firms to compete in bidding. There are potential competitors in large urban centers while, in the remaining smaller cities, they tend to face lack of competent private firms to bid. Consequently, contract maintenance needs to be introduced in a step wise manner depending on the availability of contractors in the regions. It is necessary, of course, to establish contracting formalities and procedures for maintenance works to private firms.

(2) Establishment of Maintenance Schedule

Maintenance works contain various aspects and facilities from small repairs to large works. Therefore, work schedule should be well prepared for efficient operation including contract maintenance. As maintenance works are executed on existing roads, there are various coordination works to be performed prior to the start of works including explanation to the roadside residents, adjustment with authorities responsible for underground utilities, and discussions on traffic control with the police.

a) Annual Maintenance Schedule

Maintenance schedule is planned in accordance with the estimated annual maintenance work volume based on such basic data as maintenance history, individual maintenance and repair works required, traffic on the sections and likely weather conditions.

Annual maintenance schedule should be prepared by taking account of:

- (a) Classification of direct and contract maintenance. For contract maintenance, technical specification and measurement/pavement method should be clearly specified to avoid possible disputes;
- (b) Identification of best timing for individual projects by taking account of weather conditions and local requirements; and
- (c) Establishment of overall annual maintenance schedule through coordination of resource constraints such as equipment, materials and work forces.

b) Registration of Maintenance Records

After implementation of maintenance / repair work, the maintenance records should be registered to a regional maintenance information center in a specified format for possible later reference.

(3) Introduction of Pavement Management System

Benefits of the Pavement Management System (PMS) are well known to engineers in GDDP and the PMS is planned to be introduced in two years with World Bank assistance. When the PMS is introduced, a routine maintenance management system should be established. This system should be based on a similar computerized road network database for the pavement management system and include the following:

- (a) specification of suitable frequencies for routine activities and intervention criteria for remedial works; and
- (b) setting up of safety and condition inspections to detect defects and the categorization of these defects to determine the priority for remedial action.

(4) Road Patrol, Cleaning and Winter Maintenance

a) Road Patrols

Road patrol can be classified into routine, night, winter and emergency patrol. Road patrol which aims at securing smooth traffic flows on every road section throughout the year include the following works:

- (a) to detect unusual conditions or damages to road facilities;
- (b) to remove obstacles to traffic flow and to detect potential obstacles;

- (c) to inspect traffic conditions;
- (d) to inspect progress or conditions of works associated with roads including utilities works and wayside construction; and
- (e) to take temporary measures for preventing disruption of facilities.

Any fault caused in association with road facilities are deemed to be the responsibility of public road authorities. In this sense, routine patrol is very important for early detection of possible faults and introduction of emergency measures. It could cover: road surfaces, shoulders, drainage, slope and the related structures, traffic safety facilities (guardrail, lighting, sign, signal, delineator, marking, pedestrian bridge), median, planting, structures (bridge, culverts, etc.), works undertaken by others, and conditions of right-of-way.

Because of the wide coverage of routine patrol, it should be implemented at several intervals a day with a moving focus on main inspection targets. The frequency of routine patrol in Poland needs to be increased, although the frequency is dependent on importance of roads, road conditions, surrounding landuse of roads, etc.

Night patrol which is also important for securing traffic safety at night is required to inspect visibility of lighting facilities, road signals, traffic sign and pavement markings at night. It should be implemented at least once a week or once a month.

Regular patrol or inspection is made mainly for inspecting structures in detail at certain intervals. The inspection frequency is determined by the importance of structures, degree of superannuation, possible effects on the third person or other road facilities in case of the breakdown, difficulties of repair / reconstruction.

Inspection in winter or unusual occasions are implemented at certain intervals. For securing undisturbed traffic flow as much as possible, winter maintenance is preferred to cover all the national roads and important road sections of lower class of voivodship road.

b) Cleaning of Road Facilities

Needs for road cleaning are growing in view of enhancement of road functions, beauty of roadways and protection of the roadside environment. However the cleaning frequency in Poland seems to be too low and should be increased. The road facilities to be cleaned are extensive not only for carriageway, foot paths, median but also drainage, expansion joints of bridges, road lightings, guardrails, signs, delineators, etc.

The cleaning works depends on traffic conditions and roadside land use. The work efficiency largely depends on roadside land use. If traffic restriction is required, it is better to execute various cleaning works simultaneously. If daytime cleaning is difficult, it should be performed at night. The cleaning work always requires safety of workers and to minimize disturbance on traffic flow.

5.3 Road Transport Development

5.3.1 Truck Cargo Transport

1) Cargo Transport Demand

(1) Domestic Transport

Transport demand is produced from all fields of industrial and personal activities. With further activation of economic activities, increasing production and growing individual incomes, the transport demand will grow accordingly. The transport demands and services in association with the economic activities can be generated from the three aspects of production, distribution and consumption.

The transport demands by the heavy industrial sector are generally bulky with rather limited number of customers and destinations. On the other hand, the transport demands by the distribution sectors have a large number of customers and many destinations although the haulage units are smaller.

The transport demands in Poland can be considered to be in the following stage:

- (a) The Polish economy is now in a transition stage from the socialist system to a market economy. The majority of transport demand, although considerable problems exist in the Poland statistics, is produced from the industrial sector, with less transport demand in the distribution and consumer sectors. However, transport demand of the industrial sector has been decreasing due to the economic structural reform.
- (b) Bulky cargo is transported directly from the suppliers to clients. The important factor to select the mode of transport usually depends on tariff rate rather than quality of services. There has been no particular requirement for diversified transport services.
- (c) Transport services for the light industries, distributors and consumers have not been well developed. They usually have their own transport means to carry their goods.

In consequence, trucking companies are generally forced to compete with each other in terms of tariff to be awarded the contract to have bulky cargo of rather low commodity value. Due to the lack of higher value of commodities, there is no room to upgrade their services, although the trucker's share in the market has been increasing. Moreover, rising taxes and charges including turn-over taxes, fuel prices and custom duties add financial constraints to the trucking companies.

In the year 2005 when the industries will be diversified and the consumption will be expanded, the transport demand for flexibility of truck services will increase probably in the following fields:

- (a) According to the diversification of industries and the development of distribution sectors, transport demand will change from direct haulage of single type of bulk cargo to multi-directional frequent transport with a variety of high value products.

- (b) In the agriculture goods transport, the distribution and consumption of vegetables, fruits and flowers will increase, requiring specialized transport services.
- (c) In the industrial sector, diversified consumer products will increase, requiring for quick, safe and reliable transport services.
- (d) The privatization of state super markets and further development of wholesalers and retailers goods are expected to grow. Various type of distribution industries with diversified distribution system will be developed accordingly. Thus quality transport services will be required.

Responding to the above industrial changes and transport needs, the trucking industry must cope with the following situations:

- (a) Competition in the transport market will increasingly be based on quality service.
- (b) Transporters need to develop a service chain of transport services including transport, warehousing, processing, packaging, and information services.

(2) International Transport

The international goods transport consists of three categories; export, import and transit as shown in Table 5.3.1. The international transport has increased in all categories although the total volume accounts for only 10.2% of the total domestic cargo tons. The export of agricultural goods, coal, intermediate chemical products had the dominant share of the total and increased by about 50 % from 1990. The import of goods has increased by about two times in terms of tonnage from 1990. This sudden increase of imports could be attributable to the imports from the EC countries comprising consumer goods including foodstuffs, cosmetics, electric appliances and miscellaneous goods.

Table 5.3.1 International Freight Transport in Poland, 1991

| Category | Amount (Ton) | 1990 = 100 | Share (%) |
|----------|--------------|------------|-----------|
| Export | 1,773,785 | 150.1 | 62.4 |
| Import | 882,183 | 211.2 | 31.0 |
| Transit | 188,019 | 126.0 | 6.6 |
| Total | 2,843,987 | | 100.0 |

Source: Central Statistical Office

2) Polish Trucking Industry

The volume of truck transport accounts for 80 % of the total modal share as shown in Table 5.3.2. This is because the truck transport has the advantages of cost, time and flexibility over rail and maritime transport. It is worthy to note that private truckers expanded their share although the total volume of cargo showed a decline in 1990.

Poland issued 272,000 licenses for foreign truckers while it received 416,000 licenses from foreign countries based on the bilateral agreement. Many potential truckers are waiting to receive their international licenses due to the decreasing demand in domestic transport market and higher fares in the international transport market. The problem in this respect is that the issuance of license is time consuming, only obtainable in Warsaw and nowhere else.

There are two trucking associations in Poland: domestic and international. The domestic association serves taxi companies and truckers on taxi tariff, insurance, legal services for traffic accidents, etc. The international association serves passenger and freight transport companies on keeping vehicle data base, issuance and maintenance of TIR booklets, monitoring new vehicle production, information dissemination of domestic and international regulations.

There are some problems observed in the Polish international truck sector:

- (a) new regulations of safety and environment for Polish vehicles are not compatible with those of the EC, being several years in arrears;
- (b) inefficient border crossings procedures causing tremendous time consumption;
- (c) under-development of the services sector including banking system which do not deal with immediate settlement transactions; and
- (d) under-development of communications system which hinders real time information transaction.

Table 5.3.2 Freight Transport by Mode, 1991

| | Ton (x 1,000) | Share (%) | 1990 = 100 |
|--------------|------------------|-----------|------------|
| Rail | 227,797 | 15.4 | 80.9 |
| Truck | 1,188,697 | 80.4 | 92.0 |
| Professional | (291,327) | (24.5) | (83.9) |
| Public | (125,612) | (10.6) | (64.2) |
| Private | (165,715) | (13.9) | (109.5) |
| Own-Account | (897,370) | (75.5) | (94.9) |
| Air | 11 | - | 78.9 |
| Pipeline | 26,399 | 1.8 | 80.0 |
| Inland | 7,828 | - | 79.9 |
| Marine | 27,563 | 1.9 | 96.8 |
| Total | 1,478,295 | 100.0 | 89.9 |

Source: Central Statistical Office

In Poland, there were about 60,000 trucking companies in 1991. Most of them are small scale owner-operators (Tables 5.3.3 and 5.3.4). Drastic decrease in cargo volume, and private participation into the cargo transport market have resulted in over capacity and keen competition for survival.

Table 5.3.3 Stratum of Professional Trucking Companies, 1991

| Class and No. of Workers | Number of Companies | Number of Workers | Truck Capacity (Ton) | Ton Carried (x 1,000) |
|--------------------------|---------------------|-------------------|----------------------|-----------------------|
| Large (>20) | 741 (1.3%) | 164,004 (69.1%) | 589,525 (62.1%) | 163,700 (56.2%) |
| Medium (6 - 19) | 412 (0.7) | 4,643 (2.0) | 24,922 (2.6) | 7,786 (2.7) |
| Small (< 5) | 57,892 (96.6) | 68,543 (28.9) | 334,751 (35.3) | 119,841 (41.1) |
| Total | 59,045 (100) | 237,190 (100) | 949,198 (100) | 291,327 (100) |

Source: Central Statistical Office

Table 5.3.4 Cargo Carried per Worker and by Truck Capacity, 1991

| | Cargo Carried per Worker | Cargo Carried per Truck Capacity |
|--------|--------------------------|----------------------------------|
| Large | 998 (ton/person) | 278 (ton/ton) |
| Medium | 1,677 | 312 |
| Small | 1,748 | 358 |

Source: Central Statistical Office

Trucking companies in many European countries have developed from grass-root small businesses working for local transport services. However, in Poland, all enterprises including the PKS used to be state enterprises. The privatization program forced them to be separated from the state enterprises and entered the competitive cargo transport market. In comparison with private carriers, they still have excessive working forces, old types of truck fleet and unproductive management organizations. Many of them are struggling to survive, for instance, by selling and leasing their assets as well as starting new businesses such as vehicle inspection stations, gasoline stations and driving schools. PKS companies have reduced their share to about 2.2 % of the total truck cargo transport in 1991. Many PKS are in deficit and in danger of bankruptcy.

On the other hand, private carriers offer more flexible and timely services with lower tariffs than the enterprises although majority of them (about 95 %) own only one truck. They have been expanding their share in the market by taking over the market which the enterprises used to have.

There are about 60 forwarding companies including domestic, foreign and joint venture companies in Poland. Those who intend to start domestic forwarding business need only registration with the voivod offices in accordance with the Act of Economic Activity. Permission from local court is required for those who engage in foreign forwarding business. Currently, the majority of forwarders have less experience and professional service capability. There are many warehouses and some truck terminals. All of the warehouses are located in large urban centers, while truck terminals are located near the border.

In the coming years, keen competition will stimulate stratification of trucking companies into two groups: larger trucking companies and owner-operators: the larger

services; and owner operators working either under contract with large companies or independently in local services.

The biggest issue is that only limited information is available in the road cargo transport market although it carries an overwhelming part of national cargo transport as well as the market has been drastically changing through the privatization and deregulation policy. MTME has no reliable data and information system to prepare policy measures which try to minimize the harmful effects of excessive competition and monopolistic behavior in the market, particularly during the economic transition period.

3) Integration of the Polish Cargo Transport System with those of EC Market

The single European market of cargo transport among twelve member states will start from January 1993. Liberalization measures have already been introduced: the compulsory price system was replaced by reference rates on 1st January 1989; road haulage quotas are being increased in stages and all limits will be abolished; and the conditions for competition are to be harmonized. However, domestic transport markets of member states are different and still subject to the rules and practices of the individual state.

Poland needs to reform its truck transport system to those adopted by the EC countries in roughly 10 years time. Adjustments include various aspects of technical, social, economic, institutional and legal matters though some of them have already been in compliance with the EC requirements.

(1) Liberalization of Polish Transport Market

Currently Poland has road haulage quota based on the bilateral agreements. Number of permissions (general, cabotage, transit) are issued by MTME. However toward the EC participation, the abolition of the current system and border crossing formalities need to be modified to conform with the EC regulations.

Administrative formalities and inspection at border crossing are performed by several agencies (Customs, Quarantine, MTME, Police and Military). Time consuming border crossing process hinders efficient international communications, thus retarding national economy. In order to speed up the processing, Single Administration Document (SAD) System has already been introduced. However, its effectiveness in reducing the processing time is not significant. Other measures need to be introduced including customs clearance at destinations in Poland instead of border crossing stations. In case of emergency, Poland is obliged to conform to the related countries. This implies appropriate institution and information system need to be developed by MTME.

(2) Qualification for Market Entry

Poland introduced the conditions for qualification by "Act of International Shipment Activity" consisting of three conditions of personal trustworthiness, financial conditions and professional competence in July 1991. However, no actual investigation has been performed to qualify the carriers and forwarders in accordance with these qualification standards.

(3) Act on carriers and forwarders

Those who intend to enter domestic cargo transport market are required by the Act of Economic Activity only to have registration with voivod offices through the same procedure required for retailers and wholesalers. There is no specific legislation regulating the carriers. This situation needs to be improved by introducing new laws by taking account of specific characteristics of cargo transporters.

(4) Harmonization Policy

Poland needs to adjust various cargo transport rules and practices prevailing in Poland to those adopted in the EC so as to establish fair competitive grounds between Poland and the EC countries. These includes vehicle related taxes and fees, state involvement (infrastructure costs and investments), vehicle weight and size, driver's working hours, etc.

(5) Vehicle inspection

Vehicle inspection is one of the most important aspects for Poland to join the EC in view of improving road safety and environmental protection. Currently there are about 2,500 vehicle service shops in Poland. MTME has drafted a new act for vehicle inspection with a view to achieving compatibility with the EC requirements. The new act stipulates qualification standards of service shops in terms of space, equipment, knowledge and experience as well as inspection items. The execution is to be entrusted from MTME to voivodship.

4) Modernization Policy of the Trucking Industry

Trucking industry is one of the important transport services to the national economy, especially for cargo haulage connecting production and consumption. The industry's efficiency will greatly influence the growth of the national economy.

Truck cargo transport market of Poland has completely been liberalized including market entry and exit as well as price determination. Under the circumstances, however, there are various issues to be solved with a view to encouraging national economic growth under a strong alliance with the European Community. The major issues to be addressed are:

- (1) Development of market monitoring system;
- (2) Modernization of truckers' management and operation;
- (3) Development of truckers association;
- (4) Development of public truck terminals; and
- (5) Institutional development toward the integration with the EC.

(1) Development of market monitoring system

Availability of reliable information on cargo transport and trucking industry are very important not only for the trucking industry but also for administration and policy making by MTME, foreign investors to Poland and international transport communities, especially the EC.

Among other things, the information system is vitally important for MTME to guide the transition to a market economy in an orderly and efficient way. In order to enable detecting undesirable development of the trucking industry, it is necessary to have a market monitoring system including demand and supply indicators, pricing, competitive environment, and managerial and financial situation of truckers. MTME needs to establish its own system directly accessible to the market, preferably instead of by way of GUS.

The present market observation system adopted in some of the EC countries will be good reference for Poland. These includes:

- (a) type of carriage, goods, vehicle type, trip length, origins and destinations in road haulage, including neighboring countries and international transit carriage;
- (b) capacities of truck transport and their utilization;
- (c) market prices and cost structure information based on categories of truckers; and
- (d) financial reports of trucking companies.

In this context, MTME needs a study on what type of information system is suitable for their purpose to guide the market, including items and coverage of information, timing and channels of information collection, processing of information, and information dissemination system for immediate decision making. Some information collected by MTME need to be transferred to Gus for statistical purposes

(2) Modernization of truckers' management and operation

The majority of Polish trucking companies belong to small and medium scale companies. This situation is similar to those of the EC countries in terms of trucks per company: Belgium (9.1), Germany (5.9), UK (5.4), France (5.4), Greece (1.0), Italy (1.3) and Spain (1.5). Characteristics of these small truckers are that they own one truck and operate by themselves. Due to the under-development of the supportive facilities in Poland, they have no access to banking, management know-how and market information.

To improve their management and operation, MTME needs to encourage them to establish region-wise voluntary associations for mutual cooperation, for example, in:

- (a) market information exchange;
- (b) cooperation for marketing including return cargo;
- (c) cooperation for procuring trucks, fuels and tires including mutual financing;
- (d) cooperation for education and training
- (e) cooperation for improving welfare facilities
- (f) cooperation for managerial rationalization
- (g) cooperation for developing communication system
- (h) cooperation for developing truck terminal and warehouse

As the trucking industry develops in the future, there will emerge some large trucking companies who organize small and medium sized truckers under their leadership to expand their service network. This will eventually contribute to improve the management efficiency of small and medium sized truckers. However, MTME needs to take an immediate lead in the above encouragement measures with a focus on growing medium sized truckers out of numerous small owner-operators for overall efficiency improvement of the trucking industry.

(3) Development of truckers association

There are two trucking associations in Poland: an international truckers association of voluntary 35,000 member companies including carriers, forwarders and passenger transport companies; and a domestic private transport association in Warsaw of about 4,700 members including taxi and trucking companies.

These associations need to be reformed with a view to separating truckers with other carriers and forwarders because of the complete difference of the respective markets. Integration of various kind of transport industries will disturb the quick and relevant decision making for each group of the industries. Rather, truckers belonging to the separate two associations should form a single truckers association which deals with both international and domestic cargo transport markets.

Main objectives of the truckers association should be to enhance international competitiveness of the Polish trucking industry under the competitive market. If the industry tries to keep their vested interests, its competitiveness in the international scene will be lowered in the long run. If the government tries to impose heavy financial burden on the industry to raise additional revenue to the state, it will discourage industry's efforts to improve international competitiveness.

(4) Development of public truck terminals

It is very likely that international and domestic general cargo transport will substantially increase in the future and that in the domestic market, inter-city and intra-urban general cargo transport will also increase. It is a general tendency that truckers pursue the efficiency of truck operations through separating trunk-line transport from feeder transport by enabling immediate "come and go" of trucks on the trunk lines.

Large trucking companies could develop their own truck terminals at their disposal. However, requirements for public truck terminals would increase in the future possibly from foreign truckers as well as medium and small Polish truckers.

Public truck terminals need to be developed in the vicinity of urban centers with due consideration to good connection between inter-city and intra-urban transport, possible impacts on urban environment including traffic congestion, accidents, and air and noise pollution. Development of truck terminals would have significant benefits to urban traffic particularly in large urban agglomerations in Poland because these cities have few loading and unloading spaces for large lorries. Truck terminals need to be equipped with not only transshipment facilities but also container depots, warehouses, sorting and packaging facilities, and some kinds of processing facilities.

(5) Institutional development toward the integration with the EC

a) Qualification of International Truckers

Qualification standards for international truckers will be based on qualitative criteria:

- (a) The personal trustworthiness conditions needs to be fulfilled in terms of no criminal records, no serious breach of government regulations, reliable cargo transport and suitability as transporter;
- (b) The financial conditions need to be fulfilled in terms of availability of financial resources necessary for setting up and running the business; and
- (c) The professional conditions need to be fulfilled in terms of knowledge, practical experience, and diploma attesting relevant knowledge.

The qualification standards need to be fulfilled by many applicants who want to join the EC transport market. MTME therefore needs to establish a corresponding qualification system in compliance with the EC standards. Education and training system for those working in the trucking industry needs to be established to improve their capability and international cooperation. This system can be jointly developed by MTME and the truckers association.

b) Harmonization of Transport Taxation

The basic policy of the EC is to recover the infrastructure costs by road taxes and maintenance costs by fuel taxes. Road users are expected to pay not only for the infrastructure and maintenance costs but also for environment protection. It is a common understanding that heavy vehicles should pay more for the road usage and damages. To comply with the tax requirements, the Polish government needs to introduce user pay principle for the road sector. The existing general budget system needs to be reviewed to establish a special fund earmarked for the road sector based on road user charges. Heavy vehicle taxes should be taken into account in developing the road fund.

c) Environment Protection

The Polish new ordinance of vehicle inspection is in the consultation stage with the relevant agencies. The ordinance should be put into effect within 1992. The certification of new vehicles can be started at the earliest possible time when the foreign vehicle manufactures accept the 1992 EC standards and are ready to set up the factories.

The emission standard for used cars must be raised step by step due to existence of a large number of aged vehicles. However the test should be strengthened to conform with the stipulated standards by improving engineers, equipment and total system of testing. A program to comply with the EC standards toward 2000 needs to be legislated by taking account of opinions of vehicle owners, manufacturers and the public at large.

5.3.2 International Container Transport

1) Current Situations and Future Prospect of International Container Transport

The international container transport has been developed to rationalize international general cargo transport using containers for sea, rail and air transport. International forwarders undertake the whole process of inter-modal transport from origin to destination by issuing through bill of lading. Some of the international forwarders are operators of some means of transport such as shipping companies, railway companies or road haulers while some of them are engaging just in arranging whole inter-modal transport process without their own means of transport.

Currently, in Poland, the volume of general cargo transport is not great compared with other types of cargo transport although it has rapidly been growing, especially with the western countries. It is expected that international container transport will steadily increase in the future in accordance with the progress of Polish internationalization. This is because container transport is the most prevailing means of general cargo transport in the world logistic system.

In order to develop international container transport, international forwarding system needs to be developed with a focus on inter-modal transport. Attention should be paid to:

- (a) growing international forwarders;
- (b) clarification of their responsibilities in accordance with international practices; and
- (c) development of information systems to support international and inter-modal information exchange.

2) Issues of International Container Transport

A large part of international container transport is currently carried by road haulers even over a long distance due to the under-development of container transport by sea and rail. Development of combined transport between sea/rail and road would largely depend on the volume of container transport which is still not large enough for sea and rail to develop full-fledged container transport systems. However, in the face of likely increase of international container transport in the coming years, both sea and rail need to be prepared for it, or at least to review the existing systems from the aspect of international container transport.

Sea transport has been facing keen competition with land transport between major international ports along the North Sea and Poland. It is likely that if the Polish ports are not prepared for efficient handling of containers, they could be ignored by the international logistic network. The issues to be addressed include: (a) container handling facilities in Szczecin/Swinoujście port complex need to be developed; (b) inland access roads and railways need to be improved, including layouts of roads and railways in port areas; (c) container handling efficiency needs to be enhanced through the introduction of appropriate cargo information system and relevant institutional reforms; and (d) customs clearance needs to be improved by allowing agents to represent consignors and consignees.

PKP has introduced weekly international container transport services between Hamburg and Warsaw and established an international forwarder to promote railway containerization. The World Bank's support would encourage further improvement in this field. The biggest issue would be the timing when more efforts need to be put into this field by taking account of the likely return on investments. Another issue in container transport rises from uncoordinated cross border transport between countries which considerably prolongs transport time (4-7 hours).

There are about 60 forwarders in Poland but only a limited number of them (international joint ventures) are competent for the international combined transport. Forwarders who engage in international combined transport need to have: (a) international information network including trading regulations and conditions of world-wide transport services; (b) world-wide network of business relations with forwarders and carriers; and (c) good reputation and financial soundness to cope with any problem with the assistance of banks and insurance companies.

Currently there are eleven container terminals in Poland (Table 5.3.5). At the moment, there seems to be no capacity problem at these terminals because of under-development of overall containerization. However, these terminals need to be reviewed from the aspect of international logistic system to modernize their functions.

Table 5.3.5 Container Terminals in Poland, 1992

| Owner | Number | Location |
|---------|--------|---|
| Spedpol | 6 | Warsaw, Lodz, Krakow, Sosnowiec, Poznan, Gdansk |
| PKP | 2 | Maxaszewicze, Gilwice |
| PKS | 2 | Wroclaw, Szczecin |
| Hobour | 1 | Gdynia |

3) Policy for Developing International Container Transport

Poland needs to develop international container transport system including railways, roads and sea transport. Container transport has various advantages over other type of packaging: (a) saving of packaging costs; (b) safety of contents from damages and theft; (c) time saving in cargo handling; (d) orderly stowage to save space; and (e) simplification of customs clearance procedures. Owing to these advantages, international logistics are heavily dependent on container transport.

For promoting Polish integration with the EC, Poland needs to adopt rules and practices of container transport prevailing in the EC countries. Unified standardization is a key issue in this regard.

(1) International Railway Cooperation

Railway systems of every country have been organized from domestic point of view with less attention to international connection. International connection has been hindered, for example, by width of tracks, power supplying system and train control system. However, necessity of international cooperation has been advocated by the European Community as stipulated in "91/440/EEC" that "it is appropriate that access to the railway infrastructure of other Member States should be granted to railway undertakings engaged in the international combined transport of goods."

Towards the integration, Poland needs to take necessary measures to follow the above stipulation, coupled with the measures to comply with the basic railway policy of the EC which includes:

- (a) Improvement of commercial activity by cost reduction, modernization and improvement of general economic conditions;
- (b) Easier access to international combined transport by eliminating nationality discrimination;
- (c) Deregulated pricing for combined transport;
- (d) Elimination of double taxation as well as application of unified rules and conditions for tax allowance; and
- (e) Promotion of all types of combined transport.

The first step taken by PKP to establish an international forwarder should be furthered to promote international combined transport. The forwarder should make an effort to establish proper tariff policy and to control the whole transport process so as to enhance the competitiveness of railway transport in the international scene.

(2) Development of Sea Container Transport

Future of the Polish ports is dependent on the development of general cargo terminals including container and roll-on and roll-off ships. Development policy and strategies should be formulated with a view to: (a) improving competitiveness of sea container transport relative to land transport particularly between Hamburg and Poland; and (b) expanding hinterland of Polish ports to the Baltic League nations as well as inland countries and republics.

First, port operation efficiency needs to be improved to reduce ships turn-around time as well as staying time of containers in port area to the extent that transport time by sea is competitive with that of land transport at competitive prices. The present level of efficiency could not be improved significantly if the existing management and operation system continues to the future. Measures should be introduced to encourage real competition among port businesses as well as modernize cargo handling facilities and systems.

Second, road and railway sectors should improve inland access to and from port areas under a close coordination with port authorities. At the same time, port authorities should strengthen their relations with marketing activities to the Baltic League nations as well as inland countries and republics with a view to identifying their future roles in the international transit services. This would be a hard task for the Polish port authorities because they again face keen competition with: (a) direct sea transport services, for example, from Hamburg to the Baltic League nations; and (b) railway transport services, for example from Hamburg to the East and Central European countries.

Third, liner services between international major ports and Polish ports need to be strengthened to provide frequent services competitive with land transport at reasonable costs. This is not practical, however, if transport demand remains as it is now. It is indispensable that the above three factors of port efficiency, inland access and liner services need to be improved in a systematic way keeping proper balance among them.

(3) Growing International Forwarders

International forwarder is the key element in the international combined transport. Competent international forwarders need to be developed by taking account of the functions to be performed by them, namely, arranging and contracting cargo transport with carriers under their name as proxies to consignors. To fulfill their duties, they need to have wide knowledge and experience including:

- (a) selection of best alternative transport routes and means to satisfy consignor's demand
- (b) contract with carriers to transport cargo
- (c) issuance of international combined transport documents to consignor
- (d) collection of cargo from consignor to line carrier and delivery to consignee
- (e) insurance contract and customs clearance if required
- (f) other services, if required, including packing, storage and information dissemination.

International joint venture would be an efficient way to develop international forwarders in a short period of time. Development of international communication system is indispensable for international forwarding.

5.3.3 Improvement of Inter-City Bus Transport

1) Decreasing Inter-city Bus Passenger Demand

Intercity bus passenger demand has been decreasing substantially in recent years. Total number of bus passengers in 1991 has decreased by more than 30% compared with that in 1987 (Table 5.3.6). The most significant decrease appeared in the number of monthly ticket passengers, by almost a two thirds decline. Similar trend was seen in the decreasing demand of passengers transported by commuting buses for employees. Less than half of the employees in 1987 were transported on contract based bus services in 1991. On the other hand, international bus passengers have increased dramatically: the number of bus passengers in 1991 accounted for more than ten times that in 1987, although the number of international bus passengers still accounts for only fraction of the total bus transportation demand.

This decrease of the demand has been caused by economic and social changes in recent years:

- (a) Commuter trips have decreased substantially caused by prevailing unemployment due to recent recession;
- (b) Discretionary trips such as recreational trips, summer camp trips have been decreasing drastically;

Table 5.3.6 Bus Transport Services

| Type of Services | 1987 | 1988 | 1989 | 1990 | 1991 |
|--|-----------|-----------|-----------|-----------|-----------|
| Total | 2,487,208 | 2,503,760 | 2,563,975 | 2,064,244 | 1,709,441 |
| | 100.0 | 100.7 | 103.1 | 83.0 | 68.7 |
| - International | 102 | 134 | 518 | 718 | 1,270 |
| | 100.0 | 131.4 | 507.8 | 703.9 | 1245.1 |
| Regular Traffic | 2,075,227 | 2,089,332 | 2,157,720 | 1,773,833 | 1,495,463 |
| | 100.0 | 100.7 | 104.0 | 85.5 | 72.1 |
| - Single tickets | 1,053,887 | 1,049,535 | 1,119,676 | 1,004,793 | 951,222 |
| | 100.0 | 99.6 | 106.2 | 95.3 | 90.3 |
| - Monthly pass | 1,021,340 | 1,039,797 | 1,038,044 | 769,040 | 544,241 |
| | 100.0 | 101.8 | 101.6 | 75.3 | 53.3 |
| - Employee's pass | 656,453 | 664,112 | 650,119 | 415,026 | 216,636 |
| | 100.0 | 101.2 | 99.0 | 63.2 | 33.0 |
| - Student's pass | 364,887 | 375,685 | 387,925 | 354,014 | 327,605 |
| | 100.0 | 103.0 | 106.3 | 97.0 | 89.8 |
| Occasional Traffic | 411,981 | 414,428 | 406,255 | 290,411 | 213,978 |
| | 100.0 | 100.6 | 98.6 | 70.5 | 51.9 |
| - Transport of Employees (Contract Basis) | 385,505 | 387,563 | 381,829 | 275,277 | 188,650 |
| | 100.0 | 100.5 | 99.0 | 71.4 | 48.9 |
| - Tours and Transport to Summer Camps | 26,476 | 26,865 | 24,426 | 15,134 | 25,328 |
| | 100.0 | 101.5 | 92.3 | 57.2 | 95.7 |

Source: Department Produccji i Postepu Naukowo-Technicznego,
Informacje Statystyczne, each year

Note: Upper Total Number of Passengers (000)
Lower 1987 = 100

- (c) Bus passenger demand has decreased due to increasing private car use; and
- (d) Distribution of goods has been improved after changing into market economy, consequently shopping trips to adjacent cities and towns have become unnecessary.

2) Necessity of Bus Operation Monitoring System

This drastic decrease of bus passenger demand results in over-supply of bus services. Bus transport efficiency indices illustrate the imbalance between demand and supply of bus services. Both bus transport efficiency indices, passenger per seat and passenger kilometers per seat, have decreased by 18 percent and 14 percent in the period between 1987 and 1990, respectively (Table 5.3.7).

This implies that the supply of bus services has not adjusted to the decreasing bus passenger demand. Although the nature of bus transport as a public service, which can not be abolished easily because public transportation should secure minimal mobility, prevents the level of service from adjusting to the demand quickly, inefficient provision of bus services is mainly attributable to lack of monitoring system of demand.

Table 5.3.7 Bus Transport Efficiency

| Bus Companies excluding City Transport | 1987 | 1988 | 1989 | 1990 |
|--|--------|--------|--------|--------|
| Passengers per Seat | 1,875 | 1,824 | 1,844 | 1,563 |
| Passengers Kilometers per Seat | 40,716 | 41,568 | 41,763 | 35,054 |

Source: Department Produccji i Postepu Naukowo-Technicznego, Informacje Statystyczne, each year

In current practice, bus routes and schedules have been changed mainly based on information from drivers and requests of residents. These changes have not been based on the inquiry of actual demand. The difficulty for collecting bus passenger data lies in the fact that bus tickets are sold by drivers on board, thus only the sales data are reported to the management and the passenger demand by route and section remains unknown. Therefore, if there were mistakes and errors in the reports from bus drivers, bus services could be provided much higher or lower than the desirable level.

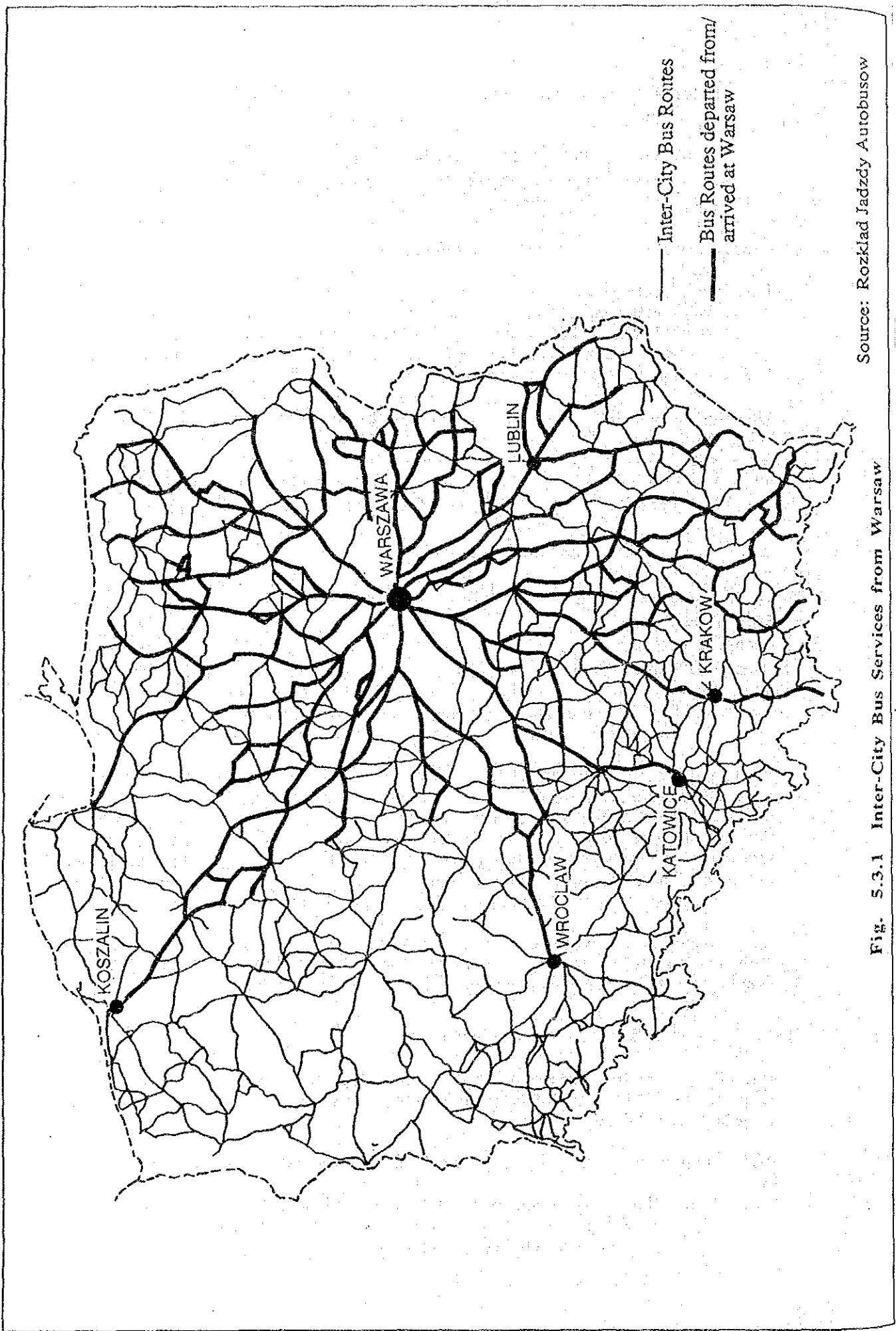
Bus transport can provide more flexible operation than railway, in particular, to cope with changing travel demand patterns. Therefore, it is crucial to understand the existing passenger demand by establishing the market monitoring system.

3) Reformation of Bus Network and Operation

Intercity bus network has extensive service coverage areas same as railway networks (Fig. 5.3.1). Many bus routes from Warsaw travel to distant areas, in particular, eastern part of Poland.

The current extensive intercity bus network has been formed for the following reasons:

- (a) direct connections between Warsaw and the capital cities in voivodships in the previous period were strongly desired, when the size of the voivodships were even smaller than at present, and



Source: Rozkład Jazdy Autobusow

Fig. 5.3.1 Inter-City Bus Services from Warsaw

- (b) some of small towns are destinations for recreational trips for which direct services are highly desired by passengers.

It is rather difficult to judge whether the level of existing bus services are adequate or not due to limited information on actual bus passenger demand and operation. More efficient inter-city transport services could be achieved by consolidating similar bus routes and aggregating into fewer primary bus routes with more frequent services supplemented by feeder services. Reformation of inter-city bus network should be studied further based on the information of actual inter-city bus passenger demand.

To cope with the problem, it is reported that the conference on bus network and schedule will be initiated this year. Issues on the reformation of bus network as well as bus schedules should be discussed at the conference. Well-coordinated connection of the bus operation can be achieved immediately without particular difficulties.

4) Efficient Bus Operation through Fair Competition

Since all the regulations on bus operation were canceled in 1988, many small bus companies have been established. Private bus companies have gained passengers from PKS by setting lower fares and have operated efficiently with lower overhead costs. Although the deregulation has shown the possibility to improve bus operations, various problems arose.

The deregulation has brought about unfair competition between PKS and private bus companies. For instance, PKS needs permission for abolishing unprofitable routes while private bus companies can freely enter into and exit from bus transport services. Private bus companies take this advantage by operating non-scheduled buses several minutes before the departure of the scheduled PKS buses.

The unfair competition has threatened stable supply of public bus services. Since PKS suffered deficit operation on several routes, which are caused partly by the entry of private bus companies, the bus routes could be suspended. If private bus companies stopped their operation for any reason, bus services could disappear in the areas. This experience shows the necessity to enforce the regulations for entry into the bus transport industry.

However, it should be noted that efficient bus services are attained through a fair competition. The government should endeavor to secure the condition for the fair competition in the inter-city bus transport industry.

5.4 Environment and Traffic Safety

Negative effects of road transport activities in Poland are concerned mainly with operation of vehicles rather than construction of the infrastructure. They include accidents, congestion, exhaust gas emission and noise. These costs are not internalized but it is reported, for instance, that the non internalized social costs of road transport accounted for about 5 percent of GDP for the OECD countries ("Transport and the Environment" by OECD in 1988).

5.4.1 Environment

1) Environmental Issues of Roads and Road Transport

The magnitude of environmental impacts depends on the vehicle type, type of fuel, emission standards, maintenance conditions of vehicles, vehicle operating speed, conditions of infrastructure and government regulations. Major environmental problems of road transport activities can be summarized as follows:

- (a) Pollution problems are mainly concerned with air pollutants (CO, NO_x, HC, particles, lead, etc) and their associated health risks and ecological impacts;
- (b) Noise is a nuisance, especially in densely built-up areas and at night;
- (c) New construction of roads sometimes destroy the natural environment depending on local conditions; and
- (d) Land use by transport infrastructure may be in conflict with other land use and also influence access and property values.

Non-internalized social costs include the following social costs beside infrastructure cost.

- (a) The impact on the environment consists of noise, vibration, air pollution, and pollution of surface and groundwater; and
- (b) The natural and cultural heritage is also affected in many ways such as visual intrusion, the spoiling of scenic spots, and deterioration of archaeological or historic sites.

The influence to natural and cultural heritage can be minimized to some extent through road route location study. The influence of noise and vibration can be alleviated by land use plan, road structure and attached facilities.

2) Actions Related to Vehicles and Their Use

To protect the environment from vehicle transport, many policy measures have been implemented in the World. The following measures could be suitable for Poland in view of the expected effects, social acceptance, and financial as well as administrative constraints.

(1) Enforcement of Emission Standards and Vehicle Maintenance

In Poland, the emission standards for both new and used cars are regulated separately including regular inspections. However, technical standards for new cars are still considerably low and the inspection standards for used cars is too lenient.

There are various methods to reduce air pollution and noise caused by vehicles. The stringent standards of exhaust gas emission enforced in the United States and Japan are attained by the use of catalytic converters, especially 3-way catalytic converters for unleaded gasoline. Unit cost of such a device and its accompanying equipment range from a 4 to 20 percent increase in the cost of the vehicle. The advanced technology of lean-burn engine consumes less gasoline and emits less air pollutants than the currently prevailing engines.

There are various technologies, some of which are already being used, to reduce noise emissions especially those from noisy heavy lorries. The cost increase involved would generally be less than 5 percent of the vehicle's price and even less than 3 percent for cars and buses.

Currently many foreign automobile manufacturers are willing to assist Polish car manufacturers in introducing recent anti-pollution technologies. These technologies can meet the EC standards of 1992. In such a case, an appropriate system needs to be introduced to guarantee the compliance with the environmental standards including the procedures of assembly line testing, warranties and recalls as practiced in EC, USA and Japan.

The standards of exhaust gas emission for used cars must be strengthened on a step by step basis because of the large number of aged vehicles in use. Inspection of used cars should strictly follow the testing procedure, especially for the aged cars of, for example, 10 years and over.

(2) Traffic Management

Inspection by police on site greatly contribute to the environmental protection as well as traffic safety through inspecting certificates of vehicles' road worthiness and actual conditions of vehicles.

Steady driving of vehicles has less exhaust gas emission and noise than stop and go. Traffic signals should be coordinated to reduce stop and go through observation of the traffic flow. Rules for coordination should be clarified that the road agencies are responsible for installing and maintaining traffic facilities (traffic signals, sign boards, road marking, etc.) while police is responsible for their operations.

Mixture of local and through traffic is another reason for traffic congestions in urban areas which worsen air and noise pollution. Measures to cope with this problem need to be introduced including bypasses constructions and time restriction of heavy lorry traffic.

(3) Physical Measures

The Ministry of Environment has announced a general guideline for environment protection. However, GDDP has not prepared any manuals for protecting the environment nor environmental assessment system consisting of monitoring, enforcement, inspection, and evaluation. GDDP needs to develop a manual for guiding planning and designing of highways from the environmental point of view.

One of the important points is the creation of buffer zones and noise screens to mitigate noise pollution along the roadways. GDDP has made a first step toward this end. Further stride should be taken to include the improvement of existing road facilities.

Mitigating the impact of noise from road transport, creation of buffer zones and noise screens have been experienced in Poland. However, proper land use along the arterial road, building design and alternatives on road structures are not practiced yet. These physical measures should be practiced to mitigate the noise impact.

Voivodship and communes are the responsible agencies to depict land use plan in their respective areas. However, the voivodship plans are seldom made and the coordination between plans have never been made. Road plans constitute the backbone of regional land use plan. Therefore, voivodship and communes should develop land use plans with due consideration to road networks, environmental protection and inter-areal coordination among local governments.

(4) Economic Measures

Selective tax privilege and penalty are effective economic measures to promote popularity of anti-pollution vehicles. Vehicles of high environment standards can enjoy, for example, lower rates of road tax while those of low environment standards are required to bear higher road tax as well as to be obliged to have more frequent vehicle inspection with relevant level of charges. Leaded fuel should be taxed at higher rates than unleaded fuel.

3) Government Role and Inter-Agency Cooperation

Council of Ministers (COM), Ministry of Environment (MOE), MTME, GDDP, Police, and local governments are the primary agencies who are responsible for enforcing environmental regulations to be applied to the transport sector including air and noise pollution. However, coordination among these agencies are lacking. MTME should play a central role in coordinating transport related agencies under the general policy guidelines and legislation prepared by the MOE. Participation of local government is critically important for improvement of the environment especially monitoring the environmental deterioration and finding local solutions.

5.4.2 Traffic Safety

1) Issues

Road safety is not a mere concern of the transport sector but a component of an integrated program of social welfare improvement from a broader aspect.

(1) Traffic Accidents

The statistics between 1988 and 1991 show a 44.0% (14.7% annual) increase in accidents, a 62.9% (21.0% annual) rise in total casualties, and 49.5 (16.5% annual) increase in other injuries. However, according to a recent data, the increasing trend has changed to decreasing or levelling trend. Comparing the 4th quarter of 1990 and 1991, the data shows minus 8% in the number of accidents, 9% in fatal casualties and 7% in other injuries. For the first quarter of 1991 and 1992 these figures are plus 1%, minus 10% and plus 2.6 %, respectively.

The trend in change of traffic accidents may be linked to the enforcement of traffic laws/regulations:

- (a) the introduction of new traffic laws requiring the use of seat-belts by front seat passengers in urban areas (this was previously only a requirement on rural roads) and the use of low-beam headlights at all times between November 1 and March 1; and
- (b) improved police enforcement of traffic laws and regulations.

To cope with the increasing vehicle ownership and traffic increase, safety measures should be further strengthened for the future in spite of the slight decline in recent years.

(2) Role of the Police

Police needs to be more deeply involved in traffic control and law enforcement to reduce traffic accidents:

- (a) The police are responsible for enforcing traffic safety laws on site by way of supervising speed limit, use of seat belts, helmets and lowering headlight beam as well as supervising vehicles' road worthiness and over-loaded trucks.
- (b) The police need to be involved in the driving license test though it is currently undertaken by the voivodship.
- (c) The police need to improve traffic accident records in terms of record format, compilation and statistics with a view to providing useful information for analyzing the accidents.

(3) Certificate of Road Worthiness

The average age of vehicles in Poland is quite old compared with those in west European countries, however, certificates of vehicles' road worthiness are issued more leniently.

The certificates are issued by voivodships. However, their testing method and equipment are in lack of quality standard. Therefore, it is very likely that many vehicles receive certificate of road worthiness without fulfilling required safety and environment standards in some of the inspection items: braking; wheel alignment; steering; lights; noise; carbon monoxide and fume emissions; and engine rotation speeds.

(4) Research on Traffic Safety

Some OECD countries have formed national research institutes working for road safety measures. This is because traffic accidents are caused by a combination of various factors, which makes it difficult to identify the real cause and introduce effective safety measures. Although it is possible to import safety measures adopted in foreign countries, Poland needs its own research to work out safety measures to comply with locally specific conditions. Roles of the Institute of Automotive Transport (ITS) needs to be strengthened to this end.

(5) Road Conditions

Polish design standards for new roads are at least as high as those adopted in Western European countries. However, there is only a very low proportion of the national road network made up of motorways and express roads (< 1.5 %). The majority of the network is made up of single carriageway roads with the following consequences for road safety:

- (a) overtaking takes place without the benefit of a central reservation to segregate opposing traffic streams;
- (b) there is a dangerous mixture of high speed long distance traffic mixed with slow moving local traffic. The higher standard single carriageway often incorporate paved hard shoulders, it has become customary for slower vehicles to drive along these shoulders to permit overtaking. However, these hard shoulders are also used by horse drawn vehicles, cyclists, pedestrians and also as bus stops;
- (c) many towns and cities are not by-passed, leading to unnecessary traffic conflict in built-up areas;
- (d) virtually all junctions on inter-urban sections of the network are at grade and priority controlled. In particular, crossroads are common and, based on Western European experience, this type of junction has a poor safety record than the staggered junctions.
- (e) A program to remove the level crossings on inter-regional road with railways is planned but few have been implemented.

2) Research on Traffic Safety Measures

In order to use limited financial sources effectively, it is necessary to study alternative safety measures in terms of their costs and benefits. It is also important that the post-evaluation of safety measures should be carried out for the further improvement of traffic safety.

Systematic research for identifying the causes of accidents and evaluation of the adopted policy measures are very important for traffic safety. Improvement of traffic safety should integrally be sought by way of: analyses of safety problems; identification of mechanisms leading to accidents; analyses of interactions among causes, accidents and measures; evaluation of policy measures. The results of research should be developed into traffic safety measures including public relations, education and training.

In research works, GDDP needs to focus on road facilities and drivers' responses including landscaping, visibility, crash-worthiness of roadside equipment (lighting poles, signs, guardrail, etc.). Police needs to focus on public relations and enforcement of laws.

The Institute of Automotive Transport (ITS) has established the Road Traffic Safety Center for augmenting traffic safety research. The Center need to disseminate timely information to the safety related agencies.

3) Role of Government Agencies

(1) MTME

MTME is expected to promote traffic safety through further elaborating road traffic laws and standardizing and monitoring vehicle inspection system of voivodship by taking account of: (a) revision of road traffic laws and requirements for driver's licenses, as required, in cooperation with police; (b) stricter enforcement of vehicle inspection and issue of worthiness certificate in corporation with voivodship; (c) supervision over vehicle manufacturers based on new ordinances expecting to be effective in 1992; and (d) to advise the Ministry of Finance on revising import tax for used vehicles and spare parts.

(2) GDDP

GDDP is expected to promote traffic safety through planning, designing, constructing and maintaining highways with a focus on eliminating possible hazards to traffic accidents:

- (a) provision of frontage roads for segregating high speed traffic with low speed traffic;
- (b) construction of bypasses for avoiding conflicts between through and local traffic in urban areas;
- (c) improvement of blind spots on highways;
- (d) grade-separation of major crossings with railways;
- (e) proper design of at-grade intersections; and
- (f) proper design, installation and maintenance of traffic signs, road markings, traffic islands, median barriers, delineators, guardrails, road lighting, pavement, structures, etc.

(3) Police

The police are expected to promote traffic safety through enforcement of traffic laws and traffic management by taking account of:

- (a) stricter enforcement of traffic laws;
- (b) proper and timely traffic management to attain smooth traffic flow;

- (d) improvement of traffic accident records and distribution to relevant agencies;
- (e) public relations to reduce drunken driving; and
- (f) more involvement in driving license issuance in cooperation with voivodship.

In addition to the above mentioned agencies, a number of state and non-state agencies need to be involved in traffic safety, for example, Ministry of Education for safety education, and Ministry of Health for first aid, hospitalization and rehabilitation.

5.5 Road Financing System

5.5.1 Budget Allocation to Roads

Insufficient and deteriorated road networks and facilities incur higher transport costs on the society through increasing travel time and vehicle operating costs. Absence of international standard motorways could impede the Polish integration with the international community, the EC in particular, and put an obstacle to international transit between the east and the west as well as between the north and the south. Improvement of border crossings, environmental protection, and traffic safety measures are also needed for the integration.

In addition, the Polish road network needs to be improved and developed to cope with the increasing international as well as domestic traffic demand. However, budget allocation to roads under the jurisdiction of GDDP has continuously been declining: road budget in 1992 is almost 25% of that of 1986, or 38% of that of 1990 although traffic demand in 1992 is estimated to be 125% of that of 1986 (Table 5.5.1). The situation of communal/local roads could be worse than that of national roads.

Table 5.5.1 GDDP Road Budget

| | 1986 | 1989 | 1990 | 1991 | 1992 |
|------------------|--------|-------|-------|-------|-------|
| Total Budget | 13,248 | 9,590 | 9,176 | 4,397 | 3,357 |
| (1986=100) | (100) | (72) | (69) | (33) | (25) |
| Maintenance | 11,953 | 7,903 | 7,948 | 3,684 | 3,011 |
| (1986=100) | (100) | (66) | (66) | (31) | (25) |
| Development | 1,295 | 1,687 | 1,228 | 713 | 346 |
| (1986)=100) | (100) | (130) | (95) | (55) | (27) |
| Transport Demand | 87.6 | 98.4 | 102.0 | 105.6 | 109.2 |
| (1986=100) | (100) | (112) | (116) | (121) | (125) |

Note: Unit for Budget - billion zloty in 1992 constant prices
 Unit for Demand - million vehicle km
 1992 - estimation

Source: GDDP

On the other hand, the total amount of national road maintenance and development required on a normal basis is estimated to be 9,278 - 14,144 billion zloty which is equal to 2.8 - 4.2 times as large as the allocated budget. In other words, road budget allocated to GDDP in 1992 covers only one-fourth or one-third of the necessary expenditures for national roads. As for budget allocation to the other classes of roads, there is no reliable data. But it is very likely that the budget allocation would have been reduced more drastically than that of the national roads.

5.5.2 Revenue from Road User Charges

Road users pay various kinds of taxes and charges in connection with vehicle ownership and vehicle operations. Major taxes and charges comprise: (a) fuel turnover tax; (b) vehicle registration tax; (c) vehicle import duties; and (d) border crossing fees. In the past, government revenue from the road user charges was reportedly far less than government expenditures on roads, the revenue per expenditure ratio being far less than 1. However, it is estimated that the ratio has significantly been raised due to the sharp cut of budget allocation to roads as well as the repeated revision of road user charges to rise.

The following numbers show the estimation for 1992:

| | billion zloty |
|--|---------------|
| (a) Budget allocated to all kinds of roads: | 8,206 |
| (b) Expenditures required on a normal basis: | 30,922 |
| (c) Revenue from Road User charges: | 31,835 |
| (d) Revenue/Expenditure Ratio: (c)/(a)*100 | 388% |
| (c)/(b)*100 | 103% |

Revenue from road user charges is estimated to far exceed the budget allocation to roads by almost 4 times in 1992. This implies that a large part of the road user charges is used as an important financial source for other purposes. In view of the great contribution of roads and road transport to the encouragement of the national economy as well as the Polish integration with the international community, more budget needs to be allocated to roads. The government's general tax bases should be strengthened and expenditures be rationalized, instead of heavily resorting to road user charges.

Under the circumstances, it is proposed to establish a special fund earmarked for roads with a view to achieving efficient allocation of resources based on user pay principle and to securing stable availability of funds to the roads and road transport sector. Scale of the road funds should gradually be increased by taking account of the general fiscal constraints of the country on one hand and investment requirements for the Polish integration with the EC on the other. The funds in the initial stage should be introduced with a view to catering for routine and periodic maintenance as well as small improvements, and then in the later stage the funds should be increased to include new investments.

5.5.3 Diversification of Financing System

Quality improvement of road networks, especially construction of motorways, is needed for the Polish integration with the international community as well as the stimulation of regional development. However, the quality improvement needs large capital investment which is extremely constrained by the government's fiscal conditions. Consequently, private capital (domestic and foreign) needs to be invited to road infrastructure development including motorways, bypasses and bridges, coupled with toll charges.

Due to the existence of various competing projects in the surrounding countries as well as the uncertainties for the future of Poland, it would not be easy to attract private foreign investors to road development in Poland in the form of "Build, Operate and Transfer (BOT)", "Build and Operate (BO)", "Build, Operate and Own (BOO)" and the like. The government, therefore, needs to take substantial part of project risks to relieve investors' burdens which would include change in design, delay in land acquisition, inflation, interest and foreign exchange risks, and resultant cost overrun of projects.

Level of tolls greatly influence financial viability of projects. However, upper limits of tolls exist because of users' willingness to pay and existence of the alternative routes along motorway corridors. If toll revenue is not sufficient to make projects feasible, additional revenue sources need to be sought including value capture along the motorways, for example, giving concession of developing various service facilities to the investor. In this case, the toll roads authority will play a key role in determining the terms and conditions of contracts and concessions.

5.6 Restructuring of Roads and Road Transport Administration

5.6.1 Road Administration

1) Policy for Restructuring of Road Administration

GDDP used to contain every kind of work forces in its organization including state enterprises in the centrally controlled system. In accordance with the economic restructuring program of the country, however, GDDP is required to restructure its enlarged organization with an aim to encouraging private sector participation as much as possible.

GDDP has been in a process of reorganization with a focus on privatizing the road state enterprises as well as separating some divisions from the headquarters to state enterprise status which include road and bridge construction, transport and equipment, material exploitation, and mining of road construction materials. Newly emerging state enterprises are expected to work as consultants, contractors and suppliers not only for GDDP but also for any customers who will need their services. The organizations of the headquarters, regional offices, district offices and site offices have also been under restructuring with an aim to streamlining redundancies.

The function of GDDP needs to be confined to the pure road administration and work forces necessary for coping with force majeure to the maximum possible extent by detaching those functions that can be performed more efficiently by the private sector. The focal points that GDDP needs to address are:

- (a) planning of the five year road development program based on the long term road plan;
- (b) planning of road maintenance programs with the increasing participation of the private sector;
- (c) establishment of motorway development schemes to encourage domestic and foreign private participation;
- (d) strengthening of international cooperation and adjustment to encourage the Polish internationalization;
- (e) establishment of road administration system with due demarcation of responsibilities and framework of cooperation between GDDP and local governments; and
- (f) development of road financing system based on road user charges.

The existing structure of GDDP which comprises the headquarters, regional offices, district offices and site offices needs to be reviewed from the above point of view. Special attention should be paid to the demarcation of responsibilities between regional and district offices as well as between district and site offices. The existing hierarchical

structure should be lowered and duplicated functions should be eliminated. New structure should be developed by taking account of: (a) further progress of private participation for road development and maintenance; (b) minimum requirements for force majeure works; and (c) efficient and effective provision of administrative and technical support to local governments.

Through the above structural reform, it is anticipated that each level of offices will have less unskilled work but increasing administrative work including planning, contracting, supervising, inspecting and advising. Consequently, human resource training will become more important for the successful structural reform.

Organization of the GDDP headquarter also needs refurbishment from the above point of view as well. More importance should be placed on planning and programming, contract and supervision, international coordination, and environment protection and traffic safety. Planning and programming functions which used to be very weak in the old regime need to be strengthened with a view to improving: (a) traffic demand forecast; (b) cost estimation; (c) project evaluation; and (d) prioritization of projects under budgetary constraints. Contract and supervision functions will become increasingly important as private participation progresses. The staff need to have good understanding of: (a) the whole scope of the contract works; (b) contribution of new technologies and materials to efficiency improvements; (c) market prices of labor, materials and equipment; (d) contracting procedures; and (e) effective supervisory methods and countermeasures when required.

For the development of motorway network in Poland, a Toll Roads Authority needs to be established as an independent body under the jurisdiction of GDDP. This is because management efficiency could be made higher by the authority than by a department of GDDP because of its clear identification of revenue and expenditures.

The Toll Roads Authority should have wider roles and functions for the future as proposed and supported by the EBRD. Functions of the toll roads authority should include: (a) planning of motorway development; (b) concession with private companies; (c) toll level setting; (d) supervision of construction and operation; and (e) financial planning for future expansion of the network.

2) Rules and Practices to be Improved

(1) Information System

GDDP has a large organization with a number of staff and works. Various kinds of data and information are required for carrying out respective duties from planning to engineering aspects. These data and information should be available to every section in accordance with its duties. However, due to the information system succeeded from the old regime, data and information have been fragmented to each section and inter-sectoral information flow are almost non-existent.

Data and information need to be centralized at least by departmental level and their reliability should be improved. This is particularly important as GDDP is going to be restructured as an administration oriented agency instead of an implementation agency. It is urgently needed to restore the important data and information from the former state enterprises to GDDP.

(2) Standards and Manuals

Polish pavement design standards are based on AASHTO 1972, and Polish traffic capacity standards were developed through an extensive R & D work principally based on "Highway Capacity Manual 1985" and "Transport Road Research Laboratory" methods.

GDDP will have increasing contract works in the future not only with domestic contractors but also with international contractors. The standards and manuals are indispensable for such contracts to secure uniformity. They should be updated and compiled into one booklet by specific topics for easy reference. For example, they include: (a) survey and planning manual; (b) project evaluation manual; (c) design standards; (d) material testing standards; (e) construction cost estimation manuals; (f) construction supervision manual; and (g) maintenance manual.

Most of the local governments (communes) are in lack of staff capable of administering every aspect of road related works which are entrusted to communal enterprises. Sometimes, they design two layers of asphalt pavement for daily traffic of 100-300 roads. The manuals prepared by the GDDP should be distributed to local governments to support their works.

(3) Project Programming

Project programming was not well prepared in the past including lenient cost estimation, absence of project evaluation, loose construction schedule, and insufficient evaluation of contractors. However, under the new economic system, this type of project implementation will not be allowed. Project programming should be carefully prepared with an emphasis on the issues which might be critical for implementation of projects. One of the most important issues will arise from the ongoing ownership change of land. It is anticipated that land acquisition will become more time consuming than ever, badly delaying the implementation schedule and requiring additional costs. Project programming should be prepared by the leadership of Regional Offices with due consideration to local characteristics.

(4) Contract Documents

GDDP needs to prepare a set of contract documents, possibly covering the works of surveying, planning, designing, construction, and maintenance work.

The general procedure of contracts comprises: (a) invitation to pre-qualification; (b) issue and submission of pre-qualification documents; (c) pre-qualification of tenderers; (d) opening and evaluation of tenders; and (e) award of tender and contract, according to FIDIC. Major documents required for the contract include: (a) Instructions to Tenderer; (b) Conditions of Contract; (c) Drawings; (d) Specification; and (e) Bill of Quantities

A set of contract documents should be prepared as soon as possible in the internationally accepted form.

(5) Project Evaluation

In the old regime, project evaluation was based on technical cost estimation with less attention to economic and financial aspects of the project. For effective use of limited resources, more focus needs to be given to economic and financial aspects. More staff of GDDP should be trained of methods of project evaluation. At the same time, data base for project evaluation needs to be developed including road network inventory, construction costs, maintenance and operation costs, trip generation and distribution, modal choice, vehicle operating costs, time value, and economic prices.

5.6.2 Road Transport Administration

1) Functions of Road Transport Department in MTME

The road transport department currently delegates limited functions:

- (a) Establishment of acts on: road traffic law, law on domestic and international transport, law on vehicle conditions and usage of public road, law on registration and classification of road vehicles, law on driving license, and law on dangerous goods transport
- (b) Administration and monitoring of domestic as well as international road transport
- (c) Supervision of local administration
- (d) Designation of vehicle type and spare parts as well as permission on vehicles and vehicle production
- (e) Cooperation and agreement with international organizations
- (f) Development of computer network of the department
- (g) Cooperation with agencies related with traffic safety and environmental protection

In order to cope with the changing economic system, the following functions need to be added:

- (a) Monitoring of road transport market
- (b) Cooperation with local governments
- (c) Qualification of road transport business including carriers, forwarders, warehouses/truck terminals
- (d) Administration of road safety/environmental protection (vehicle inspection /production/registration, and cooperation with relevant agencies)

2) Refurbishment of Road Transport Department

Road Transport Department of MTME is the sole agency responsible for the road transport sector. However, the department has only eight staff. Due to the shortage of staff, the expected functions are not necessarily performed successfully.

The functions of the department need to be reviewed from the ministerial point of view under the proposed modal and functional organization of MTME. The functions of the department can be classified into general functional and mode specific matters. As for mode specific matters, there will be a possibility to further demarcate to the department and local governments which are expected to deal mainly with registration matters. Based on such demarcation of functions, appropriate number of staff needs to be estimated.

Budgetary constraints are said to restrict the staff increase of MTME. However, the role of the road transport will become further important in the country, which requires more staff allocation to the road transport department. Staff relocation from GDDP to MTME should be an alternative to supplement the shortage of staff in MTME with relevant provision of training.

CHAPTER 6 WATER TRANSPORT PLAN

CHAPTER 6 WATER TRANSPORT PLAN

6.1 Major Issues

The water transport modes are, like other transport sectors in Poland, facing fundamental structural transformations catalyzed by the on-going socio-political changes within Poland and its neighbors. In addition, the maritime sector must cope with the need to replace an aging fleet and, to some degree, outdated port and terminal facilities. Key issues related to maritime transport can be summarized as follows:

- (1) Restructuring of the Polish maritime transport administration covering central and local governments, port authorities and the private sector toward a free market economy;
- (2) The role of Polish shipping services at Polish ports and its position vis-a-vis competition posed by foreign carriers and ports;
- (3) Development of a hierarchy of master plans which will guide the evolution of Polish ports into the next century;
- (4) Modernization of the fleet and upgrading of port facilities, to include infrastructure, operation and management;
- (5) Definition of aggressive marketing strategies, computerized management processes, competitive pricing policies as well as cargo and passenger services viewed in favorable terms by maritime patrons; and
- (6) Designation of innovative financial strategies, founded on modern book-keeping and accounting principles, which strive to forge fiduciary partnerships between the private sector and the public sector, international aid agencies and donor nations.

These issues, along with potential courses of action for ports and sea transport, are further explored in subsequent sections of this chapter.

6.2 Ports

6.2.1 Port Development Policy

1) Strategic Base

Poland is now experiencing drastic and fundamental changes in its overall economic and political structure. She is not only carrying out her own structural changes, but also facing historical transformations of the European socio-political structure, many of which directly impact Polish ports (Table 6.2.1).

Polish ports, having been under the strong direction of the central government, must react to these events in order to continue their contributing to the health of the Polish economy and welfare of its people. However, some of the legacies of the old regime and uncertainties associated with the current economic and political situation have made it difficult for the Polish ports to transpose themselves. Considering the importance of the ports to the national economy, especially in terms of foreign currency earnings, it is urgent to develop a port strategy that can take advantage of the new business environment.

Table 6.2.1 Anticipated Interaction of Socio-Political Events and Polish Ports Operation

| <u>Socio-Political Event</u> | <u>Likely Impacts on Ports</u> |
|--|---|
| <u>Domestic issues:</u> | |
| * Liberalization and decentralization → | * Selection of optimum transportation route * Increase in domestic and international competition |
| * Reshuffling of industrial center → | * Modification of transport network * Potential of port as industrial center |
| * Tight financial condition → | * Cost management * Investment priority |
| * Environmental protection → | * New constraints on development |
| <u>International issues:</u> | |
| * Collapse of Iron Curtain → | * Increase of East-West Activities |
| * Integration with European community (EC) → | * Increase of transport demand with EC countries * Adjustment to EC standards |
| * Liberalization of former CMEA countries → | * Selection of optimum transportation route * Increase of competition for cargoes |
| * Newly independent ex-Soviet republics → | * Increase of East-West Movement * Increase of intra-Baltic movement |
| * Reunification of Germany → | * Tougher competition |

2) Basic Role of the Ports

Taking into consideration the current economic and political situation, it seems useful to start with a review of very basic roles which ports should play in line with their fundamental characteristics. Analyzing these basic roles, they could be rearranged in a new order to derive a necessary and new institutional framework.

The most important function of a port is as a terminal where sea and land transportation meet. In other words, a port is a place where a chain of international transport meets a chain of domestic transport. Efficiency and safety in the transfer of cargoes and passengers are therefore vital. Ports are also used as storage and distribution centers. For efficient handling of cargoes and passengers, proper facilities and efficient workers are necessities, as is the timely exchange of information.

A port also functions as the core of the regional economy. Ports attract people, cargoes and information. The very existence of a port leads to the creation of peripheral business opportunities such as shipping companies and agents. Ports accommodate shipbuilding industries as well. Ports, by their nature, have good transport access. Therefore, ports are recognized as regional centers and treated, in many aspects, like small urban agglomeration.

3) Concepts for Port Strategy

Three key concepts emerge from the factors described above. These are:

- (1) Competition;
- (2) New hinterlands; and
- (3) Port as industrial and/or distribution center.

Ports inevitably expose themselves to international and domestic competition which dictates that cargoes will follow an optimum route of shipment. Optimum sometimes refers to cost, sometimes to time and sometimes to security. So, ports should provide an attractive service to customers as much as possible, based upon a detailed analysis of the demand of cargoes; service should also be as flexible as possible. At the same time, ports should positively promote their services, with broad marketing schemes.

New hinterlands will emerge mainly as a result of the political and economic liberalizations in ex-Soviet republics. It is very difficult, at the moment, to foresee what will happen in these countries, but it seems certain that the clock will never go backward, and that cargo and passenger movement will significantly increase. Poland, which borders these countries, has a distinct advantage in terms of capturing this new international trading opportunity.

The historic role of Polish industrial sectors will, within the new economy, require re-assessment; ports will attract more and more attention for their potential as a new industrial and/or distribution center. Keeping pace with the decrease of coal export (even a certain amount of coal imports are foreseen in the future) and the increase of oil transport by sea, ports would significantly increase their importance as new industrial centers. And also, ports could potentially become distribution centers for their hinterland.

4) Strategic Goals for the Development of Polish Ports

The strategic goals for the development of Polish ports could, within a domestic and international frameworks, be postulated as follows:

- (1) to support the national economy by providing a rational transport means for international cargo/passenger movements;
- (2) to serve foreign economies by way of providing rational transport means for transit cargo/passenger movements;
- (3) to make themselves available as new industrial and/or distribution centers; and
- (4) to support the national economy.

Polish ports have historically served as major international gateways to/from Western countries. About one fourth of total imports and two fifths of exports were handled by sea ports in 1990. After the transformation to a market economy is complete, a fundamental change in the international trade structure is expected including the volume of cargoes and their distribution patterns. Likewise, the transport structure would change.

For bulky cargoes, ports could keep their dominant position. This is because bulky cargo would choose the cheapest transportation route. At the moment, it is predicted that coal exports will decrease (Poland might even import coal in the future) and that oil imports will increase. Major bulky cargoes are handled at modern specialized terminals such as the North Port of Gdansk and the port of Swinoujscie. The planning of a terminal for bulk cargo could proceed in a similar way as before because importers/exporters could be specified and ports could utilize these shipper's demand forecasts. The major issues for planning the development of a bulk cargo terminal would be the feasibility of the project and the allocation of costs, profits and risks.

In addition, ports could enter the severe international and domestic competition for general cargo, particularly containers. POL container liner services currently do not call at Polish ports, which tend to act as feeder facilities for Hamburg (Far East service) and Bremerhafen (U.S. East Coast and Gulf of Mexico services). POL provides weekly shuttle service between Hamburg/Bremerhafen and Gdynia. Road carriers, Polish and foreign, have already intensified their services to/from the port of Hamburg, and PKP has started weekly container train services between the Port of Hamburg and Poland. Once PKP starts its service, three transport modes compete with each other for containers; unfortunately, ports emerge in an unfavorable position. In terms of time, "port plus shipping" would relegate ports to third place for service to the central and southern parts of Poland. The frequency of service is poor. More than that, even in terms of cost, some foreign forwarders operating in Poland claim that Polish ports are out of the question (a cost comparison made by a Polish forwarder, however, shows a clear advantage for the "port plus inland transport" route.)

As European deregulation policies advance, more and more foreign carriers could enter the Polish market (in return, Polish carriers could enter the EC market) and likely offer direct connections between hub ports such as Hamburg and Bremerhafen (even Rotterdam) with Poland. It is also true that in the world container transportation industry, shipping companies tend to consolidate ports of call. This tendency, combined may face with points specified in prior paragraphs, could imply that Polish ports would have extreme difficulties.

However, it should be specifically stressed that container transport is an essential factor of modern cargo flow and it has a vital effect on future port development. Once containers shift from Polish ports to other ports and business routes close, it would be extremely difficult to reopen the routes again. From this point of view, Polish ports should, by whatever means possible, maintain their container transport until such a time when the handling volume of containers is large enough to open direct container liner services. To this end, Polish ports, in close cooperation with the shipping company (POL) and local forwarders, should make every effort as soon as possible to attract more customers by introducing a better level of service and by strengthening marketing activities. Measures needed include the improvement of port efficiency, the strengthening of connection with the inland transport network and the introduction of a cargo tracking system.

The national government as well as the Polish people should be well aware of the importance of maintaining the container port in their own country. The government should give serious thought to taking measures which foster container handling at Polish ports. The measures should be comprehensive, ranging from the development of infrastructure (mainly in the North-South corridor) to modern information networks, all designed to assist both domestic and foreign shipping companies.

5) Polish Ports in the International Arena

Polish ports have historically played an important role in Baltic Sea shipping. They provide year-around service while other Baltic ports have severe icing problems during the winter. With the participation of the three newcomers, Lithuania, Latvia and Estonia, there are eight Pan-Baltic countries. Liberated from economic and political binds, the Pan-Baltic countries have begun to strengthen their ties particularly in the economic field as witnessed by the formation of the Baltic League in October 1991.

It is difficult to predict with certainty how the League and Minister's meeting will affect the member countries, including Poland; however, it is most probable that through these organizational ties, supplemented by on-going contacts, business and private, the countries will share a close association, economically and politically. It is easily foreseeable that the movements of cargo and passengers will gradually increase. The ferry service network should consequently be intensified and the container feeder network should be optimized. It should, at the same time, be borne in mind that currently there is no active, high-order commercial port along the Baltic coast between Gdansk and St. Petersburg.

New and huge markets are also emerging to the East of Poland. Byelorussia is a land-locked country and the eastern part of the Ukraine is isolated from its own port. For these countries, the ports of Gdansk and Gdynia offer the shortest access to the sea. At the moment, it is very difficult to foresee the future economic and political structures of these countries, but at least one thing is certain: they will not be able to achieve self-sufficiency in the production of consumer goods. This obliges these countries to import various consumer goods.

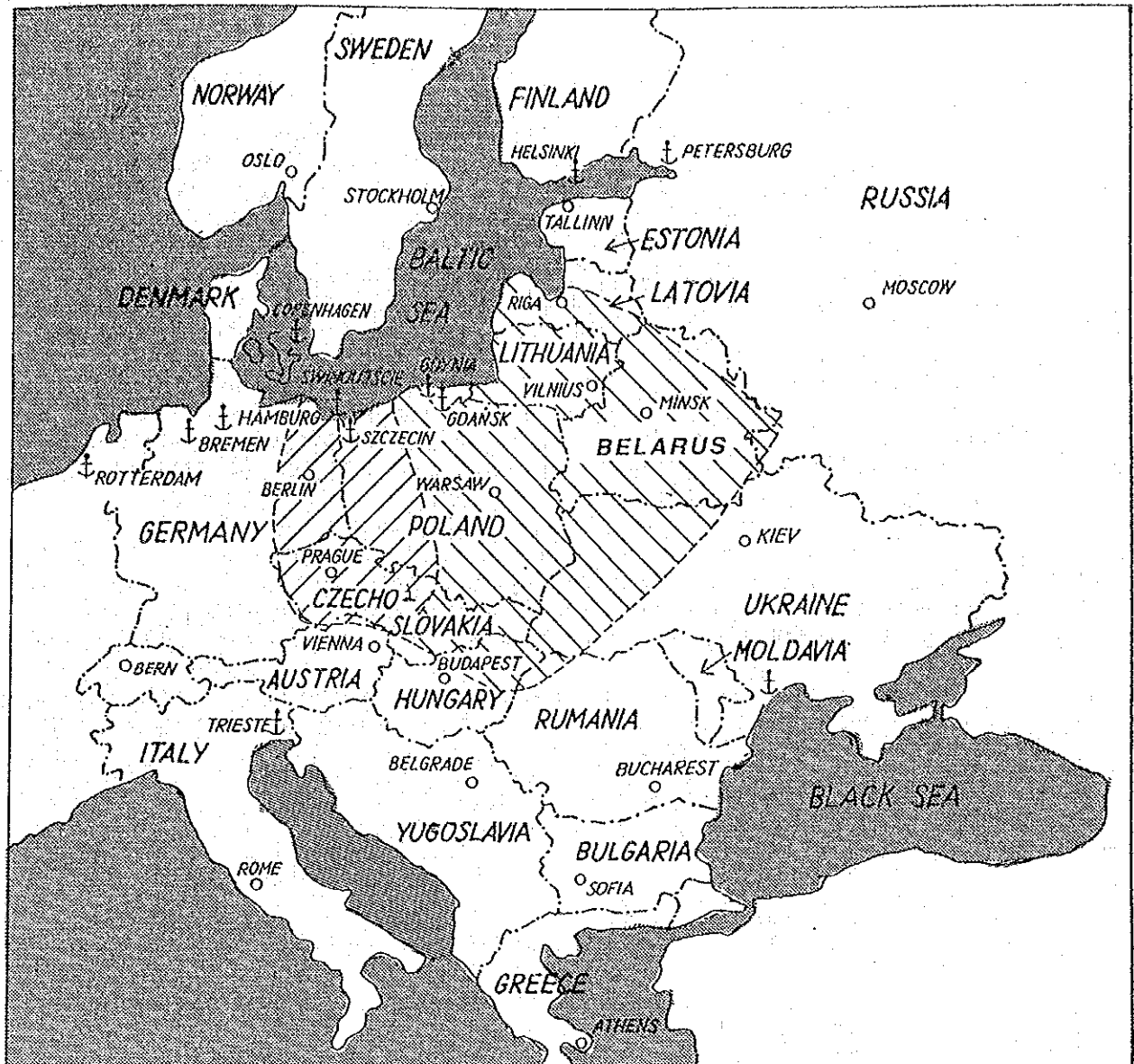
Every port is making efforts to expand its hinterland. Under the old regime, Poland did not need to worry about cargoes because they were allocated by the central government. Even the word "hinterland" did not exist in the same sense as in the Western countries. Now, under the market economy, ports must initiate previously unknown activities such as marketing and port promotion. Fig. 6.2.1 depicts the potential hinterland for Polish ports. This is derived by defining potential service borders which are at equivalent distance from Polish ports, Hamburg, Odessa and St. Petersburg. While the actual hinterland will ultimately depend on the transport network, business traditions as

well as geographical proximity, initial analyses and programs might begin with this early assumption. In other words, the hinterland of the ports of Szczecin and Swinoujscie could include the Western part of Poland, Eastern part of Germany and Western Czechoslovakia, while the ports of Gdansk and Gdynia could cover the Central and Eastern part of Poland as well as Eastern Czechoslovakia, North-East Hungary, Western Ukraine, Byelorussia, Lithuania and Southern Latvia.

6) Ports, in the Context of the Regional Development

As a consequence of the economic transformation, Polish industrial centers would be reshuffled. Roughly speaking, the volume of coal production will drop in the future mainly because of the high cost of production. Furthermore, Poland might import a certain amount of coal. This may result in the shift of industrial centers from the South where coal production is one of the major advantages for the industry. The coastal region adjacent to a port could, in this case, emerge as a potential alternative regional center because it provides easy access for ships importing energy resources and raw materials, and also for shipping export products. Alternatively, ports could pursue and expand their role as distribution centers. The ports of Gdansk and Gdynia, with their dynamic activities, could service their hinterland (Fig. 6.2.1) and thus evolve as distribution centers in their own right.

The inter-governmental cooperation on the development of the Oder River will be highlighted in the near future. A Polish-German Commission for Regional and Border cooperation has already begun talks. Recently, another proposal was presented by the prime Minister of Brandenburg State, Germany, to establish a special economic zone in the Oder River area. Through these initiatives, the international roles of the ports of Szczecin and Swinoujscie as well as the Oder River will be clearly enhanced. The ports of Szczecin and Swinoujscie have the potential to become distribution centers for their hinterland including the Eastern part of Germany.



Legend

- Major City
- ⚓ Major Container Port
- ▨ Potential Hinterland for the Ports of Gdansk and Gdynia
- ▩ Potential Hinterland for the Ports of Szczecin and Swinoujscie

Fig. 6.2.1 Potential Hinterland for Polish Ports

6.2.2 Management Strategies

1) Port Management

As already described, various activities take place in a port. Following the liberalization and deregulation of the Polish economy, new business activities have already begun to be observed inside the port area. One of these new activities occurred as a result of the separation of operational functions from port enterprise. New stevedoring, towing and repairing companies have been established. For instance, in the port of Szczecin, 17 new companies have opened business (eight stevedoring, one towing and eight ship repair companies).

In Poland, since port business is regarded as one of the most profitable businesses (in fact, it has been run quite profitably), more and more newcomers are expected. In the port of Gdynia, the Navy began handling liquid fluid for commercial purposes, the shipping yard is dealing with containers and a fishing company is running a wine business.

The chemical factory at Polic has started handling building materials destined for Berlin, utilizing its excess quay capacity. It is hard to say what comes to the quays at Polic, but it should be kept in mind that there are three ports along the lower Oder River over a distance of 60km. The new Port Act should take this issue into consideration.

For the efficient operation of a port, and also for the coordination and harmonization of various port activities, the managerial roles of port authority are very important. These are:

- (a) Coordination of various port related activities;
- (b) Mediation of conflicts which could occur between port activities;
- (c) Supervision of various activities taking place inside port; and
- (d) Promotion of the port.

2) Port Efficiency

There is a scope for the improvement of port efficiency. Recently, every operational function has been separated from the port authority (port enterprise), and already segregated companies have begun to be cost conscious in their own activities. It is recommended that measures be taken, including adopting the new Port Act, to promote this tendency.

To be competitive, Polish ports should concentrate on increasing their efficiency. Currently, the segregated companies are doing their business on a quay basis to which the port authority allocates cargoes. Competition might not work well based on this scheme. So the introduction of a new frame to foster competition in the port is recommended. One possible method is to introduce evaluation system for each company. Items to be evaluated could include handling efficiency for unit volume of cargo as well as total volume of cargo handled by the company. Close checking of these data will provide the port authority with an objective basis on which to evaluate each company. The results of the evaluation could be utilized for future contract terms between the port authority and companies. Efficiency improvement through enhancement of internal competition will contribute to the improvement of competitiveness with other competing ports including such foreign ports as the port of Rostock.

Competition between the port complexes should be accelerated. Although a basic hinterland has been envisaged, each port should compete for more cargo, especially around the border of the hinterlands. The competition could stimulate each port to improve their efficiency.

3) Port Promotion and Marketing

It is important for the Polish ports to promote port public relations with port authorities all over the world as well as shipping lines in view of obtaining wide patronage to their port services. These public relations to the potential users of the container terminals will stimulate future container traffic to the Polish ports. Eventually, this would help Polish ports establish a key position in the Baltic maritime community.

Examples of the port sales activities include: (a) distributing attractive leaflet introducing the port and its services; (b) dispatching port sales delegations to potential counterparts; (c) exchanging port personnel with counterparts; and (d) establishing sister city relations for strengthening mutual understanding.

At the same time, it is important to establish a close relationship and good communication with shipping lines and their local shipping agents. Possible measures for this purpose would be to invite their staff to the port for further delivery of port information.

The employment of market research firms is also deemed as one of the first steps. Information on the supply side as well as demand side (cargoes or passengers by type, volume, and mode and origin -destination) should be gathered and analyzed. Employing professionals for this task is recommended.

4) Accounting System

Detailed information on the accounting system employed by Polish ports was not available. From the summaries printed in the "Statistical Year Book of Polish Ports", compiled by the Maritime Institute, it appears that Polish ports have, so far, no outstanding loans nor does tax appear as a cost item in the profit/loss statement. This very much differs from the approach commonly used in other countries.

Polish ports, after complete transition to a market economy, will need some loans for investment. At the same time, they might invest in some businesses to acquire a financial return on investment. A tax system, also, must be integrated after the introduction of the new national tax system which is currently waiting for implementation.

Cost management will be more and more important for Polish ports. An investment plan could be established based on financial strategy. This requires, above all, clear and sound accounting as well as book-keeping systems.

5) Tariff

Tariff should be set at a level taking the international and domestic competition point of view into account. At the same time, ports should reserve a portion of their capital resources for re-investment and further development/improvement of port facilities. Currently, Polish ports set tariff levels at 90% of those imposed by the Port of Hamburg. Polish ports could use this lower level of tariff as a tool for promotional activities. However, there does not appear to be any documentation as to the reason

why the 90% level was selected. This might need to be reviewed in the light of current and anticipated national economic scenarios, as well as actual port fiscal performance.

Cargoes now tend to be stored at ports for excessive periods which consequently requires large areas for cargo storage. One of the main reasons for the long storage period is the low level of storage charges. One possible solution would be to raise the storage charges. However, prior to revising the tariff, it would be prudent to study tariffs at competing ports as well as to survey client attitudes and preferences.

6) Computerization

Computerization at Polish ports is still in a very early stage. The only exception is the port of Gdynia. The container terminal at the port of Gdynia is equipped with its own computer system for terminal operations. Various entities are involved in port activities. After port commercialization, the number of port-related entities will increase, thereby catalyzing a drastic growth in the required quantity and quality of information. The port, as a whole, must strive for a higher rate of efficiency in order to be competitive. Activities carried out by the port authority, quarantine, customs, forwarders and cargo handling companies should be integrated into one overall information system which rationalizes the flow of information.

Taking into consideration the current transitional condition of the Polish port system, it is recommended, as the first stage of computerization, that repetitive managerial functions, such as bookkeeping and accounting, be immediately computerized. Subsequently, as the capabilities of in-house staff improves, and hardware/software facilities expand, computerization of broader aspects of port authority tasks should be initiated.

6.2.3 Infrastructure Development

1) Diagnosis of Current Situation and Future Prospects

Generally speaking, port infrastructures, facilities and equipment in Poland are considerably well developed. Currently, no substantive shortage of cargo handling capacity is observed, with the exception of ferry terminals. However, inland connections are poor, especially connections with the road network. Polish ports should, in the long-term, adjust themselves to the demand which arises from their hinterlands. Moreover, they should attract more and more customers through providing better services and thus expand their respective hinterlands.

It should be pointed out that the predictions of future demand for ports, at the moment, include considerable uncertainties. Because of the constrained financial condition, chaotic environment surrounding Polish ports and institutional backwardness, any project which requires new investment should be carefully scrutinized. Feasibility of such projects should be calculated. Priority should be directed to projects which aim to solve current bottlenecks or which satisfy future expanded demand.

2) Bottlenecks Currently Observed

(1) Access to Road Network

Since roads are a major transport means for containers and unit cargoes, the development of road access from container terminal at the port of Gdynia has a vital effect on the evolution of a container transport network in Poland. Trucks have already begun to prevail in the shares of transport of containers and unit cargoes from the port of Gdynia, although the road network remains incomplete.

At the ports of Gdansk and Szczecin, where a small number of containers and unit cargoes are handled, constraints of road access are observed as well.

First of all, the construction work of the half completed (and half abandoned) bridge at the port of Gdynia should be resumed. With the completion of the bridge, the container terminal has good access to the national road network and would be able to serve national demand more efficiently.

For the ports of Gdansk and Szczecin, the situations are worse. Not only is the access to the road system lacking, but the road systems in the cities of Gdansk and Szczecin are in poor condition. Especially in the city of Gdansk, the arterial road goes directly through the city center. Access roads to the ports should therefore be planned as a key component of the overall city road networks.

(2) Ferry Terminal

The ferry terminals at the ports of Gdansk and Swinoujscie are owned by the Polish Baltic Shipping Company (PBSC). The ferry terminal at the port of Gdynia belongs to the port authority. Since the simplification of German border formalities, the number of passengers and cars have dramatically increased. While a further increase in the movement of passengers and cargoes is expected in the Pan-Baltic Sea area, Polish ports should keep pace with the trend.

Currently, PBSC is facing financial problems in constructing a new ferry terminal at the port of Swinoujscie. The early opening of the new terminal is vital for the further growth of exchange between Poland and Scandinavian countries as well as the Baltic countries. The early opening is also essential for increasing transit passengers and cargoes.

PBSC has been monopolizing the Polish ferry service, however, it would be worth considering the introduction of external financial support. PBSC could, with the introduction of co-financing, share the risk and financial burden, and moreover could attract more transport by offering better service.

The ferry terminal at the port of Gdynia would have a large potential in terms of attracting car traffic after the completion of the construction work on the access road to Route 6.

3) Container Terminal

(1) Number of Containers Handled at the Ports

Currently, the number of containers handled at Polish ports is extremely low. However, assuming that the number of containers correlates with national economic power (GDP), an estimate of potential demand is possible (Fig. 6.2.2). The vertical axis indicates the number of containers per 1,000 people and the horizontal axis indicates the GDP per capita. From the figure, although points are considerably scattered, three trends emerge. The first trend consists of DK, GB, E, GR and P. The second one tends to crowd in a small area and the third group consists of N, F, I and YU. There are two scaled-out points, namely NL and B. These countries have big ports relative to population (Ports of Rotterdam and Antwerp), and both ports are located at the mouth of the Rhine, which is extremely beneficial for the ports as they gather transit cargoes from land-locked upstream countries.

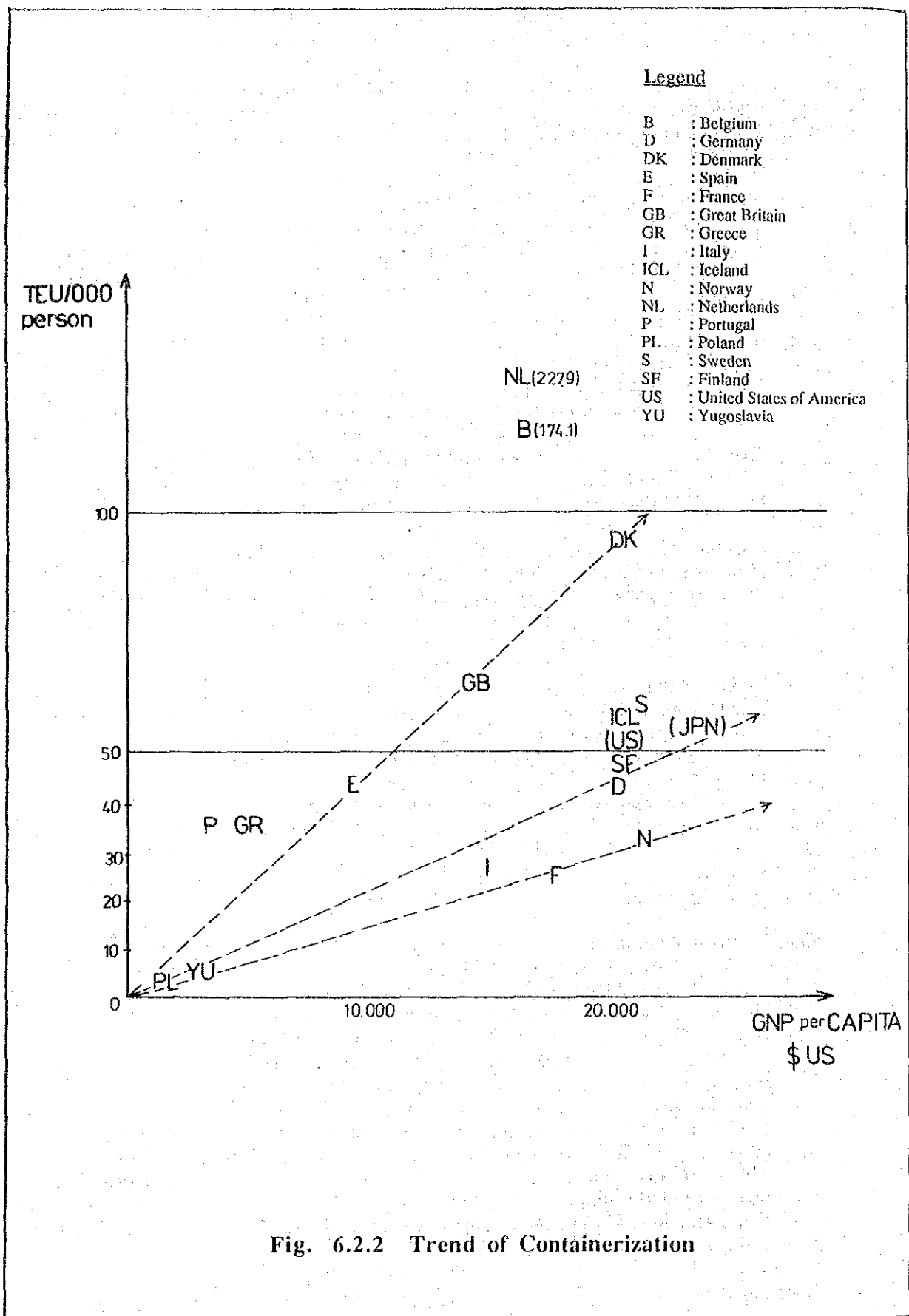


Fig. 6.2.2 Trend of Containerization