Table 2.2.7 - Forecast Profit and Loss Statement (PLN 000's)

Optimistic scenario

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 Cargo transport income	4,362,103	4,437,479	4,512,847	4,590,065	4,668,502	4,709,545	4,751,078	4,792,086	4,833,968	4,876,446
2 Passenger transport income	1,129,248	1,201,548	1,279,853	1,362,241	1,450,116	1,484,791	1,521,136	1,558,015	1,596,067	1,635,050
3 Other income	491,000	524,000	558,000	595,000	929,000	965,000	1,002,000	1,040,000	1,083,000	1,128,000
4 TOTAL	5,982,351	6,163,027	6,350,700	6,547,306	7,047,618	7,159,336	7,274,214	7,390,101	7,513,035	7,639,496
5 Subsidies	577,000	577,000	577,000	577,000	577,000	577,000	577,000	577,000	577,000	577,000
6 Total operational incomes (4+5)	6,559,351	6,740,027	6,927,700	7,124,306	7,624,618	7,736,336	7,851,214	7,967,101	8,090,035	8,216,496
7 Salary costs	1,982,905	1,996,305	2,009,996	2,023,780	2,037,658	2,018,900	2,000,312	1,981,893	1,963,645	1,945,566
8 Fuel and energy costs	829,143	836,826	843,171	850,063	857,088	863,648	869,786	879,393	886,433	893,260
9 Material costs	537,744	542,726	546,841	551,311	555,867	560,122	564,103	570,332	574,899	579,327
10 Maintenance costs	837,435	845,194	851,603	858,563	865,659	872,285	878,484	888,186	895,297	902,193
11 Other operational costs	1,095,813	1,103,218	1,110,784	1,118,401	1,126,071	1,115,705	1,105,432	1,095,254	1,085,169	1,075,178
12 Non transportation costs	350,714	374,286	398,571	425,000	663,571	689,286	715,714	742,857	773,571	805,714
13 Total operational costs	5,633,754	5,698,555	5,760,966	5,827,118	6,105,914	6,119,946	6,133,831	6,157,915	6,179,014	6,201,238
14 Extraordinary profits and losses	0	0	0	0	0	0	0	0	0	0
15 Operational income excl. depn.	925,597	1,041,472	1,166,734	1,297,188	1,518,704	1,616,390	1,717,383	1,809,186	1,911,021	2,015,258
16 Depreciation	847,079	833,857	1,704,046	1,684,371	1,669,124	1,659,776	1,654,921	1,650,964	1,647,940	1,644,537
17 Operational costs incl. depn.	6,480,833	6,532,412	7,465,012	7,511,489	7,775,038	7,779,722	7,788,752	7,808,879	7,826,954	7,845,775
18 Net income	78,518	207,615	-537,312	-387,183	-150,420	-43,386	62,462	158,222	263,081	370,721
19 Financial costs	79,451	113,524	136,748	153,767	153,183	143,300	135,511	127,722	119,933	112,143
20 Profit / loss	-933	94,091	-674,060	-540,950	-303,603	-186,686	-73,049	30,500	143,148	258,578
21 Depreciation not incl. above	46,056	57,090	101,659	124,074	142,271	157,960	173,592	189,169	204,690	220,212
22 Profit / Loss incl.21	-46,989	37,001	-775,719	-665,024	-445,874	-344,646	-246,641	-158,669	-61,542	38,366

Table 2.2.8 - Forecast Cash-flow Statement (PLN 000's)

Optimistic scenario

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 Operational income excl. depn.	925,597	1,041,472	1,166,731	1,297,188	1,518,702	1,616,390	1,717,382	1,809,186	1,911,021	2,015,251
2 Income tax	0	37,636	0	0	0	0	0	12,200	57,259	103,428
3 Profit bonus	0	7,998	0	0	0	0	0	2,593	12,168	21,978
4 Total outflow (2+3)	0	45,634	0	0	0	0	0	14,793	69,427	125,406
5 Net operating income	925,597	995,838	1,166,731	1,297,188	1,518,702	1,616,390	1,717,382	1,794,393	1,841,594	1,889,845
6 Reduction in credits	0	0	0	0	0	0	0	0	0	0
7 Financial costs	79,451	113,524	136,748	153,767	153,183	143,300	135,511	127,722	119,933	112,143
8 Capital payments	68,349	87,215	87,215	156,819	152,686	110,797	106,200	106,200	106,200	172,490
9 Total outflow (6+7+8)	147,800	200,739	223,963	310,586	305,869	254,097	241,711	233,922	226,133	284,633
10 Reduction of capital	-214,967	10,606	-153,423	-192	-94,592	-49,152	-10,135	1,943	-8,177	-19,194
11 Loans re-paid to PKP	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546
12 Net capital available	999,310	791,039	1,102,737	993,340	1,313,971	1,417,991	1,492,352	1,565,074	1,630,184	1,630,952
13 Total investment	2,350,286	1,823,193	1,937,921	1,711,899	1,684,722	1,786,033	1,863,115	1,933,224	1,998,319	1,999,072
14 Cash shortfall	-1,350,976	-1,032,154	-835,184	-718,559	-370,751	-368,042	-370,763	-368,150	-368,135	-368,120
15 External financing - repayable	561,796	459,232	265,200	232,000	0	0	0	0	0	0
16 External financing - subsidies	362,000	362,000	362,000	362,000	362,000	362,000	362,000	362,000	362,000	362,000
17 External financing - grants	139,600	211,400	209,100	125,700	9,900	7,200	7,200	4,600	4,600	4,600
18 Total external financing	1,063,396	1,032,632	836,300	719,700	371,900	369,200	369,200	366,600	366,600	366,600
19 Cash surplus / deficit	-287,580	478	1,116	1,141	1,149	1,158	-1,563	-1,550	-1,535	-1,520
20 Cash at the start of the year	452,345	164,765	165,243	166,359	167,500	168,649	169,807	168,244	166,694	165,159
21 Cash at the end of the year	164,765	165,243	166,359	167,500	168,649	169,807	168,244	166,694	165,159	163,639

Table 2.2.9 - Forecast Balance sheet (PLN 000's)

Optimistic version

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 Cash	164,764	165,242	166,359	167,500	168,648	169,805	168,242	166,693	165,158	163,637
2 Debtors	1,130,175	1,128,227	1,041,955	1,022,807	966,144	932,802	945,711	958,699	972,652	954,131
3 Inventory	420,249	403,091	406,274	398,949	402,383	405,533	397,442	401,881	393,920	397,023
4 Total current assets	1,715,188	1,696,560	1,614,588	1,589,256	1,537,175	1,508,140	1,511,395	1,527,273	1,531,730	1,514,791
5 Advance payments	72,007	65,461	58,915	52,369	45,823	39,277	32,731	26,185	19,639	13,093
6 Gross fixed assets	44,215,507	44,108,966	44,310,635	44,375,339	44,445,029	44,594,792	44,849,332	45,123,767	45,418,954	45,705,178
7 Net fixed assets	22,484,820	23,680,613	23,755,465	23,771,930	23,658,846	23,576,487	23,572,548	23,630,585	23,743,725	23,877,672
8 Construction in progress	1,175,143	911,597	968,960	855,950	842,361	893,017	931,557	966,612	999,160	999,536
9 Other fixed assets	78,254	78,254	78,254	78,254	78,254	78,254	78,254	78,254	78,254	78,254
10 Total fixed assets	23,810,224	24,735,925	24,861,594	24,758,503	24,625,284	24,587,035	24,615,090	24,701,636	24,840,778	24,968,555
11 Total assets	25,525,412	26,432,485	26,476,182	26,347,759	26,162,459	26,095,175	26,126,485	26,228,909	26,372,508	26,483,346
12 Creditors	1,224,949	1,195,237	1,265,571	1,239,290	1,280,653	1,299,613	1,314,567	1,330,050	1,344,219	1,347,996
13 Short term credit	0	0	0	0	0	0	0	0	0	0
14 Current liabilities	1,224,949	1,195,237	1,265,571	1,239,290	1,280,653	1,299,613	1,314,567	1,330,050	1,344,219	1,347,996
15 Long term credit	1,282,687	1,654,705	1,832,690	1,907,871	1,755,185	1,644,387	1,538,187	1,431,987	1,325,787	1,153,297
16 Financial result (not divided pro	-46,989	-8,634	-775,719	-665,024	-445,874	-344,646	-246,641	-173,461	-130,969	-87,048
17 Own Capiital	22,907,644	23,434,055	23,996,521	23,708,500	23,415,377	23,338,700	23,363,253	23,483,211	23,676,350	23,911,981
18 Revaluation reserve	0	0	0	0	0	0	0	0	0	0
19 Total Capital	22,860,655	23,425,421	23,220,802	23,043,476	22,969,503	22,994,054	23,116,612	23,309,750	23,545,381	23,824,933
20 Reserves and other liabilities	157,121	157,121	157,121	157,121	157,121	157,121	157,121	157,121	157,121	157,121
21 Total liabilities	25,525,412	26,432,484	26,476,184	26,347,758	26,162,462	26,095,175	26,126,487	26,228,908	26,372,508	26,483,347

Table 2.2.10 - Forecast Indicators required by EBOR (PLN 000's)

Optimistic version

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 Transport income	5,491,351	5,639,027	5,792,700	5,952,306	6,118,618	6,194,336	6,272,214	6,350,101	6,430,035	6,511,496
2 Other income	491,000	524,000	558,000	595,000	929,000	965,000	1,002,000	1,040,000	1,083,000	1,128,000
3 Subsidies	577,000	577,000	577,000	577,000	577,000	577,000	577,000	577,000	577,000	577,000
4 Total income	6,559,351	6,740,027	6,927,700	7,124,306	7,624,618	7,736,336	7,851,214	7,967,101	8,090,035	8,216,496
5 Transportation costs	5,283,040	5,324,269	5,362,395	5,402,118	5,442,343	5,430,660	5,418,117	5,415,058	5,405,443	5,395,524
6 Non-transportation costs	350,714	374,286	398,571	425,000	663,571	689,286	715,714	742,857	773,571	805,714
7 Other payments (Tax and Bonus)	0	45,634	0	0	0	0	0	14,793	69,427	125,406
8 Costs excl. interest and depn.	5,633,754	5,744,189	5,760,966	5,827,118	6,105,914	6,119,946	6,133,831	6,172,708	6,248,441	6,326,644
9 Net income	925,597	995,838	1,166,734	1,297,188	1,518,704	1,616,390	1,717,383	1,794,393	1,841,594	1,889,852
10 Capital payments	68,349	87,215	87,215	156,819	152,686	110,797	106,200	106,200	106,200	172,490
11 Interests and other payments	79,451	113,524	136,748	153,767	153,183	143,300	135,511	127,722	119,933	112,143
12 Total 11+10	147,800	200,739	223,963	310,586	305,869	254,097	241,711	233,922	226,133	284,633
13 Subsidies and grants	501,600	573,400	571,100	487,700	371,900	369,200	369,200	366,600	366,600	366,600
14 Change in capital	-214,967	10,606	-153,423	-192	-94,592	-49,152	-10,135	1,943	-8,177	-19,194
15 Loans re-paid to PKP	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546
16 Funds from internal sources	1,500,910	1,364,439	1,673,837	1,481,040	1,685,871	1,787,191	1,861,552	1,931,674	1,996,784	1,997,552
17 Total investments	2,350,286	1,823,193	1,937,921	1,711,899	1,684,722	1,786,033	1,863,115	1,933,224	1,998,319	1,999,072
18 Credits taken	561,796	459,232	265,200	232,000	0	0	0	0	0	0
19 Own capital spending (17-18)	1,500,910	1,364,439	1,673,837	1,481,040	1,685,871	1,787,191	1,861,552	1,931,674	1,996,784	1,997,552
20 Coverage ratio	6.26	4.96	5.21	4.18	4.97	6.36	7.11	7.67	8.14	6.64
21 Cash generation ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table 2.2.11 - Forecast Profit and Loss Statement (PLN 000's)

Pessimistic scenario

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 Cargo transport income	4,242,332	4,196,833	4,152,195	4,107,027	4,063,074	4,014,083	3,965,388	3,916,836	3,870,439	3,823,439
2 Passenger transport income	1,075,741	1,091,695	1,106,679	1,123,445	1,139,168	1,108,264	1,078,399	1,048,061	1,019,501	992,346
3 Other income	474,000	485,000	496,000	509,000	813,000	808,000	802,000	797,000	792,000	787,000
4 TOTAL	5,792,073	5,773,528	5,754,874	5,739,472	6,015,242	5,930,347	5,845,787	5,761,897	5,681,940	5,602,785
5 Subsidies	577,000	577,000	577,000	577,000	577,000	571,000	564,000	558,000	552,000	546,000
6 Total operational incomes (4+5)	6,369,073	6,350,528	6,331,874	6,316,472	6,592,242	6,501,347	6,409,787	6,319,897	6,233,940	6,148,785
7 Salary costs	1,958,541	1,951,394	1,942,363	1,933,564	1,924,803	1,895,685	1,867,006	1,838,764	1,810,942	1,783,550
8 Fuel and energy costs	805,510	786,829	770,344	753,760	737,063	722,606	709,230	695,727	684,940	671,244
9 Material costs	522,416	510,300	499,609	488,853	478,025	468,648	459,973	451,216	444,220	435,338
10 Maintenance costs	813,565	794,697	778,047	761,297	744,434	729,832	716,322	702,684	691,790	677,957
11 Other operational costs	1,082,349	1,078,399	1,073,408	1,068,546	1,063,704	1,047,613	1,031,763	1,016,156	1,000,781	985,643
12 Non transportation costs	338,571	346,429	354,286	363,571	580,714	577,143	572,857	569,286	565,714	562,143
13 Total operational costs	5,520,952	5,468,048	5,418,057	5,369,591	5,528,743	5,441,527	5,357,151	5,273,833	5,198,387	5,115,875
14 Extraordinary profits and losses	0	0	0	0	0	0	0	0	0	0
15 Operational income excl. depn.	848,121	882,480	913,817	946,881	1,063,499	1,059,820	1,052,636	1,046,064	1,035,553	1,032,910
16 Depreciation	601,701	857,730	1,742,027	1,715,687	1,697,019	1,684,522	1,671,841	1,660,224	1,649,520	1,638,022
17 Operational costs incl. depn.	6,122,653	6,325,778	7,160,084	7,085,278	7,225,762	7,126,049	7,028,992	6,934,057	6,847,907	6,753,897
18 Net income	246,420	24,750	-828,210	-768,806	-633,520	-624,702	-619,205	-614,160	-613,967	-605,112
19 Financial costs	79,451	113,524	136,748	153,767	153,183	143,300	135,511	127,722	119,933	112,143
20 Profit / loss	166,969	-88,774	-964,958	-922,573	-786,703	-768,002	-754,716	-741,882	-733,900	-717,255
21 Depreciation not incl. above	46,056	57,090	101,659	124,074	142,271	157,876	173,253	188,407	203,357	218,159
22 Profit / Loss incl.21	120,913	-145,864	-1,066,617	-1,046,647	-928,974	-925,878	-927,969	-930,289	-937,257	-935,414

Table 2.2.12 - Forecast Cash-flow Statement (PLN 000's)

Pessimistic scenario

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 Operational income excl. depn.	848,121	882,480	913,817	946,881	1,063,499	1,059,820	1,052,636	1,046,064	1,035,553	1,032,910
2 Income tax	66,788	0	0	0	0	0	0	0	0	0
3 Profit bonus	14,192	0	0	0	0	0	0	0	0	0
4 Total outflow (2+3)	80,980	0	0	0	0	0	0	0	0	0
5 Net operating income	767,141	882,480	913,817	946,881	1,063,499	1,059,820	1,052,636	1,046,064	1,035,553	1,032,910
6 Reduction in credits	0	0	0	0	0	0	0	0	0	0
7 Financial costs	79,451	113,524	136,748	153,767	153,183	143,300	135,511	127,722	119,933	112,143
8 Capital payments	68,349	87,215	87,215	156,819	152,686	110,797	106,200	106,200	106,200	172,490
9 Total outflow (6+7+8)	147,800	200,739	223,963	310,586	305,869	254,097	241,711	233,922	226,133	284,633
10 Reduction of capital	-271,174	-16,297	-137,575	-4,252	-77,776	-42,493	-4,718	392	-10,587	-16,681
11 Loans re-paid to PKP	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546
12 Net capital available	897,061	704,584	833,975	647,093	841,952	854,762	822,189	818,296	826,553	771,504
13 Total investment	2,248,038	1,738,768	1,670,872	1,367,545	1,214,584	1,220,692	1,185,814	1,175,287	1,180,506	1,121,421
14 Cash shortfall	-1,350,977	-1,034,184	-836,897	-720,452	-372,632	-365,930	-363,625	-356,991	-353,953	-349,917
15 External financing - repayable	561,796	459,232	265,200	232,000	0	0	0	0	0	0
16 External financing - subsidies	362,000	362,000	362,000	362,000	362,000	358,000	354,000	350,000	347,000	343,000
17 External financing - grants	139,600	211,400	209,100	125,700	9,900	7,200	7,200	4,600	4,600	4,600
18 Total external financing	1,063,396	1,032,632	836,300	719,700	371,900	365,200	361,200	354,600	351,600	347,600
19 Cash surplus / deficit	-287,581	-1,552	-597	-752	-732	-730	-2,425	-2,391	-2,353	-2,317
20 Cash at the start of the year	452,344	164,763	163,211	162,614	161,862	161,130	160,400	157,975	155,584	153,231
21 Cash at the end of the year	164,763	163,211	162,614	161,862	161,130	160,400	157,975	155,584	153,231	150,914

Table 2.2.13 Forecast Balance sheet (PLN 000's)

Pessimistic version

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 Cash	164,764	163,212	162,616	161,864	161,130	160,400	157,974	155,584	153,230	150,912
2 Debtors	1,098,324	1,064,636	955,109	910,559	841,624	792,671	783,680	774,877	766,428	732,618
3 Inventory	408,218	378,847	370,910	353,379	345,556	338,682	323,351	317,119	303,437	297,291
4 Total current assets	1,671,306	1,606,695	1,488,635	1,425,802	1,348,310	1,291,753	1,265,005	1,247,580	1,223,095	1,180,821
5 Advance payments	72,007	65,461	58,915	52,369	45,823	39,277	32,731	26,185	19,639	13,093
6 Gross fixed assets	44,123,631	45,271,842	45,207,690	45,114,982	45,103,872	45,177,270	45,240,963	45,324,486	45,424,758	45,502,806
7 Net fixed assets	22,850,534	23,829,116	23,790,251	23,469,699	22,921,472	22,296,712	21,654,870	20,986,790	20,311,810	19,606,593
8 Construction in progress	1,124,019	869,384	835,436	683,772	607,292	610,346	592,907	587,644	590,253	560,711
9 Other fixed assets	78,254	78,254	78,254	78,254	78,254	78,254	78,254	78,254	78,254	78,254
10 Total fixed assets	24,124,814	24,842,215	24,762,856	24,284,094	23,652,841	23,024,589	22,358,762	21,678,873	20,999,956	20,258,651
11 Total assets	25,796,120	26,448,910	26,251,491	25,709,896	25,001,151	24,316,342	23,623,767	22,926,453	22,223,051	21,439,472
12 Creditors	1,191,955	1,145,193	1,165,303	1,107,474	1,108,492	1,095,159	1,075,556	1,060,129	1,048,585	1,025,309
13 Short term credit	0	0	0	0	0	0	0	0	0	0
14 Current liabilities	1,191,955	1,145,193	1,165,303	1,107,474	1,108,492	1,095,159	1,075,556	1,060,129	1,048,585	1,025,309
15 Long term credit	1,282,687	1,654,705	183,690	1,907,871	1,755,185	1,644,387	1,538,187	1,431,987	1,325,787	1,153,297
16 Financial result (not divided pro	39,933	-145,864	-1,066,617	-1,046,647	-928,974	-925,878	-927,969	-930,289	-937,257	-935,414
17 Own Capiital	23,124,423	23,737,756	24,162,992	23,584,076	22,909,329	22,345,553	21,780,874	21,207,503	20,628,815	20,039,158
18 Revaluation reserve	0	0	0	0	0	0	0	0	0	0
19 Total Capital	23,164,356	23,591,892	23,096,375	22,537,429	21,980,355	21,419,675	20,852,905	20,277,214	19,691,558	19,103,744
20 Reserves and other liabilities	157,121	157,121	157,121	157,121	157,121	157,121	157,121	157,121	157,121	157,121
21 Total liabilities	25,796,119	26,548,911	24,602,489	25,709,895	25,001,153	24,316,342	23,623,769	22,926,451	22,223,051	21,439,471

2.2.14 Forecast - Indicators required by EBOR (PLN 000's)

Pessimistic version

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 Transport income	5,318,073	5,288,528	5,258,874	5,230,472	5,202,242	5,122,347	5,043,787	4,964,897	4,889,940	4,815,785
2 Other income	474,000	485,000	496,000	509,000	813,000	808,000	802,000	797,000	792,000	787,000
3 Subsidies	577,000	577,000	577,000	577,000	577,000	571,000	564,000	558,000	552,000	546,000
4 Total income	6,369,073	6,350,528	6,331,874	6,316,472	6,592,242	6,501,347	6,409,787	6,319,897	6,233,940	6,148,785
5 Transportation costs	5,182,381	5,121,619	5,063,771	5,006,020	4,948,029	4,864,384	4,784,294	4,704,547	4,632,673	4,553,732
6 Non-transportation costs	338,571	346,429	354,286	363,571	580,714	577,143	572,857	569,286	565,714	562,143
7 Other payments (Tax and Bonus)	80,980	0	0	0	0	0	0	0	0	0
8 Costs excl. interest and depn.	5,601,932	5,468,048	5,418,057	5,369,591	5,528,743	5,441,527	5,357,151	5,273,833	5,198,387	5,115,875
9 Net income	767,141	882,480	913,817	946,881	1,063,499	1,059,820	1,052,636	1,046,064	1,035,553	1,032,910
10 Capital payments	68,349	87,215	87,215	156,819	152,686	110,797	106,200	106,200	106,200	172,490
11 Interests and other payments	79,451	113,524	136,748	153,767	153,183	143,300	135,511	127,722	119,933	112,143
12 Total 11+10	147,800	200,739	223,963	310,586	305,869	254,097	241,711	233,922	226,133	284,633
13 Subsidies and grants	501,600	573,400	571,100	487,700	371,900	365,200	361,200	354,600	351,600	347,600
14 Change in capital	-271,174	-16,297	-137,575	-4,252	-77,776	-42,493	-4,718	392	-10,587	-16,681
15 Loans re-paid to PKP	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546	6,546
16 Funds from internal sources	1,398,661	1,277,984	1,405,075	1,134,793	1,213,852	1,219,962	1,183,389	1,172,896	1,178,153	1,119,104
17 Total investments	2,248,038	1,738,768	1,670,872	1,367,545	1,214,584	1,220,692	1,185,814	1,175,287	1,180,506	1,121,421
18 Credits taken	561,796	459,232	265,200	232,000	0	0	0	0	0	0
19 Own capital spending (17-18)	1,398,661	1,277,984	1,405,075	1,134,793	1,213,852	1,219,962	1,183,389	1,172,896	1,178,153	1,119,104
20 Coverage ratio	5.19	4.40	4.08	3.05	3.48	4.17	4.35	4.47	4.58	3.63
21 Cash generation ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table 2.2.15 - World Bank Indicators

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 Operating ratio with subsidies	Optimistic	99%	97%	108%	105%	102%	101%	99%	98%	97%	95%
	Pessimisti	96%	100%	113%	112%	110%	110%	110%	110%	110%	110%
2 Operating ratio without subsidi	Optimistic	108%	106%	118%	115%	110%	109%	107%	106%	104%	103%
	Pessimisti	106%	110%	124%	123%	120%	120%	120%	120%	121%	121%
3 Profit / interests on debts	Optimistic	6.26	5.19	5.21	4.18	4.97	6.36	7.11	7.73	8.45	7.08
	Pessimisti	5.74	4.40	4.08	3.05	3.48	4.17	4.35	4.47	4.58	3.63
4 Current assets / current liabiliti	Optimistic	1.40	1.42	1.28	1.28	1.20	1.16	1.15	1.15	1.14	1.12
	Pessimisti	1.40	1.40	1.28	1.29	1.22	1.18	1.18	1.18	1.17	1.15
5 Long - term credit / funds	Optimistic	0.06	0.07	0.08	0.08	0.08	0.07	0.07	0.06	0.06	0.05
	Pessimisti	0.06	0.07	0.01	0.08	0.08	0.08	0.07	0.07	0.07	0.06
6 Net income / net fixed assets	Optimistic	0.0035	0.0088	-0.0226	-0.0163	-0.0064	-0.0018	0.0026	0.0067	0.0111	0.0155
	Pessimisti	0.0108	0.0010	-0.0348	-0.0328	-0.0276	-0.0280	-0.0286	-0.0293	-0.0302	-0.0309

Table 2.2.16 Basic data used by PKP for 1995 financial forecasts

	Version	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 Passengers												
million pass.	optimistic	450	450	450	450	450	450	460	470	480	490	500
	realistic	450	450	445	445	445	440	440	440	435	435	430
	pessimistic	450	430	420	400	390	379	370	360	350	340	328
million PassKm	optimistic	25,425	25,650	26,100	26,550	27,000	27,450	28,520	29,610	30,720	31,850	33,000
	realistic	25,425	25,650	25,810	26,255	26,700	26,840	27,280	27,720	27,840	28,275	28,380
	pessimistic	25,425	24,510	24,360	23,600	23,400	23,877	23,310	22,680	22,050	21,760	20,992
Average distance	optimistic	56.5	57	58	59	60	61	62	63	64	65	66
	realistic	56.5	57	58	59	60	61	62	63	64	65	66
	pessimistic	56.5	57	58	59	60	63	63	63	63	64	64
2 Cargo												
million tons	optimistic	234.7	234	234	234	234	230	230	230	230	230	230
	realistic	234.7	230	226	221	219	218	214	210	208	204	200
	pessimistic	234.7	226	223	220	217	215	210	205	20	195	190
million ton-Km												
	optimistic	71,863	71,604	71,604	71,838	71,838	70,610	70,610	70,610	70,610	70,610	70,610
	realistic	71,863	70,380	69,156	67,847	67,233	66,926	65,698	64,470	63,856	62,628	61,400
	pessimistic	71,863	69,156	68,238	67,540	66,619	66,005	64,470	62,935	61,400	59,865	58,330
Average distance												
	optimistic	306.2	306	306	307	307	307	307	307	307	307	307
	realistic	306.2	306	306	307	307	307	307	307	307	307	307
	pessimistic	306.2	306	306	307	307	307	307	307	307	307	307
3 Employment												
	optimistic	240,000	237,500	235,500	231,500	229,500	227,800	225,800	223,000	221,000	219,000	217,600
	realistic	240,000	236,000	233,000	228,000	224,000	221,000	219,000	216,000	213,500	211,000	208,500
	pessimistic	240,000	235,000	230,000	225,000	220,300	215,300	212,000	209,000	206,000	203,000	199,500

2.5 PASSENGER TRANSPORT

Considering that the privatization of the passenger transport sector should be realized by all means, it is necessary to enable PKP to maintain sound management as a private enterprise. The following are the problems identified and picked up through our study on the present situation of passenger transport in PKP.

2.5.1 Trends in customer preferences regarding types of tickets and train services

With the progress of transformation from the controlled economy to the market economy, the passenger traffic volume of PKP has been on the decrease year after year. In this connection, freight transport has been playing the central role in railway transport in Poland, and the passenger transport sector accounts for about 20% in the entire transport sectors in terms of revenues in 1995.

The yearly frequency of railway travels per person enormously decreased from 21 times in 1990 to 12 times in 1995. The number of passenger trains operated per day decreased by 1,413 trains (20%) from 7,118 trains in 1990 to 5,705 in 1995.

Within general fall in railway passenger traffic the conventional speed trains suffered the most significant decrease-from 722 million passengers (32300 million passenger/kilometers) in 1990 to 415 million passengers and 14300 million passenger/kilometers in 1995. (Table 2-5-1)

Table 2-5-1 Changes of passengers transport volume by types and classes of train

(Unit: million people)

	1990	1991	1992	1993	1994	1995
Express	66	56	51	57	49	50
Slow train	722	594	497	483	445	415
First class	36	13	11	13	11	10
Second class	752	637	537	527	483	455

(Unit: hundred million passenger kilometers)

	1990	1991	1992	1993	1994	1995
Express	180	152	133	136	119	123
Slow train	323	249	192	172	157	143
First class	84	32	28	31	25	23
Second class	419	369	297	277	251	243

Source : Statistical yearbook PKP

The number of passengers in rapid and express trains has gone down from 66 million (18000 million passenger/kilometers) to 50 million (12300 million passenger/kilometers) in the same period.

In EC and IC express trains passengers are offered high quality service (including light meal) in modern cars. At the same time service in conventional speed trains has deteriorated due to poor maintenance and lack of new equipment. There is most likely certain correlation between the quality of railway services and the number of passengers.

Season tickets have become less popular. In 1990 the sales of such tickets amounted to 305 million passengers (6100 million passenger/kilometers) while in 1995 there were 175 million passengers and 3700 million passenger/kilometers respectively.

However in 1995 the number of suburban commuters season tickets has grown by 18.7% compared to 1994. On the other hand a number of full fare ticket holders on conventional speed trains has significantly decreased and this trend still continues. (Table 2-5-2)

Table 2-5-2 Changes of passengers transport volume by types of ticket

(Unit: million people)

	1990	1991	1992	1993	1994	1995
Normal ticket	485	450	409	422	347	290
Season ticket	305	202	140	119	148	175
Total	790	652	549	541	495	465

(Unit: hundred million passenger kilometers)

	1990	1991	1992	1993	1994	1995
Normal ticket	443	364	300	287	247	229
Season ticket	61	37	26	22	29	37
Total	504	401	326	309	276	266

Source : Statistical yearbook PKP

2.5.2 Regional and monthly passenger traffic

(1) Regional passenger traffic

A survey made of the passenger traffic in 1995 gives the following results for each of the central, eastern, southern, Slask, northern, south Slaska, western and Pomorska regions.

The total traffic in central, northern and Slaska regions is found to be 293 millions man-days and 14.6 billions man-kilometers, having a share of 63% and 55% respectively. This fact indicates the need to improve as a main point the traffic in these three regions where urban and inter-urban traffic have greatly increased. (Table 2-5-3).

Table 2-5-3 Regional passenger traffic (1995)

(unit : million people)

	Central region	Eastern region	Southern region	Slaska	Northern region	Southern Slaska	Western region	Pomorska	Total
Traffic	122	25	41	62	109	40	39	27	465
Non-seasonal passenger	69	17	27	38	68	27	25	19	290
Seasonal passenger	53	8	14	24	41	13	14	8	175

(unit : hundred million passenger kilometers)

	Central region	Eastern region	Southern region	Slaska	Northern region	Southern Slaska	Western region	Pomorska	Total
Traffic	68	17	28	31	47	27	24	24	266
Non-seasonal passenger	56	15	25	26	40	24	21	22	229
Seasonal passenger	12	2	3	5	7	3	3	2	37

Source : Statistical yearbook PKP

(2) Monthly passenger traffic

The monthly passenger traffic in 1995 is given as follows. The non-seasonal passenger traffic in man-days shows an increase of 12 to 17 % both in July and August compared with the monthly mean traffic. In the other months, the traffic remains nearly at the same level. On the contrary, the seasonal passenger traffic in man-days shows a decrease of 18 to 38% in July and August compared with the monthly mean traffic. In man-kilometers, the non-seasonal passenger traffic shows an increase of 32 to 37% in July and Augut in comparison with the monthly mean traffic.

These data shows that a considerable numbre of passagers use railway for their journey on their long vacations in July and August, indicating the need to offer railway services which can well meet the demand for the traffic (Table 2-5-4)

Table 2-5-4 Monthly passenger traffic (1995)

(unit : people)

	January	Feblary	March	April	May	June	July	August	September	October	November	December	Total
Traffic	38	40	39	38	39	36	37	39	40	41	39	39	465
Non-seasonal passenger	23	25	23	23	24	24	28	27	24	24	22	23	290
Seasonal passenger	15	15	16	15	15	12	9	12	16	17	17	16	175

(unit : hundred million passenger kilometers)

	January	Feblary	March	April	May	June	July	August	September	October	November	December	Total
Traffic	20	22	20	20	21	22	27	29	22	22	20	21	266
Non-seasonal passenger	17	19	17	17	18	20	25	26	18	18	16	18	229
Seasonal passenger	3	3	3	3	3	2	2	3	4	4	4	3	37

Source : Statistical yearbook PKP

2.5.3 Situation in inter-city transport

(1) International transport

The volume of international transport has decreased from 5,755,000 passengers and 1,005 million passenger/kilometers in 1994 to 5,049,000 passengers and 857 million passenger/ kilometers in 1995. (Table 2-5-5)

Table 2-5-5 Comparison of transport volume in 1994 and 1995

Quality of:	thousand people		million pass km		average pass km	
	1994	1995	1994	1995	1994	1995
Internation.transp.	5,755	5,049	1,005	857	175	170
Interregion.transp.	65,068	64,266	15,830	15,617	243	243
Agglomer.transp.	277,934	262,969	6,687	6,425	24	24
Provincial transp.	144,917	132,775	4,073	3723	28	28

Source : Statistical yearbook PKP

The volume of international transport by countries includes the following:

Belarus - 1,324,000 passengers, Ukraine - 1,236,000, Germany - 950,000, Russia 916,000, Czech Republic - 156,000, Austria - 85,000. PKP offers 6 IC and EC express services connecting Warsaw with following international destinations: Berlin (2 services daily), Vienna, Prague and Budapest. There is also Krakow-Berlin service.

All cars in these trains are modern and comfortable. The trains are fast and services are highly appreciated by passengers. The occupancy rate in these trains is 60%.

The IC and EC trains are in important component of future development of PKP services.

(2) Domestic inter-city transport

A number of Polish cities range from 500,000 to 1 million inhabitants. Warsaw is situated

in the center of the country and distances to other big cities range from 100 to 300 kilometers. Besides the country is flat and there are many straight sections of railways so trains can go at high speed. Considering above observations the inter-city transport constitutes the most important component of future railways' development in Poland.

The number of IC, EC and other express trains and rapid trains operating in inter-city transport on major routes exceeds 10 and passenger traffic one way varies from 2700 to 7500 passengers per day.

Table 2-5-6 Inter-city trains on major lines(1996)

Section	Distance (km)	Travel time (fastest train) (h-m)	Max speed (k/h)	Scheduled speed (k/h)	No.of trains, one way (trains/ day)	Transport volume, one way (persons/ day)
Warsaw-Krakow	287	2-35	160	111	14	3,900
Warsaw-katowice	293	2-35	160	113	16	2,700
Warsaw-Gdansk	329	3-21	120	98	12	6,600
Warsaw-Poznan	306	2-56	130	104	14	4,400
Warsaw-Lublin	175	2-06	120	83	11	3,000
Warsaw-Wroclow	385	4-56	120	78	6	2,700
Poznan-Szczecin	214	2-27	120	87	13	5,500
Poznan-Wroclow	165	1-42	120	97	14	6,300
Krakow-Katowice	78	1-13	120	64	25	7,500
Katowice-Wroclaw	180	2-33	120	71	16	6,100

Source : Time-table PKP 1996 ,Data of actual passenger flow(7.1996)

Note : The one- way transport volume shows daily average in July1997.

The total number of passengers in above trains in 1995 was 64,266,000 (98.8% of previous year) and 15,617 million passenger/kilometers (98.7% compared to 1994).

A 7% increase in number of passengers and 5% passenger/kilometers increase are expected in 1996. (Table 2-5-5)

It is, therefore, necessary to prepare a marketing policy to meet passengers expectations considering growing competition of personal cars, express buses and airplanes.

2.5.4 Situation in commuter transport

There are a number of cities in Poland which are surrounded by densely populated metropolitan areas. In such areas railways constitute an important mean of mass public transportation in a city zone. Warsaw metropolitan area has the population of 1.8 million people. The passenger transport volume in its city zone amounts to 82,412,000 passengers being the highest in the country.

Next come Gdansk (62,517,000) and Katowice (31,577,000). These three city zones represent 67% of total commuter railway transportation in Poland.(table 2-5-7)

Table 2-5-7 Transport volume in major city areas(1995)

(Unit;thousand persons,%)

Major city area	Transport volume	Share of commuter	City population
Warsaw	82,412	58.7	1,632
Gdansk	62,517	50.1	463
Katowice	31,577	45.4	351
Bialystok	16,079	53.3	279
Wroclaw	14,278	45.9	642
Poznan	13,528	50.7	581
Bydgoszcz	11,956	49.4	386
Krakow	11,313	47.0	745
Lodz	9,335	42.8	820
Szczecin	9,138	49.6	419

Source : Statistical yearbook PKP

The volume of commuter transport shows also the decreasing trend - 262,969,000 passengers (94.6% of the previous year) and 6425 million passenger/kilometers (91.1% respectively). Above figures represent respectively 57% and 25% of total passenger transport volume and prove the importance of commuter transport in overall passenger railway traffic of the country. (Table 2-5-5)

In Warsaw city zone there are about 1-3 one way trains which run during one hour to each of seven destinations (6-9 cars in rush hours and 6 in the rest of a day). The occupancy rate reaches 80% - 120% in rush hours and 30% - 40% in the rest of a day.

In Gdansk city zone population is concentrated along 27 kilometers of the line Gdansk-Sopot-Gdynia. There are 122 one-way slow trains running on this line daily. During rush hours they run every 6 minutes and normally every 12 minutes. Their timetable is arranged in the most comfortable way for the passengers and can be considered a model for other commuter railways timetables.

Growing population of urban areas will result in congestion of city centers, crowded car parks and other factors discouraging use of personal cars. In this situation the railways offering large carrying capacity, punctuality and speed in commuter transport may become increasingly attractive.

2.5.5 Local traffic lines

Conventional speed train passenger volume shows continuous tendency to decrease-132,775,000 passengers (91.6% of the previous year) and 3723million passenger/kilometers (91.4% of the previous year). (Table 2-5-5)

As there is a tendency of migration to big cities and decrease of population number in rural areas, railways cannot expect any growth of local passenger traffic.

Along with the decrease of the passenger transport volume the number of trains has also decreased. On some local lines service has been cut following respective agreements with local government authorities.

Passenger on local lines encounter deterioration of services due to reduced number of trains and poor quality of cars. There is a continuous shift to automobile transportation.

Considering the fact that there is a number of people who need public transport, it is necessary to maintain railway services or replace them with other means of affordable transportation such as buses.

2.5.6 Accommodation and service in passenger cars

EC and IC trains which serve mainly inter-city lines consist of new cars with separate compartments. Both first and second class compartments have 6 seats. The trains are comfortable, suitable for longer journey and usually include catering facilities.

Express trains consist of similar cars with first class compartments of 6 seats and second class ones with 8 seats. They also have snack bars. The cars are usually older and sometimes there are problems with water in toilets, defective lighting in compartments and other technical deficiencies.

Besides there are special compartments for disabled and sufficiently spacious decks and toilets.

Commuter trains consist of old cars, often dark with paint peeling-off. The toilets are dirty and in poor technical condition.

In a survey carried out by the Institute of Transport (OBET) (1994-1995) 70% of respondents indicated that service in sleepers (first class) and international IC trains (second class) has improved while 6-7% say that services in second class of express and rapid trains got worse.

It is necessary to invest in railway cars in order to better meet passenger requirements. (Table 2-5-8)

Table 2-5-8 Quality change in first and second class by types of trains

(Unit: %)

		Got better	Got worse	No change
EC	1 class	62.0	2.9	35.1
	2 class	66.5	0.6	32.9
International EC	1 class	58.1	4.6	37.3
	2 class	70.0	1.4	28.6
Domestic IC	1 class	62.7	1.8	35.5
	2 class	62.6	3.1	34.3
Express IC	1 class	61.8	3.1	35.1
	2 class	53.1	2.6	44.3
Fast Train	1 class	47.4	6.7	36.5
	2 class	34.8	7.4	57.8
Sleeper Train	1 class	73.3	-	26.7
	2 class	62.1	1.4	36.5

Source : The Institute of Transport

2.5.7 Ticket sales at stations

In the end of 1996 there were 3930 passenger railway stations (1150 of them unmanned). This number is likely to decrease with continuing reduction of economically inefficient lines. At some stations there are queues to buy tickets in some hours of a day.

In Warszawa Centralna there are 20 ticket counters for domestic traffic but only 10-12 of them are usually open. At different times there are up to 20-30 people queuing at each counter and it takes about 20 minutes to buy a ticket. There are several breaks in ticket sales in each counter displayed permanently in the window and at such times counters are closed even when there are passengers waiting. Even if the next counter is working there is no system of smooth shifting of waiting passengers.

Both long and short distance tickets are sold in all counters and most employees are women. There are no vending machines. The seat reservations in counters are computerized and the system is being continuously modernized. The telephone reservations are beginning to develop.

According to PKP statistics a number of seats and sleeper berths offered in 1995 was 15,831,000 (108.2% compared to previous year). 8,278,000 seats were sold (113.3% of last year sales) which represents 52.3% occupancy rate. This rate was considerably higher

(59.8% and 5,491,000 seats) on express trains. (Table 2-5-9)

Table 2-5-9 Number of sold tickets with reserved seats

(Unit: thousand seats, %)

	Available seats		Sold seats		Percentage	
	1994	1995	1994	1995	1994	1995
Sleeper train	1,679	1,733	696	707	41	41
Sleeper berth train	2,188	2,336	716	816	33	35
EC, IC	2,358	2,587	1,047	1,264	44	49
Express	8,405	9,175	4,850	5,491	58	60

Source : Statistical yearbook PKP

PKP have recently developed promotional policies such as introduction of discount tickets and active advertising in media and posters at stations.

2.5.8 Passengers' fares

In the system of passengers' fares, the fares are classified into five categories, (1) ordinary train (second class), (2) ordinary train (first class) and express (second class), (3) express train (first class), (4) limited express train (second class) and (5) limited express train (first class) according to the type and class of train used by the passengers. The fares are calculated every 10 kilometers for a distance of travel up to 100 kilometer, every 20 kilometers for that from 101 to 280 kilometers and every 40 kilometers for that of 281 to 760 kilometers. Given the fares charged on a second class seat on a ordinary train as the base, the category (2) is 1.5 times as great as (1), the cateory (3) 2.25 times as great as (1), the category (4) 2 times as great as (1) and the category (5) 3 times as great as (1). In addition to this, to take a reserved seat in second class, EX 4.5 PLN and IC 7.0 PLN are required.

In the system seasonal passengers' fares, the fares are calculated for each 100 kilometers in units of one month, three months and six months. A discount of about 40% can be obtained by a seasonal passenger who uses a one-month seasonal ticket for twenty days (Table 2-5-10).

Table 2-5-10 Ordinary passengers' fares

(unit : PLN)

Distance	Ordinary (second class)	Ordinary (first class) Express (second class)	Express (first class)	Limited express (second class)	Limited express (first class)
1-10	1.10	1.65	2.48	2.20	3.30
11-20	1.80	2.70	4.05	3.60	5.40
21-30	2.60	3.90	5.85	5.20	7.80
31-40	3.30	4.95	7.43	6.60	9.90
41-50	4.00	6.00	9.00	8.00	12.00
101-120	8.00	12.00	18.00	16.00	24.00
201-220	11.20	16.80	25.20	22.40	33.60
401-440	14.80	22.20	33.30	29.60	44.40

Seasonal passengers's fares

(Unit : PLN)

Distance	One-month	Three-month	Six-month
1-10	25.40	63.50	114.30
11-20	39.60	99.00	178.20
21-30	57.20	143.00	257.40
31-40	72.60	181.50	326.70
41-50	88.00	220.00	396.00
91-100	138.60	346.50	623.70

Source : Time table PKP 1996

Up to now, the fares have been raised every year. Except for a great raise of the fares in 1990, the raising rate is lowered. In consideration of the great influence which may be exterted on the prices of commodities and national life, the governement adopts a policy of reducing the railway fares to a lower level. On these lines, the government gives a certain subsidy to PKP to compensate for the amount not included in a newly revised fares. Therefore, PKP should have a choice to establish an adequate passengers' fares system on its own responsibility. (Table 2-5-11).

Table 2-5-11 Progress of raised passengers' fares rate

1990		1991		1992		1993		1994		1995		1996	
1/1	250%	1/1	40%	3/1	30%	4/1	29%	3/20	12%	2/15	10%	2/1	14%
6/1	100%	9/15	50%	11/15	30%	10/15	13%	9/1	20%	9/11	6%	—	

(Note) A redemonimation of one ten thousandth was carried out on the First, January in 1995.

2.5.9 Income and costs

(1) Outline

In 1995 the net income from passenger transport amounted to 1,019 million PLN (116.5% compared to previous year). This value represented 104.4% of planned sales and about 20% of total income from all transport sectors of PKP. This growing figure results from high inflation as well as from annual raise of fares. PKP has also made considerable efforts in improving its management.

The total subsidy for passenger transport amounts to 704 million PLN.

The PKP costs were 3,313 million PLN, where 2,266 million represent costs of running trains. Due to inflation the costs of labor, energy and maintenance have annually gone up and this tendency continues. There is a serious deficit in passenger traffic as both fares and subsidies do not balance the running costs. (Table 2-5-12)

Table 2-5-12 Revenues and costs of passenger transport

(Unit: Million PLN)

	1990	1991	1992	1993	1994	1995
Revenues	171	325	504	714	(874) 918	(1019) 1069
Costs	731	1466	1628	2327	(2796) 2856	(3313) 3353
Balance of costs and revenues	-560	-1141	-1124	-1613	(-1922) -1938	(-2294) -2284
Subsidies	353	375	479	663	679	704
Balance with subsidies	-207	-766	-645	-950	(-1243) -1259	(-1590) -1580

Source : Active analysis of PKP (1995)

Notes :1.The figures in parentheses indicate data on passenger transport alone.

2.Subsidies include those provided for infrastructure portions.

As an improvement of management and increase of income are essential as steps towards privatization the railways aim at modernization and streamlining of procedures to reduce operational costs and improve the quality of service.

In order to sort out PKP financial management it is necessary to clearly define loss and profit making activities.

In an attempt to improve its economic viability PKP have taken following measures:

- strengthening control of their tickets inspectors and employment of ZW Renoma - an external ticket inspection service.
- upgrading some conventional trains to rapid train level and converting some rapid trains into express trains with respective fares increase.
- development of courier service by express trains serving increasing number of customers
- reduction of number of train services on loss-making lines and replacing them with bus services.

(2) Analysis of revenues and costs

1) Revenues

In spite of the decreasing tendency of passenger traffic volume, the passenger revenue of PKP has been increasing as a result of past fare revisions.

The passenger revenue for 1995 was 1,019 million PLN, showing an increase of 16.5% compared with the previous year and an increase of 5.3% compared with the planned value. As for the structure of the passenger revenue, the weight of revenue from ordinary tickets with a high unit price is decreasing, and expansion of revenue in this field is needed. The revenue from commuter tickets increased by 47.9% and 5.3% compared with the previous year and the planned value, respectively. Although the amounts of revenues from limited express charges, additional charges and the like are small, such revenues are showing large increases every year. On the other hand, the increase in the revenues from baggage and mail transport is small, and revenue increase in the future cannot be expected. (Table 2.5.13) The average fares per passenger and per km are 0.0352 PLN for ordinary tickets and 0.0292 PLN for commuter tickets.

Table 2.5.13 Changes in passenger revenues by kind of tickets, etc.

(unit: million PLN)

	1990	1991	1992	1993	1994	1995
Passenger fares	155	295	453	657	783	908
Commuter tickets	22	25	30	44	73	108
Ordinary fare tickets	133	270	423	613	710	800
Baggage	-	1	1	2	2	3
Mail	8	18	17	23	24	24
Limited express charge	2	2	4	7	11	17
Others	6	9	29	25	54	67
Total	171	325	504	714	874	1019

Source : Statistical Yearbook PKP (1995), Passenger related materials PKP

2) Costs

① Train operation cost and infrastructure cost

The train operation cost and infrastructure cost entailed by passenger transport are both showing an increasing tendency every year. The train operation cost and infrastructure cost in passenger sectors for 1995 were 2,266 million PLN and 1,047 million PLN respectively, totaling 3,313 million PLN.

Of the total cost, the train operation cost accounts for 68%, and this share is almost the same each year. The train operation cost is divided into the variable cost which changes according to the situation of train operation (personnel cost, motive power cost, repair cost, etc.) and the cost which fixedly occurs every year independently of the situation of train operation. Of the train operation cost, the variable cost and fixed cost are 1,451 million PLN and 815 million PLN respectively, and the variable cost accounts for 64%. This share is inclined to increase year after year. To reduce these costs, curtailment of the variable cost is essential. In this connection, the weight of personnel cost is assumed to be increasing. However, it is difficult to identify the details because further data have not been available. (Table 2.5.14)

Table 2.5.14 Train operation cost and infrastructure cost

(unit: million PLN)

	1993	1994	1995
Train operation cost	1572	1952	2266
Infrastructure cost	724	844	1047
Total	2296	2796	3313

Breakdown of train operation cost

(unit: million PLN)

	1993	1994	1995
Variable cost	986	1241	1415
Fixed cost	586	711	815
Total	1572	1952	2266

Source : Passenger related materials PKP

② Cost by type of train transport

The average train cost per km for 1995 (infrastructure cost plus train operation cost) was 19.18 PLN. Of this value, the variable cost and the fixed cost were 9.37 PLN and 9.81 PLN, respectively.

As for the total cost by type of train transport, the value of international transport (electric locomotive traction) was the smallest (16.36 PLN), followed by those of urban area transport (electric railcar, 17.84 PLN) and intercity transport (electric locomotive traction, 18.22 PLN). Therefore, the total cost on electrified sections is 20% smaller on the average compared with non-electrified sections. A similar tendency is seen in the comparison in terms of the train operation cost alone. In this case, however, the cost on electrified sections is 30% smaller on the average compared with non-electrified sections, further smaller than the case of the total cost. This is probably because such costs as the motive power cost and maintenance cost are smaller on electrified sections. (Table 2.5.15)

Table 2.5.15 Costs per KM by kind of trains

(unit: PLN)

	Infrastructure cost plus train operation cost per km			Train operation cost per km		
	Variable cost	Fixed cost	Total	Variable cost	Fixed cost	Total
International transport (Electric locomotive)	7.55	8.61	16.36	6.25	3.51	9.76
Intercity transport (Electric locomotive)	8.99	9.24	18.22	7.38	4.15	11.53
Intercity transport (Diesel locomotive)	12.32	11.32	23.63	11.08	6.23	17.31
Local line services (Electric locomotive)	10.40	10.30	20.70	9.27	5.21	14.48
Local line services (Diesel locomotive)	10.93	10.79	21.72	10.14	5.70	15.84
Urban area transport (Electric railcar)	8.49	9.37	17.87	7.62	4.28	11.90
Average	9.37	9.81	19.18	8.40	4.72	13.12

Source : Passenger related materials PKP

In terms of train-km, electrified sections account for more than 80%, and passengers are also concentrating on electrified sections. From the aspect of cost as well, it is advisable to promote intercity transport (electric locomotive traction) and urban area transport (electric railcar). (Table 2.5.16)

Table 2.5.16 Train-km and passenger-km (1995)

	Train-km (millions)	Passenger-km (100 millions)
International transport (Electric locomotive)	13	22
Intercity transport (Total)	55	134
(Electric locomotive)	51	-
(Diesel locomotive)	4	-
Local line services (Total)	45	46
(Electric locomotive)	18	-
(Diesel locomotive)	27	-
Urban area transport (Electric railcar)	58	64
Total	173	266

Source : Passenger related materials PKP

2.5.10 Problems and basic policy provisions regarding privatization perspectives

The tasks of the passenger service sector toward the privatization can be summarized as follows.

(1) The volume of passenger traffic within recent years shows a tendency of decrease. There have been also deficits in spite of annual government subsidies. Therefore it is necessary to improve the balance by increasing the number of passengers and reducing operational costs. However, since a fare increase without sufficient core can adversely cause a decrease in passengers, it is necessary to carefully promote such measures as enabling PKP to decide its fares on its own responsibility.

(2) PKP national network consists of over 20,000 km lines spreading all over the country. All major cities are connected by intercity trains which cover respective distances in 3-4 hours. There are potential opportunities of increasing speed and improving the quality of services of rapid and express trains linking various regions. This should be the main issue in further PKP development.

(3) Commuter traffic is limited to metropolitan areas and the income from this type of service is relatively low as cost of individual ticket is restricted. Nevertheless a speedy and reliable local railway transportation can compete with private car travels in cities due to traffic jams and increasing parking problems. It is, therefore, necessary to come up with appropriate policies to meet passengers' needs.

(4) There is little probability of generating necessary income from the lines with low number of passengers. It will be necessary to discuss with local governments the future of such services and jointly come to economically justified decisions in this respect.

(5) The technical condition of majority of commuter trains is poor so they offer little comfort to passengers. Ticket counters at stations are overcrowded and there are problems with

buying tickets. It seems necessary to improve the quality of these services by implementing respective policies meeting customers requirements.

(6) Considering privatization of passenger transport sector it is necessary to clearly identify profitable and non-profitable lines and make every effort to stop internal subsidizing. Plans for increased traffic on profitable lines and related income raise should be devised. At the same time thorough analysis regarding viability of other lines should be carried out.

2.6 FREIGHT TRANSPORT

When the freight transportation is considered on the assumption that it is operated privately, it is required to be operable as a business, more specifically, it must be profitable.

The privatization of the railways in the countries in Europe has been pushed forward by such a method that the railway is divided into the infrastructure and the transportation and the transportation is made a freely-accessible system. Poland, desirous of joining in EU and operating the economy as an EU member country, is naturally expected to adopt the same method as other countries also in the privatization of the national railway.

Therefore, Poland's railway business is faced with a severe situation that in addition to the national railway, there are possibilities that some domestic companies and foreign firms, German or French firms, enter into the freight transportation business in Poland.

Under these circumstances, the freight transportation of Polish national railway currently proceeds as follows.

2.6.1 Trends in Freight Traffic Volume

In 1980 when the planned economy was carried out, freight traffic volume amounted to 482 million tons and 134.7 billion ton-km. By 1990, however, plummeted to 282 million tons and 83.5 billion ton-km due to the change of the economic system, and decreased further in 1992 to 202 million tons and 57.8 billion ton-km. In the following years, freight volume followed an increasing trend while fluctuating in the process, reaching 225 million tons and 69.1 billion ton-km in 1995.

Comparing with other means of transportation, truck transportation continued to follow a similar trend to that of railways from 1990 onwards in terms of freight tonnage, but continued along an increasing trend from 1980 in terms of ton-km to greatly expand its share while showing fluctuations on the way. This is probably due to the general acknowledgment of the convenience of vehicles (trucks) and also due to the improvement of living standard while the market economy progressed. The sluggishness of railway transportation was caused by the changes of the social system and the economic framework, and presumably resulted from the failure to take not particularly sufficient remedial measures against those shifts.

Traffic Volume by Means of Transportation

Year	1980	1985	1990	1991	1992	1993	1994	1995
Freight tonnage (million tons)	2713	1864	1645	1478	1388	1349	1343	1379
Railway	482	419	281	227	201	214	215	225
Road	2167	1393	1292	1188	1121	1071	1060	1086
Pipeline	40	38	33	26	30	31	34	33
Inland waterways	22	14	10	8	8	9	10	9
Freight tonnage (100 million ton-km)	1986	1755	1383	1157	1123	1179	1260	1347
Railway	1347	1206	835	651	577	643	657	691
Road	445	366	403	396	420	407	453	512
Pipeline	170	169	138	103	119	122	142	135
Coastwise service	20	14	10	7	7	7	8	9

Note : Poland National Statistics Annual Report and PKP Annual Report

2.6.2 Trends in Freight Transportation Items

Coal accounts for roughly 50% of PKP's total freight transportation. In Poland which had performed the role of the energy supply base in the old economic system, coal occupies a large proportion of the gross national production, and coal transportation by the national railway stood at 1 million tons in 1980, which accounted for 34% of the freight traffic volume, and registered 160 million tons in 1985, which accounted for 39% of the total freight volume. During the shift of the economic system, the gross national production suffered a substantial decrease, and therefore the railway transport volume sharply dropped from 482 million tons in 1980 to 225 million tons in 1995, a marked 47% decline. Under this situation, coal, occupying a great weight in the domestic energy resources, took sharp successive drops in production, namely, 193 million tons in 1980, 192 million tons in 1985, 148 million tons in 1990, and 135 million tons in 1995. Nonetheless, coal being most suited to railway transportation, coal transportation on railway suffered a relatively small decrease, registering 60% of the total volume transported by rail in 1992, and secured stable transport volume from 1992 onwards, centering on domestic consumption and export (32 million tons in 1995).

The transport volume of the items other than coal is on the way to gradual recovery after falls in transport volume up until 1992. A general look at performance from 1990 to 1995 reveals that large-volume primary products, such as coal, ore, and stone, occupy a substantial proportion of the total transport volume, whereas agricultural products and agriculture-related

goods, including fertilizer do not amount to much, nor do secondary products occupy a sizable proportion of the transport volume.

However, Poland being in the process of accelerating the pace of becoming a market economy and located in such a geographical position with ample resources, secondary products are expected to increase the weight in the distribution structure. There is a growing demand for measures to be taken to make the railway transportation compatible with this possibility.

Trends in Freight Transportation Items (million tons)

Year	1980	1990	1991	1992	1993	1994	1995
Coal	162(34)	119(43)	112(50)	98(49)	106(49)	106(50)	108(48)
Brown coal	18	11	10	10	9	9	9
Ore	27	14	11	9	9	8	14
Stone & gravel	52	21	13	14	11	14	19
Farming products	20	10	7	6	8	4	6
Forest products	13	6	4	3	3	3	3
Petroleum	17	12	10	10	11	11	12
Cement	10	5	3	3	4	6	6
Metals	44	26	18	14	10	15	17
Fertilizer	14	6	4	4	4	4	5
Chemical products	15	11	9	8	9	9	10
Others	104	28	17	14	16	19	16
Total	482	281	225	200	213	213	224

Source : PKP Annual Report The figures in parentheses are percentages to totals.

2.6.3 Locations of Freight-handling Stations and Role of Freight Car Yards

PKP posses and runs about 6,200 forwarding stations distributed along its operating lines with a length of about 24,000 km covering the entire nation in a network. This may be said to be a conventional form in the age when the railway was the only means of transportation. As many as 2578 business tracks branch out from those stations. Transportation service is offered such that the business tracks are directly connected to the shippers' gateway, a system suitable for mass freight transportation. However, with such a wide-ranging operation, freight car yards are indispensable for freight transportation.

As for the freight car yards in the present system, there are 12 major yards and 212 shunting terminals. The transportation network is organized such that zones are decided for respective freight car yards in charge, and that marshaling workload is minimized associated with relay of freight cars. Direct transportation is basically done between the zones, but a locomotion shunting method is also adopted to establish an efficient transportation system.

Automated facilities have also been adopted in the work of distributing freight cars according to destinations in the major yards and some twenty shunting terminals to facilitate the work with fewer personnel.

Let us have a look at the arrangement of stations in the Warsaw area (30-50 km area) in the central DOKP zone. In this area, there are 30 forwarding stations, with a total freight handling volume of about 10 million tons, which is broken down as follows.

Summary of Freight-handling Stations in Warsaw Area and its Vicinity

Volume by scale	No. of stations	Handling tonnage	Cumulative total	Main stations
1 million tons Min.	2	462	464	W, Praga W, Okecie
990,000-500,000 tons	3	195	657	W, G, Towarowa W, Rembertoc W, Jelonki
490,000-100,000 tons	14	283	940	
90,000-10,000 tons	9	44	984	
9,000-1,000 tons	2	1	985	
1,000 tons	0	0	985	
Total	30		985	

In Warsaw, the greatest city in Poland, the total volume of 9.85 million tons comprises 9.01 millions tons (92%) which arrives and 840,000 tons (8%) which is shipped out. The main items which arrive include coal, steel making resources, automotive parts and products, transported chiefly through the business sidetracks for the thermal power plant, steelworks, automobile plants, distribution center, etc. located in that area. There is a small amount of products shipped from those companies. The use of railway for consumer goods is very rare, with only a small number of containers being used infrequently.

As a general forwarding station, there is Warsaw Central Freight Station (also called Warsaw Odorane Station), which is located 3 km to the west from the center of the city and at one corner of the premise for the railway facilities, such as the freight car yard or the like. The

station has a sufficiently wide land area and is conveniently located for transportation. However, both in the one-storied and the dome-capped loading/ unloading areas the forwarding equipment is so superannuated and dilapidated as to be apparently unserviceable to the shippers. In the actual forwarding scene, general sundry goods, which should be notable in big cities, could hardly be seen. Only the containers and the cargo-handling machinery in the container loading/unloading area were modern.

We were told that the container loading/unloading area had been sold to the associated firm and the dome-shaped loading/unloading area leased to another associated firm. However, this freight station has the transportation routes established and the wide land area secured, and is located close to the center of Warsaw, which is expected to develop as an international city. Because of those merits, if PKP renovates this station into a modern freight terminal equipped with distribution and storage facilities and launches express freight transport service connecting the cities in Poland and cities of other countries,

this would serve a good deal to attract large quantities of railway freight.

Incidentally, there seem to be not many small forwarding stations each with an annually handled freight volume of less than 10,000 tons. They said that the railway line sections and the forwarding stations which have lost their serviceability are being abolished. In this age when the roads have improved and truck transportation has become more and more easily available, it is important to selectively place emphasis on some of the freight stations considering their importance in location. This can be said to be the subject which requires consideration in years to come along with the arrangement of the off-rail transportation system.

2.6.4 Freight Transportation Method

The conventional transportation system has entirely relied on the freight car yards. While the transport volume is rapidly declining accompanying the reform of the socio-economic structure as the backdrop, as a step to rationalize the railway operation responding to the declining transport volume, the stations and the freight car yards were integrated and abolished. In parallel with this step, the transportation system has been modernized with the aim of minimizing relays of freight cars in the yards to reduce shunting work.

At present, in the freight business, there is a handling classification system into three categories,

namely, "car-unit service", "train-unit service" and "combined transport service". The forms of transport, actually practiced, are divided into "special-purpose direct transport for bulk goods, such as coal and ore" and "direction transport between stations for containers". Nonetheless, inter-zone transportation is generally more common, based on the "12 main yards" as the centers in nationwide transport by freight cars and "212 transport terminals" to supplement the main yards. The "main yards" and the "transport terminals" serve to incorporate the freight cars in the respective zones into the nationwide transportation network, thus constituting an efficient transportation system by interconnecting the "main yards", "transport terminals" and "ordinary freight stations".

For the freight trains, the forms of transportation are divided into "yard-direct transport between the main yards" and "inter-zone-direct transport between transportation terminals in different zones." In addition, "intra-zone local transportation" is conducted from transportation terminals to local stations in the same zone. In summary, the forms of transportation may be classified as follows:

International express freight transportation

Domestic express freight transportation

Inter-yard direct transportation

Inter-zone direct transportation

General international transportation

Intra-zone transportation

As for the transportation capacity of freight trains, a standard mass transportation train for coal, ore, etc. has a pulling capacity of 2,000-3,200 tons, a general cargo train 1,000-2,000 tons, a local train 800 tons.

For the past 15 years in which there were the substantial decrease of freight transport volume and the slight recovery of late, how the transportation capacity has been set? The annual transport volume in 1980 was 134.7 billion tons, that is, 369 million tons a day. The freight transportation capacity (in freight train-km) in 1980 was 209 million km a year, 574 thousand km a day, so that the transport tonnage for 1 train-km was 643 tons. In accordance with the subsequent sharp drop of transport volume, the transportation capacity in train-km was reduced. The transport volume and the transport capacity from 1980 onwards were shown in the following table, which indicates a generally efficient state of transportation.

Comparison of Freight Transport Volume and Transport Capacity

Year	1980	1985	1990	1991	1992	1993	1994	1995
ton-km (million Tk/day)	369	330	228	178	158	176	180	189
Train-km (thousand km/day)	574	504	341	272	248	267	287	295
Transport tonnage for 1 train-km (t)	643	655	670	655	637	660	627	642

Generally speaking, from a viewpoint of transport efficiency, it is easy to raise the efficiency with the use of the freight car yards. More specifically, it is possible to gather freight cars in a car pool called a freight car yard from the stations or branch lines with little transport volume, classify the cars and organize freight trains of specified destinations, and transport the freight trains directly to the stations or freight car yards of the respective destinations at remote places. This transport method may be effective also in the future for transportation of cargoes in bulk, such as coal, ore, petroleum, etc. which need not be transported so quickly as long as they arrive on schedule if the expenses of the plants for composing freight trains, namely, the freight car yards could be reduced sufficiently.

In addition to large-quantity shippers, there are many shippers who evaluate the convenience of railway transportation and installed exclusive-use sidetracks at their cost. If one expects to handle cargoes from them and carry on a smooth transportation, it is inevitable to approve of the presence of transport terminals.

However, in present-day physical distribution, the share of transportation of large quantities of raw materials is declining while that of value-added products is expanding. This trend is more conspicuous in major industrialized countries. This is an issue which Poland, an advanced country, will definitely have to face in the near future, in the course of reforming its socio-economic system and shifting to a market economy.

PKP's first hard experience occurred from the 1980's when Poland withdrew from the COMECON economic block till the early part of the 1990's. In this period, the freight transport volume by rail took a sharp drop to less than 50% (482 million tons and 134.7 billion ton-km in 1980 to 281 million tons and 83.5 billion ton-km in 1990, further to 201 million tons and 57.7 billion ton-km in 1992). In response to this situation, PKP took measures to

improve the corporate structure, including severe rationalization steps, which resulted in a stable condition continuing in 1993 and subsequent years.

However, there is little doubt that Poland's distribution sector should be forced to engage in fierce competition because the progress of the market economy encourages the development of other means of transportation, especially trucks, and also the advanced transportation technologies from EU countries are gaining access to this business sector. The last experience was a rather quantitative change due to the economic stagnation, but what is coming to pass may be said to be a qualitative change of the transportation structure. PKP should be well aware of the fact that this is an imminent reality.

2.6.5 International Transportation

Poland, being a country in Europe, is to play an important role in international transportation, especially in the sector of freight transportation. In 1995, international freight transportation by PKP amounted to 82.8 million tons and 34.3 billion ton-km, which account for 37% in tonnage and 50% in ton-km in PKP's total freight transportation. From this, it is presumed that PKP's international freight transportation is on the track to recovery while the Polish economy is moving from the chaotic period to stability.

International transportation consists of export, import and transit. Export means that the goods are consigned to PKP in Poland to convey them by railways to a neighboring country or to a port so that the goods could be exported by vessels. Import refers to the opposite case. Transit means the goods first enter Poland by either railway or vessel, are conveyed by railways and then carried aboard by railway or vessel. Among these three, exports represent the largest share in international transportation, accounting for 66% in tonnage and 67% in ton-km. This is of course the fruit of PKP's business development activities, but at the same time, it might be largely due to the fact that PKP is the dominant transport institution in Poland.

PKP's International Freight Traffic Volume

Year	1990	1991	1992	1993	1994	1995
Traffic (million tons)	278	255	200	212	213	224
Domestic	198 (72)	166(74)	143(73)	149(71)	141(66)	141(63)
International	79(28)	59(26)	55(27)	64(29)	72(34)	83(37)
Export	49	52	39	41	51	55
Import	23	13	13	17	16	22
Transit	8	4	4	5	6	6
Traffic (100 million ton-km)	835	651	577	643	657	691
Domestic	485(68)	418(64)	359(62)	372(68)	345(53)	347(50)
International	349(42)	233(36)	217(38)	271(42)	311(48)	343(50)
Export	215	154	148	183	227	233
Import	89	55	50	65	56	78
Transit	45	24	19	23	28	32

Source : PKP Annual Report

Among the items associated with international transportation, coal accounts for a large share in exports while ore represents by far the greater share in imports. The recent trend is an increase in products transportation by containers, etc. Details are shown in the following.

Railway Transportation of Imported Goods (1000 tons)

Item	1980	1985	1990	1995	Remarks
Coal	10,731	1,071	574	1,131	
Brown coal	4	97	7	45	
Ore	20,161	12,111	8,506	6,215	Due to change of economic system
Stone, etc.	60	65	45	63	
Petroleum	2,284	2,015	1,496	1,538	
Metals	3,709	2,871	2,144	1,352	
Cement	97	10	30	2	
Fertilizer	3,423	4,035	915	935	Increase in domestic production
Chemicals	1,249	1,026	1,064	10,759	
Cereals	7,035	1,866	1,360	1,655	Due to change of economic system
Other farming products	2,224	1,451	642	811	
Lumber	533	459	172	303	
Others	3,761	3,304	1,791	1,420	
Total	45,613	35,638	22,709	22,015	

Railway Transportation of Export Goods

Coal	30,727	34,088	26,102	31,790	
Brown coal	1,702	1,666	3,346	3,928	
Ore	18	185	84	191	
Stone, etc.	70	65	24	3,125	Construction boom in Germany
Gravel, Sand	85	3	74	29	
Petroleum	831	481	1,032	762	
Metals	3,000	2,756	5,497	3,808	
Cement	1,233	1,152	712	3,113	
Fertilizer	297	210	1,456	1,570	
Chemicals	3,694	3,193	3,116	3,676	
Farming products	524	1,580	2,278	1,724	
Lumber	1,553	2,126	742	315	
Others	2,725	2,403	2,481	2,116	
Total	46,459	52,645	49,146	55,256	

As junction station for international freight transportation, there are 36 stations (31 inland stations; 5 seaport stations). The traffic volume of international cargoes in those stations in 1995 is shown below.

International freight volume by rail (10,000 tons)

	Export	Import	Transit	Total
	5525	2201	564	8291
(Connection with Russia)	32	55	62	94
Braniewo	4	55	5	65
Glomno	1			1
Skandawa	26		1	27
(Connection with Belarus)	102	252	56	411
Kuznica	3	11	1	15
Sieminowca	3	48	1	53
Czeremcha	1			1
Terespol	95	193	54	342
(Connection with Ukraine)	903	903	161	1967
Dorohus	442	10		452
Hrubieszow	123	479	1	602
Werchrata	54			54
Medyka	284	414	160	859
(Connection with Lithuania)	1	2	3	6
Trakiszki	1	2	3	6
(Connection with Germany)	1034	140	66	1239
Szlzecin	105	55	3	162
Kostrzyn	170	4	1	175
Kunowice	269	48	57	373
Gubin	169	1		170
Zasieki	201	15	3	219
Bielawa	120	17	2	1394
(Connection with Czecho)	695	312	105	1115
Zawidow	15	2	28	46
Lubawka	7	12	2	21
Mieroszow	35	8	1	44
Miedzylesie	25	39	5	69
Glucholazy	2	3		5
Chalupki	254	65	33	352
Zebrzydowice	218	174	17	408
Marklowwice	139	9	19	168
(Connection with Slovakia)	190	118	91	399
Muszyna	141	105	91	336
Zwardon	49	13	1	63
(Incominigs and outgoings at seaports)	2569	418	71	3059
Swinoujscie	400	184	47	631
Szczecin	717	133	23	873
Gdansk	1078	30		1108
Gdynia	366	71	1	439
Kolobrzeg	8			8

As the track gauge differs in Russia, Lithuania, Belarus and Ukraine, goods for these states are transshipped at the junction stations near the national border.

On international transportation, bilateral agreements have been concluded with the trading partner countries, while the transportation plan was formulated to facilitate the traffic such that 60 international preferential freight trains (TEA, TEC, TED, TET) have been designated and given top priority and differentiated from some 480 international general freight trains (TGL, TGR, TGZ, TGT) in transportation operations.

International preferential freight trains:

TEA ... EUC standard transport trains (20)

TEC ... Transport trains connected with containers, etc. (20)

TED ... Transport trains under international agreements (16)

TET ... Transit transport trains with priority (4)

International freight general trains:

TGL ... Local transport trains (263)

TGR ... Collected transport trains (116)

TGZ ... Exclusive-use freight transport trains (80)

TGT ... Transit transport trains (21)

With the progress of internationalization in railway transportation promoted by pushing forward of the market economy, there are many things required of PKP, the most important of all are the improvement of the preferential freight car bodies and the refurbishment and functional upgrading of the freight car terminals. The improvement has been done in some areas in conjunction with the handling of containers, etc. but much positive measures should be taken for improvement of the facilities. There are many connection lines for international transportation, and it seems sufficient transportation capacity has been provided. However, the improvement of the goods transshipping facilities for transportation to the countries with different track gauges and the simplification of the international transportation procedure are considered to be among the problems requiring urgent attention.

2.6.6 Holding and Operation of Freight Cars

In the booming days of freight transportation, PKP had owned more than 200,000 freight cars, but in the stagnant period, the superannuated cars were abolished ad surplus freight cars were put out of service in response to the falling transport volume. Consequently, the number decreased to 111,455 according to PKP's accounting book in 1995, but if the number of privately owned freight cars (about 27,800 cars) is counted in, the total amounts to 139,000. Among them, those in operation are 73,435, accounting for roughly 53% of the total.

When different types of cars are compared, coal cars have a share of 66%, as shown in the table below:

PKP's Freight Cars in Operation by Type

Total	Box cars	Coal cars	Gondola cars	Tank cars	Refrigerator cars	Special cars
(100)73435	(13)9376	(66)48259	(8)6027	(8)5651	( )254	(5)3868

Freight cars have been modernized every year to meet the changes in the users' demand; for example, 616 cars were modernized and 399 new cars were purchased in 1995. Modern cars are fewer in number, however, due to limited investment funds. As a result, the cars have rather deteriorated from use for many years as the freight cars are 18 years old on average, some of them being wooden cars. In general, the freight cars may better be said to be outdated rather than superannuated. Under these circumstances, private forwarding firms or the like have been using special cars of their own, and some of them even possess containers responding to the increase in container transportation demand in recent years. They are nonetheless insufficient to satisfy new demand, for example, to transport secondary products and other value-added goods which need to arrive quickly and at precise time, whether transportation is international or domestic.

As for freight car use condition, with 4,398,000 used freight cars (those shipped loaded with cargoes) of each DOKP of PKP in 1995, the shipping tonnage amounted to 208,654,000 tons, the average loading tonnage a car being 47.44 tons. Therefore, that shipping tonnage accounts for 87.9% of the loading capacity of the cars used of 237,396,000 tons, so that this may be said to be transportation with good loading efficiency.

Average loading tonnage a car = annual shipping tonnage ÷ annual number of cars used

47.44 tons = 208,654,000 tons ÷ 4,398,000 cars

Average loading efficiency a car = annual shipping tonnage ÷ possible annual loading tonnage of cars used

89.7% = 208,654,000 tons ÷ 237,396,000 tons

On the other hand, as for the freight car use efficiency stood at 16.4%, a slight drop from 1989.

Freight car use efficiency = Number of cars used a day ÷ number of cars available

16.4% = 12,049 cars (4,398,000 ÷ 365) ÷ 73,435 cars

(For reference) Freight car use efficiency in 1989

18.69% = 25,443 cars (9,287,000 ÷ 365) ÷ 36,128 cars

A general impression is that PKP seems to be making do on the outdated freight cars to meet the transportation demand.

2.6.7 Sales System

The forwarding system consists of three categories: car-unit service, train-unit service and combined transport service. The freight rates are divided into domestic and international, and the domestic rates are set according to transportation distance, weight and transportation speed. The services and the applicable rates are as follows.

* Car-unit service Conveyance in units of 1 to 2 cars
* Train-unit service Conveyance in units of actual goods weight of 800 tons or more
* Combined transportation Dual mode transportation using other means of transportation, such as containers

The rates for handling coal and ore are set by the government in line with the national policy and the rates for other goods can be decided by PKP. The basic rates are as shown below.

Basic Rates for Coal and Ore (ZL)

Distance • Weight	10 tons	15 tons	20 tons	25 tons
100 km	16.22	13.19	11.65	16.17
500 km	44.61	36.26	32.04	27.86
1000 km	80.07	65.04	57.57	50.03

Basic Rates for General Cargoes (ZL)

Distance • Weight	10 tons	15 tons	20 tons	25 tons
100 km	16.92	13.76	12.11	10.61
500 km	46.55	37.84	33.43	29.18
1000 km	83.56	67.87	60.07	52.20

As a general rule, express services are priced 50% higher, and predetermined discount rates are applied to train-unit services. In addition, an extra charge is collected from the goods requiring other special services.

For clients, fixed discounts are offered provided that certain conditions are met. Larger discounts may be provided if a proposal to the committee established by PKP is approved. Upon making such a proposal, it is essential to explain that proposed discount is reasonable, by presenting materials serving as evidence.

MTT (International Tariff) freight rates are applied to international transport freight. (PKP rates will be applied when necessary.)

MTT Rates (ZL)

Weight tons / Distance km	10	25
1500	16.79	10.63
2000	19.79	12.08
2500	21.34	13.52

Meanwhile, the sales system of freight transportation uses as the bases the forwarding stations at about 6,200 places across the country, which receive freight orders and perform delivery and storage tasks. A freight sales headquarters is established at the main office, a freight sales department is provided in each administrative bureau (for a total of 8 departments), and a freight sales branch is posed in every district (for a total of 48 branches), which together carry

out freight sales.

The freight sales department not only offers comprehensive consulting services to the clients with regard to physical distribution, but also has the authority to set freight rates and negotiate discounts. As a rule, they can set discounts up to 5% if certain conditions are met, but the freight sales headquarters are in charge of larger discounts and rates concerning international freight transportation.

If PKP is to become a private business and operates in fierce competition with other means of transportation, it is important to consider the measures listed below to secure and increase the clients.

① Setting long-term contract rates
② Setting standard mass transport rates
③ Setting shuttle transport rates
④ Setting door-to-door fixed rates
⑤ Setting base-to-base transport rates
⑥ Setting competitive rates considering rates of rival transport services

It is considered necessary to execute sales plans by establishing basic rules and carrying out those rules in a flexible manner.

2.6.8 Off-Rail Transportation

Although railway transport is conducted by using tracks, fright transport is not limited to the services on railway tracks alone. Transport service is concluded only after the goods have been conveyed from the consignor's door to the consignee's door. In Poland, railways underwent substantial development, covering every corner of the nation. Along the rails, many freight stations were built to meet the demand of consignors. Also, the consignors installed exclusive-use lines leading to the railway stations when necessity required.

Ordinary consignors without the private lines, however, had to convey the goods from the stations to their doors at their own expenses, and trucking companies undertook the transportation tasks if the consignor did not own a truck. Trucks have the potential to grow into a powerful rival against railway transportation because the activity range of trucks expands as the economy is stimulated in the course of shifting to the market economy.

Therefore, it is necessary for the railway institution to establish a cooperative system with trucking companies charged with off-rail transportation, and even run the off-rail conveying business on its own, or otherwise affiliate the trucking firms under its control for the development of railway transportation in the future.

In Poland, PSK (inland forwarding firm) has conventionally managed the forwarding operations as the state-run business. After the national system was changed, however, the forwarding business has been made open to public, the railway business does transportation only on the rail, while it has become possible for the trucking companies can freely perform the off-rail transportation, and many forwarders came into being. Under these circumstances, in 1991 PSK merged with a Sweden firm to build SPEDPOL. Further in 1994, the railway department of SPEDPOL became an independent enterprise and is engaged in domestic container business.

At present, it is said that there are as many as 60,000 truckers in Poland. In actuality, 272 trucking firms are registered in a catalog. Of them, 138 are business corporations, the remaining 134 being incorporated business operators.

By region, there are 43 corporations in Warsaw, 17 in Poznan, 19 in Gudnya, 12 in Katowice, and 12 in Krakow. However, it seems that they do not possess sufficient transport equipment, nor do they have cooperative relations with railway transportation.

In order for PKP's freight transportation to develop in the future, it is necessary to establish the transportation system suitable for new transportation demand. As a part of efforts in this direction, it is required to establish an off-rail transportation system.

2.6.9 Freight Transportation Workforce

The number of employees at PKP was 239,186 in 1995, following the promotion of rationalization. Among them, the number of employees engaged in freight transportation remains undisclosed. If PKP is to be privatized in the future, there would be no alternative but to severely rationalize its workforce in both the passenger and freight sections, for the two to operate as separate business entities. It is necessary to establish rules to calculate the number of essential personnel in different departments, and aim to boost productivity pursuant to such rules.

According to the "PKP 1995 Annual Report", the revenue and costs of passenger and freight transportation are as follows.

Freight revenue 4,288 mill. ZL Freight cost 2,801 mill. ZL

Passenger revenue 1,061 mill. ZL Passenger cost 3,290 mill. ZL

Although it is easy to grasp the revenue of both passenger and freight, it is extremely difficult to know the breakdown of costs. This is because labor, facilities and cars are shared. Notwithstanding, arguments that it is easy to clearly determine 30% of the costs but difficult to break down the remaining 70%. PKP is expected to promptly establish rules.

Personnel as of October 1995 according to PKP data

○When separated into transportation and infrastructure	226,236
◆Passenger and Freight Departments	137,854
Passenger sales	18,319
Freight sales	9,682
Train operations	109,853
(Driving job at stations, etc.)	(46,256)
(Train crew, terminal)	(63,597)
◆Infrastructure	70,050
Maintenance (track)	43,945
Electric	13,537
Automation, information	12,568
◆Other common service	18,332

When comparing productivity with other countries, it is necessary to clarify the scope of work in which the personnel are engaged.

2.6.10 Revenue and Costs of Freight Transportation

For the 1990 base year, freight traffic volume decreased by about 20% in 1995, from 281 million tons to 225 million tons. On the other hand, revenue increased by 290%, from 1,479 million zl to 4,288 million zl. due to modifications in the transport rates during this period.

By the end of the 1980's, Poland reformed its socio-economic structure at a rapid speed. This gave rise to confusion in the economy and triggered off hyperinflation by the beginning of the 1990's, leading to skyrocketing prices. PKP responded to this situation by amending its transport rates, increasing the rates by 865% in 1989; 375% in 1990; 24% in 1991; 25% in

1992; 49% in 1993; 15% in 1994; and 17% in 1995.

During the same period, PKP's operating revenue increased by some 347% from 1731 million zl in 1990 to 5992 million zl in 1995. Freight revenue suffered a slight decline in the share of PKP's total operating revenue due to the stagnation in the traffic volume, but may be regarded as the major source of income for PKP.

Meanwhile, freight transportation costs increased by only 244% from 1146 million zl in 1990 to 2801 million zl in 1995, a far less increase than the 369% increase of PKP's total costs from 1925 million zl in 1990 to 7096 million zl in 1995. This is probably due to various rationalization measures taken as mentioned in the previous section.

Consequently, profits from freight transportation rose by 438% from 339 million zl in 1990 to 1487 million PNL.

2.7 RAILWAY-RELATED BUSINESSES

2.7.1 Position of RRB in the PKP

RRB are not organized untidily in the PKP. Those are managed under each related department separately. Retail businesses in the station-yard are controlled by each station and directed by regional directors. Staff's health and welfare institutions are controlled by 'Staff and Welfare Administration' and directed by regional directors. Concerning subsidiary companies of the PKP, in November 1996, new department -Office of Joint Stock Company, KBS- was established. The office consisting of four staff supervises and advises those companies on business matters as a representative of shareholder. The responsibility of the office is supposed to control the subsidiary 'companies', not to develop railway-related 'businesses'. In the new organization chart planned presently, a special department which deals with RRB is not considered. It is supposed that this suggests the PKP's basic consciousness to RRB.

2.7.2 RRB run currently

(1) Railway connected businesses (RCB)

1) Bus and truck

The PKP does not run its own bus and truck enterprise, but it has an international bus and truck company, and a forwarding company. They say that those financial situations are well.

2) Telecommunication

Polish telecommunication business was combined with post business before, now it has been separated and managed as a limited company owned by state, and it monopolizes the market. The PKP seems have good fundamental infrastructure to enter the market, especially before the tracks will be opened publicly in the future.

3) Rolling stock repairing and other construction businesses

After 1990, the demand for railway has reduced by around half. As a result, 76 repairing manufacturing and service companies for rolling stock and railway have been spun off from the PKP. Some of those companies are profitable and were inserted in National Investment Fund -

NIF-, but most of those depend on the orders from the PKP and the financial situations are bad (some of them have already gone bankrupt). The number of staff of those spun off companies were around 100,000 (not exact).

(2) Railway supporting businesses (RSB)

1) Travel agency

In every station yard visited, travel agencies -some of those are foreign companies- are run as tenants. In Warszawa Central station, the pictures of some 50 resort hotels are showed in an electric scoreboard together with those booking states and lodging charges, and they plans to sell the train tickets accompanying with hotel reservations this year in collaboration with the tenant travel agencies.

2) Train restaurant

Train restaurants connected with coaches are almost monopolized by one company -WARS- which has nothing to do with the PKP.

3) Station kiosk, restaurant and advertising agency

These businesses are managed by private companies as tenants in almost all stations. The rents are decided according to market prices of each district, 100 pln (Polish Zloty) monthly by 1 square meter at Warszawa Central station for example. When a station wants room for its own use, it usually can demand tenants to leave by giving 1 ~ 3 months' notice.

4) Shopping center

Gdansk station has been newly rebuilt recently, which is modeled on Polish old cultural heritage. A part of construction expenses was shared by a foreign architect company, so the whole station yard businesses are undertaken by the company on a thirty-year contract. Czestochowa station has been almost reconstructed in remarkably modern architecture style. The popularity of the tenant right is very high, on the other hand inside of a ten-year contracted fast food restaurant, over half of those lights were put off. The main reason is supposedly due to the burden of the utility expenses for the tenant. It slightly darkened the impression of the new beautiful station. There are no high-rise station shopping centers like those managed by Japanese railway companies.

5) Station hotel, real estate development, housing, resort development etc.

The PKP does not manage these synergistic businesses like those widely run by Japanese railway companies.

(3) Railway welfare businesses (RWB)

The PKP has many health care, welfare and educational facilities -especially some 116 thousand flats for staff-. They are considering how to reduce those mainly by selling for easing the financial burden on the PKP.

2.7.3 Legal forms of RRB

(1) Managing directly

Only health and welfare institutions are directly managed by the PKP itself as separated organizations.

(2) Renting

Almost all station yard businesses are run by each private companies by renting station rooms.

(3) Joint stock company (subsidiary company)

The PKP has some 60 joint stock companies. In those companies, 7 are profitable earning annual dividend of US$16,000 including a trading company which is hopeful for the future listing in stock exchange. But other companies are not profitable and the acquisition cost of some 30 companies' shares had been exchanged from the PKP's accounts receivable to those after the bankruptcy.

(4) Spun off companies

76 rolling stock repairing, railway construction and equipment manufacturing companies which had been formerly included in the PKP were spun off in recent 6 years together with around 100,000 staff. Now those are not connected with the PKP on capital. Most of them are in the bad financial situation.

2.8 INFRASTRUCTURE

2.8.1 Track Maintenance

(1) Track Structure

Ballast tracks are the basic structure, with ballast and rails applied to reinforced concrete ties. Most of the track materials are produced in Poland. On lines of importance, continuous welded rails using UIC60 rails are being adopted. Instead of conventional fastening devices with bolts, which made maintenance tasks troublesome, double fastening devices (SB3-type fastener) are now being applied on the trunk lines, helping to reduce the workload of maintenance. However, no nose movable are being used even in high-speed sections (Central Trunk Line: CMK = Centralna Magistrala Kolejowa, max. speed = 160 km/h).

(2) Maintenance/Inspection Tracks

There are 243 track-maintenance depots in the whole country, each of which are in charge of a section as long as 5 - 7 km. There are roughly 30,000 workers engaged in track maintenance work. For the inspection of tracks, Plasser's EM-120-type track measurement car is being used.

(3) Mechanical Maintenance

All track maintenance tasks are basically mechanized and various maintenance machines are positioned in each track-maintenance depot and mechanical track maintenance division (there are 8 divisions across the nation).

(4) Maintenance Conditions of Tracks

Track-maintenance targets have not necessarily been met in every section, due to the maintenance costs involved. To start with, sections with higher profitability are being modernized. For example, E-20 (Kunowice-Warszawa), E-65 (Gdynia-Warszawa-Katowice), E-59 (Wroclaw-Poznan, and Poznan-Szczecin), CMK are given top priority for maintenance and modernization.

Having been on trunk-line trains, for which the infrastructure is suitable for traveling at 120 km/h (160 km/h in the case of CMK), it is fair to say that ride comfort was adequate even though rolling stock is old and the maintenance conditions of tracks are reasonable.

(5) Major Issues

Although it is difficult to make a definite statement without analyzing the number of employees in detail, it appears that there are too many employees despite the fact that most track maintenance tasks are mechanized. In view of PKP's management in the future, it would be prudent to reduce costs by increasing the pace of rationalization or by making a separate track maintenance department, or by contracting the maintenance work.

2.8.2 Civil Structures

(1) Main Civil Structures

Civil structures in PKP's route include bridges, viaducts, and tunnels, but most of them are earth structures. Excluding earth structures, the number of civil structures totals roughly 35,700, with total distance amounting to approximately 880 km. Among these, about 10,000 are bridges with span length of 3 m or more and the rest of them are mostly culverts. There are also viaducts but they are few in numbers, merely situated around Warszawa and the modernized section of the E-20 route. There are 24 tunnels, many of which are located in the southwestern part of Poland. The longest tunnel stretches as far as 1,200 m.

(2) Major Issues

Maintenance or modernization work has hardly been done on PKP's civil structures since they were built. Hence, they are becoming deteriorated, such that roughly 80% of them are more than 53 years old. In particular, 55% of the steel bridges are over 80 years old. Even though about half of all the bridges need to be replaced, the fact is that merely 10% have actually been renewed, owing to the shortage of funds. Taking civil structures as a whole, there is a plan to renew all deteriorated facilities within 10 years, from the mid-1980s to the mid-1990s, while only 20% have actually been replaced so far.

Because the funds available to renew civil structures are limited in this way, it is important to adopt a strategy that directs funds into specific sections on a preferential basis, taking both economic efficiency and safety into account.

2.8.3 Level Crossings

(1)Number of Level Crossings

The number of PKP's level crossings is as follows.

Type of Level Crossings	Number
A Level crossing with barriers (guarded by track maintenance staff or station staff)	3,660
B Automatic crossing barriers (unattended)	257
C Level crossings with signals	1,539
D No crossing barrier/signal (nothing at all)	11,860
E For pedestrians only (no access to automobiles)	424
F Level crossings in private land	1,077
Total	18,817

(2) Improvement of Safety for Level Crossings

PKP is applying the following measures to improve the safety of level crossings in line with the modernization.

- Abolish level crossings without signals. As local residents would protest against this, aim to integrate/abolish level crossings by making a sidewalk so that pedestrians can cross.
- Install automatic semi-crossing barriers. This, however, requires investment.
- Construct overpass crossings in extreme cases.

2.8.4 Architecture/Building

(1) Present Status

PKP's architecture department, with approximately 4,000 staff members, maintains and manages 3,200 station buildings, hospitals and sanitariums. There are roughly 120 large stations across the country, such as Warszawa Centralna station and Gdansk station and Wroclaw station, and the others are mostly medium-sized stations with space for approximately 10,000 cubic meters. There are also some 120 railway buildings in by PKP which are designated as cultural property.

(2) Major Issues

As in the case of other infrastructure sectors, the architecture department has a limited budget to renovate and modernize station buildings. The fact is that only around one-third of all station buildings requiring renovation have actually been renovated. The 1995 budget for station and building renovation was 22.5 million PLN.

Nevertheless, modernization is effective in boosting passenger demand; for instance, Gdansk, Krakow and Czestochowa stations, which have already been renovated, are contributing to improve the quality of railway passenger transport services.

Therefore, in the future it will be essential to aggressively procure funds from external sources from local governments, related businesses and users, in order to renovate/modernize station buildings and promote the development of related business in the station. For example, "First Class" company is financing 80% of the costs to renovate Gdansk station, and has won rights to run business for the next 30 years. However, careful consideration must be given to introduce external funds, because related business needs to be fostered in order to absorb surplus labor at PKP in the future.

2.8.5 Electric traction equipment

(1) Present status (Table 2.8.1)

The electrified lines of PKP cover most of its important routes and the length of electrified lines (11,627 km) is 51% of PKP's railway network. The electrification system is DC 3,000 volt except for a 32 km suburban line at Warszawa that is run of DC 600 volt. Total number of staff concerned with this department is 13,600.

Major parameters of electric traction equipment are as follows.

- Substations

  Average space: 20 - 25 km

  Capacity: 6 - 15MW

  Transmission line: 15 - 30 kv

- Overhead equipment

  Contact wire: Double 100 or 150 square mm hard copper wire

  Catenary wire: 120 square mm copper stranded wire (or 95–240 square mm)

  Height of contact wire: 4,9 - 5 m - 6.1 m

Table 2.8.1 Status of Electric Traction Equipment

Item	1994	1995
Electrified track		
Route length (km)	11,613	11,627
Track length (km)	26,983	26,897
Main track (km)	19,851	19,878
Transmission line		
Total length (km)	3,196	3,248
Cable length (km)	989	999
Traction substation		
Total number	448	448
Total capacity (MW)	2,739	2,739
Traction substation (Remote controlled)		
Total number	177	203

(2) Major Issues

1) 92% of the total passenger and freight volume are transported in electrified lines (51% of the total length of PKP lines), and unelectrified lines cover the remaining 8% (using diesel locomotives). This is an issue to be considered for the restructuring of PKP as a whole, not only the railway infrastructure sector. In addition, it is fair to say that electrification is more cost-efficient to operate than diesel locomotives.

2) The future electrification plan merely covers 3 lines, 250 km in total.

3) To increase train speed, the electric traction department must reinforce and renew overhead trolleys installed 40 years ago because they are becoming deteriorated.

4) At PKP restructuring, the issue is whether to make traction substations belong to the infrastructure sector or an independent power-supply department.

5) Most substations are manually controlled.

6) Some of the contact wire system is anchored in a single span which might cause problems in high-speed operation.

2.8.6 Signalling

(1) Present Status (Table 2. 8. 2)

26,295 (48%) of the 55,077 switch signal boxes are automated at PKP. The main producer of electrically centralized signal box for switches is ADtranz SIGNALS Ltd. Moreover, introduction of computer-controlled switches to PKP has been already started. These are facilities of EBKOCK P50 type, which are produced by ADtranz at Swedish license. They were given to exploitation in 1995 at Ozarow Mazowiecki station (20 switches). The second system of computer-controlled switches, which has been admitted to track laying at PKP network, is a system of ESTW L-90 type, of ALCATEL SEL company and of German production. Opalenica station located on the E-20 international line was the first station where this system was placed in revenue-service. The number of centralized switches at this station is 25. Moreover, there are 28,558 light signals installed at PKP representing 85% of total signals installed in PKP stations.

Table 2. 8. 2 Status of Signalling

Item	1994	1995
Signal boxes in stations		
Total Number of boxes	4,045	3,936
Number of switches	56,058	55,077
Electrically centralized		
Number of boxes	1,188	1,192
Number of switches	26,306	26,295
Line block		
Semi-automatic (km)	15,118	15,168
Automatic (km)	2,228	2,232
Signal		
Total number of signals	33,989	33,442
Number of light signals	28,772	28,558
Centralized traffic control		
Route length (km)	271	425
Number of stations	16	21
Number of switches	201	224
Automatic train stop equipment		
Route length (km)	17,335	17,601
Number of ground spots	18,508	18,345
Marshaling yards		
Total number of hump yards	80	75
Number of automated yards	14	14
Number of switches	482	469

(2) Major Issues

1) As in the case of other railway infrastructure sectors, the Signal Department must endeavor to modernize the facilities, rationalize its workforce and curtail its operation costs.

2) Present automatic train stop equipment warns locomotive drivers passing a signal without any relation to the signal aspect. This results in drivers' sometimes running over a stop signal unconsciously and causing bad accidents. The present system should be improved, so that it can check to see if the speed of locomotive is in accordance with signal aspect which stops the locomotive when necessary. At present there are many trials of introduction of modern track-vehicle interaction systems. The KHP system is to be adopted. This trial is conducted by CNTK (Centrum Naukowo Techniczne Kolejnictwa, Scientific Technical Center of Railway Industry). The KHP system is to deliver information on traction vehicles of current signaling messages from track signal and of permissible speed. Train speeds are also to be controlled by the permissible speed by engine-driver. At present, these trials are being conducted at the coal line, Tarnowskie Gory - Gdynia in the northern section of PKP. Moreover, the cab signaling system of EBICAB-900 type is going to be introduced. It is the Swedish ABB signaling system. This trial is being conducted at Central Trunk Line (CMK): Warszawa-Katowice.

3) In semi-automatic blocks, covering 15,168 km trunk lines, track circuits are provided only at the entrance of each block section, requiring operators at every section to check for passing trains. In automatic block, such operators are not necessary. According to agreements signed by PKP and Danish NKT-Dedicom company, at PKP network there are being conducted trials for introduction of the modern electronic automatic line block-system with the ability of dependent signal's transmission in copper cable or light-fibre cable. The system is to be adopted in 1997.

4) There are as many as 11,860 level crossings without any protection, and 3,660 level crossings with manually operated gates. They shall be equipped with automatic protection and/or automatic gates, considering the traffic density of both railway and road. As to introduction of automatic signaling facilities at level crossings, there are experimental trials being conducted to adopt the modern systems at PKP, such as SPA-4 system of ADtranz ZWUS Co. Ltd., Siemens and Schedt und Budimong. These systems will be installed on trunk

lines.

5) Only 425 km in route length are equipped with Centralized Traffic Control (CTC). For efficient train operation and for preventing the train delays, CTC or train monitoring equipment will be useful.

6) 14 marshaling yards have computer automation, which control the switches in the hump yard and wagon speeds. However, wagon cargo is sometimes damaged because of excessive speed in the connection of wagons.

2.8.7 Telecommunication

1) Present Status (Table 2. 8. 3)

For modernizing PKP telecommunication network, there have been taken up the activities of connecting the main telephone-exchanges (11 ones) and light-fibre cables. At the end of 1995 there were 3,911 km of light-fibre-cables installed at PKP network. The following plans provide for about 500 km of light-fibre cables to be put-down yearly.

Modern digital exchanges have been purchased. In 1996 the KAPSCH's digital exchange system was installed in Katowice (4,200 numbers). In 1997 other 10 main exchanges are to be installed (about 35,000 numbers). They are now being delivered to PKP. Considering the result of tender, a modern transmission system (SDH system) of 140 Mbit/s and 34Mbit/s has been chosen. This system secures the whole transmission for systems of telecommunication and information. These systems are at present being installed at light-fibre cable's route (3,911 km). Telecommunication network, which now being formed, are going to be an integrated multi-service network fitted with ISDN standards.

It will replace copper cables and electro-mechanized telephone-exchanges that have been worn out. In forming the network, PKP utilized a great deal of credits of the Word Bank and the European Investment Bank (EIB).

Table 2. 8. 3 Status of telecommunication

Item	1994	1995
Telecommunication line		
Open wire route length (km)	8,087	7,226
Wire length (km)	122,579	117,033
Cable route length (km)	13,780	14,254
Cable length (km)	35,197	35,964
Wire length (km)	2,529,413	2,807,35
Cable light-fiber line (km)	3,274	3,911
(fiber-km)	41,818	49,955
Telephone exchange		
Automatic exchange		
Number of exchanges (sets)	1,416	1,305
Number of subscribers (units)	127,991	125,643
Manual exchanger		
Number of exchangers (sets)	379	355
Number of subscribers (units)	10,607	10,207
Dispatcher telephone		
Number of sets (sets)	2,563	2,191
Multiple telephone carrier		
PCM (sets)	334	397
Mobile radio		
Length of route installed (km)	15,300	16,636
Number of equipment	53,039	55,033
(Base and mobile)		

(2) Major Issues

1) Although the Telecommunication Department is in the process of cutting its workforce, it needs to modernize telecommunication facilities, further rationalize its workforce and slash its operating costs because the budget for facility maintenance is limited.

2) One of the most important issues during PKP reform is how to deal with the Telecommunication Department. The plan under consideration is whether to make the Telecommunication Department itself become an independent business from PKP or to incorporate it into the Infrastructure Sector. To this end, it will be necessary to clarify how telecommunication assets and its fees should relate to the Infrastructure Sector in the future and figure out how profitable they would be.

2.8.8 Investment in Railway Infrastructure

(1) Contents of Investment

Considering the conditions of railway infrastructure stated above, PKP is investing in railway infrastructure under the following policies.

- Abolish outdated facilities dating back to the 19th century and surplus facilities.
- Establish a new railway network that suits the status of the EU.
- Modernize railway lines pursuant to AGC and AGTC.

Specifically, PKP is in investing in the following projects.

- Upgrade transport services by shortening the time consumed for transportation (i.e. faster services).
- Eliminate sections (routes) with insufficient transport capacity.
- Endeavor to rationalize operations (curtail costs, improve transport efficiency, reduce breakdowns, minimize environmental impact).
- Modernize large passenger stations.
- Modernize stations in major cities and improve depots for rolling stocks to be used for transportation in large cities.
- Establish facilities to improve passenger services and keep buildings and rolling stocks for passengers clean.
- Modernize workshops to handle new models.
- Modernize marshaling yards.

Under these policies, PKP's investment in railway infrastructure amounted to 969 million PLN in 1995. The investment was mainly directed to: modernize the western section of the E-20 line (Warszawa-Poznan-Kunowice, speed increase to 160 km/h), the E-59 line (Wroclaw-Poznan and Poznan-Szczecin, speed increase to 160 km/h), the E-65 line (Gdynia-Warszawa-Katowice, speed increase to 160 km/h by the introduction of tilt train) and Central Trunk Line (CMK, speed increase to 250 km/h); reconstruct stations; and digitize the telecommunication network.

Among these, the project to modernize the E-20 line, which is given top priority and is the largest project in PKP, has the targets described below and aims to increase the maximum speed to 160 km/h and axle load to 22.5 tons. The costs to modernize the western section extending to 479 km amount to 487 million ECU.

- Improve curves.
- Modernize stations.
- Renew track materials
- Improve signal/telecommunication facilities
- Extend the effective length of stations to 750 m. At the same time, improve station layout (a condition for combined transportation as set forth in the AGTC).

The costs required to modernize railway lines are high because they have been neglected for a long period of time. Although it depends on the area and line, the modernization cost is 2 million ECU/km. It is much higher than the modernization costs incurred by German railways (former East Germany).

Investment is covered by self-financing of PKP, as well as grants and loans from PHARE, the World Bank and the European Investment Bank.

(2) Major Issues

1) The biggest problem in the investment plan is the shortage of funds at the PKP itself, not to mention the limited government budget. The Polish government's guarantee is required to acquire loans from international banks, but the government does not easily give such guarantee. Out of investment funds for railways in 1996, government subsidies accounted for 48% and gratuitous funds from EU countries 13%. Credit accounted for 81% of the self-financing portion of the investment. This implies that the funds (PKP's funds) which PKP may use for investment by itself are less than the amount of funds supplied from external sources. This situation is likely to continue, and the share of PKP's funds in investment would probably decrease further in the future.

2) Under the PKP law enforced on November 20, 1995, investment in Lines of National Importance is to be financed by the government budget. The budget needs to be approved by the national assembly, which serves to clarify the government's role in Lines of National Importance. Nevertheless, the budget for development of infrastructure seems to be quite limited.

3) Designation of AGC and AGTC agreed by the Polish government obligates PKP to modernize more than 5,000 km of railway lines. These lines are components of all European network, and according to AGC and AGTC, their technical parameters have to be improved so

as to meet the European Union's requirements.

4) PKP's railway infrastructure is outdated due to the shortage of funds for modernization and renewal. As a result, the technical state of PKP's railway network is deteriorating. Though trunk lines are well maintained, some lines are maintained only to secure safety of railway transport. Arrears in railway infrastructure's maintenance and modernization from 1989 to 1995 are the following:

- Track - 6,373 km
- Turnouts - 7,123 units
- Bridges - 5,350 units
- Level crossing - 1,210
- Telephone exchanges - 33,560 numbers
- Telecommunication cable lines - 5,525 km
- Traction network - 3,970 track-km
- Electric heating for turnouts - 2,700 units, etc.

5) The so-called "surplus infrastructure" problem is very complicated. PKP has already defined surplus objects for its activity in material and expense meaning. PKP has a definite program of infrastructure's limitation.

6) According to the PKP restructuring program, PKP is to be divided into four sectors, that is, passengers, freight, infrastructure, and traction. In response the Infrastructure Sector needs to start renewing deteriorated facilities and make investments to boost railway's competitiveness against other means of transportation on a preferential basis, estimating the size of the infrastructure in the future.

2.9 OPERATION AND ROLLING STOCK DIVISIONS

2.9.1 Current Conditions

(1) Available Rolling Stock and Operational Rolling Stock

The total rolling stock owned by the PKP and the average operational rolling stock for 1991 (1990) and 1996 (1995) are shown in the table below. The size of the operational rolling stock is defined as the average size of the rolling stock which is technically usable minus reserve cars and which is used for at least one hour in a 24 hour period. Compared to fiscal 1990/91, the ratio of the operational rolling stock in 1995/96 generally improved except for PCs and DLs.

Number of Rolling Stock (Unit: cars; trains for EMUs)

	ELs	DLs	EMUs	PCs	FCs	Year
Available Rolling Stock	2,512	4,189	1,173	6,789	186,184	1991
	1,549	2,700	1,020	7,410	111,455	1996
Operational Rolling Stock	1,706	2,268	1,052	5,865	89,940	1990
	1,412	1,454	993	4,569	73,435	1995
Ratio of Operational Rolling Stock	68%	54%	90%	86%	48%	1990-91
	91%	54%	97%	62%	66%	1995-96

Sources: PKP Yearbook and Interview Survey by JICA Study Team in January, 1997

The reserve ratio of DLs is particularly high. If there is no further planned use of many DLs, they should be either scrapped or sold at the time of privatization. If they are required for national defense purposes, they could be transferred to the appropriate organization so that the PKP can receive the maintenance charge.

Types of Trains and Average Operational Rolling Stock (Unit: cars)

	ELs	DLs	Total	EMU (Trains)
Passenger Trains	434.1	313.5	747.6	992.7
Freight Trains	912.4	208.6	1,121.0	
Other Trains	15.0	153.4	168.4	
Shunting Work	50.6	779.0	829.6	
Total	1,412.1	1,454.5	2,866.6	992.7

Source: PKP Yearbook

In regard to the average train size of EMU, 41% of passenger trains are EMU. Inclusive of the trains pulled by an EL, 75% of passenger trains and 81% of freight trains are electric trains.

Car-km and Car-Ton-km by Train Type

	Passenger Trains	Freight Trains	Other Trains	Unit
Car-km	172,654	107,828	10,640	1,000 km
Car-Ton-km	51,570	142,398	2,290	1 million-ton-km

Source: PKP Yearbook

While passenger trains account for some 60% in terms of car-km, their share is less than 30% in terms of car-ton-km.

(2) Performance and Maintenance of Rolling Stock

The EC and IC trains of the PKP provided a splendid ride in those sections with good track conditions. It is unfortunate that an excessively long period of slow speed is experienced during the final approach to and departure from stations. Efforts are required to increase the nominal speed of the trains.

Train Speed (1995) (Unit: km/hr)

Train Type	Average Speed	Scheduled Speed	EL Traction	EMU	DL Traction	DMU
Passenger Trains	60.1	50.0	61.3	45.8	39.3	37.3
Euro City	98.2	91.3	91.3		97.5	
Inter City	98.5	88.2	88.2		48.7	
Express	91.0	80.9	81.0		38.3	
Fast Train	72.7	63.1	64.2	58.5	50.3	29.0
Long Distance	54.5	45.9	51.5	44.1	39.1	31.0
Local Train	53.5	43.7	48.2	45.4	38.6	38.0
Freight Trains	43.7	29.5	30.2		25.1	
Express	52.7	39.0	39.1		32.5	
Fast Train	49.5	36.4	36.4		35.2	
Long Distance	44.2	29.5	29.9		24.8	
International	38.1	23.5	23.6		22.5	

The followings shows main features of PKP power vehicle.

PKP Power Vehicle

Electric Locomotive		Axle arrangement	Weight	Tractive force	Max speed	Rated output	
Type	Volume		ton	Max kN	km/h	Cont. kW	Remarks
EP 05	8	Bo - Bo	82.5	194	160	2,032	
EU 06 EU 07	366	Bo - Bo	80.0	294	125	2,000	Bolt, Autocupler
EP 08	9	Bo - Bo	82.0	200	160	2,000	
EP 09	27	Bo - Bo	83.5	195	160	2,940	
EM 10	4	Bo - Bo	72.0		80	960	
ET 21	121	Co - Co	120.0	250	100	1,860	
ET 22	808	Co - Co	120.0	300	125	3,000	
ET 40	38	BoBo+BoBo	2 x 82.0	2 x 245	90	2 x 2,040	
ET 41	126	BoBo+BoBo	167.0	2 x 294	125	4,000	Bolt, Autocupler
ET 42	42	BoBo+BoBo	164±4	540	100	4,280	
Total	1,549						
Electric Multiple Units			Units ton		km/h	Cont. kW	
EW 55		Tc+M+Tc	123.0		110	580	
EN 57	965	Tc+M+Tc	125.0		110	740	
EW 58	12	Mc+T+Mc	147.5		120	1,648	
EN 71	27	Tc+M+M+Tc	182.0		110	1,160	
EN 94	0	Mc+Mc	44.5		80	226	WKD
ED 72	16	Tc+M+M+Tc	179.6		120	1,560	
Total	1,020						

Diesel Locomotive		Axle arrangement	Weight	Tractive force	Max speed	Rated output	Fuel consumption	
Type	Volume		ton	Max kN	km/h	Cont. kW	g/kW*h	Remarks
SM 30	81	Bo+Bo	36.0	75.0	60	220.0	244.0	Diesel electric
SM 40	0	Bo+Bo	62.5	186.0	80	441.3	237.0	Diesel electric
SM 41	2	Bo+Bo	62.5	186.0	80	441.3	237.0	Diesel electric
SM 42	809	Bo+Bo	74.0	273.0	90	588.4	121.0	Diesel electric
ST 43	108	Co+Co	116.3	320.0	100	1544.0	235.0	Diesel electric
ST 44	1040	Co+Co	116.5	200.0	100	1471.0	224.0	Diesel electric
SP 45	265	Co+Co	102.0	326.0	120	1250.0	224.0	Diesel electric
SP 42	119	Bo+Bo	70.0	228.0	90	588.0	224.0	Diesel electric
SU 46	25	Co+Co	102.0	317.0	120	1650.0	224.0	Diesel electric
SP 32	41	Bo+Bo	75.0	204.7	100	957.0	222.4	Diesel electric
SP 47	2	Co+Co	114.0	328.0	140	2200.0	224.0	Diesel electric
SM 31	154	Co+Co	116.4	360.0	80	880.0	224.0	Diesel electric
SM 48	54	Co+Co	120.0	380.0	100	883.0	224.0	Diesel electric
Total	2,700							
Diesel Multiple Units								
SA 101	Rail bus	Motor car						
SA 121	Rail bus	Trailer car						

The following shows the number and ages of freight wagons an passenger wagons by use.

Number and Age by Rolling Stack Type

	1994		1995		1996		
Freight Wagon	Number	Age	Number	Age	Number	Age	Remarks
Covered wagon	23,214	21.4	20,152	21.3	18,818	21.7	
Covered wagon	653	25.5	253	16.5	359	9.3	Special type
Platform car	14,580	18.1	13,215	17.7	12,769	18.3	
Platform car	4,421	11.5	4,426	12.3	4,600	13.5	Special type
Coal open wagon	67,685	14.7	65,048	15.4	64,518	16.2	
Coal open wagon	6,801	17.3	6,759	18.3	6,766	19.3	Special type
Special Coal wagon	354	29.5	115	28.1	72	26.8	
Tank car	41	25.9	39	26.9	39	27.9	
Refrigerator Car	2,180	21.9	1,982	22.6	1,669	23.3	
Special purpose car	1,854	13.6	1,851	14.6	1,845	15.5	
Total	121,783		113,840		111,455		
Passenger Coach	7,407	15.0	7,193	16.0	6,983	16.0	
Seat type car	5,155	14.0	5,018	14.0	4,854	15.0	
Double Decker	1,493	19.0	1,426	20.0	1,383	21.0	
Buffet car	26	19.0	25	20.0	25	21.0	
Couchette car	345	19.0	344	20.0	344	21.0	
Sleeping car	299	14.0	292	15.0	290	16.0	
Seat & baggage car	89	12.0	88	13.0	87	14.0	
Restaurant car	21	8.0	21	9.0	21	10.0	
Restaurant car	167	19.0	167	20.0	165	21.0	Modified
Heater car	10	45.0					
Baggage car	90	15.0	86	20.0	84	21.0	
Others	153	20.0	156	21.0	157	21.0	
Total	7,848	15.0	7,623	16.0	7,410	17.0	

A total of 85% of passengers use commuter or local trains. Despite the high percentage of EMU (41%) among passenger trains, the present conditions of these EMU are not fully satisfactory. The interior of the heavy and old cars is often dirty and the acceleration performance is unsatisfactory. Compared to comparable cars in Japan (after adjusting the external dimensions to achieve a fair comparison), Polish EMU cars are heavier by 20 - 25%. (The Japanese EMU used for comparison are equipped with an air-conditioning system and

tank-type toilets.) Unless these EMU are urgently improved, they will lose the competition with road transportation. Maintenance of the rolling stock emphasizes travel devices to ensure safety. Maintenance of the superstructure causes some concern, however, as the Study Team encountered broken seats on a high class train on more than one occasion. In addition, two toilets on a first class PC were found to be unusable due to a blockage on both journeys. Broken window glass and unclosed doors have been reported in the case of suburban trains. These incidents show that the PKP simply treat customers as users and the continuation of poor customer service will accelerate the customer shift from railways to other modes of transportation.

(3) Rolling Stock Improvement Programme of PKP

The PKP has a rolling stock improvement programme under which EPO9-type high speed ELs (160 km/hr) and Z-type PCs meeting UIC standards will be added to the present rolling stock. The planned procurement for the next five years also includes 50 high speed ELs (220 km/hr) to speed up the service on Route E20 (eight ELs are capable of running on either AC or DC so that they can provide a direct train service to Germany, three of which will be delivered by the end of this year), pendulum ECs for Route E65 and 50 - 70 EMU for other trunk routes. For local services, various rail buses from a number of European countries made a demonstration run in November and December, 1996 using PKP routes.

2.9.2 Issues for Operation and Rolling Stock Divisions

The Polish railway services play an important role in the European railway network. In order to provide environment-friendly, safe and pleasant transportation in the coming years, privatization is necessary to establish a strong business capable of achieving a low operation cost and efficient services in order to be fully competitive with other modes of transportation.

(1) Basic Requirements of Operation Division

Considering the likely future business environment for railway services, the following measures should be introduced while making the best use of the present network.

1) Speeding-Up

A general increase of the train speed is required to overcome the challenge made by other modes of transportation, which is expected to increase in the future, in order to fully utilize the characteristics of railway services. Passenger transportation should particularly aim at achieving the following targets.

Inter-city services	:	extension of the high speed sections (i.e. 160 km/hr or more) and improvement of the maximum speed to 200 km/hr (it is necessary to examine the feasibility of a new line with a target speed of 300 km/hr or more)
Intra-city and suburban services	:	increase of the service frequency of light EMU of which the maximum speed is approximately 160 km/hr with an average speed of 100 km/hr or more
Local services	:	improvement of the present train speed

The improvement targets for freight transportation are as follows.

Ordinary freight services	:	as the allowable speed of all FCs was improved to at least 80 km/hr in 1995, efforts should be made to increase the nominal speed by means of an improved transportation method, etc.
High speed freight transportation	:	120 km/hr operation of freight trains for combined transportation which demands fast services

An increase of the train speed should achieve the types of transportation services which meet customer needs. Therefore, any decision on investment for speeding-up must be preceded by a careful examination of all the relevant factors, such as the train line conditions, possible introduction of new rolling stock and necessity to modernize various facilities, etc.

2) Cost Reduction

Reduction of the operation cost is a major precondition for privatization. Serious consideration should be given to this in both the hardware and software areas in the coming years to further improve the low energy consumption feature of railway services by reducing the environmental load. The introduction of lighter cars is particularly effective to reduce energy consumption and track damage. The recent development of the regenerative braking system and VVVF control system have achieved a reduction of energy consumption and maintenance work, leading to a substantial cost reduction. In regard to train operation, the operation rate can be improved by the adequate use of parallel and pattern diagrams and a thorough review of the rolling stock operation. Such an improved operation rate together with reorganization of the existing rolling stock base network, etc. can further reduce the operation cost.

3) Utilization of Existing Railway Network

In the case of the east-west Route 20 where modernization work is currently in progress, the planned diagram revision in June, 1998 will result in a substantial speeding-up of the passenger services as sections permitting an operation speed of 160 km/hr will have been much extended. The planned introduction of pendulum trains will increase the maximum speed on the north-south Route E65 to 200 km/hr. If the domestic economy continues its present stable development, it may stimulate the domestic transportation demand in the very near future to the extent that the introduction of extra trains may be necessary. While the train density in Poland has declined by 31% during the last 15 years, the on-time arrival rate is as low as 75% compared to the much higher on-time departure rate at the present level of operation. The further mixture of high speed trains and low speed trains will demand punctual train operation and strengthening of the train operation command system. The mixed presence of high speed trains and low speed trains with large speed gaps between them restricts the line transportation capacity and flexibility of the diagram for effective hours due to safety reasons. It will, therefore, be necessary to maximize the use of the existing network whole considering the separation of passenger trains and much

slower freight trains where possible. The resulting reduction of the waiting time at sidings and constant speed operation could achieve low energy consumption operation.

(2) Basic Requirements of Rolling Stock Division

In the railway privatization examination process, the rolling stock division, which is very close to customers in the sense that customers experience railway transportation through direct contact with rolling stock, particularly PCs, must ensure attractive transportation services for customers. A long-term rolling stock plan with a clear insight for the future is necessary right from the initial preparatory stage of privatization so that a future plan regarding rolling stock can be clearly presented to customers at the time of privatization.

1) Desirable Rolling Stock Plan

Based on the principles of passenger and freight transportation services, a suitable rolling stock plan must be prepared for each type of service while making the maximum use of the existing facilities and rolling stock. The key point in regard to future rolling stock is the firm establishment of the basic concept through discussions with the marketing and operation divisions to thoroughly examine the demanded specifications and life-cycle cost (i.e. the total cost including the procurement cost from initial procurement to final scrapping or recycling, power cost of operation, maintenance cost and personnel cost, etc.) The technical standards to be employed must be decided taking the trends of technological innovation into full consideration.

In recent years, rolling stock manufacturers have been rationalizing their design and manufacturing costs in line with the trend of railway privatization in many countries. JR Higashi-Nihon reviewed its entire rolling stock, taking the opportunity of privatization, 10 years ago and has succeeded in reducing its rolling stock procurement cost by some 30%. There is also the example of a major European manufacturer which admits that its sales cost has been reduced by some 35% depending on the model.

2) Cost Reduction and Improvement of Rolling Stock Performance

Regardless of the final outcome, (i.e. privatized operation or continued public sector operation with a minimum subsidy as an essential public service), an over-riding requirement is to minimize the railway operation cost while ensuring safety. The PKP has made substantial achievements in terms of maintenance through its rolling stock standardization drive. However, it must also be said that it has been somewhat left behind by the phenomenal technological progress in other areas which took place during this period of standardization. At stated earlier, lighter rolling stock can have a huge impact on cost reduction and improvement of the rolling stock performance. Shinkansen trains (so-called bullet trains) in Japan have now entered the age of a 300 km/hr operation speed and the experience of Japan's shinkansen services should prove useful for the PKP even though Japan's approach to high speed trains differs from the European approach. Moreover, the 209-series commuter EMU of JR East are designed to reduce the car price and maintenance cost (maintenance and repair cost and power cost, etc.) These thoroughly light weight (more than 40% lighter than the PKP's EN71-type) EMU equipped with a control system using state-of-the-art electronics technologies (VVVF and AC motor, etc.) have reduced the total life-cycle cost by some 40% compared to earlier models.

3) Design-Oriented Strategy

The drastic changes of the business environment for railway services from a planned economy (under which customers have no choice but to use the available services) to a market economy (in which customers have a choice) have halved the number of passengers using PKP services in the last 10 years. The progress of motorisation has opened up an age of harsh competition between different modes of transportation. A design-oriented strategy is, therefore, important to provide attractive transportation services to attract prospective customers to railway services. The PKP's response in this field has been rather slow. In particular, the rolling stock is the direct contact point between a railway operator and customers and its impression is most likely to linger in the minds of customers. In both Japan and Europe, efforts are being made to create attractive interiors and exteriors through the coordination of colors association with different types

of trains (for example, ECs, ICs and Exs, etc.). In some cases, the appointment of outside engineers with no connection with the railway sector has been quite successful as such designers have come up with revolutionary car designs to halt the decline of passenger services. Flexible car design is also important to allow improvement in terms of design, color tone and comfort level, etc. to accommodate the changing tastes of customers. In any case, a design strategy is essential to improve the image of a privatized company and to strongly appeal railway service reforms to customers.