Table 6.12 Number of Passengers per Kilometer and Passenger-Km (x 1000) for Railway Lines In Case of 7%-5% Fare Raise In Different Planning Years using All-Income Model: With Case 1

LINE CODE	LINK CODE	LNTH (KM)	Number of Passengers					Number of Passenger-Km (1000)				
			1995	1998	2002	2007	2012	1995	1998	2002	2007	2012
1	24	208	194,990	207,086	226,395	265,884	307,792	40,538	43,053	47,068	55,277	63,990
2	52	892	65,674	67,888	72,794	84,686	97,237	58,590	60,565	64,941	75,551	86,748
3	8	192	57,295	62,168	67,929	78,549	90,543	11,009	11,946	13,053	15,093	17,398
4	5	53	108,411	113,833	124,355	143,390	166,091	5,700	5,985	6,539	7,539	8,733
5	3	15	5,842	6,090	6,758	8,015	9,275	86	90	100	118	137
6	3	41	0	0	0	0	0	0	0	0	0	0
7	3	91	10,032	11,347	12,506	17,491	20,053	913	1,032	1,138	1,591	1,824
8	4	63	50,217	52,713	57,628	66,545	77,344	3,141	3,297	3,604	4,162	4,837
9	6	56	21,994	23,015	25,029	28,534	32,854	1,236	1,294	1,407	1,604	1,847
10	10	119	2,791	2,930	3,160	3,642	4,156	333	350	377	435	496
11	2	38	0	0	0	0	0	0	0	0	0	0
12	13	94	34,323	36,009	39,413	45,019	51,937	3,213	3,371	3,690	4,215	4,862
13	3	135	17,411	19,187	21,289	31,486	36,222	2,348	2,587	2,871	4,246	4,885
14	3	61	35,529	37,186	29,098	33,407	38,465	2,177	2,278	1,783	2,046	2,356
15	8	21	9,015	9,944	10,848	12,365	14,350	193	213	233	265	308
16	2	52	4,039	4,256	4,631	5,387	6,216	209	220	240	279	322
17	3	71	20,126	20,933	22,844	26,041	30,000	1,433	1,491	1,627	1,854	2,136
18	4	62	19,587	20,831	22,700	26,078	30,107	1,219	1,297	1,413	1,623	1,874
19	5	71	45,809	47,602	51,806	59,516	68,281	3,231	3,358	3,654	4,198	4,817
20	2	34	10,089	10,429	11,335	13,076	14,910	345	357	388	447	510
21	1	33	16,697	17,674	19,332	22,409	25,936	547	579	633	734	850
22	1	10	0	0	0	0	0	0	0	0	0	0
23	2	50	7,279	7,620	8,331	9,543	10,989	363	380	415	476	548
24	2	19	14,185	14,755	16,048	18,212	21,046	265	276	300	341	394
25	5	73	37,722	39,231	42,598	48,935	56,388	2,761	2,871	3,118	3,582	4,127
26	5	26	18,994	20,161	22,040	25,009	28,814	491	521	570	646	745
27	10	295	5,928	6,164	6,841	8,061	9,319	1,749	1,818	2,018	2,378	2,749
28	4	81	23,192	23,990	26,021	29,594	34,056	1,880	1,945	2,110	2,399	2,761
29	4	29	6,717	7,077	7,702	8,958	10,337	192	202	220	255	295
30	1	12	17,471	18,197	0	0	0	205	214	0	0	0
31	2	27	27,378	28,554	31,023	35,852	41,327	730	761	827	956	1,102
32	5	40	0	0	0	0	0	0	0	0	0	0
33	1	24	0	0	0	0	0	0	0	0	0	0
34	1	260	0	0	0	0	0	0	0	0	0	0
35	1	346	0	0	0	0	0	0	0	0	0	0
36	1	108	0	0	0	0	0	0	0	0	0	0
37	2	25	3,268	3,349	0	0	0	80	82	0	0	0
38	2	12	3,851	3,948	0	0	0	45	46	0	0	0
39	1	7	0	0	0	0	0	0	0	0	0	0
40	1	3	0	0	0	0	0	0	0	0	0	0
41	1	15	0	0	0	0	0	0	0	0	0	0
42	1	233	0	0	0	0	0	0	0	0	0	0
43	1	338	0	0	0	0	0	0	0	0	0	0
TOTAL	218	4431						145,224	152,479	164,335	192,313	221,651

Table 6.13 Number of Passengers per Kilometer and Passenger-Km (x 1000) for Railway Lines in Case of 7%-7% Fare Raise in Different Planning Years using All-Income Model: With Case 2

LINE CODE	LINK CODE	LNTH (KM)	Number of Passengers					Number of Passenger-Km (1000)				
			1995	1998	2002	2007	2012	1995	1998	2002	2007	2012
1	24	208	194,990	217,590	251,819	294,553	340,413	40,538	45,237	52,353	61,237	70,772
2	52	892	65,674	71,332	80,968	93,817	107,543	58,590	63,637	72,234	83,697	95,942
3	8	192	57,295	65,322	75,558	87,018	100,139	11,009	12,552	14,518	16,720	19,242
4	5	53	108,411	119,607	138,321	158,850	183,693	5,700	6,289	7,273	8,352	9,659
5	3	15	5,842	6,399	7,517	8,879	10,258	86	95	111	131	152
6	3	41	0	0	0	0	0	0	0	0	0	0
7	3	91	10,032	11,923	13,911	19,376	22,179	913	1,085	1,265	1,763	2,017
8	4	63	50,217	55,387	64,100	73,721	85,541	3,141	3,464	4,009	4,611	5,350
9	6	56	21,994	24,182	27,840	31,611	36,335	1,236	1,359	1,565	1,777	2,042
10	10	119	2,791	3,079	3,515	4,034	4,596	333	368	420	482	549
11	2	38	0	0	0	0	0	0	0	0	0	0
12	13	94	34,323	37,835	43,839	49,873	57,441	3,213	3,542	4,104	4,669	5,378
13	3	135	17,411	20,160	23,680	34,881	40,061	2,348	2,719	3,193	4,704	5,402
14	3	61	35,529	39,072	32,365	37,008	42,542	2,177	2,394	1,983	2,267	2,606
15	8	21	9,015	10,449	12,066	13,699	15,870	193	224	259	294	341
16	2	52	4,039	4,472	5,152	5,968	6,875	209	232	267	309	356
17	3	71	20,126	21,994	25,409	28,849	33,179	1,433	1,566	1,809	2,054	2,363
18	4	62	19,587	21,888	25,249	28,890	33,297	1,219	1,362	1,571	1,798	2,072
19	5	71	45,809	50,017	57,624	65,933	75,517	3,231	3,528	4,065	4,651	5,327
20	2	34	10,089	10,958	12,608	14,485	16,491	345	375	431	496	564
21	1	33	16,697	18,571	21,503	24,825	28,685	547	608	704	813	940
22	1	10	0	0	0	0	0	0	0	0	0	0
23	2	50	7,279	8,007	9,266	10,572	12,153	363	399	462	527	606
24	2	19	14,185	15,504	17,850	20,175	23,276	265	290	334	377	436
25	5	73	37,722	41,221	47,381	54,212	62,364	2,761	3,017	3,468	3,968	4,564
26	5	26	18,994	21,183	24,515	27,706	31,867	491	548	634	716	824
27	10	295	5,928	6,476	7,609	8,930	10,307	1,749	1,911	2,245	2,635	3,041
28	4	81	23,192	25,207	28,943	32,785	37,666	1,880	2,044	2,346	2,658	3,054
29	4	29	6,717	7,436	8,567	9,924	11,432	192	212	244	283	326
30	1	12	17,471	19,120	0	0	0	205	225	0	0	0
31	2	27	27,378	30,002	34,507	39,718	45,707	730	800	920	1,059	1,219
32	5	40	0	0	0	0	0	0	0	0	0	0
33	1	24	0	0	0	0	0	0	0	0	0	0
34	1	260	0	0	0	0	0	0	0	0	0	0
35	1	346	0	0	0	0	0	0	0	0	0	0
36	1	108	0	0	0	0	0	0	0	0	0	0
37	2	25	3,268	3,519	0	0	0	80	86	0	0	0
38	2	12	3,851	4,148	0	0	0	45	48	0	0	0
39	1	7	0	0	0	0	0	0	0	0	0	0
40	1	3	0	0	0	0	0	0	0	0	0	0
41	1	15	0	0	0	0	0	0	0	0	0	0
42	1	233	0	0	0	0	0	0	0	0	0	0
43	1	338	0	0	0	0	0	0	0	0	0	0
TOTAL	218	4431						145,224	160,214	182,789	213,048	245,141

Table 6. 14-1 Comparison among Railway Passenger-Km (x 1000) for Different Alternatives of Fare Raise In the Base Year (1995) and Targer Year (2012)

LINE	Number of Passenger-Km (1000)						Increase (%) of Passenger-Km to Year 1995				
Alternative ->	Nothing	Without	Case 1	Case 2	Extra		Nothing	Without	Case 1	Case 2	Extra
Fare*->	0%-0%	5%-5%	7%-5%	7%-7%	10%-10%		0%-0%	5%-5%	7%-5%	7%-7%	10%-10%
Year ->	1995	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
1	40,538	67,146	69,832	63,990	70,772	70,973	66%	72%	58%	75%	75%
2	58,590	92,236	95,926	86,748	95,942	96,215	57%	64%	48%	64%	64%
3	11,009	18,256	18,986	17,398	19,242	19,296	66%	72%	58%	75%	75%
4	5,700	9,164	9,530	8,733	9,659	9,686	61%	67%	53%	69%	70%
5	86	144	150	137	152	152	67%	73%	59%	76%	76%
6	0	0	0	0	0	0	0%	0%	0%	0%	0%
7	913	1,914	1,991	1,824	2,017	2,023	110%	118%	100%	121%	122%
8	3,141	5,076	5,279	4,837	5,350	5,365	62%	68%	54%	70%	71%
9	1,236	1,938	2,015	1,847	2,042	2,048	57%	63%	49%	65%	66%
10	333	521	542	496	549	550	56%	62%	49%	65%	65%
11	0	0	0	0	0	0	0%	0%	0%	0%	0%
12	3,213	5,102	5,306	4,862	5,378	5,393	59%	65%	51%	67%	68%
13	2,348	5,125	5,330	4,885	5,402	5,418	118%	127%	108%	130%	131%
14	2,177	3,431	3,568	2,356	2,606	2,614	58%	64%	8%	20%	20%
15	193	323	336	308	341	342	67%	74%	59%	76%	77%
16	209	338	351	322	356	357	61%	68%	54%	70%	71%
17	1,433	2,242	2,331	2,136	2,363	2,369	56%	63%	49%	65%	65%
18	1,219	1,966	2,045	1,874	2,072	2,078	61%	68%	54%	70%	70%
19	3,231	5,054	5,256	4,817	5,327	5,342	56%	63%	49%	65%	65%
20	345	535	557	510	564	566	55%	61%	48%	63%	64%
21	547	892	927	850	940	942	63%	70%	55%	72%	72%
22	0	0	0	0	0	0	0%	0%	0%	0%	0%
23	363	575	598	548	606	608	58%	65%	51%	67%	67%
24	265	413	430	394	436	437	56%	62%	48%	64%	65%
25	2,761	4,331	4,504	4,127	4,564	4,577	57%	63%	49%	65%	66%
26	491	782	813	745	824	826	59%	66%	52%	68%	68%
27	1,749	2,885	3,000	2,749	3,041	3,049	65%	72%	57%	74%	74%
28	1,880	2,897	3,013	2,761	3,054	3,062	54%	60%	47%	62%	63%
29	192	309	322	295	326	327	61%	68%	54%	70%	71%
30	205	321	334	0	0	0	56%	0%	0%	0%	0%
31	730	1,156	1,202	1,102	1,219	1,222	58%	65%	51%	67%	67%
32	0	0	0	0	0	0	0%	0%	0%	0%	0%
33	0	0	0	0	0	0	0%	0%	0%	0%	0%
34	0	0	0	0	0	0	0%	0%	0%	0%	0%
35	0	0	0	0	0	0	0%	0%	0%	0%	0%
36	0	0	0	0	0	0	0%	0%	0%	0%	0%
37	80	122	127	0	0	0	52%	0%	0%	0%	0%
38	45	68	71	0	0	0	52%	0%	0%	0%	0%
39	0	0	0	0	0	0	0%	0%	0%	0%	0%
40	0	0	0	0	0	0	0%	0%	0%	0%	0%
41	0	0	0	0	0	0	0%	0%	0%	0%	0%
42	0	0	0	0	0	0	0%	0%	0%	0%	0%
43	0	0	0	0	0	0	0%	0%	0%	0%	0%
TOTAL	145,224	235,261	244,671	221,651	245,141	245,839	62%	68%	53%	69%	69%

* Percentage of fare raise for railway and competitive modes, respectivley.

Table 6. 14-2 Summary of Transport Demand Forecast of Railway Passengers for Different Alternative Cases in Different Planning Years

Alternative	Total Number of Daily Passengers (1,000)					Total Daily Passenger-Km (1,000)				
Case	1995	1998	2002	2007	2012	1995	1998	2002	2007	2012
Without	1,542	1,697	1,931	2,234	2,582	145,224	159,583	181,919	212,419	244,671
With Case 1	1,542	1,630	1,760	2,039	2,358	145,224	152,479	164,335	192,313	221,651
With Case 2	1,542	1,714	1,968	2,226	2,606	145,224	160,214	182,789	213,048	245,141
Base Case	1,542	1,680	1,893	2,169	2,482	145,224	157,846	177,829	205,633	235,261

Table 6.14-3 Comparison of Without and With Case for Main lines and Other Lines

(Units: 1000 passenger-km per day)

LINE		WITHOUT CASE					WITH CASE 1-1, 1-2				WITH CASE 2-1, 2-2			
No.	Section	1995	1998	2002	2007	2012	1998	2002	2007	2012	1998	2002	2007	2012
Main Line		115,837	127,715	145,790	169,317	194,834	121,549	131,601	153,460	176,869	127,715	146,378	170,006	195,615
1	Cairo - Alexandria	40,538	45,237	51,799	60,595	70,033	43,053	47,068	55,277	63,990	45,237	52,353	61,237	70,772
2	Cairo - El Sad El Ali	58,590	63,637	72,430	83,912	96,202	60,565	64,941	75,551	86,748	63,637	72,234	83,697	95,942
3	Benha - Port Said	11,009	12,552	14,365	16,545	19,041	11,946	13,053	15,093	17,398	12,552	14,518	16,720	19,242
4	Tanta - Mansoura	5,700	6,289	7,196	8,265	9,558	5,985	6,539	7,539	8,733	6,289	7,273	8,352	9,659
Other Lines		29,387	32,499	37,196	44,025	50,543	30,930	32,734	38,853	44,782	32,499	36,411	43,042	49,526
Total		145,224	160,214	182,986	213,342	245,377	152,479	164,335	192,313	221,651	160,214	182,789	213,048	245,141
Growth Rate (per year) % from 1995														
	Main Lines		3.31	3.34	3.21	3.11	1.62	1.84	2.37	2.52	3.31	3.40	3.25	3.13
	Other Lines		3.41	3.42	3.43	3.24	1.72	1.55	2.35	2.51	3.41	3.11	3.23	3.12
	Total		3.33	3.36	3.26	3.13	1.64	1.78	2.37	2.52	3.33	3.34	3.25	3.13

Table 6.18 Statistics of Freight Activity of ENR Classified by Each Commodity Type in 1995**

Commodity Code	Name	Average Dist. (Km)	Load (1000 Ton)	Revenue (1000 LE)	Ton-Km (1000)	Rvnu/ Tonkm 0.001 LE
1	COIL	0	0	0	0	0
2	PETR	382	1,161	13,270	443,641	30
3	NGAS	0	0	0	0	0
4	CEMT	204	209	1,402	42,750	33
5	CMAT	171	1,556	7,295	266,112	27
6	PHOS	754	938	8,160	707,162	12
7	IORE	350	2,394	50,698	838,496	60
8	COAL	275	1,624	11,880	445,930	27
9	MNRL	0	0	0	0	0
10	WHET	272	1,795	25,493	487,882	52
11	CERE	251	797	7,309	199,883	37
12	FRUT	30	0	0	2	107
13	SCAN	61	259	986	15,841	62
14	FCRP	467	1	33	545	60
15	LSTK	0	0	0	0	0
16	APRD	295	224	1,651	66,166	25
17	AGPR	125	0	0	6	52
18	SGAR	483	584	5,218	281,931	19
19	FATS	80	0	0	4	55
20	AFED	523	0	6	203	31
21	BVRG	0	0	0	0	0
22	OFOD	400	91	780	36,361	21
23	CHEM	835	9	183	7,250	25
24	MTAL	667	1	14	423	34
25	TXTL	533	2	67	810	82
26	FRLZ	545	161	1,869	88,084	21
27	PULP	205	5	41	972	42
28	LUBM	245	22	195	5,342	37
29	MANU	306	14	206	4,208	49
30	MIXC	337	392	11,849	132,305	90
	Total		12,239	148,604	4,072,306	
	Average					36

** The results of this table are based on the computerized file obtained from ENR Computer Center.

Table 6.19 Estimated Growth Factors of Different Commodities Based on the Data of Years 1992 and 2012

Commodity		1992			2012			Avg Annual Growth	
Code	Name	Rwy*	Total*	Share	Rwy*	Total*	Share	Rwy	Total
1	COIL	0	0	0.0%	0	0	0.0%	0.0%	0.0%
2	PETR	1,208	12,735	9.5%	2,852	17,815	16.0%	4.4%	1.7%
3	NGAS	0	0	0.0%	0	0	0.0%	0.0%	0.0%
4	CEMT	341	27,194	1.3%	6,875	110,783	6.2%	16.2%	7.3%
5	CMAT	737	44,559	1.7%	11,170	204,023	5.5%	14.6%	7.9%
6	PHOS	649	800	81.1%	11,089	13,233	83.8%	15.2%	15.1%
7	IORE	2,502	2,502	100.0%	4,127	4,611	89.5%	2.5%	3.1%
8	COAL	807	1,821	44.3%	0	7,077	0.0%	0.0%	7.0%
9	MNRL	46	5,443	0.8%	60	13,616	0.4%	1.3%	4.7%
10	WHET	1,351	7,921	17.1%	2,557	17,283	14.8%	3.2%	4.0%
11	CERE	93	5,451	1.7%	240	12,372	1.9%	4.9%	4.2%
12	FRUT	0	13,965	0.0%	2	33,309	0.0%	0.0%	4.4%
13	SCAN	8	617	1.3%	0	905	0.0%	0.0%	1.9%
14	FCRP	0	466	0.0%	0	755	0.0%	0.0%	2.4%
15	LSTK	0	1,462	0.0%	0	2,338	0.0%	0.0%	2.4%
16	APRD	5	2,618	0.2%	9	4,047	0.2%	3.0%	2.2%
17	AGPR	1	5,292	0.0%	0	27,492	0.0%	0.0%	8.6%
18	SGAR	511	2,304	22.2%	6	3,263	0.2%	0.0%	1.8%
19	FATS	128	1,177	10.9%	1	3,961	0.0%	0.0%	6.3%
20	AFED	1	5,682	0.0%	28	26,490	0.1%	18.1%	8.0%
21	BVRG	0	455	0.0%	0	2,427	0.0%	0.0%	8.7%
22	OFOD	11	3,574	0.3%	22	5,582	0.4%	3.5%	2.3%
23	CHEM	0	6,239	0.0%	0	13,640	0.0%	0.0%	4.0%
24	MTAL	463	7,086	6.5%	5,088	16,359	31.1%	12.7%	4.3%
25	TXTL	0	2,097	0.0%	0	4,548	0.0%	0.0%	3.9%
26	FRLZ	241	3,932	6.1%	0	9,117	0.0%	0.0%	4.3%
27	PULP	0	1,870	0.0%	0	5,889	0.0%	0.0%	5.9%
28	LUBM	13	2,262	0.6%	152	4,068	3.7%	13.1%	3.0%
29	MANU	526	7,073	7.4%	1,396	20,915	6.7%	5.0%	5.6%
30	MIXC	0	1,756	0.0%	0	5,179	0.0%	0.0%	5.6%
	Total	9,642	178,353		45,674	591,097			
	Average			5.4%			7.7%	8.1%	6.2%

* Source of these columns: ENTS IV, VOL II, Table 13-4-5, pp 87.

Table 6.26 Tonnage Density of Total Commodities (1000 Tons) and Ton-Km (x 1000) for Each Line of ENR Railway Network in Different Planning Years

LINE CODE	LINK CODE	LNTH (KM)	Tonnage Density (1000)					Estimated Ton-Km (1000)				
			1995	1998	2002	2007	2012	1995	1998	2002	2007	2012
1	24	208	271	284	310	363	458	501,867	527,565	576,010	674,898	853,229
2	52	892	123	136	158	196	255	1,708,479	1,899,403	2,225,217	2,808,226	3,728,202
3	8	192	25	31	42	67	112	124,999	154,342	212,603	337,566	570,577
4	5	53	17	24	39	76	150	8,183	11,864	19,935	39,215	78,745
5	3	15	58	71	98	156	268	4,081	5,002	6,845	10,896	18,718
6	3	41	0	0	0	0	0	0	0	0	0	0
7	3	91	11	15	22	40	74	43,274	58,384	89,742	159,954	295,008
8	4	63	85	94	107	128	154	82,934	91,574	104,872	125,031	150,916
9	6	56	26	31	41	59	93	13,869	16,484	21,392	31,290	48,779
10	10	119	62	67	75	87	103	89,618	96,659	107,779	125,367	148,854
11	2	38	0	0	0	0	0	0	0	0	0	0
12	13	94	0	0	0	0	0	0	0	0	0	0
13	3	135	26	30	36	48	68	73,007	85,010	106,045	145,047	208,650
14	3	61	3	4	4	5	7	7,146	8,103	9,609	11,977	15,118
15	8	21	709	797	950	1,231	1,701	40,793	45,865	54,638	70,822	97,811
16	2	52	0	0	0	0	0	0	0	0	0	0
17	3	71	0	0	0	0	0	0	0	0	0	0
18	4	62	92	103	123	159	220	85,105	95,687	113,988	147,751	204,058
19	5	71	112	128	157	211	306	111,580	127,458	155,806	210,325	304,775
20	2	34	0	0	1	1	2	133	168	243	415	750
21	1	33	0	0	0	0	0	0	0	0	0	0
22	1	10	0	0	0	0	0	0	0	0	0	0
23	2	50	0	0	0	0	0	0	0	0	0	0
24	2	19	0	0	0	0	0	3	3	3	3	3
25	5	73	0	0	0	0	0	0	0	0	0	0
26	5	26	0	0	0	0	0	0	0	0	0	0
27	10	295	16	20	26	41	70	141,162	170,462	229,069	357,622	605,476
28	4	81	0	0	0	0	0	0	0	0	0	0
29	4	29	0	0	0	0	0	0	0	0	0	0
30	1	12	0	0	0	0	0	0	0	0	0	0
31	2	27	0	0	0	0	0	0	0	0	0	0
32	5	40	0	0	0	0	0	0	0	0	0	0
33	1	24	0	0	0	0	0	0	0	0	0	0
34	1	260	0	0	0	0	0	0	0	0	0	0
35	1	346	7	7	8	9	11	827,345	891,878	985,368	1,116,916	1,265,838
36	1	108	0	0	0	1	1	5,077	5,299	5,709	6,522	7,953
37	2	25	0	0	0	0	0	0	0	0	0	0
38	2	12	0	0	0	0	0	0	0	0	0	0
39	1	7	0	0	0	0	0	0	0	0	0	0
40	1	3	0	0	0	0	0	0	0	0	0	0
41	1	15	0	0	0	0	0	0	0	0	0	0
42	1	233	1	2	7	17	39	30,594	128,226	356,740	928,429	2,125,302
43	1	338	0	1	4	11	26	0	136,890	460,833	1,277,978	2,997,046
TOTAL	218	4431						3,899,249	4,556,325	5,842,445	8,586,249	13,725,808

CHAPTER 7 TRAIN OPERATION PLAN

7.1 PASSENGER TRANSPORT

(1) Possible train speed up

Higher speed and shorter transit time are being achieved at relatively low cost with the progress of technology.

1) Test result
Almost all trains on trunk lines are running at 60 - 80 km/h, except the turbo train, which runs at 90 - 100 km/h on Cairo - Alexandria line. The average speed of all express trains should be increased to compete with automobile transport.
Fig. 7.1.1 to 7.1.3 shows data concerning train running speeds.

2) Track figure
The railway track figure of ENR is suitable for higher speed operation. ENR has a strong possibility to run trains at world class speeds, on current lines at relatively low cost.

(2) Estimation of passenger train km in future

Table 7.1.1 shows passenger train km as the base case, and Table 7.1.2 to 7.1.4 show the passenger coach km for each case.

7.2 FREIGHT TRANSPORT

As shown in the Chapter 6, the forecast freight volume shows remarkable growth.
Because the forecast of freight is done by regional traffic flow, some alterations were performed to show the train-km on each line, by using actual data in January 1995 and July 1994, with cooperation of ENR freight transport experts.

Freight train km on each line are estimated as shown in Table 7.2.2.

Fig. 7.1. 1Test Result of Train Running Performance Turbo Train

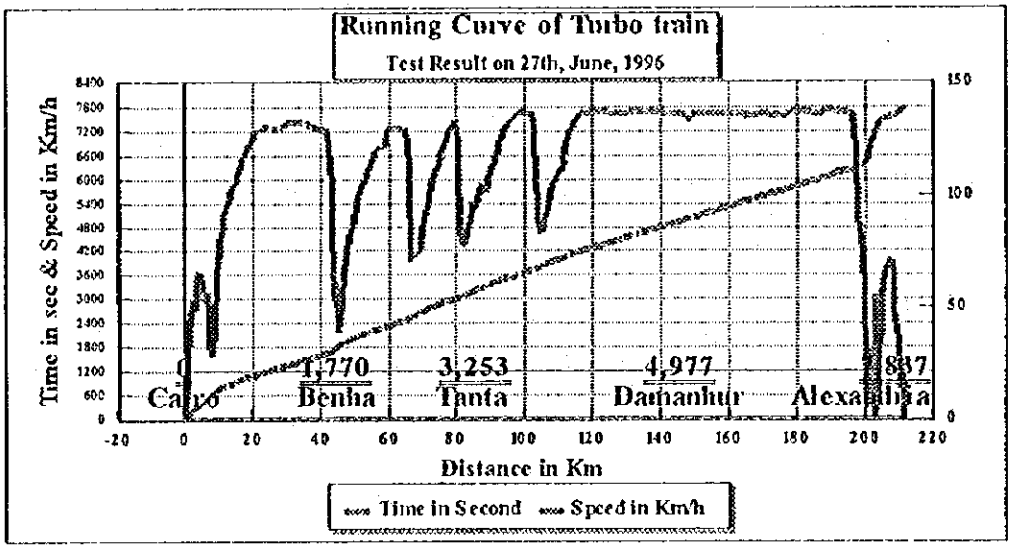


Fig. 7.1. 2 Test Result of Ordinary Express Train

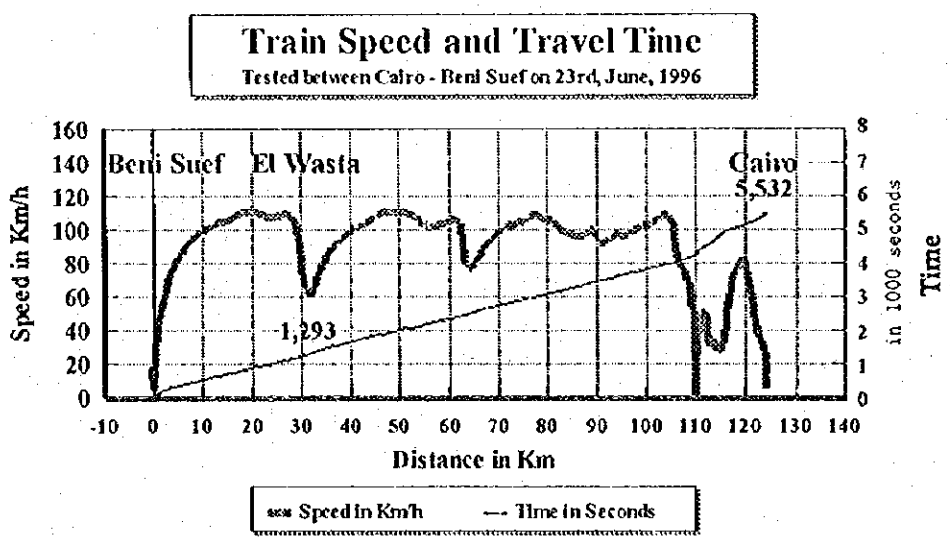


Fig. 7.1. 3 Speed And Acceleration Force

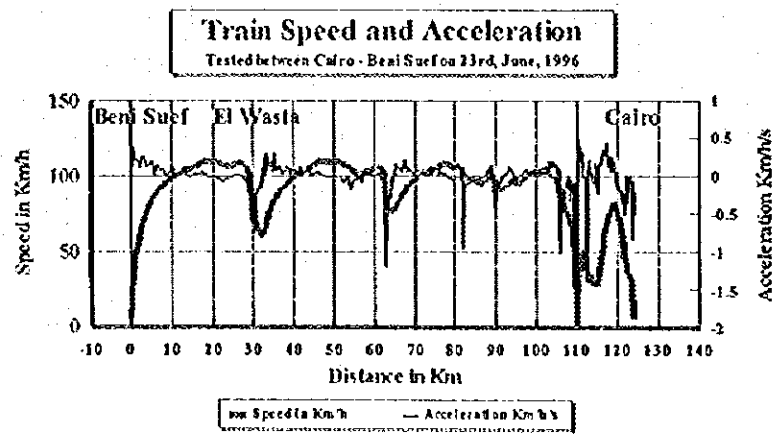


Table 7.1.1 Passenger Train Transport Volume

Regular Train km /day	Share	94/95	2002	2007	2012
Cairo - Alexandria		19,085	23,666	26,911	31,109
Rtae of Cross - sectional Passenger Number %		100%	124%	141%	163%
Cairo - Benha - Zagazig - Ismailia - Port Said		7,497	9,371	11,245	12,744
Rtae of Cross - sectional Passenger Number %		100%	125%	150%	170%
Cairo - Tanta - Mansura - Sherbin - Domietta		5,168	6,357	7,236	8,269
Rtae of Cross - sectional Passenger Number %		100%	123%	140%	160%
Cairo - Asyut - Aswan - El Sad El Ali		46,818	57,587	65,546	74,910
Rtae of Cross - sectional Passenger Number %		100%	123%	140%	160%
Sub Total of Main lines	64%	78,569	96,981	110,937	127,033
Increase of Train km		100%	123%	141%	162%
Other lines Train km / day	36%	43,287	52,902	59,661	67,937
		100%	122%	138%	157%
Total Train km / day	100%	121,856	149,883	170,598	194,970
Increase of Train km		100%	123%	140%	160%

Table 7.1.2 Passenger Flow and Coach Km in Without Case

Category	Estimation			
	1995	2002	2007	2012
Passenger km per day (1000)	145,224	182,986	213,242	245,377
Rate of annual increase (%)		3.36%	3.11%	1.41%
Coach km per day (Rate)	100%	126%	147%	169%

Table 7.1.3 Passenger Flow and Coach Km in With Cases 1-1 & 1-2

Category	Estimation			
	1995	2002	2007	2012
Passenger km per day (1000)	145,224	164,335	129,313	221,651
Rate of annual increase (%)		1.8%	3.2%	2.9%
Coach km per day (Rate)	100%	113%	132%	153%

Table 7.1.4 Passenger Flow and Coach Km in With Cases 2-1 & 2-2

Category	Estimation			
	1995	2002	2007	2012
Passenger km per day (1000)	145,224	182,789	213,048	245,141
Rate of annual increase (%)		3.3%	3.1%	2.8%
Coach km per day (Rate)	100%	126%	147%	169%

Table 7.2.2 Freight Train km Forecast on each Line in Future

Line No.	Name of Section	1995			1998	2002	2007	2012
		Loaded Train-km	Empty Train-km	Total Train-km	Total Train-km	Total Train-km	Total Train-km	Total Train-km
1	Cairo - Alexandria	226,694	172,031	398,725	420,755	460,841	539,233	675,079
2	Cairo - El Sad El Ali	1,798,399	1,364,754	3,163,152	3,516,637	4,119,864	5,199,272	6,902,556
3	Benha - Ismailia - Port S.	138,888	105,398	244,286	301,631	415,490	659,706	1,115,080
4	Tanta - Mansura	111,470	84,591	196,061	284,257	477,635	939,576	1,886,699
7	Nefsha - Suez	160,564	121,847	282,411	381,021	585,667	1,043,879	1,925,258
8	Mansura - Domietta	75,395	57,215	132,609	146,424	167,688	199,921	241,311
9	Zagazig - Tanta	4,4458	3,383	7,841	9,319	12,094	17,690	27,578
10	Imbaba - Itay El Baroud	47,864	36,323	84,187	88,838	97,302	113,853	142,536
11	Sidi Gaber - Abu Quir	80	61	141	148	163	190	238
12	Qalyub - Tanta	0	0	0	0	0	0	0
13	Ein Shams - Suez	5,734	4,351	10,085	11,743	14,649	20,037	28,823
14	El Wasta - Abu Kesah	709	538	1,247	1,414	1,677	2,090	2,638
15	El Marg - Sebeen Kanater	4,495	3,411	7,906	8,889	10,589	13,726	18,957
16	Mamoura - Rashid	332	252	584	616	675	790	989
17	Mansura - Mataria	0	0	0	0	0	0	0
18	Qalyub - Zagazig	24,437	18,545	42,982	48,326	57,569	74,620	103,058
19	Zagazig - Mansura	7,323	5,557	12,880	14,713	17,985	24,279	35,182
20	Abu Kebir - Salheia	0	0	0	0	0	0	0
21	Benha - Zefta	0	0	0	0	0	0	0
22	Faqus - El Sammana	0	0	0	0	0	0	0
23	Menuf - Kafr El Zaiyat	0	0	0	0	0	0	0
24	El Santa - Mahalet Rouh	0	0	0	0	0	0	0
25	Mahalet Rouh - Damanhur	333	253	586	618	677	792	992
26	Benha - Menuf	0	0	0	0	0	0	0
27	Qabbary - Marsa Matruh	117,635	89,270	206,905	249,851	335,752	524,176	887,462
28	Sherbeen - Qelein	1,356	1,029	2,385	2,634	3,016	3,596	4,340
29	Bouseli - El Qassabi	174	132	306	323	354	414	518
30	El Fayum - Sinnuris	0	0	0	0	0	0	0
31	Desuq - Motobus	174	132	306	323	354	414	518
32	Abbassaya - Tebeen	10,695	8,116	18,811	20,278	22,404	25,395	28,781
33	El Geish - Magharat	0	0	0	0	0	0	0
34	Samala - El Saloum	19,142	14,526	33,668	35,529	38,913	45,533	57,004
35	Tebeen - Managim	217,722	165,223	382,946	412,815	456,088	516,977	585,907
36	Ithad - Qabbary	264,192	200,488	464,679	490,354	537,070	628,430	786,746
37	Beni Suef - El Lahun	0	0	0	0	0	0	0
38	Shaweish - M. Abu Sammad	0	0	0	0	0	0	0
39	El Gabel El Asfa	0	0	0	0	0	0	0
40	Kafr Saad - Kafr Silman	0	0	0	0	0	0	0
41	Kafr Batikh - Domietta Port	13,389	10,161	23,550	26,003	29,779	35,503	42,853
42/43	Abu Tartur - Qena - Safaga	24,237	18,393	42,630	178,670	497,083	1,293,676	2,961,402
	Total	3,275,890	2,485,979	5,761,869	6,652,131	8,361,377	11,923,768	18,462,503

7.3 CAPACITY FOR FUTURE TRAIN OPERATION

The track capacity for typical lines are examined as follows.

(1) Cairo - Alexandria line

Table 7.3.1 Track Capacity of Cairo - Alexandria Line and Number of Trains

From	To	Track capacity (trains/hour)	Current No. of regular trains	Number of trains in 2012
Cairo	Qalyub (main double line)	10 trains per hour	6 trains per hour	10 trains per hour
Qalyub	Benha	8.5 (10)	6	10
Benha	Tanta	9.0 (10)	5	8
Tanta	Damanhur	9.0 (10)	4	7
Damanhur	Sidi Gaber	9.0 (10)	4	7
Sidi Gaber	Alex.(main double)	9.0 (10)	4	7

Until 2012, the bottleneck at Benha station should be solved, separating the Benha - Minuf line from the main line.

(2) Cairo - Aswan - El Sad El Ali line

Table 7.3.2 Track Capacity of Cairo - El Sad El Ali Line and Number of Trains

From	To	Track capacity (trains/hour)	Actual No. of regular trains	Number of trains in 2012
Cairo	Giza	10 trains per one hour	4 trains per one hour	7 trains per one hour
Giza	El Wast	10	4	7
El Wasta	El Minya	10	3	5
El Minya	Asyut	10	3	5
Asyut	Sohag	10	3	5
Sohag	Luxor	10	2	3.5
Luxor	Iduf	10	1.5	3
Iduf	Aswan (Single track)	3 (10)	1.5	3
Aswan	El Sad El Ali (Double track)	8	0.5	1

The single track section between Iduf and Aswan will be doubled on October 1996.

(3) Other lines

Other lines have still enough capacity for the future traffic demand until 2012.

CHAPTER 8 INVESTMENT PLAN

8.1 CONCEPT OF RAILWAY INVESTMENT

In view of the strong government desire for a financially self-supporting railway, the Study Team considered the following issues when making its investment plan:

a. Amount of investments until 2001/02. During this period, ENR needs to restructure, and should avoid accumulating too much debt.
b. A goal in 2001/02 is to begin repaying debt.
c. Investments are mostly limited to business improvement items, maintenance, and expansion to meet increased demand of daily operations.
d. Investment for national policy goals, such as Sinai new Railway line, should be completely paid for by the government.

The investment plan is divided into 2 stages, one until 2002 (short term), the other one from 2003 to 2012 (middle and long term). The short term plan (until 2002) is forecast in detail, but the plan until 2012 is described only in general, with strategies necessary to make ENR play an important role in the transport system, with healthy operations and finances.

8.2 INVESTMENT PLAN UNTIL 2002

The investment plan until 2002 is made for "Without Case" and "With Case", as shown in Tables 8.2.1 to 8.2.3.
The difference between "Without Case" and "With Case" are mostly the number of rolling stock according to future passenger volume. In addition, "With Case" considers station improvements for train speed-up, improvement of the data/information system, and installation of an automatic signaling system.

Meanwhile, the investment cost of new lines such as Sinai Peninsula is borne by Government in "With Case".

8.2 INVESTMENT PLAN AFTER 2003

For the investment plan after 2003, investment should be made for replacement and maintenance of rolling stock and infrastructure.
Besides, due to the future improvement and development of the railway, some strategic tasks should be implemented. These are:

1) Up-grading of railway transport for Abu Quir Line

2) Up-grading of El Marg - Shebeen Kanater Line

3) Modernization of freight transport

a. Large volumes in fixed sizes
b. Abolition of shunting work as much as possible
c. Scheduling of departure and arrival time
d. Containerization for high price commodities

e. Speedup of freight trains

4) New line for new town in Greater Cairo

5) Increase of line capacity

a. Improvement at Benha station to the Tanta side: Menuf - Benha line and Benha - Zefta line are separated from Cairo - Alexandria line.
b. Additional track on some sections between Ismailia and Port Side, for smooth train operation.
c. Additional track on some sections between Mansoura and Damietta, for smooth train operation.
d. Improvement of the section between Cairo and Imbaba: additional track.
e. Modification of track layout in Cairo station: In order to speed up trains at Cairo station yard, the complicated track layout should be simplified.

Table 8.2.1 Investment Plan - Without Case (excluding Metro)

Item	Total '96-2002	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	Remarks
Rolling Stock	1,711.3	203.9	216.1	229.1	242.8	257.4	272.8	289.2	
Permanent way	1,130.8	160.2	202.1	205.6	217.9	192.4	74.2	78.4	
Bridge Replacement	235.1	-	33.7	35.8	37.9	40.2	42.6	44.9	
Bridge Construction (Suez)	350.0	-	100.0	150.0	100.0				
New Line (Ismailis - Rafah)	600.0	-	100.0	200.0	200.0	100.0			
Building improvement	203.2	-	29.2	30.9	32.8	34.7	36.8	38.8	
Station improve. & others for speed-up	-	-	-	-	-	-	-	-	
Signaling & Tele-communication system	141.1	75.0	25.9	25.9	8.3	2.0	2.0	2.0	ATC
Improvement of OA system	-		-	-	-	-	-		
Improvement of Car maintenance depot	-		-	-	-	-	-	-	
Freight wagon Improvement	-	-	-	-	-	-	-	-	
Others	138.0	65.0	10.0	11.0	12.0	13.0	13.0	14.0	
Grand Total	**4,509.5**	**504.1**	**717.0**	**888.3**	**851.7**	**639.7**	**441.4**	**467.3**	

Table 8.2.2 Investment Plan - With Case 1-1, 1-2 (excluding Metro)

Item	Total '96-2002	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	Remarks
Rolling Stock	644.8	76.8	81.4	86.3	91.5	97.0	102.8	109.0	
Permanent way	1,130.8	160.2	202.1	205.6	217.9	192.4	74.2	78.4	
Bridge Replacement	235.1	-	33.7	35.8	37.9	40.2	42.6	44.9	
Bridge Construction (Suez)	(350)		(100)	(150)	(100)				Governmental Subsidy
New Line (Ismailis - Rafah)	(600)	-	(100)	(200)	(200)	(100)			Governmental Subsidy
Building improvement	203.2	-	29.2	30.9	32.8	34.7	36.8	38.8	
Station improve. & others for speed-up	88.8	-	12.8	13.6	14.5	15.3	16.2	16.4	
Signaling & Tele-communication system	668.5	75.0	113.8	113.8	96.2	89.9	89.9	89.9	ATC Aout Signal
Improvement of OA system	15.0		3.0	3.0	3.0	3.0	3.0		
Improvement of Car maintenance depot	34.8	-	7.5	4.0	4.2	4.4	4.7	10.0	
Freight wagon Improvement	134.5	-	19.3	20.4	21.7	23.0	24.3	25.8	
Others	138.0	65.0	10.0	11.0	12.0	13.0	13.0	14.0	
Grand Total	3,293.7	377.0	512.8	524.6	531.7	512.9	407.5	427.2	

Table 8.2.3 Investment Plan - With Case 2-1, 2-2 (excluding Metro)

Item	Total '96-2002	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	Remarks
Rolling Stock	1,456.0	173.5	183.9	194.9	206.6	219.0	232.1	246.0	
Permanent way	1,130.8	160.2	202.1	205.6	217.9	192.4	74.2	78.4	
Bridge Replacement	235.1	-	33.7	35.8	37.9	40.2	42.6	44.9	
Bridge Construction (Suez)	(350)		(100)	(150)	(100)				Governmental Subsidy
New Line (Ismailis - Rafah)	(600)	-	(100)	(200)	(200)	(100)			Governmental Subsidy
Building improvement	203.2	-	29.2	30.9	32.8	34.7	36.8	38.8	
Station improve. & others for speed-up	88.8	-	12.8	13.6	14.5	15.3	16.2	16.4	
Signaling & Tele-communication system	668.5	75.0	113.8	113.8	96.2	89.9	89.9	89.9	ATC Aout.Signal
Improvement of OA system	15.0		3.0	3.0	3.0	3.0	3.0		
Improvement of Car maintenance depot	34.8	-	7.5	4.0	4.2	4.4	4.7	10.0	
Freight wagon Improvement	134.5	-	19.3	20.4	21.7	23.0	24.3	25.8	
Others	138.0	65.0	10.0	11.0	12.0	13.0	13.0	14.0	
Grand Total	4,104.9	473.7	615.3	633.2	646.8	634.9	536.8	564.2	

Table 8.2.4 Comparison of Investment Plan for each Case

Investmrnt Items	Without Case			With Case 1-1 & 1-2			With Case 2-1 & 2-2		
1. Rolling stock									
- Replace & addition of rolling stock			Cost (mil. LE)			Cost (mil. LE)			Cost (mil. LE)
DEL 2475	No. of Loco.	31	351.9	No. of Loco.	3	34.1	No. of Loco.	17	193.0
DEL 1650	No. of Loco.	42	319.6	No. of Loco.	13	98.9	No. of Loco.	42	319.6
AC cars	No. of car	215	582.7	No. of car	108	292.7	No. of car	197	533.9
Psg. cars	No. of car	653	457.1	No. of car	313	219.1	No. of car	585	409.5
Freigt cars	No. of car	-	-	No. of car	-	-	No. of car	-	-
			1,711.3			644.8			1,456.0
- Install brakes	Not considered			No. of Wagons	3,280	134.5	No. of Wagons	3,280	134.5
- Depot improvement									
Install Overhead crane & Wheel Lathe	Not considered			Hadra and Zagazig depot		35.0	Hadra and Zagazig depot		35.0
			1,711.3			814.3			1,625.5
2. Parmanent Way									
- Track rehabilitaion		1570 km	909.2		1570 km	909.2		1570 km	909.2
- Addition & replacement M.T. T		24 units	221.6		24 units	221.6		24 units	221.6
			1,130.8			1,130.8			1,130.8
3. Bridge replacenment	Planned by ENR		235.1	Planned by ENR		235.1	Planned by ENR		235.1
4. New Line construction				Supported by the government, so it does not include.			Supported by the government, so it does not include.		
Sinai: Ismailia - Rafah	Planned by ENR		950.0						
5. Building improvement	Planned by ENR		203.2	Planned by ENR		203.2	Planned by ENR		203.2
6. Station & other improvement for speed-up	Not considered								
- Replacement of turnouts on main lines				440 units on main lines		56.8	440 units on main lines		56.8
- Additional Tamping works				1,970 km on main lines		32.0	1,970 km on main lines		32.0
						88.8			88.8
7. Signalling System									
- Install ATC system	ENR Plan		18.9	ENR Plan		18.9	ENR Plan		18.9
- Install CTC system (Cairo - Giza)	ENR Plan		35.2	ENR Plan		35.2	ENR Plan		35.2
- Improve signaling system	ENR Plan		87.0	ENR Plan		87.0	ENR Plan		87.0
- Install automatic signal	Not considered			Beni Suef - El Minya 123 k (1996/97 - 2002/03)		527.4	Beni Suef - El Minya 123 k (1996/97 - 2002/03)		527.4
			141.1			668.5			668.5
8. Improve OA System	Not considered					15.0			15.0
9. Others			138.0			138.0			138.0
Total (million LE)			**4,509.5**			**3,293.7**			**4,104.9**

CHAPTER 9 EVALUATION OF THE ALTERNATIVES

9.1 FINANCIAL EVALUATION

(1) Comparison with "Without Case"

ENR (excluding Metro)

There are 4 "With Cases". Judging from the result of the financial forecasts, "With Case1-1" is the case with most improvement among the 4 cases. This section compares "Without case" and "With Case1-1".

The deficit of "Without case" in 2001/02 is forecast at LE 660 million. The deficit of "With Case1-1" in 2001/02 is LE 12 million. The deficit will improve by LE 648 million in 2001/2002, compared to "Without Case". The main reasons for improvement are as shown in figure 9.1.3.

First, the impact of revenue increase is as follows. The higher rate of tariff increase in "With Case1-1" will raise revenues by LE 60 million. Strengthening ticket inspection will increase revenue add LE 53 million. Compensation for excessive ticket discounts will add LE 62 million. Contribution of diversified businesses adds LE 5 million.

Second, the impact of cost savings is as follows. Zero recruiting will reduce personnel costs by LE 229 million. Interest cost will be fall by LE 200 million. Depreciation will fall by LE 56 million. The impact of line closure will be only LE 3 million.

Passenger-km in "With Case1-1" is 2% lower than "Without Case". This will reduce revenues by LE 19 million.

From the break even point analysis point of view, there are big differences in terms of fixed cost between "With Case1-1" and "Without Case". For example, fixed costs are estimated to be around LE 1,012 million and LE 1,517 million respectively for "With Case1-1" and "Without Case". 85% of the difference of fixed costs arise from wage and interest costs.

As for value added analysis, there are also big differences between "With Case1-1" and "Without Case". In the "Without Case", value added will amount to LE 604 million in 2001/2002. Value added will increase at an annual rate of 9% for the period 94/95-2001/2002. On the other hand, in the case of "With Case1-1", value added will be around LE 767 million in 2001/2002. Value added will rise 12.8% per year for the same period. In "With Case1-1", the ratio of (personnel cost ÷ value added) and ratio of (personnel cost ÷ revenue) will improve from 88% to 51%, and from 47% to 34% respectively compared with "Without Case" in 2001/02.

As mentioned above, ENR's financial situation will improve, but there is still an important issue -- cash flow.

From the cash flow point of view, in the "Without Case" free cash flow will be negative from 94/95 through 2001/2002. In "With Case1-1", free cash flow will continue to be negative but cash flow will be positive. Investments are estimated to be around LE 644 million per year over the period 95/96 through 2001/2002 in the "Without Case". In "With Case1-1", average annual investment forecast at about LE 451 million. In both cases, investment will exceed depreciation. Therefore free cash flow will be negative, and need external debts. According to our forecast, debt will be accumulated to LE 3,235 million in 2001/2002 in the "Without Case". Even in "With Case1-1", debt will be accumulated to around LE 981 million.

As for fixed assets turnover ratio, the ratio in "Without Case" is forecast at 0.0871 in 94/95, and 0.0957 in 2001/02. This ratio in 2001/02 is forecast at a better 0.112 in "With Case2-1", and 0.113 in "With Case1-1". These figures are shown in figure 9.1.8. The differences of these forecasts arise mainly from differences of investment amount. By keeping investment low compared with past, the ratio will increase.

(2) Comparison to "Without government support"

The government plans to cut financial support to ENR from 98/99 as explained in section 3.8. If government support is terminated as scheduled, ENR must depend on external debt and pay interest on new loans after 98/99. Because ENR will suffer from a deficit over the period 95/96-2000/2001, according to the forecast of financial statement.

1) Result of "Without Case"

If government support is terminated with regard to finance from 98/99, ENR has to pay large interest costs and its deficit will amount to LE 660 million in 2001/2002.
As shown in Table 9.1.20, external debt will accumulate to around LE 3,235 million in 2001/02. Interest cost also will grow from LE 84 million in 98/99 to LE 286 million in 2001/02.

2) Result of 4 "With Cases"

In the 4 "With Cases", the difference between government support and no support is forecast to range from LE 85 million to LE 140 million. For example, if there is government support, profit will be from LE 46 to LE 79 million in 2001/02. Without government support, the deficit range from LE 12 million to LE 90 million in 2001/02. However, even in "With Case1-1", external debts will accumulate to about LE 981 million in 2001/02. As long as free cash flow is negative, external debts will expand as shown in Tables 9.1.20 to 9.1.26. Expanding external debts would be the start of the vicious circle ENR experienced in the 1980's. To stop expanding debts, profit should be maintained and free cash flow should be positive. To do so, appropriate government support and control of investment should be considered.

Table 9.1.27-36 Comparison of Alternatives
ENR Profit without Government Support (LE Millions)

Profit of ENR (without government support)

	Actual	Forecast						
	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02
without	-195.90	-240.51	-272.61	-271.00	-359.62	-455.38	-573.84	-659.88
with 1-1	-195.90	-236.31	-237.28	-198.15	-134.82	-120.23	-66.11	-12.03
with 1-2	-195.90	-236.31	-243.34	-209.62	-153.25	-147.09	-103.15	-50.93
with 2-1	-195.90	-239.14	-245.34	-208.44	-153.49	-150.64	-108.27	-55.87
with 2-2	-195.90	-239.14	-246.33	-211.99	-161.45	-163.74	-127.35	-90.55

Improvement from without-case (without government support)

	Forecast						
	95/96	96/97	97/98	98/99	99/00	00/01	01/02
with 1-1	4.20	35.33	72.85	224.80	335.14	507.72	647.85
with 1-2	4.20	29.27	61.38	206.37	308.28	470.69	608.95
with 2-1	1.37	27.27	62.56	206.13	304.74	465.57	604.01
with 2-2	1.37	26.27	59.01	198.17	291.63	446.48	569.33

Profit of Metro (without government support)

	Actual	Forecast						
	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02
without	-132.80	-145.02	-121.13	-145.43	-213.06	-248.40	-289.15	-311.32
with	-132.80	-145.02	-120.55	-144.10	-209.71	-241.45	-277.68	-294.58

Improvement from without-case (without government support)

	Forecast						
	95/96	96/97	97/98	98/99	99/00	00/01	01/02
with	0.00	0.59	1.32	3.35	6.95	11.46	16.74

Profit of ENR (with government support)

	Actual	Forecast						
	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02
without	-195.90	-240.51	-272.61	-271.00	-359.62	-455.38	-573.84	-659.88
with 1-1	-195.90	-236.31	-237.28	-198.15	-101.95	-58.44	9.56	73.85
with 1-2	-195.90	-236.31	-243.34	-209.62	-118.69	-81.20	-19.99	45.97
with 2-1	-195.90	-239.14	-245.34	-208.44	-110.07	-66.52	2.86	78.96
with 2-2	-195.90	-239.14	-246.33	-211.99	-117.30	-77.71	-12.58	51.08

Improvement from without-case (with government support)

	Forecast						
	95/96	96/97	97/98	98/99	99/00	00/01	01/02
with 1-1	4.20	35.33	72.85	257.67	396.94	583.40	733.73
with 1-2	4.20	29.27	61.38	240.93	374.18	553.85	705.85
with 2-1	1.37	27.27	62.56	249.55	388.86	576.69	738.84
with 2-2	1.37	26.27	59.01	242.32	377.67	561.25	710.96

Profit of Metro (with government support)

	Actual	Forecast						
	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02
without	-132.80	-145.02	-121.13	-145.43	-213.06	-248.40	-289.15	-311.32
with	-132.80	-145.02	-120.55	-144.10	-167.98	-197.84	-232.37	-247.84

Improvement from without-case (with government support)

	Forecast						
	95/96	96/97	97/98	98/99	99/00	00/01	01/02
with	0.00	0.59	1.32	45.08	50.56	56.77	63.48

Debt of ENR (with government support)

	Actual	Forecast						
	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02
without	0.00	0.00	0.00	0.00	-918.97	-1710.5	-2373.4	-3234.8
with 1-1	0.00	0.00	0.00	0.00	-361.79	-679.5	-832.4	-980.8
with 1-2	0.00	0.00	0.00	0.00	-380.20	-724.8	-914.7	-1103.9
with 2-1	0.00	0	0	0	-477.70	-925.3	-1222.3	-1530.9
with 2-2	0.00	0.00	0.00	0.00	-485.65	-946.4	-1262.5	-1606.6

Improvement from without-case (without government support)

	Forecast						
	95/96	96/97	97/98	98/99	99/00	00/01	01/02
with 1-1	0.00	0.00	0.00	557.18	1031.02	1540.96	2254.00
with 1-2	0.00	0.00	0.00	538.77	985.73	1458.64	2130.94
with 2-1	0.00	0.00	0.00	441.27	785.22	1151.04	1703.92
with 2-2	0.00	0.00	0.00	433.32	764.17	1110.89	1628.29

Figure 9.1.1 ENR Profit Forecast (Without government support) (excluding Metro)

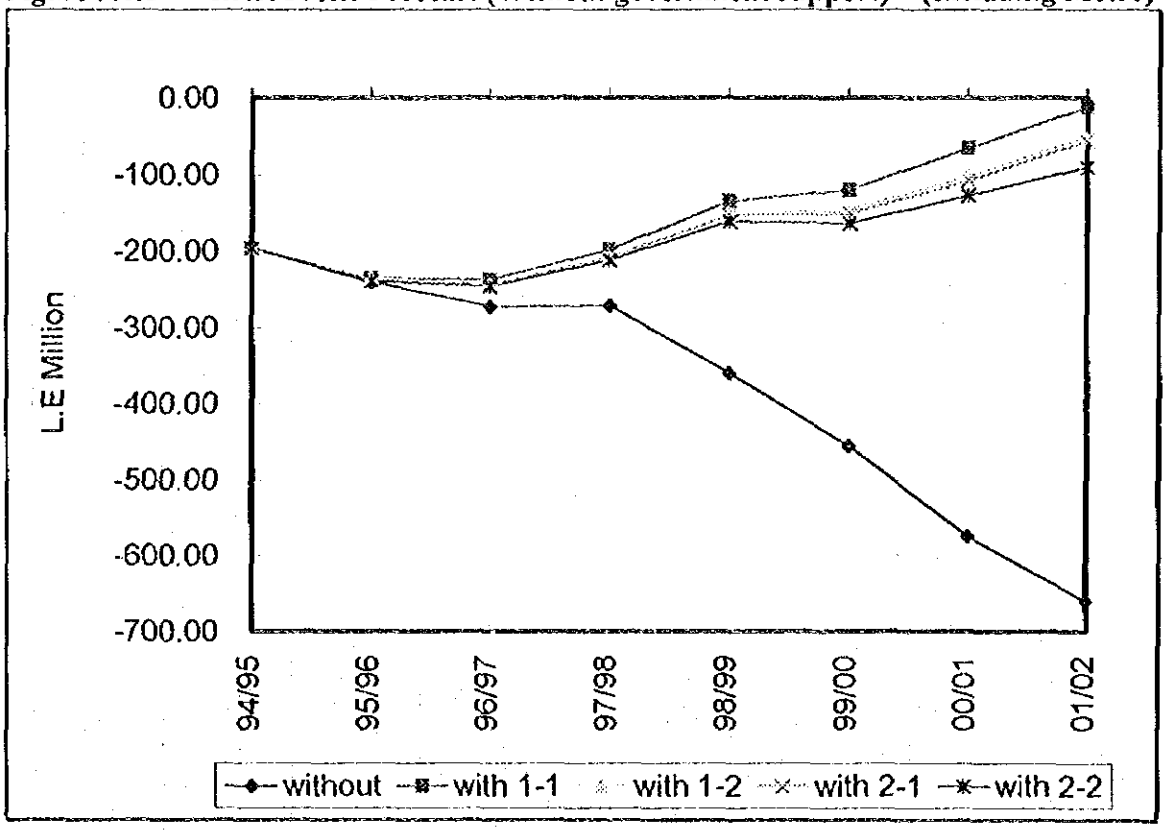


Figure 9.1.2 Forecast of Profit (With government support) ENR (excluding Metro)

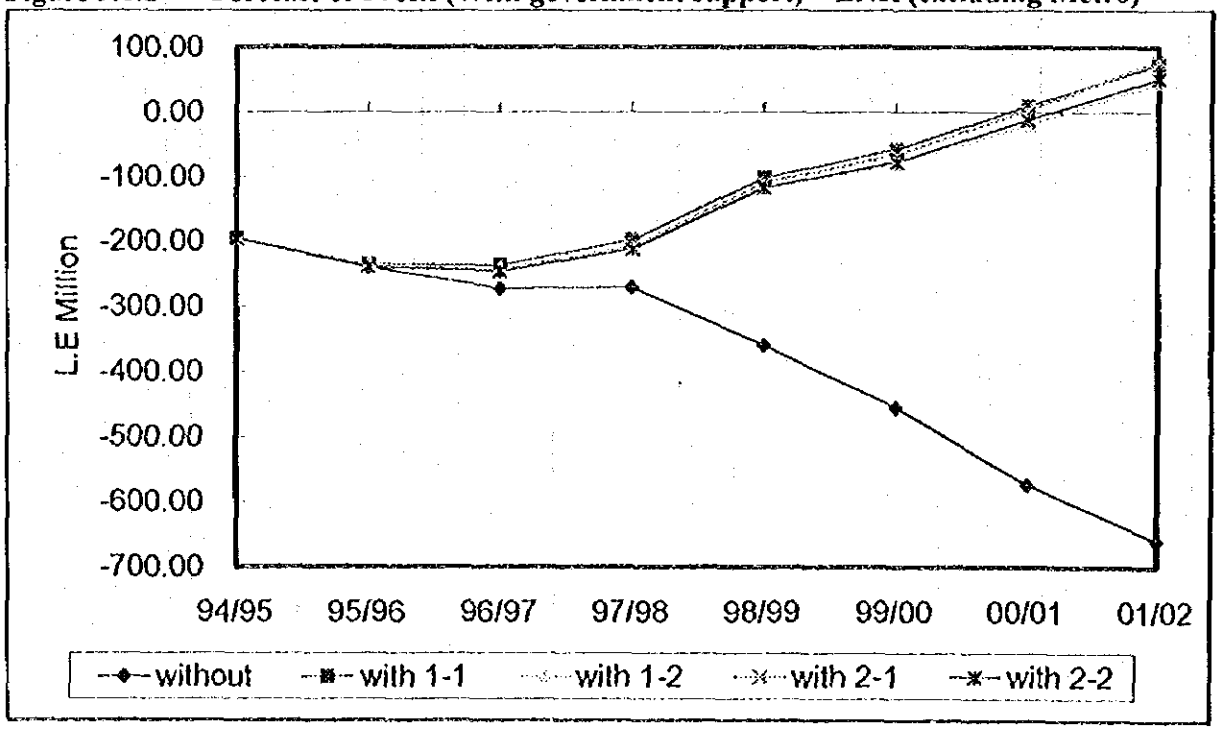


Figure 9.1.3 2001/2002 Profit Increase from Proposals

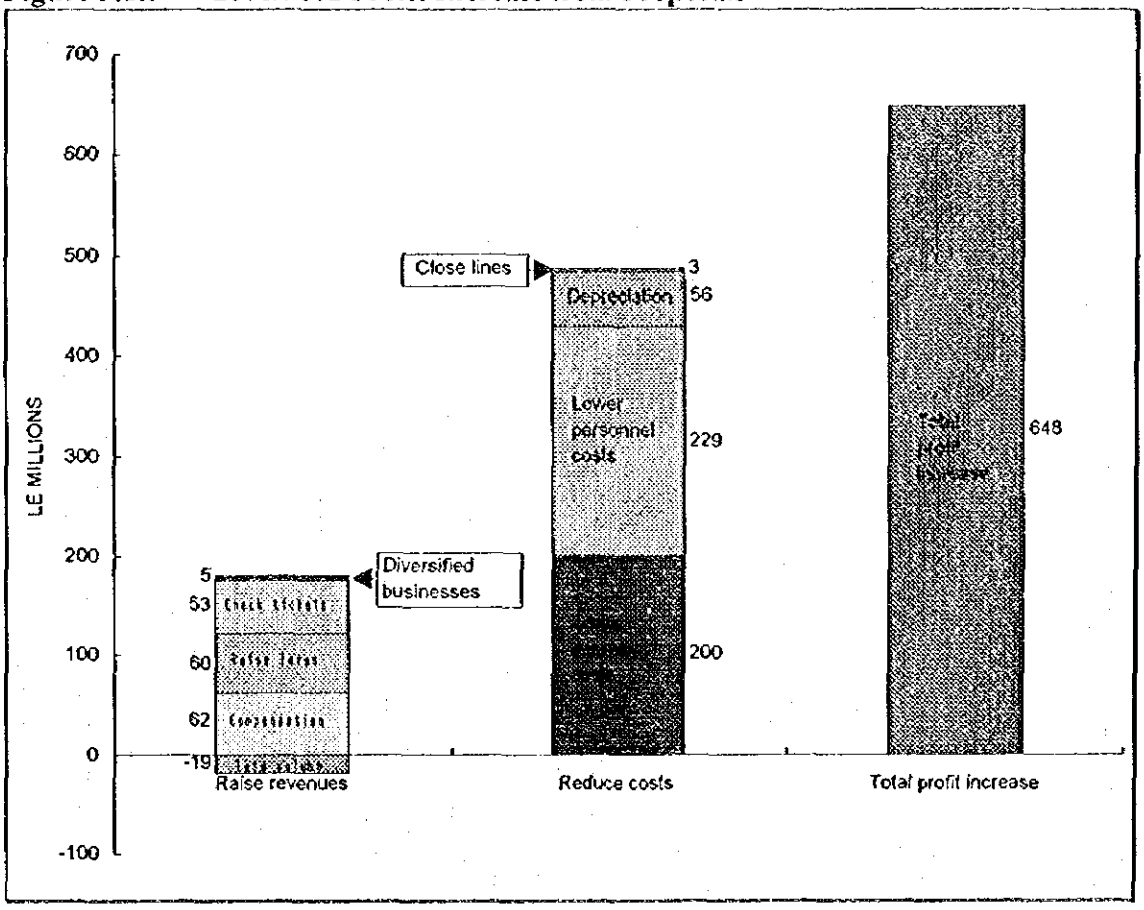


Figure 9.1.4 Profit (Loss) of ENR in 2001/2002 (excluding Metro)

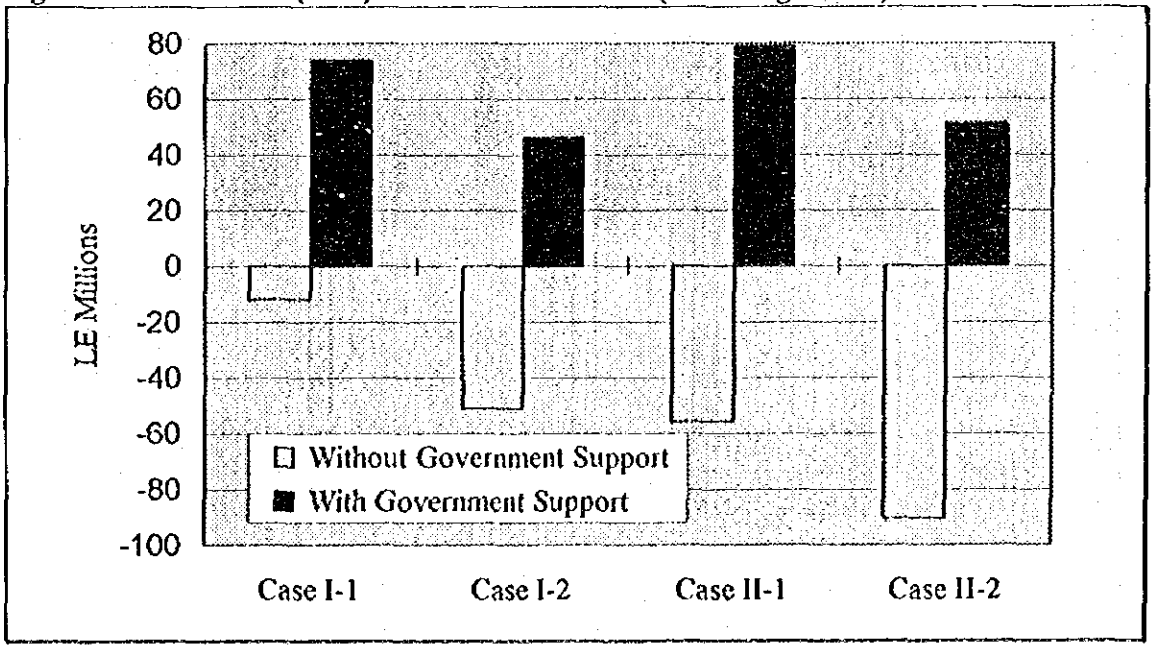


Figure 9.1.3 2001/2002 Profit Increase from Proposals

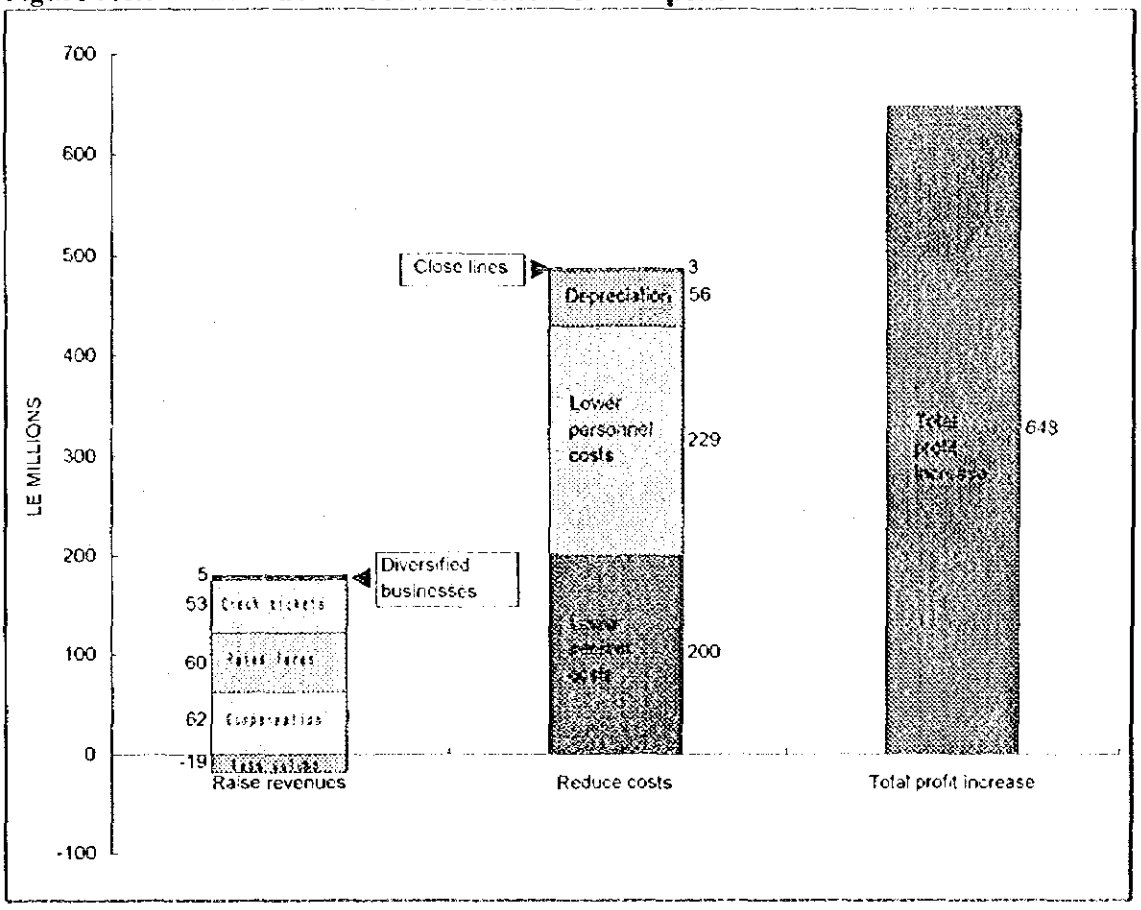


Figure 9.1.4 Profit (Loss) of ENR in 2001/2002 (excluding Metro)

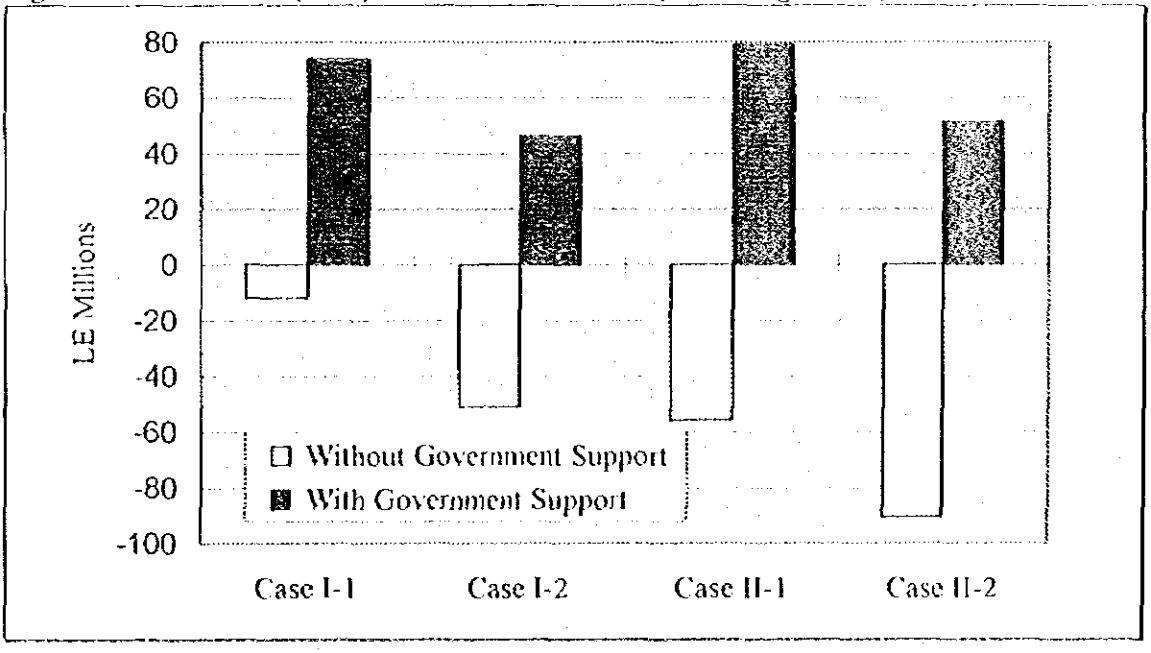


Figure 9.1.5 Investment and Free Cash Flow, ENR (excluding Metro)

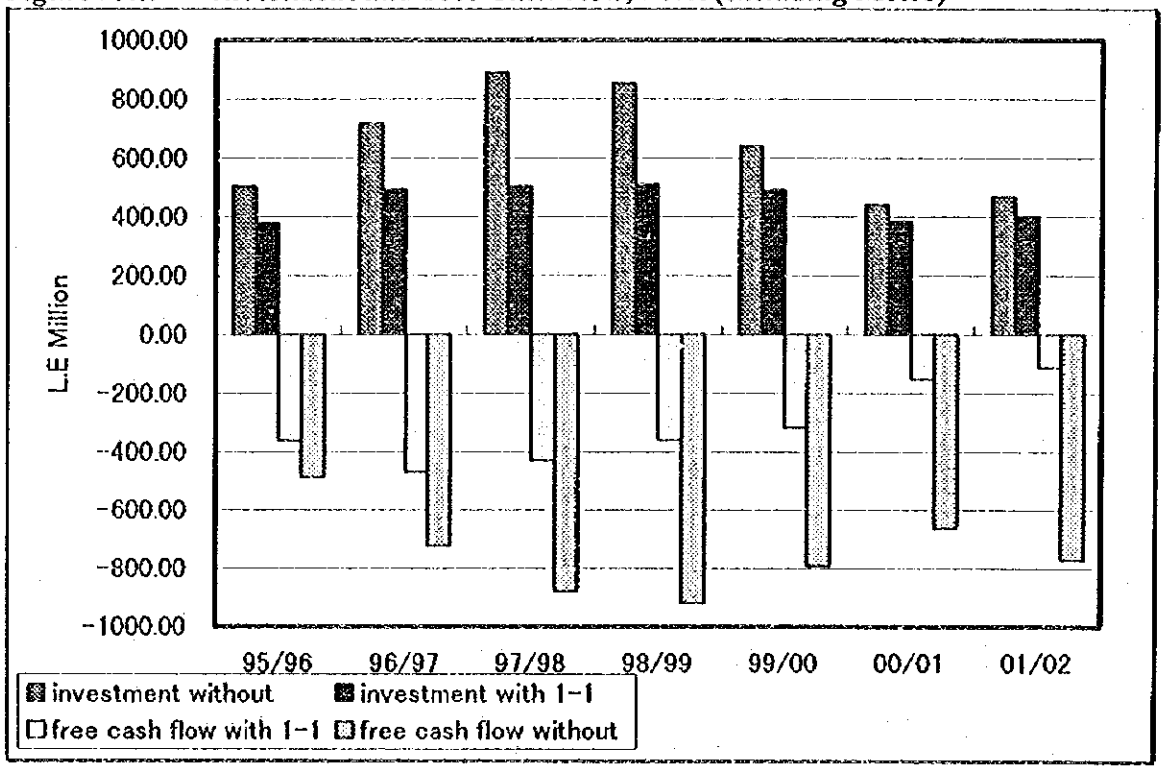


Figure 9.1.6 Investment and Free Cash Flow, ENR (excluding Metro)

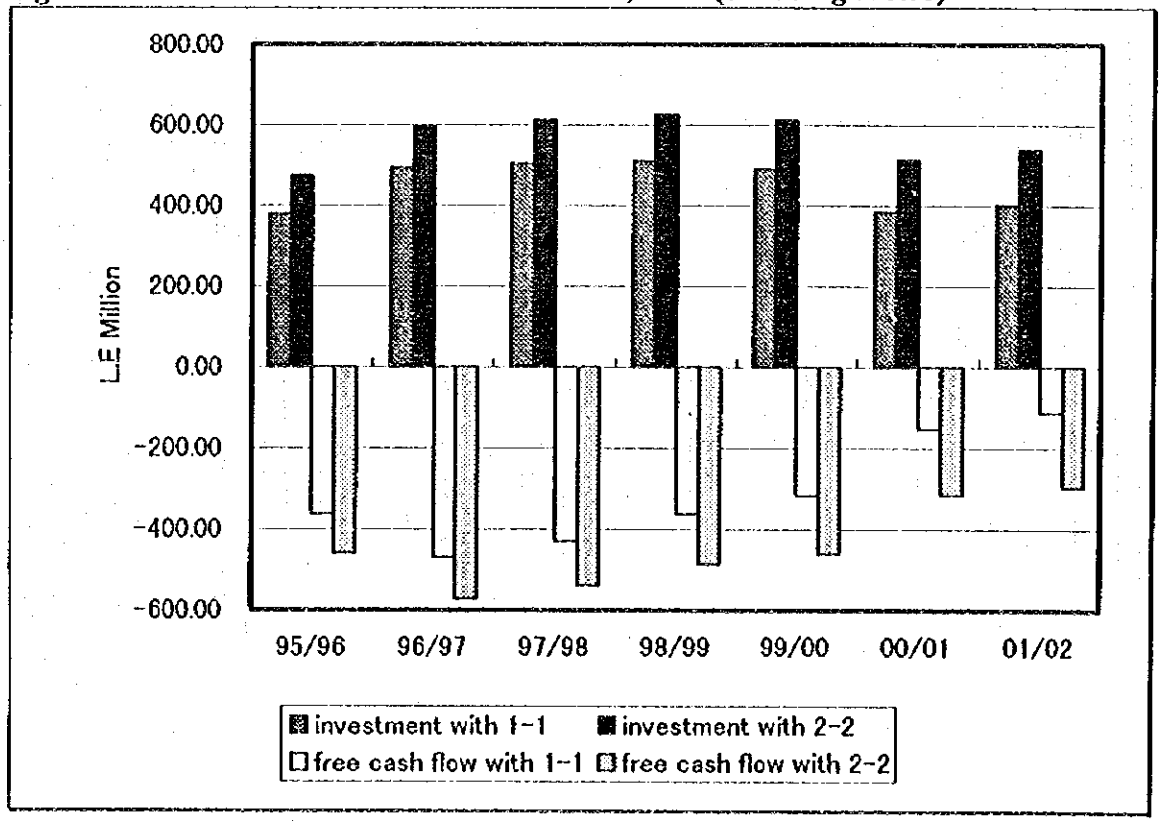


Figure 9.1.7 Forecast of Debt ENR (excluding Metro)

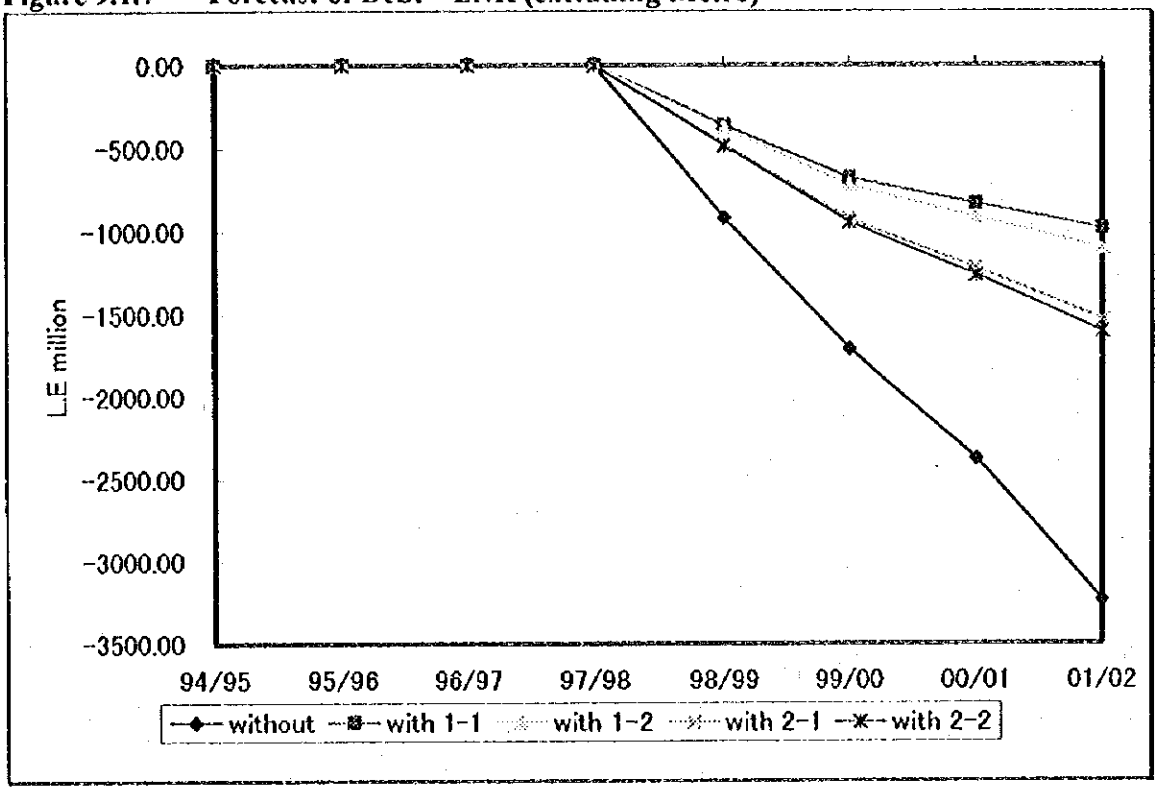
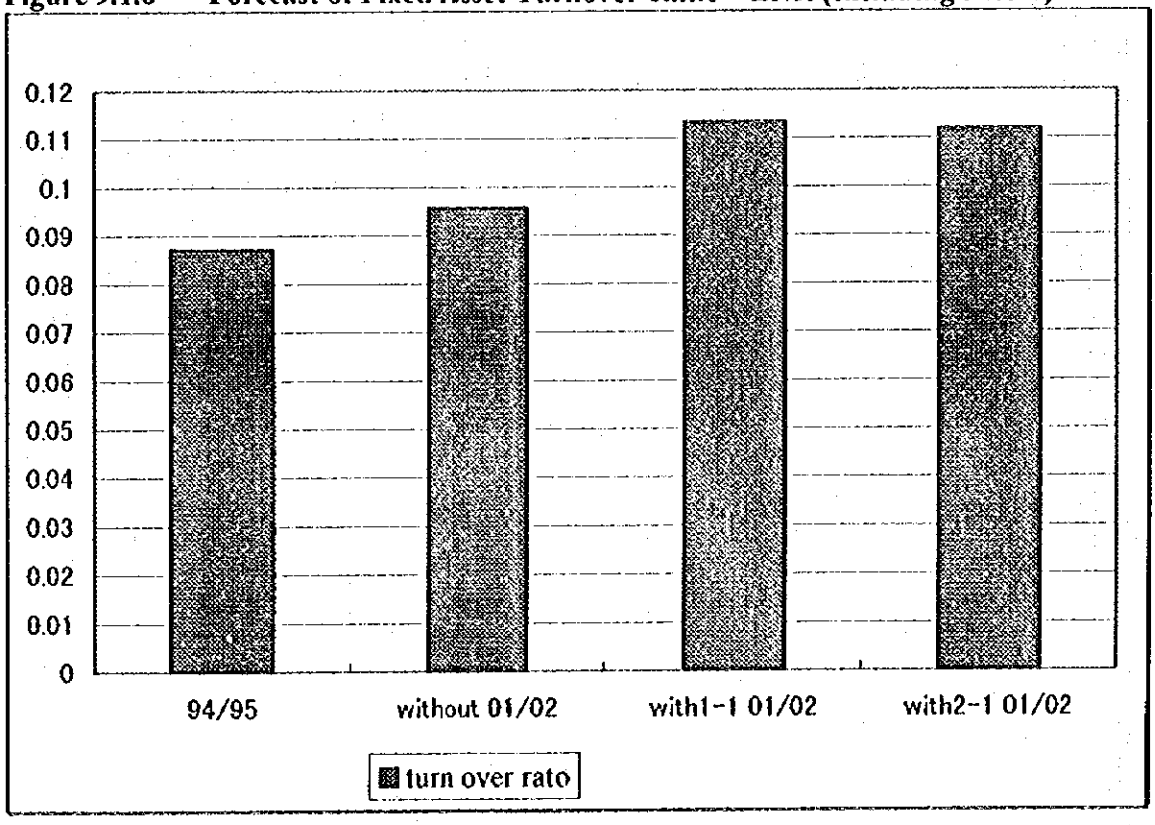


Figure 9.1.8 Forecast of Fixed Asset Turnover Ratio ENR (excluding Metro)



9.2 SOCIAL AND ENVIRONMENTAL IMPACT EXAMINATION

9.2.1 Social Impact Examination

(1) Overview
There are 3 major social impacts of the proposals in this study. These are: increased staff reductions, ticket prices, and closed lines. The table below is a summary of the detailed analysis which follows.

Reduce Staff	This project will not propose firing any staff. This study proposes keeping recruiting at low levels to reduce staff slowly through natural retirement each year. This will have a small social impact. Similar to the argument above, Egypt must decide whether ENR is a place for efficient work, or a place to create jobs. If ENR is forced to continue hiring more staff than it needs, then ENR must receive subsidies from the government.
Raise Ticket Prices	The most important issue is ENR's low ticket prices. ENR has some of the lowest ticket prices in the world. ENR is being operated as a public service, providing very cheap transport. If the Egyptian government wants to run ENR as a public service, the central government must continue to pay for ENR's losses every year, like it is paying now. But the Egyptian government is pressuring ENR to operate like a business, meeting its expenses from revenues. This is impossible with the lowest fares in the world. Ticket prices for government workers and students are especially low. Government workers have higher incomes than the average Egyptian, so this subsidy makes no sense for improving social fairness. There is also no reason ENR should pay for subsidies for students. This is an Education policy, not a transport policy. Student subsidies should be paid from the education budget. In sum, Egypt must decide if it wants to run ENR as a business or a social service.
Close Lines	Although the superficial financial savings for ENR from closing lines seems to be not large, a heavy train running with empty coaches is a waste of Egypt's precious social resources. And also it harms managerial spirit of ENR's person very much. If the alternative means of transport such as mini-bus are provided, local residents can enjoy more convenient and appropriate service and this contributes to social economy.

9.2.2 Environmental Examination and Consideration

There are no serious problems in ENR to influence the natural and social environment. However, the study of environmental analysis is to identify the existing environmental issues in ENR facilities, i.e. stations, permanent way, rolling stock, workshops etc. Most ENR facilities are not clean, because of the dry climate in Egypt, much litter on the permanent way and platform due to dumping. It is suggested to keep the facilities clean.

9.3 GENERAL EVALUATION

Chapter 5 described 4 possible proposals termed "with cases", which was evaluated in Chapters 9.1 and 9.2 with regard to financial results, and social and environmental impacts. The following discussion will select the most appropriate case for ENR, considering financial results and other factors.

9.3.1 Final Selection & Evaluation of Business Improvement Proposals

(1) Selection of best proposal

The main differences between the 4 cases are shown below:

CASE	ENR Yearly fare increase	Competing transport Yearly fare increase	New recruits (% of current staff)
1-1	7%	5%	0%
1-2	7%	5%	1%
2-1	7%	7%	0%
2-2	7%	7%	1%

1) Raise fares

All cases assume ENR raises fares by 7% per year (passenger, freight, metro). Cases 1-1 and 1-2 assume that other transport modes raise fares by 5% per year. Cases 2-1 and 2-2 assume that other transport modes raise fares by 7% per year. ENR's fare raise is considered possible, considering its cheap fares and necessity for government fiscal balance. Considering forecast inflation, the impact on Egyptian passengers will be relatively small.

As for fare raise of other modes, it is not kind of political decision. It is assumed for making alternative cases, which is considered a realistic level and combination judging with competitive aspect, market structure and so on. Namely, one is that the fare raise of other mode follows the railway, and other one is lower than railway fare rising.

A 10% annual fare rise was also considered, but this would exceed current and forecast inflation. To meet national goals of limiting inflation, this option was not selected.

2) Reduce staff

Improved productivity is crucial to raise financial results. ENR productivity is low when compared to developed countries. To reduce the social impact, the proposals to not fire employees. Yearly recruitment through year 2002 is reduced from the current 1.67% of total employees down to 1% (cases 1-2 & 2-2), or 0% (no recruitment) in cases 1-1 & 2-1. No employees are fired to improve the realistic chance of the proposals being implemented. Reallocation and re-education of employees will be necessary if these employee reduction plans are implemented.

To cooperate with national employment expansion policy and preserve balanced employee age and skill structure, continued minimum recruitment is preferable. However, forecasts show ENR will not be profitable through the year 2001/02 and a zero recruit policy should be unavoidable. Even zero recruitment at ENR will have a small impact on overall unemployment in Egypt.

3) Most appropriate "With Case"

This Study estimated the results of the 4 proposals both with and without government financial support after 1997/98. But in any case, the government subsidy program begun in 1990 should be considered a special program for a limited time only. Therefore, the case which

requires minimum government support after 1997/98 was selected.
Of the 4 proposals, Case 1-1 produces the smallest financial losses if ENR does not receive government support after 1997/98 (12,000,000 LE loss in 2001/02). Case 1-1 also has the advantage of accumulating the smallest amount of debt by 2001/02 (981,000,000 LE).
Case 1-1 and Case 1-2 assume lower fare raises for competing transport modes (bus, taxi, truck). These cases may be materialized because there is a good chance that other modes do not follow the fare raise of ENR in the competitive environment.
Case 1-1 is considered best because zero recruitment is unavoidable considering that ENR will lose money through 2001/02.

The Study Team selected Case 1-1 as the most appropriate proposal based on the above considerations.

(2) Evaluation of management improvements included in all 4 proposals

In addition to the fare raise and labor productivity improvement described above, there are several other improvement proposals in all 4 cases discussed in Chapter 4.2, and outlined below.

1) 10% Speed increase on main lines
Increasing speed will not have much impact on attracting passengers in the current transport market, but it will increase efficiency of locomotive and staff utilization. Also, speed up must be inevitable in near future to compete with motor transport on improved roads, and attract passengers with rising incomes. The proposals include a 10% speed increase on Main Lines, which is feasible without huge investment if the actions described in section 4.2.3 are implemented.

2) Government compensation
a. Government compensation of extremely heavily discounted tickets
The current ENR fare system includes extremely large discounts, which ENR is forced to provide to meet government policy. Moderate discounts for season and prepaid tickets are standard business practice, but ENR provides over 50% (in some cases more than 90%) discounts to passengers like students and government employees. Discounts over 50% are provided for social goals (like education policy), and it is inappropriate policy to force ENR to maintain this burden.
Forcing ENR to bear this burden will damage the motivation of management to improve ENR's business, and encourage irresponsible management practices. Therefore, the government should compensate ENR for the part of discounts which exceed the discount level (at highest 50%).

b. Construction & operation of new lines for national goals
New lines like the Sinai Peninsula line built to meet government policy require huge investments. Even after construction, operation is likely to be very unprofitable. Therefore, the government must compensate ENR for the financial burden of both construction and unprofitable operation. At the same time, ENR must do its best to operate the line as efficiently as possible.

3) Line closure
The 4 proposals plan for 5 lines to be closed. There are very few passengers on these lines, so

even if ENR tries its best to raise efficiency, it is certainly impossible to make a profit. Other modes such as bus transport are much more efficient for small transport volumes, so using such transport is a better use of Egypt's social and economic resources. Although the direct cost reduction of closing these lines is small, this will allow ENR to use the valuable rolling stock, staff, and management resources from these lines.
Opposition from local communities is expected, there are ways ENR can persuade them to resolve these problems.

4) Strengthen ticket checking
From 15% to 25% of 2nd and 3rd class passengers do not pay, which reduces revenues, and is unfair to paying passengers and society. By strengthening inspection and building the fence around stations, the 4 proposals plan to increase 2nd and 3rd class revenues by 15% by 2001/02, which is considered feasible.

5) Increase rolling stock utilization
Increased rolling stock availability is critical, considering the high purchase cost. The 4 proposals assume an increase of availability to 85%, from the current 74%. This is feasible considering the 90% utilization in developed countries.

6) Rationalize freight transport
ENR is similar to Japan in that its geography tends to make ENR more focused on passenger than freight transport. As for freight transport, ENR currently uses railway's strength in large volume transport to transport iron ore and phosphates, but detailed study is necessary to decide what role ENR should play in general and containerized freight. But one point which is certain is that ENR has many low volume freight stations in short distance and this fact greatly damages train operation efficiency and wastes the precious transport capacity of the track. ENR should close those small stations and try to shift cargoes handled there to adjacent larger improved railway stations as much as possible.

7) Correct the data collection system
Unfortunately, the most fundamental data of ENR such as passenger-km seems to be not correct. These data are crucially important for the adequate judgment of the railway management in every aspect. The data collection system of ENR should be immediately improved before waiting the full-fledged sophistication of information system.

8) Other proposal items
a. Develop related businesses
b. Expand & improve safety systems :
c. Improve information system

These items are considered both feasible and necessary to improve profitability, expand revenues, reduce costs, and improve safety.

9.3.2 Extend Government Financial Support Until 2001/02

The government originally plans to terminate its financial support for ENR in 1997/98. But as seen in section 9.1, ENR will lose money in all of this Study's 4 proposals through 2001/02. Also, ENR debt is forecast to grow, because of investments larger than cash flow. Even in Case 1-1, which forecasts the lowest debt, by 2001/02 ENR debt will grow to 980 million LE

(nearly equal to total revenues) without continuation of the government support. With this forecast, both the government and ENR should be careful to avoid the vicious circle of borrowing increasing amounts to pay past debts. Therefore, the government must extend its support for ENR through 2001/02. With government support and strenuous efforts by ENR to implement the proposals in this report (zero recruitment, improved efficiency and so on), ENR is likely to show a profit after depreciation.

9.3.3 ENR After 2002

Government support until 2003 is assumed in the 4 proposals, but if this Study's proposals are implemented, ENR will become financially stable after that. However, it is matter of course that management improvements should not stop at 2002. Improvement proposals described in Chapter 4 must be continued after 2002. The business environment is forecast to become more and more competitive after 2002. ENR management should be flexible enough to cope with the rapidly changing market environment. ENR must continue to improve operating efficiency, limit recruitment to minimum required staff, improve services to increase revenues, and limit investments to projects which will produce financial returns. This is especially true because from 2003 to 2012, ENR must replace large numbers of locomotives with 25 years in operation. This report has pointed out that a large share of ENR investments are in rolling stock. If the current rolling stock management situation is not improved, ENR will lose all the financial gains from its improvement efforts through 2002. To reduce purchase expenses, ENR must improve its rolling stock availability, utilization AND life-span, and should seriously consider the domestic production of diesel locomotives by either herself or external factory..

9.3.4 Overall Evaluation

ENR operates a rail network primarily along the Nile River and in the Nile Delta, in high population density areas. This is very advantageous for rail transport. This is shown by the remarkably high density of rail transport in Egypt compared to other countries. Even so, ENR has not been able to correct its financial losses due to very low fares, burdens imposed on ENR by government policy, low labor productivity and the high price of imported locomotive. If ENR takes proper action to improve, it will be able to achieve financial stability.

Chapter 4 describes solutions for the problems on railway management of ENR. ENR has plenty of room to improve its management efficiency. But improvement will require extremely hard ENR efforts and full government support. The later improvements begin, the more serious will be the problems ENR experiences. Improvements must be begun immediately.

Great efforts must be made to emphasize profitability at an organization like the railway, with many public service aspects. Since 1991, Egypt's government has implemented reforms, moving towards a market economy, but ENR efforts to improve its business have been lacking. ENR must raise productivity of staff and facilities, build an efficient organization, and provide cheaper and better service than other transport modes. To do this, ENR must raise the efforts of employees to provide excellent service, and produce a more market-oriented commercially competitive environment. This will allow the railway to play an important role in the midst of growing motorization of Egypt's transport system, and ENR can continues its large contributions to Egypt's society and economy. By changing to a more efficient organization, ENR will lighten its burden on government finances, and contribute to Egypt while using Egypt's economic resources more efficiently.

CHAPTER 10 IMPLEMENTATION PLAN

10.1 MASTER PLAN

The master plan for improvement of ENR is as follows.

(1) Changing business environment
As mentioned in Chapter 4.1, the business environment surrounding ENR has been changing steadily. The most important changes are the transition to a market economy and progress of privatization.

(2) Market orientation and efficiency
ENR needs to review and reform its current organization to prepare for the large changes expected in the transport sector. Details of aspects which ENR should change are described in Chapter 4.2. Basic points which the Study team proposes are: strengthen market orientation; emphasize profitability; and clarify responsibility between ENR and the government. In sum, ENR needs to change its basic management attitude.

(3) Improvement items
This Study proposes changes in almost 20 aspects of ENR's operations. Details of each item are mentioned in Chapters 4.2.1 to 4.3.

(4) Implementation plan of improvement items
The outlines of each improvement item and investment plan, including objectives, cost, effect, and implementation schedule are described in Table 10.1.

10.2 ESTABLISHING AN IMPLEMENTATION ORGANIZATION

10.2.1 Establish ENR Reform Management Committee
Establish an ENR Reform Management Committee composed of the top officials in related agencies and prominent opinion leaders outside the government.

10.2.2 Establish Reform Team
ENR should form a team from active managers in each division, to create the detailed implementation plan, check its progress of implementation, and provide timely, accurate advice to every sector of ENR.

10.3 IMPROVEMENT PROPOSAL IMPLEMENTATION PLAN

10.3.1 Actions to be Implemented after thorough Discussion with Related Parties (Including Labor Union)

(1) Line closure
ENR needs the thorough understanding of the high government officials and the areas which will be affected.

(2) Closure of small freight stations
ENR needs to close small freight stations which reduce efficiency, and concentrate investments in the large freight stations.

(3) Reduction of staff
ENR managers and employees must understand that number of staff will be reduced only through stopping new recruitment for a limited period, without firing any employees.

10.3.2 Issues to be Discussed with Government Institutions

The ENR Reform Management Committee must immediately make decisions on the following: Government compensation; tariff increase; clarification of relationship with the government; domestic locomotive production; extension of government financial support for ENR.

10.4 ITEMS WHICH CAN BE IMPLEMENTED IMMEDIATELY

The following improvement proposals require neither discussion with parties outside ENR nor huge expenditure, and therefore should be implemented as fast as possible.

(1) Improve data collection system
First, improvement of data collection (the most basic data such as passenger-km) from each regional office to the central office is urgently required.

(2) Improve facility cleanliness

(3) Strengthen ticket checking

(4) Change organization to emphasize marketing

(5) Reduce travel time on Main Lines

Table 10.1 Master Plan Outline

Proposal	Objectives	Cost (Mil LE)	Effect (Mil LE) (revenue increase) (*cost reduction)	Remarks	Implementation Schedule
		NOTE: Investment cost from 1996-2002	NOTE: The two numbers in parentheses for most cases below are: 1) Effect in first year 2) Effect in 2001/02		1996/97 · 1997/98 · 1998/99 · 1999/2000 · 2000/01 · 2001/02 · 2002/03 · After 2003
Market oriented tariff policy	Increase revenue and keep competitive with other modes	Not significant cost. Set new policy		Consider social impact	
Stronger ticket checking system	Increase revenue	Not significant cost	Case 1 (12.3, 52.7) Case 2 (13, 59)	Purchase portable ticketing machines	
Faster trains on main lines	Increase customer service and keep competitive with other modes	Investment cost. case 1 & 2 : 88.8 mil LE	2.36 mil LE in 2001/02	10% faster	
Improve freight transport	Increase customer service and improve competitiveness with other modes	Investment cost case 1 & 2 134.5 mil LE for improvement of freight wagon		Close small freight stations	
Improve passenger service	Increase volume. Make tariff raise easier.			Make staff attitudes more customer oriented	
Compensation from government	Cover loss related to discounted tickets	Not significant cost. Negotiation with government.	Case 1 (48, 62.1) Case 2 (51.4, 69.4)	Compensation for amounts discounted for social and political policy	
Extension of current financial support	Avoid debt accumulation	Not significant cost. Negotiation with government	*Case 1-1 (32.9, 85.9) Case 1-2 (34.6, 96.9) Case 2-1 (43.4, 134.8) Case 2-2 (44.2, 141.6)	interest is reduced	

Proposal	Objectives	Cost (Mil LE)	Effect (Mil LE) (revenue increase)	Remarks	Implementation Schedule
		NOTE: Investment cost from 1996-2002	NOTE: The two numbers in parentheses for most cases below are: 1) Effect in first year 2) Effect in 2001/02		1996/97 1997/98 1998/99 1999/2000 2000/01 2001/02 2002/03 After 2003
Reduce staff	Increase productivity. Reduce cost.	Training cost and staff reallocation cost	*Case 1-1 (32.1, 228.5) Case 1-2 (26.1, 200.6) Case 2-1 (29.5, 228.5) Case 2-2 (28.5, 200.6)	Final target is to reach to productivity level of developed countries. Reduction achieved by stopping new recruitment. Don't fire existing staff.	
Raise rolling stock availability	Reduce investment	Cost for improving car maintenance depot in Cases 1&2: 35 Mil. LE		Raise availability to 85% from 74%.	
Investment for Rolling stock	Replace old rolling stock. Meet increased demand.	Investment cost for rolling stock case 1: 644.8 mil LE case 2: 1456 mil LE		Rise of availability of rolling stock is taken into consideration	
Investment decision process	Increase profitability. Utilize existing assets.	Not significant cost Set new role for ENR investments.		Set objective standards for investment decisions	
Close lines	Increase profitability	Not significant cost	*Case 1&2 (3, 3)	Close 5 lightly used lines. Take actions to ease social impact.	
More business orientation	Increase revenue and productivity			Make ENR organization more market oriented	
Data collection system	Improve management decision process	Investment cost: case 1&2 :15 mil LE		Computerize	
Better safety devices	Maintain ENR reputation for reliability.				

Proposal	Objectives	Cost (Mil LE)	Effect (Mil LE) (revenue increase)	Remarks	Implementation Schedule							
					1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	After 2003
Improve track maintenance	Cope with speed up and more frequent train operation.	Investment cost : case 1 & 2 : 1130.8 mil LE										
Develop diversified business	Increase revenue	Estimated purchase price of land: 35 mil LE. Negotiation with government.	Case 1&2 (7.2, 9.8)	Land should be owned by ENR								
Clearer relationship with government	Clarify the responsibility between ENR and government. Reduce cost	Not significant cost. Negotiation with government.	Bridge construction (Suez) and new line (Ismailis - Rafah) are borne by government investment cost: Bridge (Suez) 350 mil LE; New line (Ismailis - Rafah) 600 mil LE	Cost of new lines built for national policy is borne by government								
Improve facility cleanliness	Improve customer service	Not significant cost										
Produce locomotives in Egypt	Reduce cost for the replacement of many locomotives		roughly 40 % of locomotive cost is reduced from current level	Feasibility Study is needed before 2000								
Privatization	Increase productivity. improve customer service. Reduce government financial burden.			"Separation of accounts" is first step to accumulate accurate and adequate data. Then consider appropriate type of privatization.	Medium and long term goal							

CHAPTER 11 OUTLINE OF FURTHER STUDY

The Team recommends the necessity of the study for following 3 items :

(1) Establishment of data collection and information system, including analysis of this data

(2) Modernization of railway freight transport including containerization

(3) Development of railway urban transport in Cairo area

Beside this further study, follow up and review of the Master Plan will be necessary. It is important to follow up on implementation of the improvement proposals mentioned in the Master Plan, and to review these proposals based on more accurate data. This will help ENR management to steadily improve the business.

JICA