Appendix 4-4 CROP PRODUCTION COST BY AMPHOE
- WITHOUT PROJECT -
(1987)

(BAHT/RAI)

AMPHOE	PD	UPD	MZ	MB	SB	GN	CS
NAKHON SAWAN	634	-	455	392	592	908	591
BANPHOT PHISAI	634	361	455	392	592	908	591
KAO LIEO	634	-	455	392	592	908	-
PHICHIT	521	391	395	419	536	978	-
SAM NGAM	521	-	407	419	536	978	-
TAPHAN HIN	521	-	407	419	536	978	-
PHO PRATHAP CHANG	521	-	395	419	536	978	-
WANG SAI PHUN	521	-	395	419	536	978	-
PHROM PHIRAM	604	-	407	429	536	978	-
WAT BOT	604	398	395	429	536	978	590
BANG KRATHUM	604	-	395	429	-	-	-
WANG CHIN	618	397	410	436	548	970	-
THOEN	610	423	400	436	548	970	620
CHAING RAI	590	460	428	420	677	1031	671
CHAING KHONG	590	460	440	430	677	1031	671
MAE CHAN	590	460	428	420	677	1031	671
THOENG	591	460	440	420	677	1031	-
WIANG CHAI	590	431	428	420	677	1031	-
LI	691	431	428	420	677	970	-
THUNG HUA CHANG	691	431	428	420	677	970	-
SUKHOTHAI	580	361	400	436	548	970	-
SI SATCHANALAI	580	360	400	436	548	970	621
THUNG SALIAM	580	360	400	436	548	970	-
SAWANKHALOK	580	360	400	436	548	970	-
SI SAMRONG	580	361	400	436	548	970	-
BAN DAN LAN HOI	580	361	400	436	548	970	-
KHLONG KHLUNG	686	380	407	419	536	978	621
KHANU WORALAKSABURI	686	381	407	419	536	978	621
SAI NGAM	686	-	407	419	536	978	-
CHON DAEN	581	-	405	382	592	908	-

PD = PADDY UPD = UPLAND PADDY MZ = MAIZE
MB = MUNG BEAN SB = SOY BEAN GN = GROUND NUTS
CS = CASSAVA

Appendix 4-4 CROP PRODUCTION COST BY AMPHOE (Cont'd)
- WITHOUT PROJECT -
(1987)

(Cont'd) (BAHT/RAI)

AMPHOE	SC	TB	GL	CL	VG	FR
NAKHON SAWAN	1240	1680	-	1490	1190	1215
BANPHOT PHISAI	1240	1640	-	1490	1190	1215
KAO LIEO	1259	-	-	1490	1190	1215
PHICHIT	1535	1600	-	1490	1190	1215
SAM NGAM	1243	1680	-	-	980	-
TAPHAN HIN	1243	-	-	-	1190	1115
PHO PRATHAP CHANG	1243	-	-	1490	1190	-
WANG SAI PHUN	-	-	-	1490	980	-
PHROM PHIRAM	-	-	-	-	1190	1115
WAT BOT	1243	-	-	-	980	1115
BANG KRATHUM	-	-	-	-	-	1115
WANG CHIN	-	1840	-	-	1280	1215
THOEN	1226	1840	1280	1490	1280	1115
CHAING RAI	1228	1840	1280	1490	1280	1215
CHAING KHONG	-	1840	-	-	-	1215
MAE CHAN	-	1840	1280	-	1280	1215
THOENG	-	1840	-	-	1280	1215
WIANG CHAI	-	1840	-	-	1280	1215
LI	-	1840	1280	1490	1280	1215
THUNG HUA CHANG	-	1840	-	-	1280	1215
SUKHOTHAI	1007	1840	-	-	1280	1215
SI SATCHANALAI	1503	1840	-	1490	1190	1215
THUNG SALIAM	1501	-	-	-	1190	1215
SAWANKHALOK	1500	-	-	-	1190	1215
SI SAMRONG	1503	1800	-	-	1190	1215
BAN DAN LAN HOI	1503	-	-	1490	1190	-
KHLONG KHLUNG	1531	-	-	1490	1190	1115
KHANU WORALAKSABURI	1531	-	-	1490	1190	1115
SAI NGAM	1531	-	-	1490	-	1115
CHON DAEN	1002	-	-	-	1190	1215

SC = SUGAR CANE TB = TOBACCO GL = GARLIC
CL = CHILLI VG = VEGETABLES FR = FRUITS

Appendix 4-4 CROP PRODUCTION COST BY AMPHOE (Cont'd)
- WITH PROJECT -
(1987)

(BAHT/RAI)

AMPHOE	PD	UPD	MZ	MB	SB	GN	CS
NAKHON SAWAN	636	-	455	393	593	909	593
BANPHOT PHISAI	636	362	455	393	593	909	593
KAO LIEO	635	-	455	393	593	909	-
PHICHIT	523	392	396	420	537	979	-
SAM NGAM	523	-	403	420	537	979	-
TAPHAN HIN	523	-	403	420	537	979	-
PHO PRATHAP CHANG	523	-	396	420	537	979	-
WANG SAI PHUN	523	-	396	420	537	979	-
PHROM PHIRAM	606	-	403	430	537	979	-
WAT BOT	606	400	396	430	537	979	593
BANG KRATHUM	606	-	396	430	-	-	-
WANG CHIN	619	398	410	437	549	971	-
THOEN	612	424	401	437	549	971	620
CHAING RAI	591	462	428	421	677	1032	673
CHAING KHONG	591	462	440	431	677	1032	673
MAE CHAN	591	462	428	421	677	1032	673
THOENG	592	462	440	421	677	1032	-
WIANG CHAI	591	432	428	421	677	1032	-
LI	693	432	428	421	677	971	-
THUNG HUA CHANG	692	432	428	421	677	971	-
SUKHOTHAI	582	398	401	437	549	971	-
SI SATCHANALAI	582	362	401	437	549	971	623
THUNG SALIAM	581	362	401	437	549	971	-
SAWANKHALOK	581	362	401	437	549	971	-
SI SAMRONG	582	362	401	437	549	971	-
BAN DAN LAN HOI	582	362	401	437	549	971	-
KHLONG KHLUNG	688	381	408	420	537	979	623
KHANU WORALAKSABURI	688	382	408	420	537	979	623
SAI NGAM	688	-	408	420	537	979	-
CHON DAEN	583	-	405	383	593	909	-

PD = PADDY UPD = UPLAND PADDY MZ = MAIZE
MB = MUNG BEAN SB = SOY BEAN GN = GROUND NUTS
CS = CASSAVA

Appendix 4-4 PRODUCTION COST BY AMPHOE (Cont'd)

- WITH PROJECT -

(1987)

(Cont'd) (BAHT/RAI)

AMPHOE	SC	TB	GL	CL	VG	FR
NAKHON SAWAN	1243	1680	-	1490	1190	1215
BANPHOT PHISAI	1241	1645	-	1490	1190	1215
KAO LIEO	1260	-	-	1490	1190	1215
PHICHIT	1538	1605	-	1490	1190	1215
SAM NGAM	1247	1680	-	-	980	-
TAPHAN HIN	1248	-	-	-	1190	1115
PHO PRATHAP CHANG	1248	-	-	1490	1190	-
WANG SAI PHUN	-	-	-	1490	980	-
PHROM PHIRAM	-	-	-	-	1190	1115
WAT BOT	1248	-	-	-	980	1115
BANG KRATHUM	-	-	-	-	-	1115
WANG CHIN	-	1840	-	-	1280	1215
THOEN	1233	1840	1280	1490	1280	1115
CHAING RAI	1233	1840	1280	1490	1280	1215
CHAING KHONG	-	1840	-	-	-	1215
MAE CHAN	-	1840	1280	-	1280	1215
THOENG	-	1840	-	-	1280	1215
WIANG CHAI	-	1840	-	-	1280	1215
LI	-	1840	1280	1490	1280	1215
THUNG HUA CHANG	-	1840	-	-	1280	1215
SUKHOTHAI	1015	1840	-	-	1280	1215
SI SATCHANALAI	1507	1840	-	1490	1190	1215
THUNG SALIAM	1503	-	-	-	1190	1215
SAWANKHALOK	1503	-	-	-	1190	1215
SI SAMRONG	1507	1803	-	-	1190	1215
BAN DAN LAN HOI	1507	-	-	1490	1190	-
KHLONG KHLUNG	1535	-	-	1490	1190	1115
KHANU WORALAKSABURI	1535	-	-	1490	1190	1115
SAI NGAM	1535	-	-	1490	-	1115
CHON DAEN	1010	-	-	-	1190	1215

SC = SUGAR CANE TB = TOBACCO GL = GARLIC
CL = CHILLI VG = VEGETABLES FR = FRUITS

Appendix 4-4 CROP PRODUCTION COST BY AMPHOE (Cont'd)
- WITHOUT PROJECT -
(2001)

(BAHT/RAI)

AMPHOE	PD	UPD	MZ	MB	SB	GN	CS
NAKHON SAWAN	644	-	455	392	592	908	610
BANPHOT PHISAI	644	368	455	392	592	908	610
KAO LIEO	644	-	455	392	592	908	-
PHICHIT	531	398	395	419	536	978	-
SAM NGAM	531	-	407	419	536	978	-
TAPHAN HIN	531	-	407	419	536	978	-
PHO PRATHAP CHANG	531	-	395	419	536	978	-
WANG SAI PHUN	531	-	395	419	536	978	-
PHROM PHIRAM	614	-	407	429	536	978	-
WAT BOT	614	398	395	429	536	978	590
BANG KRATHUM	614	-	395	429	-	-	-
WANG CHIN	618	404	410	436	548	970	-
THOEN	620	430	400	436	548	970	620
CHAING RAI	590	460	428	420	677	1031	690
CHAING KHONG	590	460	440	430	677	1031	690
MAE CHAN	590	460	428	420	677	1031	690
THOENG	598	460	440	420	677	1031	-
WIANG CHAI	590	438	428	420	677	1031	-
LI	701	438	428	420	677	970	-
THUNG HUA CHANG	698	438	428	420	677	970	-
SUKHOTHAI	595	368	400	436	548	970	-
SI SATCHANALAI	590	360	400	436	548	970	640
THUNG SALIAM	587	360	400	436	548	970	-
SAWANKHALOK	587	360	400	436	548	970	-
SI SAMRONG	595	368	400	436	548	970	-
BAN DAN LAN HOI	595	368	400	436	548	970	-
KHLONG KHLUNG	696	380	407	419	536	978	640
KHANU WORALAKSABURI	696	388	407	419	536	978	640
SAI NGAM	696	-	407	419	536	978	-
CHON DAEN	591	-	405	382	592	908	-

PD = PADDY UPD = UPLAND PADDY MZ = MAIZE
MB = MUNG BEAN SB = SOY BEAN GN = GROUND NUTS
CS = CASSAVA

Appendix 4-4 CROP PRODUCTION COST BY AMPHOE (Cont'd)

- WITH PROJECT -
(2001)

(Cont'd) (BAHT/RAI)

AMPHOE	SC	TB	GL	CL	VG	FR
NAKHON SAWAN	1240	1680	-	1490	1190	1215
BANPHOT PHISAI	1240	1640	-	1490	1190	1215
KAO LIEO	1240	-	-	1490	1190	1215
PHICHIT	1610	1600	-	1490	1190	1215
SAM NGAM	1285	1680	-	-	980	-
TAPHAN HIN	1285	-	-	-	1190	1115
PHO PRATHAP CHANG	1285	-	-	1490	1190	-
WANG SAI PHUN	-	-	-	1490	980	-
PHROM PHIRAM	-	-	-	-	1190	1115
WAT BOT	1285	-	-	-	980	1115
BANG KRATHUM	-	-	-	-	-	1115
WANG CHIN	-	1840	-	-	1280	1215
THOEN	1245	1840	1280	1490	1280	1115
CHAING RAI	1270	1840	1280	1490	1280	1215
CHAING KHONG	-	1840	-	-	-	1215
MAE CHAN	-	1840	1280	-	1280	1215
THOENG	-	1840	-	-	1280	1215
WIANG CHAI	-	1840	-	-	1280	1215
LI	-	1840	1280	1490	1280	1215
THUNG HUA CHANG	-	1840	-	-	1280	1215
SUKHOTHAI	1240	1840	-	-	1280	1215
SI SATCHANALAI	1545	1840	-	1490	1190	1215
THUNG SALIAM	1520	-	-	-	1190	1215
SAWANKHALOK	1500	-	-	-	1190	1215
SI SAMRONG	1545	1800	-	-	1190	1215
BAN DAN LAN HOI	1545	-	-	1490	1190	-
KHLONG KHLUNG	1550	-	-	1490	1190	1115
KHANU WORALAKSABURI	1550	-	-	1490	1190	1115
SAI NGAM	1550	-	-	1490	-	1115
CHON DAEN	1240	-	-	-	1190	1215

SC = SUGAR CANE TB = TOBACCO GL = GARLIC
CL = CHILLI VG = VEGETABLES FR = FRUITS

Appendix 4-4 CROP PRODUCTION COST BY AMPHOE (Cont'd)
- WITH PROJECT -
(2001)

(BAHT/RAI)

AMPHOE	PD	UPD	MZ	MB	SB	GN	CS
NAKHON SAWAN	673	-	460	402	602	928	630
BANPHOT PHISAI	673	385	460	402	602	928	630
KAO LIEO	673	-	460	402	602	928	-
PHICHIT	560	425	405	429	546	993	-
SAM NGAM	560	-	415	429	546	993	-
TAPHAN HIN	560	-	415	429	546	993	-
PHO PRATHAP CHANG	560	-	405	429	546	993	-
WANG SAI PHUN	560	-	405	429	546	993	-
PHROM PHIRAM	643	-	415	439	546	993	-
WAT BOT	643	425	405	439	546	993	630
BANG KRATHUM	643	-	405	439	-	-	-
WANG CHIN	633	430	417	446	558	985	-
THOEN	649	457	410	446	558	985	620
CHAING RAI	605	485	435	430	678	1041	710
CHAING KHONG	605	485	445	440	678	1041	710
MAE CHAN	605	485	435	430	678	1041	710
THOENG	615	485	445	430	678	1041	-
WIANG CHAI	605	465	435	430	678	1041	-
LI	730	465	435	430	678	980	-
THUNG HUA CHANG	715	465	435	430	678	980	-
SUKHOTHAI	629	935	410	446	558	985	-
SI SATCHANALAI	619	385	410	446	558	985	650
THUNG SALIAM	604	385	410	446	558	985	-
SAWANKHALOK	604	385	410	446	558	985	-
SI SAMRONG	629	395	410	446	558	985	-
BAN DAN LAN HOI	629	395	410	446	558	985	-
KHLONG KHLUNG	725	395	415	429	546	993	660
KHANU WORALAKSABURI	725	410	415	429	546	993	660
SAI NGAM	725	-	415	429	546	993	-
CHON DAEN	620	-	413	392	602	928	-

PD = PADDY UPD = UPLAND PADDY MZ = MAIZE
MB = MUNG BEAN SB = SOY BEAN GN = GROUND NUTS
CS = CASSAVA

Appendix 4-4 CROP PRODUCTION COST BY AMPHOE (Cont'd)

- WITH PROJECT -

(2001)

(Cont'd)

(BAHT/RAI)

AMPHOE	SC	TB	GL	CL	VG	FR
NAKHON SAWAN	1280	1680	-	1490	1190	1215
BANPHOT PHISAI	1260	1720	-	1490	1190	1215
KAO LIEO	1260	-	-	1490	1190	1215
PHICHIT	1655	1680	-	1490	1190	1215
SAM NGAM	1340	1680	-	-	980	-
TAPHAN HIN	1365	-	-	-	1190	1115
PHO PRATHAP CHANG	1365	-	-	1490	1190	-
WANG SAI PHUN	-	-	-	1490	980	-
PHROM PHIRAM	-	-	-	-	1190	1115
WAT BOT	1365	-	-	-	980	1115
BANG KRATHUM	-	-	-	-	-	1115
WANG CHIN	-	1840	-	-	1280	1215
THOEN	1350	1840	1280	1490	1280	1115
CHAING RAI	1350	1840	1280	1490	1280	1215
CHAING KHONG	-	1840	-	-	-	1215
MAE CHAN	-	1840	1280	-	1280	1215
THOENG	-	1840	-	-	1280	1215
WIANG CHAI	-	1840	-	-	1280	1215
LI	-	1840	1280	1490	1280	1215
THUNG HUA CHANG	-	1840	-	-	1280	1215
SUKHOTHAI	1365	1840	-	-	1280	1215
SI SATCHANALAI	1600	1840	-	1490	1190	1215
THUNG SALIAM	1540	-	-	-	1190	1215
SAWANKHALOK	1540	-	-	-	1190	1215
SI SAMRONG	1600	1840	-	-	1190	1215
BAN DAN LAN HOI	1600	-	-	1490	1190	-
KHLONG KHLUNG	1605	-	-	1490	1190	1115
KHANU WORALAKSABURI	1605	-	-	1490	1190	1115
SAI NGAM	1605	-	-	1490	-	1115
CHON DAEN	1365	-	-	-	1190	1215

SC = SUGAR CANE TB = TOBACCO GL = GARLIC
CL = CHILLI VG = VEGETABLES FR = FRUITS

Appendix 5-1 VEHICLE OPERATING COSTS ON LEVEL TANGENT ROAD

(Paved Road)

Vehicle Type	Speed (km/hr)	Fuel	Oil	Tyre & Tube	Repair & Maintenance	Depreciation & Interest	Overhead	Crew	Total
M/C	64	0.259	0.044	0.011	0.077	0.406	-	-	0.797
P/C	80	0.629	0.033	0.093	0.197	0.847	-	-	1.799
L/B	72	0.750	0.036	0.107	0.317	0.443	-	0.465	2.118
M/B	72	0.747	0.043	0.135	0.482	0.816	0.089	1.116	3.428
H/B	72	1.338	0.074	0.404	1.069	1.057	0.381	1.010	5.333
P/T	72	0.750	0.036	0.107	0.205	0.545	-	-	1.643
4/T	72	0.747	0.043	0.160	0.465	0.794	-	0.532	2.741
6/T	64	0.989	0.074	0.190	0.870	1.080	0.151	0.893	4.247
10/T	64	1.631	0.074	0.590	0.726	1.502	0.330	1.473	6.326

Appendix 5-1 VEHICLE OPERATING COSTS ON LEVEL TANGENT ROAD (Cont'd)

(Laterite Road)

Vehicle Type	Speed (km/hr)	Fuel	Oil	Tyre & Tube	Repair & Maintenance	Depreciation & Interest	Overhead	Crew	Total
M/C	48	0.284	0.055	0.014	0.084	0.459	-	-	0.896
P/C	56	0.622	0.041	0.099	0.202	0.957	-	-	1.921
L/B	48	0.714	0.045	0.115	0.339	0.717	-	0.698	2.628
M/B	48	0.711	0.054	0.146	0.515	1.395	0.134	1.675	4.630
H/B	48	1.566	0.093	0.437	1.136	1.807	0.571	1.515	7.125
P/T	48	0.714	0.045	0.115	0.219	0.883	-	-	1.976
4/T	48	0.711	0.054	0.173	0.497	1.287	-	0.798	3.520
6/T	48	1.258	0.093	0.234	1.030	1.649	0.201	1.186	5.651
10/T	48	2.074	0.093	0.728	0.860	2.293	0.437	1.954	8.439

Appendix 5-1 VEHICLE OPERATING COSTS ON LEVEL TANGENT ROAD
(Cont'd)

(Earth Road)

Vehicle Type	Speed (km/hr)	Fuel	Oil	Tyre & Tube	Repair & Maintenance	Depreciation & Interest	Overhead	Crew	Total
M/C	32	0.357	0.066	0.018	0.123	0.585	-	-	1.149
P/C	32	0.772	0.050	0.111	0.280	1.220	-	-	2.433
L/B	32	0.861	0.063	0.147	0.484	1.235	-	1.046	3.836
M/B	32	0.858	0.075	0.187	0.735	2.488	0.201	2.511	7.055
H/B	32	2.240	0.130	0.558	1.803	3.223	0.856	2.272	11.082
P/T	32	0.861	0.063	0.147	0.313	1.521	-	-	2.905
4/T	32	0.858	0.075	0.221	0.709	2.216	-	1.196	5.275
6/T	32	1.800	0.130	0.299	1.634	2.941	0.302	1.779	8.885
10/T	32	2.968	0.130	0.931	1.365	4.089	0.656	2.930	13.069

Appendix 5-2

VEHICLE OPERATING COSTS BY SPEED

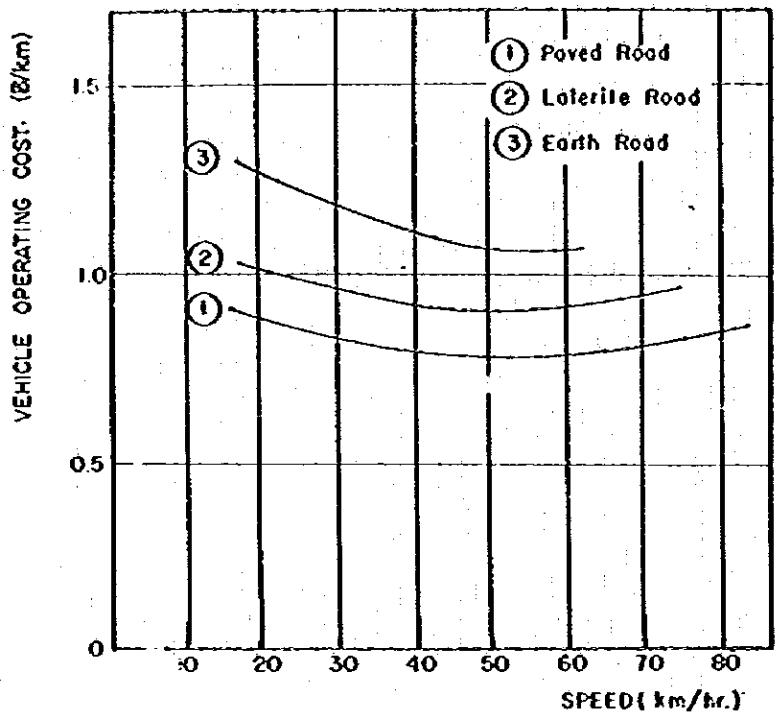
(On Level Tangent Road)

(Baht/km)

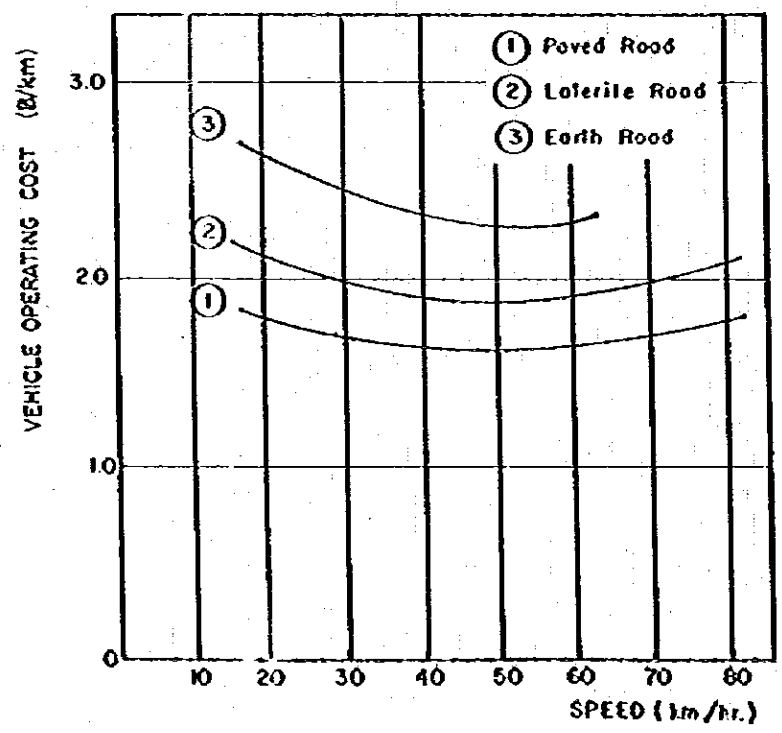
Vehicle Type \ Road Class / Speed (km/hr)	Earth Road			Laterite Road				Paved Road			
	16	24	32	32	40	48	56	64	72	80	88
M/C	1.29	1.22	1.15	0.94	0.91	0.90	0.90	0.80	0.82	0.85	0.88
P/C	2.69	2.54	2.43	1.98	1.90	1.87	1.92	1.68	1.74	1.80	1.86
L/B	5.50	4.60	3.84	3.45	2.85	2.63	2.45	2.05	2.12	2.20	2.35
M/B	11.20	8.75	7.06	6.20	5.25	4.63	4.20	3.50	3.43	3.50	3.75
H/B	17.00	13.70	11.08	9.20	8.10	7.13	5.40	5.20	5.33	5.60	6.20
P/T	4.10	3.45	2.91	2.35	2.05	1.98	1.80	1.50	1.64	1.75	1.95
4/T	7.90	6.50	5.28	4.45	3.80	3.52	3.75	2.70	2.74	2.80	3.05
6/T	14.00	10.55	8.89	7.50	6.10	5.65	5.20	4.20	4.25	4.35	4.60
10/T	20.20	16.20	13.07	11.10	9.40	8.44	6.90	6.30	6.33	6.60	7.20

Appendix 5-3 VEHICLE OPERATING COSTS - (1)

(Motor Cycle)

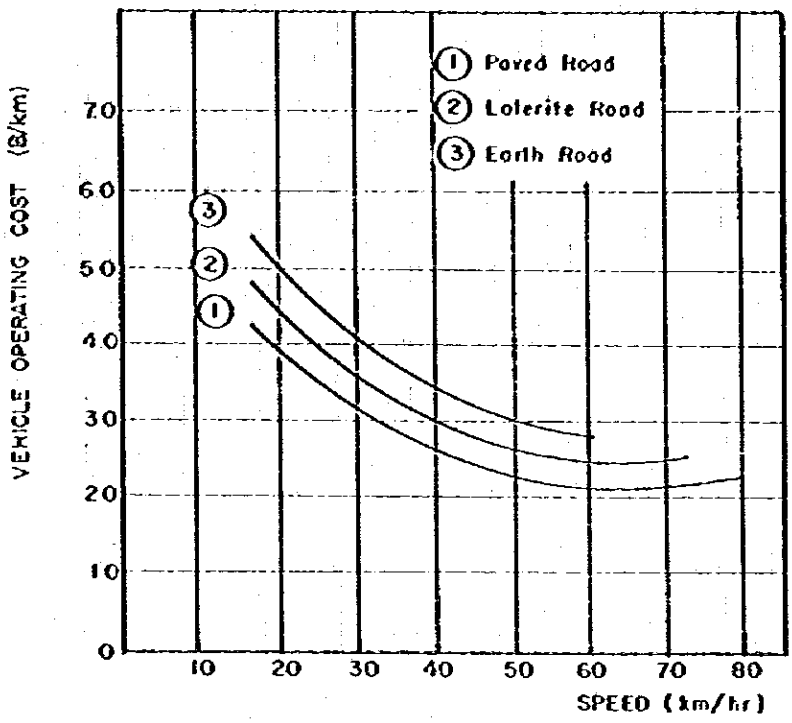


(Passenger Car)

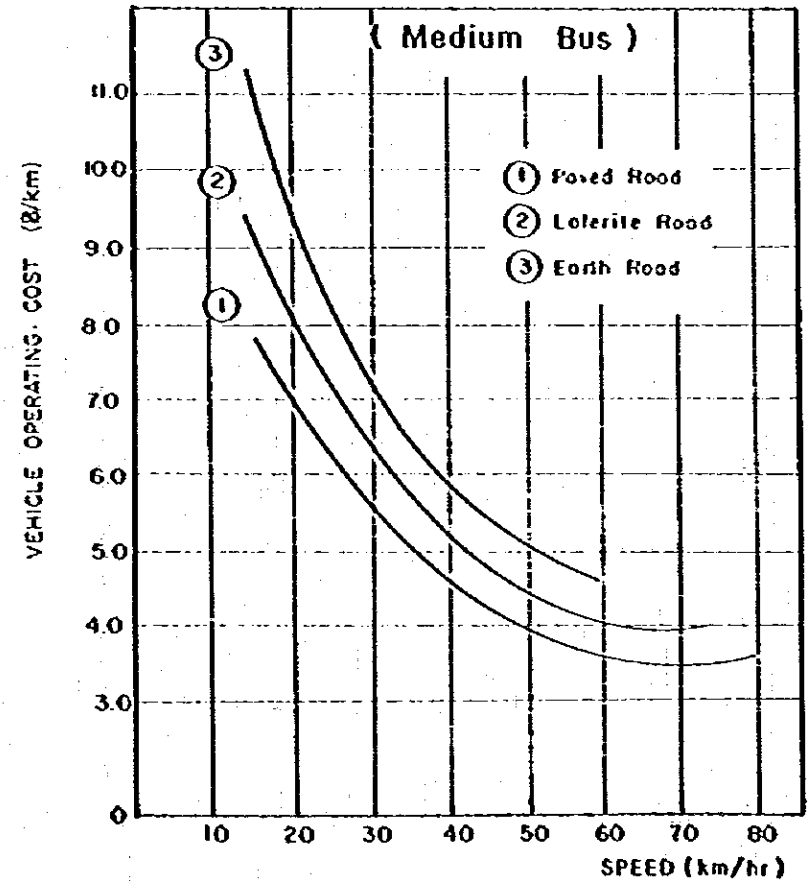


Appendix 5-3 VEHICLE OPERATING COSTS - (2)

(Light Bus)

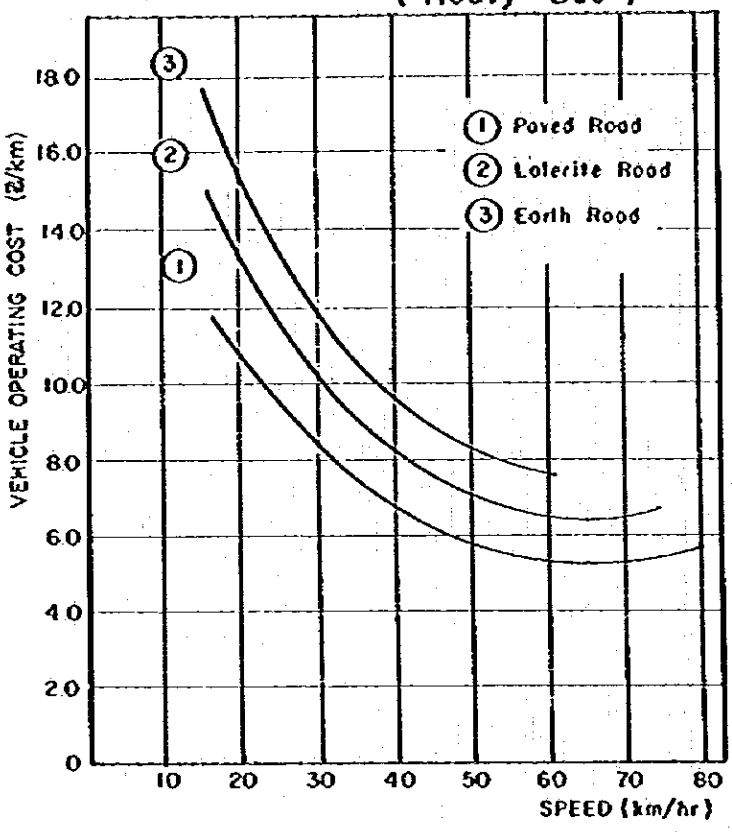


(Medium Bus)

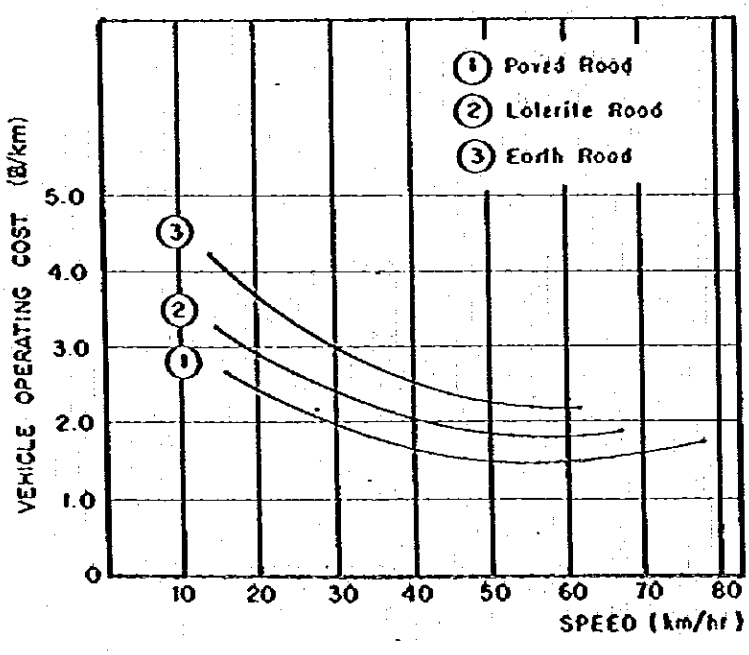


Appendix 5-3 VEHICLE OPERATING COSTS - (3)

(Heavy Bus)

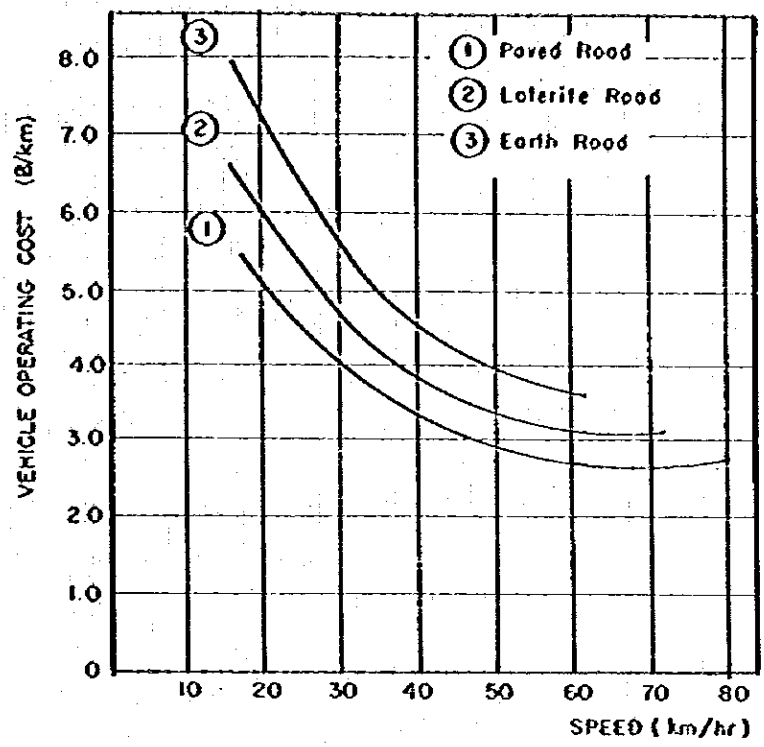


(Pick-up Truck)

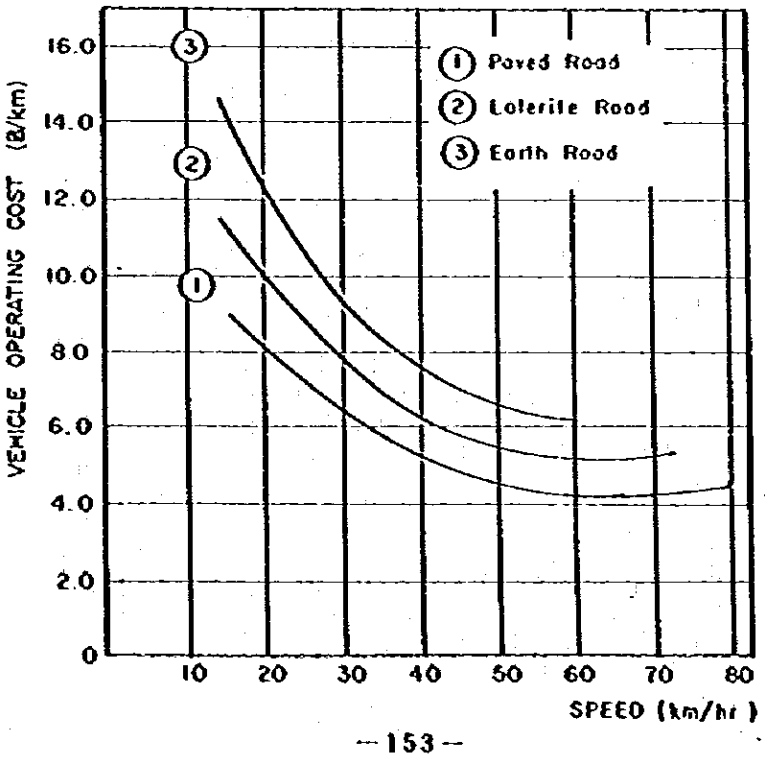


Appendix 5-3 VEHICLE OPERATING COSTS - (4)

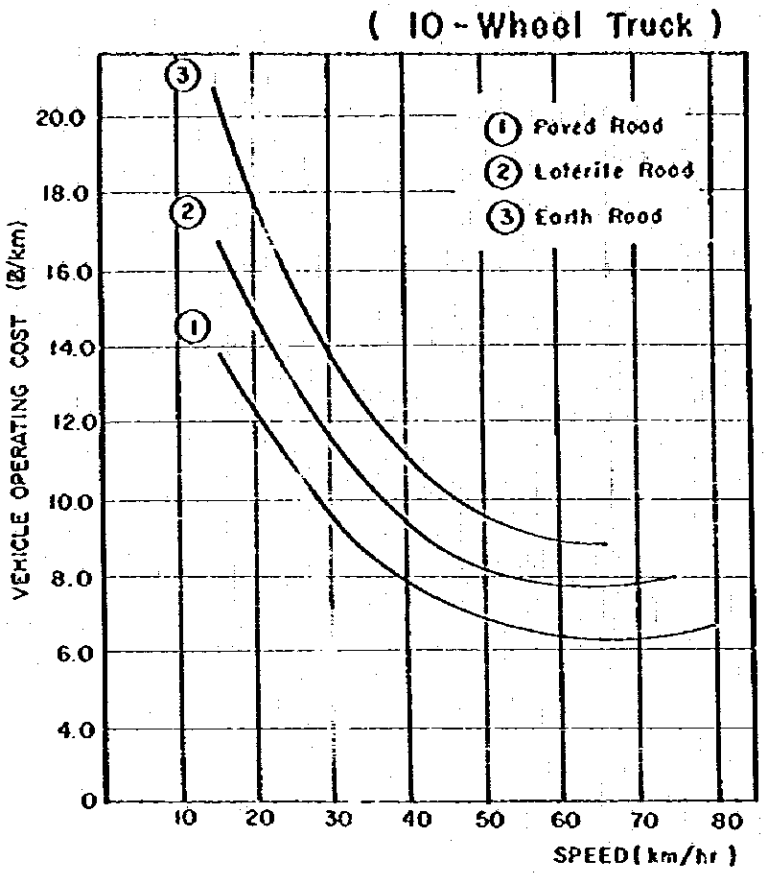
(4-Wheel Truck)



(6-Wheel Truck)



Appendix 5-3 VEHICLE OPERATING COSTS - (5)



Appendix 5-4 (1) ADDITIONAL CURVE COSTS
(% of Level Tangent Costs)

Motor Cycle, Passenger Car, Light Bus & Pick-up Truck

Initial Speed (km/h)	Radius (m)								
	1500	750	500	375	300	250	200	150	100
16	1.58	3.03	4.20	5.14	5.99	6.81	8.26	9.79	12.86
24	2.21	4.25	5.86	7.22	8.73	9.64	12.46	15.30	21.39
32	2.43	4.58	6.63	8.63	10.54	12.40	16.18	20.50	29.58
40	2.58	5.00	7.33	9.68	12.15	14.73	20.32	26.78	42.10
48	2.75	5.41	8.51	11.14	14.44	18.10	26.01	35.61	63.02
56	3.05	6.33	10.47	13.84	19.76	23.82	33.95	49.28	90.48
64	3.97	8.11	13.56	18.47	25.69	32.37	50.53	72.51	124.18
72	5.28	10.89	17.91	24.42	34.18	43.78	71.57	98.79	165.31
80	6.98	14.65	23.51	32.55	45.17	57.49	91.49	125.92	202.85
88	9.23	19.17	30.47	42.48	58.45	74.12	112.44	152.21	-

Medium Bus & 4-Wheel Truck

Initial Speed (km/h)	Radius (m)								
	1500	750	500	375	300	250	200	150	100
16	1.84	3.41	4.47	5.31	6.02	6.69	8.32	10.20	14.16
24	2.45	4.53	6.12	7.36	8.70	10.42	13.59	16.76	22.65
32	2.75	4.93	6.14	9.04	11.45	13.63	18.36	22.47	31.53
40	2.93	5 43	7.43	10.56	13.19	15.74	21.73	28.34	43.00
48	3.26	6.05	9.61	12.92	16.05	19.53	27.64	37.16	60.17
56	3.87	7.69	12.27	17.05	21.71	26.88	38.86	52.89	87.07
64	4.75	9.59	15.16	21.47	28.52	36.33	54.21	75.07	125.78
72	5.99	12.57	20.13	28.69	38.80	50.17	73.65	101.27	172.21
80	7.53	14.76	23.77	34.50	46.91	60.84	93.13	130.69	214.17
88	9.37	19.90	31.31	44.50	59.41	75.96	114.22	166.14	-

Appendix 5-4 (1) ADDITIONAL CURVE COSTS (Cont'd)
(% of Level Tangent Costs)

Heavy Bus & 6 Wheel Truck

Initial Speed (km/h)	Radius (m)								
	1500	750	500	375	300	250	200	150	100
16	2.52	4.62	6.30	7.57	8.33	9.00	11.71	14.35	19.68
24	3.48	6.32	8.39	9.87	12.08	14.22	18.60	22.92	31.93
32	3.55	6.36	9.42	12.46	15.49	18.29	24.10	29.97	42.41
40	3.71	6.57	10.89	14.41	18.04	21.38	28.47	35.90	53.68
48	3.84	8.06	12.01	15.90	20.01	23.82	32.13	44.11	88.25
56	4.11	8.29	12.40	16.58	21.01	26.43	45.74	69.31	127.16
64	4.18	8.54	14.87	22.61	32.02	42.56	67.98	98.26	171.44
72	6.31	14.00	23.11	33.70	46.01	59.69	91.54	128.90	224.90
80	9.05	19.65	31.62	45.16	60.52	77.30	116.13	161.11	-
88	11.98	25.41	40.49	51.99	75.66	96.02	-	-	-

10-Wheel Truck

Initial Speed (km/h)	Radius (m)								
	1500	750	500	375	300	250	200	150	100
16	4.33	7.98	10.93	13.14	14.53	15.75	20.52	25.07	34.20
24	6.29	11.28	15.06	17.62	21.62	25.44	33.27	41.05	57.15
32	6.49	11.61	17.26	22.73	28.30	33.45	44.07	54.87	77.69
40	6.96	12.32	20.50	27.03	33.82	40.08	53.41	67.36	100.54
48	7.29	15.33	22.88	30.22	38.08	45.40	61.27	84.09	168.17
56	7.98	16.10	24.08	32.15	40.68	51.32	88.82	134.44	264.03
64	8.16	16.78	29.14	44.29	62.76	83.36	133.09	192.07	333.79
72	12.47	27.80	45.80	66.81	91.29	118.15	180.81	254.10	-
80	18.12	39.24	63.26	90.25	120.76	153.96	230.34	318.29	-
88	24.20	51.20	81.38	104.39	151.64	191.70	-	-	-

Appendix 5-4 (2) ADDITIONAL UPHILL GRADE COSTS
(% of Level Tangent Costs)

Motor Cycle, Passenger Car, Light Bus & Pick-up Truck

Initial Speed (km/h)	Grade (%)						
	1	2	3	4	5	6	7
16	4.36	9.08	14.04	19.14	23.73	30.11	36.46
24	5.06	10.60	16.28	22.07	28.37	34.86	42.18
32	5.47	11.54	17.71	24.00	30.74	37.83	45.97
40	5.87	12.15	18.64	25.23	32.25	39.85	48.55
48	6.04	12.49	19.22	26.01	33.26	41.13	50.27
56	5.98	12.40	19.19	26.09	33.46	41.63	50.95
64	5.85	12.13	18.81	25.86	33.40	41.59	50.93
72	5.61	11.93	18.36	25.28	32.78	41.12	50.58
80	5.47	11.52	17.79	24.64	32.00	40.32	49.82
88	5.33	11.08	17.18	23.84	31.19	39.41	48.87

Medium Bus & 4-Wheel Truck

Initial Speed (km/h)	Grade (%)						
	1	2	3	4	5	6	7
16	3.76	7.94	12.55	17.72	23.54	30.31	38.27
24	4.39	9.20	14.54	20.45	27.20	34.22	44.05
32	4.93	10.17	15.99	22.54	29.84	38.34	48.32
40	5.21	10.81	17.07	23.95	31.89	40.88	51.39
48	5.42	11.44	18.03	25.31	33.47	42.60	53.97
56	5.73	11.96	18.83	26.42	34.97	44.24	56.20
64	6.00	12.45	19.56	27.34	36.15	46.22	58.15
72	6.26	13.04	20.35	28.38	37.45	47.80	60.37
80	6.52	13.49	21.09	29.42	38.79	49.82	63.57
88	6.75	14.00	21.82	30.46	40.30	-	-

Appendix 5-4 (2) ADDITIONAL UPHILL GRADE COSTS (Cont'd)
(% of Level Tangent Costs)

Heavy Bus & 6-Wheel Truck

Initial Speed (km/h)	Grade (%)						
	1	2	3	4	5	6	7
16	4.33	8.90	14.00	19.64	25.98	33.15	41.57
24	5.21	10.80	17.29	24.26	32.20	41.35	52.27
32	6.16	12.75	20.53	29.20	39.06	51.09	66.39
40	7.10	14.65	24.08	34.68	48.45	63.93	88.34
48	8.15	16.76	27.74	41.35	60.59	77.87	107.60
56	9.26	19.17	31.85	49.76	73.66	-	-
64	10.48	21.90	36.29	60.97	90.25	-	-
72	11.85	24.79	41.04	68.95		-	-
80	13.43	27.36	45.71	-	-	-	-
88	14.24	29.74	-	-	-	-	-

10-Wheel Truck

Initial Speed (km/h)	Grade (%)						
	1	2	3	4	5	6	7
16	8.65	17.22	25.67	33.98	42.20	50.30	58.64
24	12.15	24.27	36.51	48.79	61.16	73.45	82.27
32	14.61	29.37	44.77	60.81	77.61	95.49	116.07
40	16.52	33.38	51.65	71.92	95.29	120.57	-
48	17.99	36.68	57.80	83.37	110.46	-	-
56	19.62	40.21	64.52	97.25	-	-	-
64	20.05	42.49	70.22	105.84	-	-	-
72	20.87	45.29	-	-	-	-	-
80	22.12	-	-	-	-	-	-
88	23.10	-	-	-	-	-	-

Appendix 5-4 (3) REDUCTION FOR DOWNHILL GRADE
(% of Level Tangent Costs)

Motor Cycle, Passenger Car, Light Bus & Pick-up Truck

Initial Speed (km/h)	Grade (%)						
	1	2	3	4	5	6	7
16	3.74	12.26	12.09	11.82	11.24	10.44	8.92
24	4.40	11.55	14.62	14.30	13.69	12.96	11.48
32	4.99	11.16	16.90	16.53	15.99	15.23	13.86
40	5.25	10.47	15.86	18.50	17.93	17.29	15.97
48	5.47	10.51	15.61	19.68	19.97	19.22	18.08
56	5.67	10.56	15.42	19.36	21.96	21.14	19.97
64	5.80	10.62	15.30	19.21	22.81	22.87	21.67
72	5.73	10.70	15.66	19.53	22.99	24.78	23.52
80	5.75	10.81	15.77	19.71	23.13	26.03	25.18
88	5.75	11.01	16.04	20.45	23.84	26.28	26.81

Medium Bus & 4-Wheel Truck

Initial Speed (km/h)	Grade (%)						
	1	2	3	4	5	6	7
16	3.86	7.21	10.26	11.05	10.55	9.82	8.33
24	4.39	8.11	11.71	13.32	12.80	12.21	10.83
32	4.69	8.46	12.68	15.27	14.86	14.28	13.07
40	4.96	8.76	13.12	16.55	16.85	16.40	15.27
48	5.06	9.26	13.91	17.07	19.05	18.51	17.60
56	5.55	9.67	14.41	17.56	20.79	20.62	19.78
64	5.42	10.14	15.16	18.30	21.59	22.82	21.97
72	5.70	10.67	16.10	19.79	23.09	25.29	24.68
80	5.98	11.13	16.83	21.28	24.74	27.51	27.47
88	6.24	11.96	17.67	23.35	27.35	-	-

Appendix 5-4 (3) REDUCTION FOR DOWNHILL GRADE (Cont'd)
(% of Level Tangent Costs)

Heavy Bus & 6-Wheel Truck

Initial Speed (km/h)	Grade (%)						
	1	2	3	4	5	6	7
16	5.37	9.54	13.50	16.61	17.35	16.86	16.36
24	6.79	11.88	16.13	19.17	20.80	20.02	19.17
32	7.83	13.60	18.13	20.77	22.78	22.49	21.34
40	8.51	14.99	20.70	21.78	23.59	24.49	23.11
48	8.92	16.02	19.81	22.39	24.33	25.11	24.51
56	9.02	16.28	20.03	22.61	24.47	24.86	24.13
64	8.94	16.06	19.99	22.14	23.30	22.61	-
72	8.85	15.37	20.03	21.90	-	-	-
80	8.73	14.49	19.38	-	-	-	-
88	8.92	13.47	18.28	-	-	-	-

10-Wheel Truck

Initial Speed (km/h)	Grade (%)						
	1	2	3	4	5	6	7
16	8.07	11.67	15.28	14.35	11.56	9.26	7.00
24	10.30	14.85	18.70	17.28	14.53	11.51	8.36
32	11.95	17.91	21.23	19.59	17.16	13.75	9.99
40	13.05	19.75	21.73	20.38	18.53	14.95	-
48	13.59	20.90	21.81	20.83	19.25	-	-
56	12.99	20.63	21.77	21.32	-	-	-
64	12.80	20.41	22.59	21.57	-	-	-
72	12.32	19.47	22.66	-	-	-	-
80	11.96	18.37	-	-	-	-	-
88	12.49	17.58	-	-	-	-	-

Appendix 5-4 (4) ADDITIONAL COST PER SPEED CHANGE CYCLE
(% of Level Tangent Costs per km at Initial Speed)

Motor Cycle, Passenger Car, Light Bus & Pick-up Truck

Initial Speed (km/h)	Reduced Speed (km/h)								
	STOP	16	24	32	40	48	56	64	72
16	6.55	-	-	-	-	-	-	-	-
24	13.13	4.71	-	-	-	-	-	-	-
32	21.35	11.47	6.21	-	-	-	-	-	-
40	31.25	20.75	14.73	8.04	-	-	-	-	-
48	42.90	31.99	25.71	18.42	10.04	-	-	-	-
56	56.34	45.25	38.80	31.48	22.74	12.43	-	-	-
64	71.98	60.79	54.22	46.86	38.14	27.95	15.21	-	-
72	89.77	78.59	72.07	64.66	55.95	46.03	33.19	18.19	-
80	110.16	98.99	92.37	84.97	76.21	66.53	53.92	39.16	21.42
88	133.35	122.03	115.53	107.98	99.11	89.36	77.14	62.71	45.36

Medium Bus & 4-Wheel Truck

Initial Speed (km/h)	Reduced Speed (km/h)								
	STOP	16	24	32	40	48	56	64	72
16	7.02	-	-	-	-	-	-	-	-
24	13.41	5.04	-	-	-	-	-	-	-
32	21.80	12.25	6.61	-	-	-	-	-	-
40	32.04	21.55	15.46	8.37	-	-	-	-	-
48	44.19	32.96	26.49	19.04	10.25	-	-	-	-
56	58.36	46.55	39.79	32.05	23.13	12.50	-	-	-
64	74.52	62.30	55.36	47.40	38.24	27.52	15.02	-	-
72	92.45	79.84	72.84	64.77	55.58	44.93	32.45	17.61	-
80	111.73	99.00	91.84	83.86	74.67	64.17	51.81	37.28	20.22
88	131.66	118.89	111.74	103.33	94.81	84.36	72.45	58.39	41.82

Appendix 5-4 (4) ADDITIONAL COST PER SPEED CHANGE CYCLE (Cont'd)
(% of Level Tangent Costs per km at Initial Speed)

Heavy Bus & 6-Wheel Truck

Initial Speed (km/h)	Reduced Speed (km/h)								
	STOP	16	24	32	40	48	56	64	72
16	9.74	-	-	-	-	-	-	-	-
24	19.07	6.78	-	-	-	-	-	-	-
32	30.52	16.75	8.91	-	-	-	-	-	-
40	43.63	29.12	20.91	11.25	-	-	-	-	-
48	58.39	43.52	35.12	25.31	13.69	-	-	-	-
56	74.64	59.77	51.32	41.61	30.05	16.41	-	-	-
64	92.74	78.01	69.60	59.99	47.07	35.24	19.33	-	-
72	112.45	97.91	89.71	80.31	69.31	56.33	40.91	22.36	-
80	133.58	119.47	111.44	102.24	91.59	79.04	64.20	46.50	25.36
88	155.53	141.85	134.14	125.26	115.00	102.91	88.77	71.92	51.84

10-Wheel Truck

Initial Speed (km/h)	Reduced Speed (km/h)								
	STOP	16	24	32	40	48	56	64	72
16	27.95	-	-	-	-	-	-	-	-
24	53.38	20.33	-	-	-	-	-	-	-
32	87.69	58.90	28.11	-	-	-	-	-	-
40	128.71	90.06	66.04	36.61	-	-	-	-	-
48	175.81	136.52	111.92	82.43	45.77	-	-	-	-
56	228.90	189.56	165.37	136.03	100.04	55.57	-	-	-
64	285.23	247.07	223.18	194.79	160.30	117.74	65.68	-	-
72	347.01	309.64	286.90	259.57	226.54	186.25	136.97	75.98	-
80	411.60	375.79	354.06	327.98	296.60	258.50	212.17	141.17	85.77
88	476.82	442.56	421.87	397.10	367.36	331.49	288.11	248.02	171.15