

TRAFFIC SAFETY PROJECT

APPENDIX-A

EXCEL SHEET FOR COST BENEFIT ANALYSIS OF BLACK SPOTS, “BLACK-SPOT CB-ANALYSIS.XLS”

April 2001



**COST-BENEFIT ANALYSIS FOR TRAFFIC SAFETY
INVESTMENT MEASURES**

Project Name	Test object road 999
Project No	2001-001
Division	
Road-Section No	
Location	
Calculations performed by	C Sachse

DESCRIPTION

Analysis Date	4/16/01
Analysis Period	20
Discount Year	2001
Opening Year	2001
Price Level Year (Base Year is 1999)	1999

Price level index (1999=100)	100
Discount Rate (%)	15.0%
VAT, average (%) - tax factor 1	17.0%
GNP per capita (TL)	1,216,000,000
Economic annual forecast growth (%)	5.0%

NPV for IRR est 286,775

Investment years from opening year	(in price level 1999)
Year -5, M TL excl VAT	
Year -4, M TL excl VAT	
Year -3, M TL excl VAT	
Year -2, M TL excl VAT	
Year -1, M TL excl VAT	
Year 0 - Opening year, M TL excl VAT	1,000,000
Total investment cost in M TL excl VAT	1,000,000
Yearly Maintenance (M TL) excl VAT	10,000

Invest.cost (discounted to opening year), (M TL)	1,000,000
Invest.cost (discounted to discount year), (M TL)	1,000,000

COST-BENEFIT ANALYSIS FOR TRAFFIC SAFETY INVESTMENT MEASURES

ACCIDENT STATISTICS AND TRAFFIC DATA	
Accident period (years)	5
Rural or Urban	Rural
No of Accidents (if available)	0
No of Accidents used	63
No of Fatal & Injury Accidents	42
No of Fatal Accidents	8
No of Injury Accidents	34

Total A.A.D.T.	6000
If link length in m, intersection =0	0
Injury and fatality accident rate	3.84

Injury and fatal accidents per incoming Million vehicles and Year

Fatal accident rate	0.73
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Fatal accidents per incoming Million vehicles and Year

Estimated Accident Reductions	Reductions (%)
Property Damage Accidents Only	15
Fatal Accidents	50
Injury Accidents	40

RESULTS FOR PROJECT NO	2001-001
Test object road 999	

Total Yearly Accident Cost (Million TL), before measure	513,204
Reduction of Total Yearly Accident Cost (Million TL), due to measure	244,436
Total Yearly Accident Cost (Million TL), after measure	268,767
Yearly reduction fatalities (persons)	1.7
Yearly reduction injured (persons)	7.6
Yearly reduction of injuries&fatalities (persons)	9.3
Net present value benefits (Million TL) <i>(Incl. maintenance)</i>	1,456,775

BCR	1.2
NPV (Million TL)	286,775

Values

ACCIDENT VALUES PER POLICE AND GENDARME REPORTED ACCIDENTS

Incl VAT, price level 1999

		Material cost (Million TL)	Risk value (Million TL)	Total (Million TL)
RURAL AREAS	Fatal accident	13,973	235,959	249,931
	Injury accident	6,741	9,432	16,173
	Prop damage	813	0	813
URBAN AREAS	Fatal accident	8,716	161,889	170,605
	Injury accident	3,796	6,865	10,661
	Prop damage	286	0	286

INJURY VALUES PER ACTUAL CASE

without correction for killed in hospital

Incl VAT, price level

		Material cost (Million TL)	Risk value (Million TL)	Total (Million TL)
RURAL AREAS	Fatality	4,368	107,252	111,620
	Injury	3,103	3,693	6,797
URBAN AREAS	Fatality	4,013	107,252	111,265
	Injury	2,587	3,693	6,281

INJURY VALUES PER POLICE REPORTED FATALITY & INJURY

with correction for killed in hospital

Incl VAT, price level

		Material cost (Million TL)	Risk value (Million TL)	Total (Million TL)
RURAL AREAS	Fatality	6,117	161,950	168,068
	Injury	3,065	3,583	6,648
URBAN AREAS	Fatality	5,762	161,950	167,713
	Injury	2,545	3,583	6,127

Value calculation

CALCULATION OF VALUES

Green marked fields can be changed as input to new calculation

Fatalities & Injuries per accident without correction

	fatalities/fatal acc	Injuries/fatal acc	injuries/injury acc
Rural areas	1.50	2.84	2.15
Urban areas	1.17	1.91	1.45

Including correction for killed in hospital

	fatalities/fatal acc	Injuries/fatal acc	injuries/injury acc	fatalities/injury acc
Rural areas	2.22	2.22	2.22	0.01
Urban areas	1.95	1.64	1.64	0.01

Tax factor 1/VAT	1.17
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correction for police reporting

fatalities	1.51
injuries	0.97

ACCIDENT VALUES in Million TL, incl VAT

		Prop Damage	Net Prod Loss	Hosp & Adm costs	Mtrl cost incl VAT	Risk value	Total incl VAT
Rural	Damage only	688		125	813	0	813
	Injury acc.	1,550	2,882	2,308	6,741	9,432	16,173
	Fatal acc.	2,847	10,224	902	13,973	235,959	249,931
Urban	Damage only	242		44	286	0	286
	Injury acc.	545	1,952	1,300	3,796	6,865	10,661
	Fatal acc.	1,000	7,153	563	8,716	161,889	170,605

Can also be changed with index

Fatality

Years, remaining in prod	35
USD (1999)	3,079
Exchange rate	573,030
GDP per capita TL	1,216,000,000
Economic growth	5%
Discount rate	15%
Prod.Loss,No present value, M TL	42,560
Present value Prod.Loss, M TL	11,727
Consumption	75%
PV Net Prod.Loss incl VAT, M TL	3,430

Risk value fatality, Mill TL	107,252
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Injury

Percent out of prod for 1 month	40%
Percent out of prod for 3 month	30%
Percent out of prod for 6 month	20%
Percent out of prod for life	10%
Present value Prod.Loss, M TL	1,426
PV Net Prod.Loss incl VAT, Mill TL	1,325

Risk value injury, Mill TL	3,693
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Value calculation

Property damage cost for rural fatal accident (incl VAT)	Cost (Million TL) without corr	Cost (Million TL) with corr	Persons per Acc without corr	Persons per Acc with corr		
Per fatality	656	656	1.50	2.12		
Per injury	656	656	2.84	2.22		
Total	2,847	2,847	4.34	4.34		
Property damage cost for rural injury accident (incl VAT)	Cost (Million TL) without corr	Cost (Million TL) with corr	Persons per Acc without corr	Persons per Acc with corr		
Per fatality	0	720	0.00	0.01		
Per injury	720	720	2.15	2.14		
Total	1,550	1,550	2.15	2.15		
Corrected for injured in fatal accident	Cost (Million TL) without corr	Cost (Million TL) with corr	Persons per Acc without corr	Persons per Acc with corr	No of injuries without corr	No of injuries with corr
Per injury in injury accident	720	720	2.15	2.14	40673	40402
Per injury in fatal accident	656	656	2.84	2.22	5663	4422
Average injured	712	714	4.99	4.36		
Property damage cost for urban fatal accident (incl VAT)	Cost (Million TL) without corr	Cost (Million TL) with corr	Persons per Acc without corr	Persons per Acc with corr		
Per fatality	324	324	1.17	1.45		
Per injury	324	324	1.91	1.64		
Total	1,000	1,000	3.09	3.09		
Property damage cost for urban injury accident (incl VAT)	Cost (Million TL) without corr	Cost (Million TL) with corr	Persons per Acc without corr	Persons per Acc with corr		
Per fatality	0	376	0.00	0.01		
Per injury	376	376	1.45	1.43		
Total	545	545	1.45	1.45		
Corrected for injured in fatal accident	Cost (Mill TL) without corr	Cost (Million TL) with corr	Persons per Acc without corr	Persons per Acc with corr	No of injuries without corr	No of injuries with corr
Per injury in injury accident	376	376	1.45	1.43	59930	59326
Per injury in fatal accident	324	324	1.91	1.64	3637	3111
Average injured	373	373	3.36	3.07		

CALCULATION OF RISK-VALUE (VALUE OF STATISTICAL LIFE)

Green marked fields can be changed as input to new calculation

Pricelevel 1999

TL/USD

613000

	MSEK	Adjust GDP factor	Adjust MSEK	M USD
Swedish risk value for fatality	13	8.60	1.51	0.175
Swedish risk value for injury	0.4	8.60	0.05	0.006

Estimated Turkish risk value for fatality	107,252 Million TL
Estimated Turkish risk value for injury	3,693 Million TL

GDP/capita 1997		Relation
Turkey	3038 USD	1
Sweden	26126 USD	8.60

Weighted severe/slight	Severe	Slight	Partly severe
Sweden	3965	17208	0.19
Pilot region	326	1242	0.21

Administration costs

CALCULATION OF ADMINISTRATION COSTS

Swedish values

SEK	Hospital cost	Property damage cost	Administration costs	Net production loss	Total Material	Hospital & Adm./ Total Material
Fatal	25,000	231000	46000	798000	1,100,000	0.06
Severe	161,000	50000	11000	228000	450,000	0.38
Slight	8,000	25000	5000	12000	50,000	0.26
Average Injury	36,652	29,682	6,124	52,450	124,907	0.34
Property damage	0	11000	2000		13,000	0.15

Relation severe/injury	0.19
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Turkish values per reported accident

Green marked fields can be changed as input to new calculation

Million TL		Property damage cost	Net production loss	Hosp. & Adm. costs
Rural	Fatal	2,847	10,224	902
	Injury	1,550	2,882	2,308
	Property damage	688	0	125
Urban	Fatal	1,000	7,153	563
	Injury	545	1,952	1,300
	Property damage	242	0	44

Turkish values per person

Million TL		Property damage cost	Net production loss	Hosp. & Adm. costs
Rural	Fatal	656	3,430	282
	Injury	720	1,325	1,065
Urban	Fatal	324	3,430	259
	Injury	376	1,325	886

**COST-BENEFIT ANALYSIS FOR TRAFFIC SAFETY
INVESTMENT MEASURES (incl Traffic Growth)**

Project Name	Test object road 999
Project No	2001-001
Division	
Road-Section No	
Location	
Calculations performed by	C Sachse

DESCRIPTION

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Price level index (1999=100)	100
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Economic annual forecast growth (%)	5.0%

NPV for IRR est 811,417

Investment years from opening year	(in price level 1999)
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Invest.cost (discounted to discount year), (M TL)	10,000

Invest.cost (cost level opening year), (M TL)	1,000,000
Invest.cost (cost level discount year), (M TL)	1,000,000

**COST- BENEFIT ANALYSIS FOR TRAFFIC SAFETY
INVESTMENT MEASURES (incl Traffic Growth)**

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Annual Traffic Growth Rate (%)	5%
If link length in m, intersection =0	0
Injury and fatality accident rate	3.84

Injury and fatal accidents per incoming
Million vehicles and Year

Fatal accident rate	0.73
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Fatal accidents per incoming Million
vehicles and Year

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Net present value benefits (Million TL) (Incl. maintenance)	1,981,417

BCR	1.7
NPV (Million TL)	811,417