

Estimation of annual operating and maintenance costs

A. Energy Costs

- 1. Tunnel lighting 3000000 kWh/yr @ 0.1 \$/kWh= \$ 300000 /yr
 - 2. Ventilation fans 400000 kWh/yr @ 0.1 \$/kWh= \$ 40000 /yr
 - 3. Sump pumps 20000 kWh/yr @ 0.1 \$/kWh= \$ 2000 /yr
- Sub-total A - \$ 342000 /yr

B. Electrical Maintenance Costs

- 1. Labour (Assume 1 electricians for 5 days per week throughout year)

Electrician 1 2080 hrs/yr @ 65 \$/hr= \$ 135200 /yr
 - 2. Materials/replacement of equipment (assume electrical equipment replaced once every 40 years)

Electrical equipment cost= \$ 1000000
written-off over 40 years = \$ 25000 /yr
- Sub-total B - \$ 160200 /yr

C. Mechanical Maintenance Costs

- 1. Labour (Assume 1 mechanic/maintenance technician for 5 days per week throughout year)

Mechanic 2080 hrs/yr @ 65 \$/hr= \$ 135200 /yr
 - 2. Materials/replacement of equipment (assume mechanical equipment replaced every 40 years)

Ventilation system cost= \$ 1000000
written-off over 40 years = \$ 25000 /yr

Emergency generators= \$ 500000
written-off over 40 years = \$ 12500 /yr

Drainage pumps cost= \$ 200000
written-off over 40 years = \$ 5000 /yr
- Sub-total C - \$ 177700 /yr

contd.

Estimation of annual operating costs

D. Structure Maintenance Costs

1. Inspection (assume 3 man inspection crew for 10 weeks once every 4 years)

Senior engineer	100	hrs/yr @	130	\$/hr=	\$	13000	/yr
Engineer 1	100	hrs/yr @	100	\$/hr=	\$	10000	/yr
Engineer 2	100	hrs/yr @	100	\$/hr=	\$	10000	/yr

2. Tunnel Cleaning (Assume 4 man crew for 13 weeks once a year)

Labourers	2080	hrs/yr @	60	\$/hr=	\$	124800	/yr
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3. Sump clean-up (Assume 2 man crew for 2 days twice a year)

Labourers	64	hrs/yr @	50	\$/hr=	\$	3200	/yr
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4. Structure maintenance (Assume 4 man crew for 13 weeks once a year)

Labourers	2080	hrs/yr @	50	\$/hr=	\$	104000	/yr
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5. Permanent Way Inspection (Assume 2 men inspect track 3 times per week)

Labourers	312	hrs/yr @	50	\$/hr=	\$	15600	/yr
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6. Permanent way maintenance (Assume 4 man crew for 12 weeks once a year)

Labourers	1920	hrs/yr @	50	\$/hr=	\$	96000	/yr
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Sub-total D - \$ 215600 /yr

Total estimated maintenance cost=\$ 895,500 /yr

**Newfoundland Fixed Link
Rail System - Estimation of Annual Operating Cost**

<i>Item</i>					<i>Annual Cost</i>
<i>Assumptions:</i>					
<i>Facility operates 12 hours/day, 7 days/week 50 percent of this time the facility is fully staffed with toll collectors, the remainder of the time only 1 toll booth is operating on each side.</i>					
A	Salaried Staff	<i>Mult.</i>	<i>Unit</i>	<i>Rate</i>	
	Tunnel Manager	1.40	Year	100,000	140,000
	Tunnel Operator	1.40	Year	100,000	140,000
	Apprentice Operator	1.40	Year	60,000	84,000
	Site Maintenance Mgr	1.40	Year	50,000	70,000
B	Hourly Staff	<i>Quant</i>	<i>Unit</i>	<i>Rate</i>	
	Toll collectors - (2 FT, 4 PT, 1 PT Spare)	7,000	h	50	350,000
	Site Labor	4,000	h	35	140,000
	Electricians	6,000	h	65	390,000
	Mechanics	6,000	h	60	360,000
	Train drivers	8,000	h	85	680,000
	Loading foreman	4,000	h	55	220,000
	Laborers	20,000	h	40	800,000
C	Subcontracted Work				
	Locomotive maintenance	1	LS	120,000	120,000
	Rolling stock maintenance	1	LS	25,000	25,000
	Facility cleaning	52	w	250	13,000
	Landscaping	52	w	500	26,000
	Building maintenance	1	LS	10,000	10,000
D	Power	<i>Quant</i>	<i>Unit</i>	<i>Rate</i>	
		8,922	MW-h	60	535,324
E	Equipment Depreciation (straight-line)	<i>Life</i>	<i>Unit</i>	<i>Cap. Cost</i>	
	Locomotives (20 years)	20	Year	13,750,000	687,500
	Rolling stock (20 years)	20	Year	10,128,421	506,421
	Buildings	30	Year	2,912,000	97,067
	Roads	30	Year	1,250,000	41,667
	Trackwork	25	Year	3,130,000	125,200
	OCS system	15	Year	9,298,814	619,921
	Signal system	15	Year	6,592,000	439,467
	Train loading system	12	Year	500,000	41,667
	Heavy vehicles	12	Year	560,000	46,667
	Light trucks	7	Year	220,000	31,429

TOTAL ANNUAL OPERATING COST OF SHUTTLE TRAIN

\$ 6,740,327

