

**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 |
|-----------|------|----------|----|--------|----|--------|-----|

3. Sump clean-up (Assume 2 man crew for 2 days twice a year)

|           |    |          |    |        |    |      |     |
|-----------|----|----------|----|--------|----|------|-----|
| Labourers | 64 | hrs/yr @ | 50 | \$/hr= | \$ | 3200 | /yr |
|-----------|----|----------|----|--------|----|------|-----|

4. Structure maintenance (Assume 4 man crew for 13 weeks once a year)

|           |      |          |    |        |    |        |     |
|-----------|------|----------|----|--------|----|--------|-----|
| Labourers | 2080 | hrs/yr @ | 50 | \$/hr= | \$ | 104000 | /yr |
|-----------|------|----------|----|--------|----|--------|-----|

5. Permanent Way Inspection (Assume 2 men inspect track 3 times per week)

|           |     |          |    |        |    |       |     |
|-----------|-----|----------|----|--------|----|-------|-----|
| Labourers | 312 | hrs/yr @ | 50 | \$/hr= | \$ | 15600 | /yr |
|-----------|-----|----------|----|--------|----|-------|-----|

6. Permanent way maintenance (Assume 4 man crew for 12 weeks once a year)

|           |      |          |    |        |    |       |     |
|-----------|------|----------|----|--------|----|-------|-----|
| Labourers | 1920 | hrs/yr @ | 50 | \$/hr= | \$ | 96000 | /yr |
|-----------|------|----------|----|--------|----|-------|-----|

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**



