


## **Appendix B –**

### **Structural Repair Cost Estimate Information**


 <b>Computation</b>		Job No.: 159759	
Project: OIPCB - Task 8 - Bridge Inspection/Ratings	Computed: MJK	Date: 7/29/2011	
Subject: Bridge 763.55 over Coos Bay	Checked:	Date:	
Task: Estimate of Probable Construction Costs	Sheet No.:	Of:	

The following are rough estimates of the 2011 probable construction costs to repair the Critical Items of the 150' TRT span of BR 763.55. They are not based on detailed design or refined calculations.

### **150' TRT Span - Critical Repairs**

ITEM	UNIT	UNIT COST	QUANTITY	TOTAL
1 Replace Truss Chord Members	EA	\$ 79,200.00	2	\$ 158,400
2 Repair Truss Chord Members	LBS	\$ 13.00	40,922	\$ 531,986
3 Replace Floorbeams	EA	\$ 30,400.00	15	\$ 456,000
4 Add Cover Plate to Floorbeam	LBS	\$ 13.00	0	\$ -
5 Replace Stringer	EA	\$ 34,700.00	12	\$ 416,400
6 Add Cover Plate to Stringers	LBS	\$ 13.00	0	\$ -
7 Plate Web of Stringers/Floorbeams	LBS	\$ 13.00	14	\$ 182
8 Replace Truss Lower Lateral Bracing Members	LBS	\$ 13.00	0	\$ -
9 Replace Truss Upper Lateral Bracing Members	LBS	\$ 13.00	2,000	\$ 26,000
10 Replace Truss Portal Bracing Members	LBS	\$ 13.00	0	\$ -
11 Replace Stringer Top Chord Bracing Members	LBS	\$ 13.00	0	\$ -
12 Plate Floorbeam Braces	LBS	\$ 13.00	540	\$ 7,020
13 Plate Floorbeam Hanger	LBS	\$ 13.00	430	\$ 5,590
14 Replace Bearings	EA	\$ 26,400.00	0	\$ -
15 Replace Broken Lacing Bars	LBS	\$ 9.00	48,000	\$ 432,000
16 Replace Corroded Batten Plates	LBS	\$ 9.00	8,400	\$ 75,600
17 Replace Rivets w/ H.S. Bolts	EA	\$ 48.00	15,000	\$ 720,000
18 Replace or Plate Gusset Plates	LBS	\$ 32.00	78,000	\$ 2,496,000
Sub-Total				\$ 5,325,178
25% Contingency				\$ 1,331,300
<b>TOTAL</b>				<b>\$ 6,656,000</b>

Notes:


 <b>Computation</b>		Job No.: <b>159759</b>	
Project:	<b>OIPCB - Task 8 - Bridge Inspection/Ratings</b>	Computed:	<b>MJK</b>
Subject:	<b>Bridge 763.55 over Coos Bay</b>	Checked:	
Task:	<b>Estimate of Probable Construction Costs</b>	Sheet No.:	
		Date:	<b>7/29/2011</b>
		Date:	
		Of:	

The following are rough estimates of the 2011 probable construction costs to repair the Critical Items of the 180' TRT span of BR 763.55. They are not based on detailed design or refined calculations.

### **180' TRT Span - Critical Repairs**

ITEM	UNIT	UNIT COST	QUANTITY	TOTAL
1 <i>Replace Truss Chord Members</i>	EA	\$ 79,200.00	0	\$ -
2 <i>Repair Truss Chord Members</i>	LBS	\$ 13.00	0	\$ -
3 <i>Replace Floorbeams</i>	EA	\$ 30,400.00	0	\$ -
4 <i>Add Cover Plate to Floorbeam</i>	LBS	\$ 13.00	2,861	\$ 37,193
5 <i>Replace Stringer</i>	EA	\$ 34,700.00	0	\$ -
6 <i>Add Cover Plate to Stringers</i>	LBS	\$ 13.00	0	\$ -
7 <i>Plate Web of Stringers/Floorbeams</i>	LBS	\$ 13.00	9,600	\$ 124,800
8 <i>Replace Truss Lower Lateral Bracing Members</i>	LBS	\$ 13.00	0	\$ -
9 <i>Replace Truss Upper Lateral Bracing Members</i>	LBS	\$ 13.00	0	\$ -
10 <i>Replace Truss Portal Bracing Members</i>	LBS	\$ 13.00	0	\$ -
11 <i>Replace Stringer Top Chord Bracing Members</i>	LBS	\$ 13.00	0	\$ -
12 <i>Plate Floorbeam Braces</i>	LBS	\$ 13.00	0	\$ -
13 <i>Plate Floorbeam Hanger</i>	LBS	\$ 13.00	215	\$ 2,795
14 <i>Replace Bearings</i>	EA	\$ 26,400.00	0	\$ -
15 <i>Replace Broken Lacing Bars</i>	LBS	\$ 9.00	8,500	\$ 76,500
16 <i>Replace Corroded Batten Plates</i>	LBS	\$ 9.00	0	\$ -
17 <i>Replace Rivets w/ H.S. Bolts</i>	EA	\$ 48.00	2,200	\$ 105,600
18 <i>Replace or Plate Gusset Plates</i>	LBS	\$ 32.00	14,400	\$ 460,800
<i>Sub-Total</i>				\$ 807,688
<i>25% Contingency</i>				\$ 202,000
<b>TOTAL</b>				<b>\$ 1,010,000</b>

Notes:

 <b>Computation</b>		Job No.: <b>159759</b>	
Project:	<b>OIPCB - Task 8 - Bridge Inspection/Ratings</b>	Computed:	<b>MJK</b>
Subject:	<b>Bridge 763.55 over Coos Bay</b>	Checked:	
Task:	<b>Estimate of Probable Construction Costs</b>	Sheet No.:	
		Date:	<b>7/29/2011</b>
		Date:	
		Of:	

The following are rough estimates of the 2011 probable construction costs to repair the Critical Items of the 458' TRT Swing span of BR 763.55. They are not based on detailed design or refined calculations.

### **458' TRT Swing Span - Critical Repairs**

ITEM	UNIT	UNIT COST	QUANTITY	TOTAL
1 <i>Replace Truss Chord Members</i>	EA	\$ 79,200.00	0	\$ -
2 <i>Repair Truss Chord Members</i>	LBS	\$ 13.00	0	\$ -
3 <i>Replace Floorbeams</i>	EA	\$ 30,400.00	3	\$ 91,200
4 <i>Add Cover Plate to Floorbeam</i>	LBS	\$ 13.00	1,606	\$ 20,878
5 <i>Replace Stringer</i>	EA	\$ 34,700.00	6	\$ 208,200
6 <i>Add Cover Plate to Stringers</i>	LBS	\$ 13.00	17,624	\$ 229,112
7 <i>Plate Web of Stringers/Floorbeams</i>	LBS	\$ 13.00	46,800	\$ 608,400
8 <i>Replace Truss Lower Lateral Bracing Members</i>	LBS	\$ 13.00	0	\$ -
9 <i>Replace Truss Upper Lateral Bracing Members</i>	LBS	\$ 13.00	2,000	\$ 26,000
10 <i>Replace Truss Portal Bracing Members</i>	LBS	\$ 13.00	7,200	\$ 93,600
11 <i>Replace Stringer Top Chord Bracing Members</i>	LBS	\$ 13.00	0	\$ -
12 <i>Plate Floorbeam Braces</i>	LBS	\$ 13.00	0	\$ -
13 <i>Plate Floorbeam Hanger</i>	LBS	\$ 13.00	645	\$ 8,385
14 <i>Replace Bearings</i>	EA	\$ 26,400.00	0	\$ -
15 <i>Replace Broken Lacing Bars</i>	LBS	\$ 9.00	12,900	\$ 116,100
16 <i>Replace Corroded Batten Plates</i>	LBS	\$ 9.00	2,400	\$ 21,600
17 <i>Replace Rivets w/ H.S. Bolts</i>	EA	\$ 48.00	13,000	\$ 624,000
18 <i>Replace or Plate Gusset Plates</i>	LBS	\$ 32.00	13,200	\$ 422,400
<i>Sub-Total</i>				\$ 2,469,875
<i>25% Contingency</i>				\$ 617,500
<b>TOTAL</b>				<b>\$ 3,087,000</b>

Notes:

ESTIMATE SUMMARY (COSTS)

Bid #	Bid Description	Engr Bid#	Quantity	Unit	Manhrs /Unit	Direct Labor	Perm Matl	Constr Matl	Equip- Ment	Sub- Contr	Direct Total	Indirect Charge	Total Cost	Biditem U. Cost
100	REPLACE LACING BAR-SINGLE*narrow		5,155,000	LB	296 0.06	18,137 3.52	15,210 2.95	2,206 0.43	3,576 0.69	1,021 0.20	40,150 7.79	10,091 1.96	50,241	9.75
102	REPLACE LACING BAR SINGLE-wide		32,851,000	LB	1,678 0.05	101,732 3.10	90,181 2.75	34,187 1.04	23,885 0.73	7,409 0.23	257,395 7.84	64,693 1.97	322,088	9.80
200	REPLACE LACING BAR-DOUBLE		14,113,000	LB	722 0.05	44,158 3.13	38,124 2.70	10,963 0.78	11,055 0.78	2,861 0.20	107,162 7.59	26,934 1.91	134,096	9.50
300	REPLACE RIVET WITH BOLT		2,000,000	EA	780 0.39	48,525 24.26	10,000 5.00	6,000 3.00	10,681 5.34		75,206 37.60	18,902 9.45	94,108	47.05
400	REPLACE FLANGE ANGLE AND COVER PLATE		18,732,000	LB	1,365 0.07	84,371 4.50	41,282 2.20	34,996 1.87	20,898 1.12	3,505 0.19	185,051 9.88	46,510 2.48	231,561	12.36
500	REPLACE STRINGER		62,638,000	LB	1,308 0.02	81,288 1.30	114,502 1.83	3,452 0.06	52,484 0.84	9,892 0.16	261,619 4.18	65,755 1.05	327,373	5.23
600	REPLACE FLOOR BEAM		34,513,000	LB	1,427 0.04	88,299 2.56	85,214 2.47	5,210 0.15	54,152 1.57	6,070 0.18	238,945 6.92	60,056 1.74	299,001	8.66
700	ADDED COVER PLATE		16,817,000	LB	1,489 0.09	88,906 5.29	39,726 2.36	29,779 1.77	21,310 1.27	5,990 0.36	185,709 11.04	46,676 2.78	232,385	13.82
800	REPLACE PART OF PRIMARY TRUSS MEMBER		19,871,000	LB	1,290 0.06	80,298 4.04	52,795 2.66	35,697 1.80	21,710 1.09	3,229 0.16	193,729 9.75	48,691 2.45	242,420	12.20
900	REPLACE PRIMARY TRUSS MEMBER		25,266,000	LB	2,387 0.09	145,208 5.75	70,559 2.79	73,099 2.89	66,128 2.62	7,344 0.29	362,337 14.34	91,069 3.60	453,406	17.95
1000	REPLACE GUSSET PLATE		49,074,000	LB	8,633 0.18	533,546 10.87	150,101 3.06	367,231 7.48	143,197 2.92	12,324 0.25	1,206,399 24.58	303,213 6.18	1,509,612	30.76
1100	REPLACE BRACING GUSSET		8,963,000	LB	722 0.08	44,906 5.01	20,945 2.34	10,952 1.22	11,753 1.31	1,493 0.17	90,049 10.05	22,633 2.53	112,682	12.57
1200	REPLACE BRACING MEMBER		19,370,000	LB	1,020 0.05	63,060 3.26	48,848 2.52	60,737 3.14	17,573 0.91	9,332 0.48	199,549 10.30	50,154 2.59	249,703	12.89
1300	EXPANSION BEARING REPLACEMENT		4,000	EA	410 102.44	23,842 5,960.38	43,688 10,922.00	11,062 2,765.62	5,745 1,436.16	99 24.82	84,436 21,108.97	21,222 5,305.48	105,658	26,414.45
Work Category														
					23,527	1,446,276	821,175	685,570	464,145	70,571	3,487,736	876,599	4,364,335	
TOTALS:					23,527	1,446,276	821,175	685,570	464,145	70,571	3,487,736	876,599	4,364,335	
field oh by percentage					1,382	197,059		117,600	38,220		352,879			
COST TOTALS					24,909	1,643,335	821,175	803,170	502,365	70,571	3,840,615	523,719	4,364,335	

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ESTIMATE SUMMARY (COSTS)

Bid #	Engr Bid#	Quantity	Unit	Manhrs /Unit	Direct Labor	Perm Matl	Constr Matl	Equip- Ment	Sub- Contr	Direct Total	Indirect Charge	Total Cost	Biditem U. Cost
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\*\*\*\*\* ESTIMATE NOTES: \*\*\*\*\*

Bid Date: 03/09/2011      Owner:      wa-or  
Estimator-In-Charge:      Engineering Firm: HDR  
Sort= 1    HoldAcct= N    Subitems= N    NonAdd= N

\*\* in front of the Biditem indicates a Non-Additive item  
Last Summary on 07/29/2011 at 2:53 PM.  
Last Spread on 07/29/2011 at 2:53 PM.

## **Appendix D –**

### **Mechanical & Electrical Cost Estimate Information**

Minor Rehabilitation Construction Cost for rail operation				
System Component	Rehab Scope	Labor (crew days)	Materials \$	Equipment \$
<b>Mechanical</b>				
Service bridge thruster brake		1	\$500	
Tug Boat Operation				
- Boat and crew (8 hour rental)				\$1,200
- Maintenance crew		1		
- Bridge Stops		3	\$10,000	
- Bridge restraints for open position			\$2,000	
Temporary Rail lift and center latch operation				
- Rail lift servicing and supports		2	\$2,500	
- Centering latch servicing and supports		1	\$2,500	
Wedge machinery operation				
- Existing equipment removal and storage		4	\$500	
- Bolster installation		4	\$20,000	
- Jack and powepack rental				\$2,460
<b>Sub Total Item Cost</b>		<b>16</b>	<b>\$38,000</b>	<b>\$3,660</b>
Crew \$/day		\$3,200		
<b>Total Item Costs</b>		<b>\$51,200</b>	<b>\$38,000</b>	<b>\$3,660</b>
Total Cost				\$92,860
Contractor Mark Up (28%)				\$26,001
Profit (10%)				\$11,886
Contingency (25%)				\$32,687

Total Mechanical Coos Bay Cost	\$163,434
	Round \$164,000

<b>Electrical</b>				
Provide temporary power for the hydraulic power packs		2	\$2,000	

Sub Total Item Cost		2	\$2,000	\$0
Crew \$/day		\$2,100		
<b>Total Item Costs</b>		<b>\$4,200</b>	<b>\$2,000</b>	<b>\$0</b>
Total Cost				\$6,200
Contractor Mark Up (28%)				\$1,736
Profit (10%)				\$794
Contingency (25%)				\$2,182

Total Electrical Coos Bay Cost	\$10,912
	Round \$11,000

Signal System	No work performed	0	0	0
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Assumptions:

- Mechanical Crew ( 2 man crew - \$3200/day)
- Electrical Crew (3 man crew -\$2100/day)
- No redundancy on any systems
- Access Bridge by boat
- No standby generator
- No back up to wedge or span drive



Intermediate Rehabilitation for rail operation				
System Component	Rehab Scope	Labor (crew days)	Materials \$	Equipment \$
Mechanical				
End wedges	Disassemble/clean and minor repairs	10	\$5,500	\$1,000
End wedge drive	New Pump/hydraulic piping/rehab Cyl's	5	\$20,000	
Center wedges	Disassemble/clean and minor repairs	5	\$200	\$1,000
Center wedge drive	New Pump/hydraulic piping/rehab Cyl's	3	\$10,000	
Center pivot	Drain Lube/clean and fill with lube	3	\$1,000	
Balance wheels	Check rotation/clean and lube	4	\$500	
Rail lift system	Rotate rack section Clean and Lube	7	\$2,200	
Latch	Clean and lube	2	\$200	
Rack/track	Clean pier/track	3	\$250	\$500
Pinion Bearings	Clean and adjust clearance	1	\$100	
Span drive machinery	Change motor/clean and lube	10	\$10,000	\$1,000

Sub Total Item Cost		53	\$49,950	\$3,500
Crew \$/day		\$3,200		
Total Item Costs		\$169,600	\$49,950	\$3,500

Total Cost	\$223,050
Contractor Mark Up (28%)	\$62,454
Profit (10%)	\$28,550
Contingency (25%)	\$78,514

Total Mechanical Coos Bay Cost	\$392,568
Round	\$393,000

#### Electrical

Wedge Drives	Conduit/controls	10	\$10,000	
Span Drives	Replace drive motor 10HP motor			
Motor	new motor	3	\$15,000	
Support Structure	new support/instruments	5	\$10,000	
Limit Switches	Replace with New/conduit/wiring	10	\$10,000	
Navigation Lights	No work			
Submarine Cable	No work			
Standby Generator	Basic maintenance	2	\$2,500	
Electrical House	Replace with New	10	\$20,000	\$1,500
Bridge controls	New control panel	15	\$100,000	
Conduits/wiring	replace	10	\$10,000	
Temporary system (construction)			\$10,000	
Sub Total Item Cost		65	\$187,500	\$1,500
Crew \$/day		\$2,100		
Total Item Costs		\$136,500	\$187,500	\$1,500

Total Cost	\$325,500
Contractor Mark Up (28%)	\$91,140
Profit (10%)	\$41,664
Contingency (25%)	\$114,576

Total Electrical Coos Bay Cost	\$572,880
Round	\$573,000

Signal System	No work performed	0	0	0
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#### Assumptions:

- No standby generator
- No back up to wedge or span drive

System Component	Total Rehabilitation			
	Rehab Scope	Labor (Man days)	Materials \$	Equipment \$
<b>Mechanical</b>				
<b>Center wedges/bearing/rack track</b>				
Jack span	Clean pier/fab grillage/jack span/Block span/jack span/remove grillage/rig in/out	32	\$75,000	\$2,500
Remove center bearing/rehab	rig in/out, blast clean, new seats and disk, new anchor bolts	72	\$36,700	\$7,500
Remove Rack/Track/replace	Rig in/out, fab new rack track, install and align	75	\$380,000	\$1,000
Remove Center wedges/Rehab	Rig in/out, blast clean, machine sliding surfaces, install and align	140	\$118,500	\$5,000
Pier Cap Concrete repairs	demo top of cap, new cap	110	\$17,900	\$3,500
Remove/Rehab balance wheel assys	Rig in/out, blast clean, new axles and bushings, turn wheels	87	\$34,900	\$2,500
Misc Steel repairs	Assume 3000 lbs at \$10/lb		\$30,000	
Wedge drive demo	Demo drive, rig in/out, new pins/bushings, etc.	15	\$200	\$2,500
<b>Span Drive System</b>				
Demo existng equipment	demo machy, pinion gear/bearings/rig out 3 men 10 days + crane	30	\$200	\$2,500
Fabricate pinion shafts/bearings	2 shafts w integral gears and 4 bearings (PJD est)		\$100,000	
Fabricate reducer supports	2500# ea at \$15/lb		\$30,000	
reducers	2 rt angle reducers			
Hydraulic drive	2 hydraulic motors/HPU/Piping		\$75,000	
Install pinion shafts/reducers/HPU	3 men 15 days + crane	45	\$200	\$2,500
<b>End Wedge system</b>				
Demo existing Equipment	Jack end/ remove wedge seats saddles/linkages and drive equipment	156	\$30,700	\$5,500
Install rehab wedges	Rehab equipment/install	276	\$180,400	\$7,500
<b>Rail Lift System</b>				
	demo existng/rehab linkages/new shaft and cylinders	71	\$21,750	\$5,000
<b>Latch</b>				
	demo existng/rehab components/new thrusters	57	\$33,200	\$2,500
<b>Instrument supports</b>				
		51	\$9,700	\$0
Sub Total Item Cost		1217	\$1,174,350	\$50,000
Mill wright \$/day		\$900		
Total Item Costs		\$1,095,300	\$1,174,350	\$50,000

Total Cost	\$2,319,650
Contractor Mark Up (28%)	\$649,502
Profit (10%)	\$296,915
Contingency (25%)	\$816,517
Total Mechanical Coos Bay Cost	\$4,082,584
Round	\$4,083,000

<b>Electrical</b>				
<b>Incoming Electrical Service</b>	see below	60	\$142,500	\$6,500
<b>Electrical House</b>	see below	39	\$67,000	\$7,500
<b>Bridge Control system</b>	see below	246	\$296,100	\$1,000
<b>Navigation Lights</b>	see below	60	\$21,000	\$500
<b>Submarine cable</b>	see below	73	\$392,000	\$5,500
<b>Misc Electrical</b>	see below	45	\$11,200	\$500
<b>Start Up Services</b>	3 men 20 days plus controls technician	60	\$10,000	
Sub Total Item Cost		583	\$939,800	\$21,500
Electrician \$/day		\$900		
Total Item Costs		\$524,700	\$939,800	\$21,500

Total Cost	\$1,486,000
Contractor Mark Up (28%)	\$416,080
Profit (10%)	\$190,208
Contingency (25%)	\$523,072

Total Electrical Coos Bay Cost	\$2,615,360
Round	\$2,616,000

Coos Bay

Task	Description of work	Labor	Materials	Equipment
<b>Center Wedges, Bearings, rack and track</b>				
Jack Span	Fabricate grillage beams 10 kips at \$5/lb		50,000	
	Rig in/out 3 men 4 days + crane	12		2500
	Jack rental		10,000	
	Misc structure strengthening 3 kips at \$5/lb		15,000	
	Jack span 5 men 4 days	20		
Sub Total		32	75,000	2500
<b>Center Bearing</b>				
	Rig out 5 men, 2 days + crane	10		2500
	Ship to shop	2	500	
	Blast clean		1,000	
	Fabricate seats and disk		35,000	
	Rig In 5 men 2 days	10		2500
	Assemble at bridge 5 men 10 days	50	200	2500
Sub Total		72	36,700	7500
<b>Pier Cap Repairs</b>				
	Remove anchor bolts - core out 3 men 5 days	15		500
	Demo pier (12" removal) cap 3 men 10 days	30		500
	Shielding for demo work 3 men 5 days	15	3,500	
	New concrete cap/ set anchor bolts 5 men 5 days	25		
	Concrete 12 yards at \$1200/yd		14,400	
	Set Center pivot bearing 5 men 5 days + crane	25		2500
		110	17900	3500
Sub Total				

Task	Description of work	Labor	Materials	Equipment
Rack/Track	Demo exisitng rack/track core out anchor bolts 3 men 10 days	30		
	rig materials out 3 men 2 days	6		
	Fabricate new rack/track 15,000 lbs @ \$25/lb		375000	
	Rig in new rack materials 3 men 3 days	9		
	Set rack 3 men 10 days anchor bolts and grout into place	30	5000	1000
Sub Total		75	380000	1000
Center wedges	Rig in/out wedges.saddle, seat 3 men 4 days + crane	12		2500
	Blast clean all wedge system components		5000	
	Machine sliding surfaces of wedges saddles and seats \$2000/surface		16000	
	Link arm bushing replacement 10 plcs		12500	
	Drive cylinders 2 pcs 3 men 4 days	12	20000	
	Fabricate Cylinder mounts/link pins, etc. 2 pcs		50000	
	Install cylinders and supports 3 men 10 days	30		
	HPU with control manifold and piping 3 men 7 days	21	15000	
	install wedges saddles, seats 5 men 10 days + crane	50		2500
	Test operation and alignment 3 men 5 days	15		
Sub Total		140	118500	5000

Task	Description of work	Labor	Materials	Equipment
Balance wheels	Rig in/out wheel assys 3 men 5 days + crane	15	200	2500
	To/from shop		300	
	Disassemble/blast clean and inspect 12 units at \$750 ea		9000	
	Fabricate and install bushings in frames \$1200/unit		14,400	
	Fabricate new axles		5000	
	Shims and Fasteners		6000	
	Install and align balance wheel assys 3 men 2 days/assy	72		
		87	34900	2500
Demo old machinery				
Center wedge drive	Remove old equipment 3 men 5 days + crane	15	200	2500

End Wedge system				
Demo existing equipment	Fabricate jacking grillages		20000	
	Jack end of span (2 locations) 5 men 5 days + crane and jack rental	25	10000	2500
	demo drive and linkages 5 men 10 days	50	200	
	remove wedges/seats and saddles 5 men 12 days + crane	60		2500
	Rig in/out materials 3 men 2 days	6	500	
	core out anchor bolts 3 men 5 days	15		500
Sub Total		156	30700	5500

Rehab wedges/seats/saddles	Transport to/from shop 1 man 2 days	2	200	
	Blast clean all wedge system components		10000	
	Machine sliding surfaces 16 surfaces at \$2000 ea		32000	
	Link arm bushing replacement 20 pcs		25000	
	Drive cylinders (4 pcs) 3 men 4 days ea	48	40000	
	Fabricate cyclinder mounts (4 pcs)		20000	
	Install cylinders/supports 3 men 20 days + crane	60	1000	2500
	Install HPU and piping 3 men 10 days	30	1000	
	Misc steel repairs 5000lbs at \$10/lb		50000	
	Install wedges saddles seats 5 men 20 days + crane	100	1000	2500
	Install linkages and adjust 3 men 12 days + crane	36	200	2500
Sub Total		276	180400	7500

Task	Description of work	Labor	Materials	Equipment
Rail Lift System	demo existing equipment 3 men 10 days + crane	30	200	2500
	Transport to/from shop 1 man 2 days	2	100	
	Blast clean linkage components		2500	
	Link arm bushing replacement 7 pcs at		8750	
	New shaft		2500	
	Cylinder bracket		2500	
	Cylinder		5000	
	HPU (utilize end wedge unit) piping 3 men 3 days	9		
	Install new linkages and brackets 3 men 10 days + crane	30	200	2500
	Sub Total	71	21750	5000

Latch system	demo existing latch bars/linkage and shafts 3 men 4 days	12		
	Fabricate thruster bracket (2 pcs)		7000	
	Purchase two thruster units		18000	
	Rig in/out 3 men 2 days + crane	6		2500
	Rehab catch plate		2500	
	Install catch plate/new anchor bolts 3 men 3 days	9	500	
	Rehab latch bar (new roller and axle)		5000	
	Install new guides/ thruster bracket/etc 3 men 10 days	30	200	
Sub Total		57	33200	2500

Instrument supports	Demo all instrument supports 3 men 5 days	15		
	Fabricate new instrument supports 12 pcs at \$750 ea		9000	
	Transportation		500	
	Installation of supports 3 men 1 day each	36	200	
Sub Total		51	9700	0

**Electrical Work**

Task	Description of work	Labor	Materials	Equipment
Incoming Electrical Service	Demolition of approach span electrical enclosure ( 3men 5 days)	15		1500
	New Electrical Enclosure/shanty		15000	2500
	Foundation for new electrical enclosure		7500	
	Electrical equipment (enclosures, ect)		10000	
	Feeder cable (1000 ft)		20000	
	ATS		15000	
	Standby Generator		70,000	2500
	Pad for generator		4000	
	Install shanty and Electrical equipment (3 men 10 days)	30	1000	
	Cable Terminations (3 men 5 days)	15		
Sub Total		60	142500	6500

Submarine Cable	Remove existng cable 5 men 5 days + crane (2 days)	25	1000	5000
	Fabricate submarine cable 800 ft at \$200/ft		160000	
	Excavate and lay new sub cable 220 ft at \$1,000/ft (includes fill and disposal)		220000	
	Sub Cable cabinets		10000	
	Install sub cable cabinets (3 men 6 days)	18	1000	
	Terminate conductors 3 men 10 days	30		500
Sub Total		73	392000	5500

Electrical House	Demo existing house and all electrical cable/boxes etc on movable span 3 men 8 days	24	2000	2500
	Move materials on/off movable span 3 men 5 days	15		5000
	Structural support for electrical house 5000lbs steel at \$ 10/lb		50000	
	Electrical House		15000	
Sub Total		39	67000	7500



Task	Description of work	Labor	Materials	Equipment
Bridge Control System	Relay control Panel 3 men 2 days)	6	100,000	
	Power cabinet 3 men 2 days	6	75000	
	Span Drive Control manifold (3 men 2 days)	6	10000	
	End wedge control manifold 3 men 4 days)	12	25000	
	Center wedge control manifold ( 3men 2 days)	6	15000	
	Operator Interface panel		10000	
	On shore control panel (2 units)		15000	
	Install on shore control panels (3 men 10 days)	30	100	500
	Cable and conduit on Movable Span (3 men 15 days)	45	5000	
	Limit switches/instruments		40000	500
	Install LS/Instruments (3 men 20 days)	60	1000	
	Cable terminations (3 men 25 days)	75		
Sub Total		246	296100	1000

Navigation Lights	Demo existing lights, dispose of materials (3 men 5 days)	15	5000	
	Purchase navigation lights 10 pcs		15000	
	Install nav light fixtures and cable/conduits (3 men 10 days)	30	1000	500
	Terminate cables (3 men 5 days)	15		
Sub Total		60	21000	500

Misc Electrical	HVAC equipment		1000	
	Misc service outlets and lighting		5000	
	Cables and conduits		5000	
	Install misc electrical equipment (3 men 15 days)	45	200	500
Sub Total		45	11200	500

System Component	Total Rehabilitation			
	Units	Quantity	Unit Cost	Cost

<b>Pier Protection</b>				
12 in x 12 in Timber Whalers at Pivot Pier	Feet	4122	\$6	\$24,732
Timber Sheeting at Pivot Pier	Square Feet	15572	\$12	\$186,864
Timber Walkways	Square Feet	2748	\$5	\$13,740
Timber Railings	Linear Feet	1832	\$10	\$18,320
Sub Total Item Cost				243656
Contingency (25%)				\$60,914
Total Pier Protection Costs		\$0	\$0	\$304,570
Round				\$305,000