

INLAND NAVIGATION ECONOMICS WEBINAR SERIES

Great Lakes Vessel Operating Costs

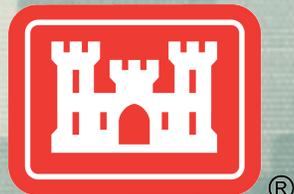
Roger E. Haberly Stephen M. Stalikas

Regional Economist Regional Economist

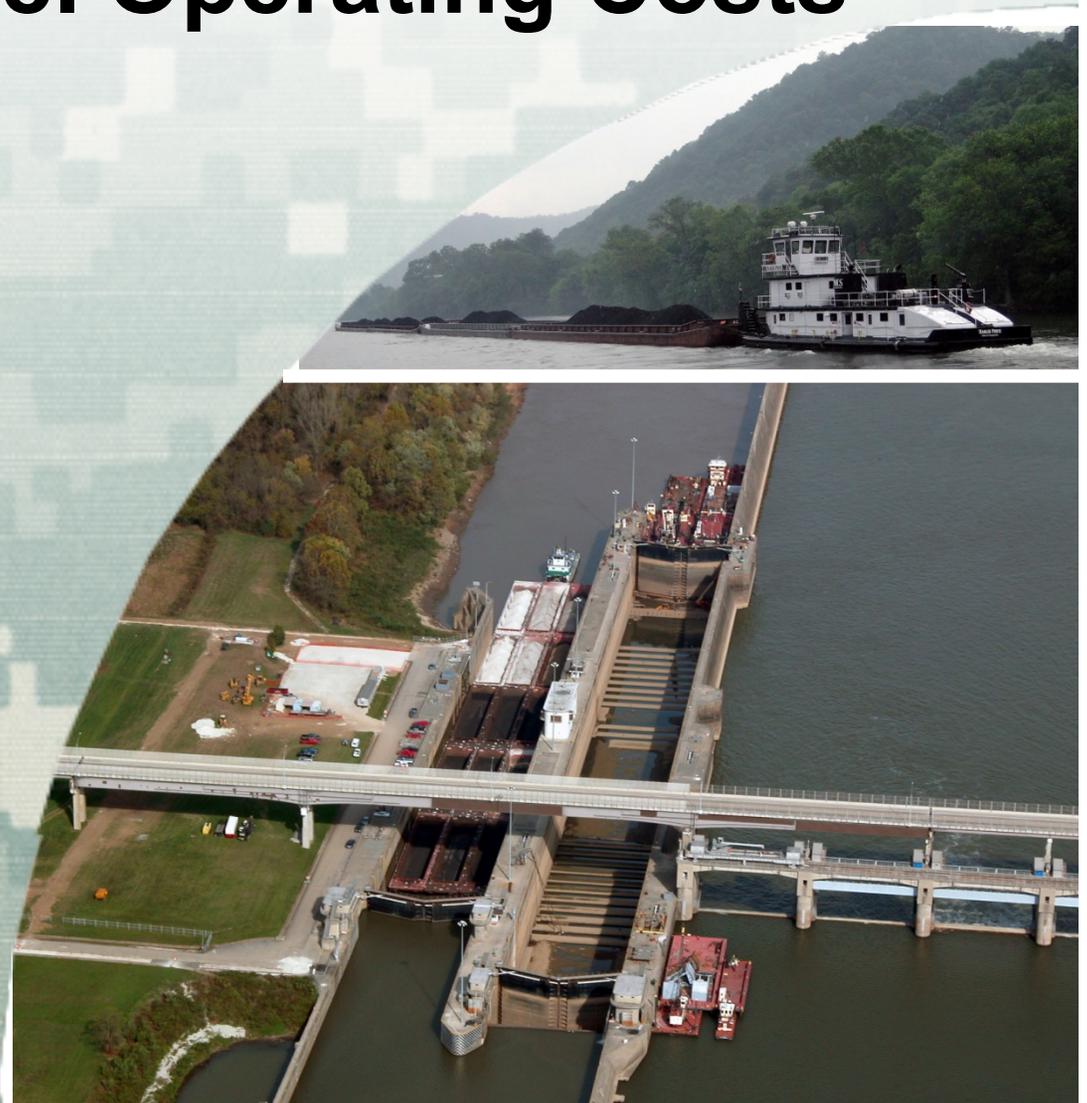
Buffalo District Buffalo District

17 April ,2013

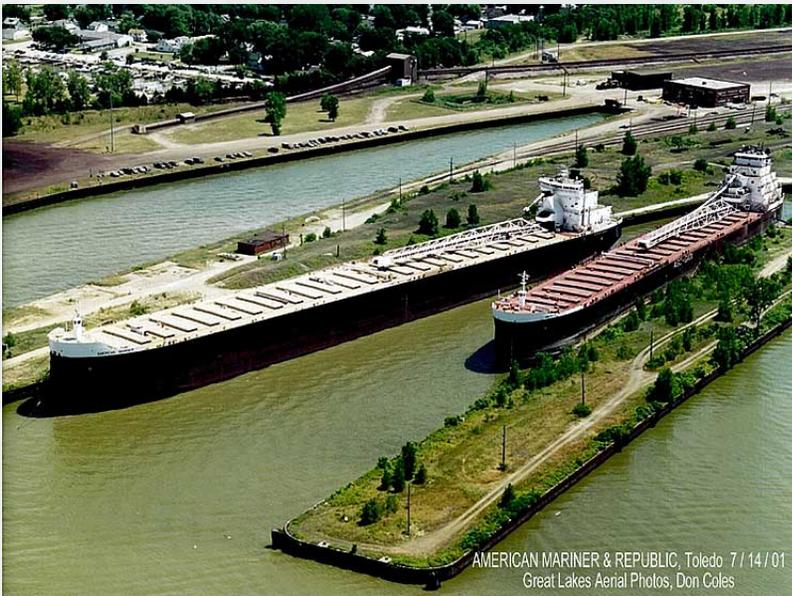
17 April, 2013



US Army Corps of Engineers
BUILDING STRONG[®]



The Great Lakes Fleet



Great Lakes Vessel Types

1. Bulk Freighters
2. Self Unloaders
3. Integrated Tug Barges
4. Chemical Carriers
5. Cement Carriers
6. New GL Vessel Concept



Corps Of Engineers Vessel Classes

Class 1	=	400' or less
Class 2	=	400' – 499'
Class 3	=	500' – 549'
Class 4	=	550' – 599'
Class 5	=	600' – 649'
Class 6	=	650' – 699'
Class 7	=	700' – 730'
Class 8	=	731' – 849'
Class 9	=	850' – 949'
Class 10	=	950' – 1,099'



Major Bulk And Self Unloading Vessels In The Great Lakes Fleet - 2010

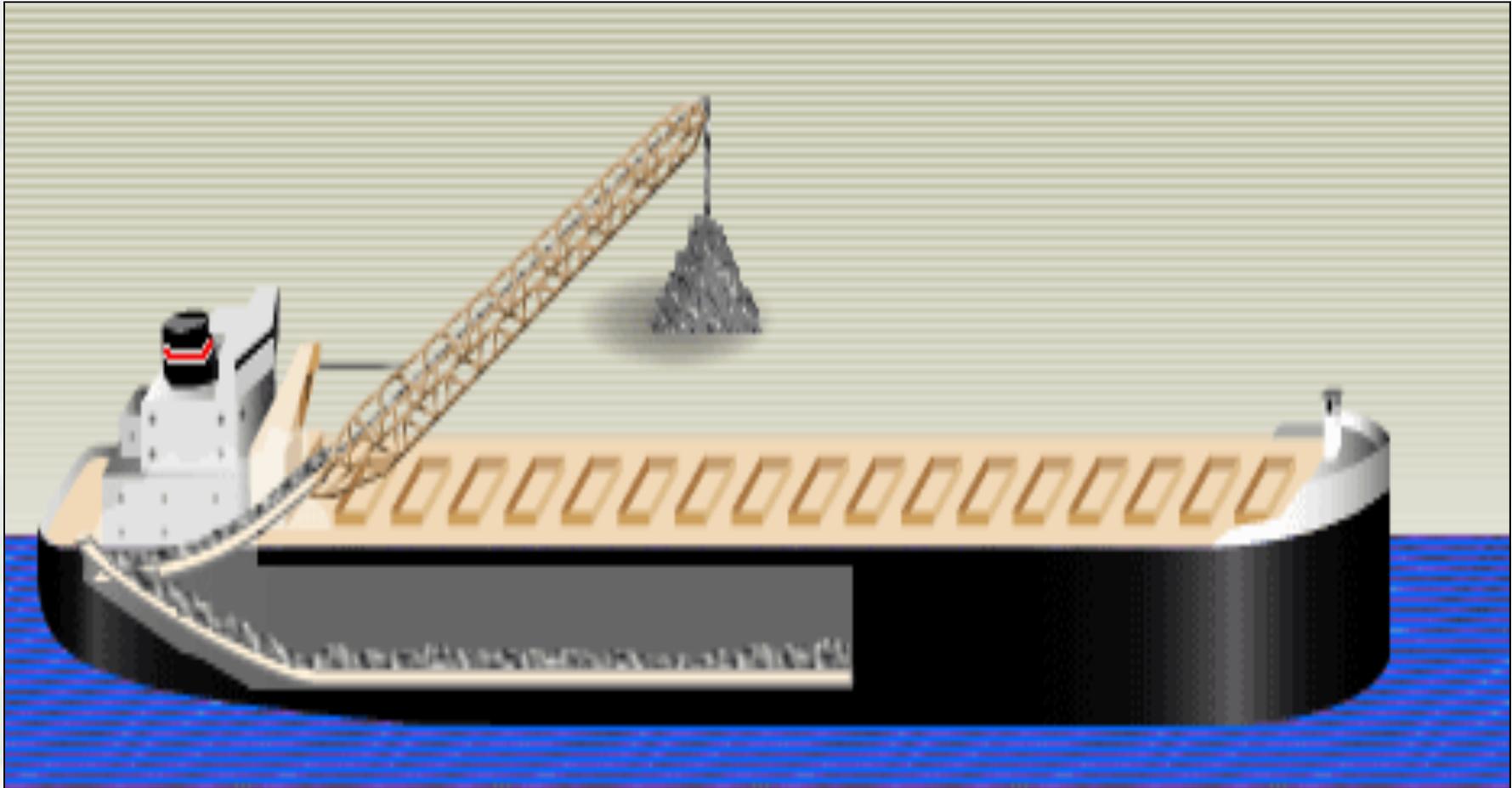
	United States				Canada				Total	Fleet %
	Self		Bulk	Sub	Self		Bulk	Sub		
	Unloader	ITB			Unloader	ITB				
	Unloader	ITB	Freighter	Total	Unloader	ITB	Freighter	Total		
Vessel Class 1		1	7	8	6		3	9	17	12%
Vessel Class 2			5	5			3	3	8	6%
Vessel Class 3		1	2	3				0	3	2%
Vessel Class 4			1	1	1			1	2	1%
Vessel Class 5	15	2		17	4		1	5	22	16%
Vessel Class 6	7			7	3	1		4	11	8%
Vessel Class 7	4	1	1	6	20		17	37	43	31%
Vessel Class 8	10	1	1	12	6		1	7	19	14%
Vessel Class 9	1			1				0	1	1%
Vessel Class 10	12	1		13				0	13	9%
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
	49	7	17	73	40	1	25	66	139	100%
	35.3%	5.0%	12.2%	52.5%	28.8%	0.7%	18.0%	47.5%		



Bulk Freighters



Self Unloaders



Class 10 Vessels



Class 7 Vessels



American Mariner -
Lake St. Claire



Algobay –
Toledo Harbor



Class 5 Vessels



American Republic - Cleveland Harbor



New GL Concept Vessels



Containers on Barges:



Great Lakes Vessel Operating Costs

Great Lakes Vessel Operating Costs- October 2012 Prices										
Interest rate =	3.7500%	Project Life	50	Profit Factor	10.00%					
1+ % Rate	1.037500	PP Factor	0.04457	Overhead Factor	12.00%					
Season Length	275									
Great Lakes Vessel Costs		Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10
Daily Variable Operating Costs										
Wages		\$10,690	\$10,690	\$10,690	\$10,844	\$11,024	\$11,358	\$12,154	\$13,869	\$13,869
Subsistence		\$340	\$340	\$340	\$340	\$340	\$397	\$397	\$397	\$397
Stores, Supplies & Equip		\$447	\$537	\$670	\$709	\$801	\$862	\$1,025	\$1,136	\$1,136
Insurance		\$1,011	\$1,057	\$1,103	\$1,259	\$1,493	\$1,819	\$2,376	\$2,927	\$2,927
Maintenance & Repair		\$4,046	\$4,631	\$4,653	\$4,633	\$4,704	\$4,905	\$5,121	\$4,965	\$4,965
Fuel		\$8,398	\$11,336	\$16,380	\$13,735	\$9,627	\$10,117	\$14,926	\$20,736	\$19,448
Other		\$1,091	\$1,198	\$1,308	\$1,331	\$1,358	\$1,397	\$1,443	\$1,474	\$1,474
Total		\$26,023	\$29,790	\$35,144	\$32,850	\$29,348	\$30,855	\$37,442	\$45,504	\$44,216
Construction Costs	3.75%	\$55,223,643	\$61,359,603	\$67,495,563	\$76,197,499	\$86,759,284	\$101,024,987	\$124,489,475	\$146,394,107	\$146,394,107
Total Daily Fixed Costs										
Construction Costs		\$55,223,643	\$61,359,603	\$67,495,563	\$76,197,499	\$86,759,284	\$101,024,987	\$124,489,475	\$146,394,107	\$146,394,107
Amortization Rate		0.04457	0.04457	0.04457	0.04457	0.04457	0.04457	0.04457	0.04457	0.04457
Annual Fixed Cost/Year		\$2,461,551	\$2,735,056	\$3,008,562	\$3,396,444	\$3,867,227	\$4,503,110	\$5,549,021	\$6,525,403	\$6,525,403
Season Length	275	275	275	275	275	275	275	275	275	275
Fixed Costs Per Day		\$8,951	\$9,946	\$10,940	\$12,351	\$14,063	\$16,375	\$20,178	\$23,729	\$23,729
Profit Factor	10.00%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total Daily Fixed Costs		\$9,846	\$10,940	\$12,034	\$13,586	\$15,469	\$18,012	\$22,196	\$26,102	\$26,102
Total Daily Variable Costs										
Daily Variable Costs		\$26,023	\$29,790	\$35,144	\$32,850	\$29,348	\$30,855	\$37,442	\$45,504	\$44,216
Overhead Factor	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12%
Total Daily Variable Costs		\$29,146	\$33,365	\$39,362	\$36,792	\$32,870	\$34,558	\$41,935	\$50,965	\$49,522
Total Hourly Vessel Costs										
Total Daily Fixed Costs		\$9,846	\$10,940	\$12,034	\$13,586	\$15,469	\$18,012	\$22,196	\$26,102	\$26,102
Total Daily Variable Costs		\$29,146	\$33,365	\$39,362	\$36,792	\$32,870	\$34,558	\$41,935	\$50,965	\$49,522
Total Daily Vessel Costs		\$38,992	\$44,305	\$51,396	\$50,378	\$48,339	\$52,570	\$64,132	\$77,067	\$75,624
October 2012 Daily Vessel Operating Costs		\$38,992	\$44,305	\$51,396	\$50,378	\$48,339	\$52,570	\$64,132	\$77,067	\$75,624
October 2012 Hourly Vessel Operating Costs		\$ 1,625	\$ 1,846	\$ 2,141	\$ 2,099	\$ 2,014	\$ 2,190	\$ 2,672	\$ 3,211	\$ 3,151



Great Lakes Vessel Operating Cost Survey



**FY2012 (Oct. 1, 2011 to Sep. 30, 2012)
UPDATING GREAT LAKES VESSEL OPERATING
AND REPLACEMENT COSTS QUESTIONNAIRE
for the Army Corps of Engineers**

Supported by



PART I: BACKGROUND

NAME OF BUSINESS or ENTITY: _____

RESPONDENT INFORMATION:

NAME: _____
TITLE: _____
PHONE: _____
E-MAIL: _____

DATE: _____

Surveys due back to Informa Economics, Inc. by March 30, 2013
[by fax at 901-766-8158 or by e-mail to VesselCost@informaecon.com.](mailto:VesselCost@informaecon.com)



Great Lakes Vessel Operating Cost Survey

Part II: Guidance for Vessel Classification				
Reference Code	Corps Vessel Class	Dimension	Type	Propulsion / Configuration
a	Class I	399' and less	Tanker	Barge
b	Class II	400' - 499'	Cement	Tug/Barge
c	Class II	400' - 499'	Tanker	ITB
d	Class II	400' - 499'	Tanker	Barge
e	Class III	500' - 549'	Dry-Bulk	Tug/Barge
f	Class III	500' - 549'	Cement	Self-Propelled
g	Class III	500' - 549'	Cement	Tug/Barge
h	Class IV	550' - 599'	Cement	Self-Propelled
i	Class V	600' - 649'	Dry-Bulk	Self-Propelled
j	Class V	600' - 649'	Dry-Bulk	Tug/Barge
k	Class VI	650' - 699'	Dry-Bulk	Self-Propelled
l	Class VII	700' - 730'	Dry-Bulk	Self-Propelled
m	Class VII	700' - 730'	Dry-Bulk	Tug/Barge
n	Class VIII	731' - 849'	Dry-Bulk	Self-Propelled
o	Class VIII	731' - 849'	Dry-Bulk	Tug/Barge
p	Class IX	850' - 949'	Dry-Bulk	Self-Propelled
q	Class X	950' - 1,099'	Dry-Bulk	Self-Propelled
r	Class X	950' - 1,099'	Dry-Bulk	Tug/Barge
s				
t				
u				
v				
x				
y				
z				



Great Lakes Vessel Operating Cost Survey

PART II: Vessel Operating Costs FY2012 (Oct 1, 2011 to Sept 30, 2012) Average Daily Vessel Operating Costs Survey by Vessel Class						
Specify Vessel Class (see Reference Card):						
Number of Vessels						
Ave. Crew Size						
Replacement or Construction Cost ¹						
<i>Year Replacement or Construction Cost Incurred</i>						
Ave. Days Working during FY2012						
Ave. Days Idle during FY2012						
Average Daily Operating Costs (see Reference Card for guidance and additional information)						
(A) Total Daily Crew Costs (1+2+3+4)						
(1) Crew Wages						
(2) Fringe Benefits						
a. Social Security						
b. Workmen's Compensation						
c. Health Insurance						
d. Retirement Contribution						
e. Training						
f. Other						
(3) Food & Subsistence						
(4) Crew Transportation						
(B) Total Daily Boat Costs (5+6+7)						
(5) Maintenance & Repair (a+b)						
a. Major Costs						
b. Routine Costs						
(6) Supplies						
(7) Insurance (a+b+c)						
a. Boat						
b. Protection and Indemnity						
c. Spill Liability						
(C) Admin., Taxes & Other (equip., comm., etc.)						
(D) Total Daily Operating Costs (A+B+C)						
Average Fuel Consumption (Gallons per Hour During FY2012) by Direction						
(D) Port						
(E) Manuvering						
(E) Full Steam						

¹Value in current dollars; or cost in year incurred (please specify year)



Great Lakes Vessel Operating Cost Survey

PART III: Quarterly Fuel Prices (\$ per gallon) by Type

Fiscal Year End	Quarter	Months and Year	Heavy Fuel Oil	Intermediate Fuel & Grade	Intermediate Fuel Oil	Intermediate/Heavy Fuel Oil	Marine Diesel Oil	Marine Diesel/Heavy Fuel Oil
			IF###	IFO	IF/HFO	MDO	MD/HFO	
FY2009	4Q	Oct to Dec 2008						
FY2009	1Q	Jan to Mar 2009						
FY2009	2Q	Apr to May 2009						
FY2009	3Q	Jun to Sep 2009						
FY2010	4Q	Oct to Dec 2009						
FY2010	1Q	Jan to Mar 2010						
FY2010	2Q	Apr to May 2010						
FY2010	3Q	Jun to Sep 2010						
FY2011	4Q	Oct to Dec 2010						
FY2011	1Q	Jan to Mar 2011						
FY2011	2Q	Apr to May 2011						
FY2011	3Q	Jun to Sep 2011						
FY2012	4Q	Oct to Dec 2011						
FY2012	1Q	Jan to Mar 2012						
FY2012	2Q	Apr to May 2012						
FY2012	3Q	Jun to Sep 2012						
FY2013	4Q	Jun to Sep 2012						



Great Lakes Vessel Operating Cost Survey

PART IV: General Discussion and Comments

What factors influenced operational costs during FY2011 (Oct. 1, 2011 to Sep. 30, 2012)?

Influencing Factors	
1	
2	
3	
4	
5	



INLAND NAVIGATION ECONOMICS WEBINAR SERIES

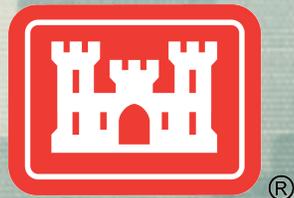
Inland Navigation Vessel Operating Costs

Bill Frechione

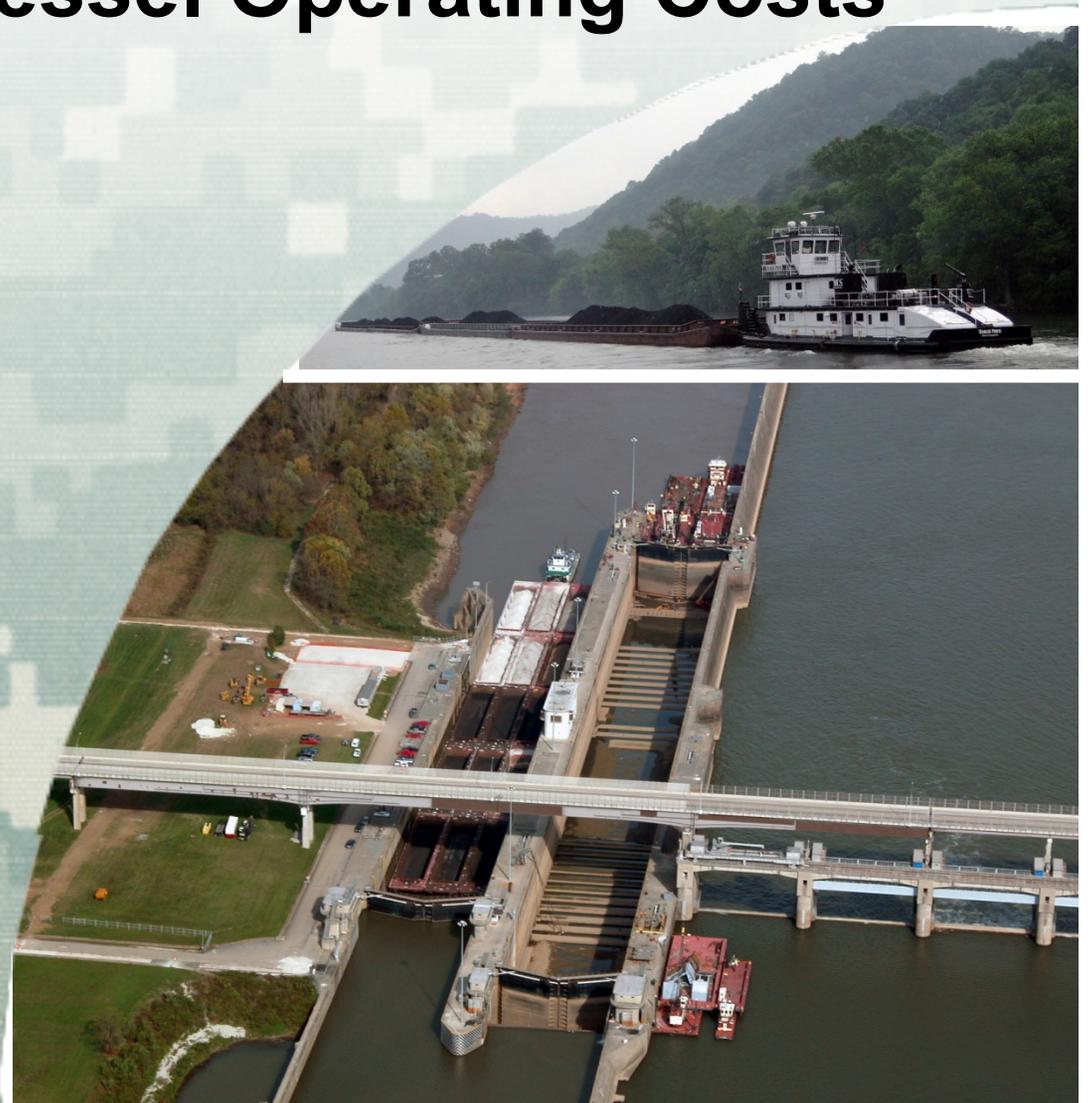
Regional Economist

Pittsburgh District

17 April ,2013



US Army Corps of Engineers
BUILDING STRONG[®]



Vessel Operating Cost

- What are they?
- What are they used for?



What are they?

- Vessel operating costs are the costs of owning and operating towboats and barges that transport coal and other commodities on the river system.



What are they used for?

- 1.0 To calculate the benefits of the waterway system.
- 2.0 To calculate the costs of delays.
- 3.0 For many other good reasons.



What are towboats and barges?

- 1.0 Towboat – the power vehicle; like a train locomotive.
- 2.0 Barges – the cargo carrying vessels; like a train car.



Towboat



Barge



Tows



Vessel operating costs

- Consist of fixed and variable costs
 - 1.0 Fixed cost – things like purchase cost, lease cost, insurance, etc.
 - 2.0 Variable costs – things like fuel costs, etc.



Cost categories for towboat

Horsepower		630
Average age	22	29
Replacement Cost		\$ 1,400,380
Replacement Cost minus salvage		\$ 1,260,342
Operating Days Per Year	365	350
Number of crew members		3
AAEC @ 30 Years @ 7.0%	30	\$ 101,566
Age adjusted AAEC	24	\$ 101,566
Fully burdened labor costs		\$ 430,000
Maintenance @ 2% of purchase price	2%	\$ 28,008
Food per year at \$5 / meal + \$5 misc	\$ 20	\$ 21,000
Insurance per year at 0.5 % per \$1000	0.50%	\$ 7,002
Subtotal of cost except for fuel		\$ 587,576
Fuel costs - normal - incl \$0.20 wtf tax	\$ 3.30	\$ 400,208
All costs except taxes and admin		\$ 987,783
Taxes	2.5%	\$ 24,695
Admin costs (incl in burden multiplier for labor)	12.0%	\$ 118,534
Return on investment	10.0%	\$ 98,778
Total cost	year	\$ 1,229,790
	day	\$ 3,514
	hour	\$ 146



Cost of crew

Crew - numbers		
Captain		1
Pilot		
Engineer		
Oil/Striker		1
Deckhands		1
Cook		
Total		3
Crew - wage/year unburdened		
Captain	\$ 125,000	\$ 125,000
Pilot	\$ 100,000	\$ -
Engineer	\$ 75,000	\$ -
Oil/Striker	\$ 50,000	\$ 50,000
Deckhands	\$ 40,000	\$ 40,000
Cook	\$ 40,000	\$ -
Total		\$ 215,000
Multiply by 2.0 to fully burden	2.00	\$ 430,000



Categories of towboats and barges

- - Towboats –defined by horsepower and usually grouped into about 15 categories.
 - Barges –defined by dimensions, intended cargo, etc and usually grouped into about 25 categories.



Sources/problems with voc's

- 1.0 IWR – last official numbers are from 2004.
- 2.0 TVA – little documentation.
- 3.0 PCXIN – learning process but not yet in production mode.



Summary

- 1.0 Inland voc – the costs of operating towboats and barges.
- 2.0 VOC used to calculate benefits of waterways and costs of delays.
- 3.0 PCXIN is in process of determining how best to update the voc on an annual basis to get reasonable approximations of costs at affordable cost and effort.

