2003

INCREASING NAVIGATION EFFICIENCY ON THE MISSISSIPPI WITHOUT LOCK EXPANSION

The barge industry is advocating for the expansion of locks on the Upper Mississippi and Illinois Rivers, a project which would cost more than one billion dollars, half of which would be paid by taxpayers. The industry argues that traffic delays on the rivers increase the cost of transportation and that longer locks are the only way to alleviate the delays and sustain Midwest agricultural exports.

On the contrary, numerous small-scale measures exist that would increase the efficiency of the current navigation system at a fraction of the cost, take significantly less time to implement and have much less environmental impact than lock expansion. Money for a massive lock expansion construction project with questionable benefits would be better invested in non-structural alternatives that will benefit farmers, rural communities, the environment and the navigation industry itself.

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Barge tows traveling the Upper Mississippi River-Illinois Waterway often experience delays at the locks. Because most locks are only 600 feet in length and many barge tows are nearly 1200 feet, the tows must split in two and lock through separately. During busy times a tow operator may have to wait for other tows to lock through, causing significant delays.

One of the primary causes of delays in the system is not the length of time it takes barge tows to lock through but the variability in lockage time. Just as when a large truck takes a long time to get back to full speed at a stoplight and backs up the faster cars behind it, slower tows can cause delays that ripple through the system and make coordination very difficult. According to a new report by the Center for Transportation Studies at the University of Missouri-St. Louis,[1] the source of delays in any queuing system, such as the Upper Mississippi River navigation system, is "variability in the arrival of customers and variability in service times….If one could eliminate these two sources of variability, one could eliminate the waiting lines and resulting waiting times."

Many proponents of navigation expansion have long maintained that the only way to eliminate traffic delays on the Mississippi River is to expand the locks. They contend that barge traffic is too unpredictable to implement any sort of transportation management system and claim that nothing can be done about the variability inherent in traveling on the river.

Recent data published by the Army Corps of Engineers,[2] however, prove otherwise. The data illustrate sources of variability that are well within the control of the industry and that can be addressed much more easily and less expensively than by expanding the locks.

Variability in Tow Processing Time

The Corps data reveal large variations in the time it takes to process a tow through a lock. Processing times are calculated as the difference from the daily average for a particular lock, thus eliminating most factors such as weather and other variables that change from day to day and over which the tow operators have little control.

On a system-wide basis, over the course of a year tows averaged anywhere from 16 minutes above to 16 minutes below the average tow processing time in 2002. On an individual lock basis the variation was much greater – some tows were as much as an hour slower locking through a particular lock than the rest of the tows that went through that lock that day. The data also revealed the inconsistencies in the time it takes for a particular tow to get through a lock – while some tows were consistently above or below the average processing time, others were all over the board.

Compiling the data by tow owner[3] reveals that tow performance varies greatly by company as well. While each company experiences a range of tow processing times, the tows of most companies are either consistently above or consistently below average.

Figure 1. Tow companies display a range of tow processing times. (Each bar represents all tows owned by a particular company.)

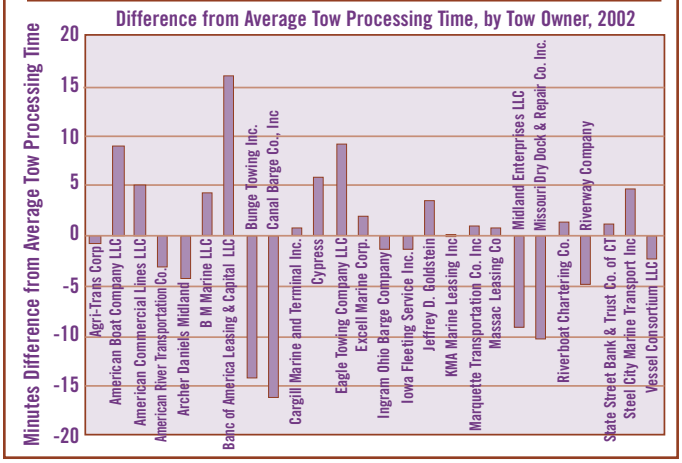
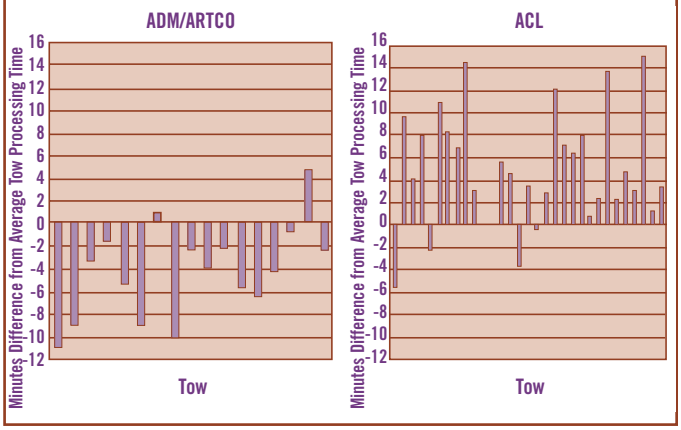


Figure 2. The difference in tow processing times between different companies indicates that some companies are more efficient than others. (Each bar represents an individual tow owned by Archer Daniels Midland or American Commercial Lines.)



Managing Variability to Increase Navigation Efficiency

The variability and inconsistency in tow processing times are due to a number of factors, nearly all of which can be remedied with low cost, non-structural measures. Inexperienced pilots and crewmembers slow processing times, and even the barge industry acknowledges that crew training is an issue that needs to be addressed. Tows that must pass through the locks in two cuts increase processing times when they tie back together with part of the tow still in the lock, a problem that could be solved with the use of switchboats.

The use of technology would also greatly aid navigation efficiency. Many river navigation companies already track their shipments with Geographic Information Systems (GIS) technology. Data from GIS systems could be compiled and made available to all tows on the system, thereby providing more information to the tows on traffic, weather and other important factors. While lock expansion advocates contend that scheduling barge traffic is too difficult, system-wide scheduling systems already in place on the St. Lawrence Seaway[4] and in the Panama Canal[5] indicate otherwise. Traffic management systems in use in other, much more complicated transportation sectors could also be applied to the Mississippi. The barge industry falls far behind other transportation sectors in terms of efficiency improvements, due to the fact that the industry is highly subsidized and thus lacks incentives to invest in innovation.[6]

The fact that tows owned by certain tow companies consistently lock through faster than others indicates that some companies' methods are more efficient than others. One tow company has incorporated the use of mechanically assisted winches and as a result has dramatically reduced its lockage times.[8] With only five tow companies owning nearly 65% of the tows on the Upper Mississippi,[7] small changes in company policy could make a big difference in the efficiency of the entire navigation system.

Conclusion

Several independent economists have questioned the economic benefits of expanding locks on the Upper Mississippi and Illinois River system. Many of these economists have recommended that the Corps study these low-cost non-structural opportunities. Unfortunately, the Corps and the barge industry have been reluctant to consider these innovative options.

Farmers will benefit from a transportation system that is efficient and competitive. Unfortunately, the current navigation system is neither. Only five companies control over 80% of the agriculturally related river transportation.[8] Throwing taxpayer money at the system without addressing these underlying issues will simply exacerbate the problem. The navigation industry needs to incorporate the easily attained transportation efficiencies already available to them before the agricultural community and taxpayers can support a public subsidy of hundreds of millions of dollars.

1 Upper Mississippi and Illinois Waterways: How to Reduce Waiting Times of Vessels While Using the Current Infrastructure. Center for Transportation Studies, University of Missouri-St. Louis. February 2003.
2 Tow Performance Data. U.S. Army Corps of Engineers. Available at http://www.mvr.usace.army.mil/mvrimi/omni/webrpts/omni_tp/towperf.asp
3 Tow ownership data from the U.S. Coast Guard Vessel Database, available at http://www.iwr.usace.army.mil/ndc/veslchar/veslcharsearch.htm
4 Great Lakes St. Lawrence Seaway AIS Project. http://www.greatlakes-seaway.com/en/navigation/ais_project.html
5 Use of Satellite Tracking in the Efficient Management of Vessels Transiting the Panama Canal. Volpe Center GPS Projects. http://www.volpe.dot.gov/gps/gpscoord.html
6 Myth: Barges are the Most Fuel Efficient Mode of Transportation for Agriculture Commodities. Institute for Agriculture and Trade Policy. 2002.
7 Tow ownership data compiled from U.S. Coast Guard Vessel Database in combination with the U.S. Army Corps of Engineers' Tow Performance Data (see above).
8 Mcdonald, Moira. Globalizing Agriculture, the State and Transportation: Grain Production in the U.S. Midwest and Brazil. February 2003.