This research initiative is funded under the auspices of the CFIRE Tier 1 University Transportation Center.

Title: Realigning Multimodal Freight Networks in Response to International Capacity Expansion

Description:
The widely discussed Panama Canal expansion project is expected to be completed by 2014. Following that expansion, container flows for imports and exports will likely shift to eastern and Gulf coast ports and the increased freight volumes may strain the already congested intermodal transportation system. This project will examine how expansion of the Panama Canal may redistribute trade volumes across the intermodal system, including ports, waterways, railroads, and highways.

This research will assess potential effects of the Canal's expansion on the freight networks in the South and Midwest and identify rational strategies for the nation's multimodal network in response to this international capacity expansion. A promising opportunity for gaining economic competitiveness is the freight village concept. Freight villages and global logistics parks are planned distribution, logistics, and warehousing communities built around intermodal hubs with the expectation of exogenous and endogenous growth. However, partners at the University of Memphis and the University of Southern Mississippi have shown that not all intermodal facilities are significant job creators and that the reasons for different economic impacts need to be better understood.

Some key activities of this research are to develop and analyze a comprehensive database of intermodal freight handling facilities for a range of comparable factors and performance measures. Research activities also include transportation network analysis with possible scenarios of shifting intermodal hub locations. It will conduct capacity analysis of existing transportation infrastructures to identify the possibility of capacity expansion. The researchers envision importing the dataset into freight network analysis and GIS tools to more clearly identify successful implementations of freight villages. They will also conduct economic development analysis to quantify the economic growth due to the increased freights movement and handling. This research will also develop web-based information tools that can be used in assessing and selecting the best routes for freight movement and best location for freight facilities.

One of the key aspects of this research is to identify the bottlenecks in transportation infrastructures and identify mitigation strategies to encourage efficient freight movement. The infrastructure impacted will most likely be the road and rail systems; however, there is great potential to consider the inland waterways as a possible method to reduce congestion, especially through the use of containers on barge and larger vessels to move greater volumes of grains and other agricultural products. The Obama Administration's Export Initiative includes a goal to double US exports. This research will also

include strategies for increasing modal freight shares on the inland waterways. Investments in the inland waterway system may help facilitate additional export activities.

Outcomes:
This research will provide decision makers with the information necessary to invest in targeted multimodal system improvements. The expected outcome is an analysis of various impacts of Panama Canal's expansion on supply chains, specific commodity groups, and prioritization of infrastructure investments to meet export initiative guidelines. This research will provide communities, states, developers, and industry with the information and tools assess site selection and growth potential for freight village development resulting from changes in intermodal freight flows. It will also provide 3PLs, freight forwarders, and other logistics providers with the information and tools to select the best strategy for freight movement.

Deliverables:
In addition to task specific deliverables, a final report will be prepared that summarizes the significant research findings and implications. The final report will include an executive summary that is intended for a broader audience beyond the research community. Quarterly progress reports will also be developed during the course of the project and will be submitted to CFIRE. Following are the task specific deliverables.

1. A report with an annotated bibliography. The report will provide a summary of review findings which will serve as a foundation for rest of the tasks. It will list the findings of various impact studies and how that can be used to identify maximum economic impact.
2. A database of transportation infrastructures and their performance measures. This database will be very helpful to conduct transportation network analysis for various scenarios of freight volumes.
3. A data set containing all possible scenarios of freight flows through the US Gulf Coast ports due to the Panama Canal expansion. This data will be used to run transportation network analysis to identify the impacts on existing infrastructures.
4. A visual model that identifies capacity constraints within the network. It will also provide a report with the capacity utilization, congestions, and bottlenecks for current state and various future states due to the post Panama Canal increased freight flows.
5. A GIS model that is interactive and useful for economic impact analysis. This will provide a visual tool for communities, states, developers, and industry with the information and tools to assess site selection and growth potential for freight village development.
6. A report highlighting economic development in specific regions where freight villages can be established. Economic impact is a driving factor for site selection and investment justification.

7. A web-based application that can be used for information dissemination, decision making and economic benefits.

Industry Impact:
The research involves the development of web-based information tools and best practices, and ultimately a framework to assist communities and developers in assessing and selecting the best routes for freight movement, best sites for building freight facilities, and maximizes economic growth.

Research Team:
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- 18 months

Student Involvement
- University of Wisconsin-Superior: One student hourly
- University of Memphis: One graduate student for one semester
- University of Alabama in Huntsville: One graduate student for three semesters