

**I PRO 307- Spring 2006**  
**Automated Shipping Container Transportation Systems**  
**Sponsor- Mi-Jack**

**The Problem**

The problem is the quantity of moving freight going through the Chicago and Northern Indiana region mostly through rubber tire transfers. This mode of transporting freight raises important traffic congestion and environmental issues including but not limited to air and noise pollution. The Chicago and Northern Indiana region possess a serious transportation problem because they have the highest density of inter-modals and basically serve as the crossroads of the U.S. This problem if not remedied would cause a costly gridlock of freight movement in the Chicago and Northern Indiana region that would eventually make congestion worse for Commuters and affect the economy adversely.

**Objectives**

The objective of I PRO 307 this semester was to evaluate various sites in the Northern Indiana region and identify a potential site that would be most suitable and favorable for the Thru-Port system in terms of accessibility, cost-efficiency and convenience.

**Organization and Tasks**

The team was separated into various teams based on the nature of the tasks, and these categories include: Site Evaluation and Criteria, Railroad network & Mapping, Corridor analysis and capacity, Environmental evaluation, databases & GIS, Animation, Graphics and Reports presentation and Website Development.

Site Evaluation and Criteria- This task involved identifying potential sites for the Thru-port system and selecting a uniform set of criteria by which the various sites would be compared and eventually analyzed.

Railroad network & mapping- This involved identifying the various and pertinent inter-modals on the U.S. Map using network analyst and representing volume data on the created inter-modal maps. The Chicago and Indiana area railroads are also modeled using GIS software and data collected from various sources. Eventually, the models are then used to demonstrate the viability of various locations for the Mi-jack inter-modal facility or Thru-Port system.

Corridor analysis & capacity- Involves identification of railroad crossing and volume in the Northwestern Indiana Inter-modal system.

Environmental evaluation- This involves identifying the environmental issues that exist from Rubber Tire- transfers and how these environmental issues can be remedied using the Thru-port concept. The positive and negative environmental impact of the Thru-port

concept are also analyzed based on zoning of the identified Thru-port site, noise levels of the yard, and the capabilities and limitations of the site's land.

Databases & GIS- This involves gathering and maintaining new and existing GIS data for the Northwestern Indiana region. This data will mostly include aerial photographs and shape files that would be later examined for sites that may be suitable for the Thru-Port system.

Animation, Graphics and Report Presentation- This would involve demonstrating the corridors of assessment in a visual and animated manner by the use of graphics, renderings, and videos. Images obtained via the GIS software would then be used to accurately show paths of trains/container along their appropriate corridors and in sequence with the Thru-Port system. After, all information and graphics would be reported in a project document or brochure.

Website Development- This involves revamping the old website of Fall 2006, updating it with new information and generally giving the website a newer look that is more in line with the IPRO's goal and accomplishments in the current semester of spring 2006.

## **Description**

With the Problem of traffic congestion and pollution arising from the rubber tire transfer of freight in the Chicago and Northern Indiana region, the first 2 years of the IPRO project focused on innovative but capital-intensive solutions. In the first semester, preliminary designs for an elevated inter-yard transportation system were developed and integrated with an intra-yard GRAIL (Grid-Rail) system that utilizes linear induction motor technology. The second semester's IPRO team, analyzed the inter-yard network, estimated its costs, and drafted a detailed GRAIL shuttle design and shuttle flow chart. This group also specified a core and alternative regional connector network. The third semester's team further refined the concepts by proposing an actual working scenario for several specific yards and an inter-yard connection which considers the real world obstacles going through an existing urban area. A detailed design and structural analysis for these two distinct systems was also provided.

This Current semester of spring 2006 would be focusing on innovative but practical and cost-efficient methods of implementing the Thru-Port Concept. The project would be executed in a "what, why, and where" approach to the Thru-Port concept. This involved analyzing the various rail corridors going through the Northern Indiana region in terms of accessibility and capacity. The "Big Blue corridor" was identified as the most suitable line, after which various sites were identified along the east-west line of the Big Blue corridor. The sites identified include Riverdale, Gibson east & west yard, U.S. steel and Gary site. The Riverdale yard was identified as the most suitable site in-terms of cost-efficiency, accessibility, size, and minimal physical constraints and zoning restrictions. After, the illustrations of the Thru-port concept through the yards are done using various animations, graphics and video renderings. The environmental impact of the thru-port system both locally and globally is also identified.

## **Team Accomplishments**

- Development of a Brochure that explains the “What, Why, and Where” of the Thru-Port system.
- Identifying the “Big Blue line” on the Cora map as a high traffic, accessible and cost-efficient corridor.
- Selection of Uniform and Appropriate criteria to evaluate the selected sites.
- Successful evaluation of the Riverdale, Gibson west, and Gary site, with the identification of new and potential sites like Gibson east yard and U.S. Steel site.
- Production of various animations, graphics and video renderings illustrating the Thru-port concept.

## **Conclusion**

I PRO 307 successfully identified the Big Blue line as the most suitable corridor for the implementation of the Thru-Port Concept in Indiana and also identified sites along the east-west direction of the line. These sites were compared with each other using uniform selection criteria like size, zoning, accessibility, cost-efficiency and availability. The Riverdale site was selected as the most favorable site. Details of the Project can be viewed in a brochure illustrating the “What, why and where” of the Thru-Port system.

## **Next step**

To evaluate the feasibility of the Thru-port system on a national and larger scale.

## **Team Members**

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