

Automated Shipping Container Transportation System Design

IPRO 307 Project Plan

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Team Members:

John Murawski (Team Leader)
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OBJECTIVE:

The objective of this project is to evaluate the feasibility of Mi-Jack's Thru-port concept - which is a rail yard operated by computer controlled gantry cranes for intermodal container transfer between the major rail road companies.

BACKGROUND:

For the United States, substantial numbers of shipping containers must be transferred from one side of the country to the other. As the major highway and railroad crossroads, Chicago is the third largest intermodal port in the world. For various reasons, substantial numbers of intermodal transfers also take place. In many instances, containers are even moved from one railroad to another by truck. Chicago has exhausted its street, highway, and rail capacity, in recent years, with meteoric container growth expected to continue. Congestion has skyrocketed with attendant increases in pollution.

IPRO teams are now working on their second solution to this problem.

The first solutions that IPRO teams researched involved capital intensive solutions for this problem. In the first semester, they developed preliminary designs for an elevated inter-yard transportation system and integrated an intra-yard GRAIL (Grid-Rail) system that utilizes linear induction motor technology. The second semester's 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, propose an inter-yard connection which considers the real world obstacles going through an existing urban area, and provided a detailed design and structural analysis for these two distinct systems.

An IPRO team is now working on a second solution to the problem, based on a concept designed by Mi-Jack Products called Thru-port. This endeavor would be achieved by implementing a rail-yard-hub that will organize and shuffle similar geographical destined intermodal containers from differing rail lines. The solution is not only environmental friendly, and relatively cheap, but also minimizes effects on other transportation modes.

In this phase two, the first semester's team evaluated Thru-port as a concept designed to help decrease the travel time of a container through Chicago by bringing all the major rail road company's trains with containers destined for other cities to one location. At this location the containers will be moved from train to train, decreasing the need for containers to be placed on trailers and driven through Chicago to other rail yards, thus alleviating traffic congestion, pollution, fuel consumption, and road restoration costs. This team evaluated several possible locations and site designs for Thru-port and the impact it will have on the entire transportation industry, and found it viable. A careful review of the hardware was also conducted.

METHODOLOGY:

This section consists of the following issues of emphasis for this project:

Site Evaluation:

- Evaluate possible locations for the Thru-port
- Determine the accessibility to the Thru-port from major rail lines
- Determine rail road and site ownership
- Evaluate site conditions; dimensions, environment, zoning

Economic Feasibility:

- Compare land cost to the cost of building rail road connections
- Determine land rehabilitation, demolition and building costs
- Compare cost to put each possible site into operation

Website:

- Design a site of usable information for everyone who visits
- Use site to keep records for further IPRO's use
- Provide visibility for sponsor's project and support.

Long-Term Assessment:

- Determine the traffic diverted off streets, expressways and highways
- Evaluate impact on environment
- Determine time and fuel savings

Project Requirements:

- Delineate and divide various responsibilities among team members
- Develop and maintain up-to-date and thorough representations of the team's progress and milestones
- Continuing to monitor individual participation and performance to ensure everyone gets a sufficient background of all aspects of the project

EXPECTED RESULTS:

As derived in the previous semester, the ThroughPort concept consists of three major designs:

- 1) A set of hardware based on conventional crane designs taken to an incremental higher level of capacity;
- 2) An Operating Plan; and
- 3) A suitable site.

This semester's (Spring2006) emphases consists of several main efforts:

- ❖ Augmentation of the specification for an operating plan, including the development of a movie based graphic
- ❖ Augmentation of the site review process, establishing criteria and investigating additional sites.
- ❖ An executive summary report with graphics, usable by the sponsor in describing the Throughport concept.

PROJECTED BUDGET:

Item: Network Analysis software --\$200.

Item: Map Corridor Graphics--\$200

Item: Binding of Subject Report-\$100

TIMELINE and MILESTONE EVENTS:*Tasks*

Organize group, discuss project plan and project objectives

Visit an existing rail yard (completed)

Finalize Project Plan (submitted 2006mar11)

Mid-Term Progress Report (scheduled 23mar2006)

Final Report Draft

Website URL

Project Abstract, Practice Oral Presentation

Give sponsor solutions for desired process
Final Oral Presentation (electronic file due)
Professional Style Exhibit (electronic file due)
IPRO Day – Project Presentation
Final Report/Comprehensive Deliverables CD
IPRO Test Number Two

RESPONSIBILITIES:

Project Aspect:	Task Leader:
Team Leader	John Murawski
(Site Evaluation Criteria)	John Murawski
Databases & GIS	William Orpet
Rail Road Network & Mapping	William Kazanis
Corridor Analyses & Capacity	Mike McVady
Thru-port Design	Jeff Uecke
Environmental Evaluations	Steve Uecke
Indiana Dunes Site Evaluation	Mario Esparza
(Fresh Site Evaluation)	Mario Esparza
Site Adaption (Gibson Yard)	Adejoke Akin-Aderibigbe
Operating Plan Presentation	Justin Mickow
(Large Scale Graphics)	Justin Mickow
Presentation Graphics & Reports	Hana Ishikawa
Website	Kenny White

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