

IPRO 307

Automated Shipping Container Transportation System Design

Sponsor - Mi-Jack Products

The Problem

Chicago is one of the largest intermodal shipping container hubs in the world. Freight and intermodal shipping is an important part of Chicago's economy. Efficient operations here affect the nation's vitality. Approximately 2000 rubber tire transfers take place in Chicago each day. A rubber tire transfer is when intermodal shipping containers are transferred to their departing trains by taking them off one train, driving the container across Chicago to a different yard, where it is placed on its train.

Objectives

The objective of IPRO-307 this semester was to examine the feasibility of the proposed Thruport rail yard to eliminate intermodal rubber tire transfers, and facilitate efficient regional operations.

Basic Organization and Tasks

The team was separated into 8 different tasks: Volume Mapping, Animations, Fresh Site Evaluation, Brownfield Site Evaluation, Recycled Site Evaluation, Thruport, Environmental Evaluation, and Website Development.

Volume Mapping- Present volume data and rail road connections in a map

Animations- Modify existing gantry crane animations and create a real time walk through animation

Fresh Site Evaluation- Evaluate a previously undeveloped site for Thruport

Brownfield Site Evaluation- Evaluate a site that previously had industrial activity for Thruport

Recycled Site Evaluation- Evaluate a site that previously operated as a rail yard for Thruport

Thruport- Understand and evaluate the Thruport and gantry cranes

Environmental Evaluation- Determine environmental concerns for evaluated sites and surrounding area

Website Development- Organize and manage the creation and maintenance of a web site as a resource function

Description

The proposed Thruport is designed to eliminate the need for the container to be driven across town. Thruport is a facility designed to be a yard where all of the cross town transfers are to be sorted. Instead of driving the individual containers from yard to yard, they would all be shipped by rail to Thruport, where they are sorted to different trains and then sent to their future destination. The concept is much the same as that of an airport. Also, the cost of Thruport was determined. The cost to build that facility was estimated along with operating costs of the facility.

Next, possible sites for Thruport had to be evaluated. There are three different types of potential sites: fresh sites, brownfield sites, and recycled sites. A fresh site is developing a site that was previously undeveloped; brownfields are sites that previously had polluting industrial activity, but were not rail yards; and a recycled site is a site that previously operated as a rail yard, or is currently operating as a rail yard.

Many considerations must be taken when evaluating each site. Not only is the cost of land and size of the land important, but the area's zoning laws are also extremely important. Rail access and the site's proximity to main rail lines are also important. Environmental impact and nearby communities must also be taken into consideration when evaluating a site. Three specific sites were evaluated: a fresh site at Rochelle IL; a brownfield site at the former Wisconsin Steel Works site in the Lake Calumet Industrial Corridor, and a recycled site on Indianapolis Avenue in northwest Indiana.

Feasibility Study Critical Barriers

- Proprietary data
- Access to non-proprietary data.
- Full rail road information is quite extensive; maps, volumes, schedules.
- Finding up to date material is harder than expected.
- Indiana data is harder to find than Illinois data and may not even exist

Team Accomplishments

- Full network rail map created including the volume of rubber tire transfers
- Real time, walk through animation of a Thruport located on Wisconsin Steel Works developed
- In depth evaluation of conceptual fresh and brownfield sites and actual sites at Rochelle and Wisconsin Steel Works
- Easily navigable website created containing work done, team information, and informative links
- Cost evaluation of the Thruport concept

Conclusion

I PRO-307 did site evaluations of three commonly occurring site types, created a real time walk through model animation, created a powerful and easily navigable website, ran cost evaluations and profit return for the Thruport concept, and created important rubber transfer volume maps with preliminary operating schemes.

Next Step

The next steps for I PRO-307 are to do an in depth evaluation of the Indiana recycled site, do an expandability evaluation of current rail yard sites and the Thruport concept, develop a better comparison criteria for the sites, and find land costs for site comparison.

Team Members

Patrick Folz, AE
Doug Meyer, CS
Purvi Patel, CS
Christopher Tyson, PHYS
Alan Whitmore, ARCH

Alija Hubjer, ARCH
Brian Neiswander, ME
Paul Prusa, ME
Joshua Vogt, ME

Faculty & Advisors

Laurence Rohter, IIT
Ariel Iris, CATS
Peter Mirabella, MiJack Products