IPRO 307 HISTORY

Mi-Jack Products is a multinational corporation providing machinery and solutions for the transportation and material handling industries worldwide. Recognized worldwide as an industry leader and innovator, Mi-Jack Intermodal is the undisputed leader in providing equipment to the railroad and port intermodal industry. Mi-Jack's corporate headquarters are located in nearby Hazel Crest, IL, where rubber tire gantry cranes are produced. These cranes are used worldwide in the railroad industry, and this is one major contribution to the railroad industry on behalf of Mi-Jack Products.

INTERMODAL YARDS

- Intermodal freight is the movement of containers and trailers by rail, truck or water carriers and is the fastest growing segment of the US freight rail industry.
- Chicago is the third largest intermodal freight hub in the world.
- Ease of trucks traveling to yards determines the accessibility of train intermodal yards.
- Of seven major US railroads, six of those, UP, BNSF, NS, CSX, CP, and CN, have facilities in Chicago, the only place in the US with these many.
- Most of this intermodal traffic is moved in containers. Container movement through intermodal freight is expected to double within 10 years.
- Approach is to make improvements to optimize intermodal yard performance with low cost and positive environmental benefits.

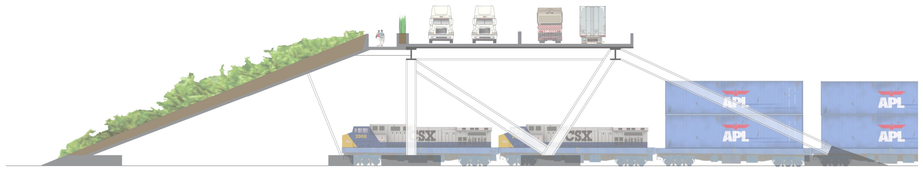
THE TEAMS

Under the sponsorship of MiJack Products, IPRO 307 has completed many projects of various types pertaining to the intermodal industry. With the guidance of Professor Laurence Rohter P.E., MiJack advisor Peter Mirabella, and guidance from MiJack founder John Lanigan, Sr., there have been close to seventy students that have applied their knowledge and talents to these projects. These seventy students have come from a variety of fields of study:

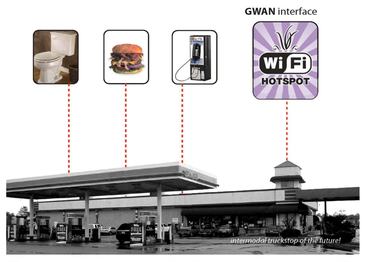
- Over a dozen civil and architectural engineering students
- Over a dozen architecture students
- More than ten mechanical and aerospace engineering students
- A number of students from other fields, such as computer science, psychology, biomedical engineering, and business

The graphic here provides a look at what goes on inside an intermodal yard. It shows a typical layout of the yard with color coding. The blue area represents the rails, and this is where containers are transferred from the trucks to the rail and the rail to the trucks. The yellow area is the trailer parking, where the trucks and containers are placed when they are not needed. The purple area are the warehouses.

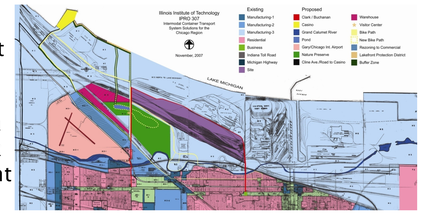
Shipping Container Transport System Solutions in Gary, IN — Fall '07



Cross section of bridge proposed by IPRO 307. The purpose of this bridges is to provide a safe path for cars, trucks, and civilians to cross the intermodal yard. On the bottom right is a proposed rezoning of the area, considering future development as well.



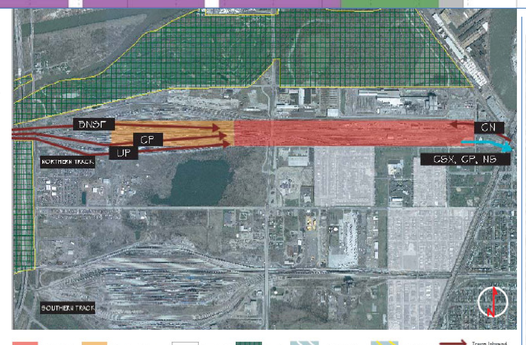
Another proposal of IPRO 307 is the use of GWAN, a computer program aimed at reducing congestion inside rail yards. The rest stop on the left is typical of where a driver would wait and check GWAN to see if the shipment is ready to pick up or drop off.



THE PROJECTS — Spring '06

Advanced Shipping Container Transport System Implementations- The focus of this project was to emphasize the benefits of using rail transport rather than trucks. Rail transport is more reliable and efficient. Presented here are the products of this project.

Thruport- Rail yard operated by large computer controlled gantry Mi-Jack cranes for intermodal container transfer.

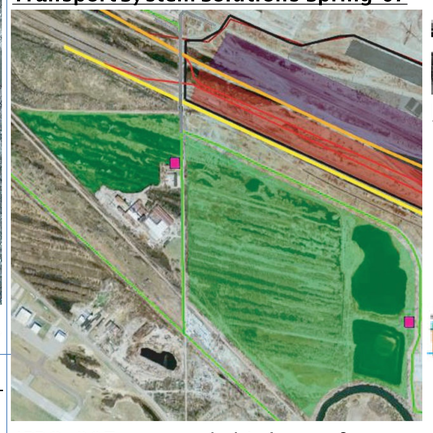


Implementation- The implementation of the Thruport system at the Riverdale rail yard. This layout uses the longest available length of track with room for expansion.

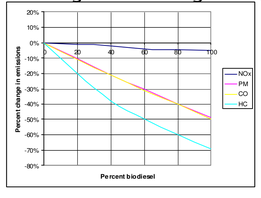
Advanced Shipping Container Solutions — Fall '06

Pictured here is a modified crane for the Bedford Park intermodal yard, created by IPRO 307. The special design takes into account specifications such as minimum and maximum clearance. The implementation of this crane allows for the transfer of containers directly from one rail to another, rather than transferring containers to a tractor trailer and then again to the rail. Simply put, this cuts out the middleman, increases efficiency, and drastically reduces congestion in the yards

Transport System Solutions-Spring '07

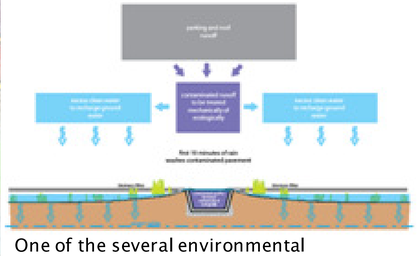


IPRO 307 proposed this layout for an intermodal site in Gary, IN. This layout allows for environmental improvements. It will facilitate bicycle paths and scenic viewing areas along the lake front.

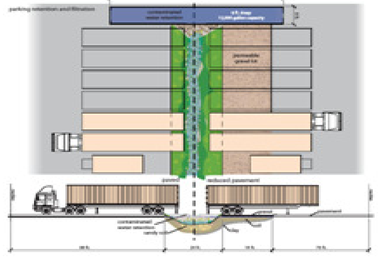


This chart shows the reduction in emissions as an effect of The proposed changes.

Environmental Solutions — Spring '08



One of the several environmental improvements proposed by this team was water retention. The diagram on top shows how runoff water is beneficial, and below how runoff will be collected in the yard.



Intermodal Solutions for Chicago — Fall '08

This team created a flipper model. A flipper is used to remove containers from trailers and improves the efficiency of the yards. Pictured on the left is the proposed layout of the intermodal yard, including a proposed expansion. This team also proposed a switch to compressed natural gas (CNG) as an alternative fuel, and a CNG station is included in this layout.