IPRO 307
Intermodal Container Facility Innovations for the Chicago Area – Focus on Kankakee County

Sponsored By: Mi-Jack Products
Hazel Crest, IL
The Problem

• The Intermodal Facility (Train to Truck/Truck to Train)
  • Property/Land
  • ATMS (Automated Transfer Management System)
  • Warehouses and Housing

• Transportation Enhancement
  • Illiana Exway & Kankakee Connector
  • Viaduct Enhancement
  • High Speed Freight Rail
Goals

• To design an intermodal facility utilizing the ATMS system
  • In-City
  • Out-of-City

• To plan transportation enhancements in the Kankakee area
The Teams
(6-Civil, 5-ArchE, 5-Arch, 1-Mech, 1-Aero)
Capstone

• Intermodal Facility
  • Site Selection
  • Greenfield/Brownfield Development
• Site Planning
• Housing
• Warehouses

• Transportation Enhancement
  • Kankakee Connector
  • Viaduct
• High Speed Freight Rail
Part 1

The Proposed Intermodal Facilities
Possible Locations for Intermodal Facilities in Kankakee, IL
In City

90 Acres
Intermodal Only

Out City

Intermodal
Warehousing
Residential

Total: 3,500 Acres
Estimated Job Creation: 12,000
Residential = 10%
Acres required for housing in apartments: 90
(including circulation)
REZONING PROCESS FOR KANKAKEE COUNTY

APPLICATION

| Base Fee: $600  
| Per Acre: | 0-50 $30 Per Acre  
| 51-100 $20 Per Acre  
| 101+ $10 Per Acre  
| 3500 Acres Site: $600 + $10*3500 = $35,600 |

NATURAL RESOURCE INVENTORY

LAND EVALUATION & SITE ASSESSMENT
BASE FEE: $400 FOR 0-5 ACRES  
$15 FOR EACH ADDITIONAL ACRE  
$400 + $15*3495 = $52,825

ECOCAT
ECOLOGICAL COMPLIANCE ASSESSMENT TOOL  
Determine if proposed action is in the vicinity of any protected natural resources FREE OF CHARGE

ATTORNEY FEE

APPLICATION CHECKLIST

SITE/Plot Plan  
Plat of Survey/Floodplain Survey  
Aerial Photograph  
Natural Resource Inventory Report  
ECOCAT Report

APPROXIMATE TOTAL COST = $100,000
Warehouse Design (20 – 1 million sq ft buildings)

Program

- storage space
- office space
- loading docks
  - rail
  - trucks
- light industrial space
- 30% refrigerated space
- 4'-4" docks for trucks

Materials

- steel structure
  - extra structural capacity to handle future additions
- (corrugated) metal siding
- batt insulation (R-Value: 3.25 per inch)
- (reflective) radiant barrier (R-Value: 3.85 per inch)
- concrete floor with epoxy coating
  - hardened for heavy industrial vehicles
- truss
  - 72" deep and 50'-69' span
  - Supermegatruss- 128' span
Dimensions of the warehouse:
Area 1,000,000 ft²
L 2,000 ft x W 500 ft x H 25 ft

Dimensions of the loading gate:
H 8.5 ft x W 8 ft
50 ft span, 3 gates can be placed between 2 structural columns.

Assumptions:
Midway Airport Outdoor Design Conditions
Zone 5 of ASHRAE Recommendation Guide.
Heat Loss Charts

Percentage of Heat loss
Semi-Heated Warehouse

Min: 45 F

- Skylights: 37%
- Walls: 8%
- Gates: 5%
- Roof: 47%

Total Loss: 12,032,734 Btu/h

Percentage of Heat loss
Conditioned Warehouse

Temp = 70 F

- Skylights: 40%
- Walls: 8%
- Gates: 4%
- Roof: 39%

Total Loss: 8,656,231 Btu/h
Part 2

Transportation Enhancements
South Suburban Airport

Proposed Illiana Expressway

Kankakee Connector
Viaduct Enhancement

Figure 1: Viaduct Model
Figure 2: All-Level View
Figure 3: Viaduct Model from Angle
Time Space from St. Louis to Kankakee

Miles from Kankakee:
- Lincoln
- Springfield
- Alton
- Carlinville
- St. Louis

Hours of the day:
- 0:00
- 4:48
- 9:36
- 14:24
- 19:12
- 0:00

Lines indicate:
- 300
- 302
- 303
- 304
- 305

Points of interest:
- Dwight
- Bloomington
- Kankakee
Results

- Total weight of the train is roughly 27 million lbs
- The aerodynamic drag force is negligible in comparison
- The locomotives can easily overcome this force

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<th>Velocity (mph)</th>
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