



JetBlue Training Facility

Orlando International Airport, Florida


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Construction Management

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Presentation Outline

- Project Introduction
- 4D CAD Analysis
- Exterior Skin Redesign to Tilt-up Panels
- Redesign of Humidification System
- Conclusions

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Project Background

4D CAD Analysis

Exterior Skin Redesign

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Building Information

- **Occupant:** JetBlue Airways Pilots, Flight Crew, & Maintenance Personnel
- **Function:** Training Facility with 8 Full Flight Simulators, two cabin trainers, training pool, classrooms, and administration offices
- **Size:** 105,475 SF
- **Duration:** February 2004 – June 2005
- **Cost:** \$15 million
- **Delivery Method:** Design - Build

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Project Team

Owner
JetBlue Airways

Owner's Representative
Tishman Construction


Owner's Architect
Rubin & Rotman Associates

General Contractor
Suitt Construction Co.

Architects-Engineers
BRPH Architects – Engineers, Inc.

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4D CAD Analysis

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Why 4D CAD Modeling?

- JetBlue is an inexperienced builder
- Very broad schedule given to the owner
- Construction sequence not explained

Lack of confidence in the GC's ability to construct the facility on schedule

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Proposed Solution

- Construct a 3D Model in Autocad
- Combine it with the schedule
- Conduct a survey on the feasibility of 4D modeling early in the project

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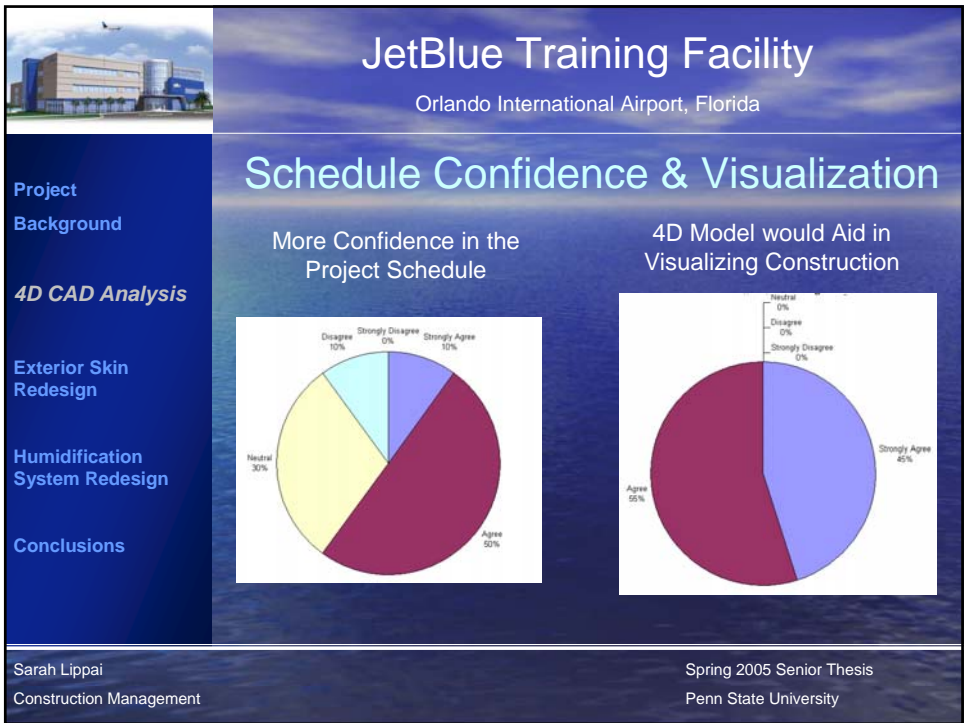
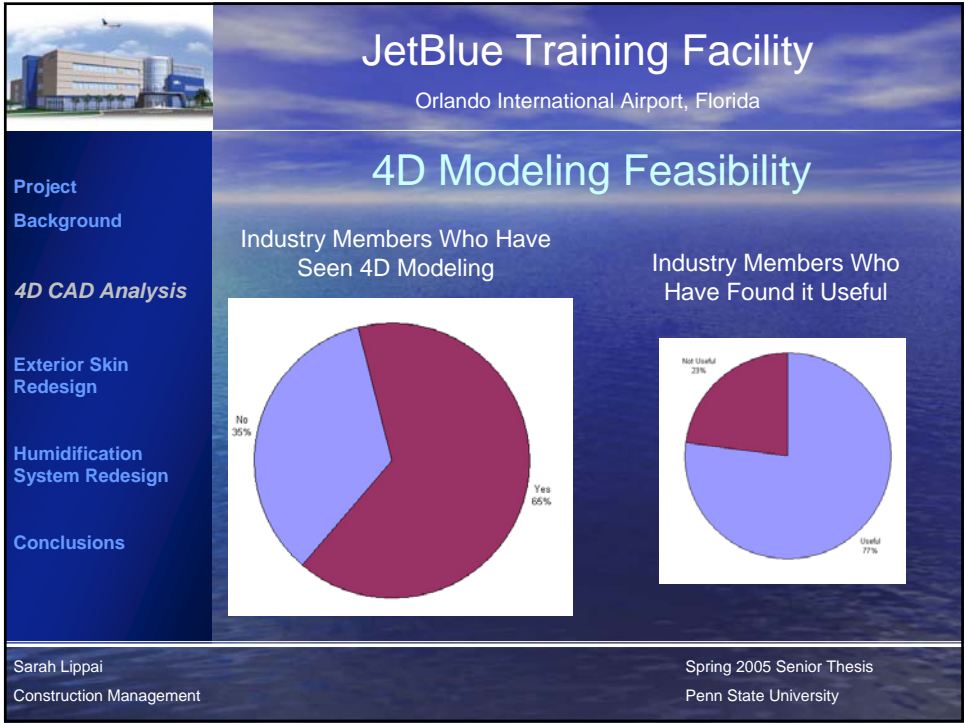
4D Model


4D Model Simulation

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Drawbacks of 4D Modeling

- Unfamiliarity of Software
- Industry members accustomed to 2D drawings
- Cannot provide the level of detail of 2D drawings
- Expensive software and training
- Developing models is time consuming

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Existing Facade

- 11" insulated precast concrete panels with exposed aggregate finish in simulator bay area
- 8" precast panels on north and south facades of administration area
- 4" architectural precast panels on 8" CMU block stair towers
- Aluminum composite panels on west façade incorporated with an aluminum storefront and curtain wall system

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Tilt-up Concrete Panels

- Given as an option in the RFP documents
- Popular technique in Florida area
- Resistant to weather conditions
- Relatively flat terrain
- Larger panels can be designed
- Quicker erection time

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Panel Sizes



- Panel Size in simulator bay area can be doubled
- Combination of many precast panels in administration areas

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Panel Thickness

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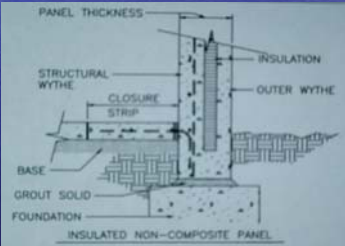
Conclusions

Simulator Bay Area

- 11" insulated non-composite panel

Administration Area


- 8" solid panel on north and south facades
- 5" spandrel panels on west façade



Insulated Non-Composite Panel

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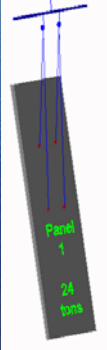
Exterior Skin Redesign

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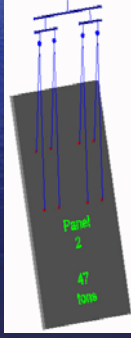
Conclusions

Panel Erection

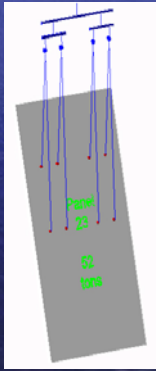
4-Point Lift



8-Point Lift




Max Lift



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Cost and Schedule

	Tilt – Up Concrete	Existing System
Cost		
<i>Material</i>	<ul style="list-style-type: none"> •Concrete affordable in Florida area •Equal in cost to Precast material 	<ul style="list-style-type: none"> •Masonry for stair towers and elevator shaft is very expensive
<i>Transportation</i>	<ul style="list-style-type: none"> •Cast-on-site •No transportation costs 	<ul style="list-style-type: none"> •Transportation from plant to site •Precast Plant not near site •Toll roads in Florida
<i>Crane and Labor</i>	<ul style="list-style-type: none"> •On-site less time 	<ul style="list-style-type: none"> •On-site longer
Schedule		
<i>Lead Time</i>	<ul style="list-style-type: none"> •Cast-on-site •No lead time 	<ul style="list-style-type: none"> •Long lead time •Fast-track project
<i>Erection Time</i>	<ul style="list-style-type: none"> •Number of panels decreased •Less erection time •Crane on-site less 	<ul style="list-style-type: none"> •Multiple systems •Many smaller panels

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Humidification System Redesign

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Existing Humidification System

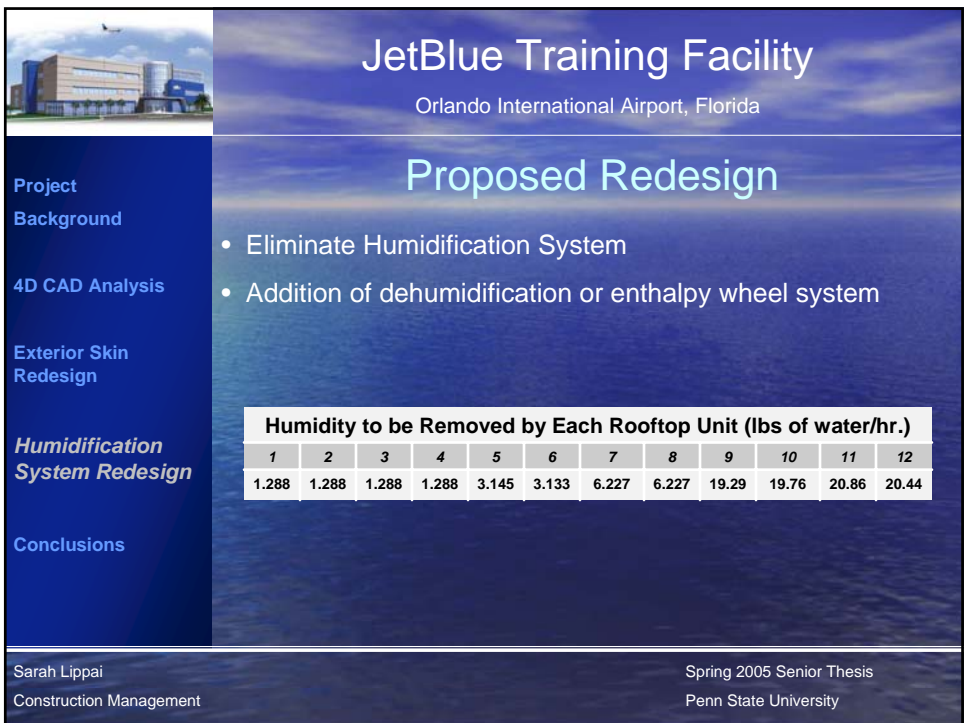
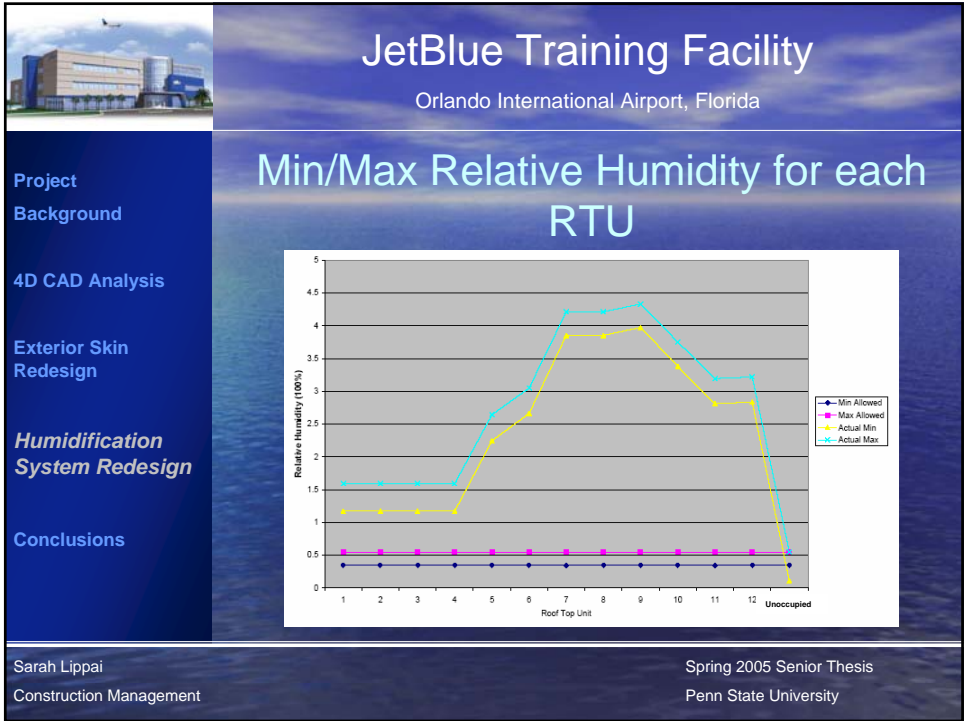
- Designated by simulator manufacturer
- 10 Armstrong Humidifiers
 - 59.9 – 229.5 lbs. of water/hour each to the building

Concerns

- Maintain 70 – 75 °F, RH 35 – 55%
- Occupancy of 500 students, faculty, and workers
- Humidity Levels in Orlando, FL

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Cost and Schedule Savings

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*Humidification
System Redesign*

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Project Costs:

- Material cost for 12 Armstrong Dehumidifier Units
- Material cost for humidity controls and supply piping
- Labor to install units and piping
- Lower training and maintenance costs

Schedule:


- No lead time on equipment
- Mechanical system installation time decrease
- Elimination of testing of equipment

Training and Commissioning

- Humidification system is difficult to maintain – eliminates training
- No testing of system
- No calibration

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Conclusions

4D Analysis

- Useful for visualization and building the owner's confidence in the schedule
- Not cost and time effective
- Difficult learning curve

Exterior Skin Redesign

- Tilt-up is a feasible option
- Faster erection time and cheaper transportation costs

Humidification System Redesign

- Eliminates cost and scheduling issues
- Dehumidification or enthalpy wheel system should be investigated

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Thanks to...








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• Dr. Horman, Dr. Riley, Dr. Messner, & Dr. Freihaut

Tishman Construction
• Carrie Macsuga


BRPH Architects – Engineers
• Jon Scott

My Family and Friends
• Dad, Mom, Luke & Alex
• Shawn, Michelle, Luke, Jason, & Jesse

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Laydown Locations



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Architectural Features

- Contemporary look with strong design elements
- Project a bright and airy image



Exterior Facade

- Precast concrete panels with exposed aggregate
- Aluminum composite panels in JetBlue corporate blue and grey
- Aluminum curtain walls and storefront system

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4D CAD Modeling

- **What is 4D CAD?**
 - Combines 3D Autocad Elements with the project schedule
 - Produces an image that aids in visualizing the schedule
 - Discovers:
 - Inconsistencies in the construction sequence
 - Potential time and accessibility conflicts

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Project Execution

During Initial Design:

- JetBlue worked with Tishman Construction, and Rubin & Rotman on the original design options
 - Rubin & Rotman from Canada
 - JetBlue located out of Buffalo, NY

Suitt Construction chosen as the General Contractor:

- Chose BRPH to act as the A/E to finish the design

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