

THE NEW DICKINSON SCHOOL OF LAW

University Park, PA

Steve Ayer

Construction Management Option



Thesis Presentation Slides

Submitted: Monday, April 14th, 2008

CPEP Website: <http://www.engr.psu.edu/ae/thesis/portfolios/2008/ska124/>

Faculty Consultant: Dr. Messner



Steve Ayer's Senior Thesis Presentation

THE NEW DICKINSON SCHOOL OF LAW

651Balter Road
University Park, PA

Option: Construction Management
Advisor: Dr. Messner

INTRODUCTION

The New Dickinson School of Law Building



Image Modified From: www.pennstate.edu

INTRODUCTION

▪ **Building Statistics**

- 113,000 SF
- LEED Certification
- \$60 Million
- Start: January 2007
- Finish: January 2009
- Elaborate Curtain Wall on South Face
- Curving Footprint
- Exotic Finish Materials

INTRODUCTION

▪ **Project Players**

- Owner: Penn State University (OPP)
- CM: Gilbane Building Company
- Architect: Polshek Partnership Architects
- Primary Engineers:
 - Robert Silman Associates
 - Flack & Kurtz

ANALYSES

- **3D Coordination Case Study**
- **Architectural Curtain Wall Redesign**
 - Architectural Breadth
- **Alternative Glazing**
 - Mechanical Breadth
- **Alternative Utility Tunnel Process**

3D COORDINATION

- **2-D: Old Process**
 - Inefficient
 - Unreliable
- **3-D: New Technology**
 - Virtually instantaneous clash detection
 - Locates every single clash (if modeled correctly)

3D COORDINATION



- **Coordination Case Study Questions**
 - Prior Experience
 - Modeling Time Expended
 - Field Clashes Found
 - Trades That Have Difficulty Modeling
 - Overall Feel For 3D Modeling



3D COORDINATION

- **Case Study Results**
 - No trade with especially high level of difficulty modeling
 - Varied experience levels
 - More time to model
 - Fewer field clashes





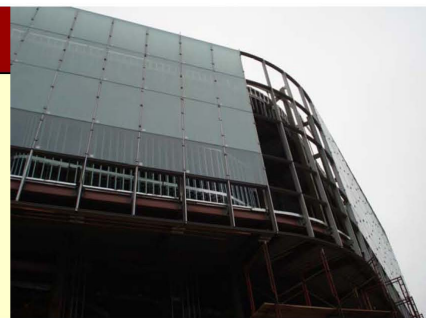
3D COORDINATION

- **Case Study Results**
 - "...get every contractor to participate from the start."
 - "I like to be able to show our employees a "real" picture of what they are getting into. It is so much easier to explain what something is supposed to look like."



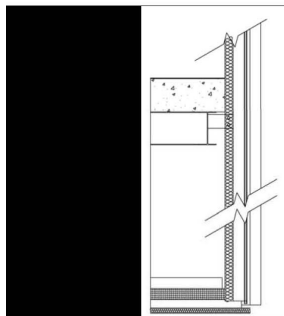
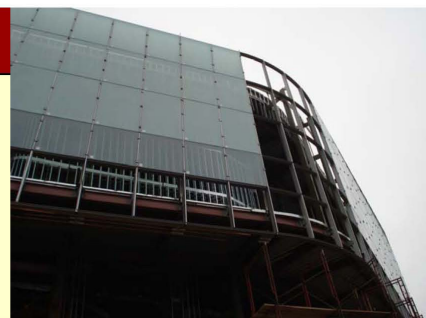
CURTAIN WALL REDESIGN

- **Current Design**
 - Curving Wall
 - Curved Glass
 - Changing Tilt



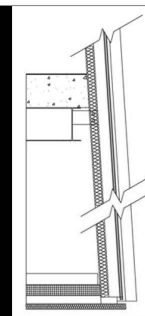
CURTAIN WALL REDESIGN



- **Redesign Options**
 - Flat Panes of Glass Instead of Curved
 - Eliminate 3° Tilt and Make Mullions Run Vertically and Horizontally



CURTAIN WALL REDESIGN


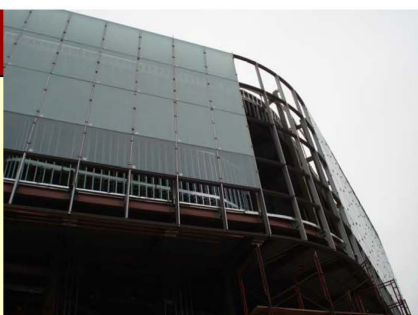
- **Remove Tilt and Run Mullions Vertically and Horizontally**
 - Easier Coordination
 - Rectangular Panes of Glass
 - Easier Construction
 - Easier Inspection



	<p>CURTAIN WALL REDESIGN</p> <ul style="list-style-type: none"> ▪ <i>Remove Tilt and Run Mullions Vertically and Horizontally</i> ▪ Lose Organic, Curving, Aesthetic ▪ Building Leans Backwards 	
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	<p>CURTAIN WALL REDESIGN</p> <ul style="list-style-type: none"> ▪ <i>Use Flat Glass Panes Instead of Curved</i> ▪ Easier to Fabricate ▪ Easier to Deliver to Site ▪ Easier to Replace 	
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	<p>CURTAIN WALL REDESIGN</p> <ul style="list-style-type: none"> ▪ <i>Use Flat Glass Panes Instead of Curved</i> ▪ Curving Wall Is Not As Sleek ▪ Location Affects Appearance <ul style="list-style-type: none"> • Appearance from Park Avenue • Appearance from in the Library 	
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	<p>CURTAIN WALL REDESIGN</p> <ul style="list-style-type: none"> ▪ Conclusions <ul style="list-style-type: none"> ▪ Eliminate 3° Tilt and Make Mullions Run Vertically and Horizontally <ul style="list-style-type: none"> • Saves \$1.1 Million • Detracts from the Rising Aesthetic ▪ Use Flat Glass Instead of Curved <ul style="list-style-type: none"> • Saves \$170K • May or May Not Be Noticeable Depending on where a Viewer Is. 	
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UTILITY TUNNEL

▪ ***Digging Utility Tunnel***

- Cost: \$0.5 Million
- Pros:
 - Relatively Cheap
 - Safe
- Cons:
 - Slow Construction (Process is Done Twice)
 - Inconvenient for Traffic

UTILITY TUNNEL

▪ ***Boring Utility Tunnel***

- Cost: \$0.8 Million
- Pros:
 - Convenient for Traffic
- Cons:
 - Cost
 - 6 Month Permitting Time Unaffected

UTILITY TUNNEL

▪ ***Conclusions***

- Pros:
 - Convenient for Traffic
- Cons:
 - Cost
 - 6 Month Permitting Time Unaffected

THANKS TO...

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> ▪ Mr. Stephen O'connor - Gilbane ▪ Mr. Jerry Shaheen - Gilbane ▪ Ms. Mary Mulligan - Gilbane ▪ Mr. Dwayne Rush - Gilbane ▪ Mr. Brian "Fishman" Horn - Gilbane ▪ Ms. Jessica "Ica" Dubler - Gilbane ▪ Mr. Darwin Appleby - Gilbane ▪ Mr. Gary "Groundhog" Rains - Gilbane ▪ Mr. Chad "Wiki" Illig - Gilbane ▪ Mr. Mike Rock - Gilbane ▪ Ms. Cathy Mulberger - Gilbane | <ul style="list-style-type: none"> ▪ Mr. M. Kevin Parfitt – Penn State ▪ Mr. Robert Holland – Penn State ▪ Dr. John Messner – Penn State ▪ Dr. Michael Horman – Penn State ▪ Dr. David Riley – Penn State ▪ Dr. James Freihaut – Penn State ▪ Dr. Richard G. Mistrick – Penn State ▪ Mr. Dennis Smith – Penn State O.P.P. ▪ Mr. Greg Clawson – Polshek Partnership Architects ▪ Ms. Kate Mann – Polshek Partnership Architects | <ul style="list-style-type: none"> ▪ Mr. Mike Croyle – Stone Valley ▪ Mr. Marty Finkle – Stone Valley ▪ Mr. Emory Lukacs – DM Products ▪ Mr. Jim Medonough – DM Products ▪ Mr. Eric Westergren – AEC Strategy ▪ Mr. Jody Bradley – Lighthouse Electric ▪ Mr. Chris Preisendorfer – Lighthouse Electric ▪ Mr. Jeff Dull – The Fairfield Company ▪ Mr. Charlie Nace – Triangle Fire Protection ▪ Mr. Travis Kerfoot – W.G. Tomko ▪ Mr. Peter Drake – Thornton Tomasetti ▪ Mr. Edward Bloom – Thornton Tomasetti ▪ Dr. Dudley McFarquhar – Thornton Tomasetti |
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