



# Washington Christian Academy



*Flagship Building & Gymnasium*

Penn State  
Spring 2008

**Casey Mowery** AE Construction Management



# Presentation Outline



- ❑ Project Introduction
- ❑ Project Overview
- ❑ Analyses Introduction
- ❑ Analysis Detail: Consequences of the English-Spanish Language Barrier in the Construction Industry
- ❑ Conclusions
- ❑ Q & A



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## Flagship Building

- ❑ School serves 300 K-12 students
- ❑ 3 stories; 67,600 SF
- ❑ Cost: 20.7 M (site & construction)
- ❑ Classrooms, Administration Offices, Multi-Purpose Cafeteria/Auditorium, Foreign Language Rooms, Science Labs, & Student Lounge



# Project Introduction

❑ Washington Christian Academy (WCA) phased construction project

❑ Location: 16227 Batchellors Forest Road, Olney, MD

- ❑ Campus to include:
- ❑ elementary, middle, and high schools
  - ❑ performing arts spaces
  - ❑ athletic facilities
  - ❑ chapel
  - ❑ outdoor sports fields



❑ Construction Schedule: January 2007-August 2008

❑ Construction Manager: Forrester Construction

❑ Architect: Grimm+Parker Architects

❑ Owner: Washington Christian Academy



## Gymnasium

- ❑ Separate building
- ❑ 1 story; 10,700 SF
- ❑ Multi-Sport Court, Bleacher Seating, Locker Rooms, Athletic Offices





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### Priorities:

1. Schedule
2. Cost & Quality

### Project Delivery Method: Design-Build

### Contract Types:

- Single Prime Contract: Neg. GMP
- ↳ Subcontractors: Lump Sum



# Project Overview

- **Construction**
  - Priorities
  - Project Delivery Method
  - Contract Types
- **Structure**
  - Envelope
  - Foundation
  - Superstructure
- Mechanical System
- Electrical System
- Emergency
- Local Conditions

### Structure



- Envelope: Standard Cavity Wall with Built-Up Roof
- Foundation: Continuous Cast-in-Place Wall Footings with 5" SOG
- Superstructure: CMU Load Bearing Walls with Steel Joists





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## Mechanical System

- 16 rooftop units; above average exhaust fans & condensing units for kitchen
- Supply: VAV fan powered terminal units, electric heat
- Ductwork: Insulated Sheet Metal

## Electrical System

- Power connection on other side of Batchellors Forest Rd.
- Classroom lighting fluorescent recessed luminaires

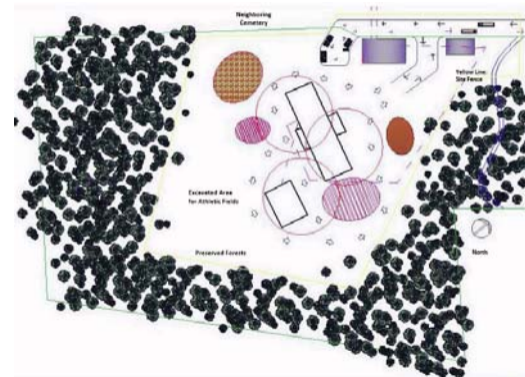
## Emergency System

- Annunciator panels & audio/visual smoke detectors
- Standard wet sprinkler system



# Project Overview

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- Electrical System
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## Technical Analysis: Utilization of Natural Light

- Incorporation of Daylighting in Classrooms
- Benefit students & reduce energy consumption, but only when lights are turned off



# Analyses Introduction

## Construction Management Critical Industry Research Issue

- English-Spanish language barrier in the construction industry today
- Inspired by the Partnership for Achieving Construction Excellence (PACE) Roundtable Event

## Technical Analyses

- Owner priority: Add value
- Pennsylvania Governor's Green Government Council
  - Utilization of Natural Light
  - Improved Acoustics
  - Improved Indoor Air Quality



## Technical Analysis: Improved Acoustics

- Redesign of Gymnasium Ductwork: Replace Sheet Metal with Fabric Duct
- Acoustical advantages will make the large space more comfortable for teaching activities

## 3<sup>rd</sup> Environmental Factor: Improved Indoor Air Quality

- Not analyzed in detail
- Adding advanced filtration or installing CO<sub>2</sub> sensors



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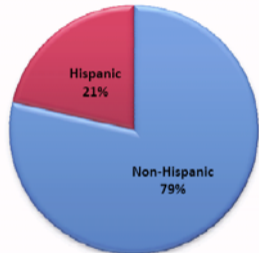
## CM Analysis





Research from the U.S. Census Bureau

## Hispanic Workforce in the Construction Industry



Data from 2004

Construction second only to agriculture

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# CM Analysis

Consequences of the English-Spanish Language Barrier in the Construction Industry

### □ Problem

The English-Spanish language barrier between general contractors, subcontractors, and laborers in the construction industry creates problems with efficiency, safety, and a general level of respect.

### □ Goals

- Determine status of barrier today according to research and industry member's opinions
- Identify the five leading consequences the language barrier creates
- Explore viable solutions to remedy the leading problems

Casey Mowery

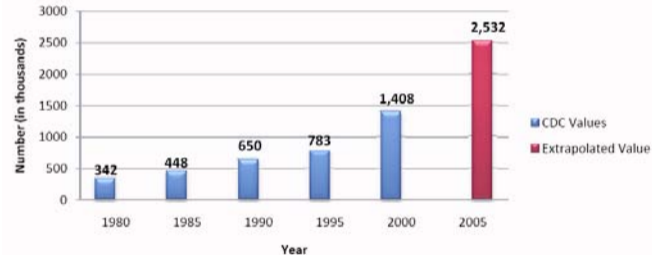
Penn State AE Senior Thesis

Construction Management

Research from the U.S. Census Bureau



## Number of Hispanic Employees in Construction, selected years 1980-2000



Hispanic influence on construction is growing fast





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Question Summary	Answer	Result (people)	Result (percent)
Does English-Spanish Language Barrier exist?	Yes	62	95.4%
	No	3	4.6%
Is it getting better or worse?	Better	21	35.0%
	Worse	39	65.0%
Are jobsite signs bi-lingual?	Yes	51	78.5%
	No	14	21.5%
Have you attempted to speak Spanish?	Yes	32	50.0%
	No	32	50.0%
Encounters with Spanish speaking industry members.	Never	2	3.1%
	Monthly	1	1.6%
	Weekly	6	9.4%
	Daily	55	85.9%



# CM Analysis

Consequences of the English-Spanish Language Barrier in the Construction Industry

- Survey Participants
  - Requirements
    - 3 years experience
    - currently working in the NE/Mid-Atlantic U.S.
    - result: 65 qualified response participants

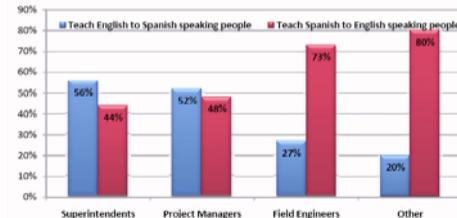
Job Title	Number of Participants	Percentage of Participants	Average Years Worked in Construction Industry
Superintendent & Asst. Superintendent	16	24.6%	21
PM, Asst. PM, Executive, VP	32	49.2%	15
Field/Project Engineer	12	18.5%	4
Other: estimator, drywall foreman, structural engineer	5	7.7%	10

Which do you think is more likely to happen?



Answer	Total (all participants)		Per Participant Category			
	Results ( ppl. )	Results (%)	Super (%)	PM (%)	F/P Eng. (%)	Other (%)
Teach English to Spanish speaking people	29	46%	56%	52%	27%	20%
Teach Spanish to English speaking people	34	54%	44%	48%	73%	80%

Result Summary per Participant Category





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# CM Analysis

Consequences of the English-Spanish Language Barrier in the Construction Industry

## Participant Reasoning

### Teach English to Spanish Speaking People

- ❑ Helps Spanish speaking people personally and professionally. Gives workers a competitive advantage for promotions.
- ❑ With only one English speaking foreman on site who may speak broken English, you are relying too much on someone who may not understand you.
- ❑ English is part of the American culture.

### Teach Spanish to English Speaking People

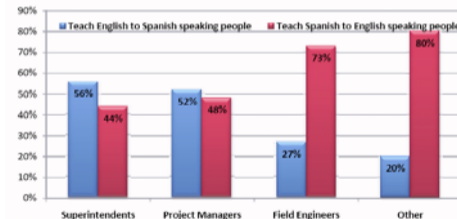
- ❑ Many Spanish speaking workers are illiterate or uneducated so they are less able to learn.
- ❑ English is more difficult to learn.
- ❑ It is important and valuable to be bilingual.
- ❑ GCs and English speaking managers have greater resources and capabilities to learn Spanish; plus there are less of them.

Which do you think is more likely to happen?



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1. **Difficulty in Giving Instructions**
2. **Greater Safety Risks**
3. **Loss of Productivity/Efficiency**
4. **Lack of Respect/Team Atmosphere**
5. **Other**

1. Lack of safety culture in Spanish speaking supervisors.
2. Prejudice between Spanish speaking and Non-Spanish speaking employees.
3. Tougher to develop casual relationships from which to build long term relationships.
4. Foremen promoted on language, not skill.



# CM Analysis

Consequences of the English-Spanish Language Barrier in the Construction Industry

Consequence	Total (all participants)	Super-intendents	Project Managers	Field Engineers	Other
Loss of Productivity/ Efficiency	22.4%	21.9%	22.6%	23.8%	19.5%
Greater Safety Risks	27.3%	29.1%	26.1%	27.5%	27.6%
Difficulty in Giving Instructions (Basic Jobsite Communication)	30.0%	29.8%	30.3%	30.3%	27.6%
Lack of Respect/ Diminished Team Atmosphere	17.9%	18.2%	16.7%	17.4%	25.3%
Other (Write In)	2.4%	1.0%	4.3%	1.0%	0.0%
<div style="display: flex; align-items: center;"> <div style="width: 20px; height: 15px; background-color: #4a7ebb; margin-right: 5px;">1<sup>st</sup></div> <div style="width: 20px; height: 15px; background-color: #e31a1c; margin-right: 5px;">2<sup>nd</sup></div> <div style="width: 20px; height: 15px; background-color: #800080; margin-right: 5px;">3<sup>rd</sup></div> <div style="width: 20px; height: 15px; background-color: #70ad47; margin-right: 5px;">4<sup>th</sup></div> <div style="width: 20px; height: 15px; background-color: #ffff00; margin-right: 5px;">5<sup>th</sup></div> <div style="margin-left: 5px;">Color Key</div> </div>					



## 5. Discrimination

- Discrimination between English and Spanish workers is a real and damaging problems. Managers have encountered slurs on the job site.
- Discrimination exists even within each language.
- Seems as though the two parties are competing to occupy the site; English speaking workers feel more entitled.



## Teach English to Spanish Speaking Industry Members

*Sed de Saber* (Thirst for Knowledge)

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# CM Analysis

Consequences of the English-Spanish Language Barrier in the Construction Industry

## Solutions

## Teach Spanish to English Speaking Industry Members



Dozens of answers...

Construction Companies offer Spanish Classes & Manuals

Virginia Tech Building Construction Department

*InterLingo*

- ❑ Internet video conferencing with native speaking instructor from Columbia.
- ❑ Dual teaching strategy of group presentations and personal one-on-one review.
- ❑ 3 hrs/week for 6 weeks



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The English-Spanish language barrier does exist and it affects the progress and success of a project.

- 95% participants agree
- U.S. Census Bureau

#### Top 2 Consequences:

- Difficulty in Giving Instructions
- Increased Safety Risks

These consequences are serious and need to be remedied

Industry divided over teaching

- English → Spanish or
- Spanish → English



# CM Analysis

Consequences of the English-Spanish Language Barrier in the Construction Industry

## Conclusions

- The industry is already using and investing in successful methods to teach Spanish to English speaking members.
- In my opinion, more innovative techniques and efforts will be needed to teach English to Spanish speaking workers.

*I think Ms. Acevedo will be sharing some of her ideas and products to address this in the next presentation.*



My Opinion:

Regardless of what people would *like* to happen, currently teaching Spanish to English speaking people is the

- path of least resistance,
- most cost efficient, and
- most likely to succeed.

Company offered classes are not enough, management students should be taught in college when they are already in a learning-conducive environment.

## Acknowledgements:

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- ❑ Forrester Construction Company, especially
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