

Project Costs & Investments

Institute for Facilities Management
Nashville, TN



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Core Description

401 Project Costs & Investments APPAU201909H

Facilities management professionals are constantly challenged on the cost of construction and improvements. This session reveals the reasons behind the high cost of higher education construction by breaking this issue down into its component parts. The session also explores how capital projects are typically funded and the challenges with making total-cost-of-ownership based project decisions.

Faculty: Sadie Greiner

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Learning Objectives

1. Learn the reasons for higher education construction costs.
2. Learn how capital projects are funded.
3. Learn the challenges with total cost of ownership based projects.
4. Discuss the challenges of construction and improvements.

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Why does it cost so much??

High Compared to What?

Frame of reference



High Compared to What?

Compared to residential construction



High Compared to What?

Compared to commercial construction



Comparisons Are Not Valid

- **Residential** – Designed and built for light traffic and medium life, high importance placed on aesthetics
- **Commercial** – Designed and built for medium traffic and short life, high importance placed on function
- **Institutional** – Designed and built for heavy traffic and long life, high importance placed on aesthetics and function

Bottom Line...

Costs for campus projects rank among the highest in the market...

Bottom Line...

Costs for campus projects rank among the highest in the market...

...and would we want it any other way?

Bottom Line...

These higher costs are by and large a reflection of sound total-cost-of-ownership decisions being made.

Total-Cost-of-Ownership

What do we mean by total-cost-of-ownership?

Total-Cost-of-Ownership

What do we mean by total-cost-of-ownership?

TOC = Total Project Cost (D+C+F) +
Operating Costs + Capital Renewal or
Deferred Maintenance + Decommissioning

Cost vs. Investment

Higher capital investments can lower the total-cost-of-ownership.



China invents value engineering.

Cost vs. Investment

Higher capital investments can lower the total-cost-of-ownership.

Many incremental investments we make in a capital project yield attractive savings.

Cost vs. Investment

Higher capital investments can lower the total-cost-of-ownership.

Many incremental investments we make in a capital project yield attractive savings.

Therefore a higher project investment may be in the best interest of the institution's bottom line.

Why the High Cost?

How do you fit these marbles into this jar without increasing the size of the jar, reducing the number of marbles, or breaking the marbles.



Why the High Cost?

- 🌐 Sense of Place
- 🟡 Codes, Regulations & Standards
- 🔴 Complexity
- 🟣 Institutional and Statutory Requirements
- 🟢 Time Pressures
- 🟦 Maintainability, Sustainability & Longevity

🌐 Sense of Place

Institutional Vision

Our institutions choose to build above the baseline



Institutional Vision

The physical environment creates the visual and tangible image of our institutions



Institutional Vision

In short, the facilities we construct reflect the vision and aspirations of the institution



Image Comes at a Price

Institutions are competing for national and international recognition



\$71 million, 149,000 gsf



\$28 million, 152,000 gsf

Image Comes at a Price

Institutions are competing for national and international recognition



\$71 million, 149,000 gsf
\$476/gsf



\$28 million, 152,000 gsf
\$184/gsf

Marketing

Noel-Levitz and Carnegie Foundation studies reveal the impact the physical environment has on prospective students

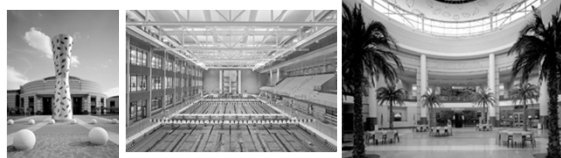


Marketing



Marketing

As students increasingly select colleges based on what they can see, colleges will spend more money on that which can be seen.



Excerpted from: "Forget the Classrooms: How Big Is the Atrium in the New Student Center?"

The Chronicle of Higher Education: July 11, 2003

Marketing

Rigor in the classroom and intellect in the faculty cannot easily be seen – certainly not as easily as a fitness center or a three story granite fireplace.

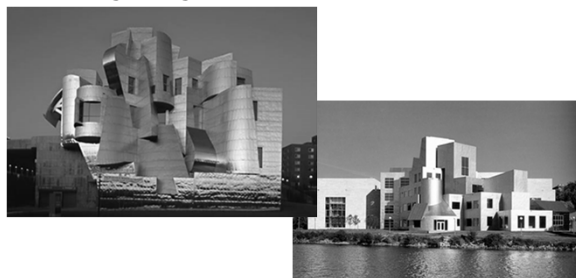


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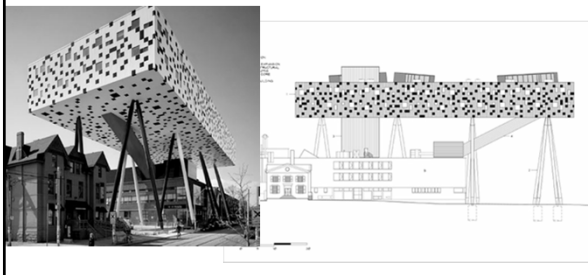
Architectural Character

Building designs make statements



Architectural Character

Building designs make statements



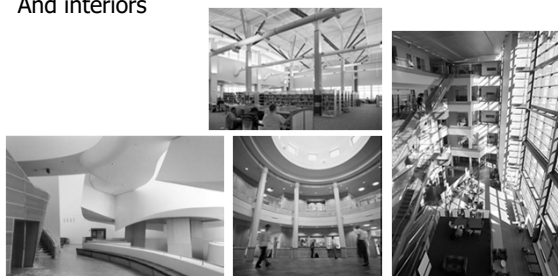
Architectural Character

Both exteriors



Architectural Character

And interiors



Quality is in the Details



Quality is in the Details

Prominent entrances



Commercial Entrance



Institutional Entrance

Quality is in the Details

Hidden downspouts



Exposed Galvanized Gutters



Concealed Copper Gutters

Quality is in the Details

Buried utilities



Quality is in the Details

Screened trash receptacles



Commercial: Chain Link



Institutional: Masonry

Quality is in the Details

Underground/screened cooling towers



Quality is in the Details

Underground/screened cooling towers



Quality is in the Details

Discrete service access



Quality is in the Details

Public Art



Quality is in the Details

Site amenities



Quality is in the Details

Intensive & extensive landscape



Preservation of Land



Preservation of Land

Importance of green space



Preservation of Land

Optimizing building footprints



Preservation of Land

Cost of building upward



Quality Comes at a Price

We are not just building structures...
...we are creating a “sense of place”



🟡 Codes, Regulations & Standards

Gathering Places

Large assemblies drive our facilities into a
higher level of life safety design



Gathering Places

Code requires rated corridors, stair towers, fireproofing, fire alarm systems, sprinklers and smoke evacuation systems



Legislative Mandates

Federal, state and local regulations add cost burdens to our facilities

- Asbestos abatement
- Hazardous waste removal
- Storm water runoff
- Air quality control
- Dust, noise & vibration controls



Universal Design

Universities facilities must not only be compliant with ADA, but are increasingly expected to go well beyond the minimum requirements.



HVAC Standards

Labs are intensive energy consumers



HVAC Standards


Classroom and assemblies are also intensive



HVAC Standards


Ventilation requirements drive up the size and cost of mechanical systems







Complexity


Complex Facilities





Sophisticated research facilities



Complex Facilities



High occupancy and specialized venues



Complex Facilities

Intensive technological environments



Complex Mechanical Systems

Designed for extreme conditions

Hottest and coldest temperatures

Humidity extremes

Strictest controls

Highest occupancy

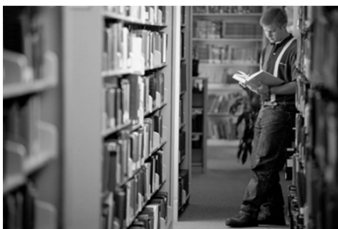
Fault detection

Measurement and
verification



Structural Loading

Heavy floor loadings



Structural Loading

Column-free spans



Mixed Use Facilities

Combine classrooms, laboratories, meeting rooms and offices under one roof



Access & Security



Institutional & Statutory Requirements

Statutory Requirements

Procurement Statutes
Prevailing Wages
Project Labor Agreements
MBE/DBE/TSB Programs
Insurance
Bonding



Institutional Constraints

“Protected environment” of the campus



Institutional Constraints

Minimize campus disruptions



Challenging Logistics

Restricted building sites

Commercial Site



Campus Site



Challenging Logistics

Limited access & staging space



Challenging Logistics

Restricted construction traffic



Challenging Logistics

Complex phasing schemes



Additional Requirements

Noise restrictions



Additional Requirements

Noise restrictions
Fencing and protection



Additional Requirements

Noise restrictions
Fencing and protection
No Parking



Additional Requirements

Noise restrictions
Fencing and protection
No Parking
No Smoking



Additional Requirements

Noise restrictions
Fencing and protection
No Parking
No Smoking
Litter-free, weed-free work site



Additional Requirements


Noise restrictions
Fencing and protection
No Parking
No Smoking
Litter-free, weed-free work site
Full time supervision




Additional Requirements

Noise restrictions
Fencing and protection
No Parking
No Smoking
Litter-free, weed-free work site
Full time supervision
Elevated safety expectations









 **Time Pressures**

Time Constraints

Immovable completion dates
Compressed construction windows





 **Maintainability, Sustainability
& Longevity**

Stewardship

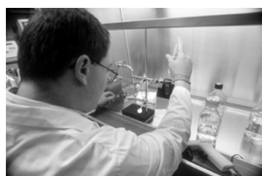
Designing for low life cycle cost requires higher initial investments:



Stewardship

Designing for low life cycle cost requires higher initial investments:

Energy efficiency



Stewardship

Designing for low life cycle cost requires higher initial investments:

Energy efficiency
Maintainability



Stewardship

Designing for low life cycle cost requires higher initial investments:

- Energy efficiency
- Maintainability
- Long life



Stewardship

Designing for low life cycle cost requires higher initial investments:

- Energy efficiency
- Maintainability
- Long life
- Adaptability



Adaptability

Overbuilt utilities and utilities pathways necessary for flexibility and growth



Adaptability

Increased floor to ceiling heights lower future renovations costs



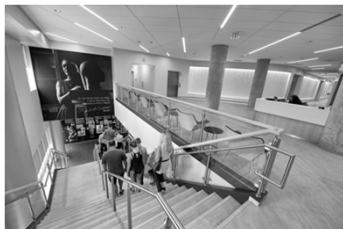
Durability

Campus facilities subjected to frequent cycles of use



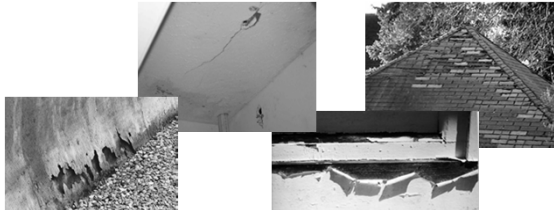
Durability

Durability important component of doors, hardware, carpeting, restrooms, furniture, etc.



Durability

Much of our deferred maintenance backlog is due to short-sighted life cycle decisions



Reliability

Reliable electrical and mechanical systems are essential to our institutional missions



Reliability

Higher cost for providing emergency power, redundancy, generators, UPS systems, and centralized utility systems



Sustainability

Higher education is “LEED”ing sustainable design efforts



Sustainability

Higher education is “LEED”ing sustainable design efforts

- Managing construction waste
- Renewable-sourced building products
- Porous pavements
- Green roofs
- Gray water systems
- Other



Evaluation Reminder



“There's no time for thinking. We have to make a management decision.”

A Postscript

What About Renovations?

Renovations

Often modifying existing conditions is more expensive than starting new



Renovations

Often modifying existing conditions is more expensive than starting new

We find this to be true with ADA compliance



Renovations

Buildings built just a generation ago may not have the infrastructure for today's renovations



Renovations

Investments in renovations must often be made to correct the “sins of the past”



Renovations

Renovations magnify the perception of high cost because they commonly fall in the realm of personal expenditures... thus heightening the “sticker shock” experience

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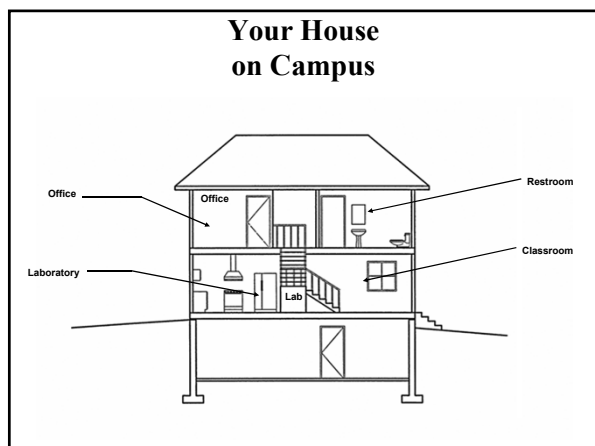


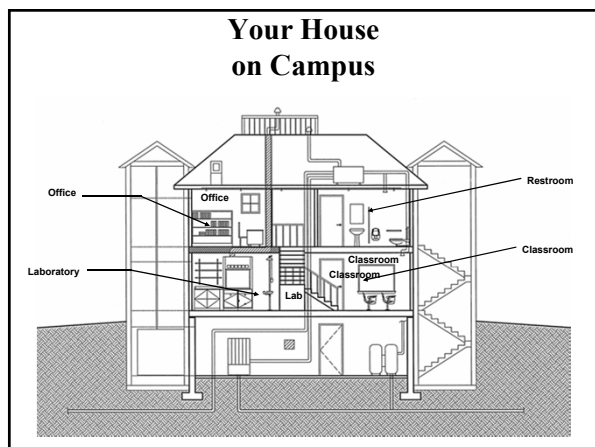
Renovations

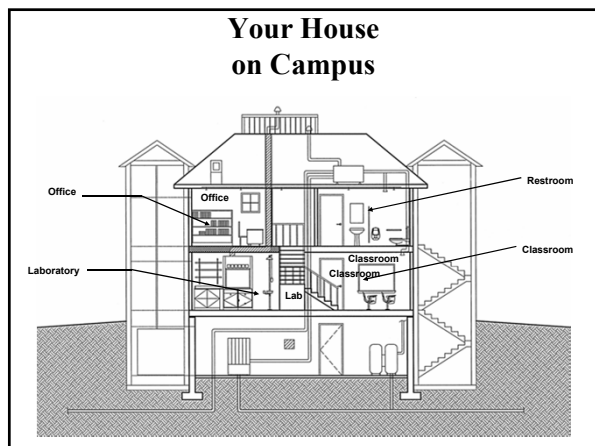
Inevitably, comparing institutional renovation costs to residential housing investments...

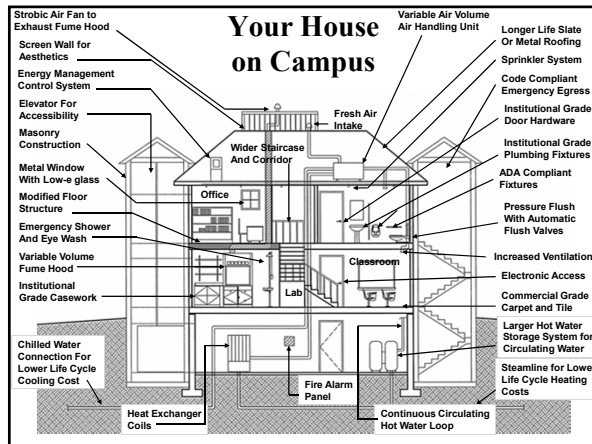
Your House











Why the High Cost?

Why the high cost?



Why the High Cost?

Why the high cost?

-  Sense of Place
-  Codes, Regulations & Standards
-  Complexity
-  Institutional and Statutory Requirements
-  Time Pressures
-  Maintainability, Sustainability & Longevity

In Summary...

- Stewardship demands a long term view of project investment decisions
- Investments are made with total-cost-of-ownership as our compass
- Excellence is in the details - thousands of cost additive details
- Construction costs mirror institutional values, demands and aspirations

This concludes The American
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