



2008
Seminars on Sustainability:
SOS for the
Environment Conference
of the Detroit Chapter of the
American Society of Heating Refrigerating & Air Conditioning Engineers

Design Build for
Green Buildings:
Integrated
Delivery of an
Integrated Idea

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CENTER FOR SUSTAINABILITY

Program Overview

- Sustainability
- Design-Build
- Key Factors
- Key Objectives
- Key Concerns
- Risk Identification
- Risk Management
- Some Tools

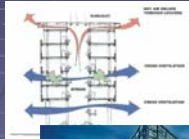
What is Sustainability?

- 'Sustainable development involves...meeting the needs of the present without compromising the ability of future generations to meet their own needs.'
- Reshaping the Built Environment Ecology, Ethics and Economics - Edited by Charles J. Kilbert Island Press, Washington, D. C. USA 1999



For the built environment

Green buildings



Sustainable



Development

What distinguishes 'sustainable' from normal design?

Sustainable...

- ...**more** energy efficient
- ...**reduced** resource demand
- ...**healthier** indoor environment
- A "better" building...

Performance metrics

- **Energy use**
- **Resource use**
- **Environmental Quality**
- **Operating expenses**
- **Certifications**

Sustainable design...

- ...is based upon traditional design and construction techniques.
- ...goes 'beyond' the normative design practice.
- ...goes beyond typical construction and construction management practice.
 - *in workmanship*
 - *in management*
 - *in procurement*

Yes?...No?

Remember!

Sustainable Buildings are...

- **... "better buildings"!**
 - **more energy efficient;**
 - **reduced resource demand**
 - **healthier indoor environment.**

What is Design-Build?

- **The Design|Build entity...**
 - ...holds all the contracts.
 - ...bears performance risk.
 - Design & Workmanship
 - ...bears cost risk.
 - **The Owner gets..**
 - ...a single point of responsibility
 - **..and expects to..**
 - ...save time and money.
- Sounds Good !**

Why do it?

Good Points

- **Responsibility**
 - Single point
 - No "finger pointing"
- **Cost Estimates**
 - Better & earlier
- **More cost effective**
 - Design Coordination
 - Constructability
- **Change Orders**
 - Less friction between Design & construction
 - Eliminated!!! (theoretically)

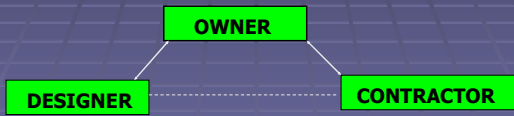
Bad points

- **Potential for poor team chemistry**
- **Less "competition"**
- **More complicated insurance and performance bond issues**
- **No inherent 'checks and balances'**

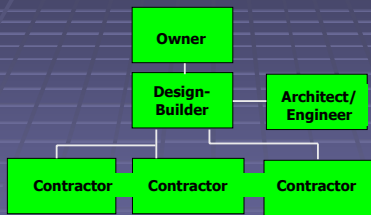
Who represents the Owner?

Getting it done

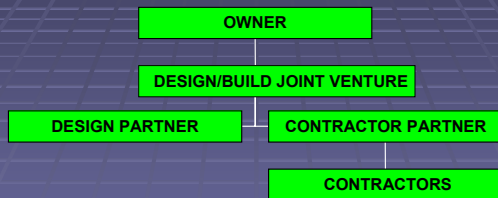
Traditional
Design/Bid/Build
Project Triangle



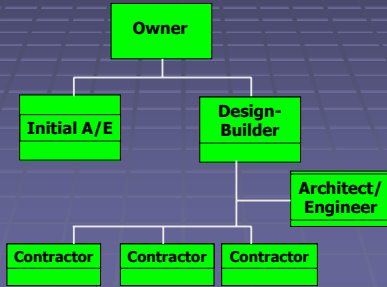
Design-Build Structure Design as Consultant



Design-Build Structure Joint Venture



Design-Build Structure Design as Subcontract with 'Bridging' Designer

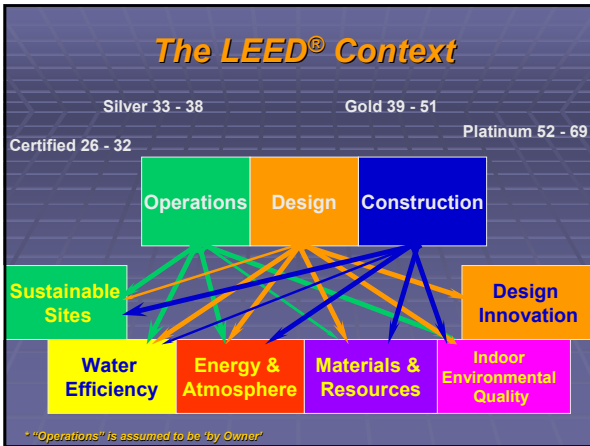


Variations upon the theme

- 'Pure' Design-Build - a single entity
- EPC/CM - sole source capability.
 - With 'captive trades' - typically 'construction first'
 - Without trades - typically 'design first'
- Joint Venture
 - on-going enterprise or 'project specific'
 - Each an agent of the other
 - each legally responsible for 'venture' liabilities.
 - Limiting liabilities
 - "Negotiated" JV (from Owner's shortlist)

Necessary Ingredients

- Aligned Purpose
- Proper Skills
- Financial Stability
- Front-end Planning
- Appropriate Design
- Fair Contracts
 - Dispute Resolution
- Defined Goals
- Team Chemistry
- Scope Definition
- Acceptance Criteria



The Objective?

High Performance Buildings...

- **...go beyond...**
 - ... 'typical' design practice;
 - ... 'typical' construction practice.

... are "better" buildings!

*But better than what?
Better how?
How much better?*

The Implications of 'high performance'

High performance means...

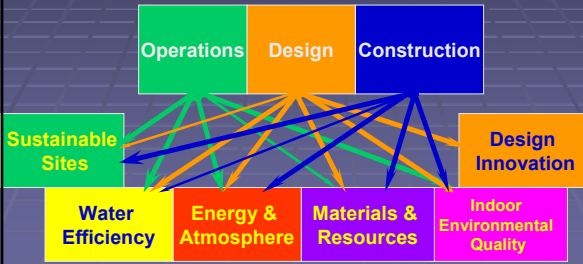
- ...lower operating costs;
- ...better environment;
- ...higher market value.

*If performance is not met
what is the impact on 'value'?*

Delivering Green Buildings

Integrated Team Approach

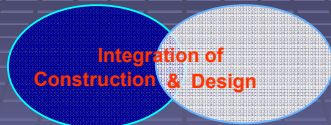
Defined Acceptance Criteria



* "Operations" is assumed to be 'by Owner'

So Why Design-Build Green?

Design-Build:



...but is DB
 $\frac{\text{Cost}}{\text{Quality}}$

Green Buildings:



Is GB
 $\frac{\text{Quality}}{\text{Cost}}$
 and where's
 the Owner??

...and Certification = Acceptance Criteria!

The Risk Picture

Design-Build entity is responsible for...

- **Cost**
 - Commodity Price Fluctuations
 - Concrete, steel, copper, etc.
- **Schedule**
 - Contractual guarantees
 - Financing
 - Move-in/Move-out; "a date certain"
- **Performance**
 - Output guarantees
 - "take or pay" contracts
- **Other**
 - Site-specific
 - Logistics
 - Safety

The Risk Picture

With Green Buildings...

- Additional risk of certification
 - or failure to achieve
- Risk of performance

Can create "downstream" damages like...

- ...increased operating costs;
- ...loss of tax credits;
- ...loss of zoning preference;
- ...loss in value.

Concerns

"Expectations" vs. "Intent"

- Integrity of "design intent"

Cost

- Product substitutions

Schedule

- Delivery & Lead time
 - Product sourcing

Owner vs. Design|Build

▪ RFP vs. Proposal

- Products & Materials
- Techniques
- Certifications

▪ Who 'approves'?

▪ The battle over the 'float'

Balancing...

- Cost vs. Schedule vs. Certification

"Green" Concerns

Product substitutions

- Due to pricing, availability, interruption
- Product "compatibility"
- Defective workmanship claim?

(Sub)contractor defaults

- properly skilled/experienced replacement
 - "suitable"
- Failure to replace in a "timely fashion"
 - Potential delay or LD costs.

*...and then there is
the "Performance" issue*

- *Sustainability can only be measured or evaluated effectively over time!!!*
 - *Contractual targets introduce risk.*
 - *Failure to meet the targets triggers liability.*
- *Sustainability = performance over time*
 - *Design & Construction 'time' is fixed.*
 - *Operations/Ownership is on-going.*
- *How does the design\construction team mitigate the impact of owner performance?*

Risk – Transfer and Mitigation

- *Performance – 'actual' versus 'modeled'*
 - *How good is the model? (GIGO!)*
 - *How is performance measured.*
 - *What if performance falls short?*
- "Guidelines" and/or criteria for...*
- *Design?*
 - *Construction?*
 - *Operation to verify proper usage?*

Establishing Performance Targets

*Establish 'reasonable' performance targets
Design Builder...*

- *...expect some owner 'misbehavior'*
 - *Don't expect 'best case' scenarios*

Owners...

- *understand industry 'norms'*
 - *including first cost.*

Owners...

Consider a 2 step process.

- **Perform a benchmark analysis**
 - (on a 'T & M' basis)
 - Understand the 'typical', the 'possible' and the 'probable'
 - Once set, shift to a fixed fee or lump sum contract
- **Consider performance bonds to cover remedial work.**

Designers...

- **Original input, assumptions and criteria determine the final design solutions**
 - can be used as a basis to measure operations performance.
 - Include some weather data 'basis' and acceptable deviation
- **Design to facilitate monitoring, modeling and optimization.**

A New Framework?

- **Indemnification**
 - May not be possible.
- **Limits of Liability**
 - ...against on-going "operating costs"
 - ...from 'consequentials' of marketplace
 - "diminution of value"
- **The 'influence' of 'specialty' consultants**
 - Energy modelers
 - Commissioning Agents
 - "green" consultants

A New Framework

Provisions for...

- **Product Substitutions**
- **Replacement (sub)contractors**
 - *Skillset and/or experience*
- **Critical Schedule ("a date certain")**
 - *Option to waive certification requirements*
 - *financial impacts???*
 - *Option to convert to "EB"*
(build now; certify later)
 - *compensation for 'extended duration' costs??*

Dealing with the Big "P"

Performance

- **Enhanced "Turn Over" Program:**
 - **Beyond traditional operating manuals.**
 - *includes methods, modes and schedules of operation*
 - **Maintenance guidelines:**
 - *require training, re-training and sign-off*
 - *Video???* "Fault Tree Analysis"

Dealing with the Big "P"

If a dispute over performance arises...

- **"Right to Audit" (and monitor?)**
 - **BAS records**
 - *Use the BAS to track compliance*
 - *Data Logging, Trending and Retention*
 - **Bills**
 - **Maintenance Records**

For you Owners...

Success depends upon...

- *the clarity of scope...*
 - *consider 'bridging' approach*
- *the quality of the bidders...*
 - *cost is not always best metric*
- *the balance between 'involvement' and 'interference'*
 - *guard against creating 'impossibility' defense*
- *understand what you are getting*
 - *and treat it right!! Monitor and maintain*



*Questions?
Thank You*

Have a great day!



Bonus Tracks!!

The Standard of Care

If a firm is a 'green' firm and

- ...green = better buildings...

What is the Standard of Care...

...for a green project?

- ...for other projects at that firm?

?

- What is the Standard of Care for the area?

- What happens to 'non-green' firms?

?

Implications to the Process

- **Time**

- The duration of the project; not post-occupancy!

- **"Completion"**

- at "Beneficial Occupancy"

- (possibly validation or certification – hospitals, pharma)

- **3rd Party Certification**

- Code compliance

- 'static' – 'snapshot'

- **Operations!!!???**

- Typically not addressed - Your Mileage May Vary!!!

Other Impacts on the Practice

- **IDP – Integrated Delivery Process** : 'binds' participants in a manner yet uncharted

- (i.e. AGC Consensus Docs, Project Alliance agreements)

- **"Carbon 2030 Challenge"**

60% reduction in carbon footprint by 2010.

2030
Challenge

- **BIM execution**

- Integrated documentation and integrated delivery

Challenges to Sustainability

- Balancing Economic Pressures and Technological Possibilities
 - Guard against 'overstating' capabilities
 - "Underpromise" and "Overdeliver"
- Focus on performance and not 'medals'
- Rating systems help to...
 - Align thinking
 - Create common language
- But!
- Too much "alignment" can lead to 'group think'
 - thinking only 'on the checklist'

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New Approaches are Required

- Project specific targets and set time period.
- 'Reasonable' goals relative to costs and 'complexity';
- Include criteria for operations & maintenance
 - facilitate 'best use';
- Performance measured over time;
- Evaluating the impact of operation relative to design relative to construction on the overall achievement of the sustainability targets will be critical to evaluating the long term performance.

Performance measurements will control 'value' perception.

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