THE INTEGRATION OF VIRTUAL DESIGN AND CONSTRUCTION
The Convergence of Process and Technology
• Moderators:
  Greg Gidez AIA, DBIA
  Director of Design Services
  Hensel Phelps
  Architect/Builder
  John Tocci Jr.
  Director of VDC
  Gilbane
  Builder/Technologist

• Panelists:
  Kelly Cone, AIA
  Director of Innovation
  Beck
  Architect/Builder

  Denton Wilson
  Methodist Hospitals
  Owner

  Thai Nguyen
  Corporate VDC Manager
  Hensel Phelps
  Builder/Technologist

  Marco Vidali Castillo
  BIM Director
  ICA
  Builder/Technologist
Consider the momentous event in architecture when the wall parted and the column became.

Louis Kahn, Architect
Neolithic Period

- For shelter
- Rituals
- Local materials and labor
- Unskilled craft
- Primitive stone and bronze tools
Copper and Bronze Age

• Egyptians
  o Professional labor
  o Respected professionals
  o Drawings on clay tablets
  o Primitive hoisting technology

• Greeks
  o Stone columns and lintels
  o Pulleys, jibs and cranes
  o Survey skills
  o Recognition of the architect
  o Skilled labor
Romans

- Organization of Labor
- Hydraulic lime mortar
- Concrete
- Arches
- 100 ton cranes
- Technology
- Trade guilds
- Slaves
- Speed of construction
Dark Ages – Western Europe

- Loss of construction technologies
- Loss of knowledge
- Loss of organized labor
- Religion as a unifying labor element
- Feudal societal organization
Medieval
Romanesque thru Gothic

- Brick, stone
- Master crafts with apprenticeship
- Paid, skilled labor
- Fortifications and religious bldgs.
- Drawings on parchment or tracing floor
- Pile driver around 1500
- Tall spaces, thin walls, flying buttresses
Renaissance

- Water powered timber mills
- Fired bricks, standards for size
- Early use of iron
- Rebirth of architect, classical design
- Guilds of paid craftsmen
- Patrons from the mercantile class
17th, 18th, 19th centuries

- 17th century
  - Plate glass
  - Plumb bob, squares, level, drafting compass

- 18th century
  - Cast/wrought Iron hangers, columns, machine cut nails
  - Imported materials

- 19th century
  - Steel, transportation,
  - Engines
  - Large capital projects
  - Elevators 1852

- AIA 1857 – elevates the profession
  - 1889 – Louise Bethune, 1st woman architect in AIA
  - 1888 Standardized contracts
Industrial Revolution

- Mass production
- Decorative architecture
- Steel wire
- Bessemer steel
- Engineering
- AGC 1918
20th century - Divergence

- Elevators
- Skyscrapers
- Curtain wall
- Life Safety Codes
- Age of Associations
- Separation of Services
- Spearin Doctrine
- Unions
- Davis Bacon
- Job Safety
- Adversarial relationships
- CAD
- BIM Forum 2005
Tools of the trade

Ink on linen
Etch-a-sketch, graphite
T Square, mylar, plastic leads, Sepias, wash-off’s
CAD to BIM to VDC

Lead on parchment
Scratches on slate
Stick in the dirt

Design Evolution
Tools of the Trade

Kneaded Erasers
Blueprints
Labor Intensive
Early CAD

Intergraph Workstation
Visualization, Problem Solving Tools
Building Models with Intelligent Information
Disrupters to 20th c.
Design and Construction Methods
Computational/Parametric Design
Design to Fabrication

- Labor
- Deliverables
- Contracts
- Fee
- Structures
- Risk
Field Mobility
Mobile Apps
New Generation of Workers
Data Driven Analytics
Cloud Driven Transformations
Reality Capture
How can the project delivery strategy influence the application of technology?
and Finally.......  
Incentives to integrate?  
What are they?  

Owner  
Architect  
Engineer  
Trades  
Suppliers  
Builder  
Operator  
Finance  
Users  

VDC

CONVERGENCE OF PROCESS AND TECHNOLOGY
That's all Folks!