Measurement Science Needs for Advancing Infrastructure Delivery Workshop

Cross-cutting and Common Themes

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May 19, 2010

CH2MHILL

Themes

- Infrastructure at CH2MHILL
- Standardization – Data, Design, Function
- Sustainability
- Modularization, Prefabrication
- Regulatory Compliance, Permitting Interface
- Energy Management
- Productivity Measurement

CH2M HILL

Organizational Units

Business Groups

Facilities and Infrastructure

- Water
- Transportation
- Industrial and Advanced Technology
- Operations and Management

Government, Energy and Nuclear

- Government Facilities and Infrastructure
- Environmental Services
- Nuclear Services

Energy

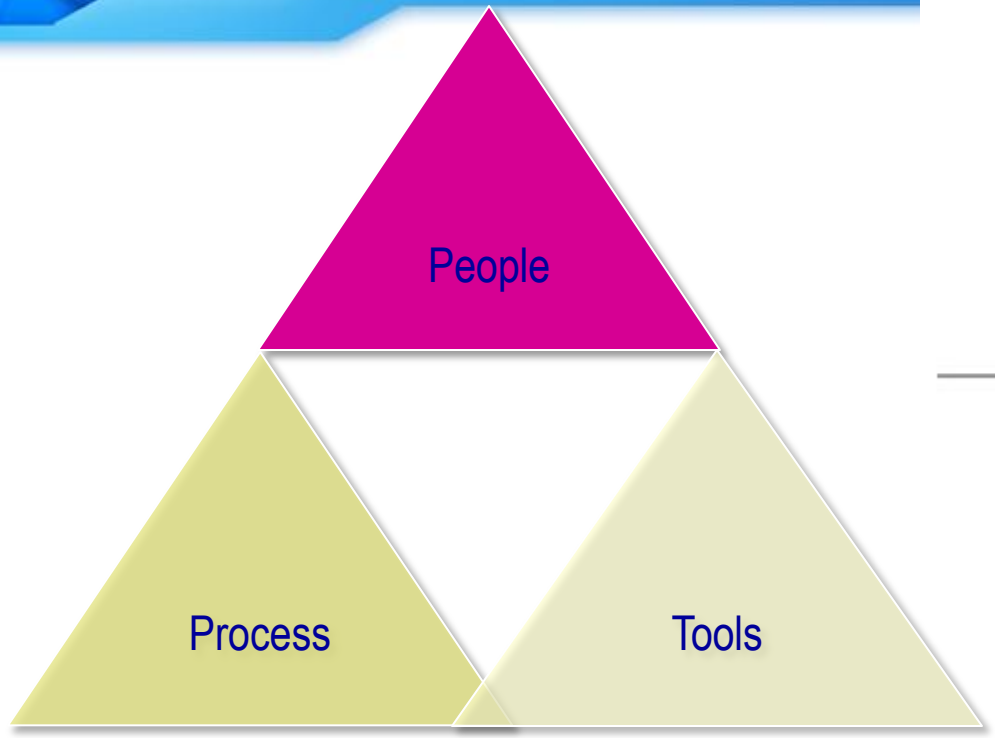
- Energy & Chemicals
- Industrial Systems
- Power

CPE

- Center for Project Excellence

CH2M HILL Maintains a Diverse Business Portfolio

Balance of People, Process and Tools is Essential for Deployment and use of Technology



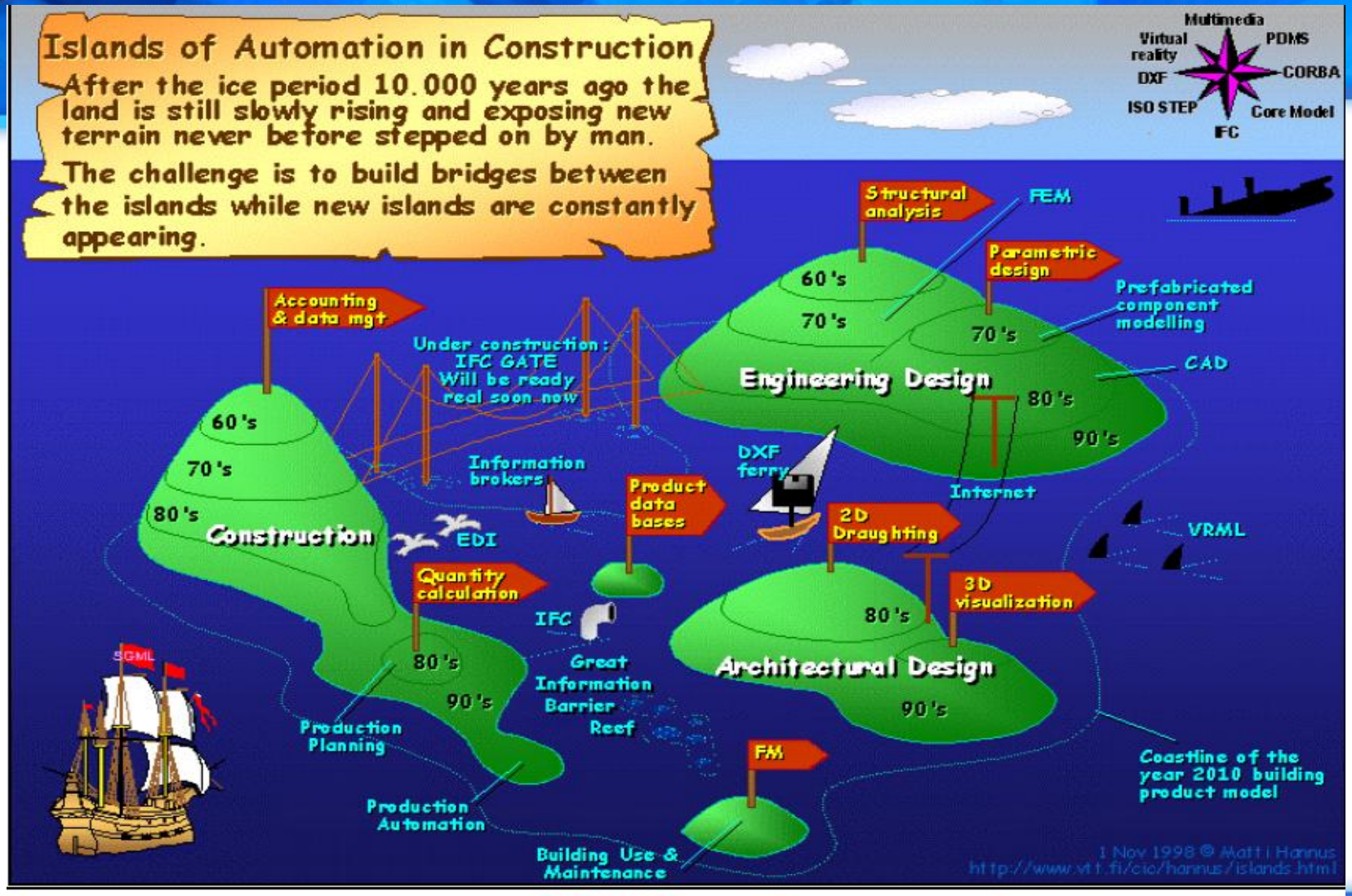
Developing People through Challenging Projects

CH2MHILL

Standardization

- Data Standards for project lifecycle
  - ISO 15926 PCA/FIATECH
  - AEX Equipment attributes
  - BIM National Institute of Building Sciences
- Design Standards
  - Codes, Specifications, Practices
- Best Practices – Construction Industry Institute

Where Are We Now?



Where We Want It To Be

Sustainability

- Integrate sustainability values into design
- Implement sustainability approaches in site, building envelope, facilities, materials, wastes, energy, water, ecosystems, and life cycle
- Implement sustainability practices in logistics, site management – RFI Tagging
- Implement sustainability practices in O & M – Smart Sensors
- Implement sustainability objectives throughout the supply chain

Sustainability

Optimizing Key Processes is Essential to Minimize and Enhance Sustainability Outcomes

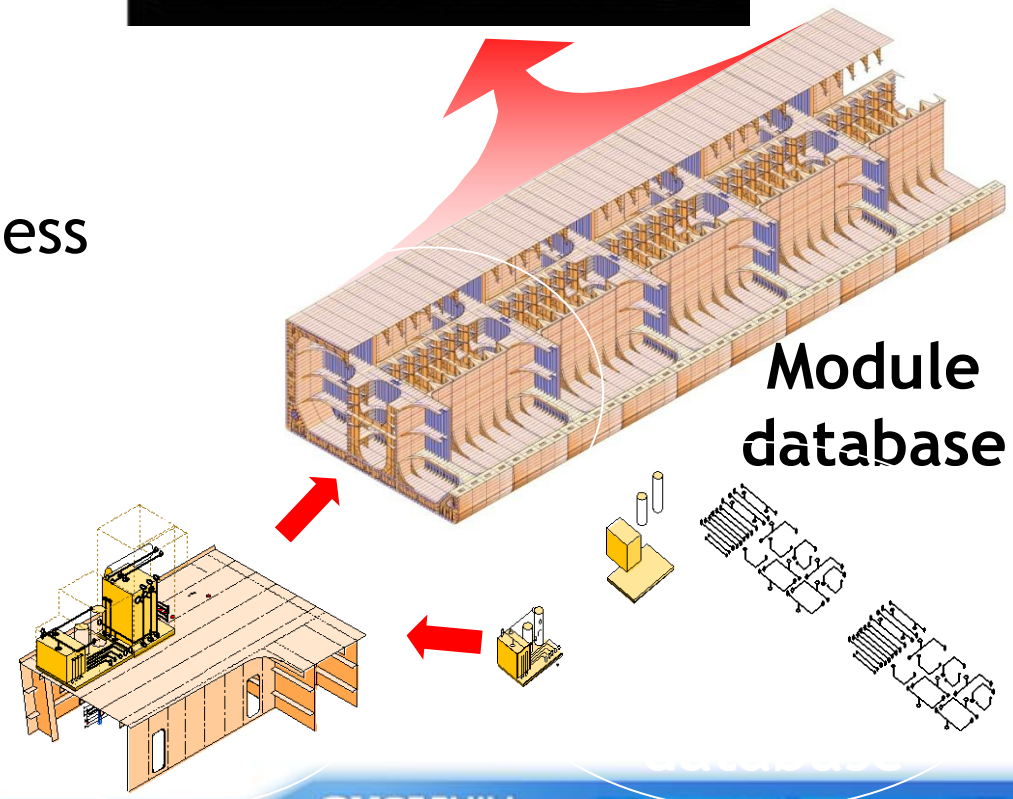
Sustainability

Implementing Sustainability Practices in Construction

- Integrate sustainability vision/ values into construction
- Implement sustainability objectives, measurement system, and sustainability framework
- Implement sustainability approaches in
  - Logistics
  - Site Management
  - Equipment
  - Materials selection/ specification
  - Work Methods
  - Waste minimization
  - Energy systems
  - Water systems
  - Environmental Management
  - Commissioning

Modularization & Prefabrication

- Zone identification
- Modular breakdown
- Module design/build process
- Sub-assemblies
- Parts identification



Modularization & Prefabrication

Manufacturing

Advantages

- Weather independent
- Quality
- Productivity
- Safety
- Ability to use automation/robotics

Regulatory Compliance & Permitting

- Streamline permitting and licensing
- Electronic submittal of plans and specifications
- FIATECH studies on revamping permitting practices
- Codes and Standards review and alignment (Domestic and International)
- Public awareness and communications

Energy Management

- Building Systems
- Alternative fuels usage
- Real time sensors and corrective actions
- Simulations and analysis

Productivity Measurement

- Advanced PCMS
  - CII RT 244
- KPI – Key Performance Indicators
  - RS-220 Leading Indicators during Project Execution
- Information Manager Role
  - Position to manage information flow through Project Life Cycle
- Performance Metrics for Intelligent Systems (PerMIS'10)
  - NIST Workshops

Questions

Next, Breakout Outlines for Work Groups