May 11, 2010

Fiatech summary
Austin Texas, March 29-31

Fiatech is the emerging technology arm of the Construction Industry Institute (CII)
This year's conference theme was: Enhancing Capital Asset Value through Leading Technologies and Delivery Processes. The presentations were then divided into four categories:

- Emerging and Market Ready Solutions for Interoperability
- New and Innovative Technologies
- Achieving Success in Safety, Sustainability and Energy Efficiency
- Academic Research and Advancements

The conference chair: Ray Topping, Executive Vice President, CH2MHill (retired) opened the conference with these words of wisdom:
Vision – Strategy- Action (don't forget the strategy)

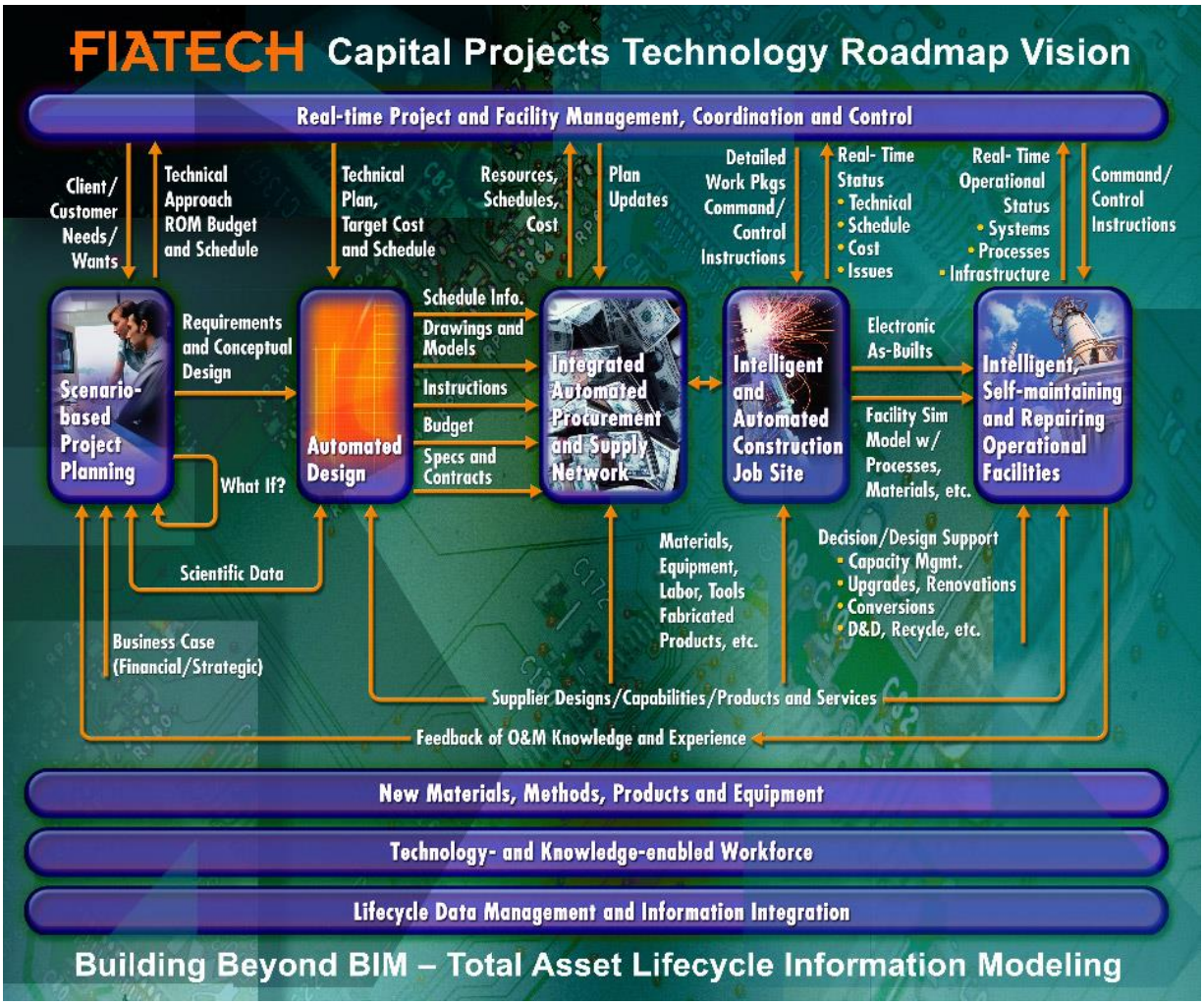
The presentations started with a keynote address from Gentry Lee, chief engineer of the solar system exploration directorate, jet propulsion laboratory for NASA. Mr. Lee oversaw the Phoenix mission to Mars (2008) and the twin rover missions to Mars (2004), along with participation in the Galileo project (1977-88) and the Viking mission (1968-76). He spoke about many things; including the migration of economic and military power to the countries that have a fanatical focus on education (Asia). However the key point of his presentation was the management of the balance between risk and innovation. He stated that innovation is essential for space travel and growth in the business world but it also came with increased risk. His summary was that each project can only tolerate changes to 25% of the established processes. Beyond this point smart people get caught up in "Happy talk" where they become wildly optimistic based upon fuzzy mathematics. He did mention that people who developed the best solutions to problems where the ones that had a wide base of knowledge and he suggested that engineering students should also study arts to wake up the right side of their brain. He concluded by saying that you should never trust anybody who tells you that you can have something, faster, better and cheaper.

Supply Chain: Reg Hunter of GMMS (Global Material Management Systems hunter.reginald@gmail.com) presented one of the optional workshops prior to the conference: "Total System Approach to Productivity Improvement Planning and Implementation".
The focus of the presentation was on the management of material data that then creates a "Situational Awareness" that supports detailed construction planning. Reg presented many of the tools and processes that we see in productivity improvement initiatives and then showed how they can be realized through the application of RFID tags. He went on to show us how passive RFID tags had optimized the process of baggage handling for the airlines. A model that has similar complexity to the material management model for our mega projects. Reg then concluded with a quick tour through some applications of RFID gate readers, active RFIDs for tracking global shipments and a process for tracking construction equipment on construction

sites. Many times EPCs have very poor visibility of where their materials really are in the supply chain. Reg Hunter's presentation showed us how a combination of RFID technology and GPS tracking software from HAL could improve the visibility of materials throughout the supply chain. Reg also mentioned that he is involved with a pilot project to demonstrate RFID and GPS technologies. HAL, a company that makes shipment tracking software used by the majority of 3PLs (3rd party logistics provider) is involved with the pilot project. Panalpina, a 3PL is also directly involved in the pilot project by hosting it at their Houston office.

Fiatech Roadmap

Ric Jackson and Neill Pawsey lead us through the Fiatech roadmap on Monday afternoon, making the point that we are all members of this industry collaboration and that collectively we are smarter than the sum of the parts. The example of this was ISO 15926 which is now appearing in RFPs (Request for Proposals) as a requirement. The library of terms is scheduled to be fully functional by the close of 2010, with wide spread application of the standard expected to develop over the next 5 years. Niell then extended an invitation to the industry to make use of these tools through accessing the Fiatech website or providing test bed projects.



WorkFace Planning:
We saw WorkFace Planning presented by a range of organizations across the three days of the conference starting on Monday afternoon with a presentation by Dan Slade, Manager of Construction Automation for Jacobs. Dan showed the basic outline of work packaging and then spent a considerable amount of time emphasizing the need for information structure and governance so that automation tools could be utilized to support the WorkFace Planners. (It was great to hear somebody else singing our song). Interestingly the questions from the audience where all about the capability of the software, nobody asked "What is WorkFace Planning", so the message must be reaching the industry.

Construction Automation:
Russell Cusimano from ePM and Tim Doran head of facilities and PM, Novartis Vaccines, presented their lesson learned from a recent project where they utilized Sim Vision to simulate their project and optimize the quality of their schedule during FEED. The 3D model software allowed them to communicate risk, brainstorm, validate the schedule assumptions, centralize decision making, optimize communications, improve productivity and enhance their predictability.

The second portion of the session was presented by Cheryl Brackett, Lead work package Engineer, Cianbro Constructors and Eric Crivella, ConstructSim Specialist, Bentley Systems. Cheryl and Eric showed how ConstructSim had been utilized on the Motiva Crude Expansion project to facilitate work packaging and reduce the total installed costs by $6.9 million. Cheryl pointed out that "top down buy in, dedicated model administrators and clean data" were essential for success. The constructors used the software to display material status, develop work packages, answer queries, record progress, plan crane utilization, plan Quality Control interactions, generate snapshots for the field and facilitate interactive planning sessions between the field supervisors. Cheryl played a short video that was developed on the project.

The session wrapped up with a quick presentation from Architect, Paul Francis Loreto on Building Information Modeling (BIM). Paul presented the BIM model as a commercial application of the industrial automation models that we are trying to progress towards. The commercial sector's application of BIM has led to a distinct competitive advantage for those organizations that utilize the tools. Paul is a member of the Canadian BIM Council.

Tuesday morning Key note speaker, Rusty Sherwood, Vice President at McGraw-Hill Construction presented the findings from an extensive market report on BIM.
Rusty started with some facts to help us understand our context:

- The global construction market is $4.6 Trillion per annum. (4.6 million piles of a million dollars).
- The US market at peak(2006) was $689 Billion and last year (2009) was $463 Billion.
- Recovery needs: Innovation which leads to growth and then access to capital which then leads to Job creation.

- Innovation is emerging, Access to capital is improving, Job Creation – not yet.
- The recovery will be U shaped and will begin in the first quarter of 2011.
- There is a big surge in alternative energy which includes nuclear.
- Green renovations will be strong based upon rising energy prices.
- There is an increasing need for healthcare facilities based upon an aging population.
- There will be a decreasing demand for new commercial and manufacturing construction.
- Manufacturers are retooling to improve productivity through interoperability.
- 1/3 of all companies (global, led by Asia) are positioning themselves around "Green".
- Material prices have bottomed out and will start to increase.

Smart market report on BIM:

- 3% of all construction project costs are related to the lack of interoperability of the systems.
- 1 out of every 2 commercial construction companies are utilizing BIM technology.
- Growth is dramatic amongst architects:
    - driven by competitive advantage
    - and the ability to make more profit.
- BIM is being used to manage:
    - Modularization
    - Estimating
    - Scheduling
    - Progress reporting
    - RFI's
    - Procurement simulations
- BIM promotes
    - Collaborative design
    - Clash detection
    - Green adaption
    - Construction simulation
    - Competitive advantage

Rusty concluded his presentation with a quote from General Eric Shinseki:
"If you don't like change, you're going to like irrelevance even less"
My own take on this presentation is that commercial construction has laid the road map for the path that industrial construction will travel. Like the commercial sector, we will eventually regulate the information that our projects generate so that we can use a 3D model to answer all of our questions around cost, schedule and quality.

Ron Zimmer, president of CABA (Continental Automated Buildings Association) presented the finding of a research study that they had commissioned on "Intelligent and Integrated Technologies".
The report brought into focus the lifecycle costs of commercial structures:

Construction 11% Financing 14% Alterations 25% and Operating costs 50% and then described the concept of smart grids where the utilities for several building were all tied in to each other.

ePlan Review:
Thomas Phillips, Code Compliance Administrator for Target and Ron Loback, CEO for Avolve software presented their project strategy for the electronic delivery and review of project plans. The process reduced their plan review time by up to 70% and eliminated the cost of producing and delivering up to 20 copies of project plans. Thomas identified the cultural change from paper to electronic as the biggest obstacle to the wide spread adaption of these methods.

Automation of the Supply Network.
Joel Gray, Senior Product Manager for Coreworx and Steve Harper Engineering Department Manager for Fluor Offshore, presented "Work Process Technology for Mega Projects". Their three principle learnings around supply chain management where:

- Management processes are directly responsible for 20% of final project costs
- All project information, right down to common spreadsheets, should be tracked and managed by a single person in a single database (Action Tracker).
- Procedures need to be finalized and added to contracts before the work begins.

Professor Yu-Tzu Chen from Drexel University presented a conceptual use of RFID tags that would track and record progress based upon the GPS location of each component. A database would track the location of each component and then report their location as progress in the 3D model using colour coding.

Lessons learned from Ras Tanura
Bob Danaho, Dow Chemical's Project Director for the joint venture Ras Tanura project with Saudi Aramco, made a presentation that highlighted the complexities of this mega project. Touted as the world's largest petro chemical project with 25 processing plants and 6 major engineering companies, this project has spent two full years developing workable specs and a set information management standards. Amongst the most complex is a single database that contains the risk assessments of all 25 plants. Bob talked at length about the importance of procedures, standards and contractual obligations. He also stated that after the owners have established these standards that you have to "Eat your own cooking".

Stereoscopic 3D
This presentation by Alex Shows from Dell showed us the development of 3D visualization technology for the purpose of home viewing. Alex told us that there are several brands of 3D TVs on the market right now for home use and that the market would be steadily increasing as more movies like Avatar are released in 3D. Alex did mention that the science of 3D is still cumbersome (you have to wear glasses or sit directly in front of the monitor) and that it is expanding into online Virtual Reality sites and will eventually be a standard for engineering models.

Jumpstarting Smarter Computing

Brian Zeve, Managing Director, Microsoft Industry Solutions wowed us with a "Vision of the Future" video that showed touch screen glass paneled desks that expanded to the office walls and windows. The entire office became the computer screen and the user moved around the room using touch and voice commands to interact with the information. (See the latest James Bond movie or the Avatar flight deck). Behind the user interface, smart technologies, auto classification and virtualization exist in cloud based computing that allow information to be identified consumed, enhanced and shared.

Brian was confident that this scenario would be real and quite common within the next 10 years. (no more pigeons or smoke signals)

Laser Scanning

Jayan Mundakkal, Construction Automation Manager with Bechtel and Steve Jennings from Trimble Navigation, showed us some examples of how laser scanning is being utilized by construction. In one instance a laser scan of a rebar configuration was imported into the 3D model so that anchors drilled into the concrete could be placed to miss the rebar. Another innovation use was to laser scan a construction site and then use it to validate progress.

Next Generation Wireless

Simon Curran from Inmarsat rolled out the idea of the 4G network and then went on to describe a mobile satellite service that has recently become available, the BGAH terminal. This satellite phone, that is not effected by weather, sets up in 5 minutes anywhere in the world and allows 10 users to have two way broadband access and phone services for $1 per minute.

Chip Yager from Motorola then introduced the audience to a range of options that Motorola have for wireless internet facilitation on worksites. The Mesh network allows point to point communication of up to 250kms or multi point receivers within a 5 mile radius. A mesh network set up on a worksite can provide wireless connection for up to 128 users in a ½ mile radius. Chip also stated that the network is self forming and self healing.

ePM Solutions

Tom Kollaja, Program Expert with the National Office of Design and Construction is responsible for the project management tools used by the GSA Public Building Service. The GSA constructs and maintains public service building across the US and has over 1,000,000 tenants. Tom led us through the deployment of Proliance an online enterprise ePM program by Meridian Systems that is standardizing design, collaboration and project delivery systems. The program manages schedules, field progress, change orders, RFIs, design documentation and contracts in one central online location. The process allows RFP's to be posted online and then allows bidders to submit electronic bids. The requirement to utilize this process is now a standard feature in all of their contracts.

The deployment of the system started in 2006 with RFPs for a software solution and is now being piloted on 200 projects. Full deployment is expected by the end of 2011. Tom concluded his presentation with a summary of the benefits: Increased situational awareness through

visibility, consistency through standard formats and standardization of information that allows true comparison. (Besides the obvious benefits of a paperless environment, electronic transfer of information and a supersized communication platform). Tom is also working on another project to develop a standard set of specs for the entire program.

Document Control through BIM

Deke Smith from the Building Smart Alliance shared his experiences with us from a recent project at the University of Southern California. The report that was generated through the National Institute of Building Sciences, focused upon the value of information management. The model shows a central depository that was used to collect, store and distribute project information. The 3D model showed the current status of all documents with the benefit being that all documents were only collected once. Deke went further to talk about the appropriateness of the structures in a project and how a 4% increase in the useful application of the end product pays for the entire project. The logic is that if a project can be completely designed electronically and then reviewed through a 3D environment to optimize the "Fit for Purpose" aspect of the deliverable, then the project returns maximum value.

Deke summarized his presentation with an endorsement for BIM and a note of caution: The 3D model must be maintained with as-builts every day so that the operator receives an accurate summary of the project. This then becomes the basis for a virtual maintenance environment. And: The project documented a $10million saving on a $350 million project.

Construction Productivity in the Nuclear Industry

Bill Rice from Westinghouse, Dale Whitchurch from GE, John DeBruin from URS and Thomas Ellis from Unistar Nuclear Energy formed a panel to discuss the productivity challenges facing the nuclear industry. The need for productivity improvement was established by Thomas Ellis who announced that there are four nuclear plants on the drawing board for Unistar right now and the possibility of many more to come. The average cost of schedule slippage for each of these projects has been assessed at $2million/day (plus the cost of labour and equipment). Bill Rice supported this statement and went on to say that improving construction productivity would require changes to technology, process and culture.

John DeBruin identified the automation of workflows as the biggest opportunity for productivity improvement in the engineering portion of the project. John then identified Smart Plant Construction as the tool that they would be utilizing to synchronize engineering with construction for the facilitation of work packaging (Workface Planning).

Dale Whitchurch identified data validation, document management and risk mitigation as focal point for GE's progression towards improved performance.

Aaron Freedman, Principle Technologist with Aveva gave a presentation on the next generation of Internet Engineering. A project in this model would exist as a web page that included user generated content, social networking, collaboration tools, links to vendor information and a central 3D model that linked objects to all the related data. A dashboard of project status would be developed from the progress entered against objects to give a high level summary.

Chehade Kassouf and Rayan Jreije of CCC presented the suite of construction productivity tools that they have developed and used on a project in Kazakhstan. The primary purpose of the software development was to support detailed work packaging (WorkFace Planning) for a largely unskilled workforce.
C3D is a proprietary product that links objects in the model to third party information (documents and vendor specs) without having to store the data. The software allows engineering to plan pipe installations, scaffold erections and record daily progress. Installation rates are calculated by weight from information stored in the model. The software also has the potential to display the schedule and to develop cost estimates.

CII Research Team members: Bruce Strupp, (CH2MHill) and, and Dr Bill O'Brien presented the conclusions from research conducted by RT 258: The Current State of Information Integration Practices Amongst CII Members. Bruce opened the presentation by stating that we are not constrained by technology, we are constrained by process. Bill then presented the stats from the research that showed of all categories recorded amongst the 76 member companies, Front End Planning scored lowest for application of known best practices.
As a result of the research the team have developed a Maturity Model that allows organizations to develop their situational awareness through the application of an assessment tool. The assessment then highlights opportunities with weighted benefits. The tool is available to all CII members and allows the organizations to plot their progress and compare their performance against other anonymous organizations.

Millenniums: (people born in this millennium)
Robert Middlebrooks from Autodesk gave us a "heads up" look at our imminent future by describing the world according to Millenniums: They already live in a world that has instant access to any answer so have no tolerance for unknowns or information hoarding. As they mature into the workforce they will force change based upon knowledge sharing.
Their life will be carbon neutral and they will choose biomedical implants as they desire, their vehicles will all be electric, they will have friends in every country, they will have a single number that works for everything from their phone to credit cards, they will personally use a Zetta byte (10^{21}) of information storage space, they will live anywhere and work anywhere.
In the construction industry can expect to see:

- All construction will exist in a 3D environment
- Everything will be modularized
- All project estimates will be from the 3D model.
- Fabrication will be digital

Robert used the example of a construction company that constructs steel studs onsite in seconds with predrilled connections.

Jon Chesser – Sales Director at Atlas RFID presented an innovative RFID solution business model where the software and tags are leased to the project on a monthly subscription basis. This

makes the use of RFID tags for materials management much more affordable and reasonable to project teams.

FIATECH has also developed what they are calling the “RFID Cookbook”….on the business case and best practices around RFID technology. The cookbook is available to FIATECH members and is a good example of the benefits of membership.

Jerry Gipson, Director of Engineering Solutions at Dow and incoming Chairman for Fiatech wrapped up the conference with praise for the participants and this challenge:
“I challenge you to develop, manage and maintain a single version of the truth.”

In conclusion: the conference was once again very good and full of innovations. Maybe we are bias but it was easy to relate every participant and innovation to the common gravity of WorkFace Planning. All of the products and methods on display had a common goal of improved project performance through elevated information management.
We handed out copies of Schedule for Sale as business cards to about 50 people at the conference, taking the time to have conversations with all of them. There is a real appetite for change and we believe that WorkFace Planning will have a pivotal role in facilitating this change.

We also had the good fortune to spend a couple of days with our families at a Dude Ranch in Bandera after the conference, where we experienced a real taste of Texas. This would make a great addition to your bucket list.

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Hyperlinks imbedded into this document:

Fiatech: http://fiatech.org/
ConstructSim: http://www.bentley.com/en-US/Promo/ConstructSim
Video: http://www.youtube.com/watch?v=1yaN5ObBrIk
Canadian BIM Council: http://www.canbim.com/
McGraw-Hill Construction: http://www.construction.com/
Smart market report on BIM: http://bim.construction.com/research/
CABA: http://www.caba.org/trm
Vision of the Future: http://www.microsoft.com/showcase/en/us/details/e7728af1-3fe4-4e25-a907-3dbf689fe11a
Inmarsat: http://www.inmarsat.com/
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