October 2011

Insight-wfp Conference Report
of the
2011 Annual Construction Industry Institute (CII) Conference
Driving Predictable Business Outcomes in a Dynamic Global Market

July 25-27 2011 at the Hyatt Hotel downtown Chicago.

Concurrent events allowed us to gather notes on a small selection (10) of the total presentations. The following reports capture only the presentations that we attended.

589 registered attendees participated in two full days of presentation from CII committees, industry experts and key note speakers. The presentations were of a class befitting the attention of the global construction industry.

The two stand out presentations, from a Workface Planning perspective were:

- The presentation of Enhanced Work Packaging (Workface Planning) as a Best Practice by the CII Research Team 272.
- The results of a study conducted by the Benchmarking Committee that showed a direct correlation between the application of Best Practices and Corporate Share value.

The Conference opened with comments from the Chairperson, Melissa Herkt (Emerson Process Management) that set the tone for the conference: Predictable Outcomes.
Melissa showed the audience that Baby Boomers in our industry represent 54% of the our construction managers and 52% of the foremen, reminding us that they are about to retire. When we weigh this against declining oil reserves in the Middle east, a maturing world population that is thirsty for energy and the fact that at Emerson the rate of growth is steeper than the decline of the recession, we can predictably see a difficult time ahead of us. Melissa then went on to warn us all about the overuse of TLAs (Three Letter Acronyms) and handed over the podium to Wayne Crew, Director at CII.
The Director endorsed Melissa's points and then pointed out that 5.5 million Americans work in construction and that the retirement of the Baby Boomers will see 20% of the workforce leave soon. This equates to a refresh rate of 1million people that we need to enter the construction industry, soon.

Wayne then used a slide to display the basic outline of the CII Model, encouraging the audience to get involved in the committees and the dissemination and application of the Best Practices.

Knowledge Creation	---	Dissemination	---	Assessment
Committees		Web Seminars		Questionnaires
		Workshops		Online data mining
		Leadership programs		Reports
				Feedback

Keynote Address: Penny Manuel
(Southern Company)

Penny started her presentation with an overview of the Southern Company showing us a map of the approximately 50 power plants across Mississippi, Alabama and Georgia that encompass hydro, nuclear and gas fired coal plants. Impressively Penny then related that the Southern Company has produced dividends for their stakeholders in each of the last 255 quarters (almost 64 years). Their secret to sustained growth and profit is to lead change based upon these fundamentals:

- Be true to your values
  Decisions cannot be good for the company and bad for the customers.
- Influence the Future
  Smart Power – Smart Grid – Smart Consumer Choices.
  Growth needs technology and investment in the future.
- Execute Today
  Have in-house Engineering and Project Management with support from contractors
  Allow the company to maintain expertise in the slow times.
- Invest in Excellence
  Good companies use economic downturns to do smart things (training)

Penny then capped off her presentation with these notes:

- Major nuclear projects under construction today by the Southern Company employ 12,000 workers and there is a serious shortage of them.
- 10 construction jobs = 1 permanent operations job and there are not enough of them either.

Featured Speaker: Bruce D'Agostino
President – Construction Management Association of America (CMAA)
http://www.cmaa.com/cmaafmi-11th-annual-survey-owners

Bruce presented the results of the 11th annual survey of owners conducted by the CMAA which showed that the recession has created a situation where the majority of their membership (7300) believed that the diminished staff resources are a permanent condition. A smaller portion of the membership agreed that conditions have improved in the last 6 months and the CMAA believe that this has created opportunities for visionary service providers.
The survey results show that the recession has created a vacuum of competency amongst the owner organizations that will require creative methods to overcome, now that the industry is recovering.
One of the interesting comments from Owners addressing competency was that undergraduate CM programs are still engineering centric and that the skills required for Project Management need to come from leadership and management training.
The presentation suggested that a blend of Construction Management (CM) consultants and in-house management will be required to staff projects and that these two groups will have to address their opinions of each other to create collaborative outcomes.

Bruce then showed us these two lists as an overview of the perception issues.

Owner's in-house management view of consultants:
- Overpaid
- Always looking for the next project
- Arrogant
- Don't want to engage
- No skin in the game

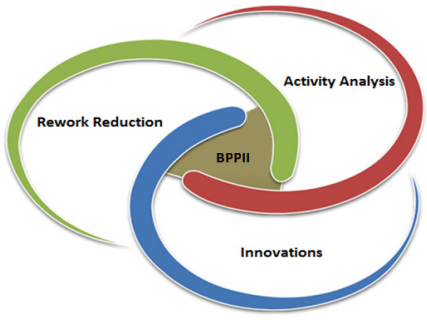
Consultant's view of in-house management:
- Not accountable
- Routinely miss deadlines
- No desire for change
- Senior management keep changing the scope

The session then wrapped up with these conclusions:
- Constrained Owner resources = Outsourced CM
- Blended Teams (Owner and Consultants) will become more common
- Concerns about the future workforce persist.
- Need to build mutual respect between Owners and Contractors (consultants).

Presentations:

RT 252 Construction Productivity Research Program:
The Construction Productivity Research Team are on a six year voyage (starting in 2009) to address productivity issues with a view to
- Increase direct activity levels,
- Reduce the amount of labour required to execute single units of work
- Reduce rework

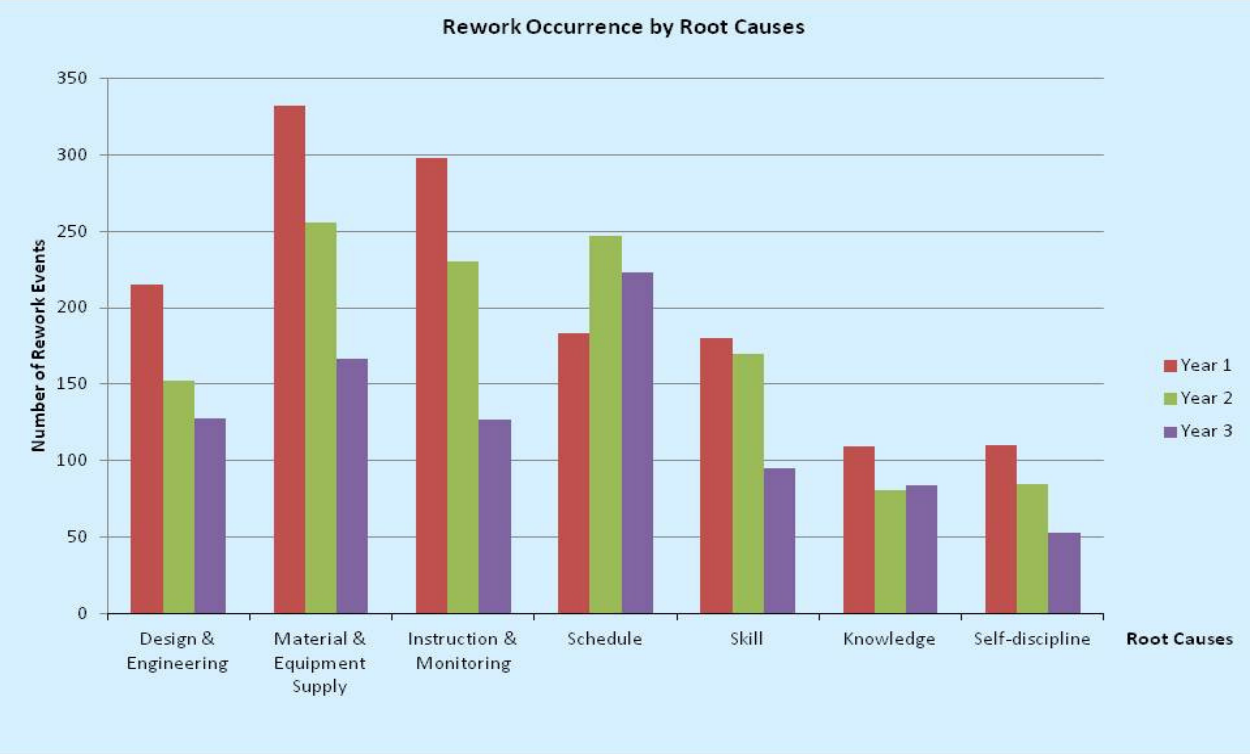
Bob Tait, Construction Manager at Irving Oil, presented the committee's finding for Rework Reduction which showed that the key to rework reduction is to track it and then apply the continuous improvement model.



The model for this process is communicated in:
"A Guide to Construction Rework Reduction" available through the website, www.construction-institute.org as Implementation Resource # IR252-2b.

David MacNeel (Baker Concrete) then presented the innovation portion of the research showing us three options for reducing the installation unit rates for concrete.
- Modular formwork (reduced construction labour and material costs)
- Self consolidating concrete (easy to pour, no requirement for vibration)
- High strength steel reinforcement: ASTM A1035 Grade 100 steel.
  (reduced requirement for rebar and reduced labor)

Carlos Caldas (Associate professor at the University of Texas at Austin) then walked us through 'Benchmarking and Metrics Data Analysis' as a methodology for improving construction productivity by promoting the application of best practices by showing their benefit.



This graph shows the trend in Rework occurrences by root cause over a span of three years – verifying the effectiveness of corrective actions for continuous improvement.

The presentation concluded with an overview of the Best Productivity Practices Implementation Index (BPPII) which is a deliverable for the committee in 2013.
The BPPII is a "*Method and metric for measuring the implementation level of practices that have the potential to improve craft productivity*."
The final slide in the presentation was a call for volunteer projects for validation.

Optimizing Jobsite Organisation RT261

Research Team 261 presented their findings from an initiative to capture the optimal staff mix of construction projects. The test data looked at 31 projects ($38 million to $1.2 Billion) from the US and captured the average Craft to Staff Ratio (CSR) for contractors and owners.
(The term staff appears to apply to everybody that is not general foreman, foreman or craft.)

The Team used this equation to develop CSRs

$$\text{CSR} = \frac{Onsite\ Craft\ Work\ Hours}{\substack{Onsite\ project\ duration \\ (in\ weeks)}} \text{ X } \frac{1}{\substack{Full\ Time\ Equivilent \\ (staff\ position)}} \text{ X } \frac{1}{\substack{50 \\ (typical\ work\ week)}}$$

So (by my calculations) a 1million hour project conducted over 1 year (385 craft) with a staff of 80 would have a CSR of

$\frac{1{,}000{,}000}{52}$ X $\frac{1}{80}$ X $\frac{1}{50}$ = 4.8 craft for every 1 staff position.

The results showed these average CSRs for Owner and Contractor positions:
Owners 13
Contractors 4.3
The team also reported that the results were scalable and that the ratios did not vary much based upon magnitude, however projects that were under staffed produced diminished results.

CSR Norms for Sample Subsets

Subset	Owner CSR			Contractor CSR		
	N	Mean	Min to Max	N	Mean	Min to Max
Petro-Chem.	9	10.5	2.7 to 43.1	5	3.9	1.6 to 7.3
Power Utility	9	15.7	1.0 to 44.1	7	3.9	1.0 to 6.3
Lump Sum	14	14.9	2.7 to 43.1	10	4.9	2.8 to 6.7
Cost Reimb.	17	11.7	1.0 to 44.1	12	4.6	1.9 to 8.4
EPC/D-B	12	11.8	3.0 to 30.6	8	3.9	1.6 to 7.3
Construct Only	11	15.6	1.0 to 44.1	9	4.3	2.2 to 6.7

This graph shows that on average Lump sum projects have 4.9 craft for every member of staff and that the owner provides 1 staff member for every 14.9 craft members. The Cost Reimbursable projects have slightly more (6%) contractor staff (1 to 4.6) and 20% more owner representatives.

Keynote Address: Edward Monsor
(Emerson Electric Company)

100 Years of Operational Excellence
Ed presented the model that Emerson have utilized to develop a standard for operational excellence based upon these two principles:

- Long term planning
- Control of short term performance through benchmarking

Interestingly Ed talked about long term planning that included the boom and recession cycles and then proposed that if we used the recession to plan for the present recovery, then now we should be planning for the next recession.
For the purpose of cost control Ed suggested that proposals must be actionable and not just be math that makes the cost look better. Examples of this were that Emerson used the downturn to optimize their cost management by changing suppliers, containing labor costs and implement productivity improvement programs.
Ed validated the effectiveness of these principles with a graph that showed 54 consecutive years of increased dividends.

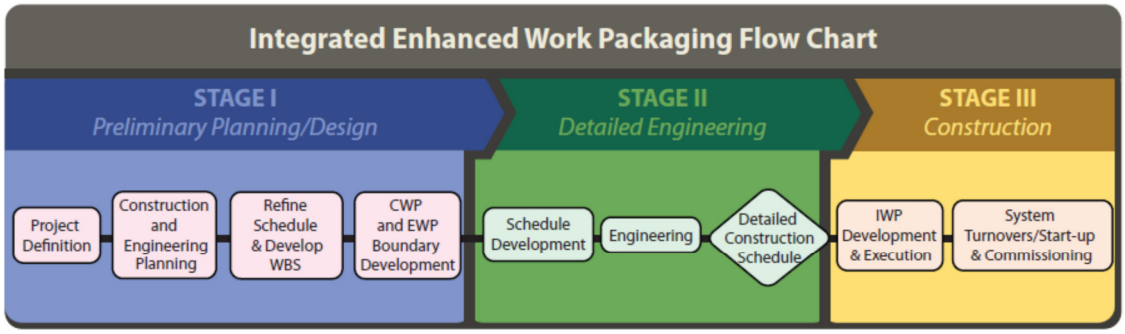
RT 272 Enhanced Work Packaging
Design through Workface Execution:

The presentation of Enhanced Work Packaging was introduced by Sean Pellegrino (Chevron) as a tool that delivers predictable business results (the conference theme) through

- Improved schedule and budget performance
- Increased resource utilization
- Elevated Foreman time in the field
- Enhanced communication and morale

The net result of the application has shown a 25% increase in construction productivity and a 4 to 10% decrease in the Total Installed Cost of projects.

Bill Obrien from the University of Texas at Austin presented this flow chart as an introduction the total project engagement that is required to enable Enhanced Work Packaging during construction.



Steve Autry (Conoco Phillips) then presented the case study from the 10 researched projects which showed

- Project completions ahead of schedule,
- Reduced labor costs (below budget)
- Improved safety performance
- Weld reject rates at <0.5 (normally 3-5%)
- Fewer changes during execution.

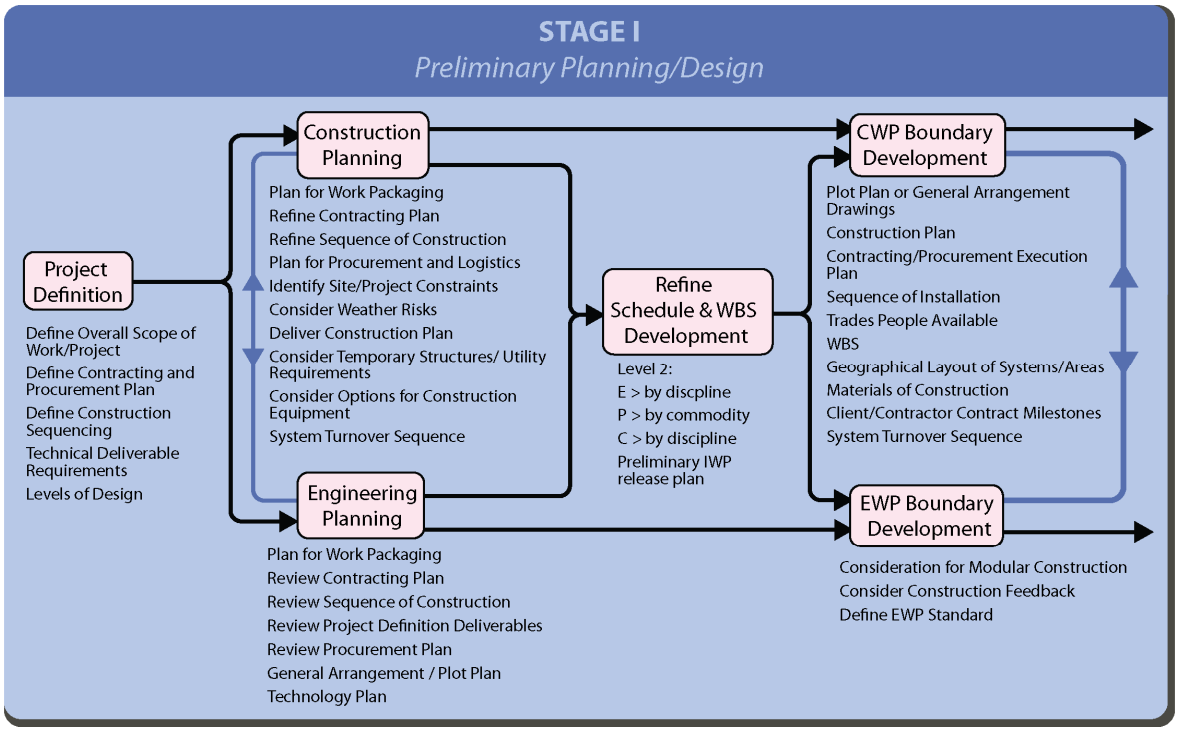
Steve did point out that even with these substantial results that the application of Enhanced Work Packaging was still not fully applied and that the obstacles to full implementation included:

- Lack of an industry standard or best practice
- Lack of an Owner standard or procedures
- Lack of Owner experience.
- Lack of Contractor experience.

The Path forward suggested by the committee was to:

- Implement an electronic Installation Work Package management system
- Begin full constraint analysis and removal
- Integrate Work Face Planning into engineering phases.

Richard Buxo (SNC- Lavalin) and Brendan Lynam (Kvaerner) then presented several extrapolations of the flow chart that showed the details of the process required to facilitate Enhanced Work Packaging



The complete Implementation Resource (IR272-2) 'Enhanced Work Packaging: Design through Workface Execution' is available through the CII book store at www.construction-institute.org

Robin Mikaelsson (Bentley systems) then presented a suite of tools developed by the committee to support the application:

- Project Definition Assessment
- Installation Work Package Checklist
- Enhanced Work Packaging Scorecard

In my humble opinion, the tools are very good, well thought through and obviously developed with input from the whole committee (Owners,E,P&C). They represent the first stage of an organisation's migration towards effective construction execution through detailed planning (Plan-Do-Check-Act) and I believe that they will help initiators get over the starting line.

Sean Pellegrino (Chevron) then added these closing remarks:
Enhance Work Packaging Requires:

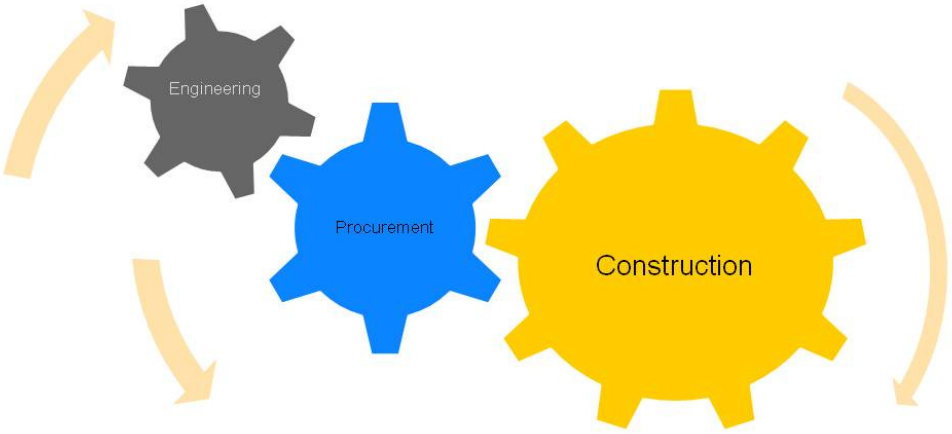
- A right to left project mindset
- Engineering and Procurement that supports the sequence of Construction
- Information Management systems
- Material Management systems that support IWPs

Factors for Implementation Success:

- Measurement
- Predictability
- Execution Excellence
- Assurance Checks
- Contract Driven

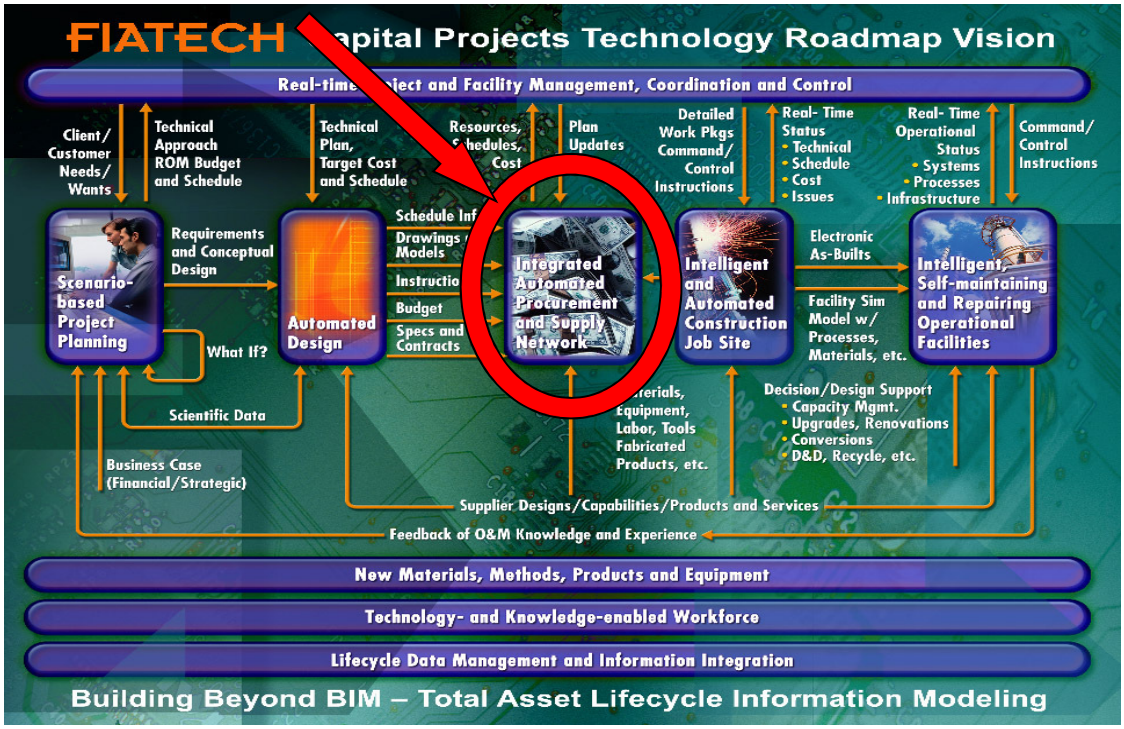
Outcomes:

- Improved Cost, Schedule, Quality, Safety and Predictability
- Effective supervision through more time in the field.



Achieving Fully Integrated Procurement and Materials Management
Presented by FIATECH – The emerging technology arm of CII

Reg Hunter (Fiatech) introduced the Fiatech road map and pointed out the flow chart node that was being addressed by the presentation.



Reg pointed out that CII have already identified significant opportunities across the board (up to 40%) for cost reduction and performance improvement through the enhanced management of materials based upon the Fiatech model.

Shirikant Dixit (Bechtel) spent a few moments on the subject of RFID tags and talked about their cost coming down and the utilization coming up. He then talked about a culture change that was required to shift our dependency from superhero material managers into systems that will produce consistently good results.

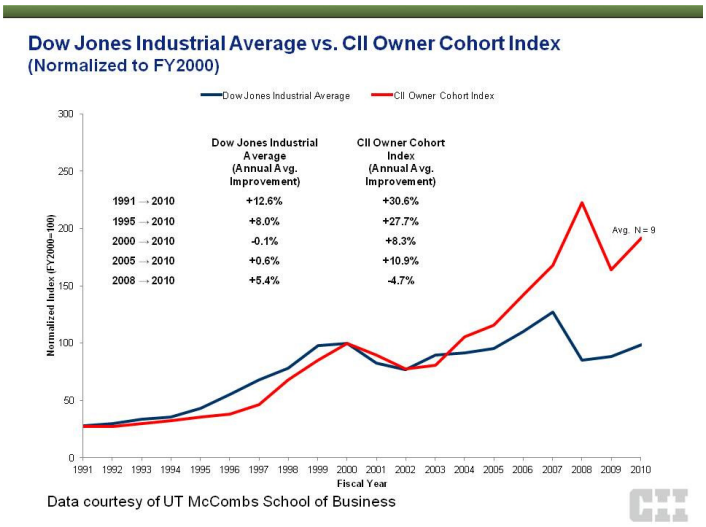
The presentation then walked through the process of designing and applying a material management system based upon the Fiatech Material Management Framework:
End to end visibility-traceability-accountability-predictability and control of materials.
Then Stakeholder collaboration which leads to consensus on functionality and fit for purpose interoperable software.
Reg wrapped up the presentation with an invitation to the memebership to “see it for themselves” with a GMMS demonstration: Reg Hunter, hunter@fiatech.org or www.fiatech.org

Quantitative Easing 3.0
Boosting the Amount of Information in the Project System
Benchmarking and Metric committee

In my opinion this presentation was the highlight of the conference, even eclipsing the emergence of Workface Planning on the global stage by the Enhanced Work Packaging committee.
The correlation between well managed companies and share value is a well established standard in the financial markets so it makes perfect sense that the application of best practices in our industry would have a positive effect on company value.

Noe Hernandez-Saenz (Burns and MacDonald) moderated the session and introduced the concept of predictable business outcomes through benchmarking. With 16 years of project data the benchmarking database was mined to develop profiles for financial analysis, regional productivity and safety analysis with a summary of the results available in the publication: CII's Value of Best Practices research study BMM2010-4. Available through the website: www.construction-institute.org

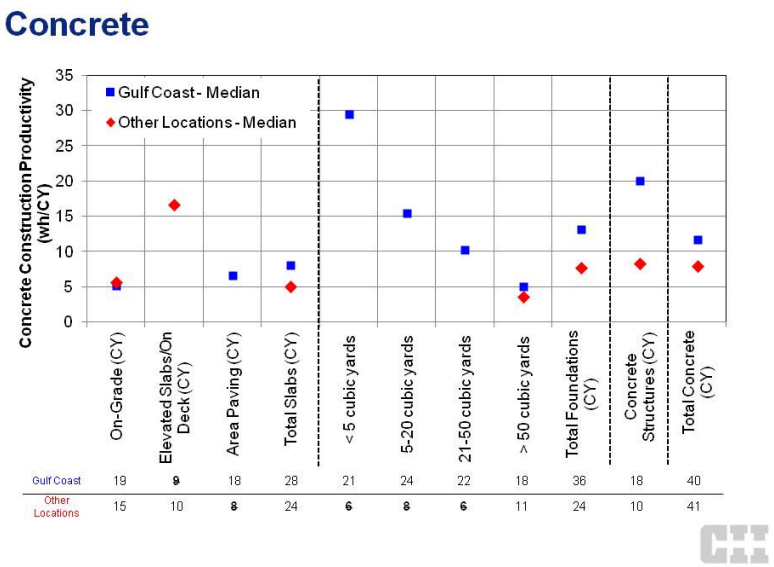
Paul Woldy (Chevron) presented a series of slides that showed us the share value of owner and contractor organisations who are CII members outperforming the DOW and non CII members in the same industry. The expanded model showed that CII members who apply best practices and benchmark outperform CII members who don't.
This standard was true for Cash Flow, Economic Value Added and New Contracts.



So my own conclusion from this was that organisations that collaborate with others in the same industry become well managed and increase the value of their company. Of those organisations the ones that apply best practices, benchmark their own results (good and bad) and compare them to industry results do things that make them perform at an even higher level, which increases the value of the company again.
(Seems way too simple).

Stephen Mulva (CII) suggested that the application of best practices requires strong leadership up front from the owners and that the deliverable is improved performance. This logic is captured in the *Value of Best Practices research study.* Stephen then talked about the validity of the information with data from 306 projects over 16 years in the database.
The problem of non-applied knowledge was apparent with a statistic that showed that constructability is recognised as one of the easiest best practices to apply with very high returns and yet only 31% of the projects applied it.
The next series of slides showed that there is a direct relationship between the number and quality of best practices applied, and project performance.

The final portion of the presentation compared commodity installation rates from the Gulf Coast with Non Gulf Coast projects (within the US) across the major disciplines, the example here shows the performance for concrete installation:



Managing with Certainty – A Contractor's View

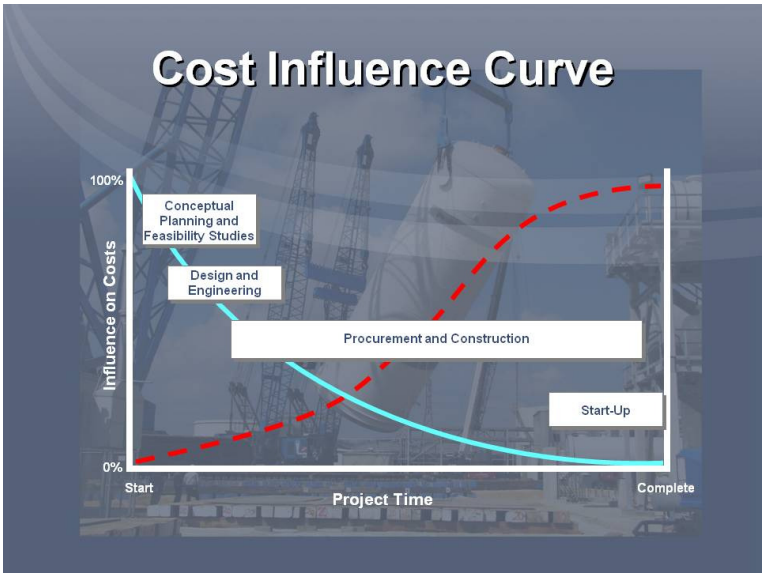
James Slaughter S&B Engineers and Constructors

Manage with Certainty is a challenge that James has laid down many times over his 44 years in industry and his presentation showed us that he has lived and prospered by these standards.

"Manage with certainty: to have thought out and planned activities in advance such that there is certainty of success"

James pointed out that the game has changed over his career and that the application of Fast Track projects and a focus upon start -up has increased the need for the fundemantals of 'Managing with Certainty'.

This CII influence curve reminded us that the greatest opportunity to influence costs was during FEP with diminishing effect as the project matures.



This led into a series of slides that focussed upon FEP activities that need to be executed for the benefit of construction and overall project success. James talked about forging the communication link between the Pipe Designer, the Pipefitter and the Start-up Supervisor as an example of holistic project thinking and then used this slide to drive home the point that excellence in any area (safety in this example) is heavily dependent upon project execution excellence (that comes from FEP).

Note: During the Research of Workface Planning we found organisations that practice this methodology and they became the foundation for the development of Workface Planning as a Best Practice.

James then gave us this list of Project Excellence components that are all too familiar but also increasingly uncommon:

- Foreman's checklist.
- Value engineering.
- Early definition of Systems Turnover.
- A single EP& C schedule that follows the sequence of construction.
- Owner commitment to the value of FEP through funding.
- Early purchasing (bulks and long leads).
- Good quality estimates.
- Risk analysis.
- Gated project development process for all stakeholders.
- Change management – The Best change is no change.
- Cancelled projects = project success (didn't waste resources building the wrong thing).

And a list of traps to avoid (Lessons Learned)

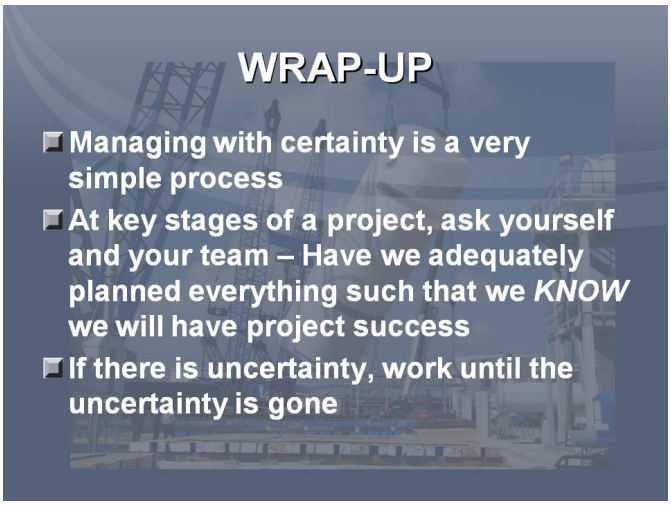
- Failure to develop alignment and trust.
- Ignoring change.
- Pushing schedule despite scope increase.
- Proclaiming that cost and schedule have equal priority.
- Change of leadership.
- Craft turnover.
- Contracts that drive bad behaviour.
- Low budget estimates during RFP (Liars Poker).

The fundamentals of Managing with Certainty

- Manage inputs not outputs.
- Aggressively remove obstacles when they occur.
- Uncover bad news early (Good news has a long shelf life).
- Develop and Maintain transparency between Owner and Contractor.

The outcome

- Excellence in Project Execution.
- A Safe project.
- Higher employee retention.
- Predictable results.
- Advancement for project's Owners Team.
- Contractor secures future work with Owner.

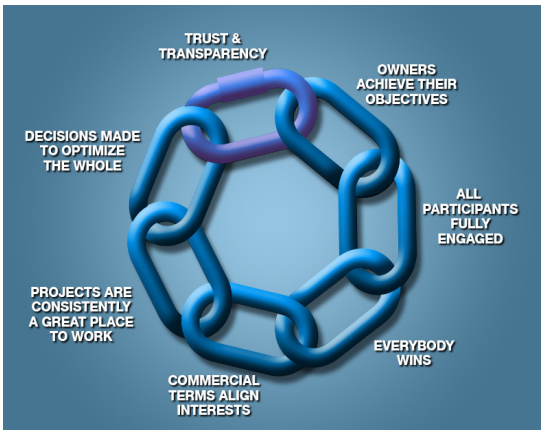


Starting from Scratch: A New Project Delivery Paradigm

The Innovative Project Delivery Research Team 271 started with this question:

The presentation then progressed through these stages:

- The Vision
- Strategic Elements
- Statistical and Case Study Validation
- Paradigm Challenge
- Call to Action



The Vision: Presented by Linda Malczewski from Procter and Gamble showed this slide as an example of how a project could look.
Linda then moved into Strategic Elements and listed:

- Organisational Integration,
- Alignment of Commercial Interests
- Managing by Means (not by the ends)

as the key components of the strategy.
Dr Glen Ballard from the University of California, Berkley then covered 'Statistical and Case Study Validation' by showing us the result from the analysis of 40 international projects. The graphs displayed a correlation between project performance and the degree of 'Alignment of Interests' and Management by Means' methodology. Interesting the case study analysis showed that emergency projects have a lot of the ideal characteristics and also enjoy above average project performance.

The Paradigm Challenge was covered by Fred Voll from Emerson Process Management with this list of Project Delivery Paradigms:

- You can manage the project by managing contracts.
- Win-win is an illusion.
- Social factors are interesting but don't really matter.
- Transfer of Risk makes risk go away.
- Risks and waste aren't problems so long as they are somebody else's problems
- Management by results yields the best results
- Variation in work flow is from external forces
- Resource utilization trumps project flow
- Optimize each function and you are optimized

The 'Call to Action' presented by Glyn Rogers from Kvaerner and Will Taylor from the Southern Company presented this framework

FRAMEWORK	STOP	START
Organizational Integration	Ignoring the human aspects of project execution	Recognizing that a project is a complex social network
Organizational Integration	Viewing each stakeholder as independent objects that respond best to external stimuli	Viewing each stakeholder as a part constituting an ecosystem where each part is connected to others
Alignment of Interest	Focusing on contract enforcement	Focusing on value delivery
Alignment of Interest	Procurement practices that result in barriers to collaboration	Procurement practices that provide competiveness yet allows collaboration
Alignment of Interest	The belief that in order for me to win you have to lose	Aligning interests
Management By Means	Being concerned only about the task under your contractual control	Integrating project organizations for project success, thus individual partner success
Management By Means	Controlling based on comparing "did" to "should"	Controlling based on forward looking value engineering
Management By Means	Defining metrics isolated to each party	Developing metrics that include all parties that interact with each other
Management By Means	Passing risk to others and assuming it's gone away	Working collaboratively to reduce overall project risk

And concluded with this gauntlet:
The RT271 team calls for the industry, under the leadership of CII, to proactively help realize the vision:
Specifically:

- Form a coalition of owners and contractors dedicated to identifying and challenging the industry paradigms that prevent us from achieving excellent project delivery every time.
- Develop and agree on a strategy for change
- Implement the strategy for change

Report Conclusion:

The project theme of Predictable Business Outcomes was evident in most of the presentations, which shows that it was the right focal point. The opening presentations from Penny Manuel and Bruce D'Agostino addressed organizational values and structure which set the stage for RT 261's findings on optimal staff and craft ratios. Then the committee for construction productivity emphasized the need for rework reduction through organized execution, a theme that was supported by the Fiatech presentation on material management by design. The Enhanced Work Packaging committee then presented the method of Workface Planning, which is really just a documented approach to the fundamentals presented under Managing with Certainty. We cap this flow of enlightenment with two presentations (Ed Monsor and the Benchmarking committee) that identify benchmarking as a cornerstone for industry excellence and high performance stock value. Finally we look into the crystal ball of the future through the work of the Project Delivery Research Team we see all the fundemantals that we have already addressed.

So we have the reality of today's industry (The need for Values and the reality of staff shortages)which identifies the need for improved productivity (Staff-craft ratios and material mgt), followed by the proven method (Managing with Certainty and Enhanced Work Packaging) and the benefit (Industry leading stock value), supported by the conceptual model for the ideal project. And all this is presented by the world's leading professionals on the global platform of the CII annual conference.
My bias towards the application of Workface Planning may have helped me to draw these stars into alignment, but even without that, there is no denying the magnitude of what took place and the potential impact that this conference will have on the future of our industry.

Geoff Ryan P.M.P
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