Construction Industry Institute®

Leadership of Tomorrow – Bridging the Gap

CII Annual Conference

Grapevine, Texas

Conference Proceedings

July 19–21, 2005

CII Member Organizations

3M
Abbott
Air Products and Chemicals
Amgen
Anheuser-Busch Companies
Aramco Services Company
BP America
CITGO Petroleum Corporation
Cargill
Celanese
Chevron Corporation
ConocoPhillips
Dofasco
The Dow Chemical Company
DuPont
Eastman Chemical Company
ExxonMobil Corporation
General Motors Corporation
GlaxoSmithKline
Intel Corporation
International Paper
Kraft Foods
Eli Lilly and Company
Marathon Oil Corporation
NASA
NOVA Chemicals Corporation
Ontario Power Generation
Petrobras
Praxair
The Procter & Gamble Company
Rohm and Haas Company
Shell Oil Company
Smithsonian Institution
Solutia
Southern Company
Sunoco
Tennessee Valley Authority
U.S. Army Corps of Engineers
U.S. Department of Commerce/NIST/Building and Fire Research Laboratory
U.S. Department of Energy
U.S. Department of Health and Human Services
U.S. Department of State
U.S. General Services Administration
U.S. Steel
Weyerhaeuser Company

ABB Lummus Global
ALSTOM Power
AMEC
Aker Kværner
BE&K
Baker Concrete Construction
Bechtel Group
Black & Veatch
Burns & McDonnell
CB&I
CCC Group
CDI Engineering Solutions
CH2M HILL/IDC/Lockwood Greene
CSA Group
Day & Zimmermann International
Dick Corporation
Dresser-Rand Corporation
Emerson Process Management
Fluor Corporation
Fru-Con Construction Corporation
Gilbane Building Company
Grinaker-LTA
Hatch
Hilti Corporation
Jacobs
Kellogg Brown & Root
Kiewit Construction Group
J. Ray McDermott
M. A. Mortenson Company
Mustang Engineering
Perot Systems Corporation
Primavera Systems
S&B Engineers and Constructors
The Shaw Group
Technip USA Corporation
Turner Construction Company
Victaulic Company of America
Walbridge Aldinger Company
Washington Group International
WorleyParsons Limited
Yates Construction
Zachry Construction Corporation
Zurich

Conference Proceedings

Construction Industry Institute

2005 Annual Conference

Grapevine, Texas

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Other Western still images during plenary sessions: El Progreso Memorial Library, Uvalde, Texas.

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Foreword

Our world and our lives are complicated, often chaotic, and nowhere is that more evident to those of us in engineering and construction than in our daily business. Technology slings us forward and requires us to keep up, get smart, or get out the way. But we're in a people business and our people are the most important asset we have. How can we bring order to the forefront, and how do we prepare our employees for tomorrow's changes?

We feel that the answer is leadership. This year's Annual Conference theme, Leadership of Tomorrow — Bridging the Gap, points to a need to develop our industry's leaders of tomorrow now. It is a particularly tough challenge because today's young people are looking for interesting work, career paths that are clearly marked, and technology that they can immediately use to advance on those paths. Amid the chaos and complications of the capital facility delivery process, however, gaps in leadership are evident. Providing young people with the mentors they need, with the newest tools from computer science to help them, and most importantly with the skills to lead is a huge task, but if we falter, our future as an industry truly is at risk.

Here in Grapevine we've gathered leaders from inside and outside engineering to provide you with several perspectives. Our keynote and featured speakers in particular will be offering new ideas and proven methods, and our case studies from member organizations all touch on the ability to communicate, to have vision, and to follow through on construction projects from the amazingly complex Walt Disney Concert Hall in Los Angeles to the efforts to establish safety standards at a project site on a small island in the Caribbean. Our goal is to inspire you to help us in "bridging the gap."

We hope that you find Grapevine and the greater Dallas/Ft. Worth Metroplex an interesting and exciting destination. Our conference accommodations at the Gaylord Texan Resort are spectacular, and of course, Texas is known for its friendly folks and bigger than life feel. Enjoy the 2005 CII Annual Conference. We're glad you're here.

SUE STEELE
Conference Chair

HANS VANWINKLE
CII Director

Leadership

Keynote Speaker

Abstract

The principles of leadership are timeless, because even in a rapidly changing world, human nature remains a constant. The first rule of leadership — treat people with dignity and respect — the way you would like to be treated. This principle has been validated again and again over the last 2,000 years. It is nothing more than a restatement of the Golden Rule — "Do unto others as you would have them do unto you."

Plenary Session Presenter

H. Ross Perot – Founder and Chairman Emeritus of the Board, Perot Systems Corporation

Ross Perot ran for president of the United States twice, once as an independent candidate and again on the Reform Party ticket. He founded Perot Systems in 1988 and subsequently led it to the Fortune 1000 status it holds today. Prior to that, he started Electronic Data Systems (EDS) in 1962 and built it into one of the world's largest technology services firms. Perot worked for IBM in the late 1950s as a salesman. The author of seven books, Perot is a graduate of the U.S. Naval Academy, where he was class president, chairman of the honor committee, and battalion commander.

Leadership Drives Successful Implementation

CII Knowledge Management, Implementation Strategy & Education Committees

Abstract

How does leadership drive implementation of CII products? How do I increase the value to my organization? What does the Education Committee do for my organization? How can I gain valuable information from the Knowledge Management Committee work? As a leader, how can I assure a sustainable implementation program for my company? What attributes or values are necessary to grow and develop successful improvement processes using CII products? How do the committees, Education, Knowledge Management, and Implementation Strategy, work in synergy to help my organization through the implementation process? What CII education programs (Executive Leadership Course, Education Modules, Continuing Education Courses, and Technology Assisted Learning) are available to CII members? How does my organization tap into the resources, cases studies, and expert knowledge within CII? These questions and more will be addressed in a unique presentation by the Education, Knowledge Management, and Implementation Strategy Committees.

The plenary presentation will be facilitated by Tom Koulopoulos. Co-presenters are Carol Arnold, Richard Danks, and Bill Beck.

The implementation session will feature the Implementation Tool Box (ITB). The ITB is the best of the best in implementation, providing tools, case studies, and expert collaboration in pursuit of sustainable implementation.

Plenary Session Presenters

Carol P. Arnold – Knowledge Management Leader, DuPont Engineering

Carol Arnold is the co-chair of the CII Knowledge Management Committee. During her 30-year career at DuPont, she has had assignments in investment, cost control, manpower forecasting, and training. Currently, she is leading both DuPont Engineering University and the knowledge management implementation project in DuPont Engineering. Active in CII activities for several years, Arnold served on the Education Committee prior to her recent commitment to CII's knowledge management efforts. She earned a bachelor's degree in business administration from Wilmington College in New Castle, Delaware.

e-mail: carol.p.arnold@usa.dupont.com

William C. Beck – Vice President and Director of Quality Management, WorleyParsons

Over the past 25 years, Bill Beck has served in numerous areas including project management, procurement management, safety, business development, and materials management. He currently manages WorleyParsons' Global Quality Management Group and is responsible for business processes, project improvement, company certifications and registrations, and quality services. Active in CII for over 15 years, Beck helped with research efforts on international standards, lesson learned, and the work breakdown structure. He also has served on the Implementation Champions Committee and is currently a member of the CII Implementation Strategy Committee.

e-mail: william.beck@worleyparsons.com

Richard A. Danks – Deputy Chief, Facilities & Test Engineering Division, Glenn Research Center, National Aeronautics & Space Administration

Rick Danks is responsible for managing the Glenn Research Center's facilities operations, maintenance, facilities engineering, and construction. He has been recognized as the Federal Engineer of the Year for NASA by the National Society of Professional Engineers. He chaired the CII Design for Maintainability Research Team, is principal author of the CII publications on design for maintainability, and is a member of the CII Education Committee. Danks, a registered professional engineer (Ohio and Pennsylvania), earned a bachelor's degree in mechanical engineering from Lafayette College, Easton, Pennsylvania, and an MBA from Cleveland State University, Cleveland, Ohio.

e-mail: richard.a.danks@nasa.gov

Tom M. Koulopoulos – President and Founder, Perot Delphi Group

Tom Koulopoulos founded Delphi Group, a Boston-based firm that provides advice on leading edge technologies. Named one of the industry's most influential information management consultants by *InformationWeek*, he is recognized as an authority on the implications of information technology on global organizations. The author of six highly popular books, his works have introduced core industry concepts, frameworks, and vernacular such as single point of access, touch points, digital control rooms, business operating systems, and corporate IQ. Koulopoulos has been an adjunct professor at the Boston College Wallace E. Carroll Graduate School of Management and a guest lecturer at Boston University and at Harvard.

e-mail: tk@delphigroup.com

Implementation Session Moderator

Virgil L. Barton – Manager of Quality Services, Bechtel Power Corporation

Virgil Barton has over 33 years of experience in power, petrochemical, industrial, shipbuilding, and telecommunication projects. During his career, he has had both domestic and international project assignments. Prior to his current assignment, he held various positions in quality and construction services. An advocate of Six Sigma, he is a certified Six Sigma Champion. Barton currently serves as co-chair of the CII Implementation Strategy Committee.

e-mail: vbarton@bechtel.com

Implementation Session Participants

Carol P. Arnold – Knowledge Management Leader, DuPont Engineering
e-mail: carol.p.arnold@usa.dupont.com

William C. Beck – Vice President and Director of Quality Management, WorleyParsons
e-mail: william.beck@worleyparsons.com

Richard A. Danks – Deputy Chief, Facilities & Test Engineering Division, Glenn Research Center, National Aeronautics & Space Administration
e-mail: richard.a.danks@nasa.gov

Jay C. Hoover – Senior Project Manager, Johnson Space Center, National Aeronautics & Space Administration
e-mail: jay.c.hoover@nasa.gov

Tom M. Koulopoulos – President and Founder, Perot Delphi Group
e-mail: tk@delphigroup.com

Other Knowledgeable Points of Contact

Manuel A. Garcia – Associate Director, Construction Industry Institute
e-mail: manuel.garcia@engr.utexas.edu

Donald G. Giles – Regional Engineering Manager, Eastern Facilities, U.S. Steel Corporation
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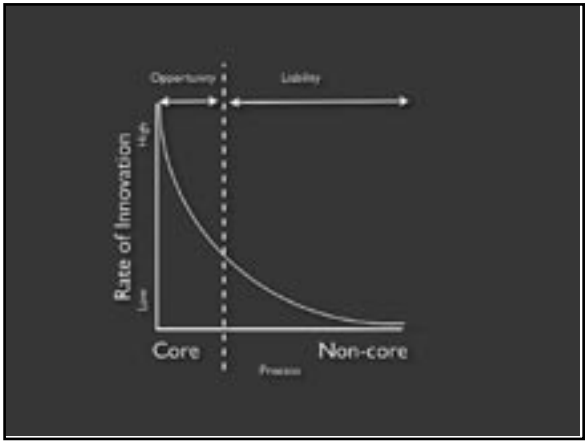
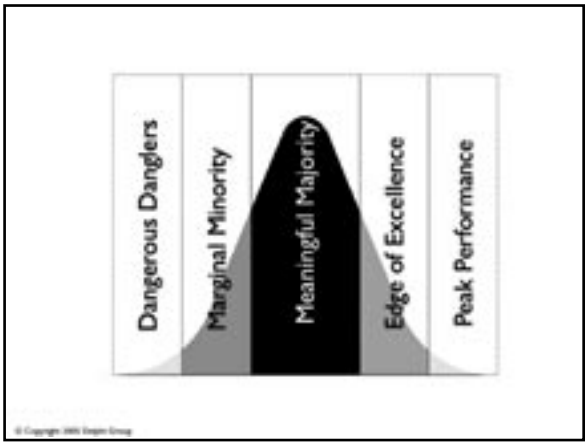
Leadership Drives Successful Implementation

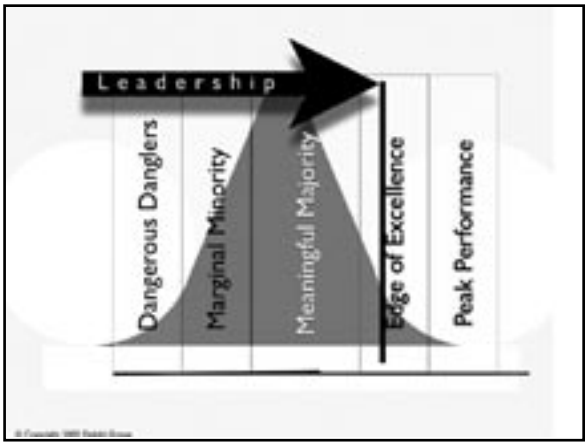
Plenary Slides

Notes

Notes


Opportunity
Liability
Rate of Innovation
High
Low
Core
Non-core
Process


Dangerous Danglers
Marginal Minority
Meaningful Majority
Edge of Excellence
Peak Performance


Leadership
Dangerous Danglers
Marginal Minority
Meaningful Majority
Edge of Excellence
Peak Performance


Interdependent Functions
CII Research
Knowledge management
Implementation Strategy
Education
Sustained improved performance

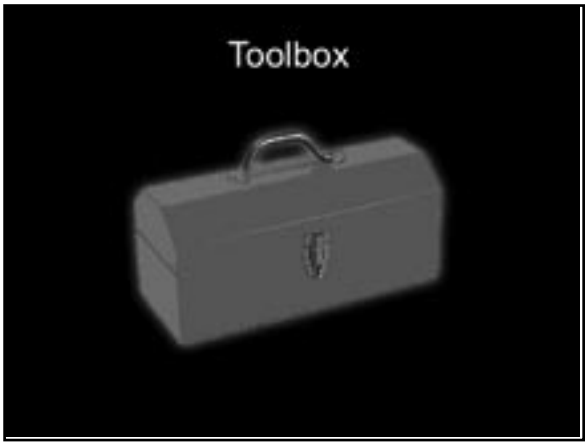
Notes


Knowledge Areas
CII Research Reports
CII Source Documents
CII Research Summaries
CII Implementation Resources
CII Technology Assisted Learning
CII Special Publications
CII Education Module
CII Videotapes
01 - Front End Planning
02 - Design
03 - Procurement
04 - Construction
05 - Startup and Operation
06 - People
07 - Organization
08 - Project Processes
09 - Project Controls
10 - Contracts
11 - Safety, Health & Env.
12 - Information Mgmt. & Technology Systems
13 - Globalization Issues
14 - Security

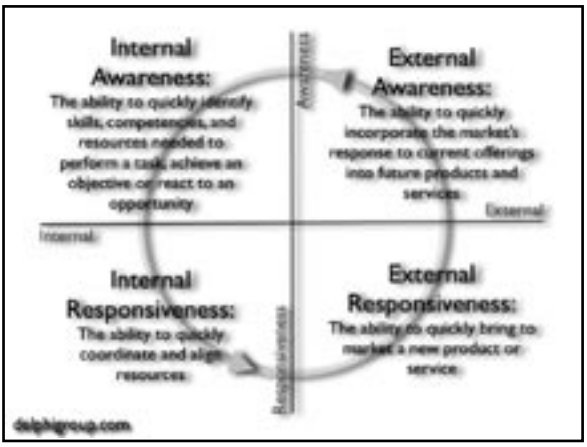

Education Links Leadership, Development & Improvement
CII Knowledge
Your Staff
CII Education Committee
Leader
Access to development
Applied Know-How
Implementation

Notes


CII EDUCATION DELIVERY SYSTEMS
Executive Leadership Course
Education Modules
Continuing Education Courses
Technology Assisted Learning (TAL)


Toolbox


The Implementation Model
Celebrate Success
Measure Results
Product Implementation
Products Training
Product Champions/Review Boards
Implementation Plan and Goals
Self Audit
Corporate Implementation Champion
Corporate Commitment
CII Products
CII Support
Benefit/Cost Data


Internal Awareness:
The ability to quickly identify skills, competencies, and resources needed to perform a task, achieve an objective or react to an opportunity.
Awareness
External Awareness:
The ability to quickly incorporate the market's response to current offerings into future products and services.
External
Internal
Internal Responsiveness:
The ability to quickly coordinate and align resources.
Responsiveness
External Responsiveness:
The ability to quickly bring to market a new product or service.
delphigroup.com


Join us: Implementation Session
• Moderator – Virgil Barton, Co Chair Implementation Strategy Committee
Participants
• Tom Koulopoulos - Perot/Delphi Group
• Bill Beck - Worley Parsons Implementation Strategy Committee
• Carol Arnold - DuPont Knowledge Management Committee
• Richard Danks - NASA Education Committee
CONSTRUCTION AHEAD


Implementation Agenda
• The Corporate IQ Test
• Knowledge Management
- Mission
- What's to come
• Education Committee
- Current and new programs
• Implementation Strategy Committee
- Implementation Resources
- Implementation Tool Box
CONSTRUCTION AHEAD

Notes

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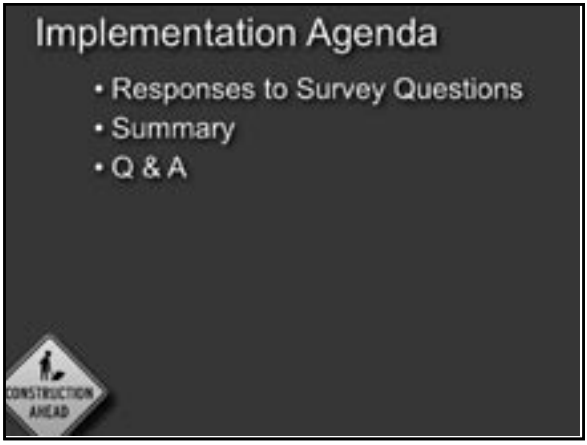
Implementation Agenda
• Responses to Survey Questions
• Summary
• Q & A
CONSTRUCTION AHEAD


Join us to take the
Corporate IQ Test
and See How your KM Rates

Blueprint for the Future: Workforce Diversity

ACE Mentor Program of America

Abstract

Early preparation of high school students for professions important to the construction industry is a critical need. The ACE Mentor Program is designed to bridge the gap in work force diversity. Introducing students to the industries while they are in their early high school years allows them to prepare properly for the professions.

Implementation session participants will receive a step-by-step agenda on how to start a program and what to anticipate in the first two years.

Plenary Session Presenter

Charles H. Thornton – Chairman, Charles H. Thornton and Co., Inc.; Consultant and Founding Principal, Thornton-Tomasetti Group; Founder and Chairman of the Board, ACE Mentor Program of America

Charles H. Thornton, co-chair of the Thornton-Tomasetti Group, an engineering and architectural services firm, also is founder and chairman of the ACE Mentor Program, which offers guidance to inner-city youth in architecture, construction, and engineering across the U.S. Thornton's 41 years of experience with the Thornton-Tomasetti Group have included design and construction of millions of dollars worth of projects in the U.S. and overseas, ranging from hospitals, arenas and high-rise buildings, to airports, transportation facilities, and special projects. An expert witness in many construction-related trials, he participated in FEMA's Building Performance Assessment Team to investigate the Oklahoma City bombing. Thornton is a member of the National Academy of Engineering and was awarded the *Engineering News-Record* Award of Excellence in 2001. He holds graduate, masters, and doctoral degrees from Manhattan College and New York University.

e-mail: cthornton@thettgroup.com
cthornton@chtandcompany.com

Implementation Session Moderator

Charles H. Thornton – Chairman, Charles H. Thornton and Co., Inc.; Consultant and Founding Principal, Thornton-Tomasetti Group; Founder and Chairman of the Board, ACE Mentor Program of America
e-mail: cthornton@thettgroup.com
cthornton@chtandcompany.com

Implementation Session Participants

Pat Coleman – Senior Associate, Thornton-Tomasetti Group
e-mail: pcoleman@thettgroup.com

Larry Kiser – Project Executive, Medical Cities Inc.
e-mail: lkiser@medicalcities.com

Steve Milner – Principal, Perkins and Will / CRA
e-mail: steve.milner@pwcra.com

Matt Papenfus – Vice President and General Manager, Turner Construction Company
e-mail: mpapenfus@tcco.com

Cathy Zaccarello – Thornton-Tomasetti Group, Inc.
e-mail: czaccarello@thettgroup.com

Other Knowledgeable Points of Contact

Pamela Mullender – Acting Executive Director, ACE Mentor Program of America
e-mail: pamela@mullenderassociates.com

Current Trends in Leadership Research and Implementation

Special Topic

Abstract

The plenary session will focus on the Vision of Engineering in 2020, the Construction Engineering Professional 2020, and the link between organization leadership and successful project outcomes. Recent research findings in leadership also will be presented

Participants at the implementation session will have the opportunity to obtain personalized leadership quality evaluations through tests provided at the session. The session will conclude with discussions from two CII members (one owner, one contractor) on their experiences and challenges concerning leadership in their organizations. Specifically, they will discuss the barriers to developing future leaders as well as the opportunities for leadership to bring productive changes to the organization.

Plenary Session Presenter

Paul S. Chinowsky – Associate Professor, Department of Civil, Environmental & Architectural Engineering, University of Colorado–Boulder

Paul Chinowsky is currently conducting research in leadership and management of architect-engineer-construct organizations and the role of technology in engineering collaboration. His book, "Strategic Corporate Management in Engineering," introduces civil engineering organizations to the concepts of strategic management. Chinowsky also is working with an international team to develop benchmarks for computer-based collaboration environments. Chinowsky, also a consultant to industry, holds bachelor and master's degrees in architecture from Cal Poly San Luis Obispo and a PhD in civil engineering from Stanford University.

e-mail: paul.chinowsky@colorado.edu

Implementation Session Moderators

Paul S. Chinowsky – Associate Professor, Department of Civil, Environmental & Architectural Engineering, University of Colorado–Boulder

e-mail: paul.chinowsky@colorado.edu

Anthony D. Songer – Associate Professor, Department of Civil & Environmental Engineering, Virginia Polytechnic Institute

Tony Songer is program coordinator for the Vecellio Construction Engineering and Management program at Virginia Polytechnic University in Blacksburg, Virginia. His research and teaching are in the area of project delivery and management, including organizational design, project management and leadership, and IT applications. Songer is a National Science Foundation Early Career award recipient. Additionally, he was awarded young researcher and outstanding teaching awards by the University of Colorado Civil Engineering Department. Songer is a graduate of the United States Military Academy and holds master's and doctorate degrees from the University of California–Berkeley.

e-mail: adsonger@vt.edu

Implementation Session Participants

Jim Breson – Director, Project Academy Training Program, BP America, Inc.
e-mail: jim.breson@bp.com

Christopher L. Parker – Senior Vice President, Houston Operations, WorleyParsons
e-mail: chris.parker@worleyparsons.com

Current Trends in Leadership Research and Implementation

Plenary Slides

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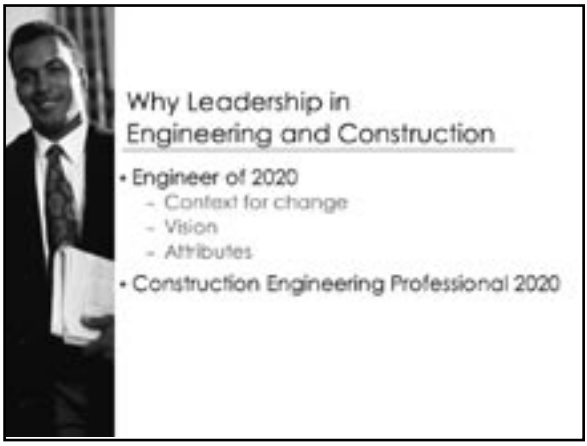
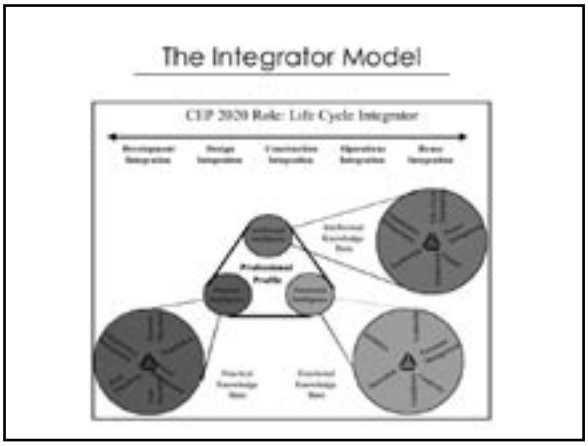
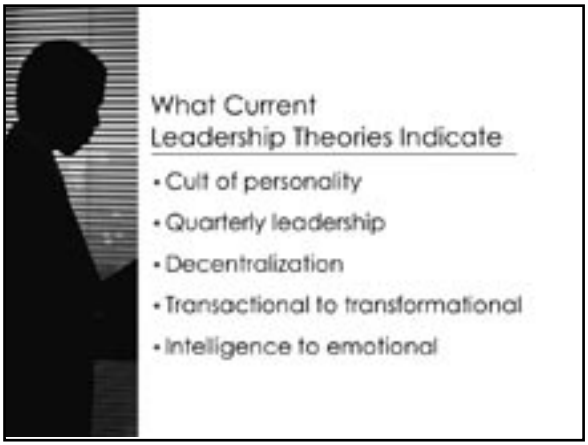
Success Based in Leadership
Results
Project Management
Operations
Vision and Strategy
Leadership


Why Leadership in
Engineering and Construction
• Engineer of 2020
- Context for change
- Vision
- Attributes
• Construction Engineering Professional 2020


The Environment of Change
• Technological
• Societal
• Global
• Professional


Professional
• Interdisciplinary and systems-based approaches
• Customerization
• Engineers involvement in public policy

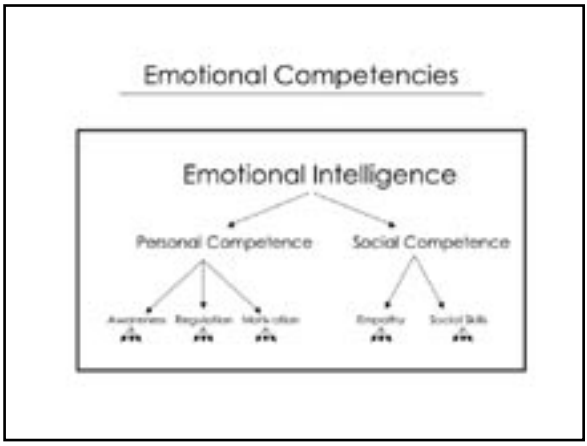

The Integrator Model
CEP 2020 Role: Life Cycle Integrator

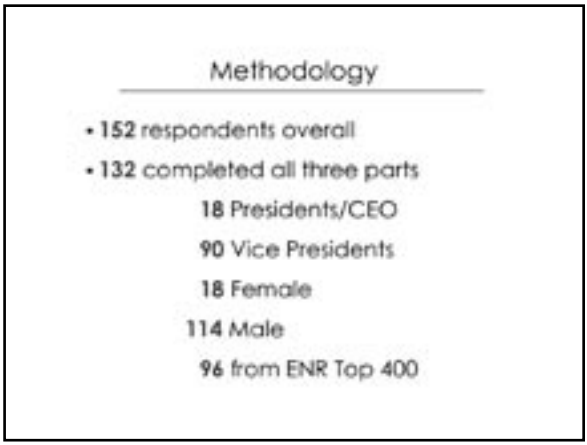

What Current
Leadership Theories Indicate
• Cult of personality
• Quarterly leadership
• Decentralization
• Transactional to transformational
• Intelligence to emotional

Notes

Notes


Emotional Competence
• The competencies
• The link to leadership

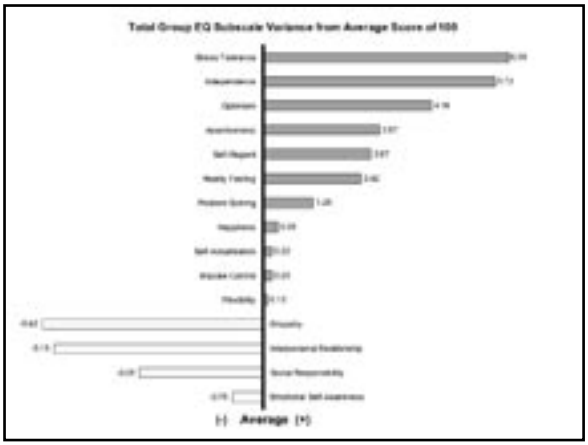

Emotional Competencies
Emotional Intelligence
Personal Competence
Social Competence

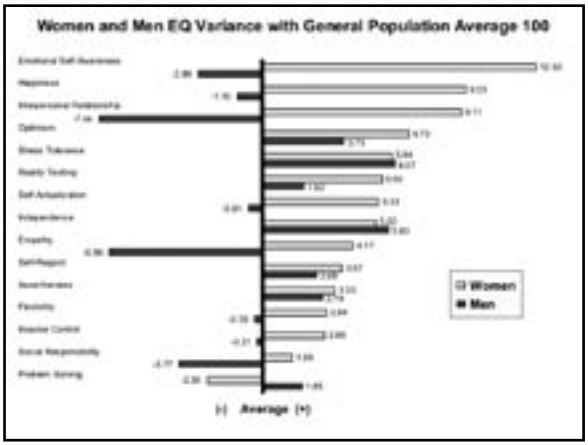

Methodology
• 152 respondents overall
• 132 completed all three parts
18 Presidents/CEO
90 Vice Presidents
18 Female
114 Male
96 from ENR Top 400

Data Analysis

Descriptive Statistics – Research Question #1

EQ Area	Mean	SD
Total EQ	101.14	10.72
Intrapersonal	102.55	11.78
Interpersonal	94.92	13.98
Stress Mgt.	103.50	10.65
Adaptability	101.65	10.03
General Mood	101.82	11.06





Notes

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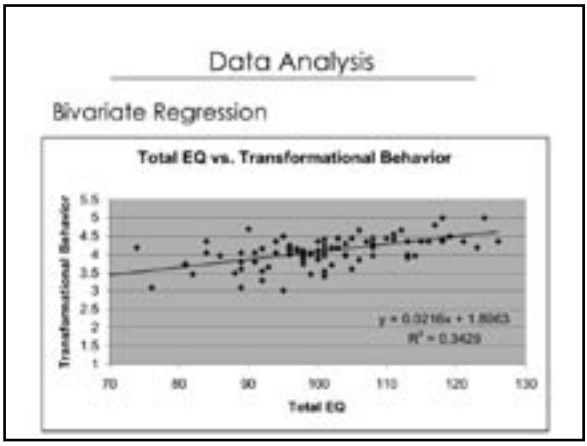
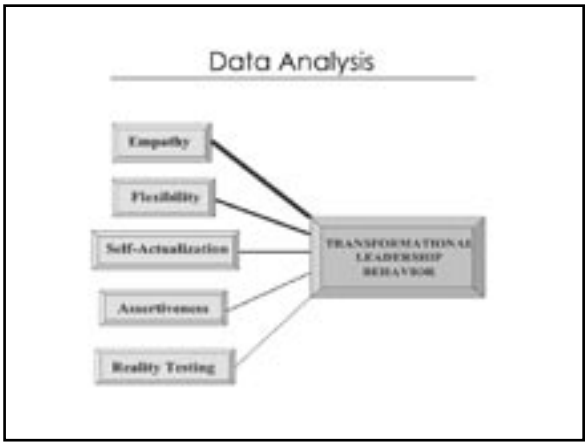
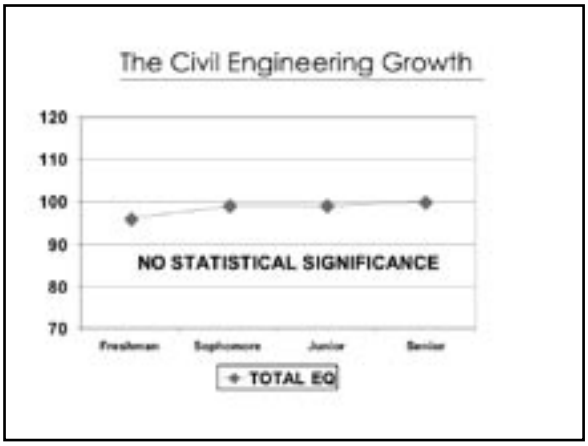
Transformational Leadership
Five Behaviors
1. Idealized influence – attributed
2. Idealized influence – behavior
3. Idealized motivation
4. Intellectual stimulation
5. Individual consideration


Data Analysis
Bivariate Regression
Total EQ vs. Transformational Behavior
Transformational Behavior
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
70
80
90
100
110
120
130
Total EQ
y = 0.0216x + 1.8063
R² = 0.3429


Data Analysis
Empathy
Flexibility
Self-Actualization
Assertiveness
Reality Testing
TRANSFORMATIONAL LEADERSHIP BEHAVIOR

Notes


Educational Challenge
• Professional and university development
• Continued development in "soft" skills
• Individual company profiles


The Civil Engineering Growth
120
110
100
90
80
70
NO STATISTICAL SIGNIFICANCE
Freshman
Sophomore
Junior
Senior
TOTAL EQ


Leadership In Action
• How to put this into action....

Notes

Leadership Trends and Implementation

Implementation Session
Tony Songer, PhD and
Paul Chinowsky, PhD
Moderators

Agenda

- Why Leadership
  - Engineer 2020
  - CEP 2020
- What
  - Transformational Leaders
  - Emotional Competent Leaders
- How

Panel

- Tony Songer, Virginia Tech
- Paul Chinowsky, University of Colorado
- Chris Parker – Worley Parsons
- -

Notes

Why Leadership in Engineering and Construction

- Leadership is NOT Management
- Leadership Relationship to Strategy
- Strategy Relationship to Success

Success Based in Leadership

Why Leadership in Engineering and Construction

- The Engineer of 2020
  - Context for Change
  - Vision
  - Attributes
- The Construction Engineering Professional 2020

Notes

The Environment of Change

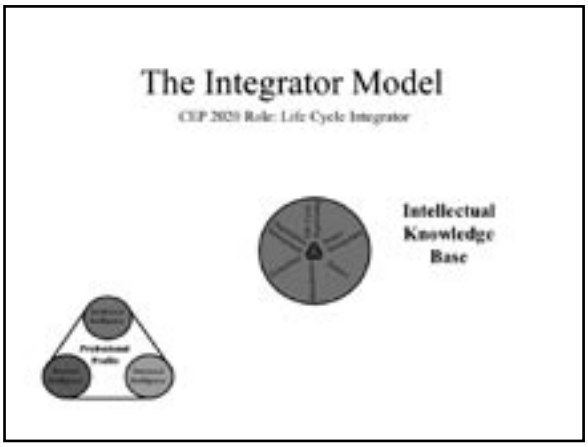
Technological
Societal
Global
Professional

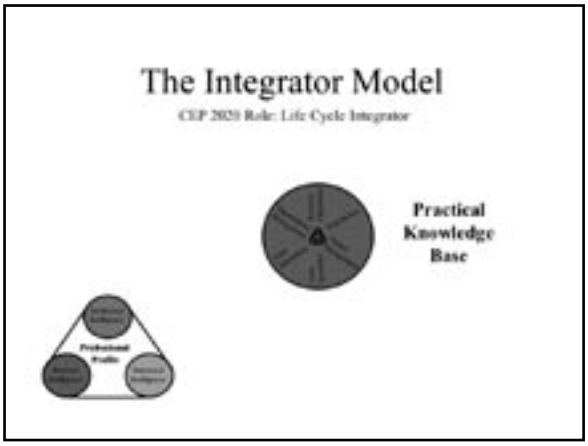
Professional

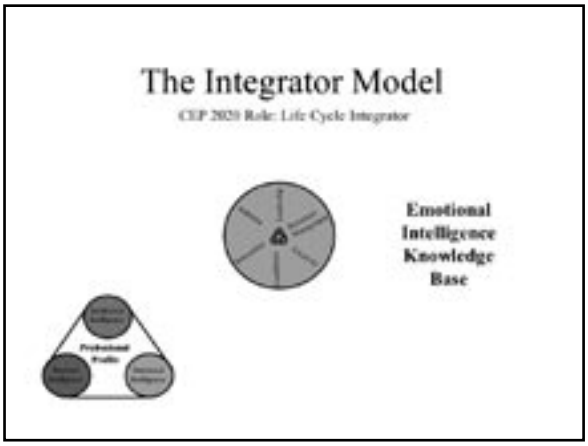
Interdisciplinary & Systems based approaches
Customerization
Engineers involvement in public policy

The Integrator Model

Notes

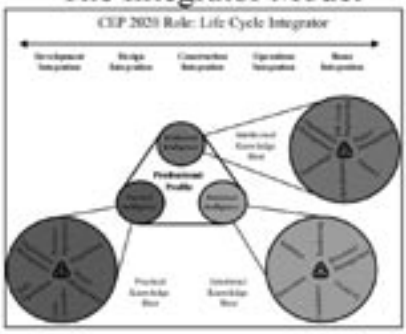

The Integrator Model
CEP 2020 Role: Life Cycle Integrator
Intellectual Knowledge Base
Professional Profile


The Integrator Model
CEP 2020 Role: Life Cycle Integrator
Practical Knowledge Base
Professional Profile


The Integrator Model
CEP 2020 Role: Life Cycle Integrator
Emotional Intelligence Knowledge Base
Professional Profile

Notes

The Integrator Model



What Current Leadership Theories Indicate

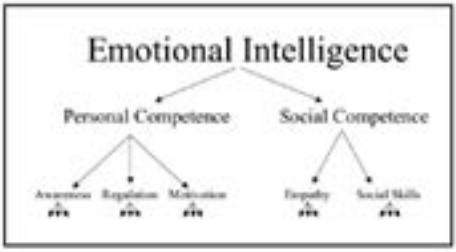
- Cult of Personality
- Quarterly Leadership
- Decentralization
- Transactional to Transformational
- Intelligence to Emotional

Emotional Competence

- The Competencies
- The Link to Leadership

Notes

Emotional Competencies



Methodology

152 Respondents overall

132 Completed all 3 parts

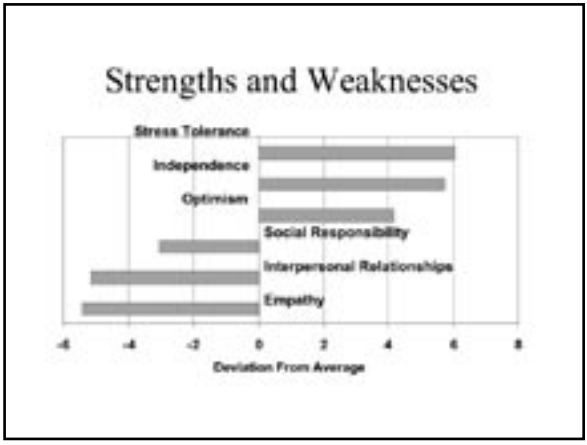
- 18 Presidents/CEO
- 90 VP
- 18 Female
- 114 Male
- 96 from ENR Top 400

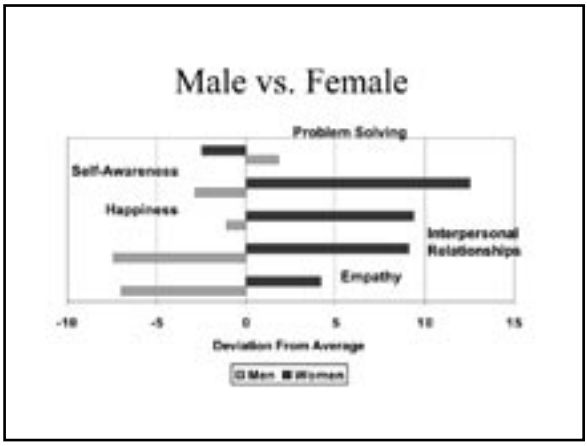
Data Analysis

Average = 100

EQ Area	Mean	SD
Total EQ	101.14	10.72
Intrapersonal	102.55	11.78
Interpersonal	94.92	13.98
Stress Mgt.	103.50	10.65
Adaptability	101.65	10.03
General Mood	101.82	11.06

Notes





Transformational Leadership

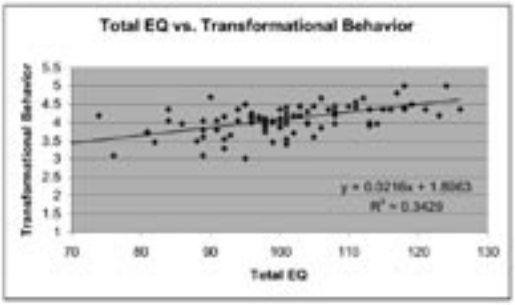
Five Behaviors

1. Idealized influence - attributed
2. Idealized influence – behavior
3. Idealized motivation
4. Intellectual stimulation
5. Individual consideration

Notes

Data Analysis

Bivariate Regression

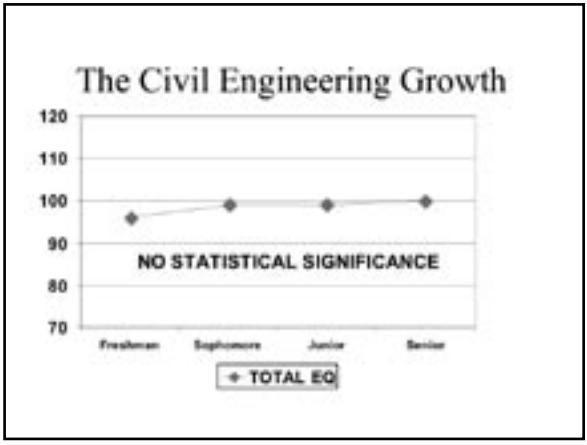


Data Analysis

Educational Challenge

- Professional and University Development
- Continued Development in "Soft" Skills
- Individual Company Profiles

Notes



Leadership In Action

- How to Put This into Action….
- Chris Parker, Worley Parsons
- ??, BP

How You Participate

- Fill In the Questionnaires
- We Will Add to Data
- We Will Send You Overall Results
- Ask Us About Individual Results
- Join Us At the Next Meeting -

Commodity vs. Value Added Services: Lost in Translation

Commodity vs. Value Added Contractor Services Research Team

Abstract

This presentation will show that communication between owners and contractors is blocked by misperceptions and lack of common language. Common terms for a constructive industry dialogue will be introduced. Also, the need for a contractors' perception of differentiators to align with the owners' perception of differentiators will be discussed.

The implementation session will present a decision-making model for strategic procurement by owners and strategic marketing by contractors. This strategic decision model is based on economic and marketing theory, proven industry application tools, and interpretation by construction industry leaders of key findings from the data collection. The team will present sound definitions to promote a construction industry dialogue and present the key findings from the team's workshop and data collection efforts.

Plenary Session Presenter

Stanley G. Schaffer – Manager of Architectural, Civil, and Structural Engineering, Anheuser-Busch Companies, Inc.

Stan Schaffer joined Anheuser-Busch in 1992 and is responsible for architectural, civil, and structural design of all domestic and international operations, including various Anheuser-Busch subsidiaries. Schaffer began his career with the Procter & Gamble Company in corporate engineering. At P&G, he served as project manager, construction manager, and technical manager positions. He co-chairs the CII research team studying commodity vs. value-added contractor services. Schaffer earned a civil engineering degree at the University of Nebraska.

e-mail: stan.schaffer@anheuser-busch.com

Implementation Session Moderator

Lewis T. Garrett – Director, Business Development, Honeywell Process Solutions

Tom Garrett has more than 25 years of experience in the process automation industry. For the past two years, he has been a member of the CII research team investigating commodity versus value-added engineering services. Garrett has held engineering leadership roles with operating companies, engineering contractor companies, and process control manufacturing companies. He has extensive experience in the oil and gas, petrochemical, and food and beverage industries. Garrett holds a bachelor's degree in mathematics from McNeese State University in Lake Charles, Louisiana, and an MBA from the University of Colorado at Boulder.

e-mail: tom.garrett@honeywell.com

Implementation Session Participants

Robert W. McManus – Region Manager, Southern Company
e-mail: rwmcmanu@southernco.com

Donald L. Sutphin – Manager, Pre-Construction Services, Baker Concrete Construction Inc.
e-mail: sutphin@bakerconcrete.com

Graeme Telford – Sourcing Group Manager, GlaxoSmithKline
e-mail: graeme.h.telford@gsk.com

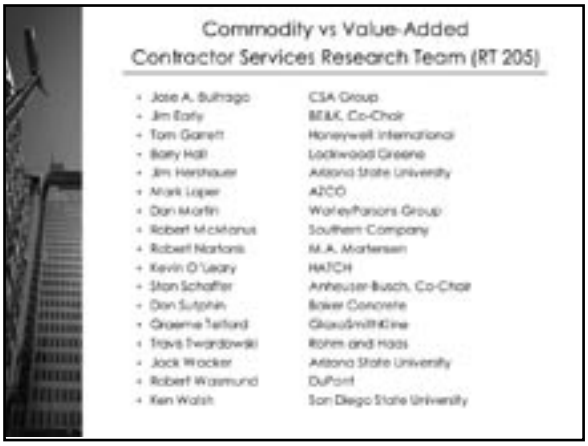
Travis E. Twardowski – Project Engineering Team Leader, Rohm and Haas Company
e-mail: ttwardowski@rohmhaas.com

Kenneth D. Walsh – Associate Professor, AGC – Paul S. Roel Chair of Construction Engineering & Management, San Diego State University
e-mail: kwalsh@mail.sdsu.edu

Commodity vs. Value Added Services: Lost in Translation

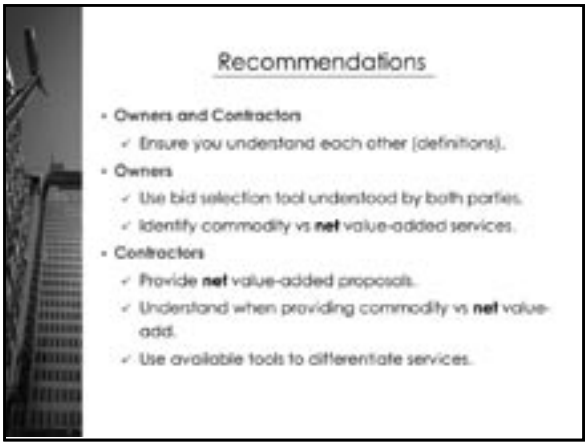
Plenary Slides

Notes



Notes


Findings
• Common definitions are critical in order to overcome communications barriers.
• Owners looking for net value-added services.
• More investment in front-end loading increases net value-added to owners.
• Perceptions drive responses and net value-added.


Recommendations
• Owners and Contractors
✓ Ensure you understand each other (definitions).
• Owners
✓ Use bid selection tool understood by both parties.
✓ Identify commodity vs net value-added services.
• Contractors
✓ Provide net value-added proposals.
✓ Understand when providing commodity vs net value-add.
✓ Use available tools to differentiate services.

Commodity vs. Value Added Services: Lost in Translation

Implementation Slides

Notes

Commodity vs.
Value-Added
Contractor Services
"Lost in Translation"

CII Research Team 205
Commodity vs Value-Added Contractor Services

Panel Members

- Don Sutphin – Baker Concrete Construction
- Robert McManus – The Southern Company
- Graeme Telford – GlaxoSmithKline
- Travis Twardowski – Rohm & Haas
- Ken Walsh – San Diego State University

Agenda

- Problem Statement
- Project Objectives
- Methodology
- Results
- Applications
- Nuggets
- Poster Content
- General Questions & Answers Session (hold questions until end of discussion)
- Poster Session Questions & Answers Session

Notes

Problem Statement

Lack of common understanding of **"commodity" and "value-added"**

1. Causes owners and contractors to often misunderstand each other.
2. Makes it difficult for owners to approach the market for contractor services.
3. Makes it difficult for contractors to develop responsive proposals and strategic marketing plans.
4. Reduces the chances of an owner receiving highest value-added contractor services.

RT 205 Project Objectives

- Develop a precise definition of terms.
- Develop an understanding of marketing and procurement strategies in capital project delivery process.
- Develop and test conceptual models for use by owners and contractors.
- Develop implementation materials to support deployment of models.

RT 205 Methodology

Definitions

Value

Benefits provided (used with modifiers such as market value, perceived value)

Definitions

Value-Add

Marginal increase in value created by features/functions of a good/service

Definitions

Net Value-Added

Value in relation to its associated cost (same concept as economic value-added).

Differentiation

The dissimilarity of the features and functions of a good or service.

Commodity

An undifferentiated good/service.

Notes

Notes

Key Workshop Result

- **Owners** believe that **more investment in front-end loading** increases life-cycle net value-added. (Influence curve)
- **Contractors** believe that **earlier contractor involvement during design** process for a project produces a higher net value-added.

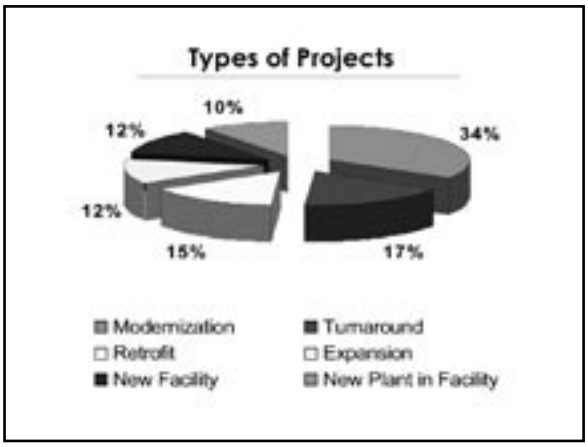
Case Study Result for 18 Projects – Influence Curve Confirmed

Every dollar spent in project scoping returns three dollars in reduced project cost, reduces project schedule, and reduces risk.

Data Collection Instrument Summary

- 91 questions on general project information
- 80 differentiators ranked
- 71 projects submitted
- 34 owner/contractor pairs
- Specific Questions for owners and contractors
- Project size: $250K to over $1 Billion
- Average project size: >$100 Million
- Median project size: ~$60 Million

Notes


Types of Projects
10%
12%
34%
12%
15%
17%
Modernization
Turnaround
Retrofit
Expansion
New Facility
New Plant in Facility


Owner/Contractor
Translation Interface
Basic truths:
• Both owners and contractors want successful project for owner.
• Everything cannot be most important _ trade-offs must be made.
"When everything is important, nothing is important."
Old management maxim
Key issues:
1. Which differentiators are relatively important to project success?
2. How do owners use these differentiators in evaluating contractors for a specific project?
3. How do contractors determine their specific competitiveness on each differentiator for a specific project?


Perceptions - Lost in Translation
Perceived Top 3 Differentiators Final Bid
Differentiators Linked to Net Value-Add - Final Bid
Owner
• Contract price
• OSHA recordable injuries
• Acceptance of terms and conditions
• Definitive safety plan w/ accountability
• Reduce ongoing facility ops costs
• Financial penalties
• Safety personnel experience
• Demonstrate delivery track record
• Unique field delivery strategy
• Constructability capability/experience
Contractor
• Project management experience
• Provide & manage skilled work force
• Contract price
Negative Correlation to NVA
• Office locations
• Compatibility of software
• Contract price
• Parent company ownership/support

Notes

Key Workshop Result

- **Owners** believe that **low-price owner procurement tactics** for contractor services **promote commoditization**.
- **Contractors** believe that contractor's **competitive advantage is not a perceived value-added to owners** who don't measure net value-added.

Differentiator Categories Related to Higher Net Value-Added

Risk management
Facility operating performance
Customer relations
Safety
Financial considerations
Delivery methodology
Quality management

Differentiator Categories Related to Higher Net Value-Added

Delivery Methodology	24%
Safety	20%
Quality Management	17%
Facility Operating Performance	14%
Financial Considerations	12%
Risk Management	7%
Customer relations	6%
	100%

Specific Differentiators within Categories Related to Net Value-Added

- Delivery Methodology (24%)
  - Demonstrated means of integrating planning process with scheduling software
  - Means of demonstrating delivery track record over recent projects
  - Construction Management Systems
  - Unique field delivery strategy
- Safety (20%)
  - Contractor commitment to zero injury goal
  - Safety plan (definitive, relevant, and providing assurance of accountability)
  - Safety personnel experience
- Quality Management (17%)
  - Actual field verification procedures
  - Technical & general information accuracy
  - Constructability (capability, experience)

Specific Differentiators within Categories Related to Net Value-Added

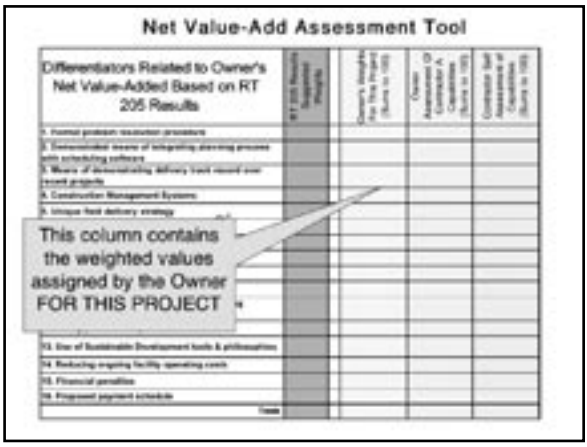
- Facility Operating Performance (14%)
  - Use of sustainable development tools and philosophies
  - Reducing ongoing facility operating costs
- Financial Considerations (12%)
  - Financial penalties
  - Proposed payment schedule
- Risk Management (7%)
  - Management of contractual risk
- Customer Relations (6%)
  - Formal problem resolution procedure

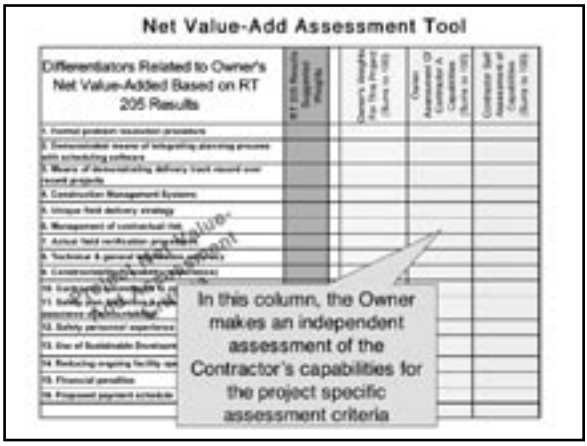
Net Value-Add Assessment Tool

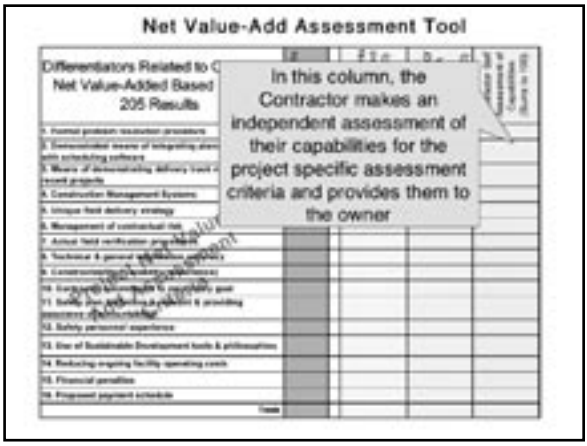
This column contains the actual value results from the data collected by RT205

Notes

Notes


Net Value-Add Assessment Tool
Differentiators Related to Owner's Net Value-Added Based on RT 205 Results
This column contains the weighted values assigned by the Owner FOR THIS PROJECT


Net Value-Add Assessment Tool
Differentiators Related to Owner's Net Value-Added Based on RT 205 Results
In this column, the Owner makes an independent assessment of the Contractor's capabilities for the project specific assessment criteria


Net Value-Add Assessment Tool
In this column, the Contractor makes an independent assessment of their capabilities for the project specific assessment criteria and provides them to the owner

Plenary Session Interview Issues

1) Formal problem resolution procedure
2) Compatibility of software
3) Means of demonstrating delivery track record over recent projects
4) Construction Management Systems
5) Management of contractual risk
6) Actual field verification procedures
7) Technical & general information accuracy
8) Reducing ongoing facility operating costs
9) Financial penalties
10)Low Price

Application of Tool to Plenary Session Interview

Differentiators for Owner's Project Depicted in Live Interview During Plenary	[illegible]	[illegible]	[illegible]	[illegible]
1. Formal problem resolution procedure	5	5	5	5
2. Compatibility of software	5	15	5	5
3. Means of demonstrating delivery track	15	2	7	7
4. Construction Management Systems	15	3	4	5
5. Management of contractual risk	10	5	7	5
6. Actual field verification procedures	5	10	4	7
7. Technical & general information accuracy	10	5	5	5
8. Reducing ongoing facility operating costs	15	10	1	7
9. Financial penalties	5	10	5	5
10. Low Price	20	35	10	5
Totals	100	100	50	54

Key Commodity vs Value-Added Nuggets

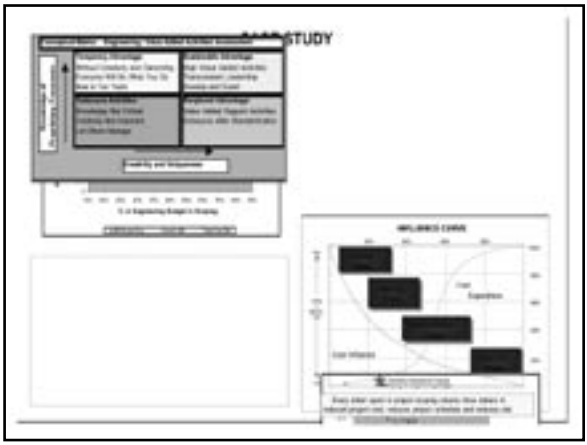
- Owners and contractors **do not communicate effectively** _ "Lost in Translation."
- **Value** can only be measured from **owner's perspective.**
- If **owners are buying on price**, they are **missing net value-added.**
- If **owners are not able to fully define what** they want (can't achieve low PDRI), they are **NOT buying a commodity.**

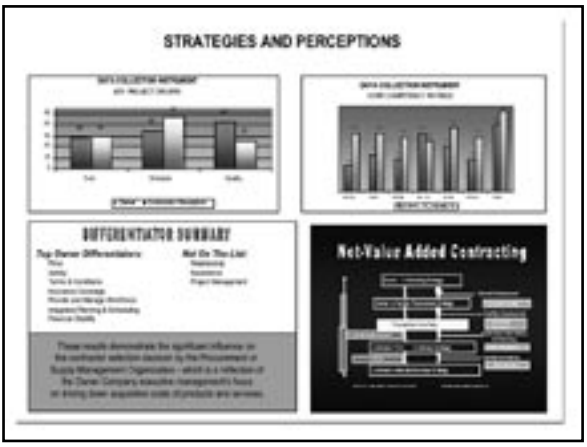
Notes

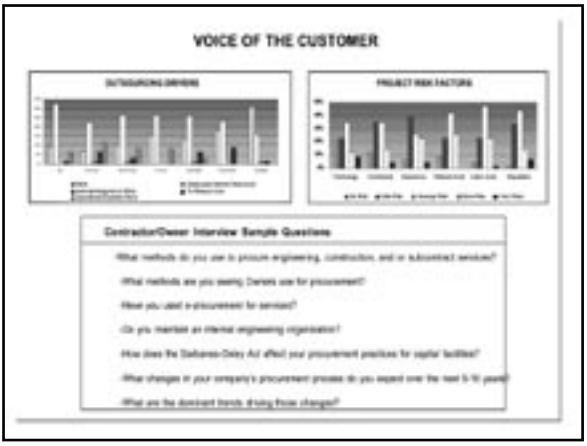
Notes

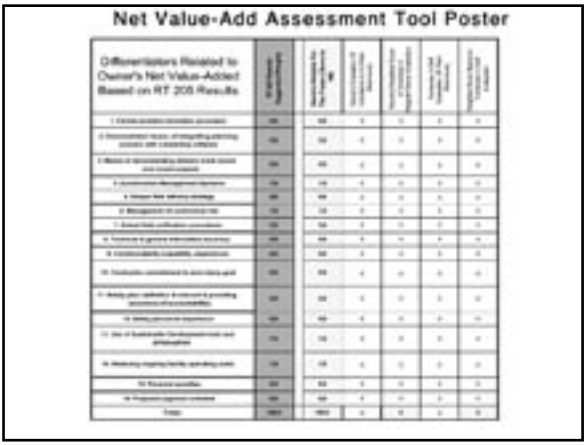
Poster Questions and Answers

- Case study – Selected results from the case study
- Data collection – Selected information about the data collected
- Strategies and perceptions – Project drivers, competency ratings and observations
- Voice of the customer – Outsourcing, risk factors and sample questions




STRATEGIES AND PERCEPTIONS
DIFFERENTIATOR SUMMARY
Net-Value Added Contracting


VOICE OF THE CUSTOMER
Contractor/Owner Interview Sample Questions


Net Value-Add Assessment Tool Poster
Differentiators Related to Owner's Net Value-Added Based on RT 205 Results

Notes

How to Keep Your Project Out of Litigation, Arbitration, and Even Mediation

Special Topic – Implementation Session only

Abstract

Good construction project managers know how to control costs, schedule, quality and safety — but few of them know how to control disputes. The construction industry has developed an astonishingly rich variety of tools for preventing, controlling, managing, and achieving early resolution of construction project disputes, yet few managers have developed the skills to use those tools.

This implementation session will review available tools, offer some practical examples of the use of those tools, and demonstrate their success in getting all disputes resolved at the project level without ever experiencing the kinds of contentious and expensive post-project disputes that have to be turned over to courts, arbitration panels or even mediators.

Implementation Session Moderator

James P. Groton – Attorney, Sutherland, Asbill & Brennan, LLP (Retired)

Jim Groton, an attorney, is a widely recognized expert in preventing, controlling, and achieving prompt resolution of project disputes. Now retired from law practice, Groton in recent years has served as an arbitrator and mediator and has been engaged in many educational and public service activities in construction and dispute resolution. He has been honored many times for his work in dispute resolution and was a founder and chairman of the Dispute Avoidance and Resolution Taskforce (DART). A member of the National Academy of Construction, Groton is a graduate of Princeton University and the University of Virginia Law School.

e-mail: jpgroton@sablaw.com

Implementation Session Participants

Andrew B. Blumenfeld – Construction Counsel, Pentagon Renovation Program
e-mail: blumenfeld@army.pentagon.mil

David B. Ratterman – Attorney, Stites & Harbison, PLLC
e-mail: dratterman@stites.com

How to Keep Your Project Out of Litigation, Arbitration, and Even Mediation

Special Topic – Implementation Session only

The Problem:

The infinite complexities of designing and delivering a constructed project, the multiplicity of organizations and individuals involved in the process, and the pressures of time and money, create many opportunities for disagreements during the course of a construction project. If these disagreements are not promptly resolved, they can escalate into disputes and conflict.

Disputes on construction projects disrupt and delay the process, increase construction costs, and cause the parties to incur substantial transaction costs in getting disputes resolved or adjudicated. CII research has shown that the costs of resolving disputes rise astronomically once the project is completed, and that they often wipe out the profits of all parties to the dispute. The cumulative economic effects of disputes substantially increase the costs of construction in the United States.

The construction industry has recognized this problem, and has taken steps to correct it, by devising many techniques, practices and tools, to prevent, control, manage, and achieve early resolution of disputes, thus avoiding the high costs of litigation and arbitration. Experience has shown that if these practices are instituted and implemented by leaders and managers of construction projects, disputes can be avoided or promptly resolved, saving the project participants the crippling costs of post-project dispute resolution through litigation, arbitration, or mediation.

Unfortunately, too few owners, contractors and managers of construction projects are aware of or use these dispute resolution tools. The National Academy of Construction and other industry leaders have concluded that the costs of disputes are one of the greatest problems facing the industry today. They have identified an urgent need to "light a fire" under key decision makers on projects, to motivate them to demand the use of proven dispute prevention and resolution practices on their projects.

Purposes of the Implementation Session:

This session will highlight the costs and benefits of preventing and achieving early resolution of disputes on construction projects, identify the proven tools that have been developed to accomplish this, provide examples of projects that have been successful and unsuccessful in resolving disputes, and demonstrate how the tools can be used to prevent disputes and to make sure that any disputes that do arise are resolved promptly. Presenters will give special emphasis to the two most important aspects of project dispute control: Equitable Risk Allocation, and Collaboration and Communication.

Tools for Preventing, Controlling and Achieving Early Resolution of Disputes

The construction industry has developed an astonishingly wide variety of proven tools to avoid, control, manage, limit and quickly resolve problems and disputes. These tools fall into four categories:

- **Prevention Tools**, implemented during the Planning and Pre-Project Planning stages of a project, structure the project in ways that avoid many of the problems that can create disagreements among project participants. Chief among these tools are Equitable Allocation of Risks and Partnering.
- **Problem-Solving Tools** create a project environment that is conducive to mutual collaboration in solving problems. Essential to this process are open communications and sharing of information..
- **Control Tools** level the playing field and provide transparency. Tools that help to achieve these objectives are the Geotechnical Baseline Summary Report and Escrowed Bid Documents.
- **"Real Time" Resolution Tools**, chiefly the highly successful Dispute Review Board, not only provide expert, objective, and prompt solutions to problems, but also help the parties mutually solve problems.

All of these tools have been successfully used by knowledgeable owners, contractors and project managers for many years; they are not difficult to understand; and they are easy to implement.

Equitable Risk Allocation

One of the principal functions of a contract is to allocate risk, and doing it well is critically important. No form of alternative dispute resolution, partnering, or other dispute minimization techniques can overcome a fundamentally flawed allocation of risk. A carefully considered, project specific, allocation of risk between the owner, the general contractor and the subcontractors can greatly increase the prospects for project success.

All too frequently, risk is allocated on the basis of the relative bargaining power prior to contract award. Provisions such as "no damage for delay," "pay if paid," and limiting recovery for differing site conditions and/or defective specifications, are all examples of risk shifting provisions imposed by superior bargaining power. Hard experience has proven that allocating risk based on bargaining power, versus allocating risk to the party in the best position to mitigate that particular risk, fails with alarming

frequency.

Bargaining power, or "leverage," in construction shifts between three principle parties: the owner, the general contractor, and the subcontractors as the project progresses. The owner's leverage, very strong prior to award, declines rapidly thereafter. The subcontractor's leverage, nonexistent prior to award, grows steadily after mobilization. Owners (and general contractors) who impose harsh contract provisions offered on a "take it or leave it basis" in the pre-award phase should expect similar treatment when leverage shifts to the subcontractor(s). For owners, resisting the temptation to include burdensome risk shifting provisions can create an atmosphere of trust that is indispensable to dispute minimization and project success.

Collaboration and Communication

The third portion of the presentation will deal with tools, both tangible and intangible, that enhance collaboration, communication, and the potential for success on complex construction projects.

Communication and collaboration are among the most ancient of tools known to human kind. Progress has been made in the evolution of our civilization when barriers to communication and collaboration have been broken down. Progress has stagnated when human kind has allowed fear and distrust, and uninformed self interest, to isolate us into individualized interest groups and build walls that separate those interest groups.

Unfortunately, lawyers are all too proficient at building walls between people. Overly zealous contract documents and liability- and fear-based management paradigms isolate and exclude. Collaboration and communication are inclusive tools that can unite project team members in common efforts and tear down unnecessary barriers to common success.

The Construction Industry's Adversarial Problems and the Steps It Is Taking to Solve Them

The Problem:

The Construction Industry Institute has concluded that "the U. S. construction industry is ill," and has complained that "litigation related to design and construction continues to increase." *Engineering News-Record* has editorially lamented "the awful litigious nature of this industry." The Business Roundtable has concluded that the U. S. construction industry is one of the country's least efficient industries, and blames much of this inefficiency on the "adversarial dance" between the parties to the construction project, which creates "a constant state of confrontation."

The adversarial nature of the construction industry wastes

incalculable energies and economic resources in dealing with disputes. This takes a terrible toll on the efficiency of the industry. In the words of The Business Roundtable, the construction industry is "a particularly seminal industry. The price of every factory, office building, hotel or power plant that is built affects the prices that must be charged for the goods or services produced in or on it." These prices affect not only the purchasers of the particular goods and services, but also the ability of American business to compete in a global market.

History of Efforts to Deal with the Problem:

1975: First Dispute Review Board was established, on the Second Bore of Eisenhower Tunnel.

1970s and 1980s: The Business Roundtable's CICE project, and early CII studies, addressed Realistic Risk Allocation, Strategic Alliances, Long-Range Partnering and other Best Practices.

Late 1980s: The U.S. Army Corps of Engineers experimented with innovative uses of Mediations, Mini-Trials, and Project-Specific Partnering.

1990–1991: The CPR Institute for Dispute Resolution Construction Committee undertook a comprehensive study of all construction industry dispute resolution tools, memorialized in the CPR book, "Preventing and Resolving Construction Disputes."

1991: CII made Dispute Prevention and Resolution the subject of its Forum at its Annual Conference held in Monterey, California.

Early 1990s: The CII Dispute Prevention and Resolution Research Team engaged in a multi-year detailed study of all dispute prevention and resolution techniques, conducted numerous surveys, investigated the use of Dispute Review Boards on conventional construction, developed the Disputes Potential Index, and produced many dispute prevention and resolution studies and products.

Early 1990s: The Dispute Avoidance and Resolution Task Force ("DART"), an industry-wide coalition of owners, contractors, subcontractors, design professionals, and insurance and bonding companies worked with CII in an effort to inform the industry about and implement best practices in dispute prevention and early resolution.

Late 1990s: CII continued with its efforts to implement dispute prevention and early resolution best practices.

Current Status of Acceptance of Dispute Prevention and Early Resolution Best Practices

There have been some notable successes on many U.S. Army Corps of Engineers, Air Force, and Navy projects in achieving resolution of all disputes during construction.

The use of DRBs has increased, and they have had a remarkable record of success, as documented by the DRB Foundation.

Some enlightened private project owners have achieved remarkable cost savings and other benefits by following CII best practices and best practices in dispute prevention and early resolution.

At the same time, these successes have largely been isolated and fragmentary, and limited to pockets within the construction industry. The vast majority of construction projects still lack any serious effort to establish team relationships or set up in advance efficient systems for controlling and resolving disputes. And these construction projects produce an enormous amount of very expensive arbitration and litigation.

Recent Dispute Resolution Initiatives

The National Academy of Construction, from its inception in 1999, has recognized the severity of the disputes problem and its impact on the construction industry, and undertaken to use its influence, and the influence of its individual members, to attack the problem of disputes in the industry. The Academy noted that the problem is not an unavailability of tools to prevent and resolve disputes, but rather the failure of the vast majority of industry participants to learn about and actually implement these tools. It reported:

"CII has sponsored research resulting in a series of published best practices for managing projects. We believe adoption and adherence to these best practices is the single most important step in dispute prevention. It is analogous to preventive medicine. Such topics as partnering, good project front end definition, role definition, building project teamwork, etc. provide guidance relative to how to effectively manage a project. A direct outcome of these practices is that significant disputes are either avoided or the team puts procedures in place to quickly and effectively resolve them. However, if a dispute does occur and cannot quickly be resolved among the immediate parties, there are proven dispute resolution techniques available that should have been agreed to in the original project contracts [to resolve all disputes promptly during the course of construction]."

It further pointed out that "The primary need today is to 'light a fire' under the key decision makers in the owner community and with design/construction companies so that they use the available tools faithfully." "We believe the key to success is our ability to enlist the key owner/contractor decision makers in sponsoring or better yet demanding use of best practices on their projects."

As a first step in carrying out this mission the National Academy of Construction, in collaboration with the Federal Facilities Council and the National Research Council, presented a national Forum at the National Academy of Sciences in September 2004 on the subject "Reducing Construction Costs: Uses of 'Best Dispute Resolution Practices' by Project Owners." The Proceedings of this Forum will soon be published by the National Academies Press.

Another initiative, supported by the National Academy of Construction, CII, the American Arbitration Association, the International Center for Conflict Prevention and Resolution, is a research study, financed by the Alfred P. Sloan Foundation, now underway at the Center for Construction Industry Studies at The University of Texas at Austin to determine empirically the costs and impacts of various forms of dispute resolution. Preliminary results of that study demonstrate that there are astronomical differences between the costs of post-project dispute resolution through litigation, arbitration and even mediation on the one hand, and the relatively modest costs and considerable benefits of implementing dispute prevention and early resolution methods. This research should lead to wide recognition of the economic benefits of dispute avoidance and early resolution, and provide convincing evidence to corporate managers and project leaders that they should institute dispute prevention and early resolution best practices on their projects.

The Path Forward

Based upon the construction industry dispute resolution experience outlined above, the keys to dispute avoidance and/or resolution certainly include the following:

a. Both contracting parties view their relationship as one of working together to advance the project.

b. Both contracting parties understand and respect the forces driving their opposite number; neither seeks unfair advantage or "something for nothing."

c. Both parties recognize the expense and waste inherent in an extended and escalated dispute resolution process.

d. Senior managers of both parties make their policies regarding dispute avoidance and resolution clear to subordinates, and they insist on adherence.

e. Channels of communication are kept open and functioning.

f. When disagreement surfaces, both parties seek quick, fair, and equitable resolution without escalation to the dispute level.

g. Exemplary performance is recognized and rewarded.

"Construction" embraces a wide variety of building and erection activities. A "job" may range from a small work crew and some specialty subcontractors to a gigantic dam or billion-dollar process plant. The construction industry, at all levels, should be concerned with the unnecessary costs and effects of disputes, wherever they may arise.

How to Keep Your Project Out of Litigation, Arbitration, and Even Mediation

Slides for Introductory Remarks

Notes

How to Keep Your Project Out of Litigation, Arbitration, and Even Mediation

Implementation Session

Jim Groton
Andrew Blumenfeld
David Ratterman

CII Annual Conference	Grapevine, Texas	July 20-21, 2005

Key Management Controls

- Control of costs
- Control of schedule
- Control of quality
- Control of safety
- Control of disputes

Evolution of a Dispute

1. Starts with a **Problem.**
2. Develops into a **Difference of Opinion.**
3. Progresses into a **Disagreement.**
4. Becomes a **Dispute.**
5. Finally escalates into **Conflict.**

Notes

Relative Costs of Post-Project Dispute Resolution

- Neutral Expert Advisory Opinion: $
- Mediation: $ $ $ $ $
- Mini-Trial: $ $ $ $ $ $ $
- Non-Binding Advisory Arbitration: $ $ $ $ $ $ $ $ $
- Binding Arbitration: $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $
- Private Judge: $
- Litigation: $

Relative Costs of Dispute Control & Early Resolution

- Equitable Risk Allocation: 0¢
- Dispute Potential Index: 1¢
- Incentives: 5¢
- Partnering: 2¢
- Negotiation: 0¢
- Dispute Review Board: 5¢

An Outline of Construction Dispute Prevention and Early Resolution Tools

by James P. Groton

More than other industries, the construction industry depends upon coordination, cooperation and teamwork among multiple participants. Ironically, the construction industry in recent years is probably the country's most adversarial, with ever-increasing numbers of construction disputes and claims, antagonistic relationships, "win-lose" attitudes and a tendency to postpone the resolution of disputes until the end of the project. Unfortunately, unresolved disputes that accumulate and fester inevitably interfere with the overall success of a project by holding up payments, creating uncertainty, and impairing relationships and efficiency. The postponement of dispute resolution to the end of a project also increases the difficulty and expense of reconstructing the project record "after-the-fact" and causes a geometric increase in transaction costs in the form of fees paid to lawyers, claims consultants and expert witnesses, as well as the lost time of the parties themselves.

The disputes that are ordinarily dealt with for the first time in mediation, arbitration or litigation do not spontaneously erupt overnight. Instead, they escalate and mature from differences of opinion, to disagreements, and finally to conflicts that require traditional dispute resolution techniques and the attendant transaction costs.

As a reaction to this spiral of conflict, there is a growing movement within the construction industry to move the dispute resolution process "upstream," closer to the source of disputes. The industry has developed an array of dispute resolution tools and techniques, described below, that can prevent disputes or encourage their earliest possible resolution.

Wise use of these "up-front" techniques will deal with the root causes of disputes rather than just the symptoms. These techniques will also minimize or eliminate the time and expense associated with conventional dispute resolution and have the added benefit of helping the parties preserve their valuable business relationships.

A. Pre-Project Planning and Prevention Tools

1. Follow the CII Best Practices that recommend how to set up the project in a way that will minimize problems, e.g.

Pre-Project Planning	Other CII Practices:
Alignment	Project Definition Rating Index (PDRI)
Constructability	Disputes Potential Index
Design Effectiveness	
Planning for Startup	
Team Building	
Quality Management	
Change Management	
Partnering	
Dispute Prevention and Resolution	

2. Select the most appropriate project delivery method. The construction industry has developed many different methods of delivering a project, such as traditional design-bid-build, cost-plus, cost plus subject to a guaranteed maximum price, construction manager at risk, construction manager as agent, design/build, bridging with design/build, etc. The project delivery method for the project must be chosen with care, depending on the nature of the project.

3. Allocate project risks realistically. Assign each project risk to the party who is best able to manage, control or insure against the risk. If a party is saddled with a risk that it cannot handle, this creates resentment and adversarial relationships, and sows the seeds of countless potential disputes.

4. Provide financial incentives to parties to encourage cooperation. An example is a "bonus pool" which will be divided among all the subcontractors in proportion to their contract amounts provided they all meet certain defined goals of cooperation and teamwork. The bonus is payable either to everyone or to no one, thus encouraging the participants to support and assist each other by focusing on legitimate project goals, and subordinating selfish interests for the ultimate benefit of all project participants.

5. Try to predict the likelihood of the project to generate disputes, and take action to prevent the most likely disputes. The Construction Industry Institute has developed a predictive tool for this purpose called the

Disputes Potential Index. If administered at the beginning of the project, project leaders can take action in certain vulnerable areas to minimize the risks of project disputes.

6. Use Partnering. This is a team-building effort in which the parties establish cooperative working relationships to work together to achieve project goals and resolve potential problems. It can be used for long-term relationships or on a project-specific basis.

B. Problem Solving Tools

7. Negotiation. This is the time-honored method of discussing problems and resolving them consensually by focusing on the legitimate interests of both parties in getting the problem solved so they can move ahead with the project. The focus should be on "First, let's fix the problem," rather than "First, let's fix the blame."

8. Step Negotiations. Sometimes the negotiation process is structured so that if the jobsite representatives are not able to resolve a problem at their level, their immediate superiors, who are not as closely identified with the problem, are asked to resolve the problem. If they fail, the problem will be passed up to higher management of both parties. Because of an intermediate manager's detachment and interest in demonstrating to higher management the intermediate manager's ability to solve problems, there is a built-in incentive to resolve disputes before they go to the higher level.

C. Dispute Control Tools

9. Geotechnical Baseline Summary Report. Where a project may encounter unanticipated geotechnical conditions, it is useful to establish, at the time of contracting, a geotechnical "baseline" of expected underground conditions, from which any changed conditions can be measured, with price adjustments at pre-agreed unit rates. This device generally results in more uniform bid prices, less exposure to claims involving interpretation of subsurface data, and a transparent non-controversial changes procedure which should foster a climate of openness and candor.

10. Escrowed Bid Documents. Because of the likelihood of changes to any construction project and the need to obtain the most reliable pricing information for changes, it is often helpful to place the successful bidder's estimating calculations in escrow, so they can be consulted whenever either party believes that reference to the original quantity and price calculations can provide information helpful to the pricing of changes. This device also fosters a climate of openness and candor on the project.

D. "Real Time" Dispute Resolution at the Job Site

11. Architect's or Engineer's Decision [less effective]. The expert design professionals who designed the project have traditionally been called on to make rulings on questions of compliance with the contract requirements and workmanship. These decisions, while not binding on the parties, can often help resolve problems in the field promptly.

12. Dispute Review Board. A more modern and much more successful alternative to architect's or engineer's decisions is the dispute review board, usually consisting of three neutral construction experts, chosen mutually by the owner and contractor at the commencement of the project, who are asked to become generally familiar with the project and its progress, and be available to render advisory decisions promptly on any problems that the parties have been unable to resolve between themselves. The existence and ready availability of trusted expert neutrals who have been chosen by and have the confidence of the parties, and the knowledge that if asked they will render objective decisions which will administer "a dose of reality" to the parties, has many advantages in encouraging the parties to resolve disputes promptly. This process has enjoyed great success in both preventing disputes and achieving early consensual resolution of disputes on virtually every project in which it has been used.

13. Standing Arbitration Panel [less effective]. A variant of the dispute review board process is the designation by the parties of one or more arbitrators at the commencement of the project to render binding decisions promptly on problems that the parties have been unable to resolve between themselves. This technique has not been as successful as dispute review boards have been, largely because the prospect of a binding decision will almost invariably cause the parties to get lawyers involved, thus adding expense, polarizing positions, and escalating adversarial attitudes. This process also takes away the ability of the parties to cooperatively work out their own mutual resolution of the dispute.

14. Standing Mediator [less effective]. Another variant of the dispute review board process is the designation by the parties of a mediator at the commencement of the project to assist the parties in resolving disputes. This technique is rarely used, probably because what the parties need at this point is not a facilitator to encourage them to compromise every dispute, but rather an objective expert who can administer the "dose of reality" referred to above, a process that is more likely to give the parties a principled basis for resolving the dispute. Also, as in the case of arbitration, parties confronted with the prospect of mediation are likely to get lawyers involved; thus adding expense, polarizing positions, and escalating adversarial attitudes.

E. Overall Project Organization and Dispute Control and Management Techniques

15. Designing "Stepped" Approaches to the Prevention, Control and Early Resolution of Disputes. There are many techniques and approaches to preventing, controlling and resolving disputes. Since problems and potential disputes can occur in many different ways and at different times during a construction relationship, no one size of dispute resolution mechanism fits all problems and disputes. Therefore the most successful approach is, at the beginning of a construction relationship, to acknowledge the reality that problems and disputes will occur, try to anticipate the kinds of problems and disputes that are most likely to occur, and design a system of techniques, controls, filters and dispute resolution devices that will insure that all disputes are promptly and realistically dealt with by the parties and resolved at the earliest possible time, before they fester and grow into serious disputes. A typical "stepped" approach would be for the parties to design a system of techniques that will, first, establish a cooperative project environment; second, set up controls that will minimize the frequency and severity of problems and third establish real time or jobsite techniques designed to get disputes resolved during construction. Then, in the unlikely event that these techniques do not resolve all problems, provide for a "backstop" combination of mediation and finally arbitration before expert construction industry arbitrators as the final resort.

16. Employing a "Project Neutral." On some large, complex, many-phase construction projects involving many different parties over a long period of time, it has been useful to employ a full-time expert in both construction and dispute resolution to continuously monitor the project to make sure that all of its dispute prevention, control and resolution mechanisms are operating well, and if they are not, to recommend to the parties other dispute resolution techniques that will make it certain that all disputes are successfully resolved.

17. Designating a "Project Counsel." On large projects which are expected to involve many different complex legal relationships and questions, the project can be well served if all of the parties collectively select and employ an expert construction lawyer who would be the legal advisor for, and represent, the "project" as a whole, not any individual party. The task of Project Counsel would be to help the parties to select the most appropriate project delivery system, assure that all contracts and insurance arrangements on the project are consistent with each other and integrated, participate in team building processes, work with the parties to design project-wide systems for dispute prevention, control and resolution,

and otherwise guide the project through the thicket of the complex legal relationships between the parties so that the project as a whole is successful, thus benefiting all parties to the project.

18. Project Alliancing. This is a process of structuring the organization of the Project in such a way as to align the commercial interests of all the parties, share risks and rewards equitably between the parties, provide incentives to work cooperatively and openly and perform well and even exceptionally, and align attitudinal objectives of the parties so as to create mutual commitment, trust, openness, flexibility, and teamwork.

How to Keep Your Project Out of Litigation, Arbitration, and Even Mediation

Slides for Dispute Prevention and Resolution Tools

Notes

Brief Review
of
Typical Dispute Prevention
and Resolution Tools

Jim Groton

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Prevention Tools

1. Use CII Best Practices to set up the project.
2. Select the most appropriate project delivery method.
3. Allocate project risks realistically.
4. Provide incentives to encourage cooperation.
5. Evaluate the potential for disputes – and take corrective action.
6. Use partnering.

CII Best Practices

1. Pre-Project Planning, including Project Definition Rating Index (PDRI)
2. Alignment
3. Constructability
4. Design Effectiveness
5. Planning for Startup
6. Team Building
7. Quality Management
8. Change Management
9. Partnering
10. Dispute Prevention and Resolution

Notes

Problem Solving Tools

7. Open communications and negotiations
8. Step negotiations

Dispute Control Tools

Leveling playing field and providing transparency:

9. Geotechnical baseline summary report
10. Escrowed bid documents

"Real Time" Dispute Resolution at Job Site

11. Dispute Review Board

Dispute Review Board

1. One or three impartial members:
   - Joint selection
   - Serve for duration of project
2. Regular meetings at project site:
   - Progress updates
3. "Real time" dispute resolution:
   - If unresolved dispute, prompt referral to DRB
   - Prompt, informal hearing
   - Non-binding written recommendation from DRB
4. Key reasons for DRB success:
   - Early and continuing involvement of DRB
   - Respect and trust in DRB members
   - Timely resolution of any disputes

DRB: "Backdoor Partnering"

- Presence of DRB forces a "reality check."
- Parties anticipate DRB's likely reaction.
- Parties usually resolve disputes without DRB involvement.

During the planning stage, set up a comprehensive system for prevention, control, and earliest possible resolution of disputes by adapting these tools to the special needs of the project.

Notes

Equitable Risk Allocation

by Andrew Blumenfeld

The single most important element of dispute minimization is the equitable distribution of risk, which begins well before the contract is awarded.

One of the principal functions of a contract is to allocate risk, and doing it well is critically important. In my view, no form of alternative dispute resolution (ADR), partnering, or other good dispute minimization techniques can overcome a fundamentally flawed allocation of risk. There must be an allocation of risk which reflects the commercial reality of the project, not merely the relative bargaining power of the owner in relation to the general contractor.

There are two principal methods of allocating risk. One is the active method, which is most appropriate for large, complex projects. This is a project-specific plan where the owner develops a detailed understanding of his risk profile. Active risk allocation typically requires substantial planning, time, and cost. There is an up-front cost the owner must be able to bear.

Active risk allocation is suitable for large projects that involve renovation of an existing structure, which is always risky, and projects with unknown factors that are beyond the control of either party. Such factors include geotechnical or environmental conditions, restricted site access, permitting, historic preservation, political issues, hidden conditions, and market/inflation risk in a multiyear contract. Rather than write a contract that puts all of the risk on the contractor, the owner can write a contract with a common baseline. If the actual situation turns out significantly different from the baseline, the contract price can be adjusted (Figure A).

Active Risk Allocation: Managing Unknowns

• Fixed bidding assumptions	➔ "Assume 100,000 CY of contaminated soil removal."
• Pre-priced general condition costs	➔ Bid a daily cost for general conditions in the event of an owner-caused delay.
• Market basket	➔ Shared risk for inflation in market priced commodities such as rebar, drywall, concrete, etc.
• Bilateral exercise of options	
• Limitations on markups	

Figure A. Active risk allocation.

The second useful risk allocation procedure is to pre-price general conditions cost. If the project is likely have some delays, as the owner I want the general contractors who are bidding on the project to tell me how much it is going to cost for each day the project is delayed. Then, as exigencies arise, I can have a fairly good estimate of what some of the delay costs are going to be.

With multi-year projects such as the Pentagon, inflation of materials costs is a significant cost driver. The Pentagon hired a cost estimating firm to create a custom inflation index of the materials used on the project. Every three years the base price is adjusted to reflect changing market conditions.

For multi-year projects, it is also in the owner's interest to have a bilateral exercise of options: First, as an owner, I don't want to work with a contractor who doesn't want to be there. Second, bilateral option exercise dramatically reduces risk for a general contractor and, as a result, the initial bids will be somewhat lower.

Contract provisions imposing limits on "soft" overhead costs on owner-directed changes is a prudent practice, particularly in projects with a large number of specialty subcontractors. Where the physical work is performed by a second or third tier subcontractor, permitting each intervening layer of subcontractors and the general contractor to apply their burdens in a formulaic manner can skew the relationship between value-added work and total costs. Imposing a cumulative limit on markups, defined as a not-to-exceed percentage of the performing subcontractor's price, helps the owner manage overhead costs while permitting the contractors to recover legitimate overhead costs on changes.

Active risk allocation also includes contract type, of which there is a range: from hard money lump sum, to guaranteed maximum price, cost, incentive, time and materials; or a hybrid combination of any of these.

Passive risk allocation is the standard package of clauses found in government contracts or the American Institute of Architects standard form contract. These are allocations of general purpose for items such as differing site conditions, site investigations, unusually severe weather, permits and responsibilities, changes, and the like. Passive risk allocation is appropriate for vertical construction on a previously undeveloped or "green" site, smaller projects with manageable unknowns, standard commercial office spaces, and most federal construction projects.

Using Leverage Wisely

It is not uncommon for owners to attempt to shift the project risk to the contractor up-front because of their leverage at this point in the process. Owners do this by adding clauses that impose no damages for delay or shift the risk of defects in specifications and drawings to the general contractor. However, a commercially unreasonable allocation of risk almost always fails. First, it drives away the top firms, who will choose not to bid on the project. Second, it creates an atmosphere of distrust. Third, it requires contractors to include in their proposals large risk contingencies that may not be realized. Fourth, is the phenomenon called "balloon theory". This is where the owner uses the contract or a regulation, or other leverage to attempt to squeeze costs out of one area. However, these costs will pop up in another area. The courts disapprove of these risk-shifting provisions.

The key is using leverage wisely. Leverage in a construction project, particularly a big construction project, shifts between three principal parties: the owner, the general contractor, and the subcontractors.

In the solicitation and award phase, owners have all the leverage. They can dictate the contract type, the specifications, the project delivery method, who can bid (based on past performance, bonding or other factors), award criteria (low bid, best value), allocation of risk through specific contract clauses.

The owner then awards the contract, shifting leverage to the general contractor. The general contractor then selects the subcontractors. The general contractor can choose whether or not to honor the subcontractors' pre-award bids, he may "shop" the bids, or adjust significant terms and conditions. In many cases, the subcontractors are relatively powerless at this point and faced with a take-it-or-leave-it contract.

At the mobilization and construction phases of the project, the leverage shifts from the general contractor to the subcontractors, who are responsible for delivering a significant portion of the job. Some subcontractors may feel the need to recover losses through change orders and claims if the general contractor has used them badly. In short, what goes around comes around. If the situation has reached this point, partnering or other ADR techniques will not work: Effective partnering requires that people be treated fairly from the beginning.

Another good reason that owners and general contractors should use their leverage gently is the time factor (Figure B).

36—Month Project Schedule

Phase 1	Phase 2	Phase 3
1—3 months	1—3 months	Duration of Project

Phase 1: **Solicitation to Award:** Owner has the leverage.

Phase 2: **Award to Buy-Out:** General contractor has the leverage.

Phase 3: **Mobilization to Completion:** Subcontractors have the leverage.

Figure B. Leverage timeline

Phase 1, where the owner has the leverage is very brief, probably 1–3 months. Phase 2, award to the general contractor, may last 1–3 months. For the remainder of the project, which may take several years, the subcontractors have the leverage. No one should be surprised if subcontractors who have been treated unfairly in Phase 2 "return the favor" in Phase 3.

ADR, partnering, and other hybrid methods of dispute minimization begin with equitable allocation of risk where leverage is used to create an atmosphere of trust. Complex projects require active risk allocation and careful planning. To help create trust and foster communication in the Pentagon renovation project, the owner's representatives, the general contractor, and the subcontractors, all work closely in the same space or trailer. Maximizing communication is critical, but trust cannot be achieved if the allocation of cost and risk is fundamentally flawed.

Background Materials

Exploring why best practices and effective dispute prevention and early resolution techniques are so little used, and what can be done about the problem

Why is there such a disconnect between the existence of proven Dispute Avoidance and Resolution Best Practices, and their adoption?

What are the barriers that impede constructive change?

CII has done considerable research on barriers to adoption of best practices. Though each project and each best practice is unique, the problems within the construction industry that impede the adoption of best practices tend to be quite uniform. There are substantial differences in the frequency of adoption of various best practices. Those most often adopted promised a high payoff potential. They are often associated with cost reimbursable projects where the owner bears the risk of innovation failure. Implementing companies typically have a recognized as having a

"continuous improvement" culture. Implementing companies commonly employ a supervisory "champion" to push changes.[1]

However, the de-centralized nature of most construction project site management allows maximum discretion to the project manager, rewarding success with substantial financial bonuses, and punishing failure, often with employment termination. Accordingly there is minimum motivation for experimentation by project managers, especially if the prospect of success is not considered very high. CII found, as have others studying the phenomenon, that the greatest barrier to change in construction is the successful project manager.

Finally, successful construction people, whether purchasing or providing the service, tend to be strong, decisive personalities. Seldom is there real doubt in the minds of key people as to where fault lies in a dispute. People may be wrong, but they are seldom in doubt. This attitude is manifest in willingness to spend more than a dispute is worth to prove a point.

Owner organizations that have limited financing are sometime motivated to fight even admittedly meritorious claims because funds are not available to pay an award. Even when the money is there, managers may be reluctant to admit that the budget has been exceeded, so the claim is fought in the hope that it will go away, or maybe even be won. Contractors suffering from cash flow pressure have presented claims generally lacking in merit, or minor meritorious claims with greatly inflated costs associated with them, hoping to obtain a settlement in excess of true merit. This "crap shoot" mentality opposes reasonable efforts to obtain just settlements. Attorneys will usually do what clients want done, even if they have recommended a different course of action.

Barriers

CII has identified several attitudinal barriers to adoption of new practices that apparently apply to the adoption of dispute prevention and resolution techniques:

a. "We're doing all of that already"
b. "We're too busy at the project level to be learning new things"
c. "Who's going to pay for us to do these things?"

The same reference listed some other common barriers:

a. General lack of commitment to the proposed concept.
b. Relatively low familiarity with the concept at the project level.

c. Limited emphasis on training and education in concept usage.
d. Failure to integrate new ideas into company procedures.
e. No proof of savings.
f. A no-risk or minimum risk environment.

The referenced publication categorized these barriers as failures in:

a. Management leadership
b. Organizational culture
c. Education and training
d. Performance measurement
e. Communications
f. Objective setting and action planning

Conclusion

The construction process involves numerous stakeholders, each with its own agenda. These agendas are not congruent; they overlap in part, with the extent of overlap depending on contracting strategy, organizational culture of the stakeholders, project urgency, and personality factors. Historically, construction has been an adversarial process, made even more so by the adversarial legal system that often is enlisted at the first suggestion of dispute. Construction, as one of the nation's largest industries, in aggregate involves huge sums of money.

With some providers of construction services, disputes are an expected, integral part of doing business. These companies apparently believe that at least in the short term, benefit-to-cost analysis favors conflict over amity. Where a party has in-house counsel, or attorneys on retainer, conflict theoretically "costs nothing". The problem tends to be more prevalent in public construction, where good will has very little to do with contractor selection, a low bid wins the job despite the contractor's claims track record, and a successful claim wins the profit.

One way for an owner to combat this thinking is to obtain and implement (at considerable cost and risk) such high quality, professional administration that the adversarial strategy fails more often than it succeeds.

Other more constructive approaches are to institute dispute prevention and resolution practices that reward good performance and behavior and motivate contractors to perform well.

Motivation programs do in fact motivate. Poorly conceived programs encourage counterproductive behavior. Well considered programs can drive change, and with change, produce improvement.

How can corporate and project leaders be motivated to use best practices in dispute prevention and early resolution?

Products, regardless of their quality or merit, rarely sell themselves. CII observes that implementation of new, improved practices involves change, and both people and organizations resist change.[2] To overcome this most fundamental and deeply rooted obstacle, the change must be strongly supported by senior management. This support must be in the form of both pronouncements of support, and action. Clearly senior management must be convinced that there is a financial benefit to the organization and its stakeholders before making such a commitment.

Risk aversion is usually inherent in organizational and employee behavior. If such aversion is not to become a major obstacle, senior managers must not only commit personally, but they must convince employees that willingness to try something new will be rewarded – even if the trial is unsuccessful.

The first challenge isto convince senior managers to make this personal and institutional commitment.

CII has invested heavily in studying techniques for advancing adoption of its recommended practices. It has published several papers on the subject of implementation based upon the collective experience of members.

The Implementation Model

In trying to encourage wider implementation of its research products, CII formed an Implementation Strategy Committee in 1995. CII undertook benchmarking and metrics as a major function of the organization when it became apparent that future implementation success was based upon demonstrable results.

The CII Implementation Strategy Committee developed a generic model to guide implementation efforts, once an organization's senior management had decided to move forward. It was thought to be universally applicable, hence useful to advancing recommendations relating to dispute avoidance and resolution. The model is based on Product Information and Benefit / Cost Data. In order of application the recommended action steps are:[3]

a. Obtain the corporate commitment

b. Designate a corporate level implementation champion
c. Conduct an organizational self-audit to determine the situation
d. Develop implementation plans and goals
e. Designate product champions and, where applicable, establish review boards to assign product implementation priorities
f. Undertake product training
g. Implement the product
h. Measure results of implementation
i. "Celebrate" success

While more detailed, these model actions follow the familiar "Plan – Do – Check – Act" sequence recommended for implementation of a continuous improvement program. Implementation of change is neither mystical nor easy. There must be a reason to change that is apparent to many, preferably all of those involved in making it happen. People generally try to please their supervisors; if he or she wants it done badly enough, and if those who must implement the change know this, it will probably happen.

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How to Keep Your Project Out of Litigation, Arbitration, and Even Mediation

Slides for Equitable Risk Allocation

Notes

PENTAGON RENOVATION & CONSTRUCTION PROGRAM OFFICE

Risk Allocation

Andrew Blumenfeld, Esq.

Allocation of Risk

Dispute minimization begins before contract award.

- **An equitable distribution of risk is the single most important element of dispute minimization.**
  - Risk Allocation must reflect the commercial reality of the project, not just the relative bargaining power of the contracting parties.
- **Active vs. Passive Allocation of Risk**
  - Active Risk Allocation is a project-specific plan to identify, quantify and manage project risk to all parties.
  - Active Risk Allocation requires substantial planning and investigation and can be costly to implement.

Allocation of Risk

Active Risk Allocation

- **Active Risk Allocation is prudent for large, complex, and risky projects involving:**
  - Renovation of an existing structure
  - Unknowns beyond the control of either party
    - Geotechnical conditions
    - Environmental/hazmat
    - Restricted site access
    - Permitting, historical preservation and other political issues
    - Existing conditions hidden or unknown
    - Market/inflation risk in multi-year contract

Notes

Allocation of Risk

Active Risk Allocation

- Active Risk Allocation includes:
  - Contract Type
    - Hard money
    - Cost type
    - Guaranteed maximum price
    - Incentive type
    - Time and materials
    - Hybrid combination of the above

Allocation of Risk

Active Risk Allocation

- Active Risk Allocation: Managing Unknowns
  - Fixed bidding assumptions → "Assume 100,000 CY of contaminated soil removal"
  - Pre-priced general condition costs → Bid a daily cost for general conditions in the event of an owner-caused delay
  - Market basket → Shared risk for inflation in market priced commodities such as rebar, drywall, concrete, etc.
  - Bilateral exercise of options
  - Limitations on markups

Allocation of Risk

Passive Risk Allocation

- **Standard Government Contract Clauses**
  - Differing site conditions
  - Site investigation
  - Unusually severe weather
  - Permits and responsibilities
  - Changes
- **Appropriate for:**
  - Vertical construction in a Green Field
  - Smaller projects with manageable unknowns
  - Commercial standard office space
  - Covers most federal construction projects

Allocation of Risk

Commercial Unreasonable Allocation of Risk

A commercially unreasonable Allocation of Risk usually fails because:

- Drives away the top firms
- Creates an atmosphere of distrust
- "What goes around comes around"
- Requires contractor to include large contingencies **for risks that may not be realized**
- "The Balloon Theory": **Costs squeezed out of one area will pop up in another**
- Disfavored by the courts

Allocation of Risk

Using Leverage Wisely (or "What goes around comes around")

Leverage shifts between the owner, the general contractor and the subcontractors as the project progresses.

- Phase 1: Solicitation and Award
  - Owner has maximum leverage.
    - Contract type
    - Specifications
    - Project delivery methodology (design-bid-build, design-build, bridging)
    - Who can bid (past performance, bonding)
    - Award criteria (low bid, best value)
    - Allocation of Risk – specific clauses

Allocation of Risk

Using Leverage Wisely (cont.)

- Phase 2: Contract Award
  - Leverage shifts from the owner to the general contractor.
  - General Contractor then:
    - Selects subs
    - May or may not honor subs' pre-award bid
    - May shop the bid
    - May adjust terms/conditions or contract type
    - Sub frequently left with take-it-or-leave-it contract

Notes

Notes

Allocation of Risk

Using Leverage Wisely (cont.)

- Phase 3: Mobilization and Construction
  - Leverage shifts from general contractor to subs.
  - Subcontractors are usually 70-90% of daily work force.
  - Subcontractor's price may now be at or below cost.
  - Subcontractors will seek to recover losses through changes, claims.

WHAT GOES AROUND, COMES AROUND!

Allocation of Risk

Leverage Timeline

36 – Month Project Schedule

PHASE 1:	**Solicitation to Award:** Owner has the leverage
PHASE 2:	**Award to Buy-Out:** General contractor has the leverage
PHASE 3:	**Mobilization to Completion:** Subcontractors have the leverage

Allocation of Risk

Conclusion

- Both ADR and partnering begin with an equitable Allocation of Risk.
- Complex projects require Active Risk Allocation and careful planning.
- Use leverage gently and create an atmosphere of trust.

How to Keep Your Project Out of Litigation, Arbitration, and Even Mediation

Slides for Collaboration and Cooperation

Notes

Collaboration and Communication

Tangible and Intangible Tools

That Minimize Project Disputes

David B. Ratterman

CII Annual Conference	Grapevine, Texas	July 20-21, 2005

Collaboration and Communication

"...[T]he real breakthrough ... was when Wal-Mart realized that while it had to be a **tough bargainer** with its manufacturers **on price**, at the same time the two **had to collaborate to create value for each other** horizontally if Wal-Mart was going to keep driving down costs. Wal-Mart was one of the first companies to introduce computers to track store sales and inventory and was the first to develop a computerized network in order to **share** this **information** with suppliers. Wal-Mart's theory was that the more information everyone had about what customers were pulling off the shelves, **the more efficient** Wal-Mart's buying would be, the **quicker** its suppliers could **adapt to the changing market demand**.".

Collaboration and Communication

The analogies of the Wal-Mart experience to construction are obvious:

- a commercial relationship in which the entities involved are not in equal **bargaining positions**,
- a highly **competitive** market place,
- **changing conditions** (often beyond anyone's control) constantly impacting the ability and cost of performance.

Notes

Collaboration and Communication

Two examples from the design process:

- **Example One**, Maximization of losses on a troubled steel project…hostile environment, little or no honest collaboration or communication.
- **Example Two**, Minimization of losses on a troubled steel project …tough love, frank and honest communication … collaboration toward project-oriented, common interest goals.

Collaboration and Communication

"Tools" to avoid "litigation, arbitration, and even mediation"

– Start at your neighborhood Wal-Mart.

Collaboration and Communication

One **difference** between the two examples: The willingness to communicate to decision-makers the absolute necessity of devoting sufficient time, thought, and resources to the **design process** (a large and continuing challenge, this one).

Collaboration and Communication

Another **key difference** between the two examples: the willingness to develop a collaborative communications protocol that is conducive to frank and efficient **sharing of information** that will contribute to overall project success.

One example of this would be…

Collaboration and Communication

Collaborate among prospective members of the contract chain of command, together with the owner and project designers, during the design process – before the design is finalized -- and before the design is released for bid.

Collaboration and Communication

Develop **interoperability** among software programs that will be utilized by both the designers and the contractors and subcontractors that will execute the design.

Notes

Notes

Collaboration and Communication

Pre-qualify and undertake early collaboration with major subcontractors and suppliers (especially those with long lead time materials or sophisticated systems responsibility) in the design and scheduling process.

Collaboration and Communication

Make the project website open to everyone on the team; immediate, full, honest communications on exactly what is going on day-by-day, supplemented with digital photos and video where applicable; share the down-the-road challenges as soon as they are known to anyone on the team...**no secrets.**

Collaboration and Communication

Designate senior company officials from all key organizations (individuals with operational or "line" responsibility but who are removed from direct, day-to-day involvement in the project) to serve as "**standing company neutrals**" and keep them informed about the progress of the work. This will increase the ability of these company neutrals to resolve disputes early.

Collaboration and Communication

The focus of the collaboration should be to keep project success first and to avoid hidden agendas and "confidential" information, or marginal distractions that are driven by the desire of one party to achieve a collateral advantage over another party.

Collaboration and Communication

Wal-Mart's goal is to capture market share.

Our goal is to complete our projects on time, within budget, and with a happy owner.

Both goals are team-driven.

The basic tools to achieve those goals are the same.

How to Keep Your Project Out of Litigation, Arbitration, and Even Mediation

Implementation Session

Jim Groton
Andrew Blumenfeld
David Ratterman

CII Annual Conference	Grapevine, Texas	July 20-21, 2005

Notes

Benchmarking Focus 2005

CII Benchmarking & Metrics Committee – Implementation Session only

Abstract

The Benchmarking and Metrics Committee has been extremely successful and busy enhancing the benchmarking system. Based on member input, new metrics were developed to assess engineering and construction productivity and small project performance and practice use. Membership has responded well to the fielding of these new metrics by providing an abundance of data.

This session will update attendees on progress made in data collection and reporting to include new online reports that improve access to benchmarking results. Early results of small project performance and practice use metrics will be presented and discussed. Progress will be presented as well on a project to develop absolute (hard dollar) metrics for the pharmaceutical industry. The session also will introduce the productivity metrics implementation session scheduled for later in the Annual Conference.

Implementation Session Moderator

Charles M. Green – Engineering Specialist, Aramco Services Company

Charlie Green has more than 31 years of experience in the specification, evaluation, development, and testing of process control and data acquisition systems, with over 21 years of service with Aramco Services Company. At Aramco Services Company, these control systems have been installed as part of new oil & gas processing facilities as well as infrastructure projects. At CII, he has been active on the Benchmarking & Metrics Committee for five years and is co-chair of the committee. Charlie earned a bachelors degree from Rice University.

e-mail: charlie.green@aramcoservices.com

Implementation Session Participants

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Mark T. Owens – Director, Global Facilities Delivery, Eli Lilly and Company
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Stephen R. Thomas – Associate Director, Construction Industry Institute
e-mail: sthomas@mail.utexas.edu

Benchmarking Focus 2005

Implementation Slides

Notes

BM&M Focus 2005

July 20, 2005

Grapevine, TX.

BM&M Committee

Bob Hemington (Co-Chair)	Jacobs
Charlie Green (Co-Chair) ✔	Aramco Services Company
Carol Aliman	General Motors Corporation
Harold Holland ✔	Abbott
Bob Chapman	National Inst. of Standards & Tech. (NIST)
Mark Owens ✔	Eli Lilly and Company
Grant Landry ✔	Jacobs
Steve Warnock	Washington Group International, Inc.
Tom Butts	Lockwood Greene
Greg Clum	Black & Veatch
Dave Perkins	Rohm and Haas Company
Dave Hile	Fru-Con Construction Corporation
Jim Gibson	ALSTOM Power Inc.
Danny Scott ✔	BE&K, Inc.
Jimmy Slaughter	S&B Engineers and Constructors, Ltd.
Howard Kass	NASA
Mike Mitchell	Emerson Process Management
Paul Wolfly	Chevron Corporation
Deborah DeGapela ✔	DI
Steve Thomas ✔	DI
Lilin Liang ✔	University of Texas at Austin

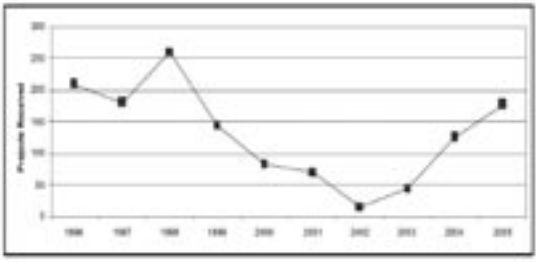
✔ Moderator & Panel

BM&M Committee Focus-2005

- Participation
- Productivity Metrics
- Special Pharmaceutical Metrics
- Product Improvement
- Small Projects Analysis

Notes

Benchmarking Participation



Participation

Projects Received

Year	Total Projects Received	Questionnaire/Data Type	Numbers
2004	125	Large Projects	26
		Small Projects	99
		Pharma	0

Year	Total Projects Received	Questionnaire Type	Numbers
2005	177	Large Projects	78
		Small Projects	95
		Pharma* (Included in Large Projects)	40

Participation in Productivity Metrics

- 33% of projects submitted in 2005 had engineering productivity metrics
- First report expected in 4Q05
- Working to sustain momentum

Year	Data Type	Numbers
2004	Engineering Productivity	15
	Construction Productivity	30
2005	Engineering Productivity	70
	Construction Productivity	29

Notes

Special Pharma Metrics

Special Pharma Metrics

- Launched Pharma focus group in March '04 to expand member services & perform a demonstration project for absolute metrics.
- Pharma metrics are an addition to the large project questionnaire.
- 40 projects submitted in 1st year.
- Project reports to be completed in July and Pharma group report to be issued 3Q05.

Pharma Team Participation

- Abbott (Harold Helland)
- Amgen (Mike Ross)
- Eli Lilly and Company (Jonathan Pitcher)
- GlaxoSmithKline (David Butler)
- Merck (Mike Nielsen)

Notes

Absolute Pharma Metrics

(Examples)

Category	Metrics
Cost	TIC / Process Equipment Cost
	TIC / Gross Square Footage
Schedule	(Design – OQ Duration) / Gross Square Footage
	(Design – OQ Duration) / Total Equipment Piece Count
Dimension	(Process Space SF + Process Related Space SF) / Gross Square Footage
	Mechanical SF / Gross Square Footage

OQ – Operation Qualification

Considerations for Absolute Metrics

- Adjustments required for location and time.
- Database maintained in current dollars at a common location.
- Relative metrics measure performance compared to planned; absolute metrics measure performance in hard dollar terms.

Productivity Metrics

Productivity - Is Construction losing ground?

BM&M Productivity Metrics Journey

- Jun 2000 – Authorized initiative and path forward
- Feb 2001 – Finalized construction productivity metric definitions
- Jan 2002 – Began engineering productivity metric development
- Sep 2002 – Initiated pilot data collection
- Jul 2003 – Jun 2004 – Pursued alignment of engineering productivity metric approaches
- Mar 2005 – Received first significant quantities of productivity metric data

Product Improvement

Notes

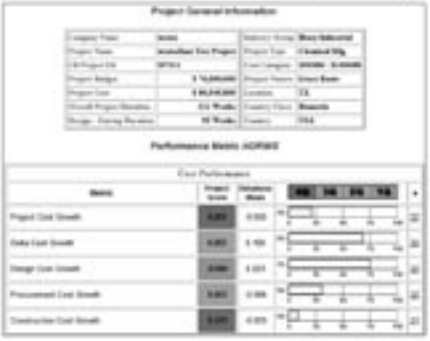
Notes

Product Improvement

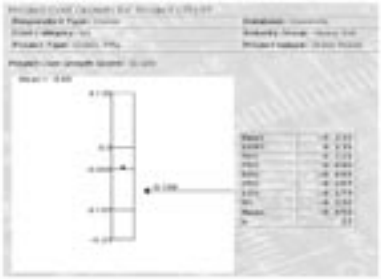
- New best practice metrics:
  - Design for Maintainability
  - International Project Risk Assessment
- Continue to improve online reports
- Expanded analysis and reporting
  - Pharma absolute metrics
  - Productivity metrics
  - New online project reports
  - Data mining
  - Small projects

Secure Online System

New Online Confidential Project Reports

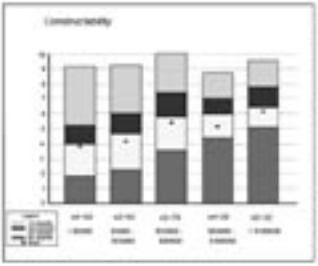


Confidential Project Reports



Statistical summary and Project Score for Project Cost Growth

Data Mining Reports



Responsible	Contractor
Location	Domestic
Project Type	Large
Cost Category	As Shown
Project Type	All
Project Increment	All
Industry	Heavy Industrial
Project Status	All

	Cost Category				
	< $5Mil	$5Mil-$10Mil	$10Mil-$15Mil	$15Mil-$20Mil	> $20Mil
Min	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Q1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Median	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Q3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Max	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mean	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Database Confidentiality & Integrity

Confidentially Policies:

- Only statistical summaries aggregated in such a manner that will protect the confidentiality of participating companies will be published.
- Only CII staff access confidential data.

Data Integrity:

- Companies benchmarking with CII must comply with a Code of Conduct committing to submit data that are representative and as complete and accurate as possible.

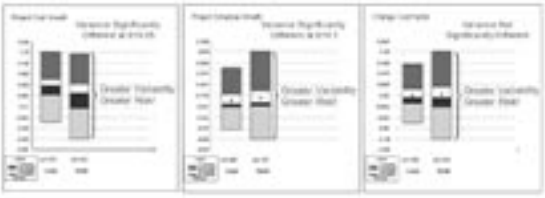
Notes

Notes

Small Project Analysis

Owner Small Project Metrics

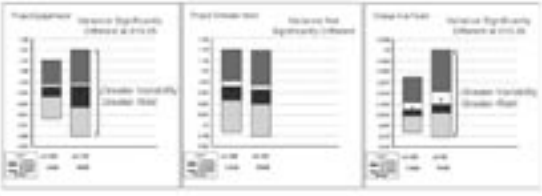
Cost, Schedule & Change Performance



Small Projects: TIC less than or equal to $5MM
Large Projects: Greater than $5MM

Contractors Small Project Metrics

Cost, Schedule & Change Performance



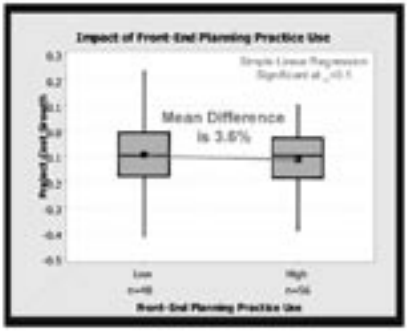
Small Projects: TIC less than or equal to $5MM
Large Projects: Greater than $5MM

Value of Small Project Practices

Small Project Practices

- Front End Planning
- Design
- Procurement
- Construction
- Start-Up Planning &
- Commissioning
- Organization
- Processes
- Controls
- Safety, Health & Environment

Project Cost Growth vs. Front-End Planning Practice Use



Notes

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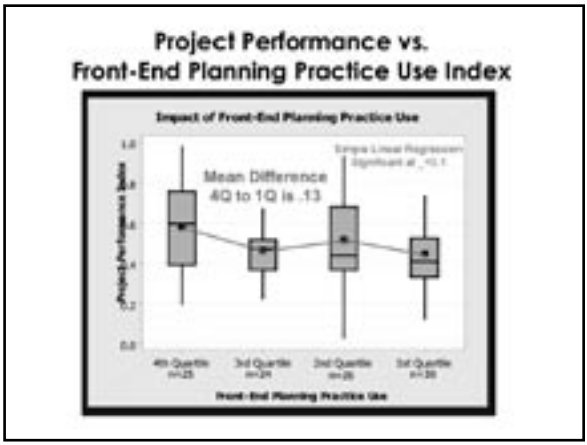
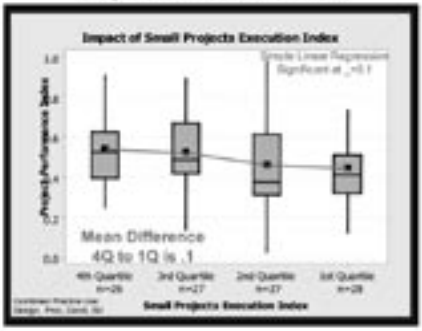
Project Cost Growth vs. Design Practice Use
Impact of Design Practice Use
Mean Difference is 6%
Design Practice Use

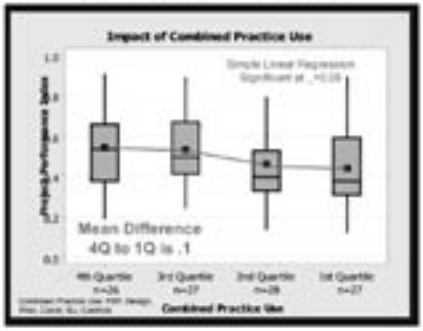

Project Cost Growth vs. Controls Practice Use
Impact of Project Controls Practice Use
Mean Difference is 7.5%
Project Controls Practice Use


Project Performance vs. Front-End Planning Practice Use Index
Impact of Front-End Planning Practice Use
Mean Difference 4Q to 1Q is .13
Front-End Planning Practice Use

Project Performance vs. Project Execution Index



Project Performance vs. Combined Practice Use



Path Forward

- Continue to grow Participation
- Continue to develop Productivity Metrics
- Refine Pharma Metrics & evaluate other similar opportunities
- Publish Small Projects Analysis
- Continue Product Improvement
- Continue to pursue leveraged funding
- Continue CII annual safety analysis

Notes

Notes

Leadership Imperatives in a Global Environment

Luncheon Speaker

Abstract

Reconstruction efforts underway in Iraq show the importance of public and private sector partnerships. As the U.S. Army Corps of Engineers continues to support the nation around the globe in a rapidly changing environment, the need for greater collaboration and agility is on the rise. New technologies, materials, and techniques are driving engineering and construction and will grow in influence in the future.

Public leaders play an important role as a catalyst for advancing R&D capabilities. Now, industry partners must provide flexibility that will encourage and promote innovation in methods, materials, and project delivery strategies. In an effort to drive innovation in the private sector and enhance the Army's ability to deliver required facilities at reduced cost and in less time, the Corps of Engineers is transforming its approach to military construction. Such strategies are already being implemented for Corps' reconstruction projects in both Iraq and Afghanistan.

Plenary Session Presenter

Lieutenant General Carl A. Strock – Chief of Engineers and Commanding General, U.S. Army Corps of Engineers

Lieutenant General Carl A. Strock grew up in an Army family, receiving his commission as an infantry second lieutenant following graduation from Officer Candidate School in 1972. After completing Ranger and Special Forces training, he served primarily with infantry units before transferring to the Engineer Branch in 1983. In September 2003, he returned from a six-month tour of duty in Iraq as the Deputy Director of Operations for the Coalition Provisional Authority. Strock holds a bachelor's degree in civil engineering from the Virginia Military Institute and a master's in civil engineering from Mississippi State University. He is a Registered Professional Engineer.

Leadership in Changing and Challenging Times

Keynote Speaker

Plenary Session Presenter

David M. Walker – Comptroller General of the U.S. and Director of the Government Accountability Office, Office of the Comptroller General

As Comptroller General, David Walker is the nation's chief accountability officer and head of the U.S. Government Accountability Office (GAO). Before his appointment as Comptroller General, Walker had extensive executive level experience in both government and private industry. Between 1989 and 1998, Walker worked at Arthur Andersen, His earlier technical, professional, and business experience was with Price Waterhouse, Coopers & Lybrand and Source Services Corporation, an international human resources consulting and search firm. He has written two books and numerous articles on a variety of subjects. He earned a bachelor's degree in accounting from Jacksonville University.

Making Zero Field Rework a Reality

Do It Right the First Time Research Team

Abstract

Are industry participants "walking the walk" or just "talking the talk" when it comes to concerns for managing quality and reducing field rework? This plenary presentation will offer some compelling evidence that the principles and processes that have resulted in successful field safety management can also be applied to reduce field rework. Key research findings requiring leadership commitment and industry-wide improvement will be presented. The presentation makes the business case for "making zero field rework a reality."

The implementation session will introduce participants to a self-assessment tool that can be applied throughout the project process to help reduce field rework. Comments will be shared about its applicability from projects where it was reviewed. A panel of research team members will address questions and discuss the research findings and how they relate to the self assessment.

Plenary Session Presenter

Cynthia J. Richartz – Manager, Technical Center of Excellence in Global Engineering Services, Abbott

Cindy Richartz and her organization have responsibility for providing technical discipline consulting and engineering standards leadership for Abbott facilities and projects worldwide. During her 22 years with the company, she has held leadership and professional positions in facilities consulting, materials administration and investment recovery, facilities planning, inventory management, and hospital sales. Richartz, who is actively involved in the Society of Women Engineers, earned a bachelor's degree in industrial engineering from the University of Illinois.

e-mail: cindy.richartz@abbott.com

Implementation Session Moderator

Lewis C. Coles – Engineering Manager, DuPont Engineering

Lew Coles chairs the CII Do It Right the First Time Research Team. At DuPont, he is responsible for capital project implementation for more than 30 electronic and communication technologies plant sites worldwide. He also is global leader of both corporate contractor safety competency and the corporate center for deployment of mobile equipment for plant sites and operations. Coles, whose career with DuPont spans 31 years, has held staff, management, and professional assignments in domestic and international engineering, construction, procurement, safety, and manufacturing. He holds bachelor's degrees in civil engineering and business administration from Rutgers University.

e-mail: lewis.c.coles@usa.dupont.com

Implementation Session Participants

Chris G. Gower – Regional Engineering Manager, Consumer Healthcare, GlaxoSmithKline
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John S. Lucente – Project Site Manager, Ontario Power Generation
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Cynthia J. Richartz – Manager, Technical Center of Excellence in Global Engineering Services, Abbott
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Gary R. Smith – Dean, Engineering and Architecture, Construction Management & Engineering, North Dakota State University
e-mail: gary.smith@ndsu.edu

Making Zero Field Rework a Reality

Plenary Slides

Notes

Making Zero Field Rework A Reality

Cindy Richartz
Abbott

for
CII Do It Right The First Time Research Team
CII Annual Conference
Dallas, Texas
July 20, 2005

CAUTION

Accidents Will Happen...

Safety Performance – TRIR

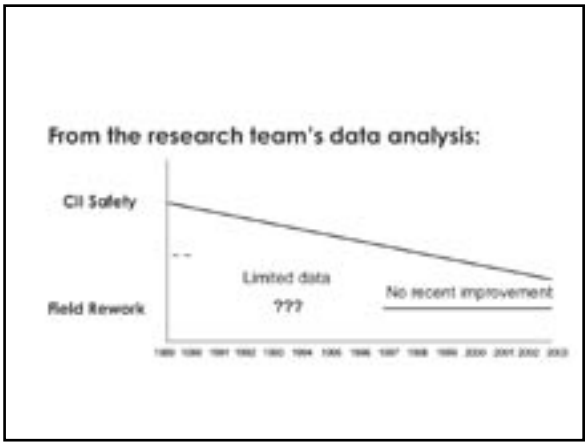
* OSHA Construction Division, SIC 15-17

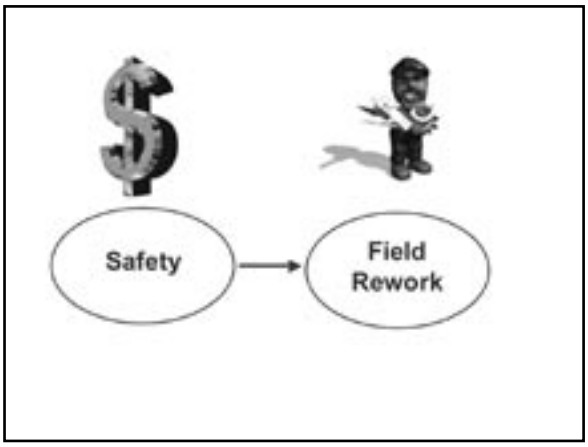
Reflects OSHA Reporting Change

Notes


Leadership in Safety...
Commitment To
Zero Field Rework
Let's Bridge the Gap in Field Rework.

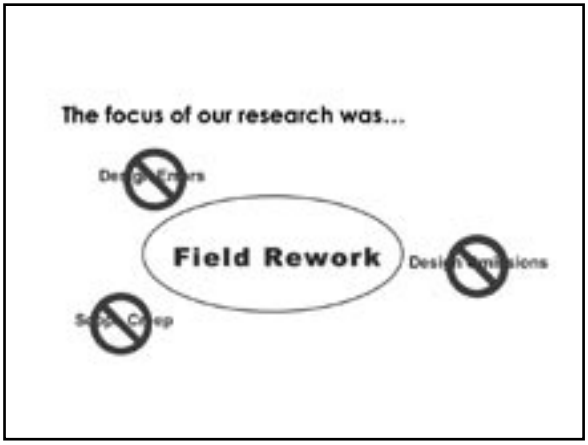

From the research team's interviews:
"Without leadership, quality is nobody's job..."


From the research team's data analysis:
CII Safety
Field Rework
Limited data
???
No recent improvement



Do It Right The First Time Research Team

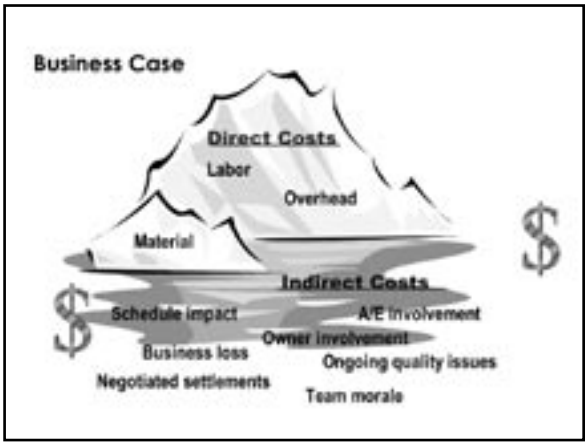
Lew Coles	DuPont, Chair
George Fenton	Victaulic
Chris Gower	GlaxoSmithKline
Paul Lee	Eli Lilly and Co.
John Lucente	Ontario Power Generation
Jim Nelson	Bechtel
John Nowoj	M.A. Mortenson Co.
Cindy Richartz	Abbott
Gary Smith	North Dakota State University
Steve Sumner	Smithsonian Institution



Notes

Notes


Research by CII Research Team 160A:
Focus on Shutdowns, Turnarounds, and Outages
Accident/incident investigations
Drug and alcohol testing
Evaluation, recognition, and reward
Staffing for safety
"Making Zero
Opportunity
Pre-project/pre-task planning
Orientation and specialized training
Worker participation and involvement
Contract type
Demonstrated management commitment
Subcontract management


Business Case
Direct Costs
Labor
Overhead
Material
Indirect Costs
Schedule impact
A/E involvement
Owner involvement
Business loss
Ongoing quality issues
Negotiated settlements
Team morale


Opportunity: Leadership
Key Findings: Education and Training
Safety: three hours per month
Rework: 30 minutes per month
Implement Quality Based Training

Notes

Opportunity: Leadership

Key Findings: Education and Training

Refreshing craft worker knowledge

Introduce new materials or methods through field demonstrations or mock-ups

Establishing firm construction quality goals and expectations

Opportunity: Leadership

Key Findings: Staffing Levels Per Project

Opportunity: Leadership

Key Findings: Incentives for Crafts

Notes

RT 203 Self-Assessment Elements

Primarily Focused on PEOPLE

- Leadership by example
- Sufficient/capable resources
- Employee involvement
- Communications
- Teamwork
- Documentation
- Absence of shortcuts
- Auditing

Zero Field Rework
Self-Assessment
Opportunity Checklist

Opportunity: Leadership

The Do It Right The First Time Breakout Session

How Is This Research Different?

Key Findings

Self-Assessment Checklist

Q&A

Notes

Notes

Making Zero Field Rework A Reality
Implementation Session

CII "Do It Right The First Time" Research Team
Annual Conference
Dallas, Texas
July 20, 2005

Agenda

- Introductions
- Research Overview
- Self-Assessment Opportunity Checklist
- Q & A's

Research
Gary Smith
North Dakota State University

for
"Do It Right The First Time" Research Team
Annual Conference Dry Run
Dallas, Texas
July 20, 2005

APPROACH

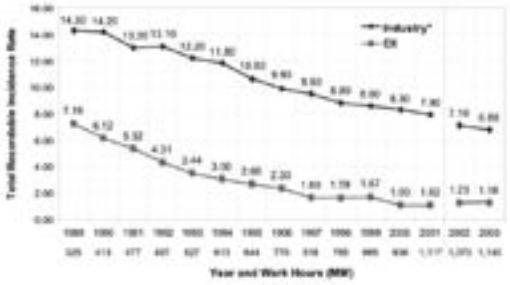
Considering

- Significant research on the quantitative evaluation of rework has been done. Methods to measure rework have been defined.
- Significant research on safety has been done including measurements and safety management process improvements.
- Dramatic improvements in safety have been measured. Dramatic improvements in rework have not. What can be learned from safety implementation?

OBJECTIVES

1. Identify and evaluate safety program components that may be convertible to quality processes
2. Identify and evaluate error reduction processes
3. Concurrently collect data on safety and quality processes.
4. Formulate a comprehensive "zero-rework" management process

Safety Performance – TRIR



* OSHA Construction Division, SIC 15-17

Reflects OSHA Reporting Change

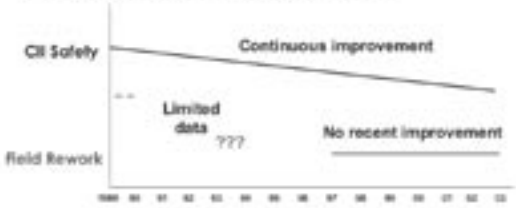
Notes

Notes

Previous Rework Data

- CII Research Summary 10-2 (1989)
  - 12% rework on 9 industrial projects
- CII Benchmarking & Metrics Data Report (1997)
  - 3.4% for 19 industrial projects
- CII Field Rework (Rogge RT 153) (2001)
  - 4.4% for 109 industrial projects
  - Ranges between 0% and 25%
- CII Impacts of Delivery Systems (2002)
  - 5.0% DB Contractors
  - 3.0% DBB Contractors
  - 326 Projects all types (Benchmarking Database)

Basic Trends From Previous Studies:



APPROACH

"The Main Question"

If effective safety management has been responsible for reduced total recordable incident rates,

Then…

what similarities would there be for quality management reducing field rework?

Making Zero Accidents a Reality

- Demonstrated management commitment
- Staffing for Safety
- Planning: Pre-project and pre-task
- Safety Education: orientation and specialized training
- Worker Involvement
- Evaluation and recognition/reward (incentives)
- Subcontract management
- Accident/Incident investigations
- Drug and Alcohol testing

Research Approach

Paired question survey

- Can we identify opportunities for rework reduction by examining safety and rework in the same cultural environment?
- Within the rework information collected can we identify specific field practices that can eliminate contractor errors?

SURVEY FORMAT

- Volunteer Projects
- Demographic Information
- Organized by key safety topics
- Matched questions created within topics
- Additional questions specific to topics also created
- Overall 103 Questions

Notes

Notes

Project Type

Project Functional Description	No. of projects
Manufacturing	9
Petrochemical	4
Pharmaceutical	3
Power	2
Telecommunication	1
Commercial/Pubic Buildings	3

Owner and Contractor Responses

Respondent	No. of Sites
Owner	12
Contractor	10
Total	22

Average Field Rework Reported 3.13% Is Consistent With Other Studies Considering Blended Data

KEY FINDINGS

Comparative Analysis Findings
•Demonstrated Management Commitment for rework reduction was found in the research.
•Staffing for Quality Staffing levels for quality were generally lower than safety, given the requirement of discipline specific knowledge for quality
•Quality Pre Project and Pre Task Planning •Pre-project planning (constructability analysis and project specific quality plans were consistent with safety planning •Pre-mobilization quality analysis and pre-task quality analysis were lagging

KEY FINDINGS

Comparative Analysis Finding
Quality Education • Safety education more predominate and averaging 3 hours per month compared to quality/rework at 0.5 hrs per month • A standard orientation for quality was implemented on less than _ of the projects
Worker Participation and Involvement The lower level of craft worker involvement and lack of incentives based on quality
Subcontract Quality Management Subcontractors are more commonly required to submit safety plans than quality plans

KEY FINDINGS

Comparative Analysis Finding
Quality- Rework Tracking • Tracking rework was very common on the study projects • Investigation of rework or defects was less common than for safety incidents
• Drug and Alcohol Testing Pre employment screening would be functional for both safety and quality programs • For cause testing generally conducted more for safety than rework or defective work (20:6)
Contract Type Lump sum contracts were shown to have less rework than reimbursable contracts which is opposite the relationship for safety

OPPORTUNITIES TO CONSIDER

- Staff for quality in appropriate manner – unlike safety, inspection requirements in rework and quality areas is based on discipline specific knowledge requirements
- Consider using subcontractor written quality plans
- Coordinate rework reduction training based on known factors contributing to rework problems

Notes

Notes

INFORMATION EXCHANGE

Transfer of information to the field could take the form of rework reduction tool box talks or similar training opportunity

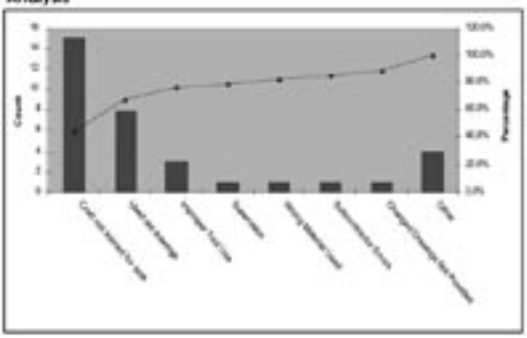
TOP FIVE LIST
HANDRAIL, LADDER & PLATFORM
FUNCHLIST ITEMS

1. **1-1/2" clearance around top rail:**

Note: This figure was scanned from a handout provided to field personnel to reduce field rework

Process Improvement – Data Analysis

Evaluate rework causes in a consistent manner using Pareto Analysis



Thank You

Notes

Self-Assessment Opportunity Checklist

Lew Coles
DuPont Engineering

for
CII Do It Right The First Time Research Team
Annual Conference
Dallas, Texas
July 20, 2005

Quote from Our Pilot Interviews

"It's interesting that we always went back to the analogy of how we do our safety process so well."

Zero Field Rework Self-Assessment Checklist

- What is it?
- What is it intended to do?
- What's the value to my organization?
- How is it different from what I already do?
- When should I use it?
- How does it work?

Notes

What Is the Self-Assessment Checklist?

A tool used by the project team to help identify areas for further improvement on the journey to zero field rework.

Contains *8* elements and *117* questions.

Where can the Self-Assessment Checklist be used?

- Large Projects
- Sites with multitude of small projects
- Fab shops
- Any contracting strategy
- By owners and contractors…around the globe

Backward integration into engineering design.

What the Self-Assessment Checklist *Is Not*

It is *not* a tool to generate a lengthy list of administrative action items.

Notes

When Can It be Utilized?

- During project Front End Loading when the construction quality plan is being developed.
- During construction to audit against the plan.
- During the post-project review to help identify key learnings and improvements for future use.

The Self-Assessment Checklist Can Help To....

Improved employee morale:
- Reduced rework -- nobody likes rework
- Workers feel more highly valued
- Better communications
- Teamwork

Reduced costs
Improved project cycle time
Improved safety performance

Self-Assessment Checklist Elements

Leadership by example	Teamwork
Sufficient and capable resources	Documentation
Employee involvement	Absence of shortcuts
Communications	Auditing

Primarily focused on People

Notes

Typical Quality Assessment

Manuals and procedures	Quality verification
Document and data control	Records retention
Material control and management	Training
Measuring and testing equipment	Contractor controls

Primarily focused on Things

Performance (Results)
Element #1 -- Leadership by Example

- Percentage of workers on the team who understand how they contribute to quality and rework goals.
- Number of quality and rework related issues observed this period.
- Cost of rework activities by month.
- Cost of materials written off due to quality and rework issues by month.
- Hours written off due to quality and rework issues by month.
- Number of quality and rework toolbox talks completed this month.
- Visibility of site quality and rework Goals and Plan.
- Number of open and overdue quality and rework issues this period.

Thank You!

Questions?

The Quest for Injury-Free Performance

Intel Case Study

Abstract

Intel has demonstrated over the last six years that world-class construction safety performance is not only achievable, but sustainable. The plenary presentation will identify the challenges with obtaining, maintaining, and improving on world-class construction safety performance. Various techniques will be presented that enable the continuous improvement of management systems and cultural development in the quest to eliminate injuries that occur in a "world-class" environment.

The implementation presentation will outline the challenges and breakthrough solutions developed to drive elimination of injuries and continue the quest toward injury-free performance.

Plenary Session Presenter

Steve Bowers – Environmental, Health, and Safety Manager, Worldwide Projects, Intel Corporation

With Intel since 1996, Steve Bowers has 25 years of EHS management experience within the petrochemical and semiconductor manufacturing industries. He also has extensive expertise in both process operations and construction safety. In his current role at Intel he oversees EHS for all of the company's construction projects around the globe. Bowers is a member of the American Society of Safety Engineers and maintains the Certified Safety Professional designation from the Board of Certified Safety Professionals.

e-mail: steve.bowers@intel.com

Implementation Session Moderator

Steve Bowers – Environmental, Health, and Safety Manager, Worldwide Projects, Intel Corporation
e-mail: steve.bowers@intel.com

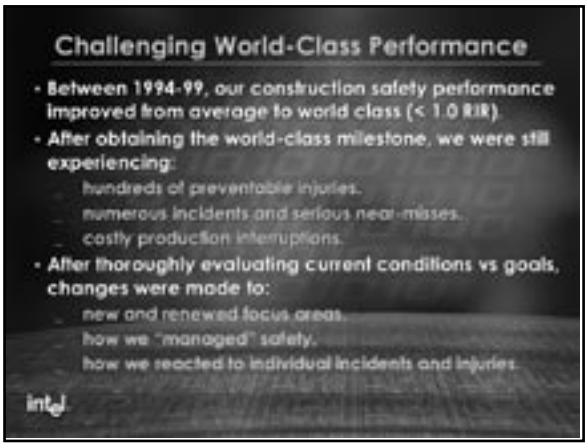
Implementation Session Participant

Robert A. Predmore – Manager of Projects, Corporate Services Construction, Intel Corporation
e-mail: bob.predmore@intel.com

The Quest for Injury-Free Performance

Plenary Slides

Notes


Challenging World-Class Performance
• Between 1994-99, our construction safety performance improved from average to world class (< 1.0 RIR).
• After obtaining the world-class milestone, we were still experiencing:
– hundreds of preventable injuries.
– numerous incidents and serious near-misses.
– costly production interruptions.
• After thoroughly evaluating current conditions vs goals, changes were made to:
– new and renewed focus areas.
– how we "managed" safety.
– how we reacted to individual incidents and injuries.
intel

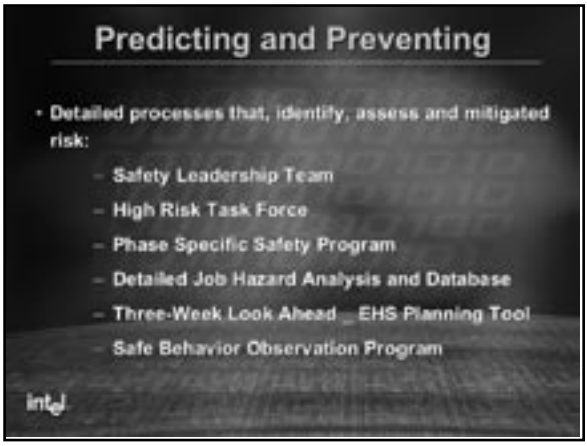
Notes


Why World Class Wasn't Enough
• Achieving global, world-class performance reflected five years of:
– dedication
– commitment
– leadership
– partnership with the construction industry
• World-class performance still represented numerous injuries, incidents, and near-misses.
• Being satisfied with world-class performance was in conflict with our Injury Free Environment.
intel


Injury Free Environment
• Our Injury Free Environment is based on one main belief...
All Injuries are Preventable!
• This one principle was the foundation that enabled world-class performance.
• Obtaining "Injury Free Performance" is the new challenge.
intel

Notes

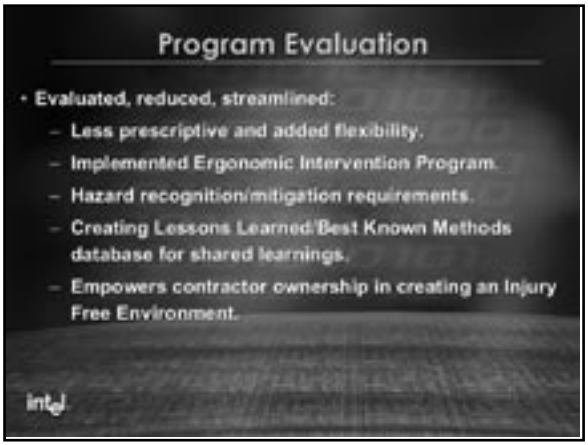

Performance Breakthroughs!
1. Predict and prevent injuries/incidents.
2. Measure safety commitment and cultural maturity.
3. Improve management's leadership skills.
4. Development of "Precipitating Events."
5. Streamline programs, policies & procedures.
intel


Predicting and Preventing
• Detailed processes that, identify, assess and mitigated risk:
– Safety Leadership Team
– High Risk Task Force
– Phase Specific Safety Program
– Detailed Job Hazard Analysis and Database
– Three-Week Look Ahead _ EHS Planning Tool
– Safe Behavior Observation Program
intel


Leading Indicators
• Leading indicators were created that evaluated:
– Behaviors
– Conditions
– Environment
– Planning
– Management leadership and commitment
– Project's cultural maturity
- Used in addition to lagging indicators with equal weighting
intel


Cultural Leadership
• Developed Cultural Leadership Workshops for both senior and project management:
– How to create/evolve a culture
– Cultural leadership "do's & don'ts"
– Management's role
– Creation of Safety Executive Leadership Team
• Focus was on differences between managing and leading an Injury Free Environment.
intel


Precipitating Events
• Created Precipitating Event classifications:
– What worker was doing at time of incident.
– Evaluates actions and conditions before injury.
• Evaluate the behavior "failure mechanism"
• Data indicates most injuries occur while:
– Walking in work area.
– Material handling.
– Using power tools.
– Working in awkward postures.
intel


Program Evaluation
• Evaluated, reduced, streamlined:
– Less prescriptive and added flexibility.
– Implemented Ergonomic Intervention Program.
– Hazard recognition/mitigation requirements.
– Creating Lessons Learned/Best Known Methods database for shared learnings.
– Empowers contractor ownership in creating an Injury Free Environment.
intel

Notes

Notes


Were We Successful?
• Did we eliminate the early project injury spike?
• What impact have "ergonomic interventions" had on injury reduction and productivity?
• Has management's new cultural leadership skills made a difference?
• How much closer are we in our quest towards Injury Free Performance?
intel

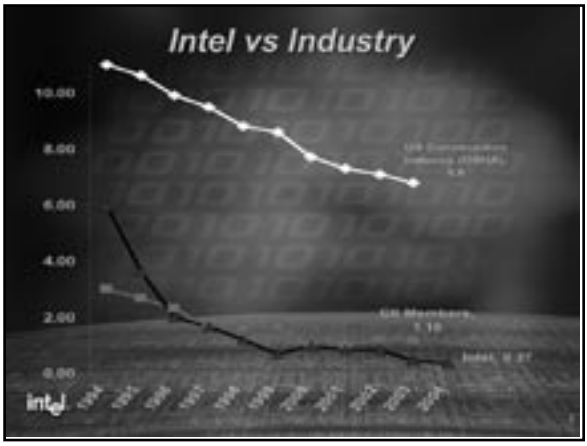
The Quest for Injury-Free Performance

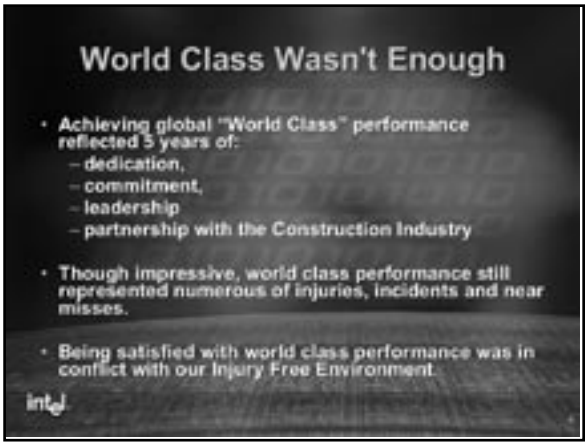
Implementation Slides

Notes

Notes


Journey to World Class Performance
• 1994:
– Primary focus was schedule
– Safety performance was 2X CII (6.0 RIR)
– Numerous incidents, near misses and production interruptions
• 1995:
– Safety performance expectations established
– Dedicated safety resources
– Beginning of the "Construction Safety Program"
• 1996-99:
– Performance improved dramatically
– World Class benchmark (< 1.0 RIR) obtained in 1999 and sustained since
intel


Intel vs Industry
10.00
8.00
6.00
4.00
2.00
0.00
intel


World Class Wasn't Enough
• Achieving global "World Class" performance reflected 5 years of:
– dedication,
– commitment,
– leadership
– partnership with the Construction Industry
• Though impressive, world class performance still represented numerous of injuries, incidents and near misses.
• Being satisfied with world class performance was in conflict with our Injury Free Environment.
intel


Injury Free Environment
Our Injury Free Environment is based on one main belief…
All Injuries are Preventable!
This one principle was the foundation that enabled world class performance.
Obtaining "Injury Free Performance" was the new challenge.
A "Breakthrough" was necessary to drive further improvements!
We needed a new which could improve our existing culture.
intel


Creating a New Vision
Vision*:
– a vivid mental image
– the ability to see
– a religious or mystical experience of a supernatural appearance
Visionary*:
– a person given to fanciful speculations and enthusiasms with little regard for what is actually possible
– a person with unusual powers of foresight
– airy; not practical or realizable; speculative
* Definitions from: www.cogsci.princeton.edu/cgi-bin/webwn2.1
intel


Visionaries of the Past
"640K ought to be enough for anybody."
– Bill Gates (1955-) in 1981
"There is no reason anyone would want a computer in their home"
– Ken Olson, Chairman/founder of Digital Equipment Corp., 1977
"Who the hell wants to hear actors talk?"
– H. M. Warner (1881-1958) founder of Warner Brothers, in 1927
"We don't like their sound, and guitar music is on the way out."
– Decca Recording Co. rejecting the Beatles, 1962
"Everything that can be invented has been invented."
– Charles H. Duell, Commissioner, U.S. Office of Patents, 1899
intel

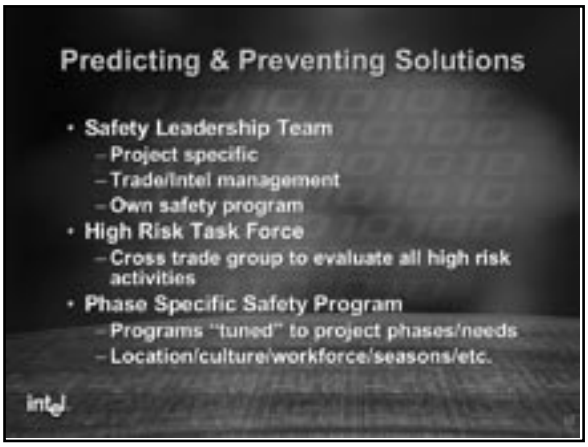
Notes

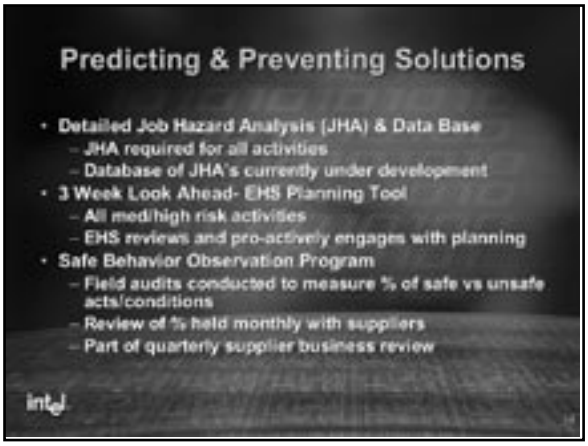
Notes


Our New Vision
To
Create an
Injury Free Environment
that is Dedicated to Eliminating
ALL Workplace Injuries and Incidents.
intel


Performance Breakthrough
1. Implement programs that Predict & Prevent injuries/incidents
2. Create "Leading Indicators" for evaluating safety culture & commitment
3. Develop "Leadership Training" for management
4. Create "Precipitating Events" criteria that evaluate conditions before incidents occur.
5. Streamline existing programs to ensure effectiveness and value.
intel


Predicting & Preventing
• OLD:
– Typical projects experience higher rate of injuries & incidents at start up
• NEW:
– Created detailed proactive evaluation processes that ensure the identification, assessment and mitigations of inherent risks for all phases of construction:
– Safety Leadership Team
– High Risk Task Force
– Phase Specific Safety Program
– Detailed Job Hazard Analysis & Data Base
– 3 Week Look Ahead- EHS Planning Tool
– Safe Behavior Observation Program
intel


Predicting & Preventing Solutions
• Safety Leadership Team
– Project specific
– Trade/Intel management
– Own safety program
• High Risk Task Force
– Cross trade group to evaluate all high risk activities
• Phase Specific Safety Program
– Programs "tuned" to project phases/needs
– Location/culture/workforce/seasons/etc.
intel

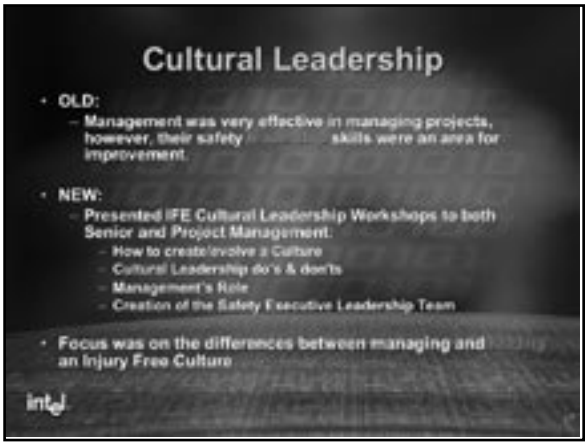

Predicting & Preventing Solutions
• Detailed Job Hazard Analysis (JHA) & Data Base
– JHA required for all activities
– Database of JHA's currently under developement
• 3 Week Look Ahead- EHS Planning Tool
– All med/high risk activities
– EHS reviews and pro-actively engages with planning
• Safe Behavior Observation Program
– Field audits conducted to measure % of safe vs unsafe acts/conditions
– Review of % held monthly with suppliers
– Part of quarterly supplier business review
intel


Leading Indicators
• OLD:
– Projects performance measured by lagging indicators (RIR/DAWC)
– This was not an accurate indicator of a project's true safety culture or performance.
• NEW:
– Leading Indicators were created that evaluated:
– Behaviors
– Conditions
– Environment
– Planning
– Management Leadership & Commitment
– Project's Cultural Maturity
– Used in addition to Lagging Indicators with equal weighting
intel

Notes

Notes


Leading Indicators
• Behaviors
– Safe Behavior Observations (SBO)
• Conditions
– Safety Management by Walking Around (SMBWA)
• Environment
– Environmental Performance Indicators
• Planning
– 3 Week Look-ahead, JHA, Pre Task Planning
• Management Leadership & Commitment
– Field time, Classroom Instruction, Leadership evaluations
• Project's Cultural Maturity
– Project team assessments, contractor feedback, Safety Self Assessments
intel

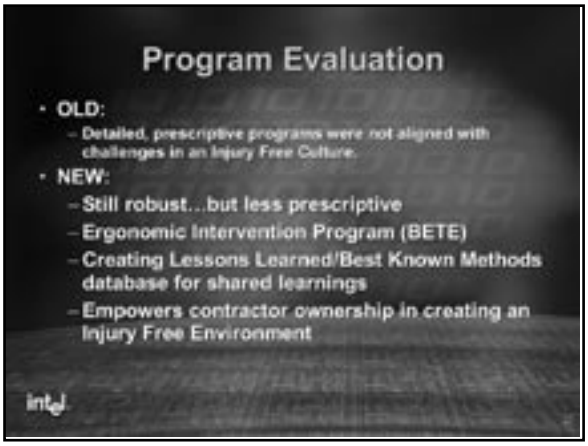

Cultural Leadership
• OLD:
– Management was very effective in managing projects, however, their safety skills were an area for improvement.
• NEW:
– Presented IFE Cultural Leadership Workshops to both Senior and Project Management:
– How to create/evolve a Culture
– Cultural Leadership do's & don'ts
– Management's Role
– Creation of the Safety Executive Leadership Team
• Focus was on the differences between managing and an Injury Free Culture
intel


Cultural Leadership
• A successful IFE culture is dependant on:
– Committed Leadership
– Positive Engagement
– Cultural Assessments
– Open Communication
• IFE is about People...not rates!
• How management engages has a direct effect on our culture
• We must continue to improve our methods in order to achieve a sustainable IFE culture
intel


Managing vs. Leading
Manager
Implementation
Detail
Short Term
Direct
Action Planning
Assess Progress
Reactive
Facilitate
Steady hand
Leader
Vision
"Big Picture"
Long Term
Inspire
Strategic Planning
Outline Framework
Proactive
Motivate
Change Agent
intel

Notes


Precipitating Events
• OLD:
– 75% of all incidents and injuries cited "Behavior" as the Root Cause.
• NEW:
– The creation of Precipitating Events:
– What the worker was doing at the time of the incident
– Evaluation of the actions and conditions leading up to the injury
– Data has shown most injuries occur while:
– Walking in the work area
– Material handling
– Using power tools
– Working in awkward postures
intel


Program Evaluation
• OLD:
– Detailed, prescriptive programs were not aligned with challenges in an Injury Free Culture.
• NEW:
– Still robust…but less prescriptive
– Ergonomic Intervention Program (BETE)
– Creating Lessons Learned/Best Known Methods database for shared learnings
– Empowers contractor ownership in creating an Injury Free Environment
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Notes


10 Year Performance Trend
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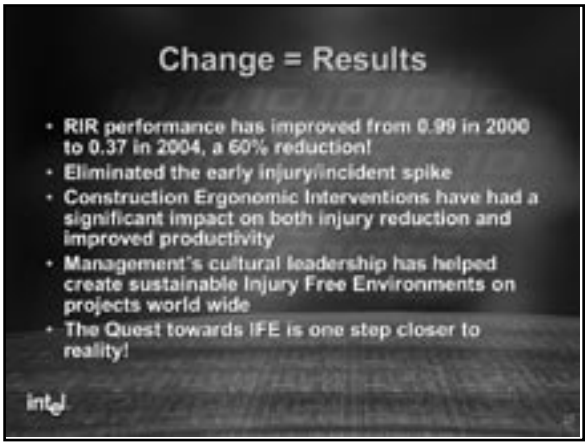
Change = Results
• RIR performance has improved from 0.99 in 2000 to 0.37 in 2004, a 60% reduction!
• Eliminated the early injury/incident spike
• Construction Ergonomic Interventions have had a significant impact on both injury reduction and improved productivity
• Management's cultural leadership has helped create sustainable Injury Free Environments on projects world wide
• The Quest towards IFE is one step closer to reality!
intel


Summary
• Key Learnings / Focus Areas:
– Committed Cultural Leadership
– Extensive Partnering with Suppliers
– Development of World Class Planning Tools
– Effective, Simplified Programs
– Embrace Construction Ergonomics
– Identifying & Understanding the "True" Root Causes of all Injuries and Incidents
intel

Achieving Interoperability for Equipment Supply Chains

FIATECH

Abstract

The plenary presentation will describe how the FIATECH Automating Equipment Information Exchange (AEX) project has undertaken a pragmatic approach to attain interoperability in equipment supply chains and improve supplier integration with project delivery. A summary will be presented of a cooperative industry demonstration project of owner-operators, EPCs, equipment suppliers, and software suppliers to apply the XML technology developed by the AEX project. The presentation will emphasize the importance of industry leadership for achieving the benefits of equipment supply chain interoperability.

The implementation session will provide a detailed explanation of the underlying technology, project work processes, and involvement of industry stakeholders. An overview of recent demonstrations of AEX implementations will be presented to show how multiple companies using different software systems can share information seamlessly using AEX project results. Further information will be presented about the work products, upcoming project activities and how companies are using the AEX results. A discussion session will be facilitated to discuss how companies can get started in using and deploying AEX project results to achieve software interoperability across the equipment supply chain.

Plenary Session Presenter

Mark E. Palmer – Project Manager, Building and Fire Research Laboratory, National Institute of Standards & Technology

Mark Palmer researches the integration of IT, automation, and work process re-engineering. Also active in national and international standards development activities, Palmer works with numerous initiatives to advance the IT competence and competitiveness of the U.S. He currently is the project leader for the FIATECH AEX Project. He recently led a CII research team investigating how to improve construction supply chain performance. Palmer earned a bachelor's degree in architecture at the University of Oregon and a master of science degree at MIT.

e-mail: mark.palmer@nist.gov

Implementation Session Moderator

Mark E. Palmer – Project Manager, Building and Fire Research Laboratory, National Institute of Standards & Technology
e-mail: mark.palmer@nist.gov

Implementation Session Participants

Manoj Dharwadkar – Senior Software Development Manager, Bentley Plant Division, Bentley Systems Inc.
e-mail: manoj.dharwadkar@bentley.com

James Klein – Application Consultant, AVEVA
e-mail: jim.klein@aveva.com

Judith W. Passwaters – Global Director, Facilities Services & Real Estate, DuPont Company
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Brett A. Phillips – Project Engineer, S&B Engineers and Constructors Ltd.
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Achieving Interoperability for Equipment Supply Chains

Plenary Slides

Notes

Achieving Interoperability for Equipment Supply Chains

Mark Palmer
FIATECH AEX Project Leader
National Institute of Standards and Technology

CII Vision for Fully Integrated and Automated and Project Processes (FIAPP)

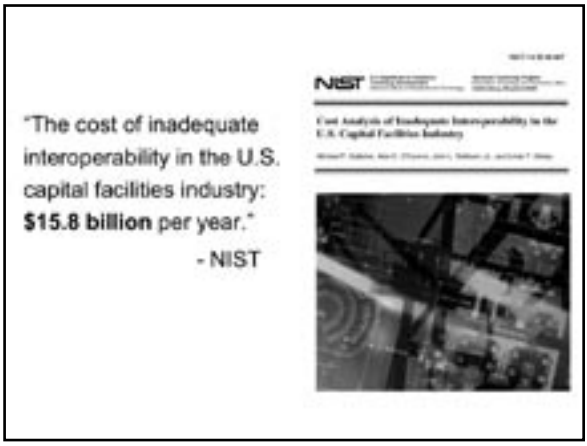
- Fully Integrated and Automated Project Processes = FIATECH
- CII identified supply chain challenges.
  - Three research teams investigated.
  - Design, procurement, materials mgmt, eBusiness
- FIATECH responded with new project:
  - Automating Equipment Information Exchange (AEX)
- Move AEX results into Best Practices.
  - PEpC and supplier integration

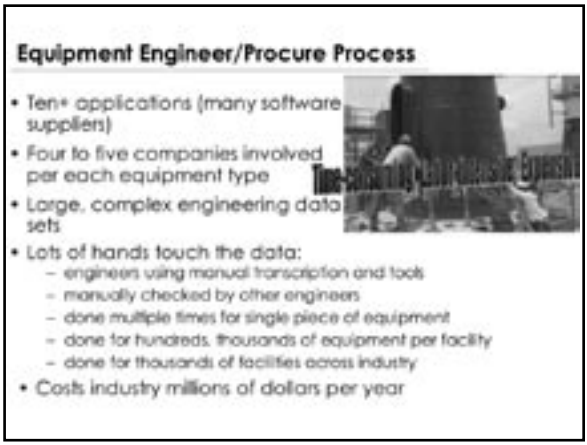
Outline

- Equipment Supply Chain Interoperability
- AEX Project
- Leadership in Supply Chains
- Industry Momentum
- Implementation Session

Notes


Interoperability
The ability to electronically **communicate product and project data between collaborating firms'** and within individual companies' design, procurement, construction, maintenance, operations, and business process systems.


"The cost of inadequate interoperability in the U.S. capital facilities industry: **$15.8 billion** per year."
- NIST
NIST


Equipment Engineer/Procure Process
• Ten+ applications (many software suppliers)
• Four to five companies involved per each equipment type
• Large, complex engineering data sets
• Lots of hands touch the data:
– engineers using manual transcription and tools
– manually checked by other engineers
– done multiple times for single piece of equipment
– done for hundreds, thousands of equipment per facility
– done for thousands of facilities across industry
• Costs industry millions of dollars per year

One Company's Data Sheet

Another Company's Data Sheet

AEX Project

Automating **E**quipment Information e**X**change

Goal

- Streamline equipment supply chain
- Eliminate redundant input of data
- Automate information exchange

Approach

- Focus on high value problems
- Develop partnerships: API, HI, LCI, PIP,...
- Demonstrate incremental solutions

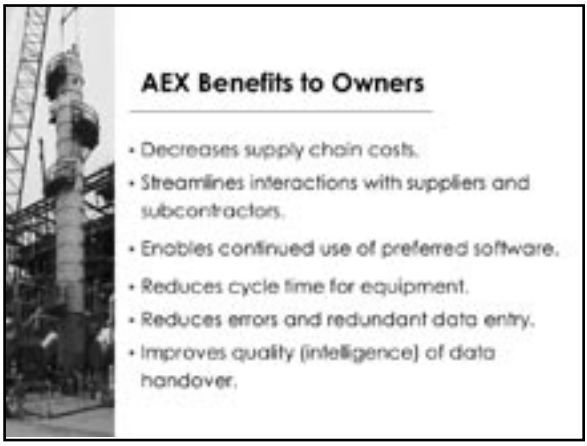
Products

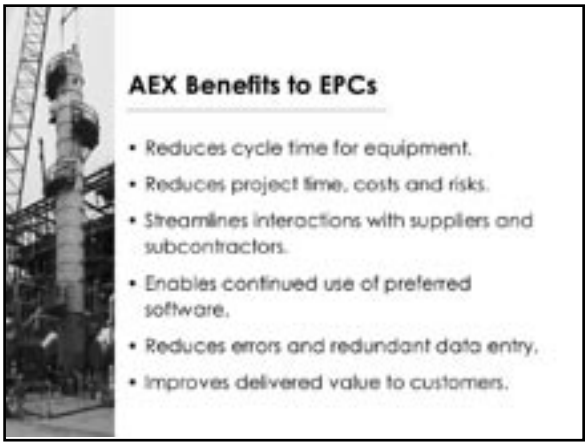
- XML specifications and industry guidelines
- Specs given to standards organizations

Notes

Notes


Benefits of AEX
• DuPont/EPC/pump supplier team:
E-enabling engineer and procure => 5.25% savings
Estimate: $12.5 million reduction yearly in equipment supply chain costs
• "The AEX project provides a pragmatic approach to achieving widespread adoption of reusable technical data exchange across the industry."
Robin Benjamins, Mgr. Bechtel Infor. Systems & Technology
• "We are extremely pleased with the results of this work."
Jim Porter, VP, DuPont Engineering & Operations


AEX Benefits to Owners
• Decreases supply chain costs.
• Streamlines interactions with suppliers and subcontractors.
• Enables continued use of preferred software.
• Reduces cycle time for equipment.
• Reduces errors and redundant data entry.
• Improves quality (intelligence) of data handover.


AEX Benefits to EPCs
• Reduces cycle time for equipment.
• Reduces project time, costs and risks.
• Streamlines interactions with suppliers and subcontractors.
• Enables continued use of preferred software.
• Reduces errors and redundant data entry.
• Improves delivered value to customers.

Why use XML for Data Exchange?

- eXtensible Markup Language
- Internet standard for intelligent document content
- Foundation for distributed applications and Intelligent Web services
- Foundation for B2B e-commerce
- Pervasive, in most software applications

AEX Development Process

1. Identify priority transactions and equipment.
2. Establish partnerships.
3. Investigate data sheets.
4. Document data requirements.
5. Develop XML schemas.
6. Develop example files; test schemas.
7. Demonstrate interoperability.
8. Promote industry adoption and use.
9. Add AEX schemas into industry standards.

FIATECH Partnership with Process Industry Practices (PIP)

- Memorandum of Understanding to use PIP data sheets in AEX.
  - Baseline requirements
  - Demonstrate AEX with PIP data sheets
- Collaborate with PIP Machinery Team.
- Include AEX results with PIP Practices.
- Advance industry capabilities.

Notes

Notes

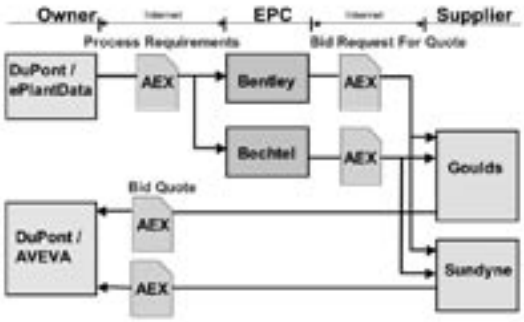
FIATECH Partnership with Pump Suppliers

- HI Electronic Data Exchange Group
  - alliance with AEX
- Participating in AEX interoperability demos.
- Working on more types of pumps.
- Leadership in ***Pump Supply Chain*** and ***Market Transformation.***
  - AEX part of the strategy
- **Using AEX to improve business processes with customers and save money.**

Hydraulic

Recent AEX Successes

- ✓ Released v.1 schemas and examples.
- ✓ New partnerships and advocates
- ✓ Defined core data for pump RFQ & Quote.
- ✓ Pump suppliers on board.
- ✓ New companies joining the project.
- ✓ Demonstrated interoperability across the pump supply chain.



Notes


Industry Momentum
• Solving equipment data interoperability.
– pumps, heat exchangers, compressors, ...
• Faster cycle times, improved productivity, reduced error rates.
• Owners, EPCs, IT and equipment suppliers collaborating on supply chain automation.
• Leadership by FIATECH, CII, PIP and HI.
→essential to achieve full benefits


Next Steps
• Contact equipment and IT suppliers
• Use AEX in your equipment partnerships
• Contact FIATECH and AEX
• Participate in work on other equipment
• Add AEX to CII Best Practices
• Attend AEX Implementation Session


Implementation Session
• Industry panel
– Art Stout, Intel
– Judy Passwaters, DuPont
– Brett Phillips, S&B Engineers and Constructors
– Jim Klein, AVEVA
– Manoj Dharwadkar, Bentley
– Tom Teague, ePlantData
• Productivity and schedule improvements
• Demonstrate AEX interoperability
• Guidance on using AEX
Use AEX for project success

Global Virtual Engineering Team Implementation

Effective Use of Global Engineering Workforce Research Team

Abstract

The plenary presentation will illustrate the importance of organizing global virtual engineering teams (GVET). An overview of the successful implementation of the GVET tool also will be introduced. This tool allows project leaders to develop a comprehensive project plan for effectively developing virtual engineering teams which efficiently utilize the global engineering workforce. The tool also allows companies to capture lessons learned from previous projects and provide the lessons to future project leaders during their plan development.

A demo of the GVET planning tool will take place in the implementation session through an engaging mock team meeting to develop a plan for a portion of the tool. The remainder of the session will be devoted to a panel of experienced global virtual team members/planners who the panel will share their experiences, answer audience questions, and provide feedback on the implementation of the GVET planning tool.

Plenary Session Presenter

James B. Mynaugh – Director of Manufacturing Services, Engineering Division, Rohm and Haas Company

Jim Mynaugh currently serves on the CII research team investigating the global engineering work force. At Rohm and Haas, Mynaugh and his team of capital project engineers, risk management staff, technical specialists, and reliability engineers support more than 100 international manufacturing sites. He has over 25 years of experience with Rohm and Haas, largely in manufacturing. He has served as site manager for the company's plant in Grangemouth, Scotland, and has held other senior management roles at Rohm and Haas' offices in Houston, Texas, Knoxville, Tennessee, and Bristol, Pennsylvania.

e-mail: jmynaugh@rohmhaas.com

Implementation Session Moderator

Karl E. Seil – Director of Engineering, Shaw, Stone & Webster

Karl Seil has been involved in the setup and interface with global virtual engineering teams (GVETs) for the last eight years and was instrumental in the startup of a joint venture in Mumbai, India, for Shaw Stone & Webster. Prior to joining the Shaw Group in 2002, Seil spent 22 years at Bechtel, where he was involved in various petrochemical, fossil, and nuclear power projects. He is a member of the CII research team studying effective use of the global engineering work force. Seil holds a bachelor's degree in mechanical engineering from Brigham Young University and he is a Registered Professional Engineer in both Texas and California.

e-mail: karl.seil@shawgrp.com

Implementation Session Participants

Jiri Gregor – Director, Engineering, ABB Lummus Global (via virtual link)

Aivars E. Krumins – Vice President, Engineering & Procurement, ABB Lummus Global
e-mail: aivars.e.krumins@us.abb.com

John I. Messner – Assistant Professor, Architectural Engineering Department, Pennsylvania State University
e-mail: jmessner@engr.psu.edu

James B. Mynaugh – Director of Manufacturing Services, Engineering Division, Rohm and Haas Company
e-mail: jmynaugh@rohmhaas.com

Matthew J. Petrizzo – Project Engineering Manager, Washington Group International, Inc.
e-mail: matthew.petrizzo@wgint.com

Marcel Prunaiche – Managing Director, Washington E&C Romania (via virtual link)

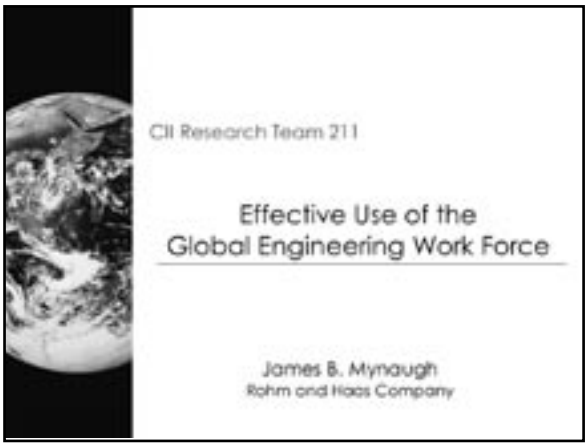
Pooran Tripathi – President, Stone & Webster Rolta Limited (via virtual link)

Todd White – Engineering Manager, Anheuser-Busch Companies, Inc.
e-mail: todd.white@anheuser-busch.com

Global Virtual Engineering Team Implementation

Plenary Slides

Notes



Notes

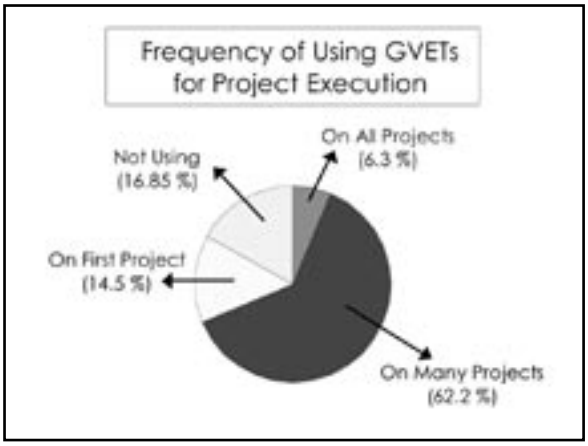

Definition
A Global Virtual Engineering Team (GVET) is a group of geographically dispersed individuals organized through communication and information technologies that needs to overcome space, time, functional, organizational, national, and cultural barriers for the completion of a specific engineering task.

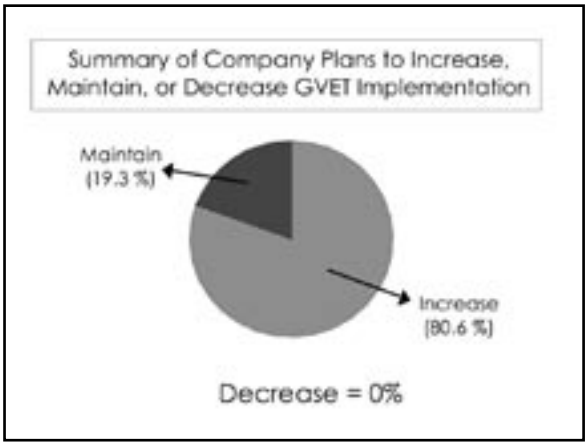

Project Objectives
1. Determine driving factors for GVET.
2. Determine current status of GVETs, tools, and work processes.
3. Define criteria for successful GVET adoption and lessons learned from past experiences.
Develop a framework for global engineering work force establishment and maintenance.


Research Process
1. Survey of global teaming status and trends.
2. Detailed interviews to identify a framework for critical planning issues.
3. Case study analysis.
4. Focus-group meetings to evaluate framework.
5. Implementation tool development (GVET Project Planner).

Notes


Survey Results
• Survey Responses: 47 individuals, 33 companies
– 19 owner and 28 EPC individuals submitted surveys
– CII member companies: 13 owners and 20 EPCs
• In-Depth Interviews: 21 total
– Domestic: 17 managers
– Foreign: 4 managers
• Detailed Case Study
– Five projects within one CII member organization
• Two Focus-Group Meetings
– 16 experienced executives/managers

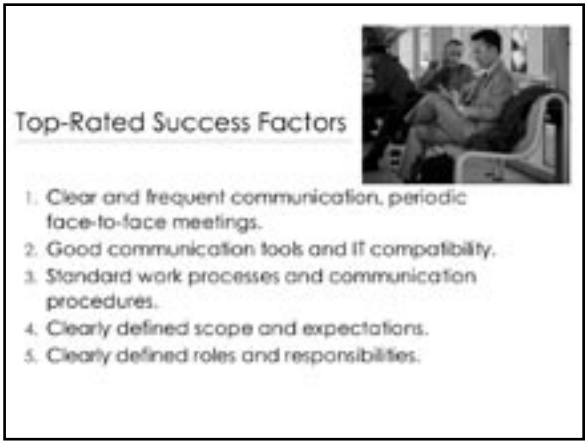

Frequency of Using GVETs for Project Execution
On All Projects (6.3 %)
Not Using (16.85 %)
On First Project (14.5 %)
On Many Projects (62.2 %)


Summary of Company Plans to Increase, Maintain, or Decrease GVET Implementation
Maintain (19.3 %)
Increase (80.6 %)
Decrease = 0%

Notes

Perceived Impact of GVET

Performance Metric	Average Opinion
Engineering Cost	More than 10% reduction
Construction Cost	No impact
Engineering Time	No impact
Overall Project Delivery Time	No impact
Engineering Quality	No impact
Construction Quality	No impact



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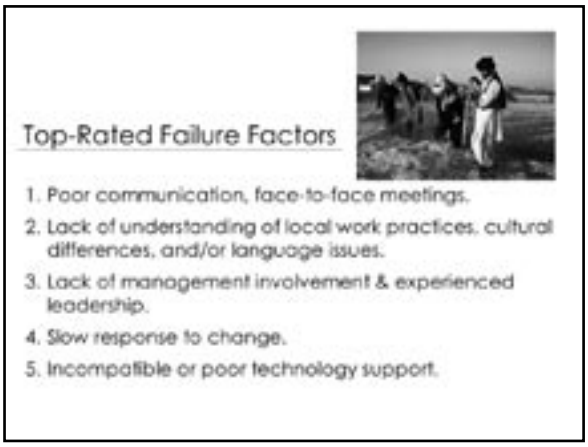

Top-Rated Failure Factors
1. Poor communication, face-to-face meetings.
2. Lack of understanding of local work practices, cultural differences, and/or language issues.
3. Lack of management involvement & experienced leadership.
4. Slow response to change.
5. Incompatible or poor technology support.


Additional Results
74% EPC respondents have permanent domestic and overseas engineering design offices participating in GVET.
71% Felt less like an integrated team.
60% Team members have less trust.
61% GVET increases time spent by project management team.


SOLUTION ??
SOLUTION ??
SOLUTION ??
GVET Execution Planner

Notes


GVET Execution Planner
• Software application
• Six primary categories:
1. Scope definition
2. Communication
3. Project organization
4. Technology
5. Project controls
6. Quality assurance


PROJECT - Communication
GVET Execution Planner
SNAPSHOT


Implementation Session
• Join us for:
- Demo of GVET Execution Planner
- Additional research findings
- Live discussion with virtual team members
• Room ????


Effective Use of the Global Engineering Work Force Research Team
Robert J. Beaker
General Motors (Co-chair)
Karl E. Sell
Stone & Webster, Shaw Group (Co-chair)
Hector Brouwer de Koning
Black & Veatch
Dennis Chastain
Mustang Engineering
Chuan "Victor" Chen
Penn State University
Gregory Gould
Burns & McDonnell
John Hockney
Nova Chemicals
Lana Hankins
ConocoPhillips
Robert E. Houghtaling
DuPont
George Joseph
Penn State University
Alvan E. Krumins
ABB Lummus Global
John L. Messner
Penn State University
James B. Murphy
Rohm and Haas
Bahuk Patel
The Dow Chemical Co.
Matthew J. Petrizzo
Washington Group International
Reinhard Pratt
AMEC
Gerald A. Schacht
Abbott
Bruce A. Stupp
Parsons Corporation
H. Randolph Thomas
Penn State University
Todd White
Anheuser-Busch

Notes

Benchmark Subcontractor Safety Performance through Leadership and Ownership

Bechtel Case Study – Implementation Session only

Abstract

Subcontractors in developing countries can work "accident free." This implementation session will describe success in achieving zero accidents on an international project as the result of applying "Zero Accident Techniques" and "Safety Practice Use" metrics. Lessons learned and innovative thinking that resulted in the consistent continuous improvement in safety performance will be discussed. The strategies used and opportunities for improvement during construction of a major project also will be discussed. The remainder of the session will be reserved for questions from the audience and the shared experiences on managing subcontractor safety performance.

Implementation Session Moderator

DaCosta Kirton – Safety and Health Manager, Atlantic LNG Expansion Project, Trinidad Train 4 Project, Bechtel International Inc.

With Bechtel since 1989, DaCosta Kirton has over 25 years of experience in the engineering and construction industry, primarily in ESH assignments. Other international assignments include work on Bechtel projects in Mexico and Saudi Arabia. Domestically, his work has included projects at Oak Ridge National Laboratory. He previously worked for the American Cyanamid Company in Princeton, New Jersey. An OSHA certified trainer and former chair of the Safety Council of Trinidad and Tobago (Southwest Chapter), Kirton holds a bachelor's degree in environmental science from the University of Southern Colorado.

e-mail: dkirton@bechtel.com

Implementation Session Participants

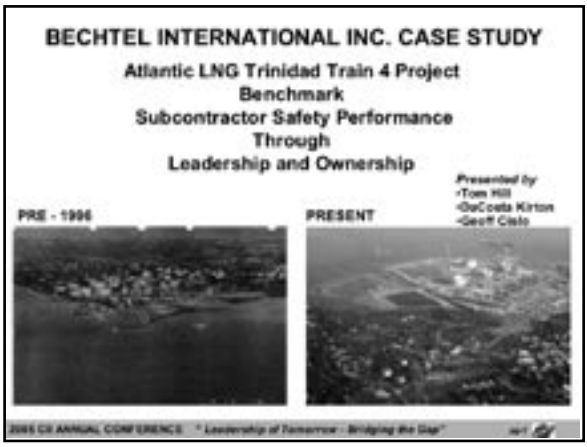
Geoffrey B. Cislo – Area ES&H Manager, Bechtel Corporation
e-mail: gbcislo@bechtel.com

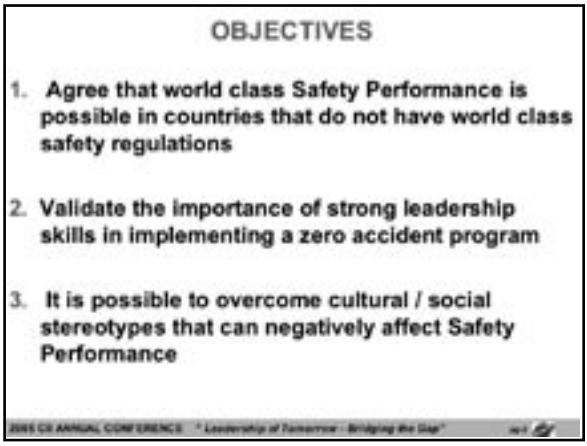
Thomas C. Hill – Site Manager, Trinidad Train 4 Project, Bechtel International Inc.
e-mail: tchill@bechtel.com

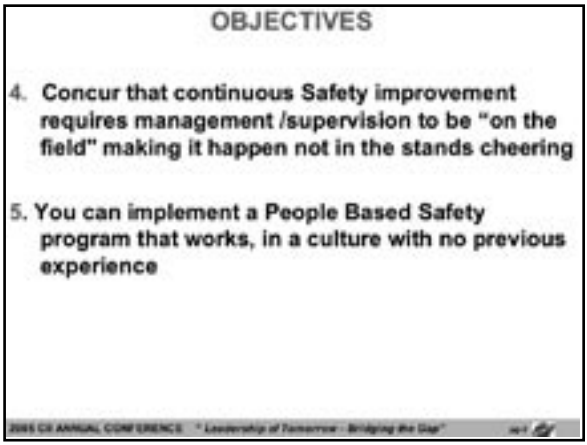
Benchmark Subcontractor Safety Performance through Leadership and Ownership

Implementation Slides

Notes







Notes

TRINIDAD & TOBAGO

➢ **BACKGROUND**

- British control in the 19th century.
- Independence in 1962.
- One of the most prosperous in the Caribbean thanks largely to petroleum and natural gas production and processing.
- Located in the Caribbean between the Caribbean Sea and the North Atlantic Ocean and is northeast of Venezuela.

TRINIDAD & TOBAGO

- It covers a total area of 5128 sq km and is slightly smaller than Delaware.
- 590,000 Trinbagonians make up the Labour force
- Trinidad & Tobago has a population of 1,275,700 persons:
  - ❖ 40.3% consist of East Indian
  - ❖ 39.5% consist of of African
  - ❖ 18.4% consist of a Mixed origin
  - ❖ 0.6% consist of Caucasian
  - ❖ 1.2% consist of Chinese and other races.

Safety and Health, Goals and Targets, and Expectations

➢ **Project Goals**

- Achieve ZERO incidents by providing a work environment where Safety Performance is optimized and risks are managed to prevent accidents during plant Construction and Operation.

➢ **MEETING / EXCEEDING CUSTOMER EXPECTATIONS**

Notes

Safety and Health, Goals and Targets

➢ **Project Performance Measurement Values**

	Threshold Value	Target Value	Stretch Value
RECORDABLE	1.00	0.55	0.25
LTA	0.20	0.10	0.00

- Developed by customer and included in contract
- Basis for rewarding performance as part of Incentive program
- Threshold value = Upper Boundary value that must not be exceeded to earn incentive payment.

Safety and Health, Goals and Targets

- Target Value = Midpoint value required to earn the incentive payment.
- Stretch Value = Lower Boundary value required to earn the incentive payment.

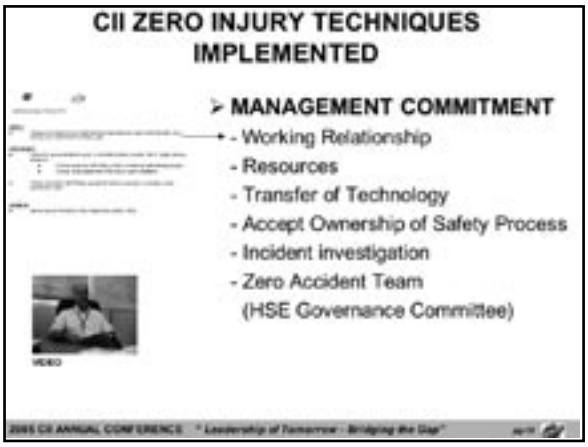
CATEGORY	WEIGHT %
OSHA RECORDABLE	20
LTA	20
FATALITIES	30
CUSTOMER SATISFACTION	30

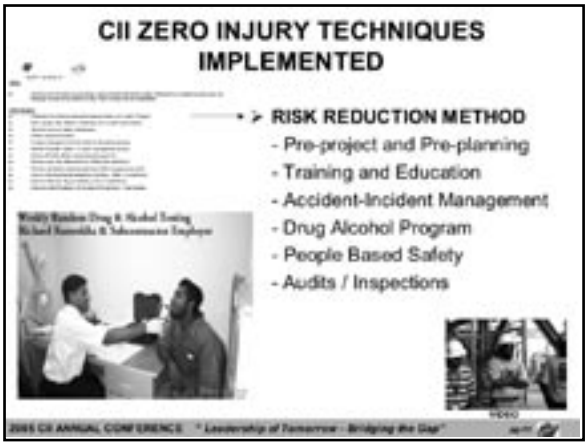
EXISTING CONDITIONS /FACTORS AFFECTING SAFETY PERFORMANCE

➢ TRINIDAD AND TOBAGO HAS NO CURRENT ES&H REGULATIONS
– Proposed 2003 Draft HSE Bill still to be signed.

➢ TRINIDAD AND TOBAGO COST OF ACCIDENTS 1976-1998
– Direct Cost = US$ 25,000,000 (Source: National Insurance Board)
– Indirect Cost = US$ 100,000,000
– Total Cost = US$ 125,000,000

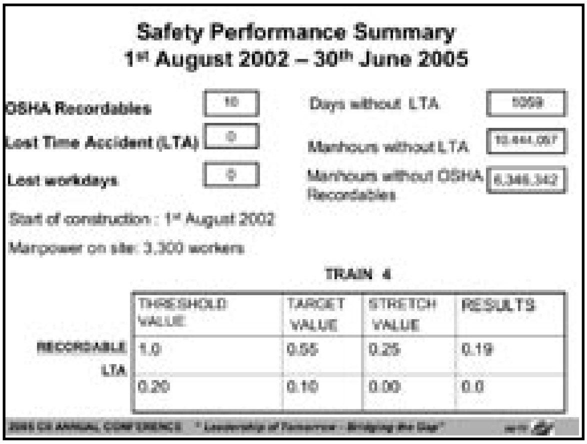
Notes


CII ZERO INJURY TECHNIQUES IMPLEMENTED
➢ MANAGEMENT COMMITMENT
- Working Relationship
- Resources
- Transfer of Technology
- Accept Ownership of Safety Process
- Incident investigation
- Zero Accident Team
(HSE Governance Committee)


CII ZERO INJURY TECHNIQUES IMPLEMENTED
➢ RISK REDUCTION METHOD
- Pre-project and Pre-planning
- Training and Education
- Accident-Incident Management
- Drug Alcohol Program
- People Based Safety
- Audits / Inspections


CII ZERO INJURY TECHNIQUES IMPLEMENTED
➢ RECOGNITION AND REWARDS
- Attendance Incentive
- Safety Incentive
- Fringe Incentive
- (S.H.O.T) Safe Habits Observation Team Incentive
- Contractor Performance Incentive
➢ SUSTAINABILITY
- Customer Satisfaction
- Future work

Notes



Safety Performance Summary
1st August 2002 – 30th June 2005

OSHA Recordables	10	Days without LTA	1059
Lost Time Accident (LTA)	0	Manhours without LTA	10,441,097
Lost workdays	0	Manhours without OSHA Recordables	6,348,342

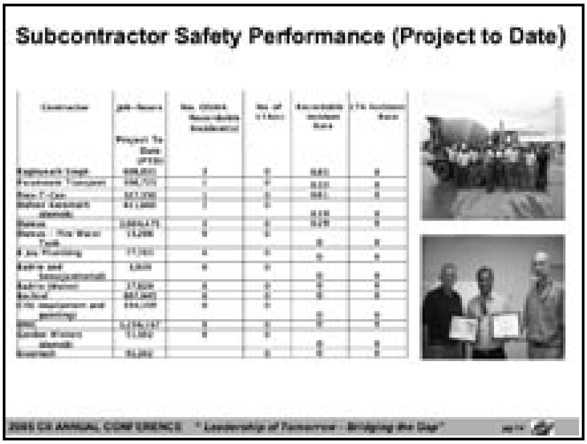
Start of construction : 1st August 2002

Manpower on site: 3,300 workers

TRAIN 4

	THRESHOLD VALUE	TARGET VALUE	STRETCH VALUE	RESULTS
RECORDABLE	1.0	0.55	0.25	0.19
LTA	0.20	0.10	0.00	0.0

2005 CII ANNUAL CONFERENCE "Leadership of Tomorrow - Bridging the Gap"



Subcontractor Safety Performance (Project to Date)

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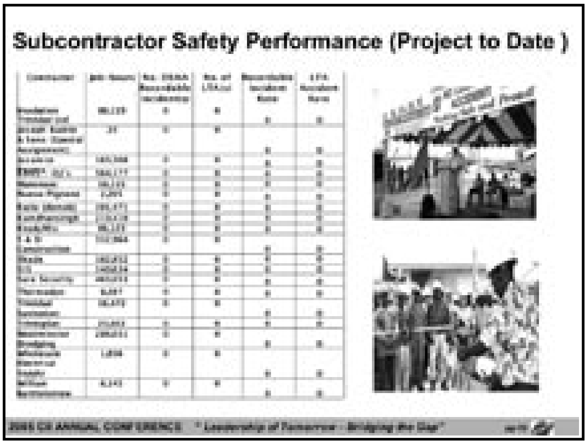


Subcontractor Safety Performance (Project to Date)

2005 CII ANNUAL CONFERENCE "Leadership of Tomorrow - Bridging the Gap"

TRINIDAD TRAIN 4 PROJECT
Safety Perception Survey - 7/2004

AREA	NO. OF RESPONDERS / GROUP			
	CRAFT (MANUAL) 300	CRAFT SUPER (NON-MANUAL) 54	BECHTEL (NON-MANUAL) 179	CUSTOMER (NON-MANUAL) 13
Project Management Support of Safety Procedures	% YES	% YES	% YES	% YES
Does Project Management visibly and actively participate in the safety process?	79	89	89	77
Are supervisors supported by Project Management in their decisions relating to safety?	86	87	90	92
Has Project Management's efforts encouraged you to work more safely?	83	80	91	77
Schedule Priority Over Safety				
Has your Supervisor required you to carry out any job or task that you felt was not safe?	18	6	3	0
Do you think schedule takes priority over safety at any time on this project?	44	22	27	23
Personal Commitment to Safety				
Has your attitude toward safety gotten better since you started working on this Project?	94	91	93	85
Do you think zero accidents are achievable?	77	81	89	92

2005 CII ANNUAL CONFERENCE "Leadership of Tomorrow - Bridging the Gap"

TRINIDAD TRAIN 4 PROJECT
Safety Perception Survey - 7/2004

AREA	NO. OF RESPONDERS / GROUP			
	CRAFT (MANUAL)	CRAFT SUPER (NON-MANUAL	BECHTEL (NON-MANUAL)	CUSTOMER (NON-MANUAL)
Is you feel this is your safety program?	75	76	79	69
Is you think employees are committed to achieving zero accidents?	82	91	79	62
Supervisors Commitment / Support to Safety Process				
Does your Supervisor regularly discuss safety goals and performance with employees?	84	85	73	92
Does your Supervisor show a personal interest in having a safe job?	92	91	93	100
Is you think your foreman is committed to achieving zero accidents?	91	91	77	54
Are you encouraged by your supervisor to participate in the site's safety program?	88	89	85	100
People Based Safety Increases Safety Awareness				
Is you think Craft workers observing other Craft workers to provide feedback on safe and risky behaviors makes you more aware of safety?	88	89	81	77
New Hire Orientation Effective				
Is the Project new employee safety orientation efficient in preparing you for work on the project?	88	83	96	77

2005 CII ANNUAL CONFERENCE "Leadership of Tomorrow - Bridging the Gap"

Project Management Team Commitment / Ownership

-Leadership role in ES&H

-Positive Working relationships with customers and subcontractors

-Work Execution Philosophy: for us (Bechtel) to be successful, we have to make our Subcontractors successful

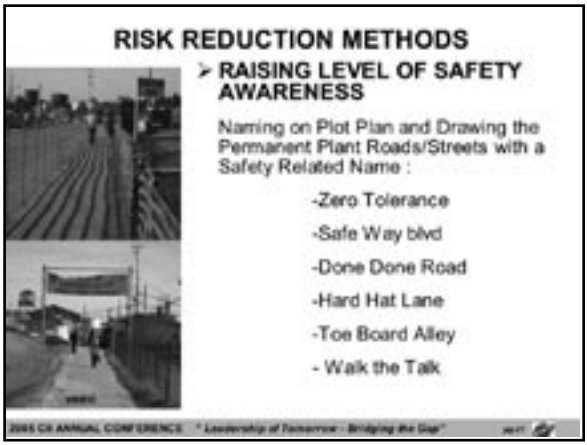
2005 CII ANNUAL CONFERENCE "Leadership of Tomorrow - Bridging the Gap"

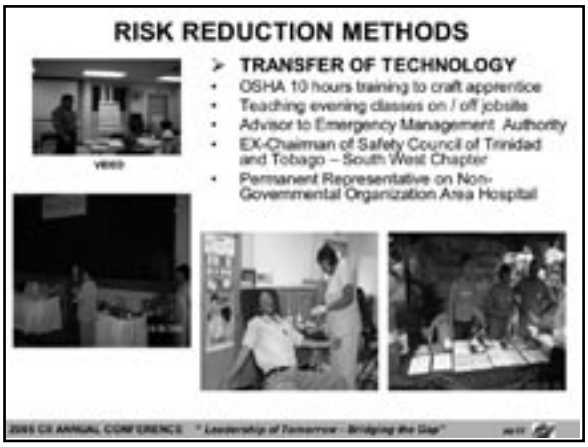
Notes

Notes

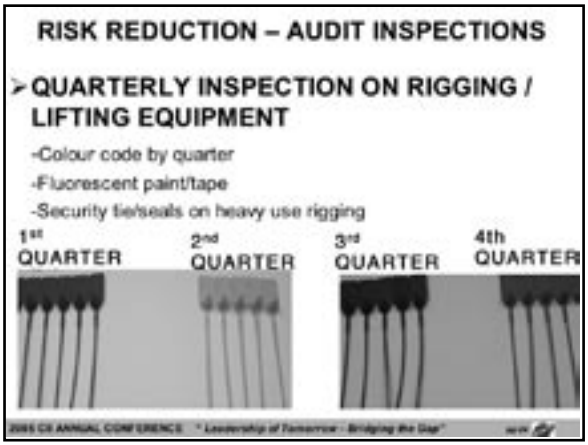

Project Management Team Commitment / Ownership
- Mandatory attendance at plan of the day and Tool box meetings
- Provide resources and staffing level of one (1) Safety Representative / 50 workers minimum
- Bechtel, Customer, Subcontractor Weekly Management Safety Walk downs per area
- Increased Management attendance / participation via Specially prepared "Monday Management Safety Talk"


Project Management Team Commitment / Ownership
- Zero Accident Team is the HSE Governance Committee
- Mission Statement – A committee of your Company's most Senior Management personnel who meet twice monthly to hold discussions on providing guidance, assistance and leadership to all employees on the jobsite on the Project's Safety and Health Program


RISK REDUCTION METHODS
➢ RAISING LEVEL OF SAFETY AWARENESS
Naming on Plot Plan and Drawing the Permanent Plant Roads/Streets with a Safety Related Name :
-Zero Tolerance
-Safe Way blvd
-Done Done Road
-Hard Hat Lane
-Toe Board Alley
- Walk the Talk

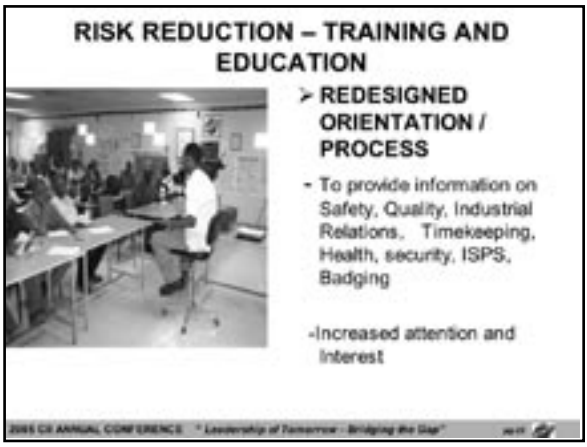

RISK REDUCTION METHODS
TRANSFER OF TECHNOLOGY
OSHA 10 hours training to craft apprentice
Teaching evening classes on / off jobsite
Advisor to Emergency Management Authority
EX-Chairman of Safety Council of Trinidad and Tobago – South West Chapter
Permanent Representative on Non-Governmental Organization Area Hospital

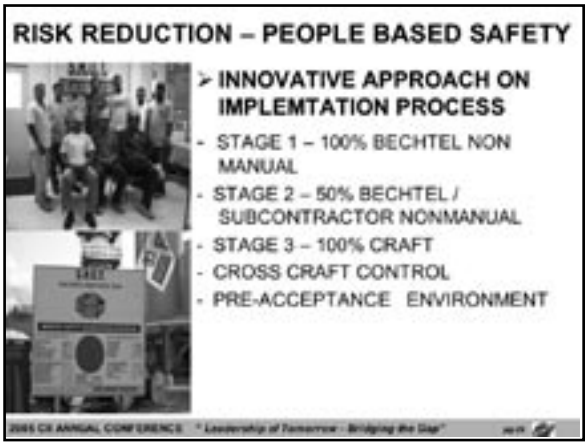

RISK REDUCTION METHODS
ROAD SAFETY AWARENESS
Keep your eyes on the road.
Make safety your code.


RISK REDUCTION – AUDIT INSPECTIONS
QUARTERLY INSPECTION ON RIGGING / LIFTING EQUIPMENT
-Colour code by quarter
-Fluorescent paint/tape
-Security tie/seals on heavy use rigging
1st QUARTER
2nd QUARTER
3rd QUARTER
4th QUARTER

Notes

Notes


RISK REDUCTION – TRAINING AND EDUCATION
➢ REDESIGNED ORIENTATION / PROCESS
- To provide information on Safety, Quality, Industrial Relations, Timekeeping, Health, security, ISPS, Badging
-Increased attention and interest


RISK REDUCTION – PEOPLE BASED SAFETY
➢ INNOVATIVE APPROACH ON IMPLEMTATION PROCESS
- STAGE 1 – 100% BECHTEL NON MANUAL
- STAGE 2 – 50% BECHTEL / SUBCONTRACTOR NONMANUAL
- STAGE 3 – 100% CRAFT
- CROSS CRAFT CONTROL
- PRE-ACCEPTANCE ENVIRONMENT


RISK REDUCTION – ACCIDENT MANAGEMENT
➢ INCIDENT INVESTIGATION
- Integrated Investigation Team for High Potential Incidents Investigation with Bechtel, customer, subcontractor
- Management trained in how to perform Root Cause Analysis from start of project and retrained as construction progressed.

RISK REDUCTION –DRUG AND ALCOHOL PROGRAM

TYPE	FREQUENCY	NO. TESTS	POSITIVE RESULTS %
RANDOM TESTING	WEEKLY	2,861	0.9%
NIGHT SHIFT	WEEKLY	557	1.5%
NEW HIRE CHECKS	3 TIMES/WEEK	1,023	0.8%
SPECIAL(MAJOR HOLIDAYS)	EVENT	16,086	0.7%
CAUSE(INCIDENTS)	EVENT	140	5%
CAUSE (SUSPICION	EVENT	7	28.6%

RISK REDUCTION – TRAINING AND EDUCATION

- ZERO TOLERANCE ON FALL PROTECTION VIOLATION
  - 100% of Workers required to work in elevated areas must attend and pass the Bechtel 5(five) hour Fall Protection Workshop
  - Consequences for not tying off
  - 100% Tie-Off Matrix
  - Vertical Anchor Points using wire rope loops

RISK REDUCTION – TRAINING AND EDUCATION

- ESTABLISH MINIMUM REQUIREMENTS for ES&H PERSONNEL
  - 5 Years Experience
  - OSHA 30 hours construction Safety course
  - Blood Borne Pathogen Training
  - CPR / FIRST AID (current)

Notes

Notes

RISK REDUCTION – TRAINING AND EDUCATION

- **CREATED SUPPLY TO MEET DEMAND**

-ES&H Assistants Training Program to provide Trained Personnel for future work. Off project poaching created demand

- -Mentoring
- -Training and development
- -Transfer of Technology

2005 CII ANNUAL CONFERENCE "Leadership of Tomorrow - Bridging the Gap"

RISK REDUCTION – INITIATIVES

-TO REDUCE THE NUMBER OF NEAR MISS AND FIRST AID INCIDENTS BY 75% FOR THE NEXT MILLION HOURS WORKED

2005 CII ANNUAL CONFERENCE "Leadership of Tomorrow - Bridging the Gap"

REDUCTION METHODS -AGGRESSIVE MEDICAL CASE MANAGEMENT

- OCCUPATIONAL HEALTH NURSES AND EMTS
- EMPLOYEES CAN GET EXTRA SICK LEAVE DAYS EASILY
- IMPLEMENTED RETURN TO WORK POLICY
- All WORKERS MUST BE SEEN BY NURSE BEFORE SEEKING OFFSITE MEDICAL ASSISTANCE.

2005 CII ANNUAL CONFERENCE "Leadership of Tomorrow - Bridging the Gap"

RECOGNITION / REWARDS

- Subcontractors Companies receive a Certificate of Completion and a "Write- Up" in the local Newspaper.
- Gifts and Achievement certificates at Million Man hours Milestone 1,3,5,7,10 and completion of the project.
- Workers receive incentives for attendance, working safe, and making observation as members of PBS

CII ZERO INJURY TECHNIQUES IMPLEMENTED

➢ **SUSTAINABILITY**

- The project has received an "A" rating in ES&H Compliance from our customer
- Assist in winning other LNG Work in other companies

PRE - 1996

PRESENT

Notes

Productivity Metrics Preview

CII Benchmarking & Metrics Committee – Implementation Session only

Abstract

After several years of development and alignment activities, CII has a set of engineering and construction productivity metrics that are based on design and installed quantities, respectively. Data collection has been most successful for these metrics: more than 80 projects have been submitted with engineering productivity data and more than 50 projects have been submitted with construction productivity data.

This implementation session will describe the data set received to date, preview early analysis of the data, and discuss reports being developed to present benchmarking comparisons for those submitting data. The four levels of reports in development will be discussed to include the development of an overall construction industry productivity metric. Participants will be invited to join the effort as CII continues to take advantage of recent breakthroughs in productivity measurement.

Implementation Session Moderator

Daniel E. Scott – Manager, Engineering Project Controls, BE&K Engineering Company

Danny Scott is responsible for engineering cost and scheduling, document control, and project support at BE&K. He has over 17 years of engineering and construction experience on heavy industrial and process-intensive projects, both domestically and internationally. His roles at BE&K have included project engineer, subcontract coordinator, expeditor, project scheduler, and project cost analyst. At CII, he has served as a member of the Benchmarking Committee for the past three years. Scott holds a bachelor's degree from the University of Montevallo and an MBA from Samford University.

e-mail: scottd@bek.com

Implementation Session Participants

James B. Gibson – Vice President, Projects, ALSTOM Power Inc.
e-mail: james.b.gibson@power.alstom.com

David G. Hile – Operations Manager, Fru-Con Construction Corporation
e-mail: david.hile@frucon.com

David M. Perkins – Project Manager, Rohm and Haas Company
e-mail: david_m_perkins@rohmhaas.com

James G. Slaughter, Jr. – President, S&B Engineers and Constructors Ltd.
e-mail: jgsjr@sbec.com

Stephen R. Thomas – Associate Director, Construction Industry Institute
e-mail: sthomas@mail.utexas.edu

Paul N. Woldy – Staff Engineer, Chevron Inc.
e-mail: pwoldy@chevron.com

Productivity Metrics Preview

Implementation Slides

Notes

Productivity Metrics Preview

July 21, 2005
Grapevine, TX

Agenda

- Introduction & Background
- Productivity Measurement Milestones
- Data Collection Status
- Data Set Descriptives
- Preview of the Engineering Productivity Data
- Report
  - Sample Productivity Key Report
  - Industry Report
- Path Forward

Purpose of Implementation Session

- To report out on Productivity Measurement activities of the Benchmarking Committee
- To provide a preview of productivity data being received
- To obtain feedback on planned reports and future activities

Notes

BM&M Productivity Team Members

Danny Scott ✔ *	BE&K Inc.
Paul Woldy ✔	Chevron Corporation
Charlie Green	Aramco Services Company
David Perkins	Rohm and Haas Company
Dave Hile ✔	Fru-Con Construction Corporation
Jim Gibson ✔	ALSTOM Power Inc.
Jimmy Slaughter ✔	S&B Engineers and Constructors Ltd.
Steve Thomas ✔	Construction Industry Institute
Inho Kim	CII / The University of Texas at Austin
Pin-Chao Liao	CII / The University of Texas at Austin

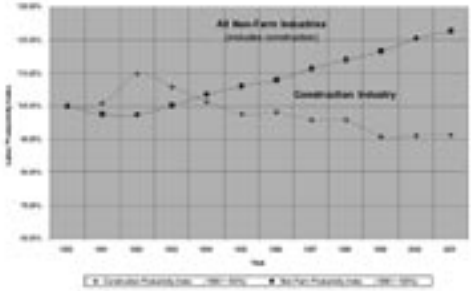
✔ Panel * Moderator

Workshop Participants* (E&C)

Owners (17)	Contractors (19)
3M	ABB Lummus Global Inc.
Anheuser-Busch Companies Inc.	Aker Kvaerner
Aramco Services Company	ALSTOM Power Inc.
BP America, Inc.	BE&K, Inc.
Chevron Corporation	Bibb & Associates (Kiewit)
Conoco Inc.*	Black and Veatch
Degussa	BMW Constructors Inc.
General Motors Corporation	CDI Engineering Solutions
GlaxoSmithKline	Cherne Contracting Corporation
Naval Facilities Engineering Command	Day & Zimmermann
Philips Petroleum Company*	Flint Energy Services Ltd.
Praxair, Inc.	Fluor Corporation
Rohm and Haas Company	Jacobs
Southern Company	Mustang Engineering, L.P.
Texaco Inc.*	Rust Constructors Inc.*
The Dow Chemical Company	S&B Engineers and Constructors Ltd.
The Shaw Group	Washington Group International, Inc.
	Watkins Engineers & Constructors*
	Zachry Construction Corporation

* At time of workshop

Is Construction losing ground?



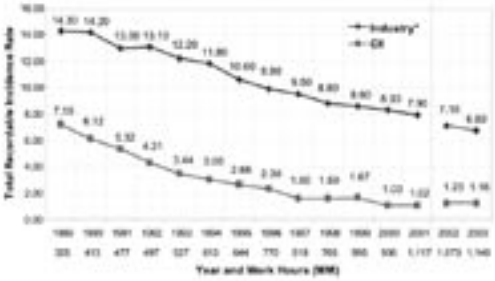
Engineering & Construction Market Size

- $998 Billion Expenditure in US alone*
  - 20 - 40 % Construction Labor
  - 10 - 15 % Engineering of TIC
- How much can you save from a 5% improvement in productivity?

* BLS 2004

What gets measured gets improved!

Safety Performance Trend



* OSHA Construction Division, SIC 15-17

Reflects OSHA Reporting Change

Notes

Notes

BM&M Productivity Metrics Journey

- Jun 2000 – Authorized initiative and path forward
- Feb 2001 – Finalized construction Productivity Metrics definitions
- Jan 2002 – Began engineering Productivity Metrics development
- Sep 2002 – Initiated pilot data collection
- Jul 2003 – Jun 2004 – Pursued alignment of engineering Productivity Metric approaches
- Jun 2004 – Achieved alignment & established data collection plan
- Mar 2005 – Received first significant quantities of Productivity Metric data

Definition of Productivity
(Raw Productivity)

$$\text{Construction Productivity} = \frac{\text{Direct Work-Hours}}{\text{Installed Quantity}}$$

$$\text{Engineering Productivity} = \frac{\text{Direct* Design Hours}}{\text{IFC** Quantity}}$$

* Per Design Component
**IFC (Issued for Construction)

Metric Categories

Construction Productivity	Engineering Productivity
• Concrete	• Concrete
• Structural Steel	• Structural Steel
• Electrical	• Electrical
• Piping	• Piping
• Instrumentation	• Instrumentation
• Equipment	• Equipment
• Insulation	

Engineering Concrete Breakouts

(Wk-Hrs/CY)

Total Concrete

- Total Slabs
  - Ground and Supported Slab
  - Area Paving
- Total Foundations
  - Piling (Wk-hrs/ EA)
  - Foundation (<5 CY)
  - Foundation (>5CY)
- Concrete Structures

Data is coming in !

- Engineering Productivity: 85 projects from 18 companies.
- Construction Productivity: 59 projects from 20 companies.

Engineering Productivity Data

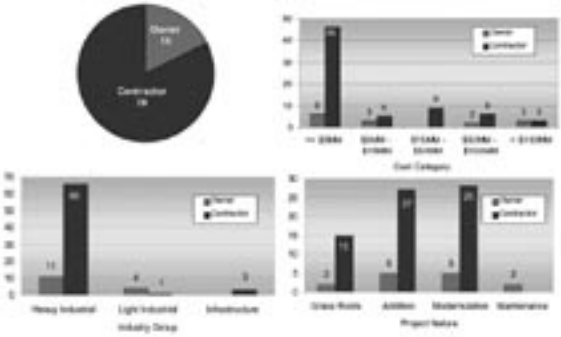
Notes

Notes

Data Count by Metric Category
Engineering Productivity Metrics

Major Categories	No. of Projects	No. of Companies
Concrete	37	11
Structural Steel	40	12
Electrical	28	11
Piping	66	17
Instrumentation	45	17
Equipment	47	16

Engineering Productivity Data Set



Project Types
Engineering Productivity Metrics

Project Type	Count	Percentage
Oil Refining	40	31%
Chemical Mfg.	12	14%
Environmental	7	8%
Pulp and Paper	7	8%
Pharmaceutical Mfg.	4	3%
Heavy Industrial	3	4%
Electrical (Generating)	2	2%
Oil Exploration/Production	2	2%
Laboratory	1	1%
Natural Gas Processing	1	1%
Pipeline	1	1%
Rail	1	1%
Water/Wastewater	1	1%
Total	86	100%

Reporting Levels

- Level I – Overall Project
- Level II – Major Category
  - Example: Concrete
- Level III – Sub-Category
  - Example: Foundations
- Level IV – Detail Category
  - Example: Foundations < 5 CY

Industry Report

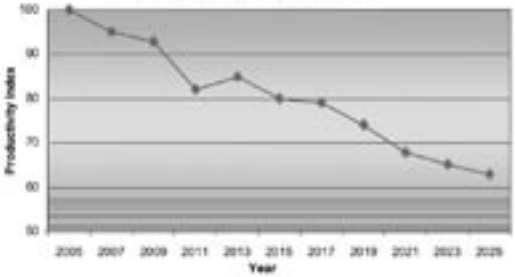
Project Key Report
*Where Applicable

Sample Engineering Productivity

Key Report

Report in Development

Overall Productivity Index



Notes

Notes

Path Forward

- Collect more data
- Produce more meaningful data slices
- Develop level I metric definition
- Establish productivity trends from actual project data
- Expand effort to building and other industry groups
- Engage both union and non-union labor
- Customize (Develop) for special industry groups
- Increase emphasis on construction

Comments / Questions

Productivity Metrics Preview

July 21, 2005
Grapevine, TX

Construction Industry Leadership in the Changing Energy Marketplace

Keynote Speaker

Plenary Session Presenter

Rex Tillerson – President, ExxonMobil Corporation

With Exxon since 1975, Rex Tillerson has held several executive, engineering, technical, and supervisory assignments. In the late 1980s as business development manager in the natural gas department, his responsibilities included developing long-range plans for commercialization of Alaska and Canadian Beaufort Sea gas. He also has served as president of Exxon Yemen. In 1998 as vice president of Exxon Ventures and president of Exxon Neftegas Limited, he was responsible for the company's holdings in Russia and the Caspian Sea. Tillerson is a member of the U.S.–Russia Business Council, the Society of Petroleum Engineers, and the American Petroleum Institute. He earned a bachelor's degree in civil engineering at UT Austin.

CII Forum: Leadership of Tomorrow – Bridging the Gap

(Where have all the great leaders gone or are they just waiting to be discovered?)

Abstract

The CII Forum will address some key issues facing the development of leaders for CII member organizations with capital-intensive enterprises. Owners and contractors alike are faced with a gap in talent caused by the boom in the software industry in the late 1990s and the severe reduction in capital spending since 2000. Owners have downsized and emerging talent has left.

One common debate is whether great leaders are "born" to lead or is leadership a "learned" skill? If it is learned, then what type of formal and informal leadership programs have been effective to create stronger leaders? When is the best time to begin leader training, and are external programs preferable to in-house programs? What part do on-the-job training and real world experiences play in creating leadership competency? Is strategic leadership a specialized skill?

When selecting a new leader, common traits such as initiative, technical skill, good communications, and trustworthiness are sought. Is there a proven road map for leadership? If someone is a good manager, does that mean they will be a good leader? The forum will explore leader characteristics, examples of effective leadership, and the difference between a good manager and a good leader.

Moderator

Susan M. Steele – Vice President, Industrial Services, BE&K Construction Company

Sue Steele is involved in strategic planning implementation, business development, and operations management. Steele previously was operations manager for the BE&K–GE Alliance, which included work at 30 project sites in the U.S., Canada, Mexico, and Brazil. Arizona State University's Del Webb School of Construction has recognized her as an "Outstanding Woman in Construction." A graduate of Auburn University, she also holds an MBA from the University of Miami.

e-mail: steeles@bek.com

Panelists

Deborah L. Grubbe – Vice President, Group Safety, BP p.l.c.

Based in London, Deborah Grubbe is accountable for providing global safety leadership in all business areas: exploration and production, refining and marketing, gas, solar, and renewables. Formerly with DuPont, she has held corporate director positions in safety, operations, and engineering and has had assignments in capital project implementation, strategic safety assessments, manufacturing management, and human resources. Grubbe has served as a consultant to NASA, NIST, and the National Academy of Sciences. A graduate of Purdue University, she received a Winston Churchill Fellowship to Cambridge University, where she received a certificate of post-graduate study in chemical engineering.

e-mail: deb.grubbe@uk.bp.com

Theodore C. Kennedy – Founder, BE&K, Inc.

Ted Kennedy and two colleagues established BE&K over 30 years ago. He is one of the original members of the CII Board of Advisors, served as chairman of CII in 1989, and is a recipient of the Institute's highest honor, the Carroll H. Dunn Award of Excellence. His company has achieved world-class rankings in several categories and BE&K projects have been honored with three OSHA Star Awards. Fortune has called BE&K one of the "100 best places to work for." Kennedy is a summa cum laude graduate of Duke University and has been recognized by his alma mater with its Distinguished Alumnus Award.

e-mail: kennedyt@bek.com

Dr. Charles H. Thornton – Chairman, Charles H. Thornton and Co., Inc.; Consultant and Founding Principal, Thornton-Tomasetti Group; Founder and Chairman of the Board, ACE Mentor Program of America

Dr. Charles H. Thornton is responsible for millions of dollars worth of projects in the U.S. and overseas. He participated in FEMA's investigation of the Oklahoma City bombing. Thornton was awarded the *Engineering News-Record* Award of Excellence in 2001. He holds graduate, masters, and doctoral degrees from Manhattan College and New York University.

e-mail: cthornton@thettgroup.com
cthornton@chtandcompany.com

More Value for the Money

Featured Speaker: Dunn Award of Excellence Address

Abstract

Challenges of a wide variety must be faced now to ensure the construction industry builds facilities that can deliver sustainable, competitive advantage. Topics ranging from needed technological innovations and work process changes to resource availability and behavioral shift issues will be discussed. This presentation is the first in a new series by CII that provides industry perspective from the previous year's recipient of CII's highest honor, the Carroll H. Dunn Award of Excellence.

Plenary Session Presenter

James B. Porter, Jr. – Vice President, Safety, Health & Environmental Engineering, DuPont Engineering

Jim Porter served as CII Chairman in 2000 and has a lengthy association with CII in various executive capacities. Porter's career with DuPont began in 1966 as a chemical engineer in Newark, Delaware. After a two-year tour of duty with the U.S. Army, he returned and took an assignment as a field engineer. He was promoted to field manager in 1979, followed by an assignment as Manager of Investment Engineering. With the restructuring of DuPont Engineering in 1990, Porter became Director of Engineering Operations. In 1992, he was named Director of Operations for the Fluoroproducts business. He has been in his current post since 1999. Porter holds a degree in chemical engineering from the University of Tennessee.

e-mail: james.b.porter-jr-1@usa.dupont.com

More Value for the Money

Presentation Slides

Notes

More Construction
for the Money

"Back to the Future"

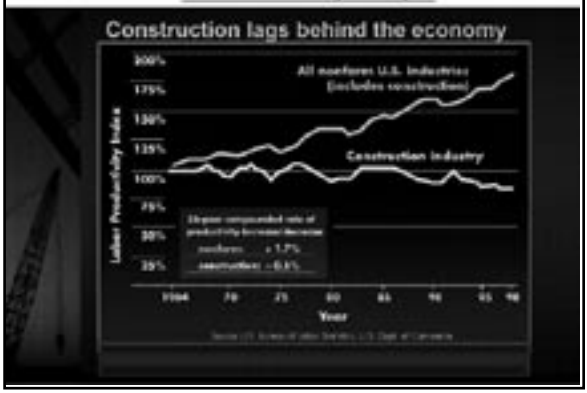
Jim Porter
2004 Recipient
Carroll H. Dunn Award of Excellence

Core Values

- Safety and Health
- Environmental Stewardship
- Highest Ethical Standards
- Respect for People

The Goal Is "Zero"

Productivity Gap




Transforming Our Industry
Birth
Growth
Maturity
Birth
Growth
Maturity
Birth
Growth
Maturity
"Last Time" Practices
CII Best Practices
Sustainable, Knowledge-Intensive Solutions
Quality Management
1900
1945
1983
2000
2005
2020

Notes

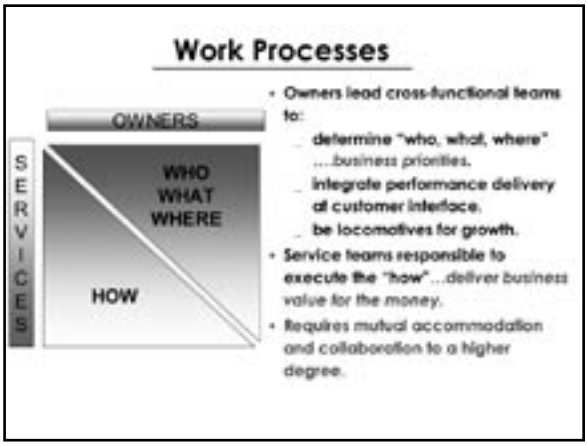

Let's talk about GROWTH.....
Shared Vision:
Safer, Better, Healthier Lives
Go Where The Growth Is
Expand Addressable Markets
Product Innovations
Sustainable Projects:
Safer, Better, Faster


Keys to Success
People
Strategy
Execution

Notes


Eight Operations Centers of Competency
Strategy
CORE VALUES
OPERATIONS STRATEGY
PEOPLE
People
CUSTOMER FOCUS & QUALITY
ORGANIZATIONAL PRODUCTIVITY
SUPPLY CHAIN PRODUCTIVITY
CAPITAL PRODUCTIVITY
ASSET PRODUCTIVITY
Execution


Delivery Effectiveness Strategy Shift
From Competition
Contractors & Suppliers
Owners
Academia
To Collaboration


Work Processes
OWNERS
SERVICES
WHO
WHAT
WHERE
HOW
• Owners lead cross-functional teams to:
_ determine "who, what, where" ....business priorities.
_ integrate performance delivery at customer interface.
_ be locomotives for growth.
• Service teams responsible to execute the "how"...deliver business value for the money.
• Requires mutual accommodation and collaboration to a higher degree.

Notes

Compete with Who?

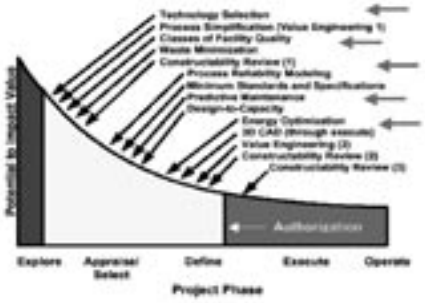
- Regionals
- Locals
- Multi-nationals
- Combinations

Build What?

- Core values
- PSM requirements
- Affordability
- Facility standards
- Operating strategy

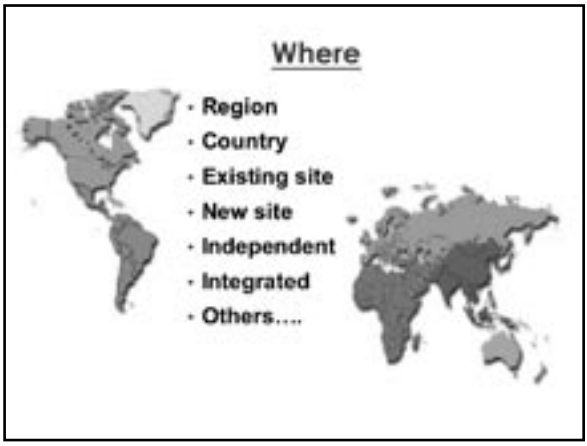
The "Right" Plant

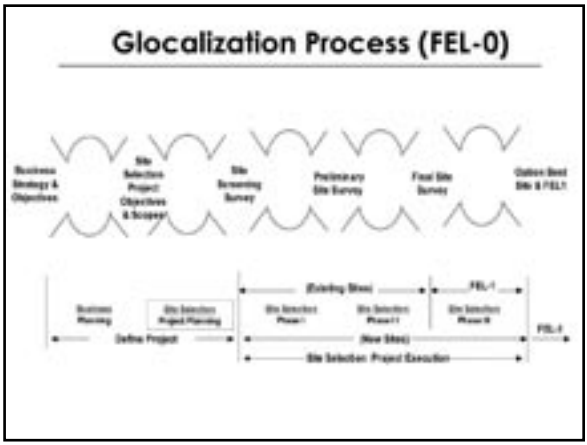
Value Improving Practices



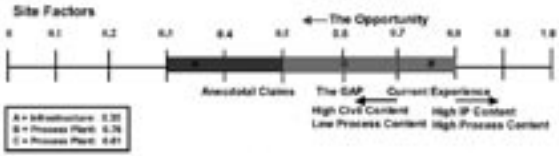
Notes


Sustainable Competitiveness
through Manufacturing Effectiveness
HIGH:
Custom
Piece
Production
Agile
Production
PRODUCT
VARIETY
LOW:
Standard
Mass
Production
Lean
Production
Quality Consistency
80%
10%
< 1 %
Amount of Rework


Where
Region
Country
Existing site
New site
Independent
Integrated
Others….


Glocalization Process (FEL-0)

China Project Costs: Reality Check



Decisions that impact project cost most are made during Front-End Loading !!

- Core Values
- Site Selection
- Operation Strategy
- Contracting Strategies
- Specs/Standards
- PSM Requirements

Build How?

- Core values
- Estimating
- Contracting
- Engineering and design
- Procurement
- Construction
- Resource deployment and renewal

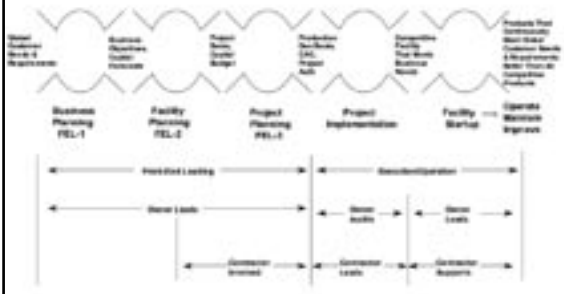
Capital Productivity Best Practices

- Front-end load vs. business goals.
- Install competitively superior technology.
- Minimize non-value adding investment.
- Execute projects with no changes.

Notes

Notes

Facilities Engineering Process



Productivity Enhancements

1. Information Technology
2. Project Delivery
3. Automation and Prefabrication
4. Workforce Development
5. Materials

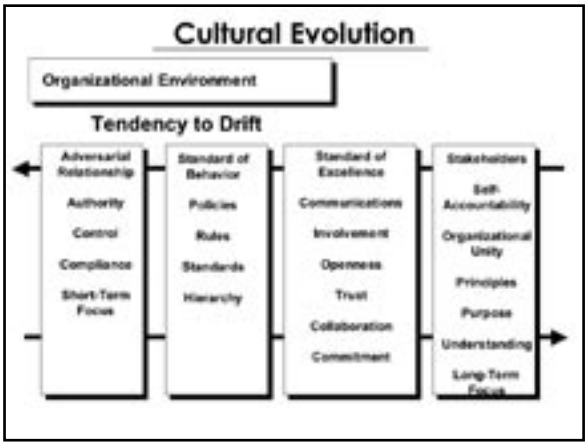
"Knowledge Management"

The Right Information
at the Right Place
at the Right Time
at the Right Price
enables rapid, effective Decision Making
and Problem Solving delivering
Sustainable Business Results

Notes


The Vision of an Integrated and Automated Capital Projects Industry


It's not the change people don't like, it's the transition.
"The most dangerous time in the life of nations is the time between systems, when the old ways are discredited and the new habits are still unknown."
– Mikhail Gorbachev


Cultural Evolution
Organizational Environment
Tendency to Drift
Adversarial Relationship
Authority
Control
Compliance
Short-Term Focus
Standard of Behavior
Policies
Rules
Standards
Hierarchy
Standard of Excellence
Communications
Involvement
Openness
Trust
Collaboration
Commitment
Stakeholders
Self-Accountability
Organizational Unity
Principles
Purpose
Understanding
Long-Term Focus

Notes

Focus the Conversation on Great Performance

"Don't get sidetracked into talking about side issues. The main issue in any organization is *performance* — *great performance*. Keep the conversations tightly focused on what it takes to produce great performance, and what you and the performer can do, separately and together, to assure that great performance."

Flight of the Buffalo

Soaring to Excellence, Learning to Let Employees Lead

James Belasco and Ralph Stayer

NIST Investigation of the World Trade Center Disaster

Luncheon Speaker

Abstract

A major scientifically-based investigation of the World Trade Center (WTC) disaster was completed recently by the National Institute of Standards and Technology (NIST). This study was carried out under the mandate of the National Construction Safety Team Act of 2002, which authorizes NIST to investigate major U.S. building failures. The purpose of such investigations is to establish the technical causes of building failures and evaluate the technical aspects of emergency response and evacuation procedures. Since NIST is not a regulatory agency and does not issue building standards or codes, the institute is viewed as a neutral investigator.

The orientation will describe the NIST-led building and fire safety investigation of the WTC disaster and how it seeks to make buildings, occupants, and first responders safer in future disasters. The following will be described:

- The probable collapse sequence for each of the WTC towers due to the aircraft impact and subsequent fires to which the buildings were subjected during the terrorist attacks of September 11, 2001.
- The rigorous and detailed methodology used to analyze the aircraft impacts, fire dynamics, thermal response of the structure, and the collapse of the structure due to the combined effects of aircraft impact and fire damage.
- The study of evacuation and emergency response that included nearly 1,200 first person interviews of building occupants, first responders, and families of victims.
- The investigation's specific recommendations for improvements to building and fire codes, standards, and practices, including improvements to structural integrity, fire protection, building evacuation, and emergency response.

Luncheon Speaker

Dr. Sivaraj Shyam-Sunder – Deputy Director, Building and Fire Research Laboratory, National Institute of Standards and Technology

Dr. Shyam Sunder serves as the lead investigator for the Federal building and fire safety investigation into the World Trade Center disaster of September 11, 2001. Prior to joining NIST in 1994, he held a succession of positions at the Massachusetts Institute of Technology: instructor, assistant professor, associate professor, principal research scientist, and senior research scientist. He holds a bachelor's degree in civil engineering from the Indian Institute of Technology, Delhi, a master's in civil engineering from MIT, and a Sc.D. in structural engineering from MIT.

e-mail: sunder@nist.gov

NIST Investigation of the World Trade Center Disaster

Presentation Slides

Notes

National Context

- The collapse of the World Trade Center structures following the terrorist attacks of September 11, 2001 was one of the worst-ever building disasters in recorded history – killing 2749 people.
- More than 400 emergency responders were among those killed, the largest loss of life for this group in a single incident.
- Strong private sector, public, and Congressional demand for a comprehensive response to the World Trade Center disaster.
- Congress passed and the President signed into law on October 1, 2002, the National Construction Safety Team (NCST) Act.
  - Gives NIST authorities to investigate building failures.
  - Modeled after the NTSB, with some differences.

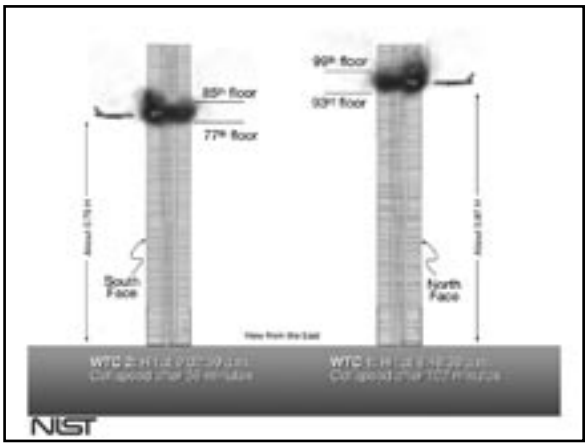
NIST

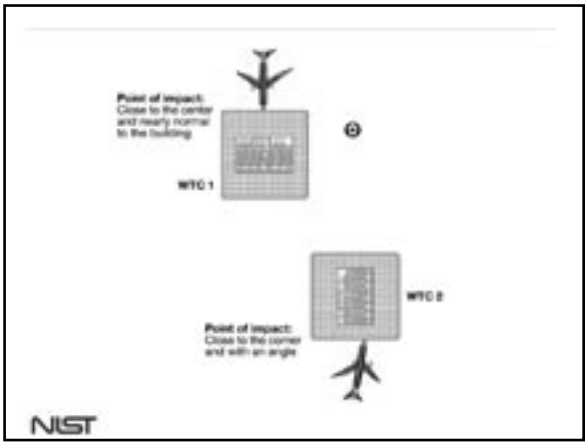
Learning/Investigation Objectives

- Why and how the WTC Towers collapsed following the initial impact of the aircraft?
- Why the numbers of injuries and fatalities were so low or high depending on location, including technical aspects of fire protection, occupant behavior, evacuation, and emergency response?
- The procedures and practices that were used in the design, construction, operation, and maintenance of the WTC buildings.
- **Specific areas in current** national building and fire model **codes, standards, and practices that warrant revision.**

NIST

Notes





Some Specific Questions

- How and why did WTC 1 stand nearly twice as long as WTC 2 before collapsing (102 min. vs. 56 min.) though they were hit by virtually identical aircraft?
- What factors related to normal building and fire safety considerations not unique to the terrorist attacks of September 11, 2001, if any, could have delayed or prevented the collapse of the WTC towers?
- Would the undamaged WTC towers have remained standing in a conventional large building fire scenario?
- What factors related to normal building and fire safety considerations, if any, could have saved additional WTC occupant lives or could have minimized the loss of life among the ranks of first responders?
- How well did the procedures and practices used in the design, construction, operation, and maintenance of the WTC buildings conform to accepted national practices, standards, and codes?

NIST

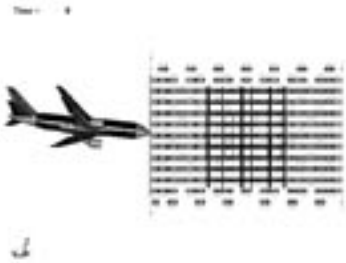
Analysis of Probable Collapse Sequences

NIST developed and used a series of rigorous and comprehensive models to determine the probable collapse sequence for the WTC towers, from aircraft impact to collapse initiation. The approach:

- Analyzed the complete sequence of events from aircraft impact to the spread of jet-fuel-ignited multi-floor fires, thermal weakening of structural components, and the progression of local structural failures that ultimately initiated collapse of the buildings
- Combined mathematical modeling, well_established statistical and probability_based analysis methods, laboratory experiments, and analysis of visual and physical evidence—**significantly advancing the current state-of-the-art and testing the limits of current computational capabilities.**
- Required use of **advanced strategies for managing computational demands due to unprecedented analysis complexity and sophistication; adequately captured the physics of phenomena essential to determining the probable collapse sequence.**

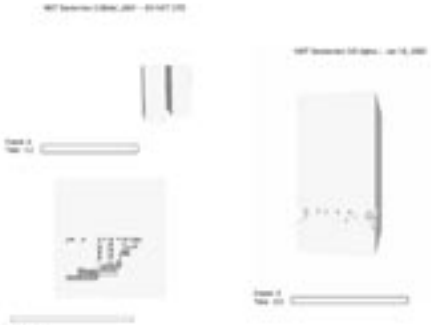
NIST

WTC 1



NIST

Initial Fire and Smoke Simulations: Fall 2001



NIST

Notes

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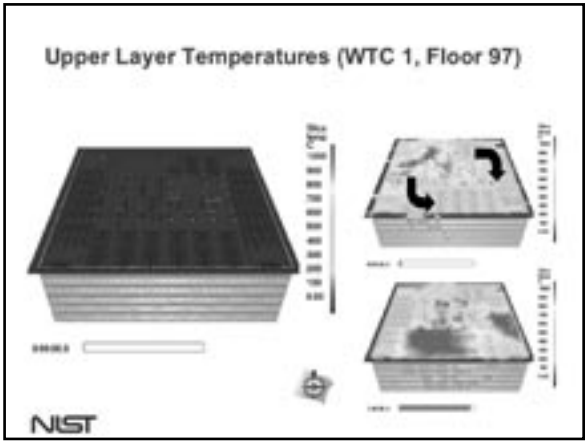
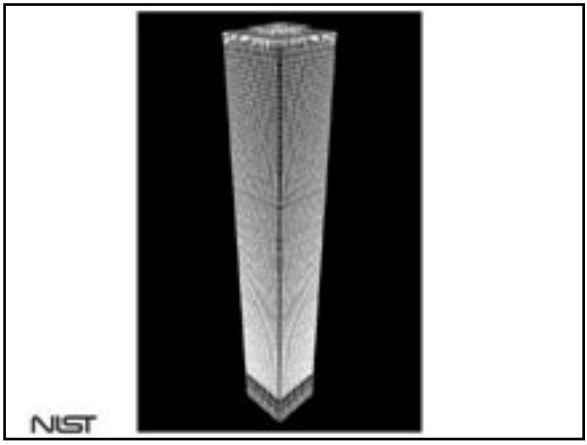
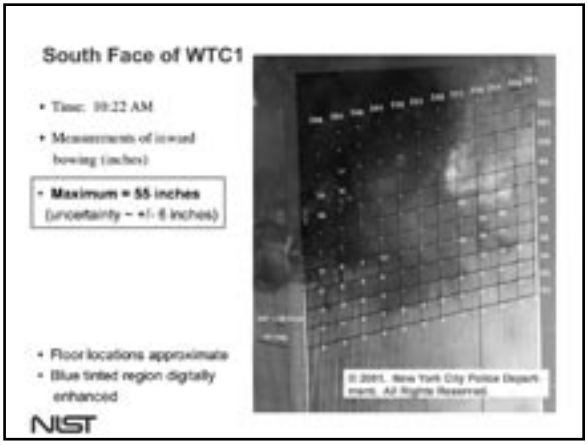

Upper Layer Temperatures (WTC 1, Floor 97)
NIST


NIST


South Face of WTC1
• Time: 10:22 AM
• Measurements of inward bowing (inches)
• Maximum = 55 inches
(uncertainty ~ +/- 6 inches)
• Floor locations approximate
• Blue tinted region digitally enhanced
NIST

Tilting of Building Sections

Initiation of global collapse was first observed by the tilting of building sections above the impact regions of both WTC towers. WTC 1 tilted to the south.

NIST

Evacuation and Emergency Response

Based on 1,056 interviews of surviving WTC occupants and 116 interviews of emergency responders.

- **It is estimated that 17,400 occupants (± 1,200) were present in the WTC towers on the morning of September 11, 2001.** The initial population of each tower was similar: 8,900 (± 750) in WTC 1 and 8,500 (± 900) in WTC 2. Of those present on 9/11, 16 percent were also present during the 1993 bombing.
  - **About 6 percent of the surviving occupants reported a pre_existing limitation to their mobility.** These limitations included obesity, heart condition, needing assistance to walk, pregnancy, asthma, being elderly, chronic condition, recent surgery or injury, and other.
- Approximately **87 percent of the WTC tower occupants, including more than 99 percent of those below the floors of impact, were able to evacuate successfully**.
- Rough estimates indicate that about **20 percent or more of the 2,567 building occupants and emergency responders who were in the WTC towers and lost their lives may have been alive in the buildings just prior to their collapse.**

NIST

FDNY Access to the WTC Towers

- **After aircraft impact, only two elevators out of 198 were operating inside the two WTC towers.** WTC 1, from the lobby to the 16th floor. WTC 2, from the lobby to the 40th floor.
- The stairways were filled with occupants evacuating the buildings. **FDNY personnel and other emergency responders reported difficulty attempting to climb the stairs due to this counterflow.**
- Counter flow in the staircases made it difficult for emergency responders to carry equipment up the stairways.
- Counter flow in the staircases caused teams of emergency responders to become separated, causing delays and disrupting team operations.

NIST

Notes

Notes

Radio Communications in High-Rise Buildings

Schematic of WTC Radio Repeater System

- Challenging radio-frequency propagation environment: steel and reinforced concrete buildings.
- Large scale operations.
  - Number of first responders.
  - Communications hierarchy and protocols.
  - Surge in traffic: doubling.
- Interoperability of radio communication technologies among different emergency responder organizations.
- Identification, location, tracking first responders.

NIST

Web site http://wtc.nist.gov

Email to wtc@nist.gov

Facsimile to (301) 975_6122

Regular mail:
WTC Technical Information Repository, Stop 8610,
100 Bureau Drive, Gaithersburg, MD 20899_8610.

NIST

Leadership Through Challenging Times

Keynote Speaker

Abstract

This presentation will focus on the challenges one company faced, leadership required, and lessons learned on the path from Chapter 11 reorganization a few years ago to becoming a leading global company in the engineering and construction industry:

How integrating CII Best Practices into standard work processes for projects helped merge many heritage company cultures into one way of doing business and resulted in consistent, improved project performance.

How focus on employee development and training not only helped retain top talent, but actually made it possible to recruit and retain entry level as well as experienced talent from outside the company during the most challenging of times.

How to develop leaders at all levels in the company and why it is important.

How to motivate project management and team performance based on CII Best Practices.

Panelists in the implementation session will briefly provide additional details and respond to audience questions.

Plenary Session Presenter

Stephen G. Hanks – President, Chief Executive Officer, and Director, Washington Group International, Inc.

Steve Hanks joined the company, then known as Morrison Knudsen, more than 25 years ago as a corporate attorney. He was promoted to vice president in 1991 and senior vice president and general counsel in 1992. He was named president of the company in April 2000 and a member of the Board of Directors, and has been WGI's chief executive officer since June 2001. Hanks earned an accounting degree from Brigham Young University, an MBA from the University of Utah, and a law degree from the University of Idaho.

e-mail: steve.hanks@wgint.com

Implementation Session Moderator

Michael M. Cate – Corporate Functional Leader, Global Procurement, Washington Group International, Inc.

Mike Cate has 39 years with Washington Group International, including both foreign and domestic assignments. Functional responsibilities have included engineering, procurement, project management, and field assignments. His long association with CII began in 1986 as a member of the Contracts Research Team. Since then, he has participated on the Dispute Prevention and Resolution Research Team, the Education Committee, and the Knowledge Management Committee. He is principal author of two CII publications on dispute prevention and resolution and currently chairs the CII Research Committee. Cate holds an electrical engineering degree from the University of Tennessee.

e-mail: mike.cate@wgint.com

Implementation Session Participants

Robert Gomez – Florida Design Manager, Washington Group International, Inc.
e-mail: robert.gomez@wgint.com

Stephen G. Hanks – President, Chief Executive Officer, and Director, Washington Group International, Inc.
e-mail: steve.hanks@wgint.com

Jennifer A. Large – Vice President, Integrated Staffing and Talent Management, Washington Group International, Inc.
e-mail: jennifer.large@wgint.com

Thomas H. Zarges – Senior Executive Vice President, Operations Officer, Washington Group International, Inc.
e-mail: tom.zarges@wgint.com

Leadership in a Knowledge Era

Achieving Learning Organizations in the EPC Industry Research Team

Abstract

This plenary presentation will look at the need for a learning organization culture within the engineer-procure-construct (EPC) industry. This need will be outlined through an introduction to learning organizations, the move to a knowledge era, and the development of a learning organization evaluation and implementation framework. The current state of learning organizations in the EPC industry and the need to move to a learning organization focus will be discussed. The conclusions will illustrate a path for organizations to follow including a maturity model, an evaluation matrix to determine where an organization is currently positioned, and where the weaknesses in the industry were found.

The implementation session will provide participants with an introduction to LEONARDO, a tool that evaluates an organization's progress to a learning organization and provides a path forward for implementing a learning culture.

Plenary Session Presenter

Christopher L. Parker – Senior Vice President, Houston Operations, WorleyParsons

Chris Parker is responsible for overall operations including profit and loss, development and execution of business plans, strategic planning, and resource and facility management. Parker chaired the CII research study on virtual teams from 2000-2002. He currently is the chair of CII's Achieving Learning Organizations in the EPC Industry Research Team as well as a member of the CII Research Committee. He also is active in the Process Industry Practices (PIP) initiative. A licensed professional engineer, Parker earned a bachelor's degree in mechanical engineering from the University of Houston.

e-mail: chris.parker@worleyparsons.com

Implementation Session Moderator

Christopher L. Parker – Senior Vice President, Houston Operations, WorleyParsons
e-mail: chris.parker@worleyparsons.com

Implementation Session Participants

David P. Burford – Manager, Nuclear Fleet Security & Emergency Preparedness, Southern Nuclear Operating Company
e-mail: dpburfor@southernco.com

Julius J. Chepey – Director of ITS, M. A. Mortenson Company
e-mail: julius.chepey@mortenson.com

Paul S. Chinowsky – Associate Professor, Department of Civil, Environmental & Architectural Engineering, University of Colorado–Boulder
e-mail: paul.chinowsky@colorado.edu

George T. R. Land – Senior Risk Engineering Consultant, Zurich Services
e-mail: tom.land@zurichna.com

Keith R. Molenaar – Assistant Professor, Construction Engineering & Management, University of Colorado–Boulder
e-mail: keith.molenaar@colorado.edu

Allan Reid – Project Manager, Northeast Plant Group, Ontario Power Generation
e-mail: allan.reid@opg.com

Notes

Leadership in a Knowledge Era: Achieving the Learning Organization

PT201

Leadership Challenges

- Safety
- Productivity
- Pre-Project Planning

... what is next?

Learning

The Knowledge Era

entry is granted only to those who learn, innovate and implement

Notes

Survey Says ...

- The Good: Lessons Learned
  - 1 in 2 are implementing
- The Bad: Reactive Learners
  - 1 in 3 are proactive
- The Ugly: Passionate Leadership
  - 1 in 8 get it

The PT201 Mandate

How Do We Achieve a Learning Organization in the EPC Industry?

Research Methodology

- **What Is Possible?**
  - The Literature
- **Where Are We Now?**
  - A CII Survey
- **Where Are We as an Industry?**
  - Case Studies
- **What Is The Framework for Development?**
  - Characteristics and Organizational Levels
- **How Do We Measure Our Progress?**
  - LEONARDO

Notes

The problem ...

"The trouble with our times is that the future is not what it used to be"

- Paul Valery

The solution ...

"The rate at which individuals and organizations learn may become the only sustainable competitive advantage"

- Ray Stata

A **Learning Organization**

A **learning organization** is skilled at creating, acquiring, sharing, and applying knowledge.

It embraces change and innovation at all levels for optimum performance and maximum competitive advantage

Notes

Where Are We Now?

Case Studies

- Army Special Forces
- ExxonMobil
- General Motors
- NASA Jet Propulsion Lab
- Washington Group
- British Petroleum
- Fluor
- HB Zachry
- NASA Facilities

CII Member Companies Surveyed

Case Studies Feedback

- Keys to implementation
  - Leadership
  - Champions
  - Direction
  - Balance
  - Resources
- Barriers
  - Funding
  - Risk Aversion
  - Culture
  - Focus on Individuals

The Framework

Characteristics	Learning Organization Levels		
	Organization	Community	Individual
Leadership			
Processes and Infrastructure			
Communication			
Education			
Culture			

Notes

Maturity Model – Level 1

Characteristics	Learning Organization Levels		
	Organization	Community	Individual
Leadership			
Processes and Infrastructure			
Communication			
Education			
Culture			

Maturity Model – Level 2

Characteristics	Learning Organization Levels		
	Organization	Community	Individual
Leadership			
Processes and Infrastructure			
Communication			
Education			
Culture			

Maturity Model – Level 3

Characteristics	Learning Organization Levels		
	Organization	Community	Individual
Leadership			
Processes and Infrastructure			
Communication			
Education			
Culture			

Notes

Maturity Model – Level 4

Characteristics	Learning Organization Levels		
	Organization	Community	Individual
Leadership			
Processes and Infrastructure			
Communication			
Education			
Culture			

Maturity Model – Level 5

Characteristics	Learning Organization Levels		
	Organization	Community	Individual
Leadership			
Processes and Infrastructure			
Communication			
Education			
Culture			

Where are you?

- **LEONARDO**
  (LEarning OrgaNizAtion Rapid DiagnOstic)
  - Diagnostic - tool
  - Guideline - framework
  - Path Forward - Guidance

Notes

Case Study Sample

Characteristics	Learning Organization Levels		
	Organization	Community	Individual
Leadership			
Processes and Infrastructure			
Communication			
Education			
Culture			

Meeting the Challenge?

- Leadership becomes passionate about Learning
- Learning becomes strategic
- Rate of learning becomes a differentiator
- Optimization gives way to innovation

PT 201 Products

- Research Summary Report
- Research Report
- **LEONARDO**
  (LEarning OrgaNizAtion Rapid DiagnOstic)
  - Diagnostic - tool
  - Guideline - framework
  - Path Forward - Guidance

Notes

PT 201 Members

- Bruce Bailie – Honeywell International
- Eskil Carlsson – CSA Group
- Julius Chepey – M.A. Mortenson Co.
- Paul Chinowsky – University of Colorado
- Al Goethe – Aker Kvaerner, Inc.
- David Hammes – U.S. Department of State
- Randy Hendricks – Southern Company
- Tom Land – Zurich North America
- Keith Molenaar – University of Colorado
- Chris Parker – WorleyParsons
- Allan Reid – Ontario Power Generation
- James Ross – Kvaerner Songer
- Ted Thorpe – GlaxoSmithKline

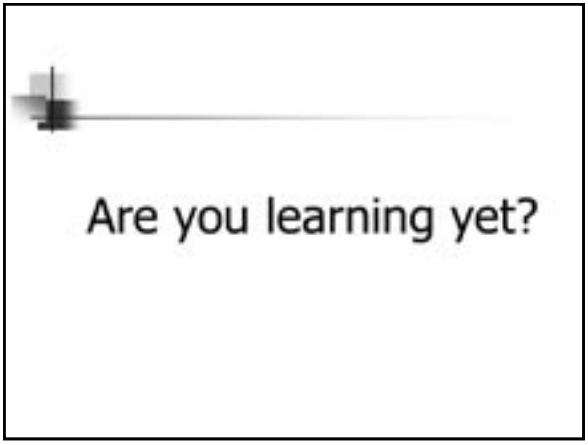
Implementation Session Participants

- Tom Land
- Julius Chepey
- Paul Chinowsky
- David Burford
- Al Reid
- Keith Molenaar

Implementation Session Agenda

Self Assessment (group participation) -

i. The Maturity Model
ii. Leonardo – a tool for the knowledge era
iii. Global War on Terrorism Case Study
iv. Leading the Learning Organization
v. Getting Started
vi. Q&A



Notes

Owner Core Competencies

Independent Project Analysis, Inc., Construction Industry Institute, and Center for Construction Industry Studies

Abstract

This presentation will explain the concept of owner core competencies and the use of the CII Owner-Contractor Work Structure (OCWS) process as a rational approach to help owner companies address this issue. The presentation will also explain how project competency benchmarking results were used by engineering organizations within owner companies to convince their businesses about maintaining certain competencies in-house instead of outsourcing.

The OCWS process was recently updated and published by CII under the title *Core Competency Toolkit*. This toolkit presents a decision process and associated worksheets that owners and contractors can use to devise work relationships that make optimal use of their respective resources. The implementation session will demonstrate the use of the OCWS process through a case study. In this session the audience will use the key steps in the OCWS process and complete the accompanying worksheets, thereby gaining insights into how they can use this process to develop competitive owner-contractor work relationships in their respective organizations.

Plenary Session Presenter

Edward W. Merrow – Chairman, President, and Chief Executive Officer, Independent Project Analysis, Inc.

Ed Merrow began his career as an assistant professor at UCLA. He joined the Rand Corporation after four years in academia and developed and directed Rand's Energy Program and its research program for the chemical process industries. He has testified before Congress in matters pertaining to overruns in major capital projects and served as a panel member for the National Academy of Sciences and the National Academy of Engineering on the analysis of project risks. Merrow, a recipient of CII's highest recognition, the Carroll H. Dunn Award of Excellence, earned degrees from Dartmouth College and Princeton University.

e-mail: emerrow@ipaglobal.com

Implementation Session Moderator

Stuart D. Anderson – Professor, Department of Civil Engineering & Management Program, Texas A&M University

Stu Anderson teaches a variety of classes in project management as well as a course that integrates design and construction processes. Active in CII research for several years, he is credited with developing the owner/contractor work structure and the CII tool for project delivery and contract strategy approaches. He currently is the principal investigator on CII research investigating leading indicators of project outcomes. A licensed professional engineer (Texas) and an industry practitioner for over 12 years, Anderson has been recognized by CII as the Outstanding Researcher (1997). He earned his doctoral degree as a CII researcher at UT Austin.

e-mail: s-anderson5@tamu.edu

Implementation Session Participant

Shekhar Patil – Senior Project Analyst. Independent Project Analysis, Inc.
e-mail: spatil@ipaglobal.com

Other Knowledgeable Points of Contact

W. Edward Back – Professor of Civil Engineering, Clemson University
e-mail: wmeback@clemson.edu

G. Edward Gibson, Jr. – Professor of Civil Engineering, The University of Texas at Austin
e-mail: egibson@mail.utexas.edu

Robert A. Herrington – Manager of Quality, Southern Region, Jacobs
e-mail: bob.herrington@jacobs.com

Richard J. Jessop – Senior Vice President, Comstock Canada Ltd.
e-mail: rjessop@comstockcanada.com

Tom E. Will – Director of Capital Deployment, Coatings, Rohm and Haas Company
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Owner Core Competencies

Independent Project Analysis, Inc., Construction Industry Institute, and Center for Construction Industry Studies

Executive Summary

CII published the *Owner/Contractor Work Structure (OCWS) Process Handbook*, Implementation Resource 111-2, in April 1997. The intent of the handbook is to provide owners with a decision-making process to identify project competencies, determine whether these competencies are core or non-core to the owner, and decide upon the most effective approach to source different project competencies. The handbook presented a sourcing framework that defined five possible owner/contractor work relationships. The second edition, Implementation Resource (IR) 111-3, *Core Competency Toolkit*, is an updated, practical toolkit for individuals in a position to influence outsourcing decision.

Why Update Is Needed?

Shortly after Implementation Resource 111-2 was published, CII conducted a survey in conjunction with the Center for Construction Industry Studies (CCIS) to assess the use and effectiveness of the OCWS process. This survey was deemed necessary because owners of capital projects continued to downsize their organizations, reduce or eliminate central project engineering organizations, shift project responsibilities to business units and operating facilities, and outsource more work to contractors. The OCWS process was an attempt to provide a structured and rational approach to such organizational rearrangements, and the CII was interested in learning whether owners engaged in organizational rearrangements used the OCWS process. The findings from the survey indicated that the OCWS process was not used by the owner community, which then led CII and the CCIS to investigate the reasons behind the lack of use and to improve the process itself as necessary.

Three case studies were performed with CII member organizations in which the process was implemented in different situations. This effort provided a richer understanding about the practicality of OCWS process use. The case studies also validated the applicability of the process for decision-making with regard to the evaluation and sourcing of various project related human resources. A Delphi study was then conducted that validated the steps in the OCWS process and confirmed its value to industry.

As a result of the CII-CCIS case study, the original OCWS process was modified and improved substantially. The basic framework and theoretical basis of capital project sourcing based on competencies did not change. The

original benefits of the process cited by CII were clearly confirmed in the more recent CII-CCIS studies. These benefits were:

- Systematic approach to determine key project competencies and their sourcing.
- Vehicle for documenting decisions related to competency evaluation and sourcing.
- Vehicle for discussion when different viewpoints are represented (i.e., stakeholders).
- Rationale for evaluating project skills and resources needed.
- Leads to efficient operations by eliminating gaps and minimizing overlaps through alignment of work structures between owners and contractors.
- Instrument for rational organizational change.
- Can be a source of improved capital project effectiveness and an ingredient in achieving project success.

The OCWS process has now been simplified to encourage greater use and to achieve the benefits that the OCWS process can provide to owners and contractors as well. The simplified OCWS process is described in the *Core Competency Toolkit* with the goal of providing a product that is easier to implement.

How much effort?

The OCWS process is intended as a guide to assist in the decision process for defining owner and contractor roles in capital projects. The users of the process need to decide the steps and tools that are relevant for achieving their objectives. As a consequence, the effort involved in using the process could vary substantially depending on the objective and the scope of the application. In a survey of project executives and managers that were familiar with the OCWS process, the average estimated effort for an owner team to implement the capital program level process was approximately six person-months; the average estimated effort to implement the project level process was approximately one half person-months for a typical capital project.

What is the Benefit of Using the OCWS Process?

The main benefit of using the OCWS process is ensuring proper alignment between the specific engineering, construction, and project management skills that owners and contractors provide to projects. The need for such alignment has continued to increase over the last few

years as owner companies look for ways to outsource project functions to contractors. Particularly, in the manufacturing industries in the US, Canada, and other nations in the western hemisphere, owners continue to face increasing pressures to reduce the number of project personnel as they compete with low-cost manufacturers in foreign countries. Contractors, conversely, are moving their engineering operations to developing economies in search of low-cost labor.

Regardless of whether the OCWS process is used for an individual project, for the entire project portfolio, or for forming owner-contractor alliances, seamless alignment of owner and contractor personnel is key to project success. The OCWS process is designed to enable owners to achieve such alignment of owner and contractor resources while minimizing the costs associated with maintaining in-house engineering and project management personnel.

How to Learn about the Core Competency Toolkit?

The plenary session will make the case as to why owners and contractors should use the *Core Competency Toolkit* and what the benefits are for both organizations. The implementation session will provide an overview of the OCWS process and then apply key steps in the process through audience interaction. Attendees will make decisions regarding the owner-contractor work structure for a proposed alliance relationship between a mid-sized Chemical Company and a contractor. Key attributes of the new *Core Competency Toolkit* also will be presented.

References

Patil, S. S., and Anderson, S.D., *Core Competency Toolkit*, Implementation Resource 111-3, Construction Industry Institute, June 2005.

Anderson, Stuart D., Patil, Shekhar S. and Gibson, G. Edward, Jr., *Developing optimal owner-contractor work structures – Case studies*, Report No. 12, Center for Construction Industry Studies, The University of Texas at Austin, 2000.

Anderson, Stuart D., Patil, Shekhar S. and Gibson, G. Edward, Jr., *Developing optimal owner-contractor work structures – Validation of the OCWS process*, Report No. 15, Center for Construction Industry Studies, The University of Texas at Austin, 2000.

Notes

Construction Industry Institute

Annual Conference

July 19-21, 2005

Core Competency Toolkit

Implementation Session

Moderator: Stuart D. Anderson, Professor, Texas A&M

Panelist: Shekhar S. Patil, Senior Analyst, IPA

Implementation Session Overview

- Objective: Learn to use the Core Competency Toolkit to develop a capital program level Owner Contractor Work Structure (OCWS)
- Deliverable: Capital program level OCWS covering the key project competencies for a mid-size chemical company
- Benefit: A tool for the business and the engineering leadership
  - To communicate and align owner and contractor roles in capital project development and execution

Outline

- *Implementation Session Agenda*
- History and Key Features
- The Case of a Mid-Size Chemical Company
- Developing a Capital Program Level Owner Contractor Work Structure (OCWS)
- Concluding Discussion

Notes

Implementation Session Agenda

- Introduction/History/OCWS process — 10 minutes
- The case of a mid-size chemical company — 5 minutes
- Develop OCWS using worksheets — 30 minutes
  - Review project competencies — 5 minutes
  - Show an example for a competency — 5 minutes
  - Define drivers of core competencies — 5 minutes
  - Classify three competencies into core and non-core and develop OCWS — 15 minutes
- Concluding discussion — 15 minutes

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History of the Core Competency Toolkit

(Formerly Known As The OCWS Process Handbook)

- The Core Competency Toolkit is covered under the CII Knowledge Area: Organization
  - Originally published as Implementation Resource (IR) 111-2, Owner Contractor Work Structure Process Handbook
  - New publication: IR 111-3, Core Competency Toolkit
- The practice was validated through research by CII and the Center for Construction Industry Studies
  - CCIS Technical Report No. 12: Case Studies
  - CCIS Technical Report No. 15: Delphi Validation

Notes

What's New in the Core Competency Toolkit

- Easy-to-use flow chart illustrating steps and associated worksheets
  - Electronic worksheets
- Actions and tips for each step in the OCWS process
- Functions and capabilities defined for 30 competencies
  - Provides better resolution around the roles for competencies that involve owner as well as contractor resources
- Link to owner resources/Full-Time Equivalents

What is OCWS?

The strategic distribution of roles and responsibilities between owners and contractors based on project competencies

Note: "Contractor" in OCWS implies all participants that are external to the owner, such as suppliers, consultants, engineering contractors, or construction contractors

The OCWS Process

Capital Program Versus Project Level Application

- Capital Program application
  - The scope covers the engineering or project organization that is responsible for capital spending
  - The focus is on corporate strategy for core project competencies
- Project application
  - The scope covers a particular project
  - The focus is on project team's strategy to leverage contractors where necessary or deemed beneficial during the life of the project

Benefits of the Core Competency Toolkit

- Provides a common language to communicate and align owner and contractor roles
  - Clarifies the extent to which a company relies on contractors for developing/executing capital projects
- Facilitates linkage between an owner company's core competency strategy and outsourcing strategy
- Tool for rational organizational change
  - Can provide a clear picture of FTE for each job classification/competency – minimizes duplication
  - If benchmarked against competition or other businesses, helps make a case to the business for increasing or reducing in-house FTE

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Notes

The Case of a Mid-Size Chemical Company

Company A

- Headquartered in North America
- Products: chemicals, fibers, and plastics that go into numerous consumer products and packaging
- Emphasis on innovation to grow new markets and license technologies to other manufacturers
- 25 manufacturing facilities in 11 countries spread over 3 continents
- Approximately 200 engineering and project personnel, excluding R&D personnel
- Annual capital budget of about $250 million excluding maintenance work orders
  - 60 percent of projects cost under $1 million

Objectives of the OCWS Process

Company A's Objective Today

✓ Provide a common language to communicate and align owner and EPC contractor roles in an alliance relationship

✓ Facilitate linkage between Company A's core competency strategy and its outsourcing strategy for specific project competencies

✗ Tool for rational organizational change

Only the objective marked "✓" will be covered in today's implementation session

Participants in the OCWS Workshop

Company A Representatives	EPC Contractor Representatives
Business	Business
Engineering	Engineering
Project Management	Project Management
Construction	Construction
Operations	
Procurement	
Quality	
Human Resources	

Notes

Alignment on the Objectives
Before Using the OCWS Process is Critical!

Outline

- Implementation Session Agenda
- History and Key Features
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- *Developing a Capital Program Level Owner Contractor Work Structure (OCWS)*
- Concluding Discussion

Core Competency Toolkit

Steps in the Capital Program OCWS Process

- ✓ Identify and Define Capital Project Competencies
- ✓ Review for Completeness
- ✓ Determine Drivers of Core Competencies
- ✓ Classify Competencies into Core or Non-Core
- ✓ Assign Work Relationship
- x Define Supporting Role Where Applicable
- x Estimate Owner Resources
- x Review for Alignment

Please ensure that you have the 3 worksheets that are being handed out

Only the steps marked "✓" can be covered in today's implementation session

Notes

Competency Definition Worksheet

Review

Core Competency

A set of project functions and skills that are a source of competitive advantage and cannot be effectively and reliably sourced from the market

Competency Classification Worksheet

Classify Project Competencies into Core and Non-Core

Notes

Company A's Drivers of Core Competency

- Proprietary technology or work process
- Criticality of competency ownership to sustaining competitive advantage
- Reliability of market
- Effectiveness of in-house sourcing versus outsourcing
  - Safety, Cost, Schedule, Quality (Have data?)
- Liability
- Others?

Work Relationship Assignment Worksheet

Assign Work Relationship to Project Competencies

Types of Owner-Contractor Work Relationships

- OP
  - Owner performs all work using
    - Own resources
    - Own work process
- OP/CI
  - Owner provides resources and work process
  - Contractor provides necessary input
- OL/CP
  - Owner leads with own work process
  - Contractor performs the work with own resources
- CP/OI
  - Contractor provides resources and work process
  - Owner provides necessary input
- CP
  - Contractor performs all work using
    - Own resources
    - Own work process

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- **History and Key Features**
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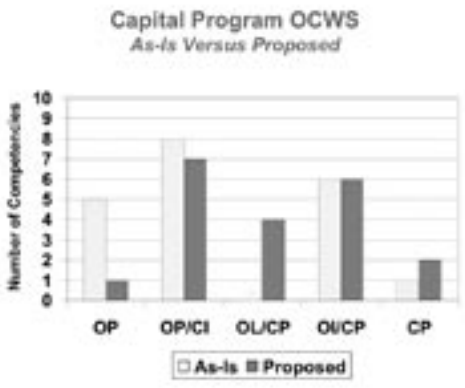
Company A's Proposed OCWS

OP	OP/CI	OL/CP	CP/OI	CP
Business Development	Commissioning and Startup	Conceptual Cost Estimating	Constructability	Construction
	Convert New Technology to Project/Scale-up	Process/ Conceptual Design	Construction Management	Detailed Engineering
	Contract Administration	Project Management	Field Quality Control	
	Definitive Cost Estimating	Project Control Systems	Planning and Scheduling	
	Lessons Learned		Preliminary Design/Scope Development	
	Permitting		Safety	
	Procurement			

Company A's Current or As-Is OCWS

OP	OP/CI	OL/CP	CP/OI	CP
Business Development	Permitting		Construction Management	Construction
Convert New Technology to Project/Scale-up	Project Management		Definitive Cost Estimating	
Conceptual Cost Estimating	Preliminary Design/Scope Development		Detailed Engineering	
Commissioning and Startup	Constructability		Field Quality Control	
Process/ Conceptual Design	Procurement		Planning and Scheduling	
	Contract Administration		Safety	
	Project Control Systems			
	Lessons Learned			

Notes



Conclusions

The Core Competency Toolkit

- Provided Company A and the EPC Contractor a common language to communicate roles at a strategic level
- Clarified to project teams the extent to which the company could rely on contractors for performing various functions
- Helped company A and the EPC Contractor gain alignment on owner-contractor roles

Discussion and Q/A

The Owner's Role in Project Success

Owner's Role in Project Success Research Team

Abstract

Just as the process of design and construction calls for the input of different disciplines and trades at various points, often many owners—different entities (for example executives, technical personnel, and end users)—within owner organizations participate over the life cycle of a capital project. With all these players and variables, determining the "right" level of owner involvement is the key to success. This plenary presentation will discuss the owner's role in the management and delivery of capital construction projects. The recent trend of downsizing and outsourcing within owner organizations now means that in-house personnel are managing the contracting of design, engineering, and construction services. The presentation also will describe owner's recommended roles and responsibilities.

Plenary Session Presenter

Debra Nauta-Rodriguez – Project Executive, Smithsonian Institution

Debra Nauta-Rodriguez is responsible for two of the Smithsonian's largest capital projects: the design and construction of the Mall Museum of the National Museum of the American Indian (NMAI) and the renovation and enhancement of the Patent Office Building. Nauta-Rodriguez joined the Smithsonian in 1990 and soon began work on the NMAI facilities. She was responsible for the design management of the NMAI Heye Center, housed in the historic Alexander Hamilton U.S. Custom House in New York City, and the NMAI Cultural Resources Center in Suitland, Maryland. Nauta-Rodriguez, a registered architect, holds bachelor of architecture and master of planning degrees.

e-mail: nautad@opp.si.edu

Implementation Session Moderator

James B. Vicknair – West Coast Manager of Construction, WorleyParsons

Jim Vicknair began his career in the construction industry 25 years ago as a steamfitter apprentice. His career path has taken him from steamfitter craftsman to the management side of construction. Vicknair joined the construction management group of WorleyParsons in 1990 and currently manages all construction management services for the company's offices in Los Angeles, California. At CII, he is a member of the research team studying the owner's role in project success. Vicknair teaches construction management at Diablo Valley College in Northern California.

e-mail: jim.vicknair@shellopus.com

Implementation Session Participants

Andrew J. Bates – PhD Candidate, Polytechnic University of New York
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Dan Christian – Industrial Business Development Manager, Victaulic Company of America
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Fletcher H. Griffis – Provost and Vice President for Academic Affairs, Polytechnic University of New York
e-mail: griffis@poly.edu

Scott S. Hill – Construction Engineering Supervisor, Air Products and Chemicals, Inc.
e-mail: hillss@airproducts.com

Debra Nauta-Rodriguez – Project Executive, Smithsonian Institution
e-mail: nautad@opp.si.edu

Other Knowledgeable Point of Contact

Bryan Vicknair – Project Controls Associate, Performance Mechanical Inc.
e-mail: bvicknair@perfmech.com

The Owner's Role in Project Success

Plenary Slides

Notes

Notes

Leadership of Tomorrow
Bridging the Gap

- RT 204 created to answer the question…

What is the "RIGHT" level of owner involvement that leads to project SUCCESS?

Leadership for Today

AKER KVÆRNER
WorleyParsons
intel
Lilly
AIR PRODUCTS
Victaulic
DuPont
ROHM HAAS
Smithsonian
GM
Polytechnic
ONTARIO POWER GENERATION
National Institutes of Health

Leadership – Bridging the Gap

- Andrew Bates
- Dan Christian
- Curtis Fisher
- John Friedrich
- Bud Griffis
- Dale Griffith
- Scott Hill
- Tony Palma
- Brian Kong
- Fred Lyu
- David McKinney
- Peter Murphy
- Debra Nauta-Rodriguez
- Joel Sauer
- Jim Vicknair
- Paul Walls

Statement of Project Success

The "***RIGHT***" level of owner involvement is the key to project **SUCCESS**

Who is the Owner?

The ultimate decision making authority

In many projects, the "owner" may change throughout the life of the project

Upon completion: owns & operates facility

Project Success

Project Success =

Achieving the stated goals & objectives

*Respondent's provided the success criteria used on their project

Priority	Success Factor
	Safety
	Duration (Schedule)
	Budget
	Quality
	Business Expectations
	Future work
	Profit / Return on Investment
	Other:

Notes

Notes

"Project Success"

Success Factors	Outcome
ZERO Incidents	SAFETY*
Finish On or Ahead of Schedule	DURATION
Finish On or Below Budget	COST
Finish Project With Specified Quality	QUALITY
Achieve All Business Goals	BUSINESS

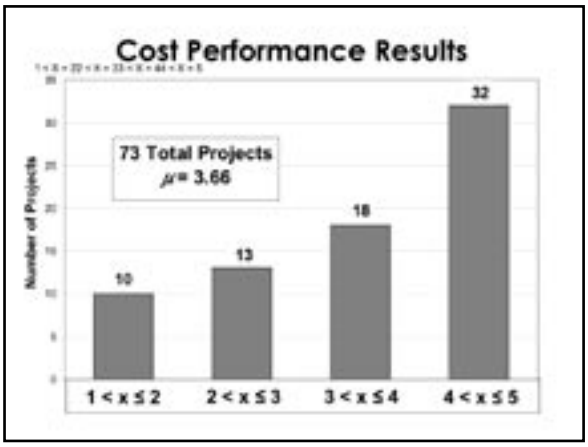
* CII Owner's Role in Construction Safety Report

Research Effort

1. Develop a Survey for CII members
   Literature review, CII Benchmarking, PDRI questionnaire
2. Collected 73 projects (45 companies)
3. Conducted quantitative & qualitative analysis

What Can the Owner Do To Impact the Outcomes?

Notes


Cost Performance Results
73 Total Projects
μ= 3.66
Number of Projects
10
13
18
32
1 < x ≤ 2
2 < x ≤ 3
3 < x ≤ 4
4 < x ≤ 5


Owner Actions Drive Success
Improved input = Improved outcome
Increase the value of the owner input
Pre Project Planning
Owner Involvement
Leadership
Project Management
IMPROVED
OUTCOME


Leadership Principles
Team Leadership
Owner Leadership
Business Leadership
Leadership Performance

Notes

Leadership Principles

Business Leadership

- Communicate the business plan
- Foster an innovative environment
- Evaluate available resources
- Train employees in core competencies
- Emphasize scope definition & management

"Drivers of System Performance"

Pre Project Planning

Owner's Involvement

Leadership Performance

Project Management

"System Performance Results"

Safety

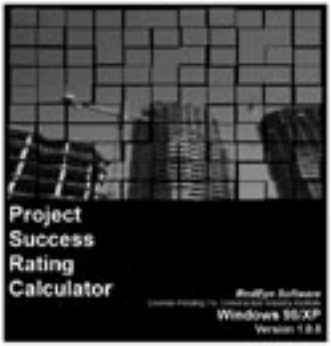
Duration

Cost

Business

Quality

Owner's Role Implementation Tool



Come to RT 204 Break-Out Session

- What makes a project successful
- How to measure what you are doing during the project to ensure you are on track
- Make your project successful

Notes

Notes

THE OWNERS ROLE

RT 204

The Owner's Role in Project Success

2005

Jim Vicknair – WorleyParsons

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THE OWNERS ROLE

Implementation Panel

- Jim Vicknair – WorleyParsons
- Bud Griffis – Polytechnic University
- Andrew Bates – Polytechnic University
- Debra Nauta-Rodriguez – Smithsonian Institution
- Dan Christian – Victaulic
- Scott Hill – Air Products and Chemicals

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THE OWNERS ROLE

The Owner's Role

Purpose

How the owner best contributes to project success

Objectives

Define success
Address shifts in roles and responsibilities
Develop a methodology to mitigate problems

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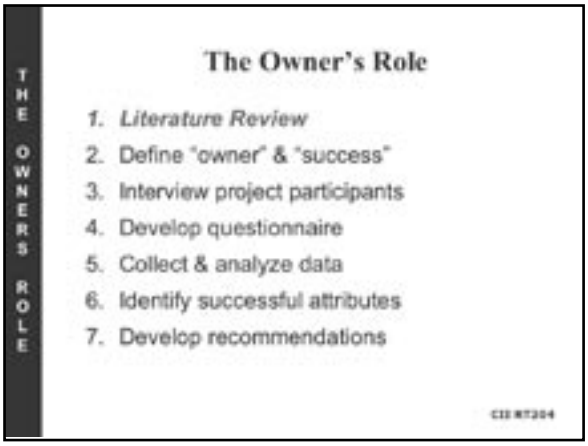
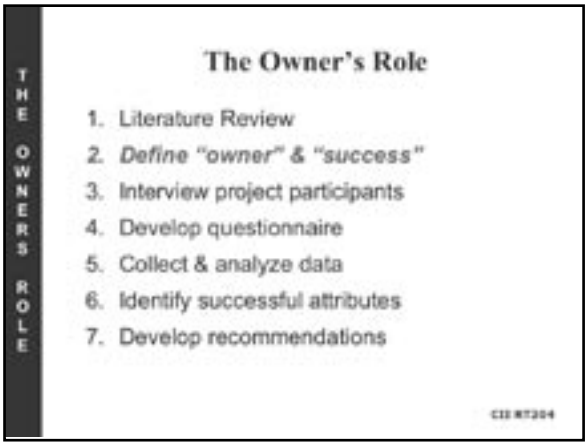
THE OWNERS ROLE
The Owner's Role
In Project Success
Stay Involved
Focus on Safety
Communicate
CII RT204


THE OWNERS ROLE
The Owner's Role
1. Literature Review
2. Define "owner" & "success"
3. Interview project participants
4. Develop questionnaire
5. Collect & analyze data
6. Identify successful attributes
7. Develop recommendations
CII RT204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Notes

Notes

THE OWNERS ROLE

The Owner's Role

OWNER

The ultimate decision making authority

- Establishes project goals & objectives
- Upon completion – may own & operate facility

The *"owner"* will change throughout the life of the project

Actions to be successful will also change

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THE OWNERS ROLE

The Owner's Role

Project Success =

Achieving the stated goals & objectives

*Respondents provided the success criteria used on their project

Success Criteria
Safety
Duration (Schedule)
Budget
Quality
Business Expectations
Future work
Profit / Return on Investment
Other:

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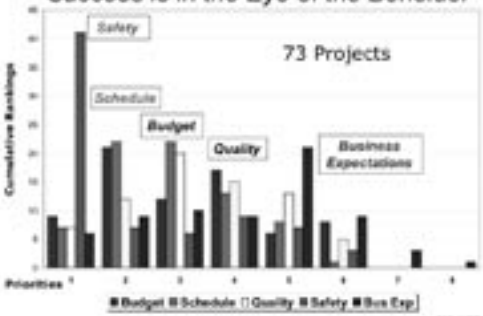
THE OWNERS ROLE

Defining Success

"Success is in the Eye of the Beholder"



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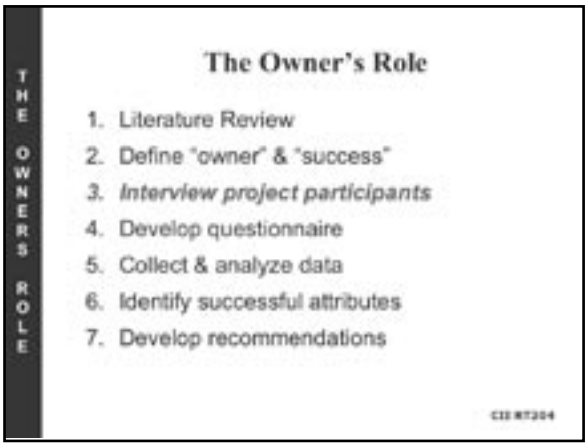

THE OWNERS ROLE

The Owner's Role

1. Literature Review
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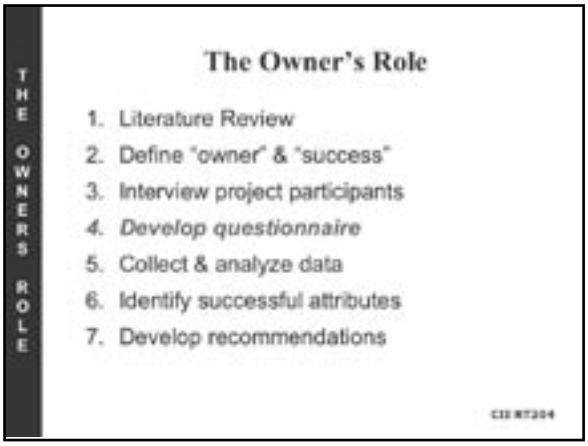

THE OWNERS ROLE

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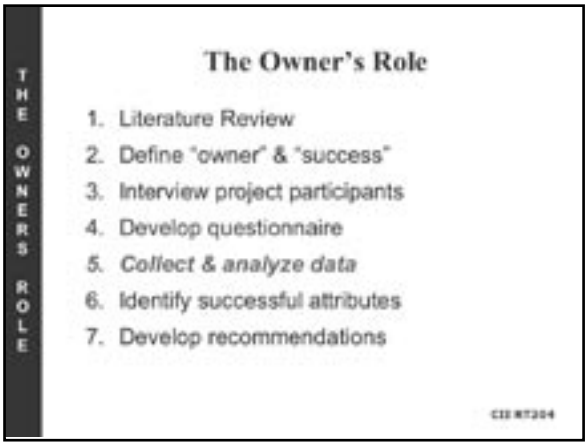

THE OWNERS ROLE

The Owner's Role

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Notes

Notes

THE OWNER'S ROLE

Collecting Data

Title		Multiple Choice	Scaled Response	Write In
Stratification		6	2	2
Business Expectations		1	5	1
Core Competencies		0	8	1
Owner's Involvement		1	11	2
Success Criteria		1	7	2
Leadership Performance		0	35	1
Project Management		0	29	1
Cost Performance		2	5	1
Duration Performance		2	5	1
Safety Performance		3	0	1
Quality Performance		1	8	1
Total Questions =	146	17	115	14

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THE OWNER'S ROLE

Data Collection

Email survey

Request sent to CII member organizations

≈ 100 initial emails

July – November 2004

73 projects from 45 companies

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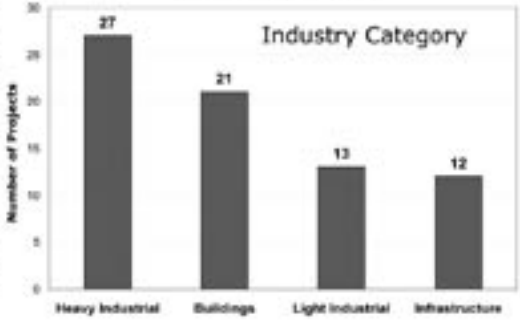
THE OWNER'S ROLE

Data Population



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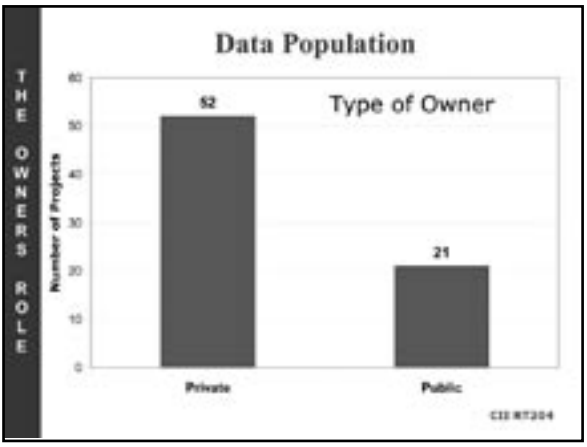
THE OWNERS ROLE
Data Population
Type of Owner
Number of Projects
52
21
Private
Public
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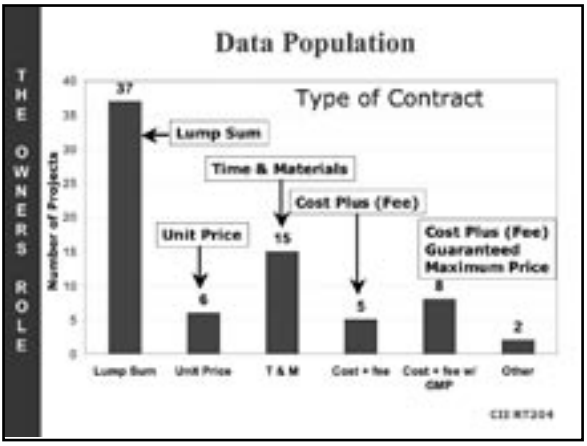
THE OWNERS ROLE
Data Population
Type of Contract
Number of Projects
Lump Sum
Time & Materials
Cost Plus (Fee)
Unit Price
Cost Plus (Fee) Guaranteed Maximum Price
37
6
15
5
8
2
Lump Sum
Unit Price
T & M
Cost + fee
Cost + fee w/ GMP
Other
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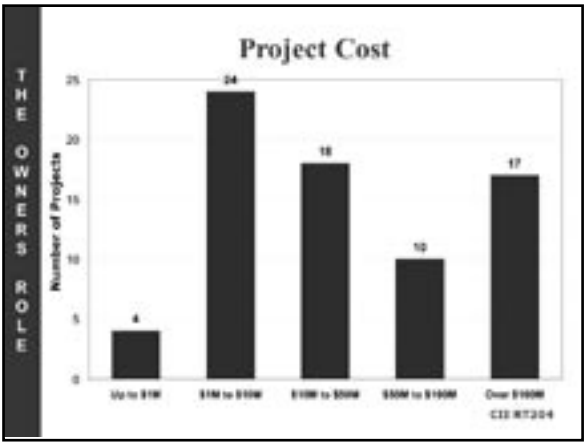
THE OWNERS ROLE
Project Cost
Number of Projects
4
24
18
10
17
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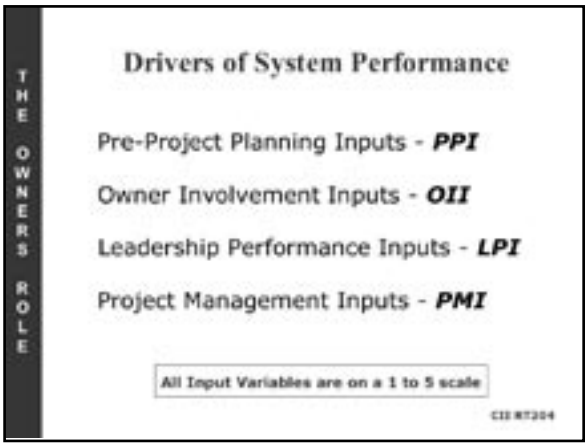
Notes


THE OWNERS ROLE
Drivers of System Performance
Pre-Project Planning Inputs - PPI
Owner Involvement Inputs - OII
Leadership Performance Inputs - LPI
Project Management Inputs - PMI
All Input Variables are on a 1 to 5 scale
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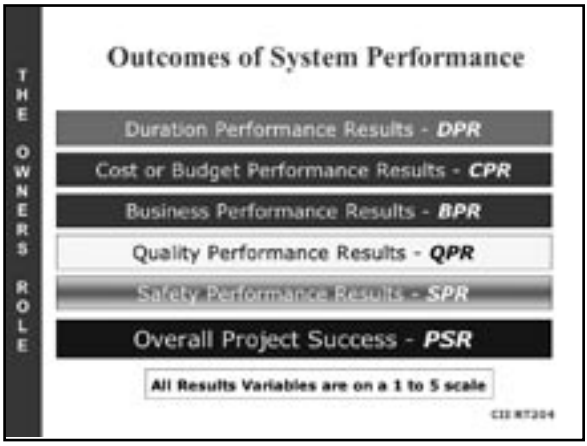
THE OWNERS ROLE
Outcomes of System Performance
Duration Performance Results - DPR
Cost or Budget Performance Results - CPR
Business Performance Results - BPR
Quality Performance Results - QPR
Safety Performance Results - SPR
Overall Project Success - PSR
All Results Variables are on a 1 to 5 scale
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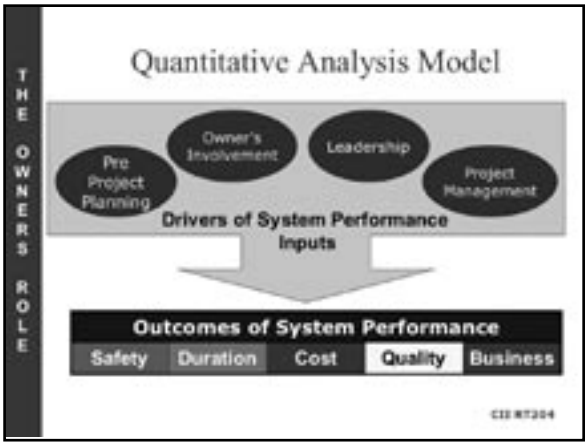
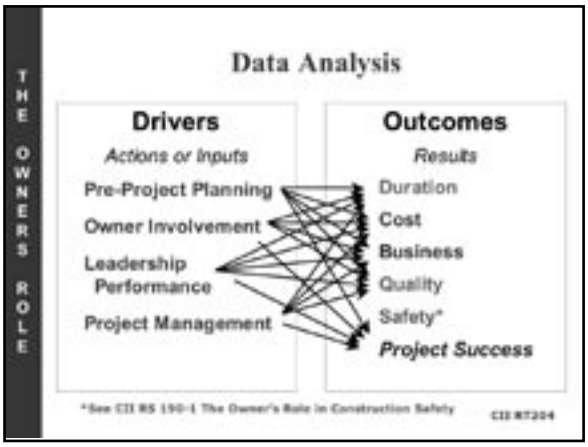

THE OWNERS ROLE
Quantitative Analysis Model
Pre Project Planning
Owner's Involvement
Leadership
Project Management
Drivers of System Performance Inputs
Outcomes of System Performance
Safety
Duration
Cost
Quality
Business
CII RT204

Notes


THE OWNERS ROLE
Data Analysis
Drivers
Actions or Inputs
Pre-Project Planning
Owner Involvement
Leadership Performance
Project Management
Outcomes
Results
Duration
Cost
Business
Quality
Safety*
Project Success
*See CII RS 190-1 The Owner's Role in Construction Safety
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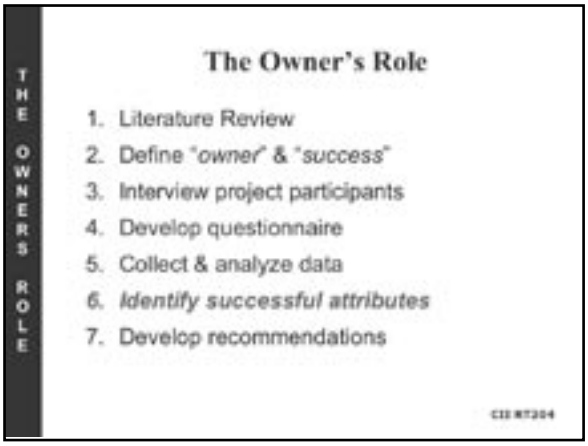
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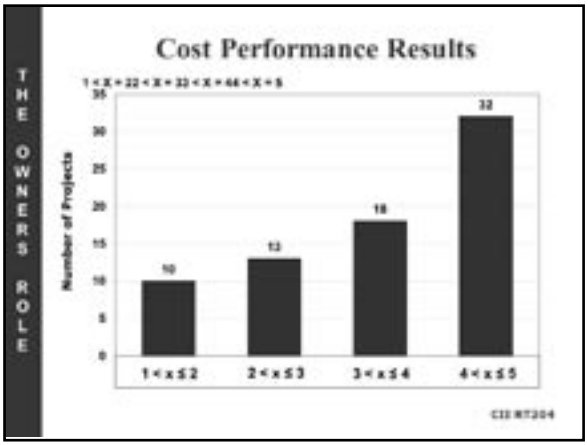
THE OWNERS ROLE
Cost Performance Results
Number of Projects
35
30
25
20
15
10
5
0
10
13
18
32
1 < x ≤ 2
2 < x ≤ 3
3 < x ≤ 4
4 < x ≤ 5
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Notes

THE OWNER'S ROLE

Cost Performance Results

1. Manage the scope & limit scope creep (PPI)
2. Conduct a thorough site survey to minimize the impact caused by unforeseen site conditions (PMI)
3. Respect the professional integrity of the position of the project manager in dealing with team members & contractors (OII)
4. Exercise an appropriate level of involvement (OII)
5. Foster communications among team members (LPI)

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THE OWNER'S ROLE

Cost Performance Results

6. Communication—face-to-face meetings (PMI)
7. Where owner decisions are required, make those decisions in a timely manner (OII)
8. Recognize the achievements of the team members (LPI)
9. Develop a comprehensive business strategy (PPI)
10. Limit the number of design omissions and errors that increase project cost (PMI)

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THE OWNER'S ROLE

Cost Performance Results

Question Category

Actions Identified By survey Question

	CPR			
–	PPI	OII	LPI	PMI
PM22	X			
DP04				X
OI08		X		
OI09		X		
LP14			X	
PM18				X
OI11		X		
LP07			X	
BX02	X			
CP03				X

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THE OWNERS ROLE

Overall Project Success

Question Category

Actions Identified By survey Question

	PSR			
	PPI	OII	LPI	PMI
LP14			X	
CP05				X
SO6a	X			
LP10			X	
QP08				X
LP27			X	
DP03				X
LP32			X	
PM12	X			
CO01	X			
OI09		X		
LP15			X	

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THE OWNERS ROLE

The Owner's Role

1. Literature Review
2. Define "owner" & "success"
3. Interview project participants
4. Develop questionnaire
5. Collect & analyze data
6. Identify successful attributes
7. *Develop recommendations*

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THE OWNERS ROLE

The Owner's Role

In Project Success

Stay Involved

Focus on Safety

Communicate

CII RT204

Notes

Notes

THE OWNERS ROLE

The Owner's Role

In Project Success

Leadership

Focus on Safety

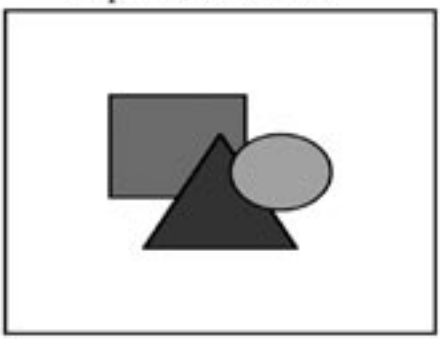
Know what Success is

Use CII Best Practices

CII RT204

THE OWNERS ROLE

Implementation Tool



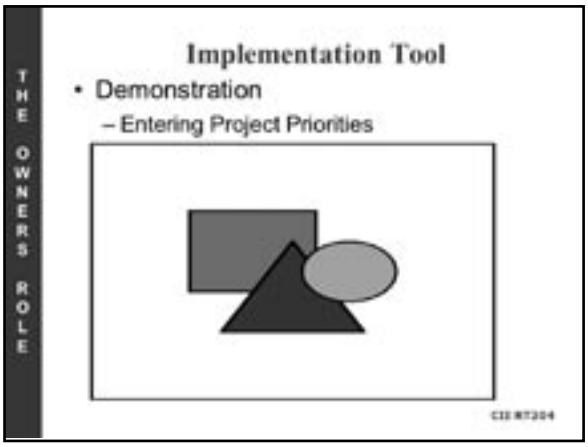
CII RT204

THE OWNERS ROLE

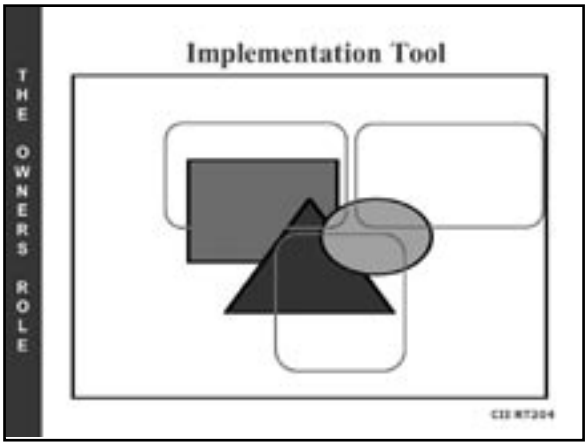
Implementation Tool

- Objective
  - To promote critical thinking on a project.
  - Beginning, During, At Completion
- How it works
  - Establish project priorities
  - Self rating on key performance drivers
  - Provides current priority status
- Who would use it
  - Owners Project Team
  - Contractors
- Value
  - Provides feedback on stated vs. current priorities

CII RT204


THE OWNERS ROLE
Implementation Tool
• Demonstration
– Entering Project Priorities
CII RT204


THE OWNERS ROLE
Implementation Tool
CII RT204


THE OWNERS ROLE
Implementation Tool
CII RT204

Notes

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THE OWNERS ROLE

Implementation Tool

- Interpreting results page for a completed project
  - Compare original project priorities to current project priorities
  - Compare how changes in the input on the questions impact the current project priorities

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THE OWNERS ROLE

Implementation Tool

- Path forward
  - Working beta-version
  - CII member input
  - CII product review board
  - Available via CII...

CII RT204

THE OWNERS ROLE

Questions

- Thank you

CII RT204

The Energetic Economy

Featured Speaker

Abstract

The U.S. economy has managed to resist the drag of higher interest rates and high oil prices better than anyone expected. Although growth is slowing, to 3.5% in 2005 from 4.4% last year, it remains strong. Inflation has not repeated the surge that occurred in the 1970s oil price spikes. Interest rates have remained low – perhaps too low for the Fed. Although there are clear dangers still in the economy, if nothing to bad happens growth and inflation are expected to remain in a comfortable range.

Oil is clearly the main worry, but oil prices aren't as critical to the economy as they were 25 years ago. In 1981, energy was 14% of US GDP; today, it is only 7%. Oil could still cause a recession, but only if it goes much higher.

The other major concern is the twin deficits. The federal deficit is dropping faster than expected, but when the baby boomers start to retire, will surge because of higher pension and health costs. The trade deficit is a bigger danger in the short run, since that is continuing to rise. The US has a problem because it sells to the slow-growth industrial countries but buys from the high-growth emerging economies. These emerging economies are getting much bigger; China is already the world's second largest economy, measured in terms of purchasing power rather than official exchange rates.

The Federal Reserve is raising interest rates not to slow the economy down, but to keep it where it is. They would like to raise the federal funds rate to neutral, but aren't sure where neutral is. We expect continued increases, to perhaps 4% at yearend.

But the puzzle for the Fed is that long-term interest rates are not rising in line. The yield on the 10-year Treasury bond is about where it was a year ago. No one is quite sure why, but we believe it is related to the globalization of world bond markets. Although 4% doesn't look very attractive, it beats the 3.2% paid on German bonds or the 1.2% on Japanese. High saving rates in the developing countries and central banks attempts to strengthen the dollar are also pushing US yields down.

The low interest rates have been a major boon for construction, especially residential. Single-family housing starts and home sales are at a record high. We believe this year will be the peak — but we said that a year ago as well. The real worry is that homebuyers are bidding prices too high in order to get in. The average home price is at a record 3.1 times average household income; we expect that to drop. If the rise in interest rates is gradual, that will occur by home prices stabilizing while incomes rise.

Featured Speaker

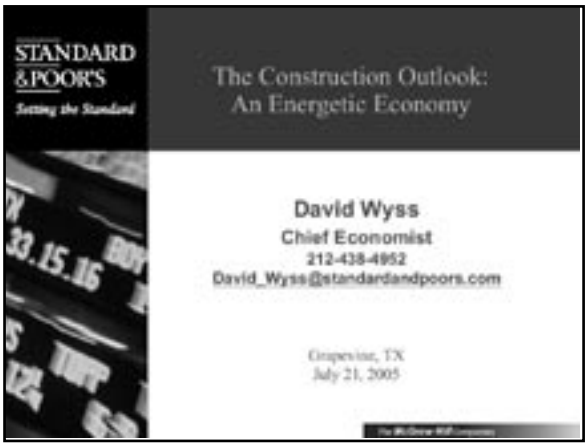
David A. Wyss – Chief Economist, Standard & Poor's

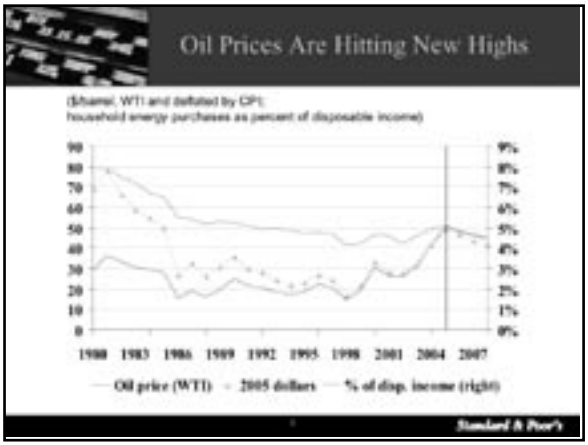
David Wyss is responsible for S&P's economic forecasts and publications, and co-authors the monthly Equity Insight and the weekly Financial Notes. Often quoted in the press, he also manages research projects, especially in financial risk. He formerly was a senior staff economist with the President's Council of Economic Advisers, senior economist at the Federal Reserve Board, and economic advisor to the Bank of England. Wyss holds a bachelor's degree from MIT and a Ph.D. in economics from Harvard University.

e-mail: david_wyss@standardandpoors.com

The Energetic Economy

Presentation Slides





Notes

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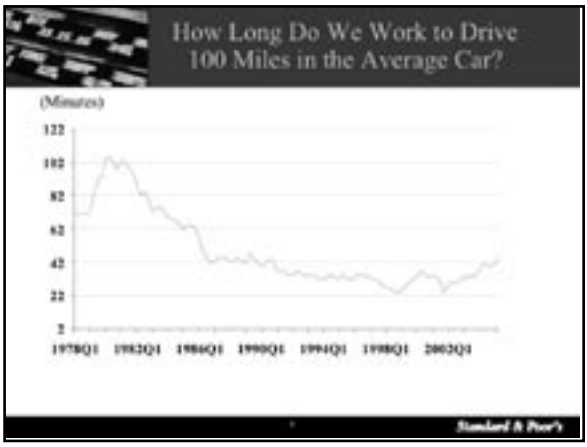
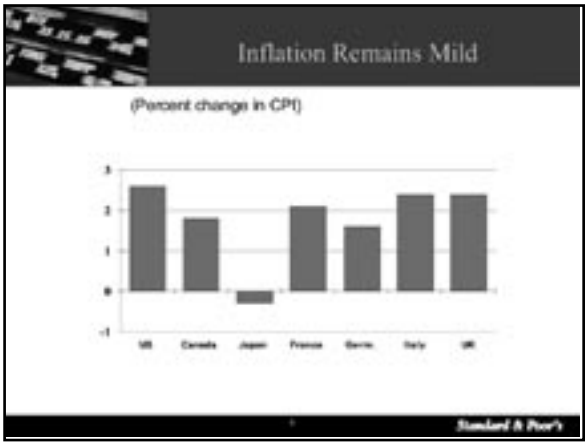
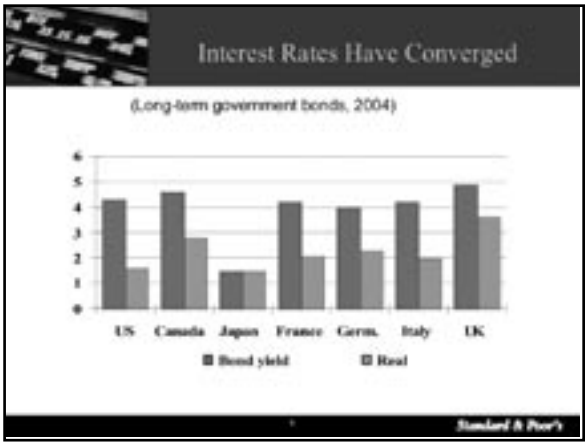
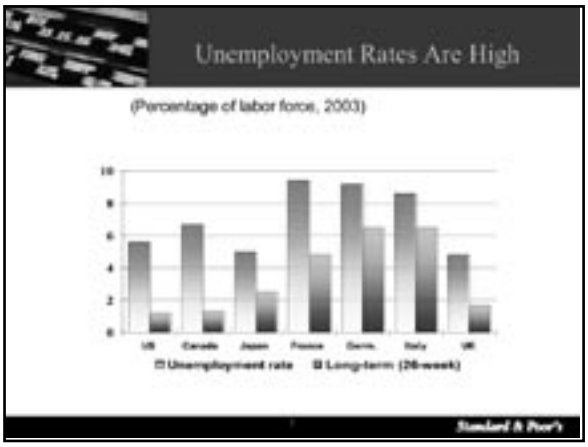
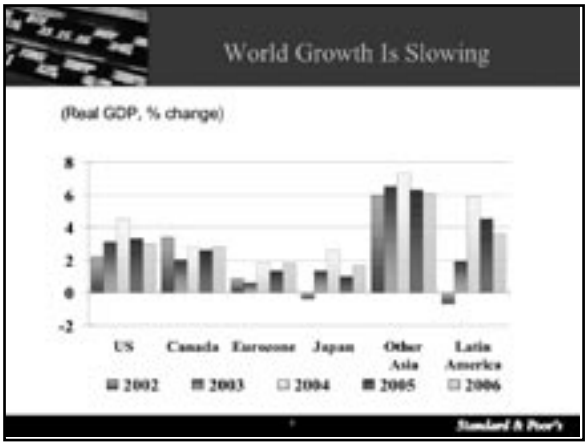
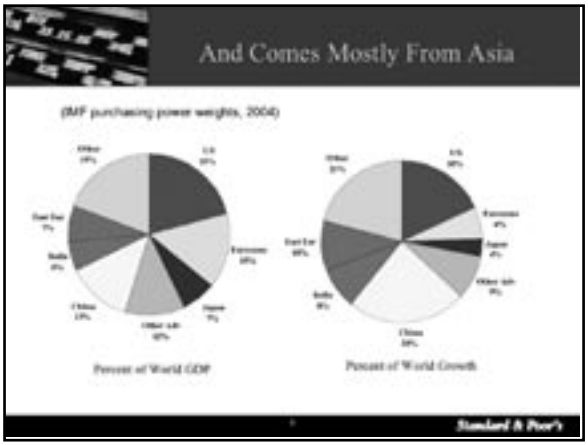

How Long Do We Work to Drive 100 Miles in the Average Car?
(Minutes)
122
102
82
62
42
22
2
1978Q1
1982Q1
1986Q1
1990Q1
1994Q1
1998Q1
2002Q1
Standard & Poor's


Inflation Remains Mild
(Percent change in CPI)
3
2
1
0
-1
US
Canada
Japan
France
Germ.
Italy
UK
Standard & Poor's


Interest Rates Have Converged
(Long-term government bonds, 2004)
6
5
4
3
2
1
0
US
Canada
Japan
France
Germ.
Italy
UK
Bond yield
Real
Standard & Poor's

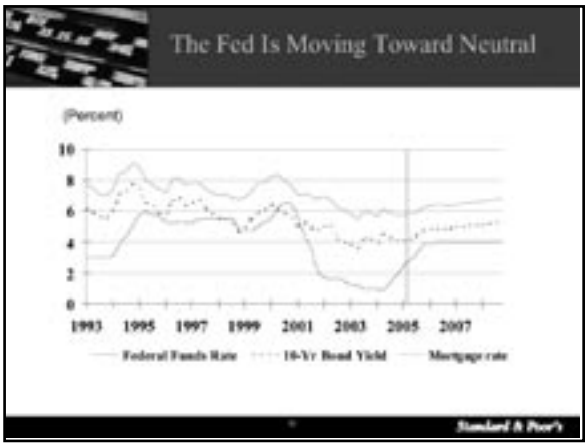

Unemployment Rates Are High
(Percentage of labor force, 2003)
10
8
6
4
2
0
US
Canada
Japan
France
Germ.
Italy
UK
Unemployment rate
Long-term (26-week)
Standard & Poor's


World Growth Is Slowing
(Real GDP, % change)
8
6
4
2
0
-2
US
Canada
Eurozone
Japan
Other Asia
Latin America
2002
2003
2004
2005
2006
Standard & Poor's

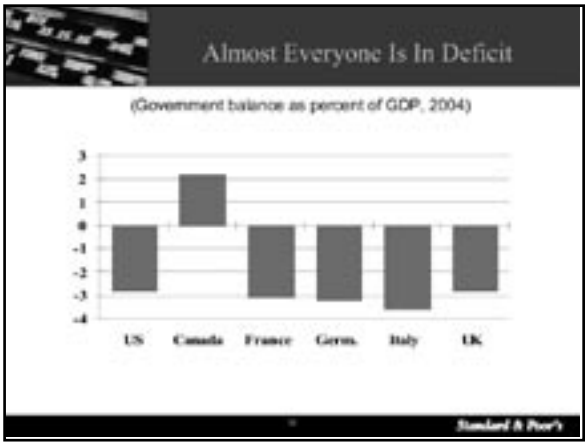

And Comes Mostly From Asia
(IMF purchasing power weights, 2004)
Percent of World GDP
Percent of World Growth
Standard & Poor's

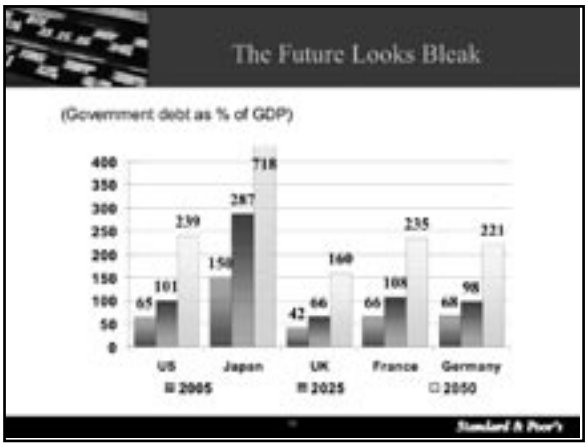
Notes

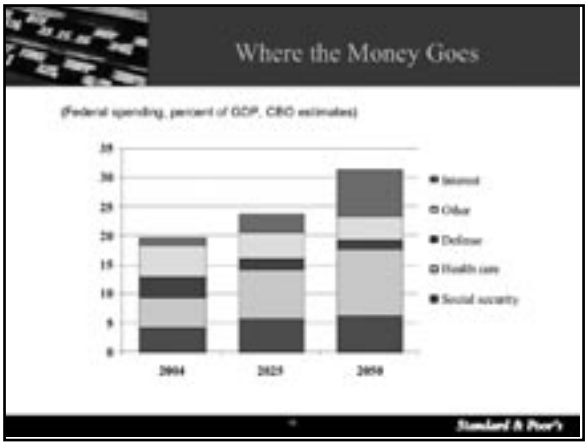
Notes

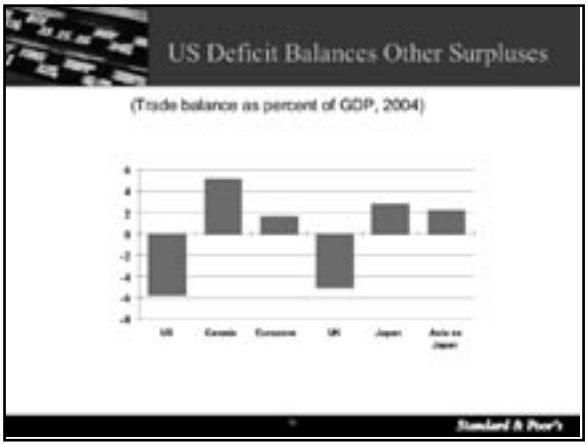

The Fed Is Moving Toward Neutral
(Percent)
10
8
6
4
2
0
1993
1995
1997
1999
2001
2003
2005
2007
Federal Funds Rate
10-Yr Bond Yield
Mortgage rate
Standard & Poor's


Quality Spreads Grind Tighter
900
800
700
600
500
400
300
200
100
0
2003
2004
2005
Investment grade
Speculative grade
Standard & Poor's


Almost Everyone Is In Deficit
(Government balance as percent of GDP, 2004)
3
2
1
0
-1
-2
-3
-4
US
Canada
France
Germ.
Italy
UK
Standard & Poor's

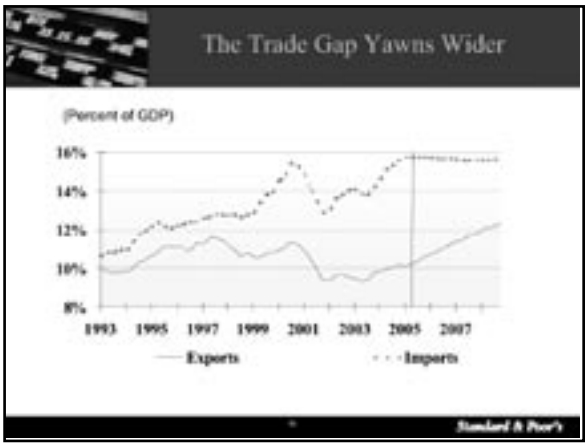

The Future Looks Bleak
(Government debt as % of GDP)
400
350
300
250
200
150
100
50
0
65
101
239
150
287
718
42
66
160
66
108
235
68
98
221
US
Japan
UK
France
Germany
2005
2025
2050
Standard & Poor's

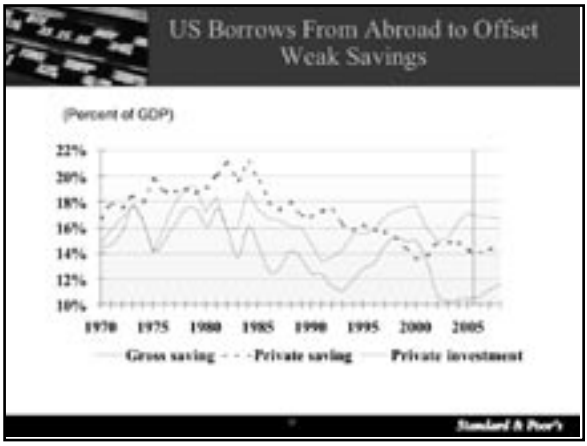

Where the Money Goes
Interest
Other
Defense
Health care
Social security
2004
2025
2050
Standard & Poor's

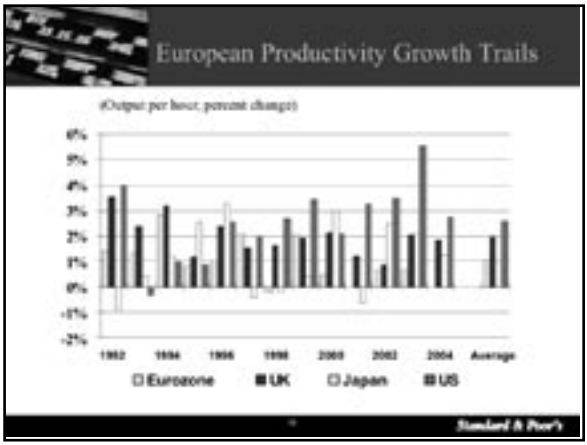

US Deficit Balances Other Surpluses
(Trade balance as percent of GDP, 2004)
US
Canada
Eurozone
UK
Japan
Asia ex Japan
Standard & Poor's

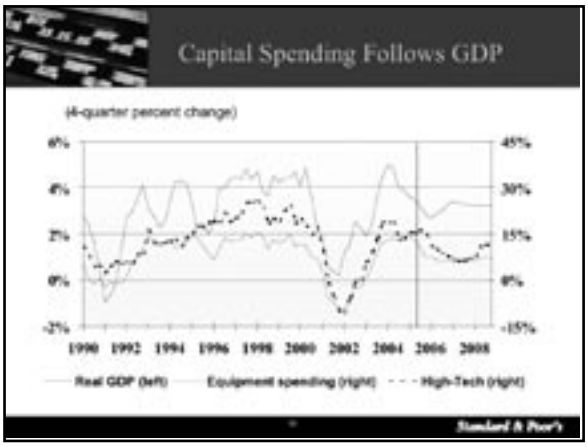
Notes

Notes

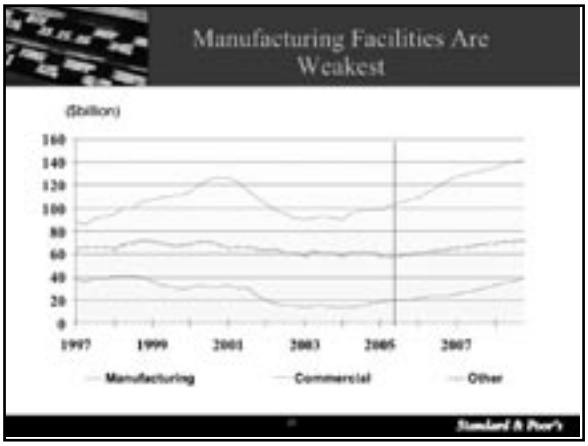

The Trade Gap Yawns Wider
(Percent of GDP)
16%
14%
12%
10%
8%
1993
1995
1997
1999
2001
2003
2005
2007
Exports
Imports
Standard & Poor's


US Borrows From Abroad to Offset Weak Savings
(Percent of GDP)
22%
20%
18%
16%
14%
12%
10%
1970
1975
1980
1985
1990
1995
2000
2005
Gross saving
Private saving
Private investment
Standard & Poor's


European Productivity Growth Trails
(Output per hour, percent change)
6%
5%
4%
3%
2%
1%
0%
-1%
-2%
Average
Eurozone
UK
Japan
US
Standard & Poor's


Capital Spending Follows GDP
(4-quarter percent change)
6%
4%
2%
0%
-2%
45%
30%
15%
0%
-15%
1990 1992 1994 1996 1998 2000 2002 2004 2006 2008
Real GDP (left)
Equipment spending (right)
High-Tech (right)
Standard & Poor's


Weak Employment Means Weak Construction
(4-quarter percent change)
4%
3%
2%
1%
0%
-1%
-2%
30%
20%
10%
0%
-10%
-20%
-30%
1990 1992 1994 1996 1998 2000 2002 2004 2006 2008
Employment
Nonresidential Building
Standard & Poor's


Manufacturing Facilities Are Weakest
($billion)
160
140
120
100
80
60
40
20
0
1997 1999 2001 2003 2005 2007
Manufacturing
Commercial
Other
Standard & Poor's

Notes

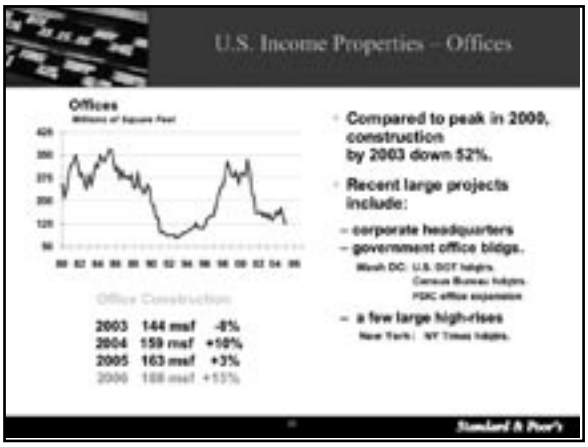
Notes

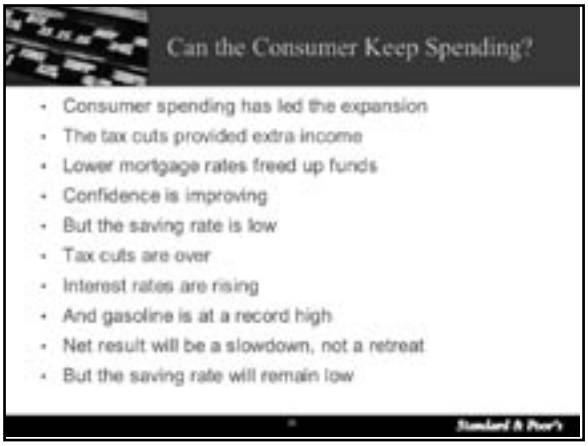

U.S. Income Properties – Stores
Stores and Shopping Centers
Is the nation "over-stored"?
Derived demand from strong housing market
Major retail chains still expanding. Expansion continues for Wal-Mart, Home Depot, Lowe's, Target, Kohl's, IKEA, etc.
Move to smaller venues e.g., "lifestyle centers"
2003 282 msf +10%
2004 293 msf +4%
2005 290 msf -1%
2006 275 msf -5%
(msf = million of sq. ft.)
Standard & Poor's

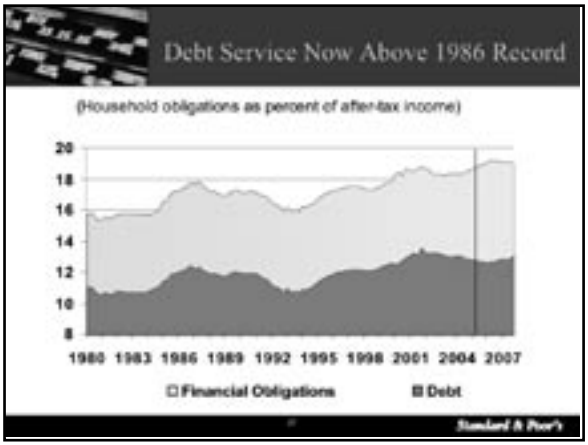

U.S. Income Properties – Warehouses
Warehouses
Vacancy rates peaked at 11.7% in 2003:q3, receded to 10.7% by 2005:q1
Recent large projects include warehouses for Wal-Mart, Home Depot, Lowe's, IKEA
Impact from RFID's?
2003 186 msf -5%
2004 197 msf +6%
2005 209 msf +6%
2006 223 msf +7%
Standard & Poor's


U.S. Income Properties – Hotels
Hotels
High-profile projects in 2004 include:
Caesar's Palace South Tower
South Coast Hotel/Casino
Convention center-related hotel in Boston
Industry financials weak, though improving:
Occupancies moving back above 60%
Efforts to "catch the upturn" is supporting new construction
2003 45 msf +12%
2004 47 msf +5%
2005 53 msf +13%
2006 62 msf +17%
Standard & Poor's

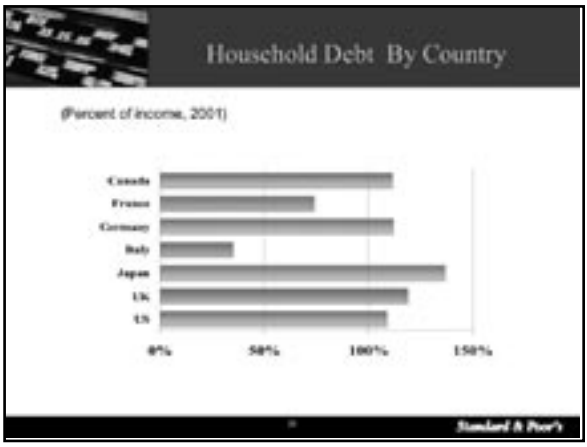
Notes

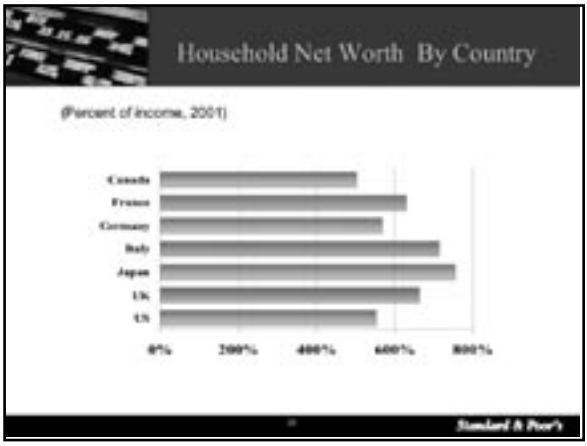

U.S. Income Properties – Offices
Offices
Compared to peak in 2000, construction by 2003 down 52%.
Recent large projects include:
– corporate headquarters
– government office bldgs.
– a few large high-rises
2003 144 msf -8%
2004 159 msf +10%
2005 163 msf +3%
Standard & Poor's

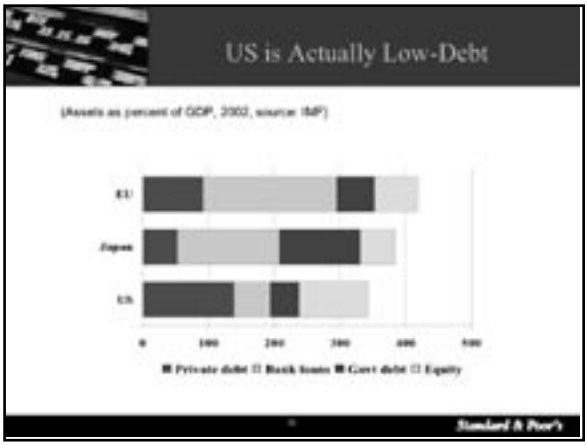

Can the Consumer Keep Spending?
Consumer spending has led the expansion
The tax cuts provided extra income
Lower mortgage rates freed up funds
Confidence is improving
But the saving rate is low
Tax cuts are over
Interest rates are rising
And gasoline is at a record high
Net result will be a slowdown, not a retreat
But the saving rate will remain low
Standard & Poor's


Debt Service Now Above 1986 Record
(Household obligations as percent of after-tax income)
20
18
16
14
12
10
8
1980 1983 1986 1989 1992 1995 1998 2001 2004 2007
Financial Obligations
Debt
Standard & Poor's

Notes


Household Debt By Country
(Percent of income, 2001)
Canada
France
Germany
Italy
Japan
UK
US
0%
50%
100%
150%
Standard & Poor's


Household Net Worth By Country
(Percent of income, 2001)
Canada
France
Germany
Italy
Japan
UK
US
0%
200%
400%
600%
800%
Standard & Poor's


US is Actually Low-Debt
(Assets as percent of GDP, 2002, source: IMF)
EU
Japan
US
0
100
200
300
400
500
Private debt
Bank loans
Govt debt
Equity
Standard & Poor's

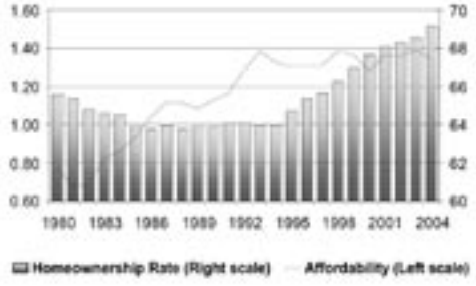
Notes

A Housing Bubble?

- Housing is the most affordable it has been since the early 1970s
- Thanks to low mortgage rates
- Home prices have outpaced incomes
- But ratio of home price to income is only moderately high
- There are local bubbles
  - E.g., New York, Bay area, Boston, DC
- And higher mortgage rates will cause weakness
- But housing looks less overvalued than other assets

Standard & Poor's

More Affordable Housing Allows More Households To Own Their Home



Standard & Poor's

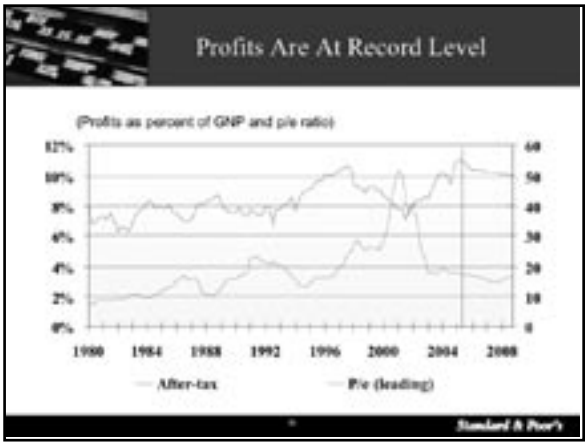
Home Prices Are High Relative to Household Income

Standard & Poor's

Notes

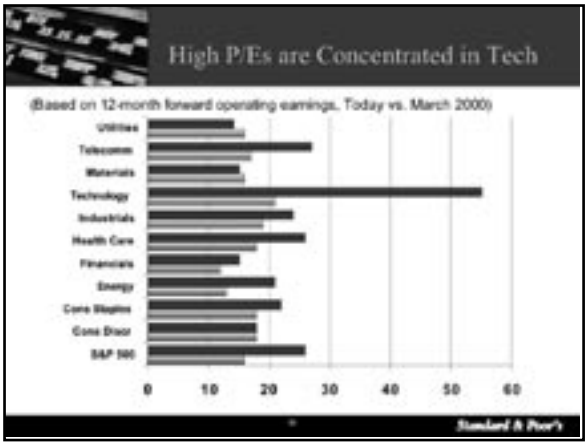

The Stock Market Will Recover, But Slowly
Market rose over 20%/year from 1995 -99
But dropped from March 2000 through June 2003
First three consecutive down years since 1939-41
Biggest drop since 1929-32
Profits cannot continue to outpace GDP
Share prices cannot continue to outpace earnings
As interest rates rise
Stocks will thus yield less in the future than in the recent past.
But a near-term rally is being spurred by earnings recovery and dividend tax change
Standard & Poor's


Most Stock Markets Remain Below 2000 Peaks
(Change in S&P stock indexes since March 2000 peak)
US (S&P 500)
Canada (TSE 60)
Japan (Topix 150)
Europe (EU 350)
Asia (AP 50)
Lat Am (LA 40)
-60
-45
-30
-15
0
15
30
Oct-02
May-05
Standard & Poor's


Profits Are At Record Level
(Profits as percent of GNP and p/e ratio)
1980
1984
1988
1992
1996
2000
2004
2008
After-tax
P/e (leading)
Standard & Poor's

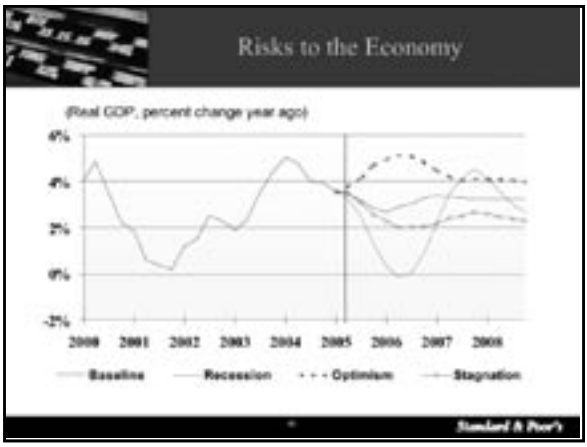
Notes


Most Sectors Have Recovered from the Bear Market
(Change in S&P 500 sectors since March 24, 2000 peak)
Utilities
Telecomm
Materials
Technology
Industrials
Health Care
Financials
Energy
Cons Staples
Cons Discr
S&P 500
-90
-60
-30
0
30
60
90
Oct-02
Mar-05
Standard & Poor's


High P/Es are Concentrated in Tech
(Based on 12-month forward operating earnings, Today vs. March 2000)
Utilities
Telecomm
Materials
Technology
Industrials
Health Care
Financials
Energy
Cons Staples
Cons Discr
S&P 500
0
10
20
30
40
50
60
Standard & Poor's


Bottom Line: The Economy Recovers, But Slowly
- Consumers are spending near max
- Businesses will not take over the lead yet
- But stimulus from fiscal policy continues
- Interest rates rise gradually
- Weak recovery for stock market
- Risk of recession remains if:
  - Further terror attacks damage confidence, while oil prices soar
  - Problems in financing deficits push investment down and savings up
- But could be better if productivity stays stronger
Standard & Poor's

Notes


Risks to the Economy
(Real GDP, percent change year ago)
6%
4%
2%
0%
-2%
2000
2001
2002
2003
2004
2005
2006
2007
2008
Baseline
Recession
Optimism
Stagnation
Standard & Poor's


Economic Updates
Thank you for your attention
If you would like to receive our regular economic and credit market updates, please register at:
http://info.standardandpoors.com/mk/get/ECMR_REG_FORM
Standard & Poor's

The Future of Project Delivery

Mortenson Case Study – Implementation Session only

Abstract

The use of technology tools and innovation reduces the time and cost of construction. The presentation will provide an overview of 3D and 4D technology and identify its advantages in promoting innovation and fostering project communication, constructability solutions, schedule enhancement, and cost control/reduction.

Examples of how Mortenson developed and implemented 3D and 4D technology on the Walt Disney Concert Hall, Denver Art Museum, and other projects will be presented in the implementation session, illustrating the unique design and construction techniques the project team employed during each project. These examples also will demonstrate how innovation, cooperation, teamwork, and expertise resulted in added value in various phases of design and construction.

Implementation Session Moderator

Jim Yowan – Director, M. A. Mortenson Company

Jim Yowan was Mortenson's project director for the construction of perhaps the most difficult construction project in recent memory, the Walt Disney Concert Hall in Los Angeles, California. He also completed Mortenson's largest design-build project, a semiconductor manufacturing facility in Northern Ireland, and led his team in obtaining the first ISO 9001 and 14001 certifications for design/construction by a building contractor in both Northern Ireland and the Republic of Ireland. A much sought after speaker on innovation and technology in the building industry, Yowan earned a bachelor's degree in architectural engineering from Penn State University.

e-mail: jim.yowan@mortenson.com

Implementation Session Participant

Derek Cunz – Director of Project Development, M. A. Mortenson Company
e-mail: derek.cunz@mortenson.com

Other Knowledgeable Point of Contact

Greg Knutson – Construction Executive, M. A. Mortenson Company
e-mail: greg.knutson@mortenson.com

CII Executive Leadership Course

Special Topic – Implementation Session only

Abstract

This session will explain the reasons that CII has developed its Executive Leadership Course in conjunction with the McCombs School of Business at UT Austin, and will discuss the value that the course will bring to CII member organizations.

The course is directed toward individuals who have significant leadership experience in owner and contractor companies, and who have demonstrated strong potential to assume the highest leadership positions in their organizations. The curriculum will be made available, and panel members will discuss why they are strongly supporting the program by sending participants or by making one of the course presentations. Ample time will be allowed for questions and discussion.

Implementation Session Moderator

Judith W. Passwaters – Global Director, Facilities Services & Real Estate, DuPont Company

Judy Passwaters is responsible for the acquisition and operation of DuPont offices and laboratories worldwide and for corporate real estate in the U.S. Her lengthy career with DuPont includes several assignments in manufacturing as well as corporate engineering. She served as the DuPont Director of Engineering for Europe, Middle East, and Africa, and was headquartered in The Netherlands for this late 1990s assignment. She moved to her current position in 2004. Passwaters holds a bachelor's degree in chemistry and a master's degree in electrical engineering and computer science, and is a certified Six Sigma Green Belt and Champion.

e-mail: judith.w.passwaters@usa.dupont.com

Implementation Session Participants

Manuel A. Garcia –Associate Director, Construction Industry Institute
e-mail: manuel.garcia@engr.utexas.edu

Richard J. Haller – President and Chief Executive Officer, Walbridge Aldinger Company
e-mail: rhaller@walbridge.com

James A. Scotti – Vice President and Chief Procurement Officer, Global Sourcing & Supply, Fluor Corporation
e-mail: jim.scotti@fluor.com

CII Executive Leadership Course

Implementation Slides

Notes

Notes

Needs Statement

- Due to the aging of the professional work force, an urgent need is to develop the next generation of construction industry leaders.
- Industry has not invested in professional development of middle managers to assume construction industry leadership positions.

Brief Course History

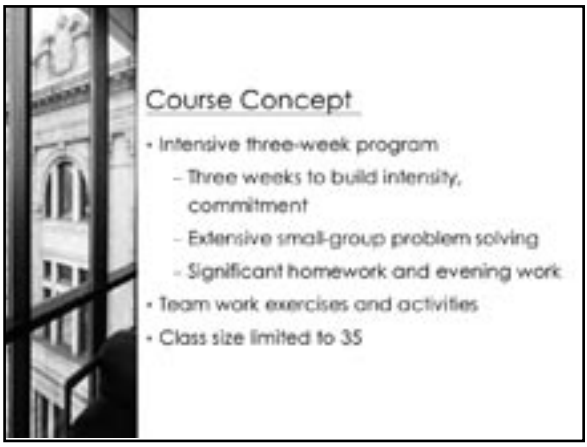
No program currently meets these needs.

- Nov. 2004 CII Board approved initial development.
- Dec. 2004 Steering Team appointed.
  - Helped develop agenda/alliance with McCombs School of Business.
- April 2005 CII Board approved course with strong initial interest.

Steering Team

Doug Eastman, Dofasco
Ron Hertwig, GSA
Rick Haller, Wallbridge Aldinger
Ken Lunsford, ConocoPhillips
Mark Owens, Eli Lilly
Judy Passwaters, DuPont
Bob Predmore, Intel
Dennis Schroeder, BE&K
J. J. Suarez, CSA Group
Art Washburn, S&B
Tim Woodard, McDermott
Manny Garcia, CII
John Lowe, consultant

Notes


Course Concept
• Intensive three-week program
– Three weeks to build intensity, commitment
– Extensive small-group problem solving
– Significant homework and evening work
• Team work exercises and activities
• Class size limited to 35

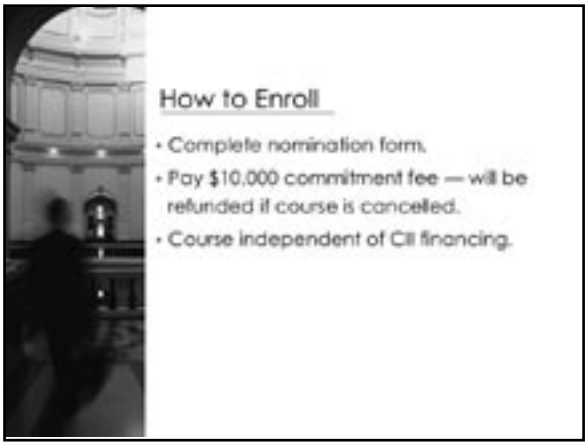

Course Concept
• Good owner/ contractor balance essential
• A solid, blended curriculum
– Broad-based executive leadership topics
– Construction executive-specific topics


Presenters
Industry
• Distinguished executives
• Selected, widely recognized consultants on emerging and visionary topics
Academia
• Distinguished faculty
• Widely recognized by peers in executive and construction topics

Notes

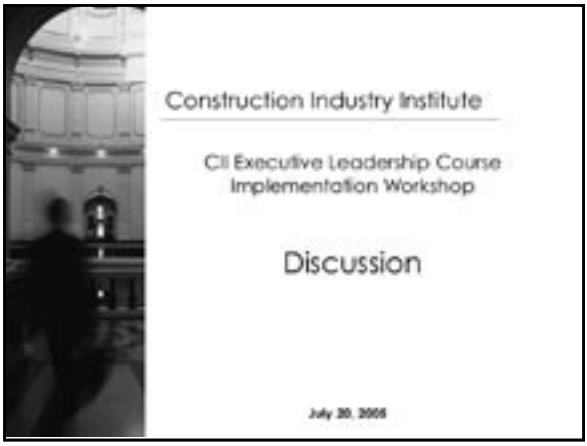

Course Cost
• Participant Fee
– $21,500 for three-week program, including all meals and lodging
– Fee less than comparable top business school offerings.
– Covers all CII development costs
– Course not subsidized by CII dues.


Status
• April 2005 Website up
– www.construction-institute.org/xlc/
• May 2005
– Invoice and information letter to all with interest or commitment
– Invoice and information letter to CII Board
• May-July 2005
– Strong response to date.


How to Enroll
• Complete nomination form.
• Pay $10,000 commitment fee — will be refunded if course is cancelled.
• Course independent of CII financing.

Notes


For More Information
• Ask your questions here.
• Contact any of the panel members during the conference or later.
• Call Manny Garcia at CII:
– (512) 232-1966
• Visit our website
– www.construction-institute.org/xlc/


Construction Industry Institute
CII Executive Leadership Course
Implementation Workshop
Discussion
July 30, 2008

It Takes Commitment

Banquet Speaker

Chad Hennings – former Dallas Cowboys Lineman and three-time Super Bowl Champion

Chad Hennings is president of Virtus Inc., a marketing consulting company. An outstanding athlete, Hennings is also a combat veteran who flew 45 missions as a U.S. Air Force pilot in Operation Provide Comfort in Northern Iraq. He is a graduate of the Air Force Academy, where he excelled in football and earned unanimous All-American honors as well as being named Academic All-American twice. In 1987, he was selected as the recipient of the Outland Trophy, given to the nation's outstanding college defensive lineman, and named the Freedom Bowl's Most Valuable Player. Hennings played nine seasons with the Dallas Cowboys and participated on three Super Bowl Championship teams.

Outstanding Researcher for 2005

James T. O'Connor

Dr. James T. O'Connor has been selected as the recipient of the Outstanding Researcher Award for 2005. The panel of judges has determined that he meets or exceeds all criteria and as one of the earliest researchers in CII funded studies, brings added distinction to the award.

A professor of civil engineering and the C. T. Wells Professor of Project Management at The University of Texas at Austin, Dr. O'Connor began his CII research in the early 1980s. His research report on constructability improvement during engineering and procurement, a groundbreaking effort, was among the first published reports from CII. He then went on to study and write on constructability during field operations and eventually helped write the definitive text on constructability concepts. He later developed the first university course on constructability, and has been both an instructor for industry short courses on the topic and a consultant to dozens of organizations. Constructability later became a CII Best Practice, as did another research topic he investigated, Planning for Startup.

Dr. O'Connor's other CII research efforts cover a broad spectrum of the engineering and construction industry. He led a study in the early 1990s on graphical simulation software, and then worked closely with the U.S. Navy on a demonstration project that not only was a test bed for CII best practices, but laid the groundwork for the stellar CII programs today that involve benchmarking and metrics and implementation. In addition, he led a unique CII study on improving industrial piping. Most recently, he was the principal investigator for CII's research on value management, which details over 40 value management practices and their effect on project performance.

CII takes great pride in recognizing Dr. O'Connor for his outstanding research contributions. He has demonstrated true leadership, has mentored dozen of students working on CII research, and is richly deserving of this prestigious award. Congratulations to Dr. James T. O'Connor on his selection as the Outstanding Researcher for 2005.

Award Criteria

- The research significantly contributed to the improvement of the construction industry.
- The research is completed and products delivered.
- The researcher's excellence is recognized by his or her CII team members, the staff, and the membership.
- The researcher's report to CII is innovative, well written, and timely.

Previous Recipients of the Outstanding CII Researcher of the Year Award

1995 – Mike Vorster, Virginia Polytechnic University

1996 – Edd Gibson, The University of Texas at Austin

1997 – Stu Anderson, Texas A&M University

1998 – Gary Oberlender, Oklahoma State University

1999 – Ed Back, Texas A&M University

2000 – Jeff Russell, University of Wisconsin–Madison

2001 – Ed Jaselskis, Iowa State University

2002 – Carl Haas, The University of Texas at Austin

2003 – Jimmie Hinze, University of Florida

2004 – Edd Gibson, The University of Texas at Austin

Outstanding Researcher Award Panel of Judges

Edward R. Bardgett	Senior Vice President, Zachry Construction Corporation
Wayne A. Crew	Associate Director for Research, Construction Industry Institute
Richard J. Haller	President and Chief Operating Officer, Walbridge Aldinger Company
Dr. Jeffrey S. Russell	Professor, Civil & Environmental Engineering, University of Wisconsin–Madison
Arthur A. Stout	Director, Capital Improvement Group, Intel Corporation

Outstanding Instructor for 2005

W. Edward Back

CII has selected Dr. W. Edward Back, Professor of Civil Engineering, Clemson University, as the Outstanding Instructor of the Year for 2005. The award recognizes excellence in imparting knowledge about CII material and in enhancing the learning process. The panel of judges views Dr. Back as meeting or exceeding all of the criteria for the award and is pleased to have him as the 2005 recipient.

Dr. Back becomes the first person to receive this award more than once, having been recognized Outstanding CII Instructor in 2001 as well. During the intervening four years, he has:

- Completed the development of over 150 hours of classroom training on more than 20 topics related to project management based on CII Best Practices and candidate Best Practice.
- Converted over 15 modules of project management training to Web-based training for Washington Group International.
- Served as instructor for all CII campus-based courses at Clemson on all 13 of the currently offered CII Education Modules.
- Developed and presented courses for corporations.
- Developed and taught a graduate level course at Clemson that highlights CII Best Practices, for which he has received the highest teacher evaluation ratings each semester it has been offered.
- Presented highly rated workshops for past CII Annual Conferences and Construction Project Improvement Conferences.
- Presented sessions at recent Board of Advisors and Executive Committee gatherings.

Dr. Back continues to stay current on the latest CII research findings and integrates them into the university curriculum. This effort has produced in Dr. Back a strong understanding of CII research in every aspect of project management. His effectiveness in the delivery of CII Best Practices for project management, in either privately or publicly offered courses, is unmatched. His interest and abilities are not focused solely on traditional presentation methods, but he is intent on mastering cutting-edge presentation techniques as well. CII is pleased to recognize Dr. Back as the recipient of the Outstanding Instructor Award for 2005.

Award Criteria

- The nominee is an exceptionally effective instructor whose contributions, talent, and efforts have been recognized for outstanding performance by the participants in learning activities involving CII education material.
- The nominee has presented CII material in ways that have significantly enhanced the learning process.
- Consideration will also be given to the degree to which the nominee has contributed to the development of CII education material.

Previous Recipients of the Outstanding Instructor Award

1995 – Jorge Vanegas, Georgia Institute of Technology

1996 – Stan Nethery, Dow Chemical

1997 – Steve Sanders, Clemson University

1998 – Edd Gibson, The University of Texas at Austin

1999 – Don Shaw, Ontario Hydro

2000 – Gary Aller, Arizona State University

2001 – Ed Back, Clemson University

2002 – Ed Ruane, J. A. Jones Construction Company

2003 – James M. Neil, Morrison Knudsen
Emmitt J. Nelson, Shell Oil Company

2004 – Michael R. Peters, Washington Group International

Outstanding Instructor Award Panel of Judges

Manuel A. Garcia	Associate Director for Education, Implementation, Knowledge Management, Construction Industry Institute
Arnold M. Manaker	Project Manager, Paradise SCR, Tennessee Valley Authority
Leo McKnight	Director, Training & Development, Hilti Corporation
Dr. Gary R. Smith	Dean, Department of Civil Engineering & Construction, North Dakota State University

Outstanding Implementer for 2005

Brett A. Phillips

CII has selected Brett Phillips, S&B Engineers & Constructors, Ltd., as the Outstanding Implementer of 2005. The award recognizes outstanding achievement in enhancing implementation of CII Best Practices within one or more CII member organizations. In the opinion of the panel of judges, Phillips meets or surpasses all criteria and adds distinction to the award.

Brett Phillips has been a prime motivator for continuous improvement and an advocate of using CII Best Practices within S&B. He leads S&B's CII Implementation Team, which is comprised of key managers within the company who meet monthly to review the latest CII products, discuss their merits, decide their application value to S&B, and determine how they should best be implemented. He also helped create the S&B Best Practices website, one of the company's most useful tools for integrating these concepts throughout the company.

Some other areas where S&B has shown notable improvement after implementation of best practices under Phillips' leadership include:

- Zero Accidents Safety — instilled new ideas such as sharing the program with subcontractors to improve their safety behavior and starting a design for safety program.
- Pre-Project Planning — applied the CII Project Definition Rating Index and Alignment Thermometer tools directly with project teams.
- Design Effectiveness — acts as a key motivator in the S&B design effectiveness practices and constructability program.
- Materials Management — encourages use of an electronic database integrated into engineering and procurement files; alliances and quality assurance programs with suppliers; field partitioned lay-down; and bar coding.
- Management & Technology — formed a FIATECH implementation team at S&B to promote new ways of using technology.

Phillips also is the S&B associate for the Benchmarking Committee, the S&B data liaison resource for CII, and is a member of the Implementation Strategy Committee. Because of his continuous efforts to enhance implementation of best practices, CII is pleased to present the Outstanding Implementer Award for 2005 to Brett Phillips.

Award Criteria

- The nominee has made a significant contribution to enhancing the implementation of CII Best Practices and/or CII Proposed Best Practices within one or more member organizations.
- Objective and specific data are available from the nominating organization that demonstrates the improvements attained through the enhanced implementation of CII Best Practices or CII Proposed Best Practices. The categories of improvements should include: cost, schedule, safety, quality, and process improvement.
- The nominee has demonstrated a commitment to the implementation of CII Best Practices or Proposed Best Practices.
- The nominee has developed and/or employed creative and innovative means to enhance the implementation of CII Best Practices or CII Proposed Best Practices. The nominee has also willingly informed others of these means and has shared the details of their use with those interested in implementation.

Previous Recipients of the Outstanding Implementer Award

2001 – Richard J. Jessop, Ontario Power Generation

2002 – Mohammad S. Al-Subhi, Saudi Aramco

2003 – Bernard J. Fedak, United States Steel Corporation

2004 – Melissa Herkt, GlaxoSmithKline

Outstanding Implementer Award Panel of Judges

Virgil L. Barton	Manager of Quality Services, Bechtel Power Corporation
Manuel A. Garcia	Associate Director for Education, Implementation, Knowledge Management, Construction Industry Institute
Robert F. Jortberg	National Academy of Construction and former Associate Director, Construction Industry Institute
Richard F. Kibben	National Academy of Construction and President, Kibben Consulting
Charles I. McGinnis	National Academy of Construction and former Associate Director, Construction Industry Institute

Benchmarking User Awards for 2005

The Benchmarking User Awards, given to both an owner organization and a contractor organization, recognize exceptional use of and contributions to benchmarking.

Owner: 3M Company

3M demonstrates a remarkable corporate commitment to benchmarking and improvement. Last year the company submitted more than 50 projects to the CII database, the most any company has ever submitted in one year. Later that year, 3M shared their story at the CII Annual and CPI Conferences, as well as at the Benchmarking Users Forum.

Contractor: BE&K

Active since the beginnings of the CII Benchmarking program in the mid-1990's, BE&K has continually supported the program through committee membership and consistent submittal of project data. Taking a lead role in the productivity measures initiative, BE&K has set an unparalleled example of benchmarking excellence. The company shared its experiences at the 2001 Benchmarking Users Forum and last year hosted a Benchmarking Associate training session.

Award Criteria

- Best application of benchmarking for project system improvement.
- Contributions to benchmarking through active participation (forum, training, project submittal, committee).
- Willingness to share ideas.

Previous Recipients of the Benchmarking User Awards

2000 –	Owner:	Champion International
	Contractor:	Jacobs Engineering
2001 –	Owner:	General Motors Corporation
	Contractor:	BE&K
2002 –	Owner:	Aramco Services Company
	Contractor:	Dillingham Construction Holdings
		S&B Engineers and Constructors Ltd.
2003 –	Owner:	Rohm and Haas Company
	Contractor:	CDI Engineering Group Inc.
2004 –	Owner:	GlaxoSmithKline
	Contractor:	Aker Kværner

Benchmarking User Awards Panel of Judges

The Benchmarking & Metrics Committee selects the recipients of the award each year. The committee includes the following individuals:

Carol Allmen	Project Planner for Capital Projects, Worldwide Facilities Group, General Motors Corporation
Tom Butts	Director, Southwest Operations, Lockwood Greene
Robert E. Chapman	Economist, Office of Applied Economics, National Institute of Standards & Technology
Gregory D. Clum	Manager of Project Controls, Black & Veatch
Deborah L. DeGezelle	Systems Analyst, Construction Industry Institute
James B. Gibson	Vice President, Projects, ALSTOM Power Inc.
Charles M. Green	Engineering Specialist, Aramco Services Company
Harold L. Helland	Manager, Project Engineering, Abbott
Robert A. Herrington	Manager of Quality, Southern Region, Jacobs
David G. Hile	Operations Manager, Fru-Con Construction Corporation
Howard Kass	Senior Facility Engineer Program Manager, National Aeronautics & Space Administration
Michael S. Mitchell	Director, Project Management Office Refining & Chemical Industry Center, Emerson Process Management
Mark T. Owens	Director, Global Facilities Delivery, Eli Lilly and Company
David M. Perkins	Project Manager, Rohm and Haas Company
Daniel Scott	Manager, Engineering Project Controls, BE&K Engineering Company

Florencio Sepulveda	Project Manager, Kiewit Industrial Company
James G. Slaughter, Jr.	President, S&B Engineers and Constructors Ltd.
Dr. Stephen R. Thomas	Associate Director, Construction Industry Institute
Stephen D. Warnock	Project Manager, Washington Group International, Inc.
Paul N. Woldy	Staff Engineer, Process Technology Unit, Chevron Inc.

Richard L. Tucker Leadership & Service Award

Gerald H. Greene

Gerry H. Greene is the second recipient of the Richard L. Tucker Leadership and Service Award. In the judgment of the Executive Committee, he meets or exceeds all criteria. Because of the leadership role he played in a critical juncture of CII and because of the outstanding contributions he has made as a role model for others, he makes an excellent choice to receive this prestigious award.

Gerry Greene began his association with CII as a Board representative from the Procter & Gamble Company in the early 1990s. By the mid-1990s, he was serving as chairman of the Strategic Planning Committee. He was elected to serve as the Chairman of CII in 1998. Little did he realize that the ensuing 12 months would be among the toughest served by any chairman in the history of the Institute. The retirement that year of CII's first Director, Dr. Richard L. Tucker, would throw a challenge at Greene that he would later describe as one of the most complicated activities that he ever imagined he would lead a group through. Over 120 resumes were submitted, a national executive search firm was hired, and Greene personally interviewed the final eight candidates face-to-face.

That transition was made even tougher because of Tucker's vision for CII, his love of the industry, and his expertise in research had all combined to bring CII to the forefront of engineering and construction research. With the selection of Ken Eickmann as the new Director, however, Greene, the Executive Committee, and the CII staff were able to build the foundation for a bridge to the future. Greene's other initiatives during his term included creating the focus for the "value added" benefits of being a CII member; the creation of Implementation Champions; introduction of the three-year budget plan; and globalization forums on China and Brazil. He also strengthened ties with the President's Office at The University of Texas at Austin.

Greene retired from the industry, but pursued a "late blooming" career in law, graduating from the University of Dayton Law School. Upon graduation, he and a law professor devised a course to help law graduates pass the Bar exam and increased the law school's passing rate dramatically. He now works pro-bono for Legal Aid in the Cincinnati-Dayton area, and is deeply involved in helping the less fortunate and the abused to better themselves in society.

CII takes great pride in selecting Gerry Greene as the recipient of the Richard L. Tucker Leadership and Service Award. He is a fitting example of all that the award stands for. Congratulations to Gerry, his wife, Kat, and their family on this momentous occasion.

Award Criteria

The recipient must have:

- Been active in CII programs or have provided significant exceptional service to further the mission accomplishment of CII.
- Demonstrated strong and lasting commitment and support for the mission and the objectives of CII.
- Served as a role model for other CII participants.
- Normally the period of service appropriate for consideration for this award will be three years or more.

Previous Recipient of the Richard L. Tucker Leadership & Service Award

2004 – J. Kent Underwood, Solutia Inc.

Carroll H. Dunn Award of Excellence

The Construction Industry Institute established the Carroll H. Dunn Award of Excellence in 1985 to honor an individual for significant achievements in improving the engineering and construction industry. The award is CII's highest honor and is recognized as one of the most prestigious awards of its kind in the construction industry. A recipient for 2005 has been selected by the CII Executive Committee and will be recognized at the CII Banquet.

Carroll H. Dunn

Carroll H. Dunn was the Project Director of the Construction Industry Cost Effectiveness (CICE) Project, which was sponsored by The Business Roundtable and led to the creation of the Construction Industry Institute. Dunn had a highly decorated career in the United States Army Corps of Engineers, retiring as a Lt. General. During his military career, Dunn served in World War II and later served as Director of the Titan II Missile Program and was Division Engineer of the Corps' Southwestern Division.

In 1980, Dunn began work full-time on the CICE Project and later was instrumental in the establishment of CII. Dunn's service to CII was considered so valuable that he was appointed an ex-officio member of all the original committees and research task forces.

Criteria of the Dunn Award

Criteria for the Dunn Award include the following:

- Significant contributions to the construction industry.
- Demonstration of the highest degree of personal dedication to improving costs, schedule, quality, and/or safety of the capital facilities delivery process.
- A level of knowledge and breadth of experience that distinguish the recipient as an eminent authority.
- A leadership position in the construction industry from which others can be influenced by example and direction.
- A record of accomplishment that brings added distinction to the recipient, the organizations with which he or she has been associated, and to the industry at large.

Recipients of the Dunn Award of Excellence

Carroll H. Dunn (1985) – inspiring leader and project manager of the CICE Project who guided the establishment of CII as a principal national forum for construction research

Charles D. Brown (1987) – early application of cost-effectiveness principles led to stellar engineering career; DuPont representative to CICE study; energetic advocate of CICE findings

Ted C. Kennedy (1988) – a founder of BE&K; influential member of original CII Board of Advisors; recognized industry leader in education, training, and employee development

Robert H. Miller (1989) – intense DuPont participant during CICE who later chaired CII, oversaw its first published research, and helped to establish its educational program

Louis Garbrecht, Jr. (1990) – pioneered "engineering" of the construction process and proved that constructability is cost-effective; early advocate of project management research; original chairman of CII

Clarkson H. Oglesby (1991) – research pioneer and author of classic construction engineering textbooks who established the first graduate studies in construction at Stanford University

James M. Braus (1992) – Shell Oil and CICE leader and diplomat who bridged diverse opinions within CII to keep the Institute unified and authored the original CII Strategic Plan

Gary D. Jones (1993) – hard-working, determined 1987 CII chairman whose "implementation challenge" that year led to a dramatic change in how CII viewed implementation

Jack E. Turner (1994) – originated idea that led to establishment of The Business Roundtable, and later suggested a study of owner-contractor issues that became the CICE Project

Daniel J. Bennet (1995) – aspiring association executive, CICE participant, and author of CII by-laws who led establishment of the National Center for Construction Education and Research

John W. Morris II (1996) – led effort to unite Corps of Engineers, Federal government, and environmentalists in shaping national water resources policy during turbulent transition era

Richard L. Tucker (1997) – professor, productivity research pioneer, CICE participant, and renowned industry speaker who personally led efforts to establish CII at UT Austin; served as first Director from 1983-1998

Edward W. Merrow (1998) – researcher who developed the Project Evaluation System, an analytical tool to benchmark project data, and founded Independent Project Analysis (IPA)

Donald J. Gunther (1999) – hard-driving Bechtel executive whose leadership, dedication, and teamwork influenced others personally and professionally as well as changed Bechtel's approach to worldwide business

Arthur J. Fox, Jr. (2000) – long-time editor of *Engineering News-Record;* traveled around the world to report on more than four decades of industry progress, created *ENR*'s Engineer of the Year award

H. B. Zachry, Jr. (2001) – a born constructor who led a road contracting firm founded by his father to a worldwide leadership role through dedication to his employees and the principles of quality, safety, and client satisfaction

Joseph J. Jacobs (2002) – Jacobs Engineering founder who led his company to the top echelons of the engineering world and whose entrepreneurial spirit and ethical beliefs inspire those who work for him

James B. Porter, Jr. (2004) – innovative engineer and executive with experience in business methods, investments, design, and operational management who focuses on efficiencies that increase competitiveness

Appendices

Glossary of Acronyms — 2005 Annual Conference

AC	Annual Conference
ACE	Architectural, Construction, and Engineering
AEX	Automating Equipment Information Exchange
ADR	Alternative Dispute Resolution
API	American Petroleum Institute
ASTD	American Society for Training and Development
B2B	Business-to-Business
BA	Benchmarking Associate
BLS	Bureau of Labor Statistics
BOA	Board of Advisors
BP	Best Practice
BM&M	Benchmarking and Metrics
BMC	Benchmarking and Metrics Committee
BPR	Business Performance Results
BTSC	Breakthrough Strategy Committee
CCIS	Center for Construction Industry Studies
CEC	Continuing Education Course
CEP	Construction Engineering Professional
CEU	Continuing Education Unit
CICE	Construction Industry Cost Effectiveness
CII	Construction Industry Institute
CKII	CII Knowledge Implementation Index
CP	Contractor performs
CP/OI	Contractor performs/owner input
CPI	Construction Project Improvement [Conference]
CPI	Consumer Price Index
CPR	Cost or Budget Performance Results
CURT	Construction Users Roundtable
CY	cubic yard
DART	Dispute Avoidance and Resolution Taskforce
DB	Design-Build
DBB	Design-Bid-Build

DL	Data Liaison
DOD	Department of Defense
DPI	Disputes Potential Index
DPR	Duration Performance Results
DRB	Dispute Review Board
E&C or E/C	Engineering and Construction
EC	Education Committee
ECC	Engineering Contracting & Construction [Conference]
ECI	European Construction Institute
EEC	European Economic Community
EM	Education Module
ENR	*Engineering News-Record*
EPC	Engineer-Procure-Construct
EQ	Emotional Intelligence
ESH	Environmental, Safety, and Health
ExCom	Executive Committee
EU	European Union
FEL	Front-End Loading
FIAPP	Fully Integrated and Automated Project Processes
FIATECH	Fully Integrated and Automated Technologies
FRI	Field Rework Index
FTE	Full-Time Equivalent
GAO	Government Accountability Office
GDP	Gross Domestic Product
GPS	Global Positioning System
GVET	Global Virtual Engineering Team
HI	Hydraulic Institute
IC	Implementation Champion
IDS	Industry Data & Statistics
IFC	Issued for Construction
IFE	Injury-Free Environment
IMF	International Monetary Fund

IPA	Independent Project Analysis, Inc.
IR	Implementation Resource
ISC	Implementation Strategy Committee
JSA	Job Safety Analysis
KA	Knowledge Area
KM	Knowledge Management
KMC	Knowledge Management Committee
KSFG	Knowledge Structure Focus Group
LCI	Lean Construction Institute
LEONARDO	Learning Organization Rapid Diagnostic
LL	Lessons Learned
LNG	Liquefied Natural Gas
LPI	Leadership Performance Inputs
LWCIR	Lost Workday Case Incidence Rate
MC	Membership Committee
MM	millions
NGL	Natural Gas Liquids
NIST	National Institute of Standards and Technology
NSPE	National Society of Professional Engineers
NTSB	National Transportation Safety Board
NVA	Non-Value Added
OCWS	Owner Contractor Work Structure
OII	Owner Involvement Inputs
OL/CI	Owner leads/contractor input
OL/CP	Owner leads/contractor performs
OLA	Online Administrator
OMB	Office of Management and Budget
OP	Owner peforms
OP/CI	Owner performs/contractor input
OQ	Operation qualification
OSHA	Occupational Safety and Health Administration
P&ID	Piping and Instrumentation Diagram

PBP	Proposed Best Practice
PDCS	Project Delivery and Contract Strategies
PDH	Professional Development Hour
PDRI	Product Definition Rating Index
PE	Professional Engineer
PEPW	Project Executive Planning Workshop
Pharma	Pharmaceutical
PIP	Process Industry Practices
PM	Project Manager or Productivity Metrics
PMI	Project Management Inputs
PO	Purchase Order
POL	Products Online
PPI	Pre-Project Planning Inputs
PPP or P^3	Pre-Project Planning
PRB	Product Review Board
PSM	Process Safety Management
PSR	Overall Project Success Results
QM	Quality Management
QPR	Quality Performance Results
R&D	Research and Development
RC	Research Committee
RD&D	Research, Development, and Deployment
RFP	Request for Proposal
RIR	Recordable Incidence Rate
RR	Research Report
RS	Research Summary
RT	Research Team
S&P	Standard & Poor's
SAME	Society of American Military Engineers
SF	square foot
SME	Subject Matter Expert
SPC	Strategic Planning Committee

SPR	Safety Performance Results
SRI	Security Rating Index
TAL	Technology Assisted Learning
TED	Training, Education, and Development
TIC	Total Installed Construction
TISP	The Infrastructure Security Partnership
TQM	Total Quality Management
TRIR	Total Recordable Injury Rate
USACE	U.S. Army Corps of Engineers
USGBC	U.S. Green Building Council
VE	Value Engineering
VM	Value Management
WGI	Washington Group International
WHS	Washington Headquarters Service, Dept. of Defense
WTC	World Trade Center
WTI	World Trade Institute
XC	Executive Committee
XML	Extensible Markup Language

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