

#### CONSTRUCTION OWNERS ASSOCIATION OF ALBERTA

#### CONSTRUCTION BEST PRACTICES XVII CONFERENCE THEME: "It's Going to Get Better – We'd Better Get Going" SHAW CONFERENCE CENTRE 9797 Jasper Avenue, Edmonton, AB May 19<sup>th</sup> & 20<sup>th</sup>, 2009

#### MAY 19<sup>th</sup> Evening PRESENTATIONS

ΤΟΡΙΟ	PRESENTER	TIME	
<b>REGISTRATION - Light Snack</b>		5:00 - 6:00	
<ul> <li>OPENING REMARKS &amp; AGENDA REVIEW</li> <li>COAA Don Currie Award Presentation</li> </ul>	<b>Rick Watters</b> – <i>Team Lead, Facility Asset</i> <i>Management, EnCana Corporation</i>	6:00 - 6:20	
KEYNOTE ADDRESS: The economy – provincial, national and global – will shape the future of heavy industrial construction in Alberta. Delegates will hear from two of Alberta's most respected economic analysts and one of industry's most influential corporate voices, who will provide context for the sector in today's investment environment and talk about strategies and approaches companies should consider as they plan their places in Alberta's economic recovery.	Todd Hirsch – Senior Economist, ATB Financial Services Dr. Mike Percy – Dean, School of Business, University of Alberta Tom Katinas – President and CEO, Syncrude Canada Ltd.	6:20 - 7:50	
QUESTIONS AND ANSWERS		7:50 - 8:10	
EVENING WRAP UP	<b>Rick Watters</b> – Team Lead, Facility Asset Management, EnCana Corporation	8:10 - 8:15	
SOCIAL & TIME TO NETWORK Hors-d'oeuvres		8:15 - 10:00	



#### CONSTRUCTION BEST PRACTICES XVII - CONFERENCE THEME: "It's Going to Get Better – We'd Better Get Going"

#### **MAY 20<sup>th</sup> Morning PRESENTATIONS**

REGISTRATION		7:15 - 8:00
WELCOME	<b>Rick Watters</b> – <i>Team Lead, Facility Asset</i> <i>Management, EnCana Corporation</i>	8:00 - 8:05
CIB CONFERENCE	<b>Russ Thomas</b> – Director – New Initiatives, National Research Council of Canada – Institute for Research in Construction	8:05 - 8:10
AGENDA REVIEW	John Brogly – Manager, Engineering Support, Canadian Natural Resources Ltd.	8:10 - 8:15
SAFETY	<b>Peter Dunfield</b> – Senior Advisor, Safety Health and Environment External Interfaces, Syncrude Canada Ltd.	8:15 - 8:35
WORKFORCE DEVELOPMENT	<b>Terry Burton</b> – Manager, Construction Labour Relations, Shell Canada Energy	8:35 - 9:00
<ul> <li>WORKFORCE FORECAST</li> <li>Alberta Construction Workforce Supply Demand Forecast</li> </ul>	<b>Herb Holmes</b> – Northern Manager, Construction Labour Relations - Alberta	9:00 - 9:25
CONTRACTS COMMITTEE	Dariel Suhan – Purchasing Leader – Strategic Capital Projects, NOVA Chemicals Jane Sidnell – Partner, Fraser Milner Casgrain, LLP	9:25 - 9:40
BREAK		9:40 - 10:10
<ul> <li>CONSTRUCTION INDUSTRY PERFORMANCE</li> <li>WorkFace Planning</li> <li>Benchmarking</li> </ul>	Al Wahlstrom – Director, Central Construction, Suncor Energy Inc. Steve Revay – Vice President – Western Region, Revay and Associates Limited Larry Sondrol – Manager, Project Controls, Estimating & Benchmarking, Suncor Energy Inc.	10:10 - 10:55
BEST PRACTICE AWARDS	Rick Watters – Team Lead, Facility Asset Management, EnCana Corporation Shirley Howe – Deputy Minister, Alberta Employment and Immigration	10:55 - 11:30
LUNCH		11:30 - 12:30



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#### CONSTRUCTION BEST PRACTICES XVII - CONFERENCE THEME: "It's Going to Get Better – We'd Better Get Going"

#### MAY 20<sup>th</sup> Afternoon WORKSHOPS

	WORKSHOP TOPICS	WORKSHOP	SELECTION
	ONLY TWO SESSIONS PER PERSON PLEASE	SESSION I (12:45 - 2:15)	SESSION II (2:30 - 4:00)
1.	<b>Benchmarking</b> – Alberta Report The Alberta Report from COAA Benchmarking Project is now available. This workshop will provide details and interpretation on the results of Phase 1 of the project and outline steps for moving forward with the Benchmarking project.		
2.	<b>Path of Construction – Laying the Foundation for Success</b> The COAA WorkFace Planning Committee is hosting this interactive workshop on the path of construction. The workshop will feature flow diagrams, procedure and checklists that can be used by participants in their application of WorkFace planning on their projects.		
3.	<b>Incident Investigation Best Practice</b> COAA's Safety Committee has been working with industry and government stakeholders to develop a consensus for how on-site OH&S investigations, data gathering and witness statements should be conducted. The goal is to determine most effective methods and guidelines that will result in unbiased incident reports and protect the rights of employers and workers. This workshop will outline progress on this effort to date and next steps in developing this Best Practice.		N/A
4.	<b>The Health and Safety Association Network (HSAN) Training Records System</b> HSAN is a network of safety and employer associations representing all industries in Alberta, with a focus on the identification of common safety training standards, mutual endorsement of these standards, accreditation of training providers. This workshop will provide an overview of the new HSAN Industry Training and Tracking System and outline the process for companies to get involved with the new system.		N/A
5.	<b>Noise Management Best Practice</b> This presentation is the first step in a three-step process to develop a comprehensive noise management strategy for industrial construction projects. Participants will discuss the next steps in the development, which will include a formal COAA Best Practice and toolkit on Noise Management.	N/A	
6.	Alcohol and Drug Policy Update (CANCELLED) The latest developments in alcohol and drug testing policy development will be showcased during this workshop. Participants will take away information on company and government initiatives and will discuss future COAA activities to address this issue of continued importance.	N/A	



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7. 8.	Contracts – More Construction for Your Money The Contracts Committee has assembled a panel of corporate executives and industry leaders to lead an interactive discussion with workshop participants on issues relating to construction contracts. Topics include balancing risk, effective communication, clarity of roles and scope, and proposals to amend the Builders' Lien Act. Industrial Construction Crew Supervisor (ICCS) Development Program Best		N/A
0.	Practice		
	This participatory workshop will give delegates an opportunity to shape the ICCS Development Program's new website and program tools that will be used to help develop better supervisors for industrial construction projects.		
9.	Absenteeism Research Study The COAA Absenteeism Committee will be presenting its preliminary findings with respect to a methodology on how to determine the causes and impacts of Absenteeism in the industrial construction sector. The committee's research body, the University of Alberta (U of A), has piloted a methodology for collecting absenteeism causes at a single industrial site since the fall of 2008. The next step on the project is to broaden the research to other job sites across the province and identify how different factors affect absenteeism. The U of A will share its recommendations relating to effectively collecting absenteeism data on the projects. Finally, the U of A will also be giving a glimpse at some of the information coming out of the pilot site research. Recommendations from workshop participants will be useful in improving the pilot study methodology for future data collection.	N/A	
10.	<b>Improving Construction Productivity on Oil and Gas Capital Projects</b> On behalf of Alberta Finance and Enterprise, Dr. George Jergeas has conducted a new survey of more than 100 industry professionals in Alberta from the oil and gas industry. During his workshop, he will introduce the findings of the survey on strategies for improving construction productivity on oil and gas capital projects. Workshop attendees will receive a copy of the findings and will be asked to make comments, present new ideas and help in prioritizing the top factors for improving construction productivity.		

#### MAY 20<sup>th</sup> Afternoon EVENT

CLOSING RECEPTION	4:15 - 5:30
If you did not have an opportunity to meet or speak	
to members of COAA's Board of Directors,	
Executive Committee or Best Practices Committees	
during the conference, here is your chance to catch	
up with them in an informal setting. This event,	
first introduced at last year's conference, was very	
well received as a unique networking opportunity	
away from the fast pace of the main conference.	



# **Benchmarking and the Alberta Report – a**

# **Government/Industry Partnership**

Patricia Armitage, M.Eng., P.Eng. Director, Architecture/Engineering/Construction Industry Development Branch Alberta Finance and Enterprise Larry Sondrol Stephen Revay FCJC CCC COAA Co-Chairs Benchmarking Committee

# Importance of the Oil Sands to the Canadian Economy



- Canada's oil reserves are second in the world behind Saudi Arabia
- Of 179 billion barrels of Canada's oil reserves, the oil sands represents 97%
- For each permanent oil sands related job, 9 additional direct, indirect and induced jobs are created in Canada
- Currently 240,000 jobs in Canada are directly or indirectly linked to the oil sands
- Between 2000 and 2020, oil sands development has the potential to generate at least \$124B (Cdn) in royalty and tax revenues for Canada's federal and provincial governments

## Why Benchmarking in Alberta ?



- Alberta was experiencing major cost overruns on it's mega-projects
- Many of these mega-projects were in Alberta's oil sands sector
- Oil sands are an important and growing sector of Alberta's economy
- Something had to be done to rein in rising construction costs, Alberta was being viewed as a high cost jurisdiction in which to do business

## **Alberta Government Involvement**



- Due to rising costs for developing the oilsands, the Alberta government could see the province's competitive advantage being eroded and was having trouble attracting foreign investment
- The Alberta government supports the oil sands sector in it's pursuit of higher productivity and lower development costs
- Alberta always compared unfavourably to the US Gulf Coast for costs and productivity
- What gets measured gets improved!



- Benchmarking initiative started in 2003 with the development of Alberta specific metrics (isolated, camp conditions, winter weather, size)
- The Construction Industry Institute (CII) chosen for their expertise in benchmarking
- Phase I now complete
  - Company reports generated for participants
  - Alberta Report done
- About to embark on Phase II
  - Many enhancements added
  - Alberta Report 2



- 37 (out of a total of 78) projects were analyzed in August 2008 resulting in the "Alberta Report"
- 27 of the 37 oil and gas, half are grassroots
- Total installed costs range from less than \$5M (Cdn) to over \$100M (Cdn), with eight projects over \$1B (Cdn).
   Average = \$368M (Cdn)
- In general, Alberta not so bad with respect to measures of construction productivity when compared to US projects

# Alberta Report – An Overview



 Productivity metrics assessed both engineering and construction productivity (overall and in specific disciplines)

- Metrics are defined as ratios of work hours to quantities
- Performance metrics used included cost, schedule, safety, change and re-work

### • 14 Best Practices assessed for impact on performance metrics

- 18 COAA specific metrics for Alberta included
  - Direct and indirect costs
  - Use of modularization
  - Peak workforce
  - Overtime
- Comparisons made between Alberta projects and comparable projects in the CII database for the USA

# **Alberta Report - Costs**



- 19% average cost growth for Alberta projects (actual costs exceeded initial planned cost by 19%).
- Cost growth lower as % detailed engineering complete increased
- Use of Project Risk Assessment Best Practice reduced project cost growth
- High indirect costs (additional supervision, bussing, camps, etc.)
  - Averaged 21% of total project costs
  - Indirect cost growth increased as project size increased
- Best Practice of Planning for Startup reduced cost growth in startup

# **Alberta Report - Schedule**



- Average schedule growth was 17%
- Constructability Assessments led to reduced schedule growth

## **Alberta/USA Comparisons**



- US database 353 projects, 250 Gulf Coast projects
- Similar industrial projects no adjustments made for differences in project size, economic conditions or other significant project drivers.
- Median project size in Alberta dataset is \$186M (Cdn) vs. \$40M (Cdn) in the US dataset
- Project cost growth much higher in Alberta (19%) vs. US (3%)
- Alberta project cost growth had much wider range (-27% to 69%)
- Development and scope changes similar between Alberta and the US



- Engineering productivity measured as the ratio of direct engineering hours per installed quantity in the field
- Comparisons based on weighted averages (ie: larger projects count more in the average productivity than smaller projects)
- Engineering productivity for concrete better in Alberta than in US
- Structural steel engineering productivity worse in Alberta
- Engineering productivity for piping comparable.

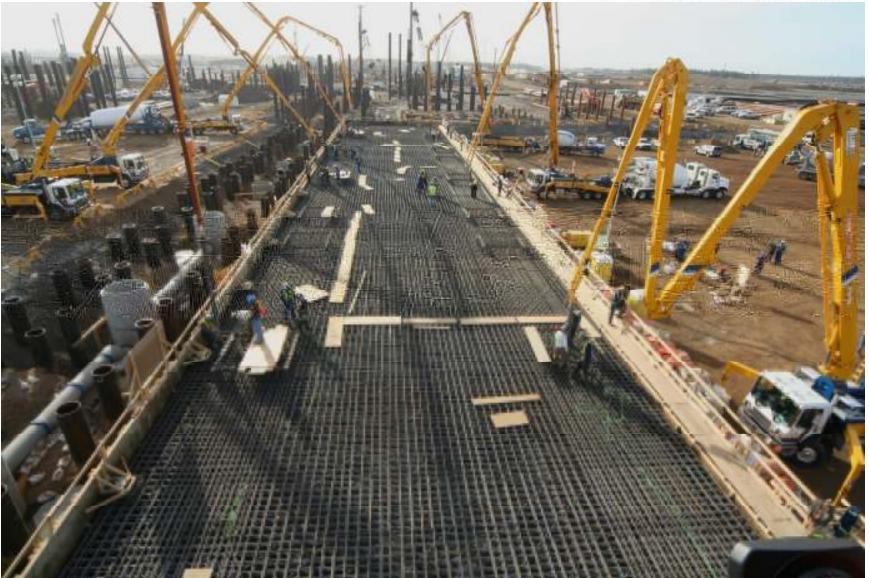
#### Alberta/Gulf Coast Comparisons – Construction Productivity



- Construction productivity measured as the ratio of field direct work hours per installed quantity
- Comparisons based on weighted averages
- Construction productivity for concrete slightly worse in Alberta
- Instrumentation devices construction productivity much worse in Alberta (non-weighted average between the two was comparable, further research is warranted)
- Construction productivity for structural steel was comparable
- Insulation construction productivity was better for the Alberta dataset

## Economy of Scale may not be equal





# **Construction Approach is Similar**





# **Alberta Report - Results**



- Before this study it was perceived that Alberta's productivity was much worse overall than similar US based projects
- Productivity similar between Alberta and US
- So why the higher cost growth in Alberta vs. US data?
  - Average wage rates are higher in Alberta than where most of the US projects occur
  - Indirect costs are higher on mega-projects than on smaller projects
  - Initial cost estimates on mega projects weak
  - Starting projects with very low % engineering complete

# **Alberta Report - Appreciation**



### Phase 1 Funding Partners

- Alberta Finance and Enterprise
- Construction Owner's Association of Alberta
- Several Owners & Contractors

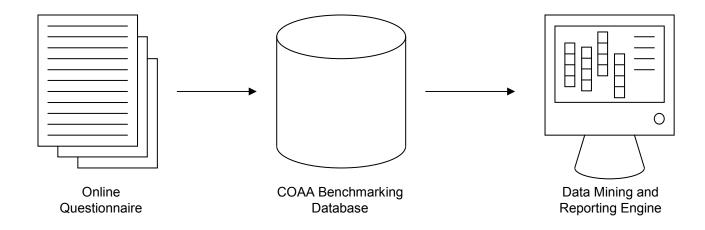
#### Construction industry Institute (CII)

- Dr. Stephen Mulva
- Research Students

## **COAA Benchmarking Phase II**



3-Step Process



## **Phase II Features**



- Customized Questionnaire Development
  - Absolute Metrics
  - Indirect Costs
  - Pipeline Projects
  - Modularization (Productivity in Fab Yard)

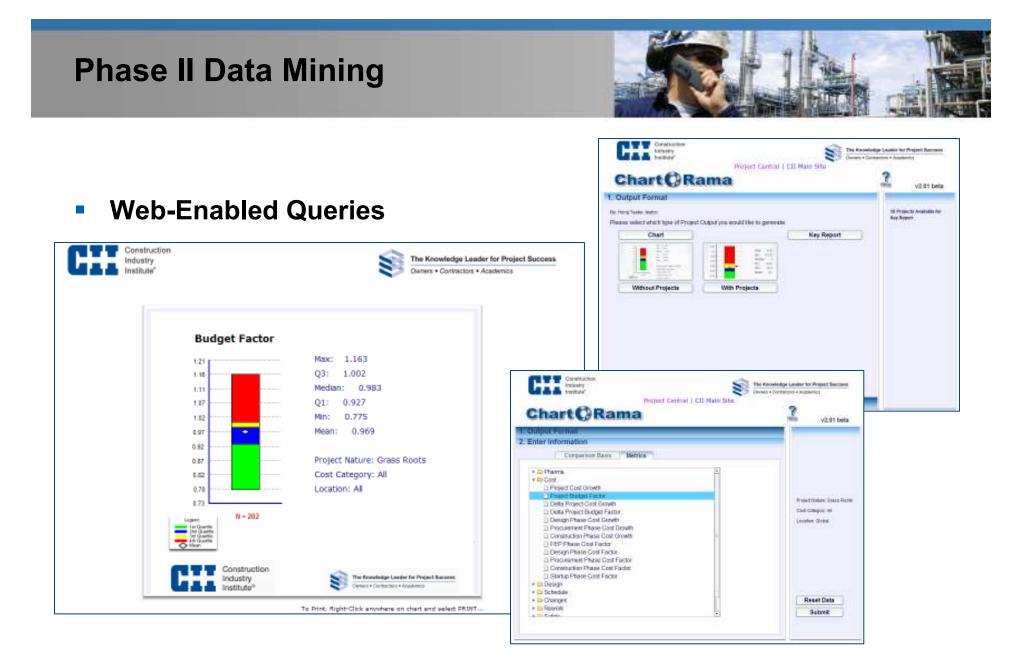
#### Alberta-Based Benchmarking Lab

- Full-Time Alberta-Based Support
- Real-Time (OTJ) Training
- Alberta Report #2

## **Phase II System Enhancements**

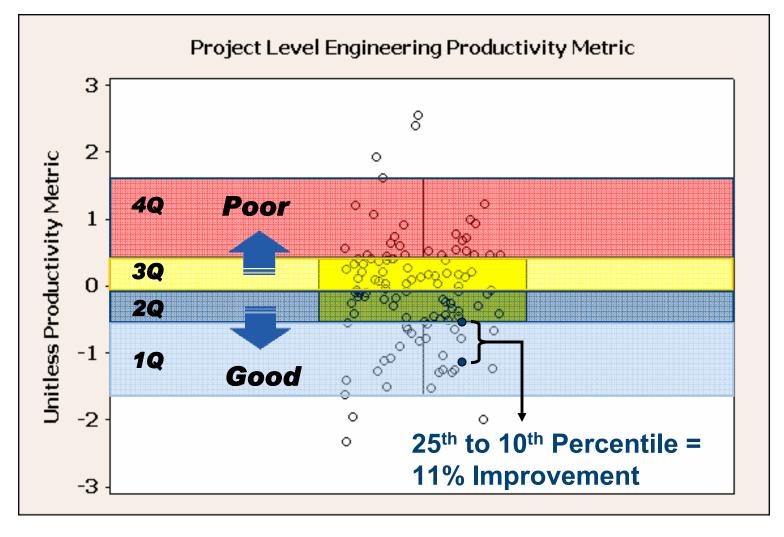


- Internal (Process Unit, Project specific) Benchmarks
- Automated Key Reports
- Company-Level Reports
- Executive Dashboard
- Full Data Mining Capability
  - Comparisons with CII (U.S.) Database
  - "Level 1" Productivity Metrics (All Disciplines)



# **Project-Level (Eng) Productivity**



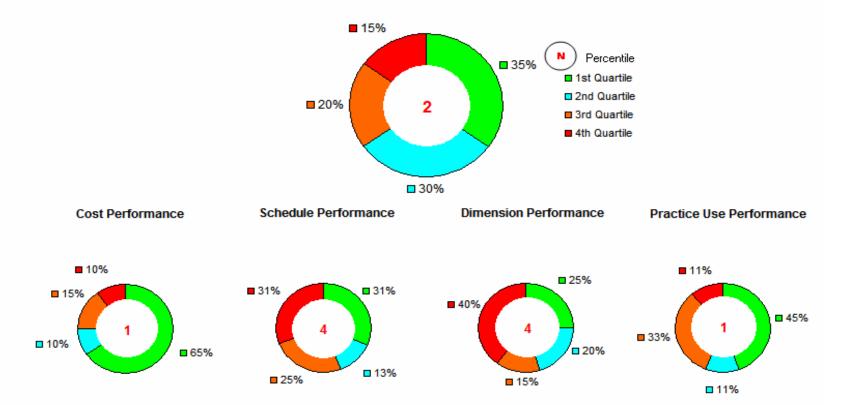


## **Executive (Portfolio) Dashboard**



#### All Projects

Number of Project : 20



#### **Overall Project Performance**

## Project Key Report-Construction Productivity-Structural Steel



Structural Steel									
Metric	Wk-Hrs	Installed Quantity (MT)	Unit Rate (Wk- Hrs/MT)	Weighted Database Mean	40	<mark>3</mark> Q	2Q	<mark>1Q</mark>	n
Structural Steel	62,067	744.8	83.33	49.961	0	i 25 5	0 75	100	s
Pipe Racks & Utility Bridge	20,765	261.3	79.48	33.628	0	1 25 5	0 75	100	s
Miscellaneous Steel	13,230	114.3	115.74	116.256	0	25 5	0 75	100	s
Total Structural Steel Productivity	96,062	1,120.4	85.74		0	25 5	0 75	100	S
Estimated Total Structural Steel Productivity Rates	Est. Wk- Hrs	Est. Quantity (MT)	Est. Unit Rate (Wk-Hrs/ MT)	28.267	40	<mark>3Q</mark>	2Q	<mark>1Q</mark>	n
	79,684	1,038.7	76.71		0	25 5	0 75	100	s
Total Installed Unit Cost	Actual (\$/MT)	Estimated (\$/MT)	Actual DI (\$/M		40	<mark>3</mark> Q	2Q	1Q	n
	9,628.5	9,265.4	C			(	C		С

# **Project Key Report- Best Practices**



Practices					
Metric	Project Score	Database Mean	4Q 3Q 2Q 1Q	n	
Front End Planning	1.350	6.745	0 25 50 75 100	<u>s</u>	
Project Risk Assessment	10.000	7.813	0 25 50 75 100	<u>s</u>	
Team Building	8.906	7.019	0 25 50 75 100	<u>s</u>	
Alignment during Front End Planning	9.375	7.952	0 25 50 75 100	<u>s</u>	
Design for Maintainability	8.929	7.206	0 25 50 75 100	<u>s</u>	
Constructability	10.000	8.946	0 25 50 75 100	<u>s</u>	
Materials Management	8.333	6.589	0 25 50 75 100	<u>s</u>	
Project Change Management	8.958	7.696	0 25 50 75 100	<u>s</u>	
Safety (Zero Accidents)	7.273	7.848	0 25 50 75 100	<u>s</u>	
Quality Management	6.893	6.584	0 25 50 75 100	<u>s</u>	
Automation/Integration (AI) Technology	9.615	5.683	0 25 50 75 100	<u>s</u>	
Planning for Startup	9.731	7.885	0 25 50 75 100	<u>s</u>	
Pre Fabrication, Pre Assembly, Modularization and Offsite Fab. (PP_MOF)	9.167	9.427	0 25 50 75 100	<u>s</u>	
Workface Planning	N/A	6.865	N/A	<u>S</u>	

# **Phase 2 - Appreciation**



#### Phase 2 Partners thru 2010

- Alberta Finance and Enterprise
- Construction Owner's Association of Alberta (COAA)
- Construction Industry institute (CII)
- Owners & Contractors
  - Nexen Inc.
  - Shell Canada Energy
  - Suncor Energy Inc.
  - StatoilHydro Canada Ltd.
  - MEG Worley Ltd.
  - Bantrel
  - Enbridge Inc.
  - JV Driver Projects Inc.
  - Boilermaker Contractor Association (BCA)
  - Electrical Contractors Association of Alberta (ECAA)
  - Industrial Contractors Association of Alberta (ICA)

Page --25 Several other Potential Interested Owners & Contractors

#### MORE PROJECTS REQUIRED!!

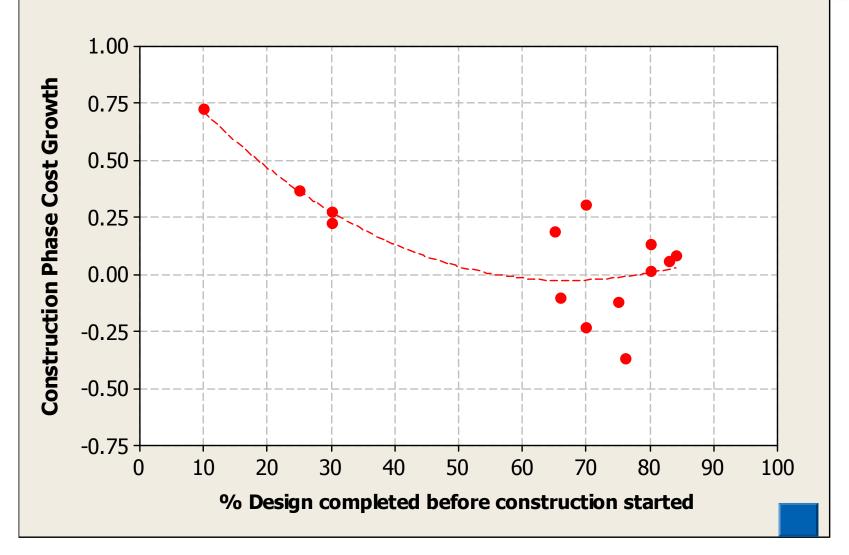
# Workshops



- Workshop Sessions @12:45 and 2:30
- Benchmarking Phase 2 Plan
- Alberta Report Overview of Results

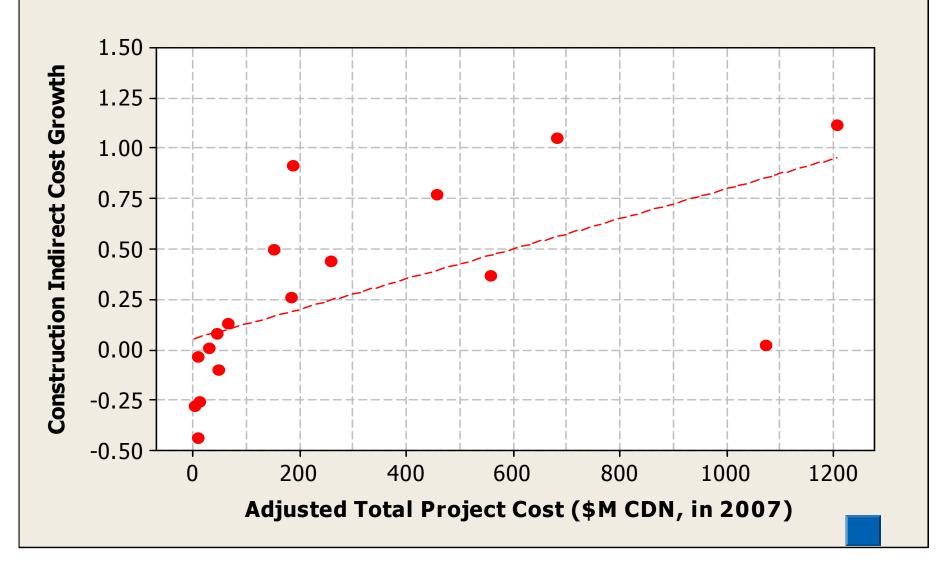
#### **Engineering Complete Before Construction Start**





**Construction Indirect Cost Growth** 





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Construction Owners Association of Alberta



# COAA Safety Committee Update Best Practices XVII May 20, 2009





Construction Owners Association of Alberta



# Safety...

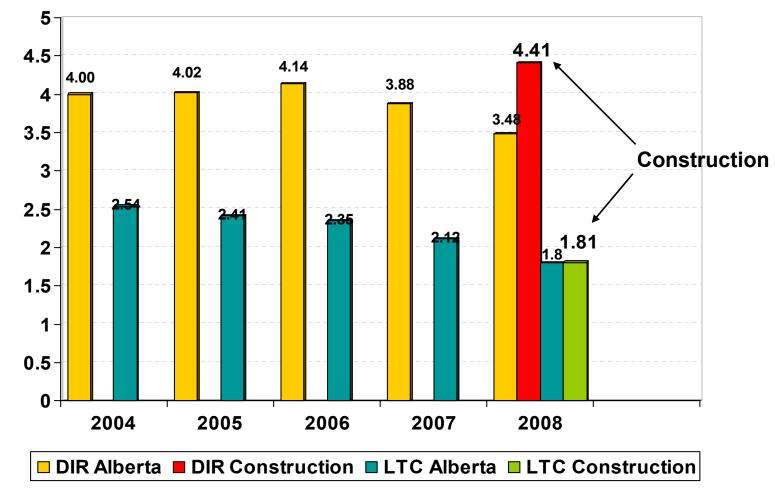
Leadership in safety ... no one gets hurt in heavy industrial construction



#### Construction Owners Association of Alberta



# **Alberta Injury Statistics (WCB)**



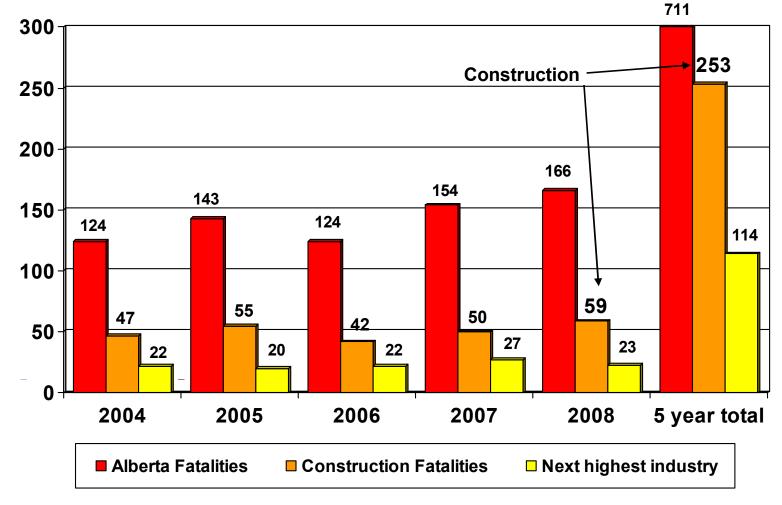
May 20, 2009

# Association of Alberta

**Construction Owners** 



# **Alberta Fatalities (WCB)**



Source: WCB data, prepared by Data Development and Evaluation

May 20, 2009

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## Safety...

Leadership in safety ... no one gets hurt in heavy industrial construction

# Identify and facilitate resolution of emerging safety issues.





## **Other Emerging Issues...**

- Alcohol and Drug Issues concerns about on-going high rates of non-compliance
- Commitment at all levels how to turn stated commitment into tangible actions?
- Work face planning involving safety resources up front when developing work plans
- Best Practices Application extent that BP's are being used by industry
- Current economic down turn and potential impact on safety programs

May 20, 2009





## Safety...

Leadership in safety ... no one gets hurt in heavy industrial construction

Identify and facilitate resolution of emerging safety issues.

# Ensure safety best practices lead industry practices and legislation,



## Safety Best Practices Available

- 1. Behavioral Based Safety Best Practice
- 2. Canadian Model for Providing a Safe Workplace
- 3. Construction Safety Training System (CSTS)
- 4. Contractor EHS Management
- 5. Cranes & Hoisting Best Practice
- 6. Field Level Risk / Hazard Assessment
- 7. Leading Indicators
- 8. Modified Work Programs
- 9. Owner's Guide to Contractor Health and Safety
- 10. Workers at Risk Mentoring



## **Best Practices Under Development**

### Performance Measuring and Improvement

Leading and lagging indicators of performance, benchmarking with world-class performers and driving improvement

## Field Competency Verification Guidelines

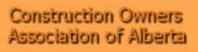
Simple tools for employer to measure and verify competency in the field – a responsibility under OH&S Legislation

## Incident Investigation Processes

Build industry and Government consensus for conducting OH&S on-site investigations

## Noise Management

> A guide to managing noise exposure and audio-metric testing





## Safety...

Leadership in safety ... no one gets hurt in heavy industrial construction

- Identify and facilitate resolution of emerging safety issues.
- Ensure safety best practices are kept up with current industry practices and legislation, and are readily available on the COAA website

## Lead implementation of the Canadian Model Alcohol and Drug Guidelines



## **A&D and Human Rights Act**





Alberta Human Rights and Citizenship Commission

INFORMATION SHEET

Source: Alberta Human Rights Web Site – Information Sheet (February 2009) <u>www.albertahumanrights.ab.ca</u>

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## **Recreational Drug & Alcohol Use**

Recreational use of drugs or alcohol is not protected under the *HRCM Act.* A "recreational user" is a person who uses drugs or alcohol, but is not dependent on or addicted to drugs or alcohol. A recreational user does not have a dependency and therefore does not have a disability.





## **Human Rights Jurisdiction**

Q...<u>Can an employer require drug and alcohol testing</u> such as mandatory random testing, pre-access testing, post-incident testing or testing before an employee returns to work after rehabilitative leave?

A...The Commission <u>does not have jurisdiction over</u> whether or not an employer conducts drug and alcohol testing or what type of drug and alcohol testing an employer implements. <u>The Commission can, however,</u> become involved if there is discrimination based on a real or perceived disability, an accommodation issue when there is a drug or alcohol dependency, or a policy that may discriminate against an employee who has a drug or alcohol dependency.

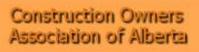
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## RSAP Update Union Locals and Owner Sites

- Cement Masons
- Electricians
- Operating Engineers
- Ironworkers structural
- Ironworkers reinforcing
- Plumbers & Pipefitters
- Insulators
- > Millwrights
- Sheeters, Deckers and Cladders
- Sheet Metal Workers

- CNRL
- > Dow
- EPCOR Keephills 3 Project
- KBR Mod Yard
- Northwest Upgrader
- Opti Nexen
- Petro Canada
- Shell
- Suncor
- Syncrude





## Safety...

Leadership in safety ... no one gets hurt in heavy industrial construction

- Identify and facilitate resolution of emerging safety issues.
- Ensure safety best practices are kept up with current industry practices and legislation, and are readily available on the COAA website
- Lead implementation of Canadian Model A&D Guidelines

# Establish common safety training tools and practices

May 20, 2009



## **Today's Workshops**

- **1. Incident Investigation Guidelines**
- 2. Noise Management
- 3. Health and Safety Association Network (HSAN)
  - Industry Training Tracking System







## 2009 A Year of Transition



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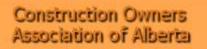








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## WORKFORCE DEVELOPMENT

## COMMITTEE

**Co-chairs** 

**Terry Burton/Stephen Kushner** 





## COAA Best Practices XVII May 19-20, 2009

- o Provide an Overview of WFDCC 2008-09 Activitieso Thank-you
  - o Herb Holmes, Steve Jarvis/Syncrude, Christine Couture/AB Govt., Lori Miller/Kiewit
  - o Members of the WFDCC & the various sub-committees
  - o Construction Sector Council (George Gritziotis, Rosemary Sparks)
  - o University of Alberta (Dr. Aminah Robinson Fayek for the research)
  - o A&IT (Shirley Dul, Mark Douglas, Olie Schel and group)
  - o Susan Williams, Shannon Marchand AB. Govt.
  - o BCA, ECAA, ICA, Fluor, Ceda & the Ab . Govt for funding support



## COAA Best Practices XVII May 19-20, 2009

o Marketplace opportunities

- o Apprentice employment
- o Female employment
- o Aboriginal employment
- o Establish LR KPIs for each major project
- o Cost Awareness (absenteeism, turnover, late starts, early quits, breaks)
- o Productivity
- o National craft database
- o Improved TFW process



## COAA Best Practices XVII May 19-20, 2009

o Marketplace challenges

- o East Coast potential activity
- o Supply of qualified supervision
- o Competitive collective agreements
- o Absenteeism
- o Turnover
- o Retirees/the bubble
- o Expectations



## COAA Best Practices XVII May 19-20, 2009

- o Sub-committee 2008 & 2009 Activities
  - **o** Supervisory Training & Qualifications Sub-Committee
    - Designated Occupation/Alberta--completed
    - CSC National Occupational Analysis (NOA)
    - Industrial Construction Crew Supervisor (ICCS) Development Program
    - > Supervisor Skills Development Tool/completed—CD available
  - o Workforce Forecasting Sub-Committee (Herb will cover)
  - **o** Respect in the Workplace Sub-Committee
    - Industry workshops (Ft. Mac, Edm & Calgary)
    - Individual Contractor workshops
    - Cultural awareness module
    - Manuals & Brochures

## COAA Best Practices XVII May 19-20, 2009

Construction Owners

Association of Alberta

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- o Sub-committee 2008 & 2009 Activities
  - o Absenteeism Sub-Committee
    - > Undertaking initial research/ U of A re Absenteeism
    - Expected 12-18 months for completion of research and report issuance.





## COAA Best Practices XVII May 19-20, 2009

o Sub-committee 2008 & 2009 Activities

- o Effective Use of Apprentices Sub-Committee
  - Continued distribution of "A Guide For On –The Job Learning booklet,"-- well received by industry
  - > Apprenticeship Mentoring Program/communications plan
- **o** Opportunities for Women in Construction Sub-Committee
  - Working with various groups to enhance employment opportunities
  - Distributing various tools (brochures—employee & employer, posters, etc.)
  - > Advertising campaign
  - Government of Alberta support

## COAA Best Practices XVII May 19-20, 2009

- o Respect in the Workplace Booth
- o -Employee and Supervisory training curriculum and facilitators guide will be available for review
  - -Sign up sheet for train the trainer workshops for or organizations who wish to deliver the material internally
  - -Sign up sheet for employee and supervisor training
- o New Volunteers Welcome

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## COAA Best Practices XVI May 20, 2008

o Workshops

## o Absenteeism Committee Workshop

• STQ Industrial Construction Crew Supervisor (ICCS) Development Program Workshop



## COAA Best Practices XVII May 19-20, 2009

 Workforce Development Committee – Terry Burton (Shell Canada Energy), Stephen Kushner (Merit Contractors), Co-Chairs

- TIW Western
- CNRL
- Alberta Government
- CLAC
- PCAC
- Alberta Building Trades Council
- Fluor
- Alberta Government
- Alberta Government
- Syncrude Canada Ltd.
- IBEW Local 424
- Suncor



## COAA Best Practices XVII May 19-20, 2009

 Supervisory Training & Qualifications ("ST & Q") Sub-Committee, Elizabeth Krywolt (AB. Govt.), Shabbir Hakim (TIW Western), Co-Chairs

Burt van Delden – CLAC Cam Blair – Lockerbie & Hole Erik Schmidt – Alberta Apprenticeship & Industry Training Hugh Tackaberry – Fluor Canada Marla McCready – Merit Contractors Association Matthew Smart – Syncrude Canada Mike Yorke – Bantrel Constructors Pat Barnes – Electrical Contractors Association of Alberta Ron Cherlet – Construction Labour Relations Association Sherri Thompson – Flint Energy Tracy Stephen – REPPSCO





## COAA Best Practices XVII May 19-20, 2009

- Workforce Forecasting Sub-Committee, Herb Holmes (CLRA-A), Chair
- o Lori Miller
- o Antony Ngo
- o Gary Mullaly
- o Gina Wong
- o Cathy Dumaresq
- o Patricia Armitrage
- o Ken Gibson
- o Mike Lam
- o Wilma Monje
- o Ron Harry
- o Bob Collins
- o Ernie Stokes
- o Sam Patayanikorn

- Heidi Harris Kelly Hurford Paul deJong Steve Etlinger
- Herb Holmes
- Vinay Bhardwaj
- Debra Windle-Smith
- Carla Corbett
- Brian Dijkema
- Bill Stewart



## COAA Best Practices XVII May 19-20, 2009

#### • Respect in the Workplace Sub-Committee, Lynn Palumbo (CLRA-a), Paul Dejong (CLAC) Co-Chairs

Wade Ashton	- IBEW Local 424
Lynne Palumbo	- CLRA
Sam Kemble	- CLRA
Marla McCready	- Merit Contractors
Cailin Mills	- Alberta Government
Steve Lamb	- Syncrude Canda Ltd.
Sam Kemble	- CLRA
Paul DeJong	- CLAC
Lindsay Osmond	- Westwood Companies
Hardy Lange van Ravenswaay	- PCAC



## COAA Best Practices XVII May 19-20, 2009

• Effective Use of Apprentices Sub-Committee, Doug Hawkins (CLRA-A) and Larry Bell (CNRL), Co- Chairs

Shabbir Hakim Vern Kibblewhite Graeme Proudfoot Terry Burton Gene Bartel Shelley Playford Mike York Gene Bacon Roland Labossiere Garth Rattray Don Obrowsky Ken Eerkes Larry Schmidt

- TIW (Western)
- PCL Industrial Constructors Inc
- Merit Contractors
- Shell Canada Energy
- TIC Canada
- Ledcor Group
- Bantrel Constructors
- Suncor Energy Inc retiree
- Kelogg Brown Root
- Alberta Building Trades Council (IUPAT Local 177)
- Waiward Steel
- Christian Labour Association of Canada
- Alberta Government



## COAA Best Practices XVII May 19-20, 2009

#### • Opportunities for Women in Construction Sub-Committee, Hugh Tackaberry (Fluor), Chair

Erica Storteboom Elizabeth Krywolt Jane Kerry Shelly Playford Donna MacPherson Dawn Ohama Wanda Wetterberg Ryan Timmermans Brenda McCallum Marla McCready Michele Spak Alisa Neuman

- Kiewit
- Alberta Government
- Bantrel Constructors
- Ledcor Group
- Alberta Government
- IBEW Local 424
- Women Building Futures
- Christian Labour Association of Canada
- Jacobs
- Merit Contractors
- Alberta Government
- Alberta Government

COAA

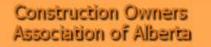
## COAA Best Practices XVII May 19-20, 2009

## Absenteeism Sub-Committee,Warren Douglas (Suncor), Chair

Randy Stefanizyn Herb Holmes Shabbir Hakim Hugh Tackaberry Zarelda Reghelini Elizabeth Krywolt Gerry Donnelly Steve Kushner Edwin Dening Mahedi Saleni Aminah Robinson SangHyun Lee

- Syncrude Canada Ltd.
- CLRA
- TIW (Western)
- Fluor
- Alberta Government
- Alberta Government
- Alberta Building Trades Council
- Merit Contactors
- CLAC
- -U of A
- -U of A
- -U of A





COY



# Support from and For the WFDCC!





# Contracts Committee Report to Best Practices 2009

**Co-chairs:** 

E. Jane Sidnell and Dariel Suhan



May 20, 2009

COAA Best Practices Conference XVII - 2009



## **Contracts Committee Presentation**

Contracts

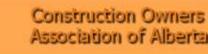
> Appendices

Promotion

Builders' Lien Act initiatives

Workshop: "More Construction for your Money"







## The Team

#### Appendices & Promotion

- Ray Ambeault, Stantec
- Darryl Baron, Dow
- Frank De Luca, Bird Construction
- Lloyd Dick, COAA
- Jim Freiburger, Nexen
- Ted Helboe, Enbridge
- Bill Kenny, Miller Thomson
- Dariel Suhan, NOVA Chemicals
- Lauren Toreson, Miller Thomson

## **Builders Lien Act**

- Paddy Breen, Cobra
- Peter Farnum, TransCanada
- Syd Hartley, Alberta Construction Association
- Tim Mann, Suncor
- > Wayne McFarlane, Ledcor
- Dan Mowat, AMEC
- Craig Saloff, Total
- E. Jane Sidnell, Fraser Milner Casgrain
- Tamsin Taft, Nexen
- Neil Tidsbury, CLRA



## **COAA Standard Form Contracts**

- COAA Stipulated Price Contract (2003)
  - Original contract issued in 1997
  - > 2003 Revisions made as a result of:
    - Experience of contract
    - Fresh eyes after 5 years
    - Updates to current legislation
- COAA EPC Contract (2005)
- COAA EPCM Contract (2008)
- Contracts include the General Conditions and selected appendices
- Available on the COAA website



## New this year

- Additional appendices for the COAA EPCM Contract (2008)
  - Appendix B Owner's Obligations
  - Appendix D Invoicing and Payment Procedures
  - Appendix E Work Procedures
  - Appendix G List of Policies
  - Appendix H Forms
  - Appendix I Dispute Resolution
  - Appendix J Key Personnel





## **Promotion of COAA Contracts**

Recognized need:

- Fair and evenly balanced terms
- >Appropriate for industrial projects

Committee has surveyed a number of COAA members to find out about the use of the COAA Contracts by industry



## Survey says ....

- 16 of 21 owners and 10 of 15 EPC/EPCM firms responded to the survey
- 50% use the COAA Contracts, as a minimum, as a reference
- > 20% have used at least one of the contracts as a basis
- the COAA Contracts are suitable for the type of work and contract size of COAA members





## **Builders' Lien Act Initiatives**

- 1. Adding a Definition
  - to define "oil or gas wells" and "oil or gas well sites" and promote certainty, especially as to holdbacks for SAGD and other heavy oil operations

### 2. Progressive Release of Holdback

- Considering an annual release of holdback
- Designed to get more money flowing into the system sooner without increasing the exposure to owners

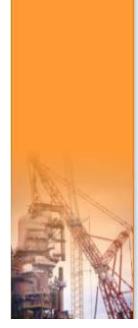




## **Builders' Lien Act Initiatives**

Need your input

Please complete the sheets in the registration package or go to the COAA website





### Workshop More Construction for your Money

- Panel discussion during first session:
  - Introduction: Dariel Suhan
  - Moderator: Jim Freiburger
  - ➢Panelists:
    - David Claggett, Kiewit Energy
    - Ron Genereux, Suncor
    - ➤Ian Johnston, PCL
    - ➢Bill Kenny, Miller Thomson
    - Grant Martin, TransCanada





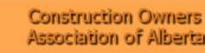
## We want to hear from you:

Contracts – use and promotion
 Dariel Suhan or Frank De Luca

Builders' Liens Initiatives
 Jane Sidnell or Tamsin Taft

### Or visit the COAA website and provide your feedback

May 20, 2009



# **WorkFace Planning**



# Best Practice XVII Conference

**AI Wahlstrom** 

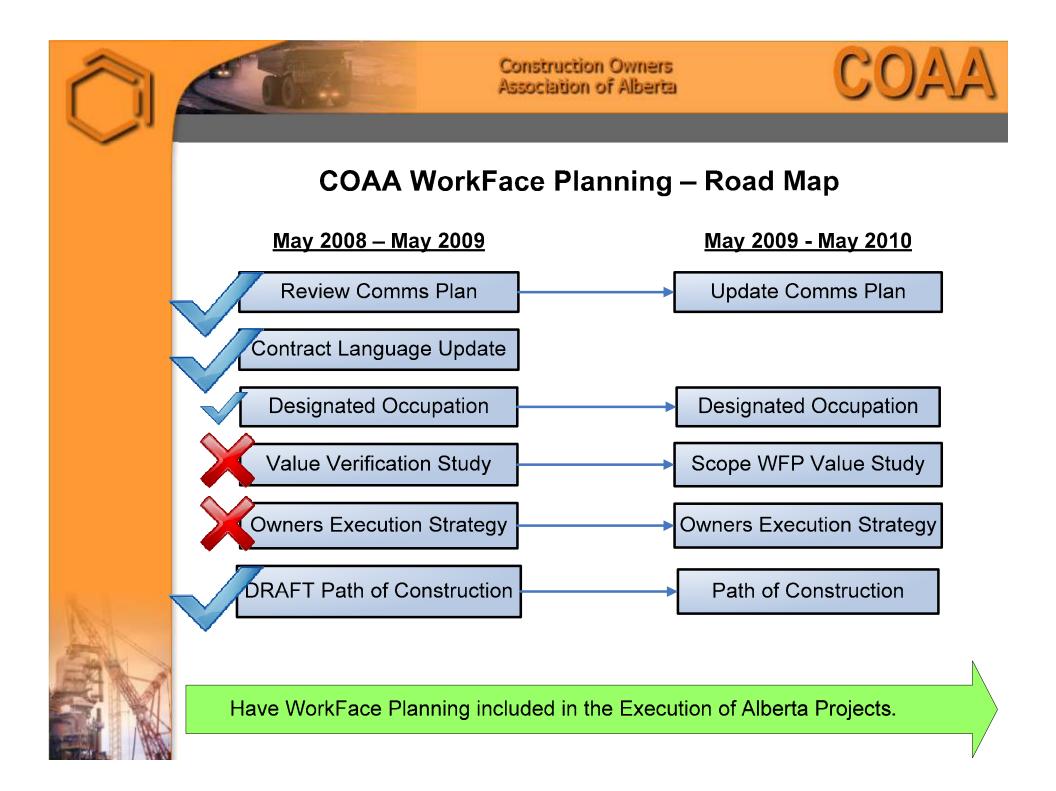
May 19, 2009

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# WorkFace Planning Definition

Construction Owners Association of Alberta COAA

 WorkFace Planning is the process of organizing and delivering all the elements necessary, before work is started, to enable craft persons to perform quality work in a safe, effective and efficient manner.





# **Review Comms Plan**

- Strategic Communications Plan reviewed by the COAA WorkFace Planning Committee
- Part of a Quality Check and a Pulse Check
- Updates required

# Contract Language Update

 Contract language created to direct the use of WorkFace Planning and qualified WorkFace Planners





# **Designated Occupation**

- Raising awareness to the value of WorkFace Planning
- Get the right people in the program
- Build the infrastructure
- Recently completed Industry Survey





# Value Verification Study

- Evaluate how the COAA Work Face Planning Model is being applied
- Evaluate the effectiveness of the Model
- Determine Project Performance with Work Face Planning and benchmark it
- There is an opportunity to be part of the study.
   Please see the SAIT booth or contact AI Wahlstrom if you wish to participate.



# **Owners Execution Strategy**

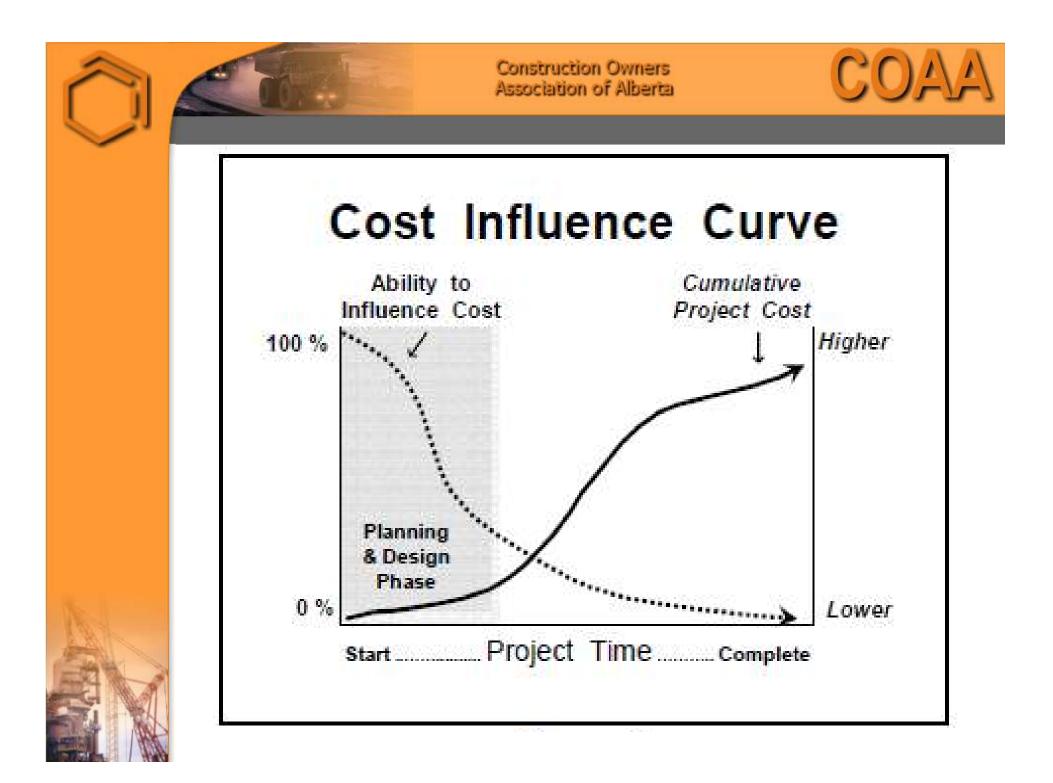
- Who is the Champion of WorkFace Planning?
- Who brings Construction Planning expertise in early Project Stages?
- Who drives coordination of early project planning between owner, engineering, and construction?



# **DRAFT** Path of Construction

- Path of Construction is the compass, the roadmap and the clock for execution planning
- It needs to be formalized







# WorkFace Planning Training

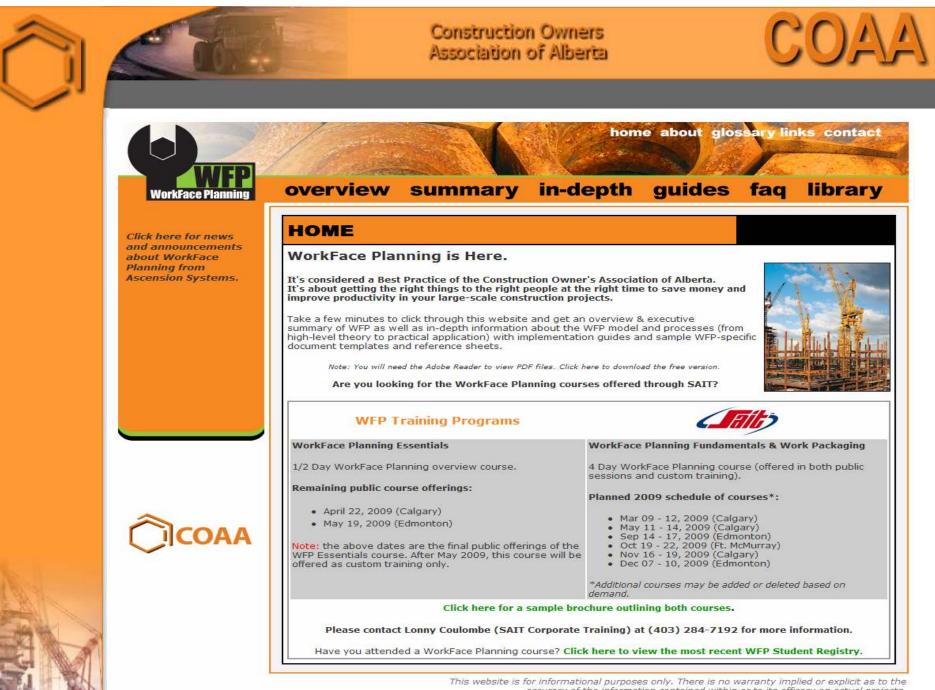
- <sup>1</sup>/<sub>2</sub> Day Essentials
  - Executive, Management, Supervision
  - Owner, EPCM, Construction Contractors

### 4 Day Fundamentals

- WorkFace Area and Integration Planners, Champions, Coordinators (Equipment, Material, Tool, Scaffold)
- Owner, Construction Contractor, Construction
   Manager

Book now ... learn more at the SAIT booth.





accuracy of the information contained within or to its efficacy on actual projects.

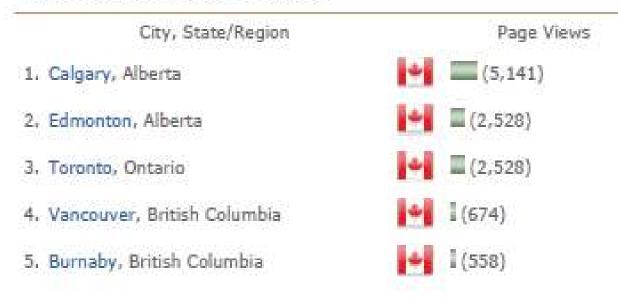




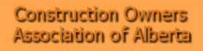
COYY



### **Top Geographic Visitor Locations**



### Visit us at www.workfaceplan.com





# Workshop

### Presentation

 Path of Construction Laying the Foundation for Success

## **Interactive Session**

 Give feedback real time on the Path of Construction work flow and procedure



# COAA WFP Conference

- When: November 17-18 2009
- Where: The Glenmore Inn and Convention Centre
- What:
  - 36 presentations
  - 2 expert panel discussions
  - Tradeshow exhibition





## This Year's Sweat Equity

### **Al Wahlstrom (Chair) Suncor**

Faisal Ali Fouad Baellafkir Sarab Bhodal **Darrell Coughlin** Peter Dumont Ron Embury Scot Fyfe George Gardner **Doug Gerrits Farshid Gholami** Jose Herrero Bob Hughson George Jergeas Dennis Krenz Tom Martin Sandy Mac Elherson

SAIT Alpha Matrix Bantrel Flint Tracer Industries NOVA Constr. Dynamics Flint Jacobs U of C Fluor Shell UofC Total CH2M Hill Alpha Matrix

Dennis Meads **Emily Qian** Lloyd Rankin Todd Rapp Randy Regan Ross Richards Brian Rodrigues Geoff Ryan Linda Savage **Gary Semaniuk** Jason Starchuk Kalvin Tsang Roger Van Den Bossche J.E. (John) Vincent Dave Witsken Robyn Yaremchuk Jeph Virtue

Nexen **Flement Industrial** Acension Systems Conoco Philips Suncor Petro Canada Stantec Consulting Insight WFP Inc. Suncor Stantec Suncor JV Driver Projects Flint Energy Services Colt Aluma Beamer Engineering Suncor

## **Owner Commitment**



Delivering the Future







COAA

















# Thank you



### CONSTRUCTION LOOKING FORWARD

Labour Requirements from 2009 to 2017 for ALBERTA

PRODUCED BY THE CONSTRUCTION SECTOR COUNCIL



## Key Indicators – US / National

	2007	2008	2009	2010	2011	2012	2013-2017*	2007-2017*
Raw Material Prices								
Agricultural Products \$US Inflation	14.7	12.3	1.9	1.5	1.8	3.1	3.1	3.6
Other Non-Energy Products \$US Inflation	5.7	-3.7	-30.1	1.5	2.8	7.1	3.9	-0.3
WTI Oil Price (@ Cushing) \$US/BBL	72.3	101.0	45.0	55.0	75.0	90.0	122.9	98.1
Henry Hub Gas Price \$US/MMBTU	6.9	9.0	5.8	6.5	6.5	6.9	8.1	7.5
United States								
Real GDP Growth (%)	2.0	1.2	-1.6	3.2	4.5	3.2	2.2	2.2
Canada								
Real GDP Growth (%)	2.7	0.5	-0.4	2.9	2.4	2.7	2.4	2.5
GDP Deflator Inflation (%)	3.1	2.9	-1.4	1.2	2.1	3.0	2.6	2.1
3 Month Treasury Bill Rate (%)	4.2	2.6	1.0	2.9	3.3	4.2	5.5	4.2
Exchange Rate \$US	0.93	0.96	0.85	0.87	0.88	0.88	0.89	0.89

\*Growth rates are averages for the period, while levels are 2017 values

\*\*Forecast period average

Source: Statistics Canada and the CSC



## Key Indicators – Alberta

Alberta (Growth Rates)	2007	2008 e	2009f	2010f	2011f	2012f	2013- 17f*	2008- 2017f**
Real GDP	3.1	0.3	-0.6	1.3	2.2	2.7	2.8	2.0
Consumer Exp.	6.5	6.0	2.2	1.3	1.5	2.0	3.0	2.8
Government Consumption Exp.	6.6	3.3	2.8	2.2	1.9	2.0	3.0	2.7
Government Investment Exp.	28.9	4.1	7.4	2.3	-11.5	-9.4	4.4	1.5
Business Investment Exp.	-0.5	-6.8	-8.3	-1.9	-0.4	-1.1	4.0	0.2
Exports	2.7	0.7	-0.3	2.6	4.7	4.3	2.6	2.5
Imports	3.6	-0.8	-0.7	1.3	2.0	1.3	3.5	2.1
Population	2.6	2.1	1.7	0.9	0.6	0.8	1.7	1.5
Employment	4.7	2.8	-1.0	-0.1	0.6	1.6	1.3	1.0
Labour Force	4.8	2.8	0.9	0.5	0.3	0.6	1.2	1.1
Unemployment Rate (Level %)	3.5	3.5	5.4	5.9	5.6	4.7	4.1	4.6
СРІ	5.0	3.8	1.7	2.8	2.3	3.0	2.6	2.7
Labour Income Per Hour (\$)	5.1	5.9			2.3	3.7	4.9	4.1

\*Growth rates are averages for the period, while levels are 2017 values

\*\*Forecast period average

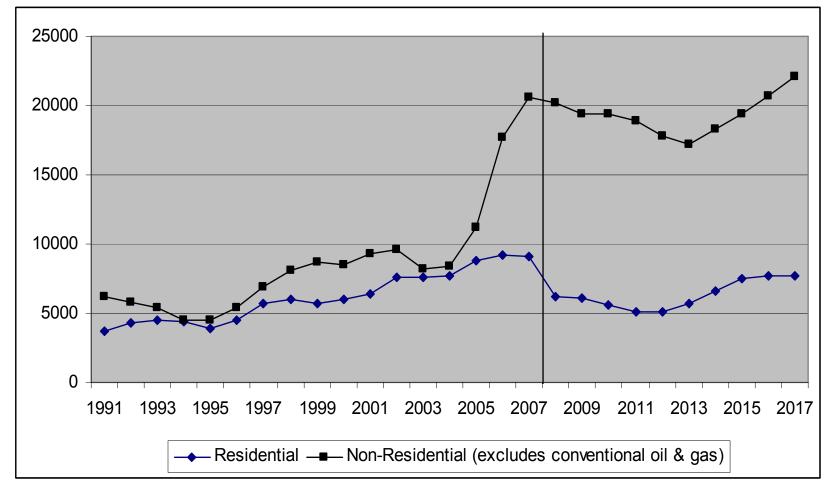
Source: Statistics Canada and the CSC

## Construction Investment (\$2002 Millions)

Construction Owners

Association of Alberta

C(0)

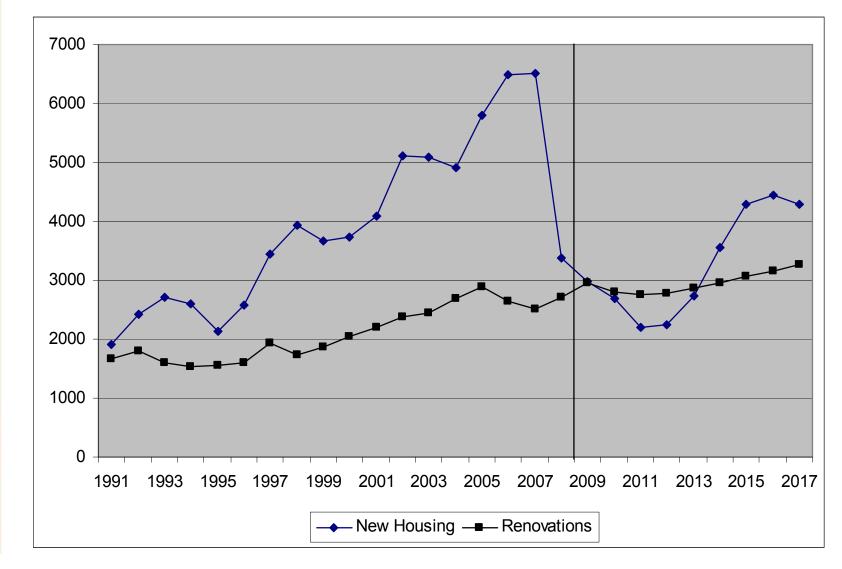


## Residential (\$2002 Millions)

**Construction Owners** 

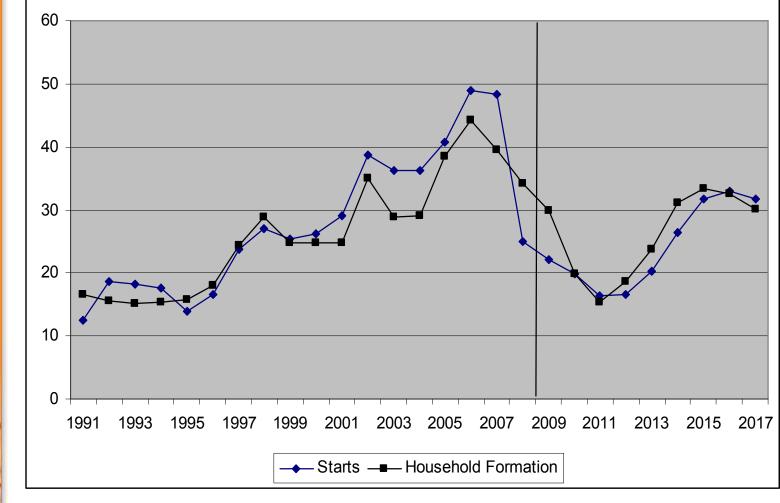
Association of Alberta

COY



## Housing Starts and Household Formation (000s)

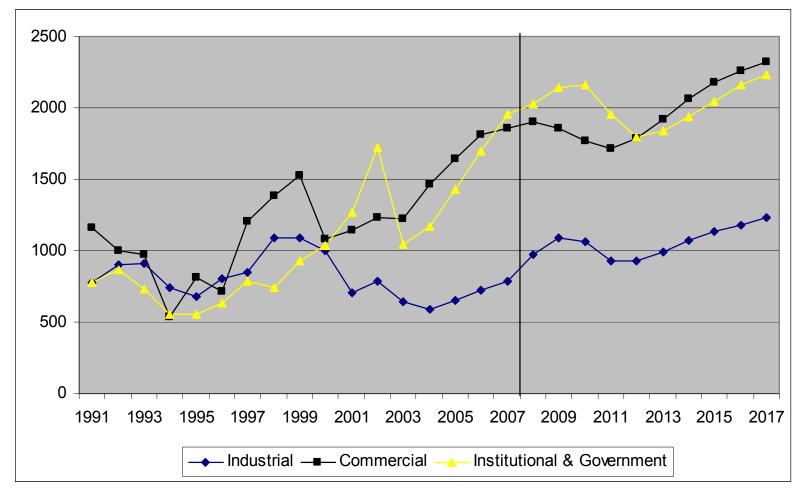
Construction Owners Association of Alberta COA





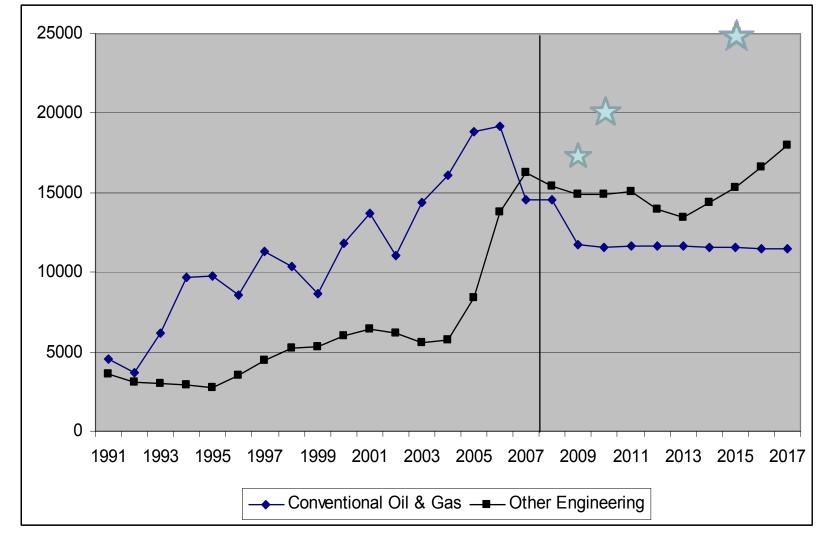
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## Building Construction (\$2002 Millions)



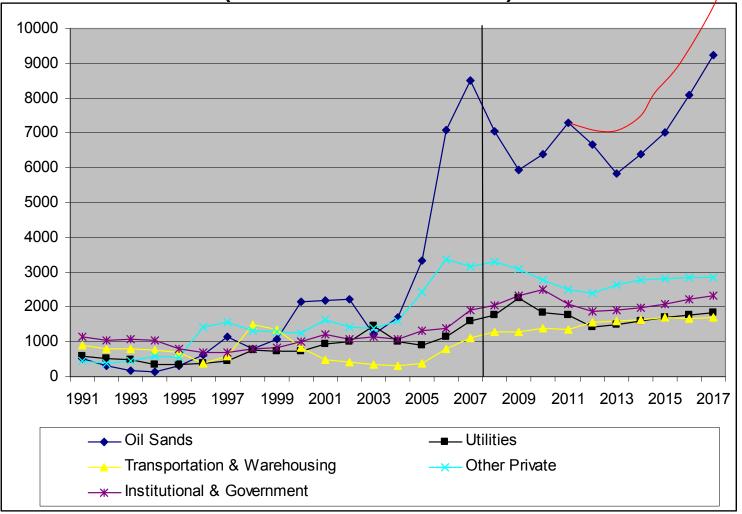
### Investment in Conventional Oil & Gas Versus Other Engineering Construction

Construction Owners Association of Alberta COVV

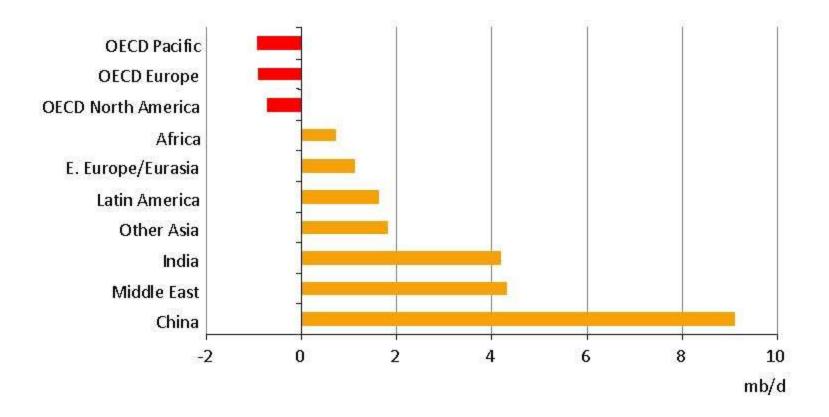




## Other Engineering (\$2002 Millions)



## Change in oil demand by region in the Reference Scenario, 2007-2030



World

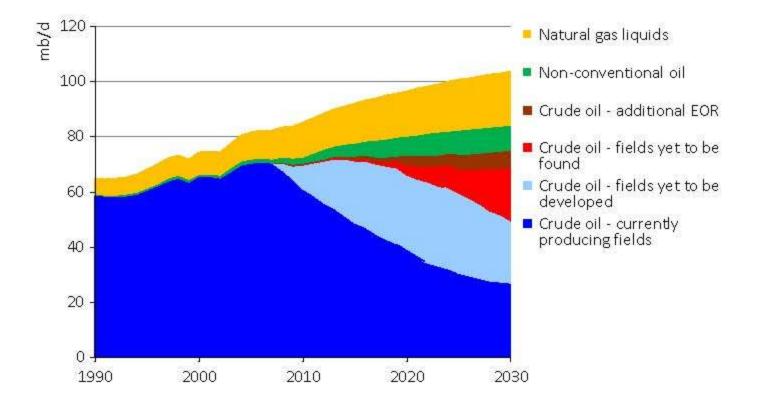
Energy Outlook

2008

All of the growth in global oil demand comes from non-OECD, with China contributing 43%, the Middle East 20% and other emerging Asian economies most of the rest

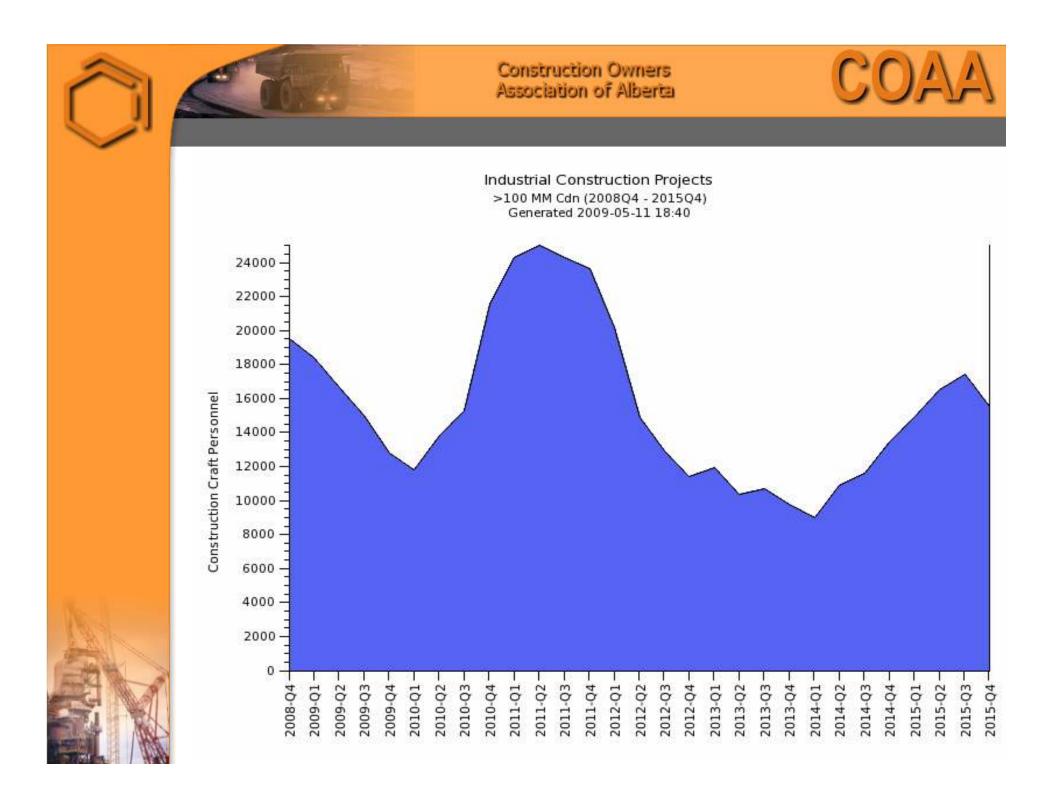
# World oil production in the Reference Scenario

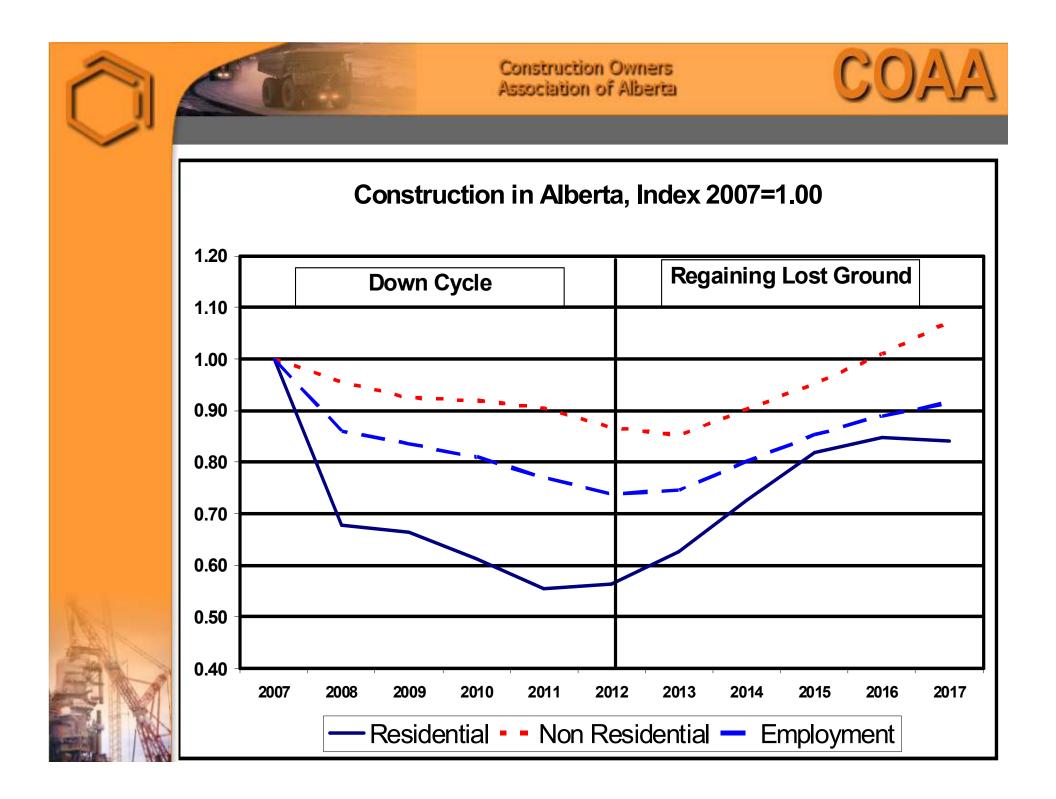
World Energy Outlook 2008

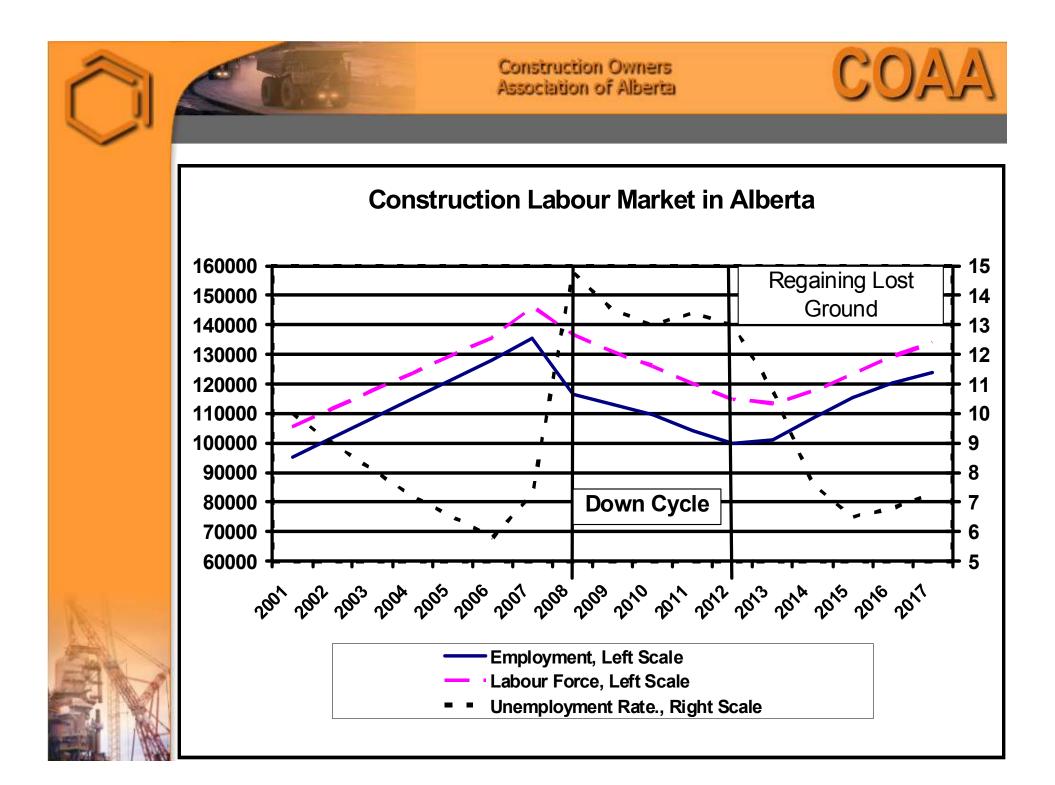


Production reaches 104 mb/d in 2030, requiring 64 mb/d of gross capacity additions – six times the current capacity of Saudi Arabia – to meet demand growth & counter decline

© OECD/IEA - 2008







Construction Owners Association of Alberta



# My Last HWAG

As the world emerges from this recession the value of the US\$ will go down. The good news is that should cause oil prices to rise significantly. The bad news is we could see rampant inflation rear its ugly head again.

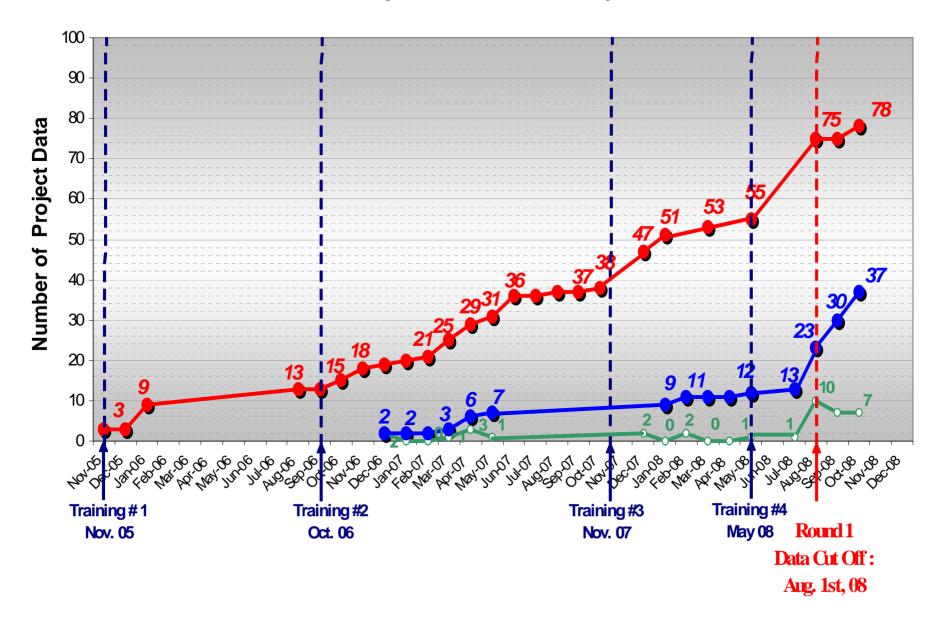


# Benchmarking and the Alberta Report – a Government/Industry Partnership

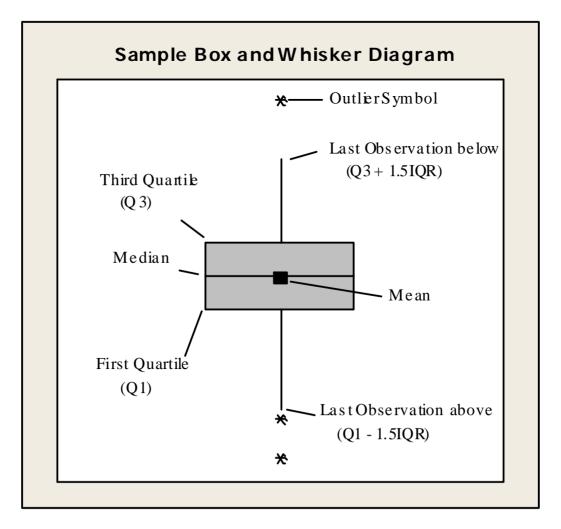
# Alberta Report Phase I Results

Larry Sondrol Stephen Revay FCJC CCC

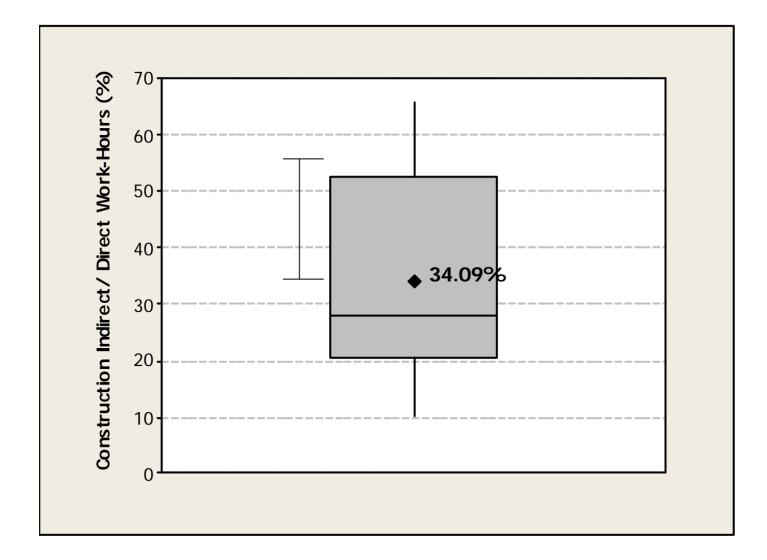
#### Number of Project Data in COAA DB by Month (last updated Oct. 24th, 08)



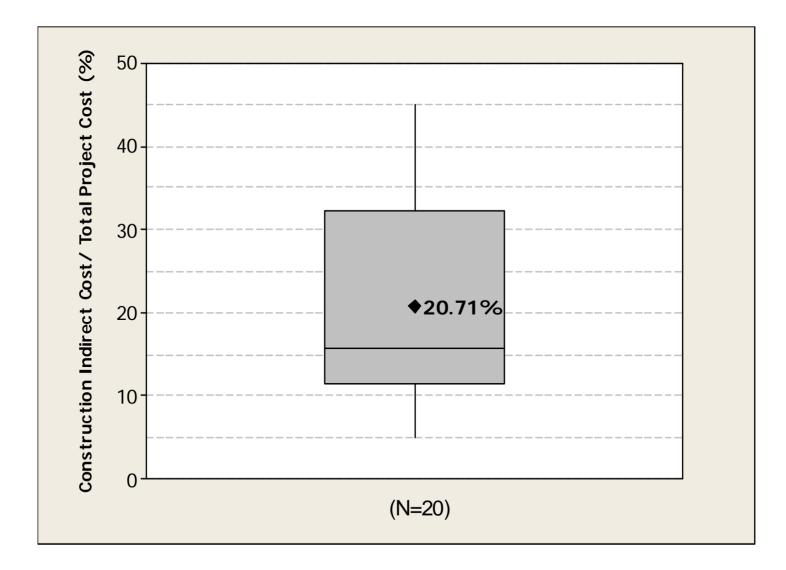
#### **Sample Box and Whisker Diagram**



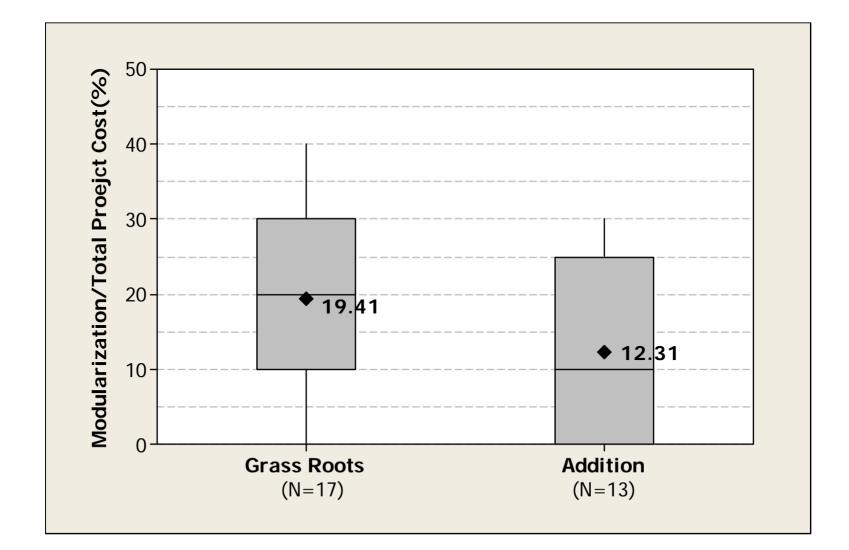
#### Figure 4-3 Construction Indirect / Direct Work hours (%)



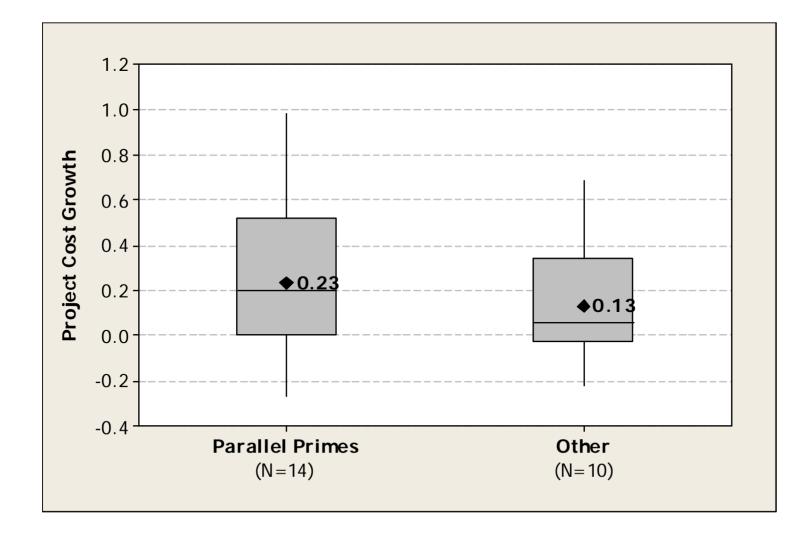
#### Figure 4-4 Construction Indirect Cost / Total Project Cost (%)



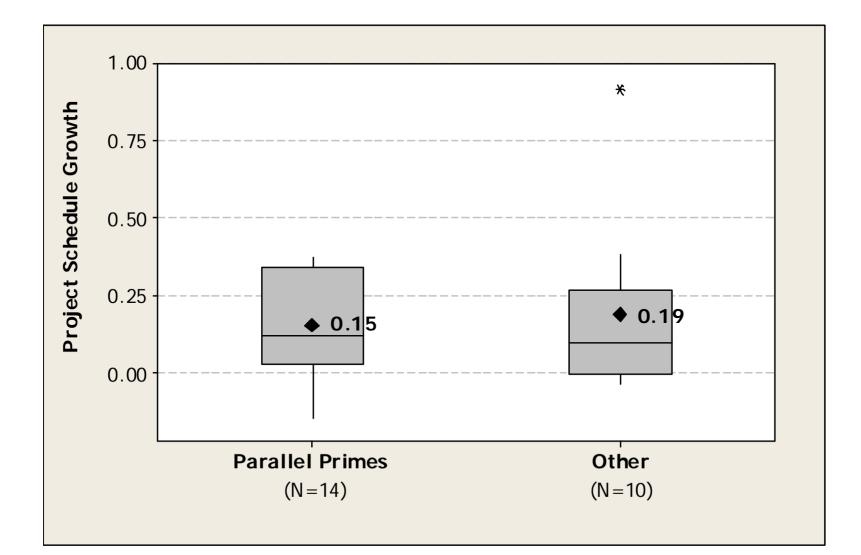
#### **Figure 4-5 Modularization by Project Nature**



#### Figure 4-6 Project Cost Growth by Project Delivery System

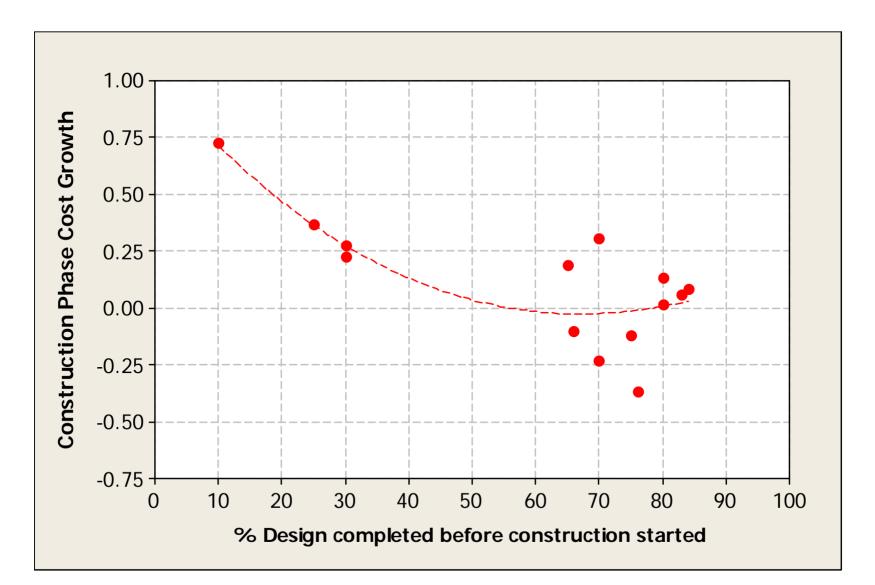


#### Figure 4-7 Project Schedule Growth by Project Delivery System

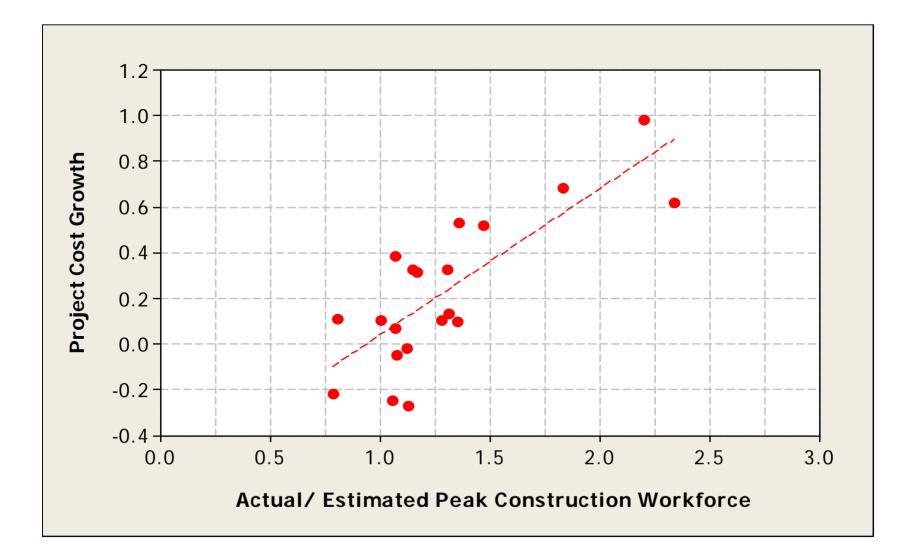


#### **Figure 4-8 Effect of % Engineering Completed before**

**Substantial Construction Started** 



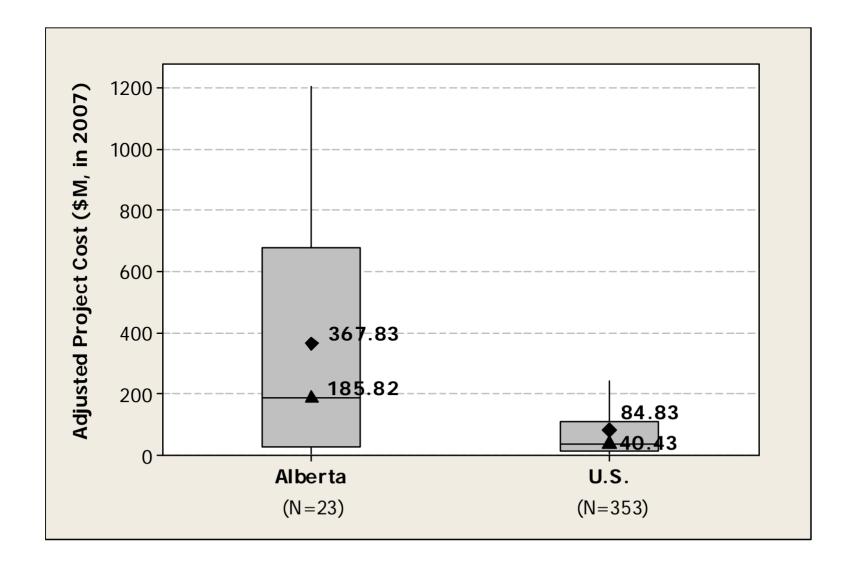
#### Figure 4-9 Actual / Estimated Number of Peak Construction Workforce



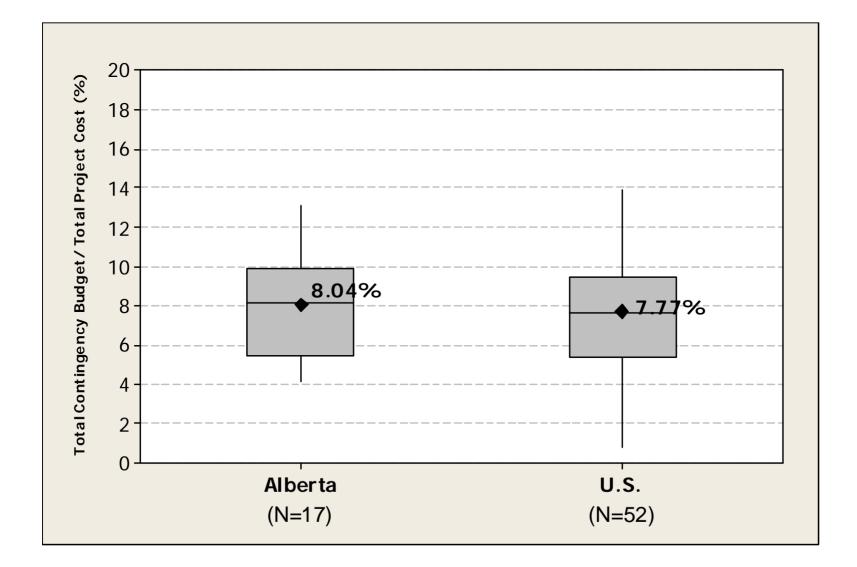
#### Figure 4-15 Workface Planning vs. Construction Schedule Growth



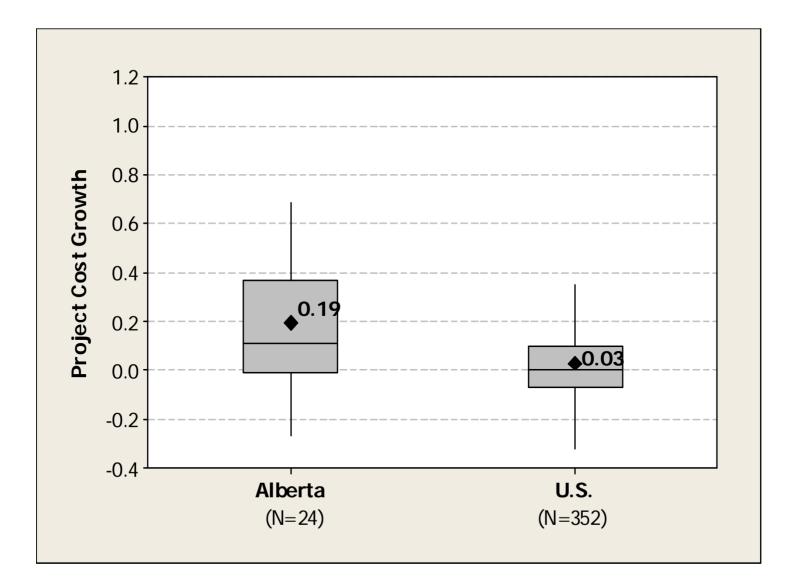
#### Figure 4-16 Project Size (\$M CDN, in 2007)



#### Figure 4-17 Contingency Budget (%)

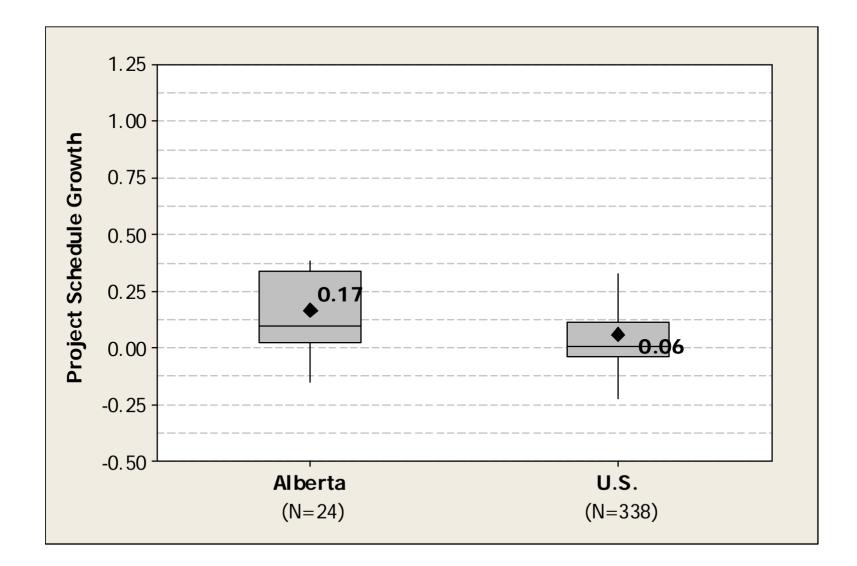


#### **Figure 4-18 Project Cost Growth**



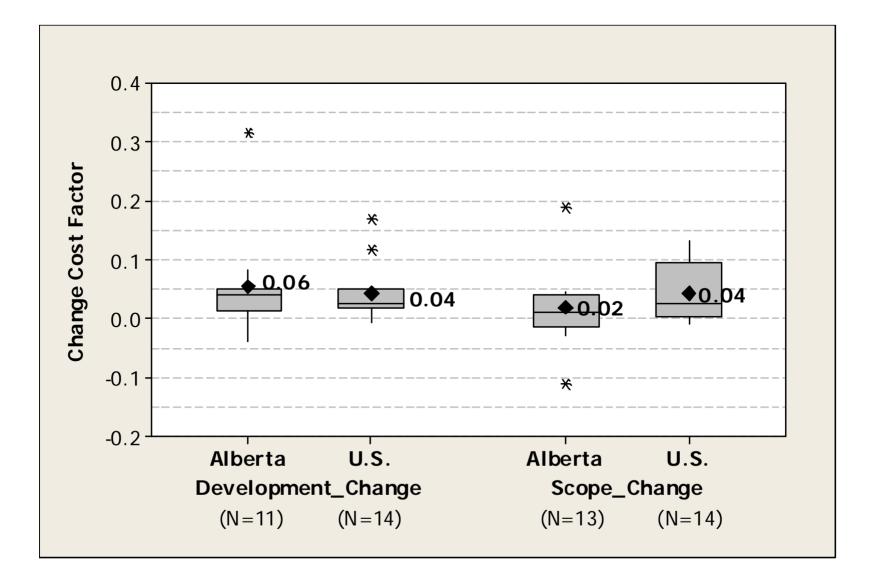
#### Figure 4-19

#### **Project Schedule Growth**

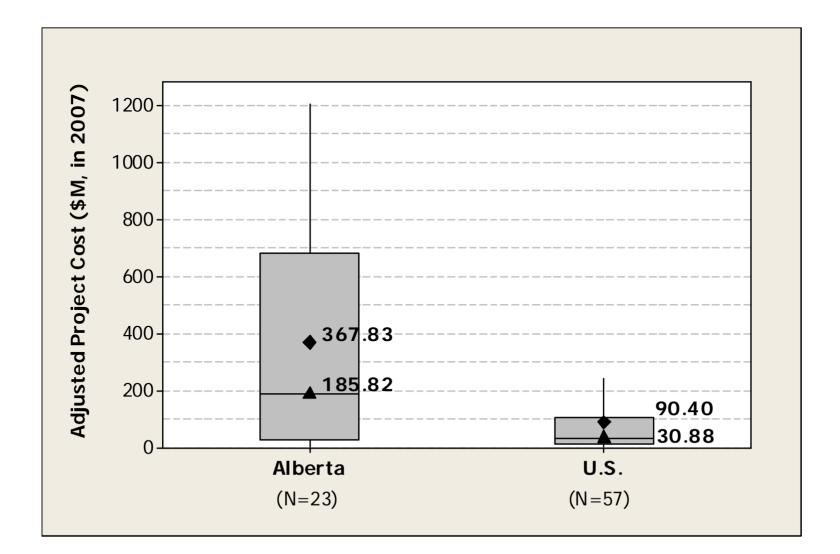


#### Figure 4-20

#### **Development and Scope Change Cost Factor**

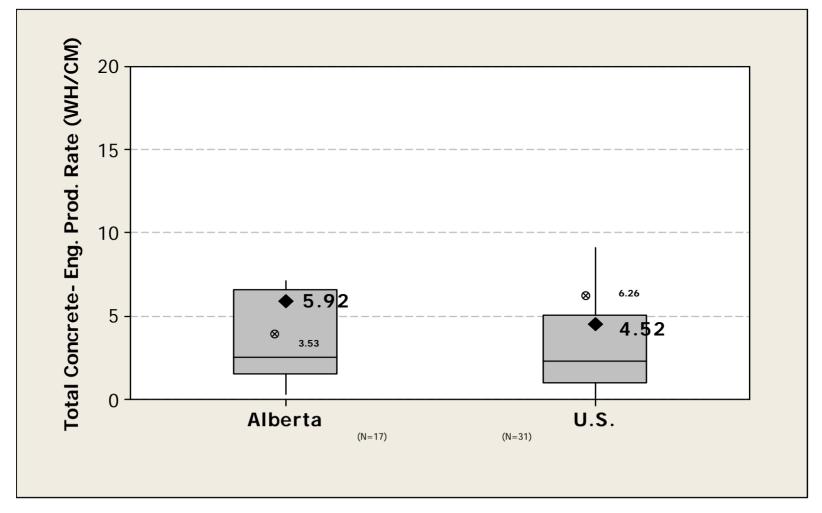


## Figure 4-21 Comparison of Project Size (\$M CDN, in 2007) for Engineering Productivity Dataset



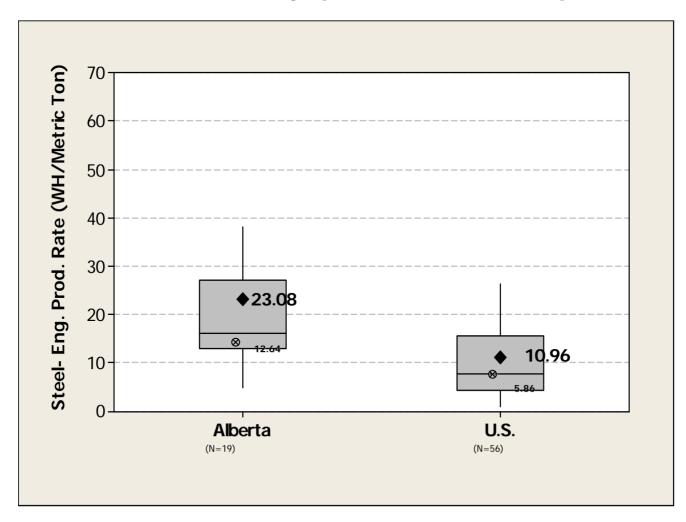
# Figure 4-22 Comparison of Concrete Engineering Productivity

(WH/ Cubic Meter)



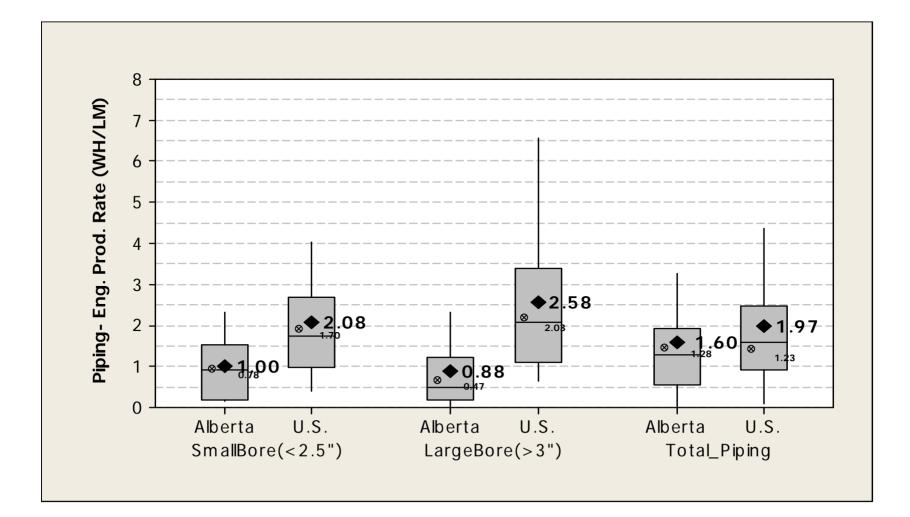
# Figure 4-23 Comparison of Structural Steel Engineering

**Productivity (WH/ Metric Ton)** 



# Figure 4-24 Comparison of Piping Engineering Productivity

(WH/ Linear Meter)



## Figure 4-XX Comparison of Electrical Engineering Productivity

Not enough data to produce results.

More projects required.

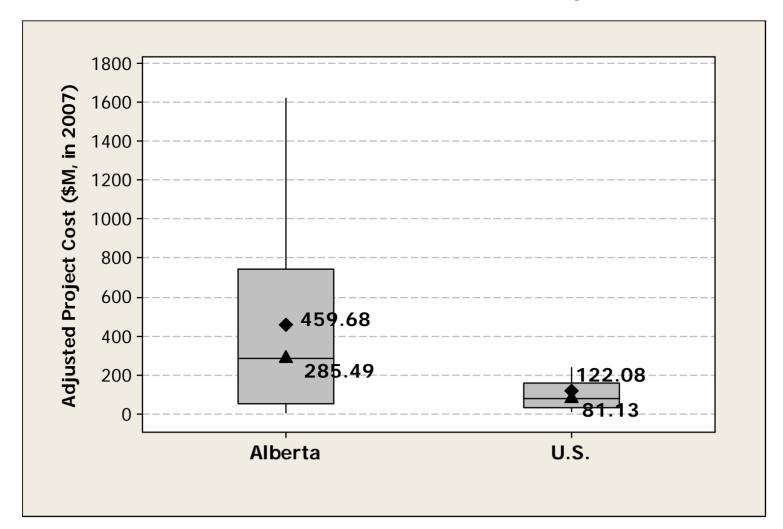
# Figure 4-XX Comparison of Instrumentation Engineering Productivity

Not enough data to produce results.

More projects required.

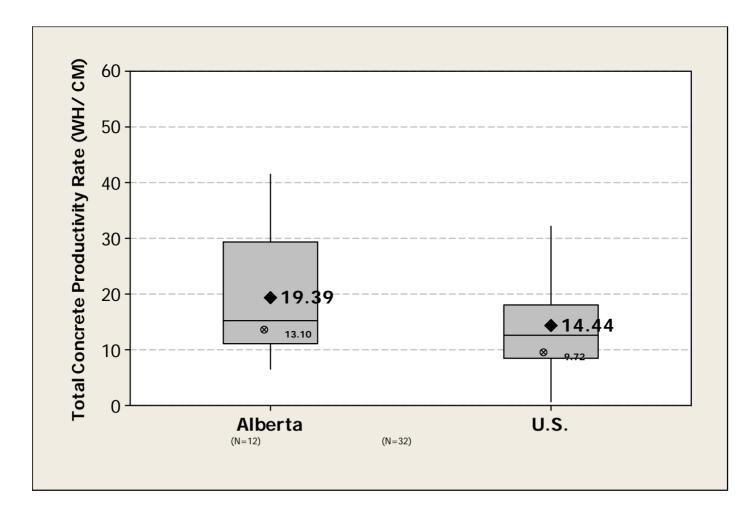
# Figure 4-25 Comparison of Project Size (\$M CDN, in 2007) for

**Construction Productivity** 

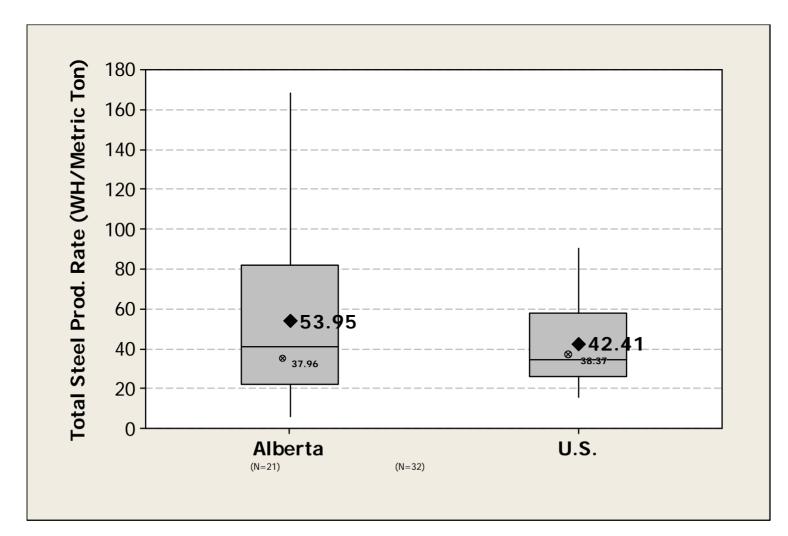


# Figure 4-26 Comparison of Total Concrete Construction

Productivity (WH/m3)



# Figure 4-27 Comparison of Total Structural Steel Construction Productivity



# Figure 4-XX Comparison of Total Piping Construction Productivity

Not enough data to produce results.

More projects required.

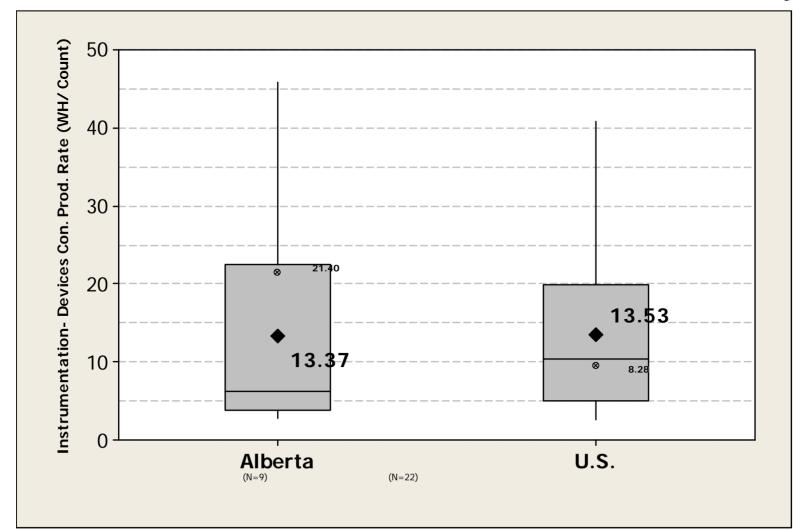
## Figure 4-XX Comparison of Total Electrical Construction Productivity

Not enough data to produce results.

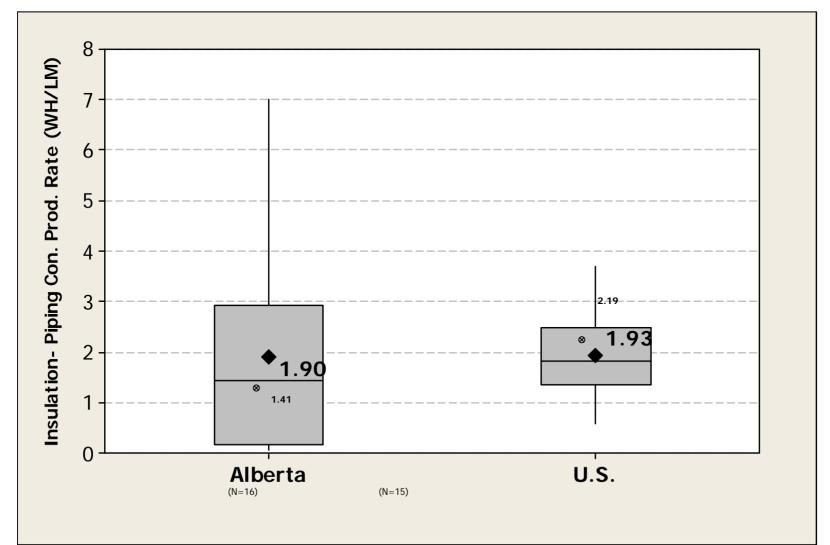
More projects required.

### Figure 4-28

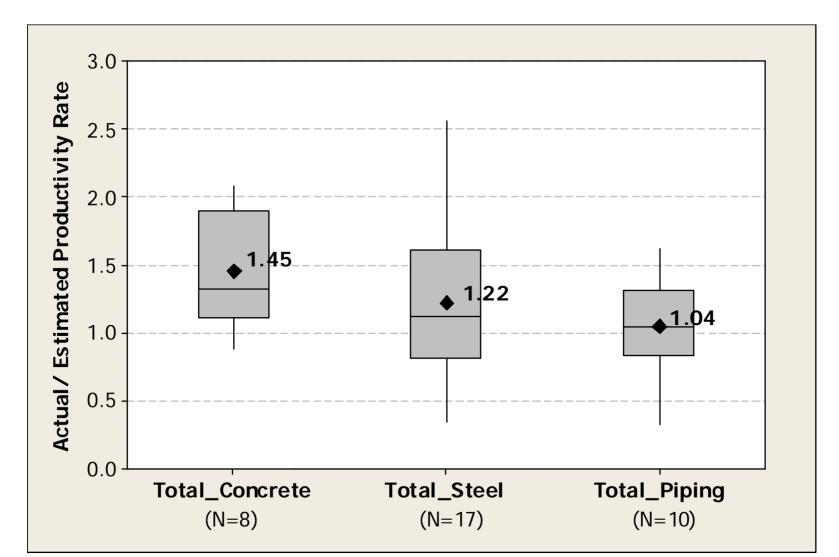
#### **Instrumentation – Devices Construction Productivity**



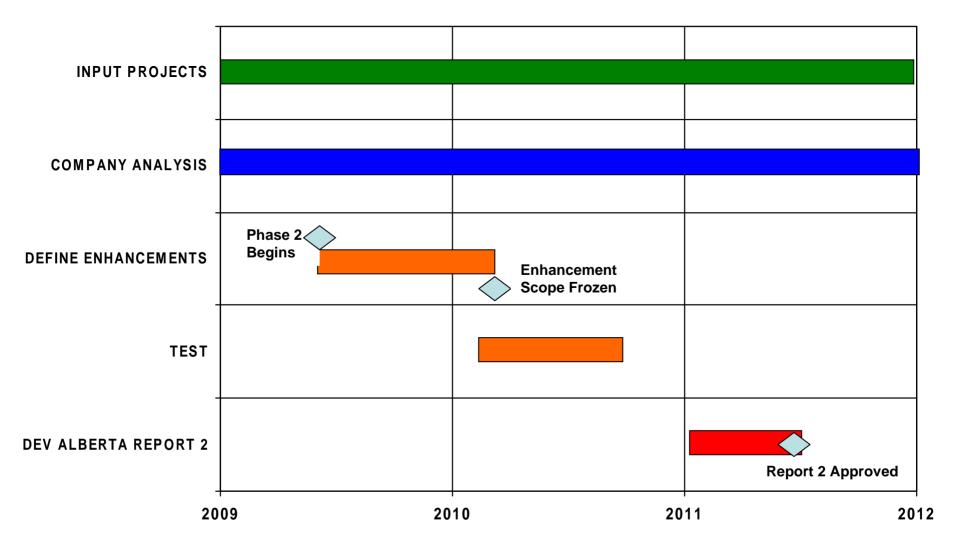
# Figure 4-29 Comparison of Insulation- Piping Construction Productivity (WH/ Linear Meter)



# Figure 4-31 Actual / Estimated Construction Productivity Rate by Work Discipline



# Phase II - DRAFT Simplified Schedule



#### Project Status - 2 year look ahead

	WIP Projects on Hold/Dead	Valid WIP Projects	New Projects
OWNER	11	60	10
CONTRACTOR	7	17	2
TOTAL	18 of 41	77	12

#### Thank-You

Not enough data to produce results.

More projects required.





Laying the Foundation for Success

# Agenda

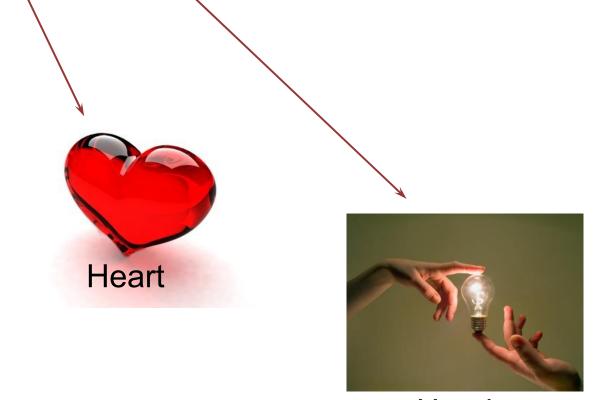
Item	Торіс	Presenter/Facilitator	Timing (min)
1	Safety Moment	Geoff Ryan	5
2	Introduction	Al Wahlstrom	10
3	Objectives	Al Wahlstrom	5
4	Path of Construction	George Gardner and Geoff Ryan	30
5	Interactive Session	Linda Savage	30
6	Questions	All	10

#### How to Walk the Safety Talk

Thoughts  $\rightarrow$  Passion  $\rightarrow$  Action  $\rightarrow$  Habits  $\rightarrow$  Character  $\rightarrow$  Destiny



Head

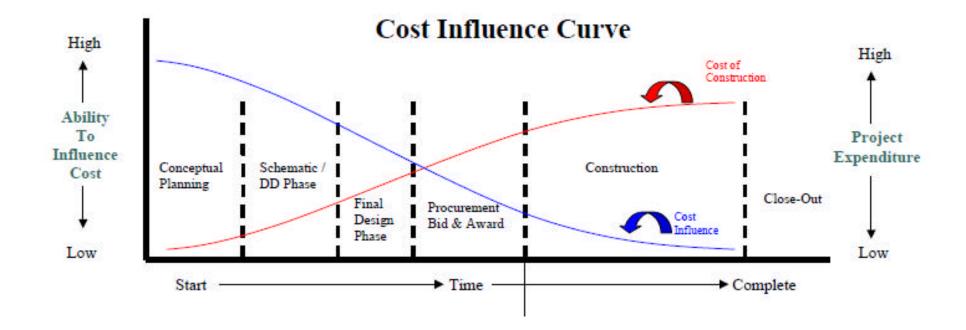




# Introduction

- WorkFace Planning Lesson Learned
  - Construction needs to be "involved" in the Front End?
- CII identified barriers to Front End Planning
  - Silo based project organizations are a barrier to collaboration
  - Contract models institutionalize non-collaborative approaches
  - Decision aids do not exist that allow project managers to prioritize activities that require and benefit from construction input
- Construction Work Packaging can be misaligned with WBS and CBS structures

#### **Cost Influence Curve**



KWAME Building Group Inc.

# **Objectives of Breakout Session**

- Buy In to the Importance and Timing for the Development of the Path of Construction
- Acknowledgement that a FORMAL Process is Required
- Understand of the COAA "Path of Construction" Process
- Interactive Real Time Feedback on Path of Construction Concept



# Path of Construction



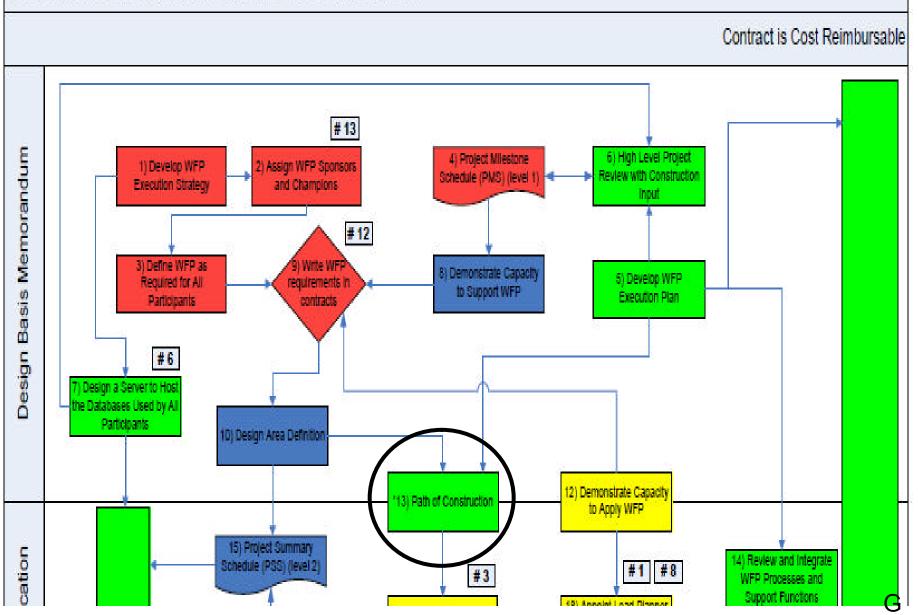


# Path of Construction Working Definition

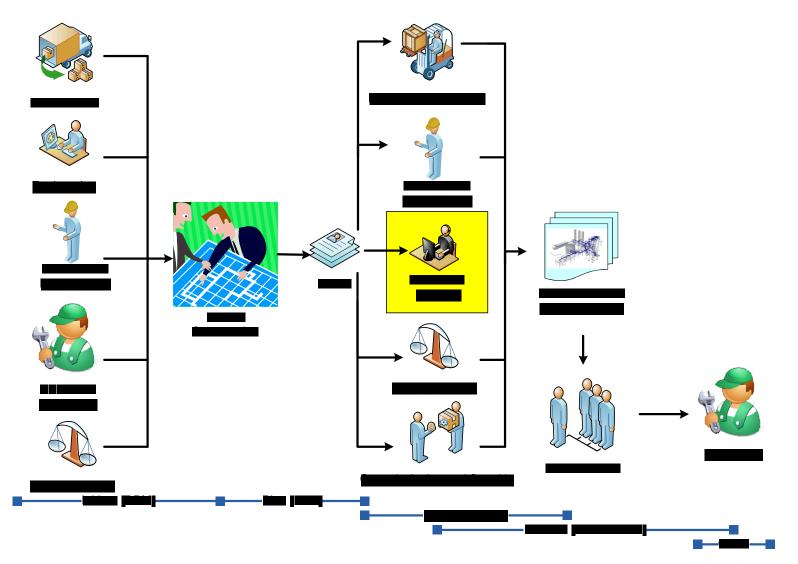
 Path of Construction is the articulation of the optimum building (installation, erection) sequence of the physical components of the facility.

#### Workface Planning Flowchart:

An Example of the Processes that are Involved in Workface Planning



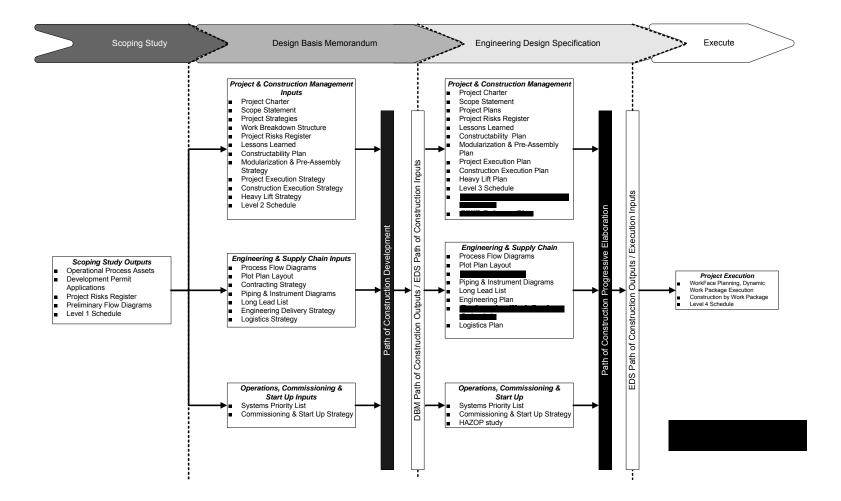
### Influence Diagram



#### Inputs, Tools & Techniques, Outputs

Inputs	Tools & Techniques	Outputs	
<ol> <li>Project Scope Statement</li> <li>Project Charter</li> <li>Enterprise Objectives</li> <li>Site Plan</li> <li>Commissioning &amp; Start Up Priorities</li> <li>Work Breakdown Structure</li> <li>Plot Plans</li> <li>Project Delivery Model</li> <li>Project Management Plan</li> <li>Milestone Schedule</li> <li>Construction Execution Plan</li> <li>Heavy Lift Requirements</li> <li>Specialty Contractors</li> <li>Procurement Constraints (Long Leads)</li> <li>Organizational Process Assets (Standards, Procedures, Templates, Measurement Data, Project Files)</li> </ol>	<ol> <li>Constructability Techniques</li> <li>Expert Judgment</li> <li>Decomposition</li> <li>Alternatives Identification</li> <li>Activity Sequencing.</li> <li>Activity Duration Estimating</li> <li>Work Packaging – definition</li> <li>Participative Planning</li> <li>Interactive Schedule Development</li> <li>Risk Identification</li> <li>Management of Change</li> </ol>	<ol> <li>Path of Construction Identified</li> <li>Integrated Project Baseline</li> <li>Schedule with Engineering,</li> <li>Procurement, and Construction</li> <li>deliverables identified</li> <li>Contracting Plan</li> <li>Construction Work Package</li> <li>Schedule</li> <li>Engineering Work Package</li> <li>Schedule</li> <li>Field Installation Work Package</li> <li>Release Plan</li> <li>Modularization, Prefabrication and</li> <li>Pre-assembly Plans</li> <li>Construction Management Team</li> <li>Resource Requirements</li> <li>Project Constraints</li> <li>Construction Risk Identification</li> </ol>	

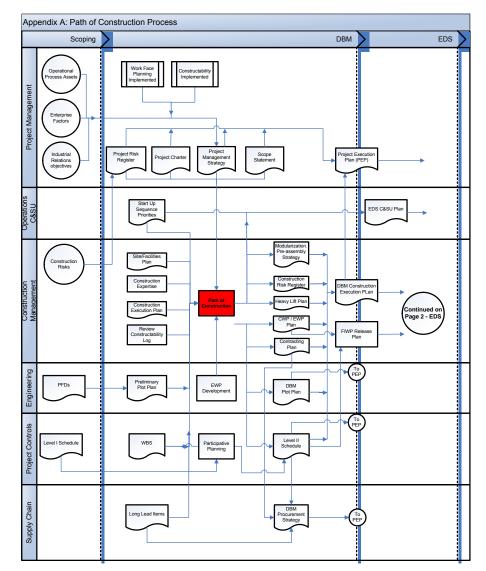
#### **Block Diagram**



#### Procedure

- Procedure documentation of the established method of performing work. It explains WHO does WHAT by WHEN. Procedures present a step-by-step sequenced way to do a task consistently and with maximum efficiency
- Link to Procedure

### Flow Diagram



#### Input Checklist and Tracking Log

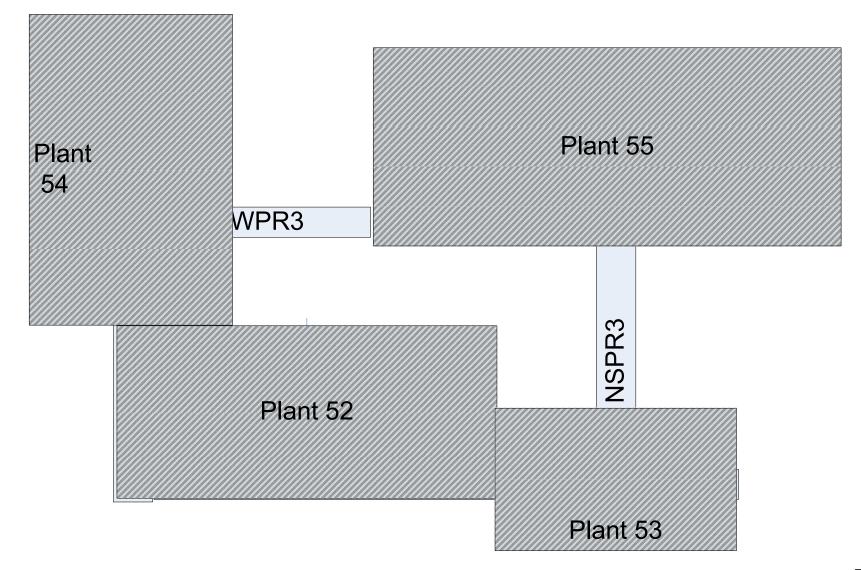
Funtional Area	Input	Туре	Due Date (D/M/Y)	Check ü	Input Owner (specific person)
	Project Charter	Doc			
	Scope Statement	Doc			
	Project Plans	Doc			
Project Management	Project Risks Register	Doc			
	Lessons Learned	Doc			
	Project Execution Plan	Doc			
	Level 3 Schedule	Schedule			
	Constructability Plan	Doc			
	Modularization & Pre-Assembly Pla				
Construction Management	Construction Execution Plan				
	Heavy Lift Plan				
	Construction Wor d	lle			
		<u> </u>			
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Engineerin		<u>g</u>			
		1000			
		Schedule			
	En En Co O	Doc	<b> </b>		
Supply Cha	<u></u>	Doc			
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	Systems Priority List	Doc			
Operations and	Commissioning & Start Up Strategy	Doc			
	HAZOP study	Doc			

# Path of Construction

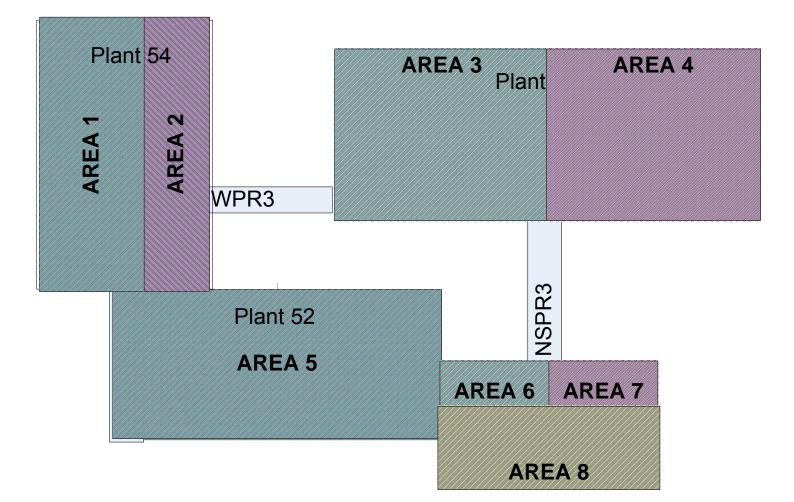
- The Flow Diagram is a roadmap for the development of the Path of Construction
  - a plot plan and drawings are not enough
- The procedure, checklist, tracking log, etc. are like a compass, providing direction for who does what, when
  - "informal" planning and tracking will get you inconsistent, inexperienced, ill-timed results
- The schedule should be integrated and reflect the path
   of construction
  - not a bias schedule for just engineering, procurement or construction

# Project 123

# Project 123



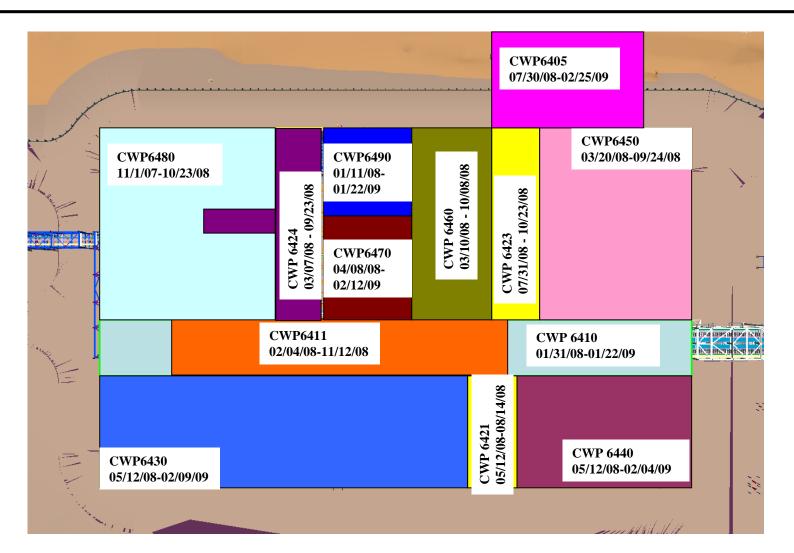
### Project 123



# Suncor MNU Project ISBL&OSBL and Hydrogen

Presentation to: Suncor 14 January 2008

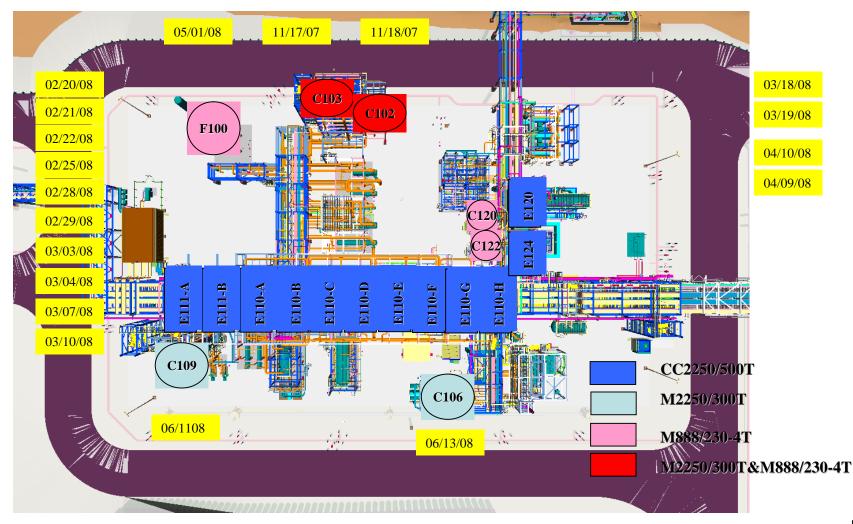
### Path of Construction - ISBL



#### Edmonton Module Yard Schedule

Scope	CWA	Module ID	Finished Dates	Scope	CWA	Module ID	Finished Dates
CM	CWA64-05	64-PRM-1201	7-Apr-08		CWA 56-40	56-PRM-0040M	31-Jul-07
		64-PRM-100A	13-Dec-07			56-PRM-0040N	31-Jul-07
		64-PRM-101A	10-Jul-07			56-PRM-0040P	31-Jul-07
		64-PRM-100B	21-Jan-08			56-PRM-0040 Q 56-PRM-0040 R 56-PRM-0080 A	1-Aug-07
		64-PRM-101B	11-Dec-07				2-Aug-07
	CWA 64-10	64-PRM-100C	11-Feb-08				23-Nov-07
	C 00A 04-10	64-PRM-101C	14-Dec-07			56-PRM-0080B	16-Nov-07
		64-PRM-100D	14-Feb-08			56-PRM-0080C	14-Nov-07
		64-PRM-101D	31-Oct-07			56-PRM-0080D	29-Jan-08
ISBL		64-PRM-100E	17-Jan-09			56-PRM-0080E	30-Jan-08
ISDE		64-PRM-101E	31-Oct-07	OSBL		56-PRM-0080F	31-Jan-08
	CWA64-21	64-PRM-100H	31-Mar-08	USBL	CWA 56-50	56-PRM-0080G	14-Nov-07
		64-PRM-100F	20-Feb-08			56-PRM-0080H	31-Jan-08
	CWA 64-23	64-PRM-101F	7-Mar-08			56-PRM-0080J	7-Aug-07
		64-PRM-100G	14-Mar-08			56-PRM-0080K	6-Sep-07
	CWA 64-24	64-PRM-100J	28-Mar-08			56-PRM-0080L	19-Sep-07
	C VVA 04-24	64-PRM-100K	13-Mar-08			56-PRM-0080M	3-Oct-07
	CWA 64-30	64-PM-204	26-Mar-08			56-PRM-0080N	28-Aug-07
	CWA 64-60	64-PM-202	14-Mar-08			56-PRM-C100	28-Feb-08
		64-PM-203	19-Mar-08		CWA 56-52	56-PRM-C101	18-Apr-08
					C 11A 30-32	56-PRM-C102	3-Mar-08
						56-PRM-C103	21-Apr-08
						East PR Module	30-Apr-08
						West PR Module	30-Apr-08
		Hydrogen		East Cable Tray Modle	2-Apr-08		
		lingulogen		West Cable Tray Modle	5-Mar-08		
					Process Module 1	Technip	
						Process Module 2	Technip

# Construction Execution Plan – ISBL (Heavy Lift Equipments Setting)





# Path of Construction





### Interactive Session

- Goal
  - Get Your Feedback on this DRAFT Path of Construction Process
  - Harness Your Experience. We need Your HELP!
  - Gather Your Comments on the Handout

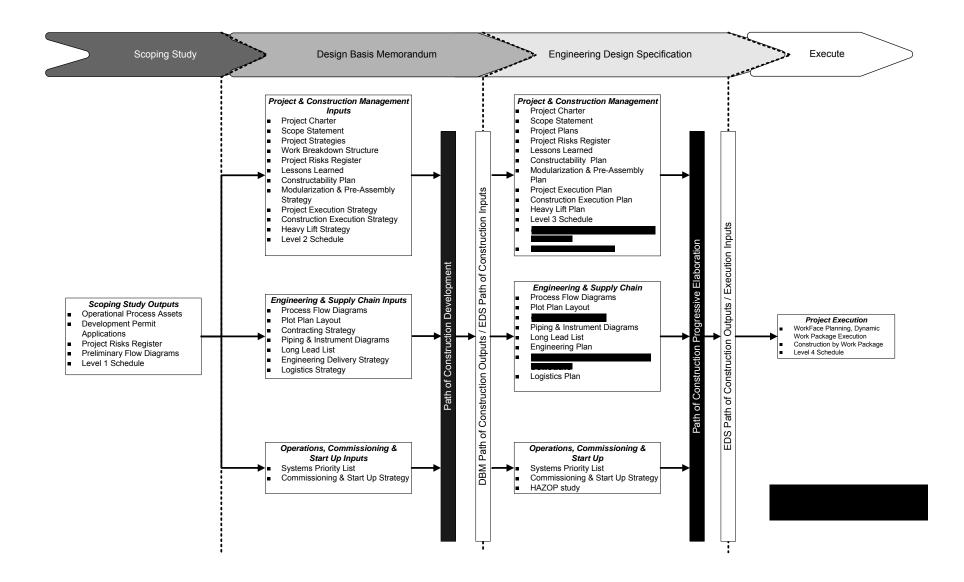
# Interactive Session

- Rules of Engagement
  - Cell phones off
  - When you have a comment or question raise your hand and wait to be called on
  - Respect other speakers, wait your turn
  - Voting will be done with a show of hands
  - Linda's gavel is the great silencer ORDER!



# Interactive Session Agenda

Item	Торіс	Timing
1	Conceptually Sound	10
2	Players	10
3	Timing	10



# Players

ü Project Management
ü Construction Management
ü C&SU
ü Operations
ü Engineering
ü Project Controls
ü Supply Chain

# Timing

- Scoping Study
- DBM...to early...why?
- EDS...better time...why?
- Detailed Design...too late...why?

### Q&A





The Knowledge Leader for Project Success

Leveraging 25 Years of Industry Leadership

#### **COAA Benchmarking Program Phase II**

Stephen P. Mulva, Ph.D. Associate Director, Cll

COAA Best Practices Conference May 20, 2009 Edmonton, Alberta



#### Why Benchmarking?

#### (Texas Hold-Em – 2 Players)



#### **Bob Benchmarker**

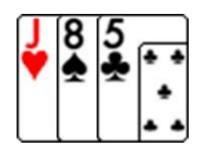
Winning Percentage 37.6% (Before Flop) 26.0% (After Flop) 95.5% (After Turn)



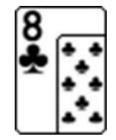
#### Will Chansit

Winning Percentage

#### WINNER!



Flop



Turn



?

?

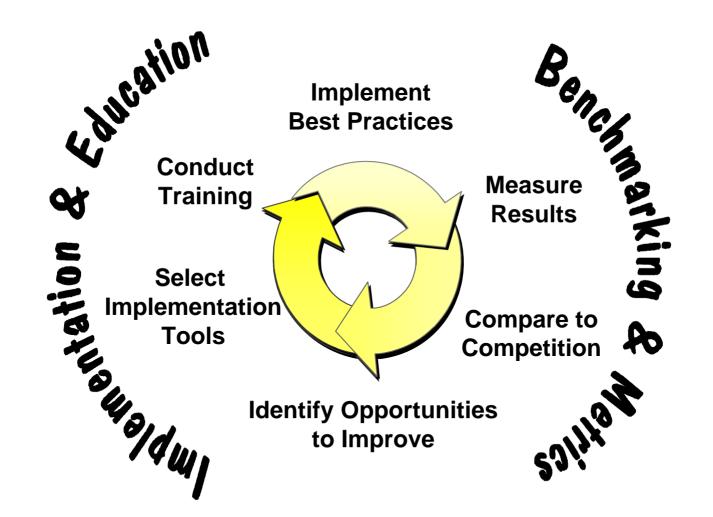
?

River





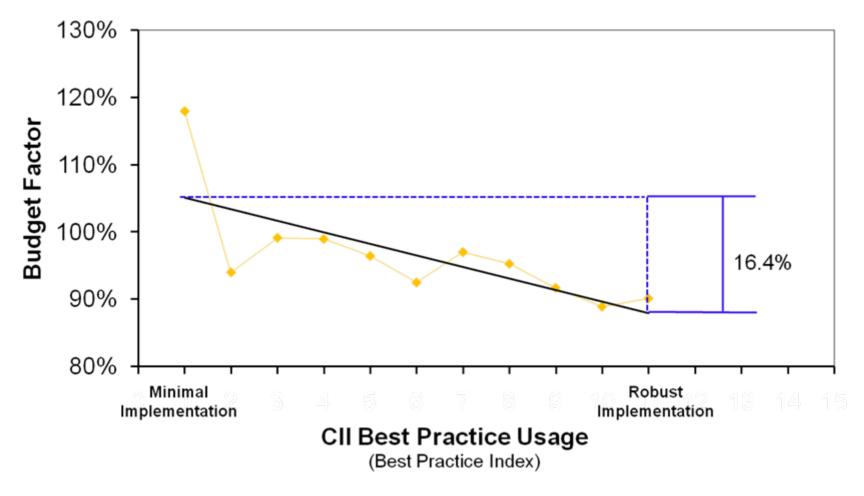
#### **Integral to the Improvement Process**







## Value of Best Practices (Cll Owners)

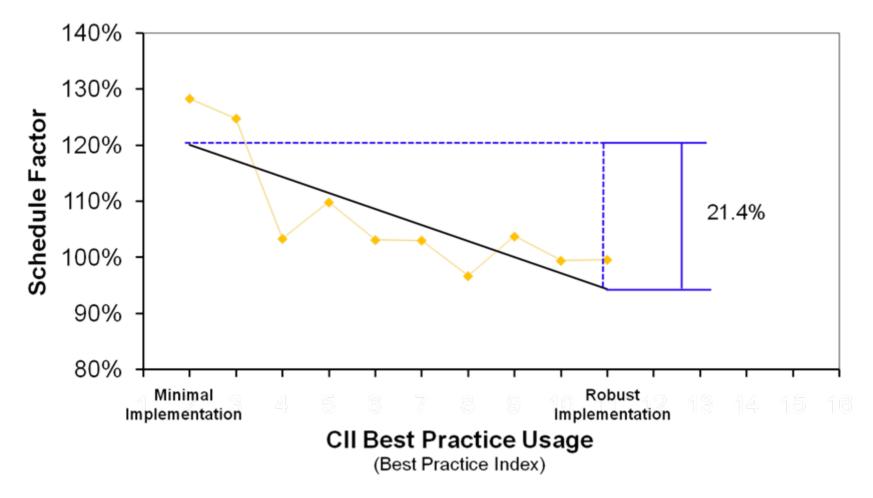


Note: Average Budget 53 Million, submitted after 2002 (n=152)





## Value of Best Practices (Cll Owners)

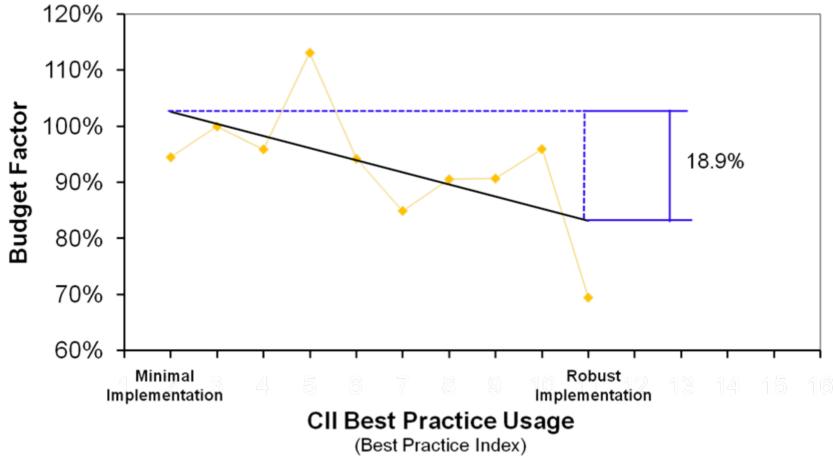


Note: Average Planned Duration 135 weeks, submitted after 2002 (n=152)





## Value of Best Practices (CII Contractors)

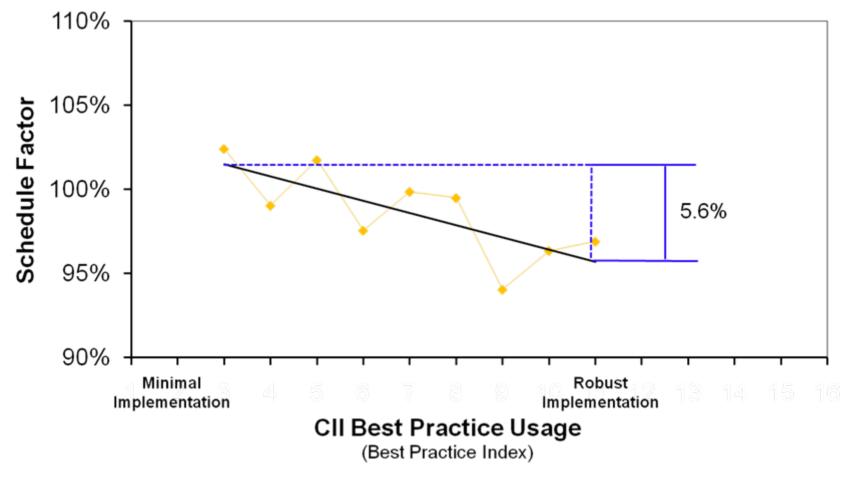


Note: Average Budget =58 Million, submitted after 2002 (n=81)





## Value of Best Practices (CII Contractors)

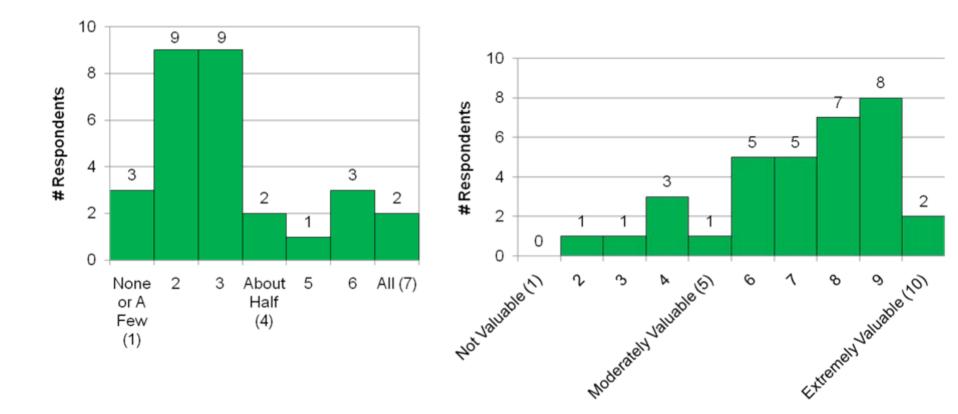


Note: Average Planned Duration=109 weeks, submitted after 2002 (n=81)





## **Benchmarking is a COAA Best Practice**



**Projects' Use of external Benchmarking** 

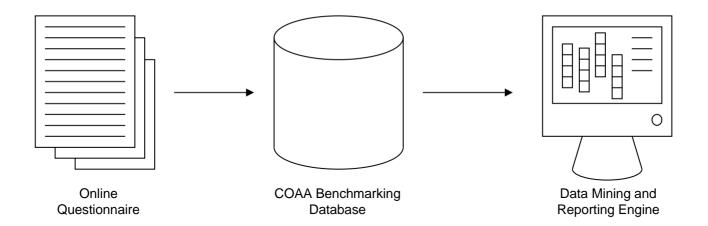
Value of Benchmarking





## **COAA Benchmarking (Phases I and II)**

• 3-Step Process







# Program Changes (2009)

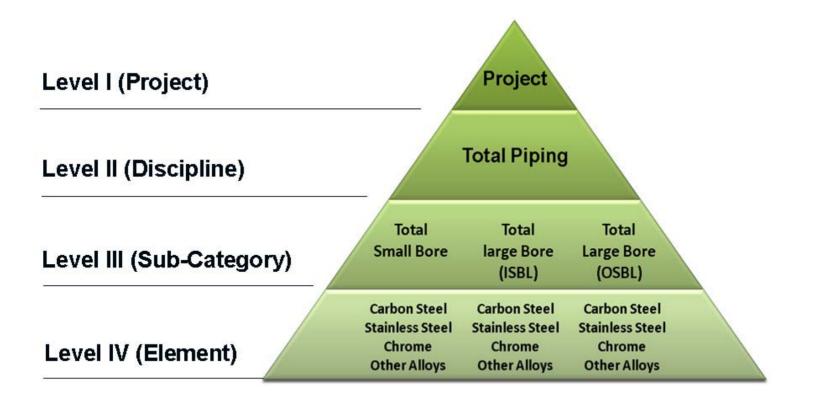
- Level 1 Productivity
  - Engineering Productivity Index
  - Construction Productivity Index
- Tier 1 Questionnaire
  - Contains 20% of All Questions
  - Remaining 80% Still Available (Optional)
- CII Summer Intern Program
- Additional Industry-Specfic Metrics (U/S & D/S Oil & Gas)
- NextGen Benchmarking System





# **Project-Level Productivity**

- Engineering Productivity (1 Number)
- Construction Productivity (1 Number)









• Benchmark ALL your projects (350 Projects / Year)

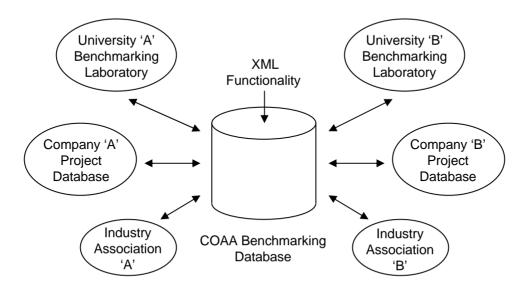






# NextGen System (2009)

- Federated Architecture
  - XML Functionality Enables:
    - Data Transfer from Member Companies / Participants
    - Data Transfer from University 'Benchmarking Labs'
  - Projects from Industry Associations







## **Phase II Features**

- Customized Questionnaire Development
  - Additional Absolute Metrics (\$CDN/??)
  - Indirect Costs (Detail)
  - Pipeline Projects
  - Modularization (Productivity in Fab Yard)
  - Other (Scaffolding, Project Delivery, Construction Productivity)
- Alberta-Based Benchmarking Lab
  - Full-Time Alberta-Based Support
  - Real-Time (OTJ) Training
- Alberta Report #2





# **Phase II System Enhancements**

- Internal (Business Unit, Product Line) Benchmarks
- Automated Key Reports
- Company-Level Reports
- Executive Dashboard
- Full Data Mining Capability
  - Comparisons with CII (U.S.) Database
  - "Level 1" Productivity Metrics (All Disciplines)





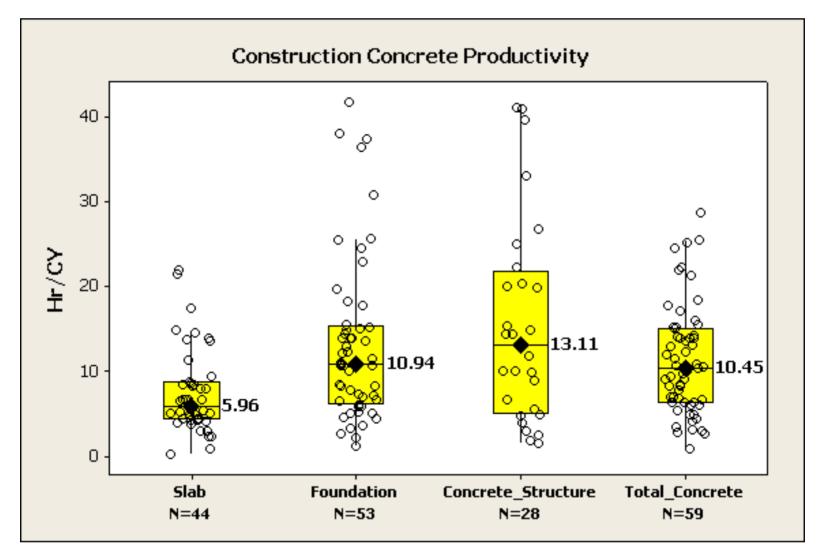
# **Phase II Data Mining**

Construction The Knowledge Leader for Project Success Industry S Web-Enabled Queries Oursen + Oceleration + Academics Project Central | CII Main Site Chart C Rama v2.01 beta 1. Output Format Ms. Hong Tester, testco 18 Projects Available for Key Report Please select which type of Project Output you would like to generate. Chart Key Report Construction The Knowledge Leader for Project Success 10 - 110 No. - 110 No. - 110 Industry +\*: 1 -0.0--0.3 Institute Owners • Contractors • Academics Without Projects With Projects **Budget Factor** Max: 1.163 1.21 03: 1.002 1.16 CONStruction Industry Institute" The Knowledge Leader for Project Success Median: 0.983 1.11 Owners • Contractors • Academics Project Central | CII Main Site 01: 0.927 1 07 Chart C Rama Min: 0.775 1.02 v2.01 beta 0.97 Mean: 0.969 > 2. Enter Information 0.92 Comparison Basis Metrics Project Nature: Grass Roots 0.87 ► 🗅 Pharma Cost Category: All 0.82 y 😂 Cost Project Cost Growth Location: All 0.78 D Project Budget Eactor Project Nature: Grass Roots 0.73 Delta Project Cost Growth Delta Project Budget Factor Cost Category All N = 202 Design Phase Cost Growth Legend Location: Global 1st Quarti 2rvi Quarti Procurement Phase Cost Growth Construction Phase Cost Growth D EEP Phase Cost Eactor Design Phase Cost Factor Procurement Phase Cost Factor Construction Phase Cost Factor Construction Startup Phase Cost Factor The Knowledge Leader for Project Success Industry Design Owners • Contractors • Academics Institute® Schodulo Changes Reset Data ► 🗀 Rework To Print, Right-Click anywhere on chart and select PRINT. Submit Ca Safety





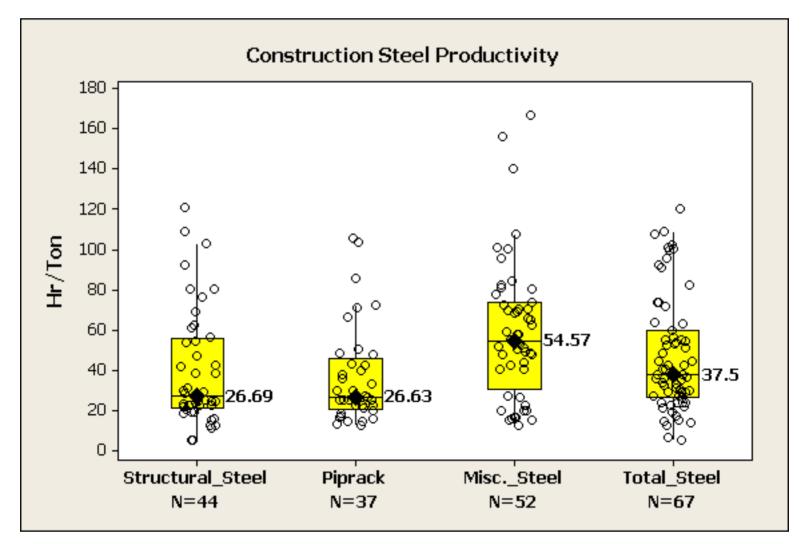
### **Concrete Construction Productivity**







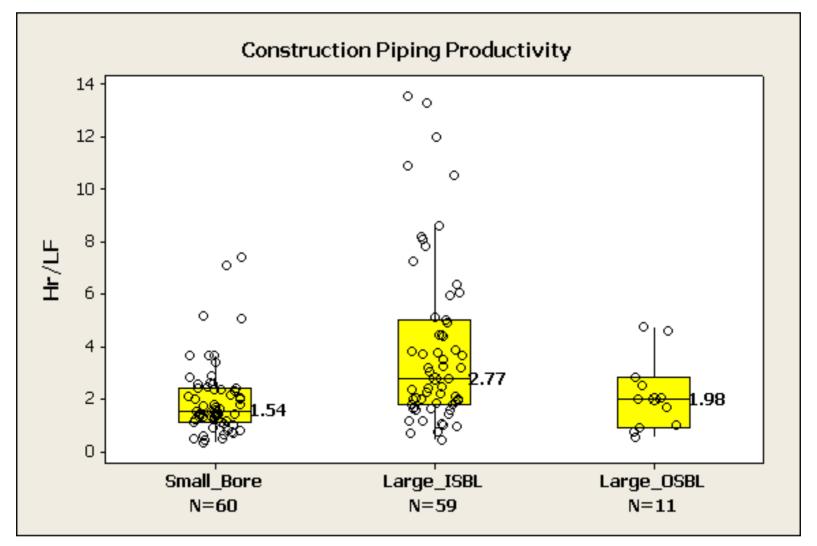
### **Structural Steel Construction Productivity**







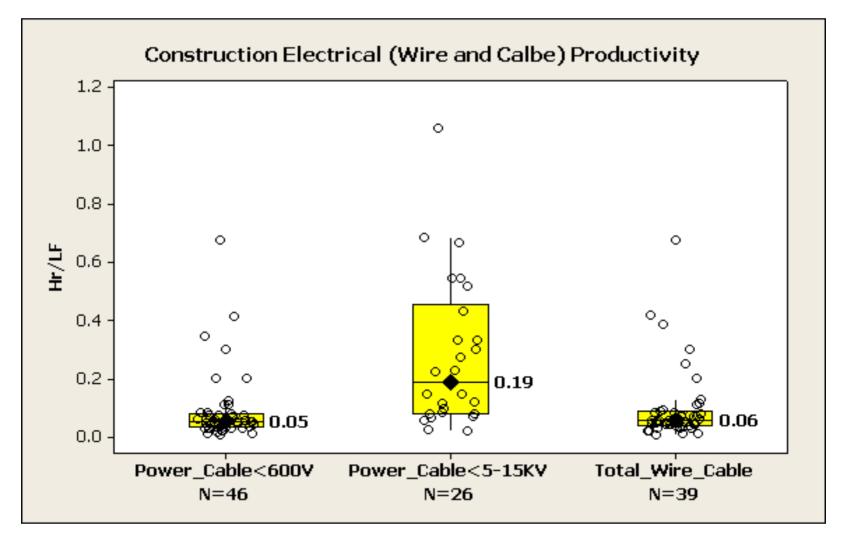
# **Piping Construction Productivity**







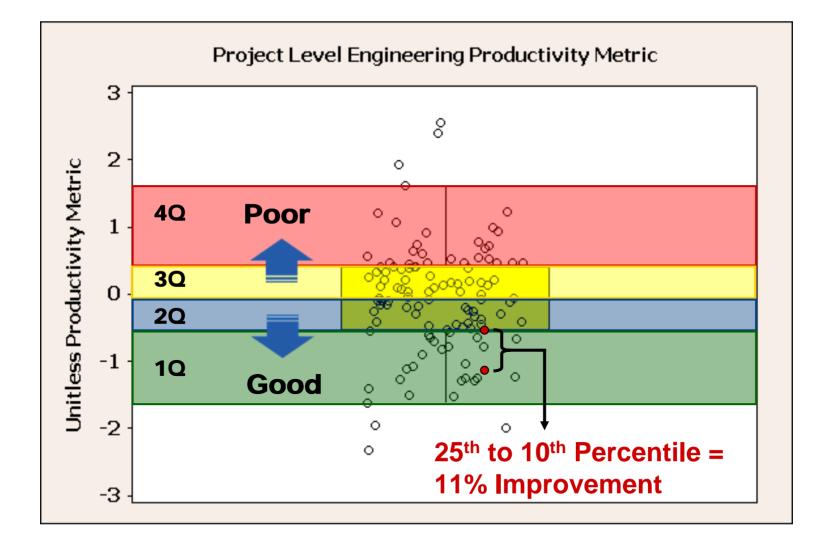
## **Electrical Construction Productivity**







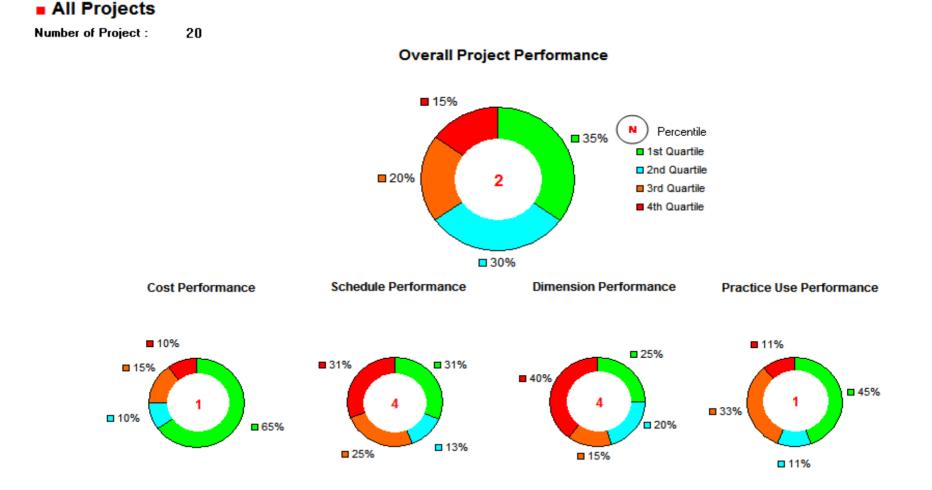
## **Project-Level (Engineering) Productivity**







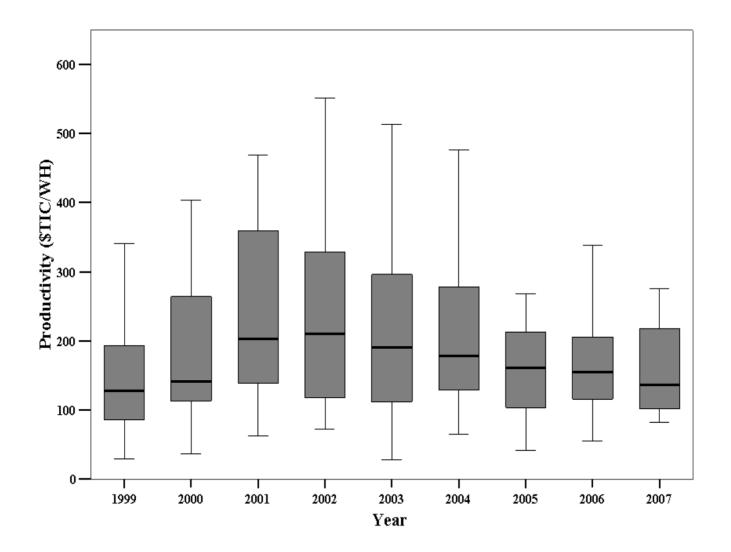
## **Executive (Portfolio) Dashboard**







## **U.S. Dept. of Commerce / NIST Study**

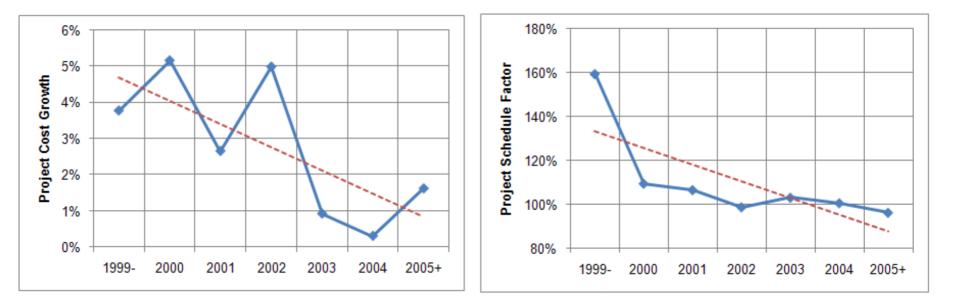






# **Does Benchmarking Work?**

Cost (Growth) and Schedule (Factor) Trends







# **Questions?**

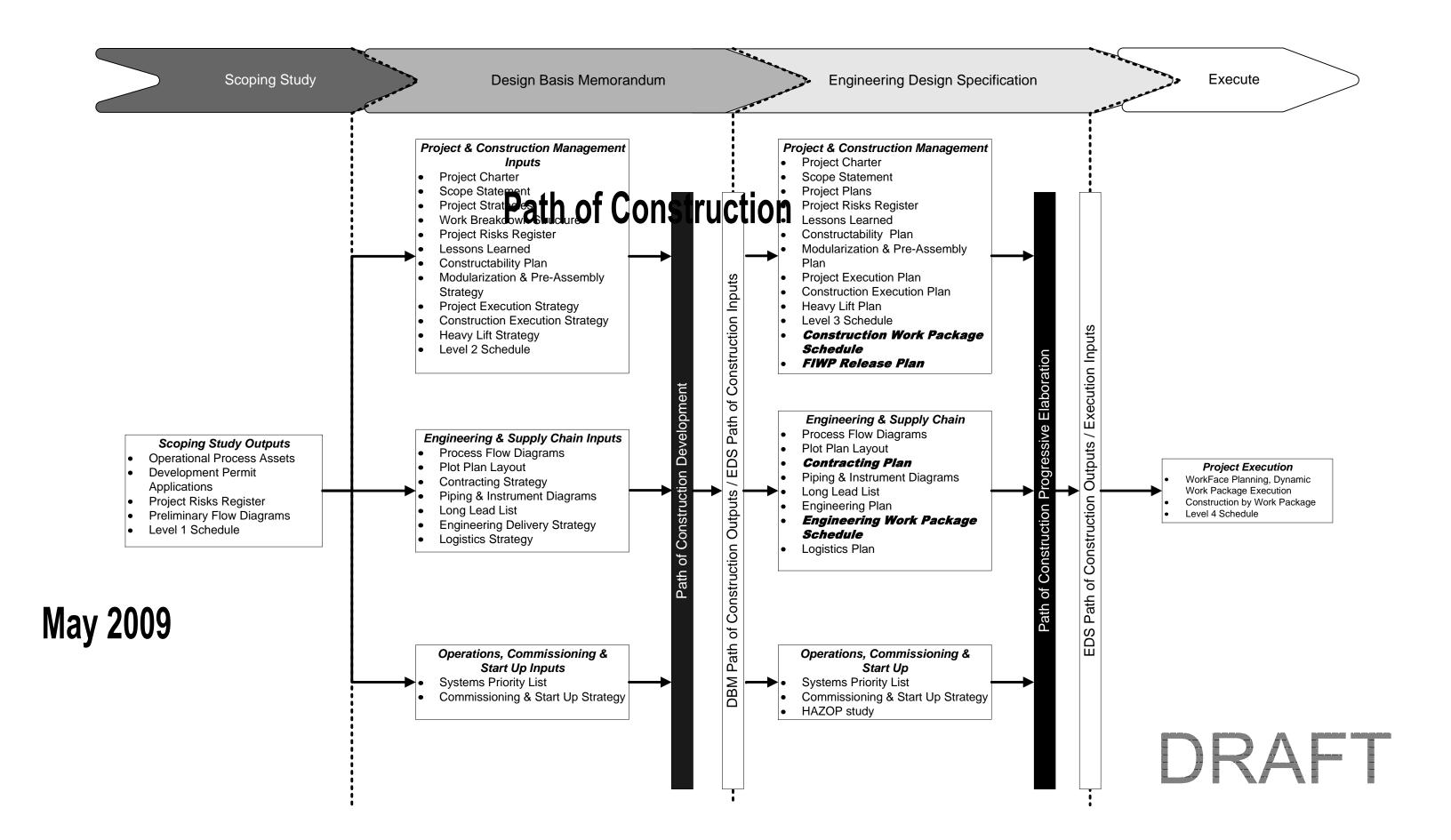
### Larry Sondrol

Manager of Project Controls, Suncor <u>Isondrol@Suncor.com</u> (403) 693-2050

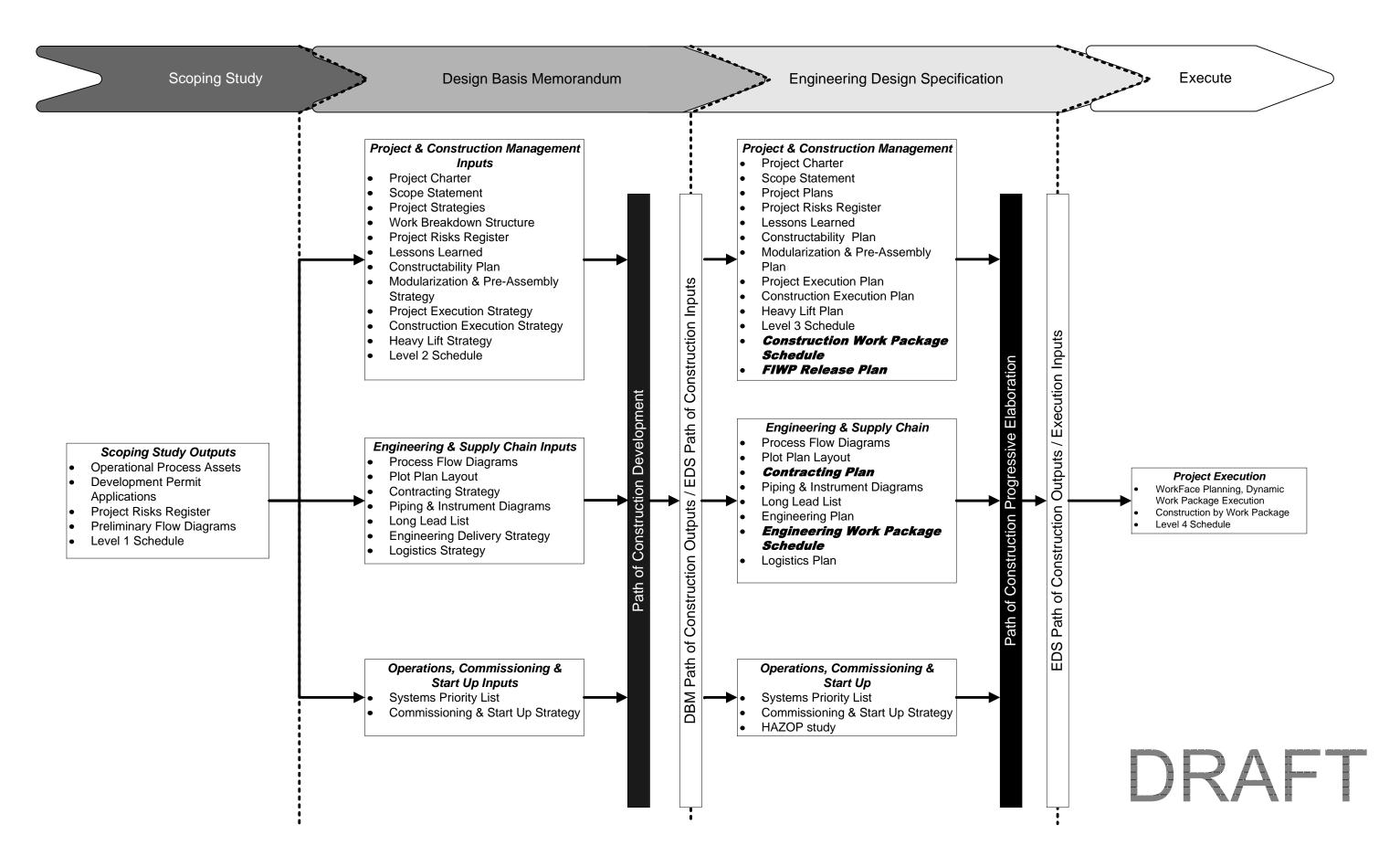
Stephen P. Mulva, Ph.D. Associate Director, CII <u>smulva@mail.utexas.edu</u> (512) 232-3013







### Path of Construction





### Procedure No. PCM-GP-0001



### THE MEGA PROJECT Path of Construction Development

**ABC Construction Company** 

### CANADA

Α	04/20/09	Issued for Review			
Rev	Date (MM/DD/YY)	Revision Notes	Originator	Checker	Approver



Department:	CONSTRUCTION MANAGEMENT	Number: PCM-GP-0001
Subject:	PATH OF CONSTRUCTION	Revision: <b>A</b>

### 1 **PURPOSE** (Why the document has been written)

The purpose of this procedure is to outline the process for developing the path of construction.

#### 1.2 SCOPE (What to expect in the document)

This document contains detailed information about conducting multiple sessions that follow a process flow diagram by projects stage versus roles outlining the inputs, activities, and outputs necessary to develop a path of construction.

1.3 RESPONSIBILITIES (Who is responsible for the document and executing its contents)

1.3.1 Construction Director is accountable to ensure the path of construction procedure is followed in the development of the path of construction.

1.3.2 Construction Manager is responsible for using the path of construction procedure as a roadmap for executing the process. The Construction Manager will facilitate the path of construction sessions and have the appropriate level of experience to perform the path of construction activities.

1.3.3 Constructability Coordinator – Has a supporting role to the Construction Manager and the Path of construction activities.

1.3.4 CWP Coordinator – develop and maintain CWP list and interface with engineering to ensure EWPs are in line with the path of construction

1.3.5 Engineering Manager – Participate in path of construction activities as a Subject Matter Expert and to represent Engineering's interests.

1.3.6 Procurement Manager – Participate in path of construction activities as a Subject Matter Expert. Researches and provides identification of long lead items and procurement constraints.

1.3.7 Scheduler – Represent the path of construction in the project schedule in the form of CWPs and EWPs

1.3.8 Contracts Manager - Participate in path of construction activities as a Subject Matter Expert. Contributes high level, or enterprise level contracting strategy.

1.3.9 Project Manager - Participate in path of construction activities as a Subject Matter Expert and manages functional interfaces as required.

1.3.10 C&SU Manager - Participate in path of construction activities as a Subject Matter Expert and contributs high level turn over strategy.

1.3.11 Estimator - Participate in path of construction activities as a Subject Matter Expert and contributes activity durations where required.



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Subject:	PATH OF CONSTRUCTION	Revision: A

1.3.12 Operations Manager - Participate in path of construction activities as a Subject Matter Expert.

#### 1.4 DEFINITIONS (INCLUSIVE OF APPENDICES)

Facilitator – is a person or party with proven credentials to manage the proceedings of a meeting of people from different backgrounds with different agendas and direct them to arrive at consensus decisions in an effective manner, all without interjecting the facilitator's own preferences.

Construction Work Package (CWP) - An executable construction deliverable that defines in detail a specific scope of work and should include a budget and schedule that can be compared with actual performance. The scope of work is such that it does not overlap another CWP. The CWP can be used as a scoping document for Requests for Proposal and Contracts.

Engineering Work Package (EWP) - An engineering deliverable that is a component of a CWP and that defines a scope of work to support construction in the form of drawings, procurement deliverables, specifications, and vendor support. The EWP is released in an approved sequence that is consistent with the CWP schedule. The scope of work is typically both by discipline and by area.

Field Installation Work Package (FIWP) - A detailed execution plan that ensures all elements necessary to complete the scope of the FIWP are organized and delivered before work is started. This detailed planning enables craft persons to perform quality work in a safe, effective, and efficient manner. Generally, the scope of work associated with the FIWP is small enough that it could be completed by a single-foreman team, typically in a one- or two-week time frame.

WorkFace Planning (WFP) - The process of organizing and delivering all the elements necessary, before work is started, to enable craft persons to perform quality work in a safe, effective, and efficient manner.

Path of Construction – is the articulation of the optimum building sequence of the physical components of a facility.

Design Basis Memorandum (DBM) - A "Controlled Document" produced during the front-end engineering study phase that defines the basic design parameters for the intended project. Generation, review, and approval of the DBM are prerequisites to AFE approval and release for development of the Engineering Design Specification (EDS).

Engineering Design Specification (EDS) - The product of front-end engineering development (basic engineering) that defines all elements of project scope and is the Control Document for commencement of detail engineering and procurement activities on the project. A companion document to the EDS is the Project Execution Plan that sets forth the program for project implementation.

Detailed Design - The phase of engineering following EDS, after approval has been given for the project. The DEP provides the specifications and construction drawings that detail all engineering aspects for the construction of a project.



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Subject:	PATH OF CONSTRUCTION	Revision: <b>A</b>

2 **PROCEDURE** (A Procedure is a document of the established method of performing work. It explains WHO does WHAT by WHEN. Procedures present a step-by-step sequenced way to do a task consistently and with maximum efficiency.)

#### 2.1 SESSION PREPARATION

The Project Construction Manager is responsible for the preparation of the path of construction sessions.

2.1.1 Develop the path of construction agenda. The agenda must have a clearly stated objective and list of activities. This should be based on Appendix A Path of Construction Flow Diagram, Appendix B – Inputs, Tools and Techniques, Outputs and reflect the stage of the project at the time of the meeting. Appendix B Outputs should guide the list of activities for the session.

2.1.2 The time frame and scope of activities discussed during the path of construction session depends on the current project objectives. If the project's current deliverables are for DBM or EDS purposes, then the activities discussed should only detail that phase of project development. If the current scope of the project is detailed design, it is appropriate to discuss detailed engineering activities. This approach avoids wasting time in discussing activities that are not relevant at the time of the path of construction meeting.

2.1.3 Distribute Appendix C Path of Construction Input Checklist and Tracking Log by Functional Area to the participants.

2.1.4 The Project Construction Manager, with help from other functional participants, will assemble the data for review by the meeting participants prior to the session. This will ensure all relevant information is available and complete.

2.1.4 Send out the meeting agenda and data package to attendees. In the meeting request make it clear that attendance is mandatory. If a person is unable to attend they must send a delegate.

#### 2.2 MEETING GUIDELINES

2.2.1 Construction Manager, or designate, will facilitate the path of construction sessions according to the agenda. Strong facilitation skills are critical to achieving path of construction outputs in the allotted time.

2.2.2 Provide a sign in sheet for the meeting.

2.2.3 A path of construction log should be set up to keep lists of needs, assumptions and parking lot issues, so they can be addressed during the path of construction development.

2.2.4 Review cycles must be established during the path of construction session to ensure progressive elaboration and updates occur during the Front End of the project.

2.2.5 Holiday periods should not be overlooked during the path of construction development process.



Department:	CONSTRUCTION MANAGEMENT	Number: PCM-GP-0001
Subject:	PATH OF CONSTRUCTION	Revision: A

#### 2.3 POST-MEETING ACTIVITIES

2.3.1 The path of construction session provides the basis for or input to the final project modularization strategy, procurement strategy, contracting plan, heavy lift plan, plot plan, work package schedules, and estimate with project team input and buy-in.

2.3.2 Path of construction outputs are critical inputs to participative planning sessions held by project controls to establish the project schedule.

3 **IMPLEMENTATION** (Who is responsible to ensure the document is being implemented)

#### 3.1 REFERENCE DOCUMENTS

CWP Best Practice EWP Standards FIWP Standards WFP Implementation Manual

#### 3.2 APPENDICES

Appendix A - Path of Construction Flow Diagram Appendix B – Path of Construction Inputs, Tools and Techniques, Outputs Appendix C - Path of Construction Input Checklist and Tracking Log

3.3 ACKNOWLEDGEMENTS

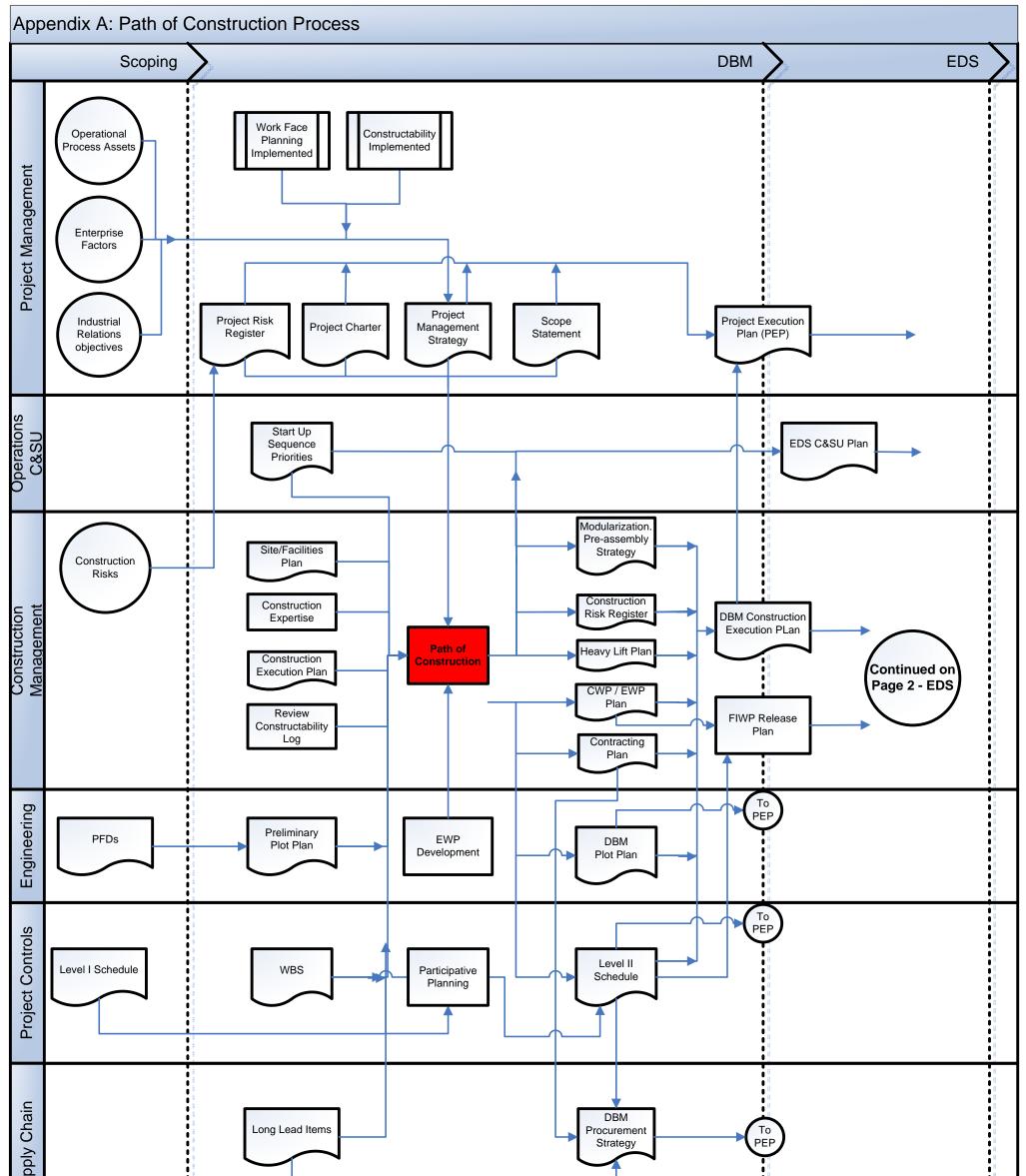
COAA WFP Best Practices Committee Construction Industry Institute

- 4 **INTERPRETATION AND UPDATING** (Accountable for interpretation and updatting to be defined using position titles. Should be one position only.)
  - 4.1 The Director, Construction Management is responsible to interpret and update this procedure.

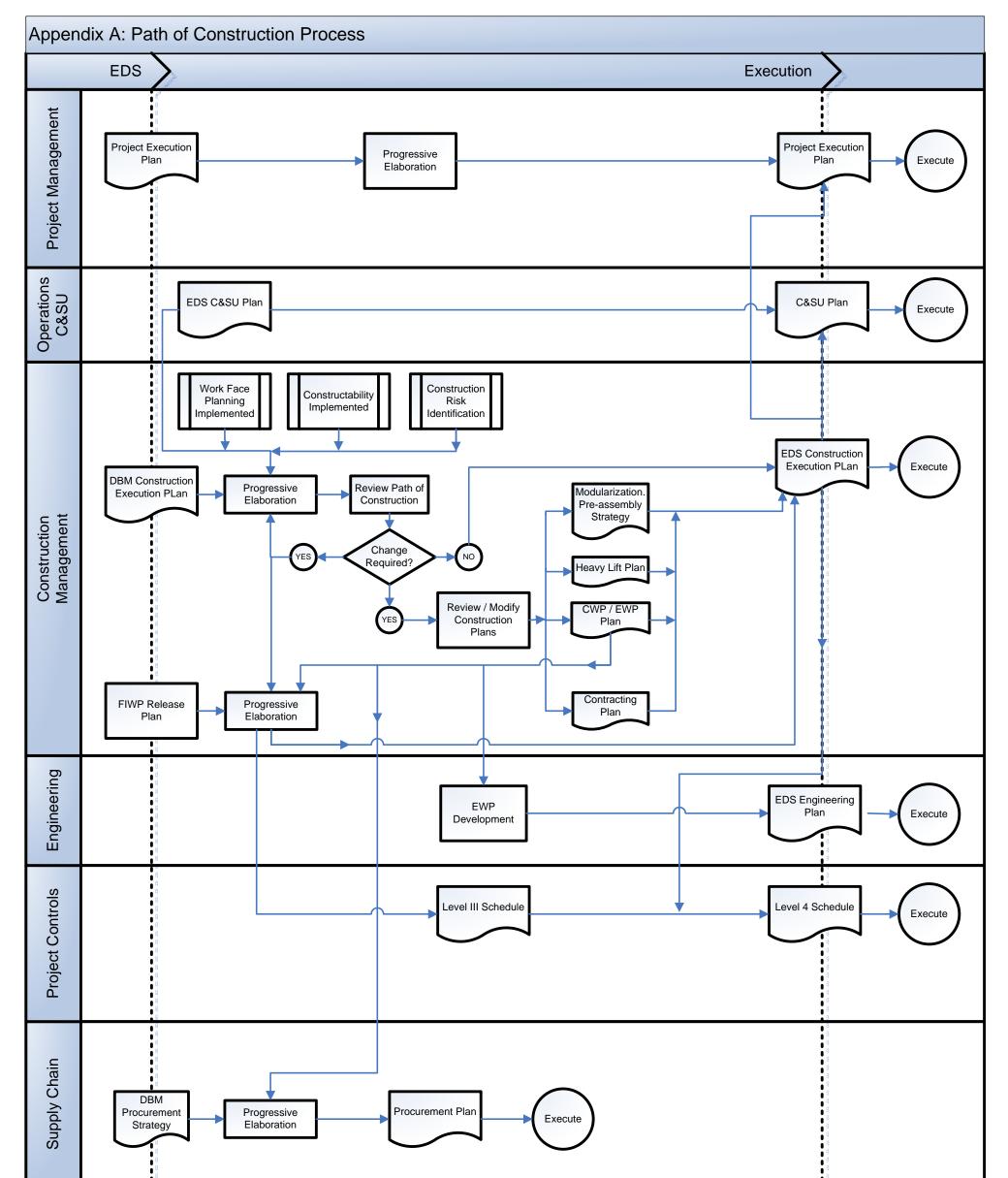
### 5 APPROVED BY

Name Title Department

#### NOTE: ORIGINAL SIGNED COPY TO BE RETAINED BY THE LEAD DOCUMENT CONTROLLER FOR MAJOR PROJECTS



Sul	ゼ 日 日 日	
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### Appendix C: Path of Construction Input Checklist and Tracking Log

Funtional Area	Input	Туре	Due Date (D/M/Y)	Check ✓	Input Owner (specific person)
	Project Charter	Doc			
	Scope Statement	Doc			
	Project Plans	Doc			
Project Management	Project Risks Register	Doc			
	Lessons Learned	Doc			
	Project Execution Plan	Doc			
	Level 3 Schedule	Schedule			
	Constructability Plan	Doc			
	Modularization & Pre-Assembly Plan	Doc			
<b>Construction Management</b>	Construction Execution Plan	Doc			
Construction Management	On Management Heavy Lift Plan				
	Construction Work Package Schedule Schedule				
	FIWP Release Plan	Doc			
	Process Flow Diagrams	Drawing			
	Plot Plan Layout	Drawing			
Engineering	Piping & Instrument/Diagrams	Drawing			
	Engineering Plan	Doc			
	Engineering Work Package Schedule	Schedule			
	Contracting Plan	Doc			
Supply Chain	Long Lead List	Doc			
	Logistics Plan Doc				
	Systems Priority List Doc				
Operations and C&SU	Commissioning & Start Up Strategy	Doc			
	HAZOP study	Doc			

### Appendix B: Path of Construction Inputs, Tools & Techniques and Outputs

Inputs	Tools & Techniques	Outputs
<ol> <li>Project Scope Statement</li> <li>Project Charter</li> <li>Enterprise Objectives</li> <li>Site Plan</li> <li>Commissioning &amp; Start Up</li> <li>Priorities</li> <li>Work Breakdown Structure</li> <li>Plot Plans</li> <li>Project Delivery Model</li> <li>Project Management Plan</li> <li>Milestone Schedule</li> <li>Construction Execution Plan</li> <li>Heavy Lift Requirements</li> <li>Specialty Contractors</li> <li>Procurement Constraints (Long Leads)</li> <li>Organizational Process Assets (Standards, Procedures, Templates, Measurement Data, Project Files)</li> </ol>	<ol> <li>Constructability Techniques</li> <li>Expert Judgment</li> <li>Decomposition</li> <li>Alternatives Identification</li> <li>Activity Sequencing.</li> <li>Activity Duration Estimating</li> <li>Work Packaging – definition</li> <li>Participative Planning</li> <li>Interactive Schedule Development</li> <li>Risk Identification</li> <li>Management of Change</li> </ol>	<ol> <li>Path of Construction Identified</li> <li>Integrated Project Baseline Schedule with Engineering, Procurement, and Construction deliverables identified</li> <li>Contracting Plan</li> <li>Construction Work Package Schedule</li> <li>Engineering Work Package</li> <li>Schedule</li> <li>Field Installation Work Package Release Plan</li> <li>Modularization, Prefabrication and Pre-assembly Plans</li> <li>Construction Management Team Resource Requirements</li> <li>Project Constraints</li> <li>Construction Risk Identification</li> </ol>







Construction Owners Association of Alberta



### Mission For this best practice:

Develop industry stakeholder guidance for process of how on-site incident investigations involving government authorities will be conducted.

Develop a user's guide to help industry personnel guide their actions during such an investigation.



### Construction Owners Association of Alberta



### **Incident Investigation Guidelines**

### **Best Practices committee:**

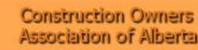
- Co-chair
  - COAA Safety Committee
  - Alberta Employment and Immigration Workplace Health & Safety
- Core Team:
  - Brian Edwards IOR Co-Chair
  - Mark Rice Alberta WHS Co-Chair
  - Eric Reitsma Alberta WHS
  - Randy Gauthier Alberta WHS
  - Edith Cook Syncrude
  - Peter MacEachern Fluor
  - Kevin Mather Novacor (Statoil)
  - Mike Rogers Nexen (Long Lake)
  - Bill Hogan KBR



### **Incident Investigation Guidelines**

### Stakeholders: Stakeholder Benefits

- Industry Owners & Contractors
  - More efficient ... Employees as individuals and as company officials understand;
    - Process to be used ... roles for each stakeholder
    - Their rights & their obligations within that process
    - What to expect during WHS investigations
    - Less time spent developing / understanding process at time of an investigation
    - Transparency in key information collection what, why, how
  - More effective ... Able to talk to involved parties, collect information in a timely manner;
    - Improve accuracy of information collected
    - Improve completeness of information collected
    - Process drives improved quality determining direct and root cause of incident





#### **Incident Investigation Guidelines**

#### Stakeholders: Stakeholder Benefits

- Government WHS investigators
  - More efficient ... An industry that understands the process to be followed
    - WHS authorities roles and responsibilities
    - Steps to be taken within the investigation process
    - Clear expectations for potential outcomes of investigation process
  - More effective ... An industry that understands the process to be followed
    - Investigation "process" is understood and is transparent

#### Construction Owners Association of Alberta



#### **Incident Investigation Guidelines**

#### Scope:

- Alberta OH&S reportable incident
  - Initial notification to completion of government investigation
- Roles and Responsibilities Owners, Contractors, Government Officials

#### Investigation:

- Incident investigation process
  - Collection of information on site by owner, contractor, government agency
     1) Immediately 2) Same day 3) Future days
  - Determining Direct Cause
  - Completion of Investigation Report

#### Excluded

- Owner / Contractor case management
  - Care for the injured party
  - Elimination of release/emission
  - Owner / Contractor incident classification process
- Owner / Contractor incident investigation process to determine root cause

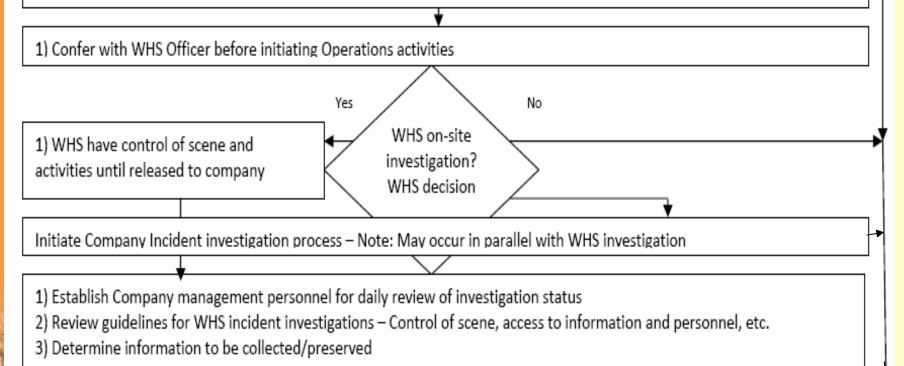
#### Construction Owners COALA Association of Alberta **Incident Investigation Guidelines** Incident Occurs Initial Response 1) Assess risk and secure the Scene 2) Treat & protect personnel Establish Safe Boundaries 4) Protect & Preserve the Incident Scene to the fullest possible extent while ensuring Safe conditions (If, while securing scene - evidence or scene must be disturbed - ensure records are kept - photographs / document) 5) Ensure safety of all personnel (Company, Contractor -compliance with safety standards) In addition - Prime Contractor or Owner Yes responsible to notify appropriate agencies for 1) Establish appropriate company phone Emergency Response or Criminal Activity if Evaluate severity of numbers to complete notification required (ERCB, Local Fire Dept., Transport incident & determine designate contact person & back-up Çanada, RCMP) if reportable to WHS 2) Contact government's WHS (OH&S Act section (1-866-415-8690) - Complete incident 18(2) & OHS code notification process No - Initiate company investigation section 544)

# Incident Investigation Guidelines

Construction Owners

Association of Alberta

- 1) Determine lead investigating Agency WHS, RCMP, EUB, DOT etc
- 2) Establish single Company Contact person for overall incident management Internal and communication with OHS officer
- 3) Contact Company Law Dept (or outside counsel) determine Law Department involvement



COA

#### Construction Owners Association of Alberta



#### **Incident Investigation Guidelines**

Identify Key Personnel/Witness's for Incident Investigation

- Counsel personnel in safe area to avoid cross contamination of evidence.
- · Consider the requirements for witness preparation
- · Consider the requirements for Critical Stress debriefing.
- Consider having witness' independently document their observations both before and during incident review with Company management for clarity, completeness
- · Consider debrief process for witnesses post interview with WHS officer

Establish timing for WHS Officer to arrive at scene - determine what interim steps should be taken

- Ensure that witness's will be available to interview by WHS Officer
- Work with WHS Officer to gather information, materials, samples, equipment, data etc.
- Ensure safety of all personnel (Company, Contractor, WHS Investigating Officers-compliance with safety standard
- Consider photographing aspects of the Incident Scene
- WHS Officers have full authority for their investigation

#### Construction Owners Association of Alberta



#### **Incident Investigation Guidelines**

Record & Obtain Receipts for all documentation, material, equipment, etc. requested by WHS

- Ensure there is a company focal point to manage this process
- Do not provide extraneous material that is not directly related to the Incident

#### WHS Issues Orders where applicable

WHS releases scene and direction of activities to Owner - WHS continues internal review process - 3 possible outcomes;

- WHS can require responsible party's report be made readily available; or
- WHS investigation report issued to all stakeholders; or
- Alberta Justice to lay charges (2 yr less a day) summons issued to party charged

Complete company internal incident investigation - determine root cause

 Prepare incident investigation report per section 18 of OHS Act – review for completeness and correctness - ensure address time frame and process steps leading up to incident

> Establish Corrective Actions

Address causes of incident – may be direct, indirect, root causes
 Address other findings (direct or systemic) from incident investigation process



#### **Incident Investigation Guidelines**

Key Messages – Owner / Contractor

- 1. Understand the legislation Compliance with OH&S Act;
  - Reporting incidents Company investigation report made available to OH&S
  - Scope, powers of investigating officer
  - Duties and obligations to comply
- 2. Secure the scene
  - Control entry Focus on preservation / documentation of evidence
- 3. Assign a site contact person to interface with OHS
- 4. Create a site management team to manage process
- 5. Ensure care of witnesses
  - Consider need for critical stress debriefing formal or informal
  - Prepare witnesses
    - Guidance Complete, Factual, Don't speculate, Understand question etc.
    - Counsel may not be allowed in room can request to receive advice
    - In general, statements cannot be used against individual
  - Immediately start process of collecting statements
  - Debrief post interview with WHS investigating officer

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#### **Incident Investigation Guidelines**

Key Messages – Owner / Contractor

- 6. Understand the process to be followed;
  - Authority under which investigation is occurring
  - Effective preservation of evidence
  - Required to provide a broad range of information
- 7. Flow information through a defined channel
  - Log all items, information provided attach receipts to log
- 8. Required to provide information which may help WHS investigation
  - Use site management team to guide this activity
- 9. OH&S control the scene until returned to owner
  - Owner is responsible for safety of all parties on-site
- 10. Start own investigation as soon as possible
  - Can occur in parallel with WHS investigation
  - Consider whether to conduct under soliciter:client privilege should be decided at start of investigation



Construction Owners Association of Alberta



Incident Investigation Guidelines Questions ?

#### Best Practice - Publish Q4-2009

- Process Flow
- Guidance document
- Tools
- FAQs





Freedom To Create. Spirit To Achieve.

# Reporting and Investigating Injuries and Incidents

#### Alberta Employment and Immigration





Freedom To Create. Spirit To Achieve.

# **Presenter: Mark Rice** *Policy and Legislation*



## **Key points**

- Role of government
- Occupational Health and Safety Act
  - Obligations on employers and workers
  - Authority of OHS Officers
- What happens after an incident is reported
- Endpoint of an investigation
- Available resources



# **Role of government**

- Neutral party with many stakeholders
  - Employers
  - Workers
  - Workers' families
- Works in the public's interest
- We are all in this together
- We all have the same goals



## **Occupational Health and Safety Act** Section 18

 Creates obligation for prime contractor, contractor, or employer responsible for the worksite to **notify** Government of Alberta of any serious injury or incident
 – Report as soon as possible



## **Occupational Health and Safety Act** Section 18

- The following injures and incidents must be reported:
  - Result in death
  - Hospitalization for more than two days
  - Unplanned or uncontrolled explosion, fire or flood that causes or has potential for serious injury
  - Collapse or upset of a crane, derrick or hoist
  - Collapse or failure of any component of a building or structure necessary for its structural integrity



## How to notify the government

Report serious injuries and incidents to:

- Government of Alberta's Workplace Health and Safety Contact Centre
  - **1-866-415-8690**
  - 24 hours per day, 7 days per week



# **Mining operations**

- For dangerous occurrences at a **mine or mine site**, there are additional reporting requirements
- Described in section 544 of Occupational Health and Safety Code
  - Major ground falls
  - Stoppage of underground ventilation
  - Out-of-control vehicles
  - 8 other situations



Government

of Alberta

## **Occupational Health and Safety Act** Section 18

- Creates obligation for prime contractor, contractor, or employer responsible for the worksite to investigate any serious injury or incident (internal investigation)
  - Determine the circumstances surrounding the injury or incident
  - Prepare a **report** including corrective actions
  - Report to be available for 2 years for inspection by an OHS Officer



## **Occupational Health and Safety Act** Section 18

- A person may not **disturb the scene** of a serious injury or incident unless:
  - Attending to persons injured or killed
  - Preventing further injuries
  - Protecting property that is endangered
- A Director of Inspection, OHS Officer or a peace officer may grant permission for the scene to be disturbed



## **Occupational Health and Safety Act** Section 19

- OHS Act gives **authority** to an OHS Officer to attend scene of accident and make any inquiries to determine cause and relating circumstances
  - OHS officer authorized to use his or her own discretion in determining what is necessary



Government

of Alberta

## **Occupational Health and Safety Act** Section 19

- Every person with information must cooperate with the Officer and provide information upon request
  - Witness statements
  - Documentation
  - Other assistance
- Under section 2 of the OHS Act, the employer is responsible for the health and safety of the OHS officer



## **Occupational Health and Safety Act** Section 19

- Related to an accident, an Officer may seize or take samples of any
  - Substance
  - Material
  - Product
  - Tool
  - Appliance
  - Equipment
- An Officer must provide a **receipt** when a sample is taken away from the worksite
- Items can be returned when no longer needed



## **Other powers of OHS Officers**

- In addition to powers to investigate
  - OHS Officers have powers to inspect worksites at any reasonable time
  - Order people responsible to remedy unsafe conditions
  - Issue stop work orders
  - Issue stop use orders for tools, equipment, etc.
- These powers are always in place even when an Officer is conducting an investigation



# After an injury or incident has been reported

- One or more OHS Officers may be dispatched to visit the scene
- An Officer may inspect the worksite or conduct a formal government investigation
- An employer must complete an internal investigation regardless of whether there is a government investigation
- Charges could result



# Endpoint of a government investigation

• The Crown has up to 2 years less a day after the alleged offence to lay charges





## Resources

- Workplace Health and Safety Bulletin: Reporting and Investigating Injuries and Incidents
  - Describes employer obligations
  - Includes sample forms for internal investigation reports and witness statements
- Work Safe Alberta Incident Investigation
   eLearning Program
- Resources available at worksafely.org



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# **Presenter: Randy Gauthier** *Investigations*



#### **Key Messages**

- Introduction to WHS
- Field level interface/Chronology
- Outcomes



# Field level interface/Investigation

- An incident has occurred
- Recognize that it has the potential to be a reportable incident.
- Contact the Alberta contact centre to report the event.
- During business hours you will reach a contact centre person who will ask a number of questions.
- The information gathered will be used to best direct the Investigator to the site and to allow contact with the site prior to arrival.
- At this time you can expect to be contacted by an OHS officer











- The Officer investigating will contact the caller or the site representative.
- This conversation will be to gather some preliminary information about the circumstances surrounding the event and the location.
  - This allows the officer to adequately prepare for the hazards or challenges the site may provide. If the site is isolated and the event appears to be complex the officer may need to arrange for specific equipment for communication. They may have to pack additional clothing or PPE that is appropriate for the hazards at the site.
  - Sleeping arrangements may have to be organized.
  - If the injured person has been transported off site to a hospital the officer will need specific information about the patient in order to plan for a visit at a later time or to receive the medical examiners report.



- The officer will answer any questions the caller might have.
- The officer will indicate how they would like the site to be protected. This may involve a verbal stop work order over the phone of some or all of the processes at the site that contributed to the event.
- Before disturbing the site in any way, other than to attend to the injured persons, consult with the lead investigator.
- There may be a time lapse between the initial call and the officer's arrival. The officer will provide direction as to what the employer can or can't do prior to arrival.



- Concern for officer safety and the safety of others at the site.
  - Equipment may be needed
  - Radios
  - PPE
  - Specific site safety procedures
  - Emergency response plans



#### AND WHERE SHO You Will Not Proceed STOP **Beyond This Point Unless You Have:** permission from South Gate two-way radio communication with channel #5 range control approved range map • aerial whip flag Failure to comply with the above conditions will result in immediate dismissal from air weapons range.



### **Information collection**

- Photos
- Measurements
- Training records
- Certifications
- Statements
- Log books
- Maintenance records









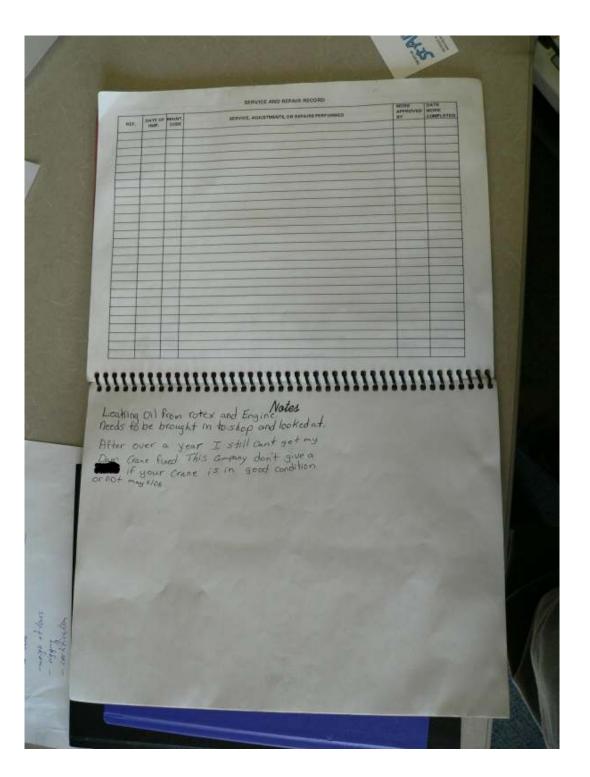














## 

Licaking Oil From rotex and Engine. Needs to be brought in to shop and looked at. After over a year I still can't get my Dam Grane fixed. This Company don't give a find if your Grane is in good condition or not. may 11/06.







#### **Outcomes**

- Once the officer returns the site back to the employer they can proceed with their own investigation.
- Officers will request to view the investigation once complete.
- Any physical evidence that was removed will be followed by a receipt. The officer will provide a Client Contact Report to the person or party the item was taken from.
- Officers may observe other contraventions to the OHS legislation and could issue orders to have the infractions rectified. Officers may do additional follow up at the site.
- When the officer has completed the investigation they will generate a report that is reviewed by the Executive director for WHS. If there is enough evidence to show that the responsible parties were not in compliance with the legislation the file may be forwarded to Alberta Justice for review.

Construction Owners Association of Alberta



## Contracts Committee Workshop

#### "More Construction For Your Money"



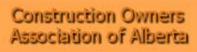
May 20, 2009

COAA Best Practices Conference XVII - 2009



#### Workshop More Construction for your Money

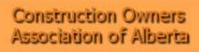
- Introduction: Dariel Suhan
- Moderator: Jim Freiburger
- ➢Panelists:
  - David Claggett, Kiewit Energy
  - ➢Ron Genereux, Suncor
  - ➤Ian Johnson, PCL
  - Bill Kenny, Miller Thomson
  - Grant Martin, TransCanada





## Industry standards for contracts will significantly reduce costs and cycle time.

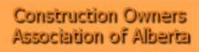






#### Contract risk elements – liability, indemnification, warranty, and insurance are highly contentious.

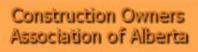






## A well defined project scope is critical to the contract and a successful project.

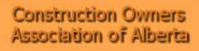






# Clarity of roles and an effective communication structure will reduce project costs.







#### Lobbying for change to the Builders' Lien Act can reduce project costs for the heavy construction industry.



Construction Owners Association of Alberta



#### THANK YOU FOR ATTENDING THE WORKSHOP

PLEASE FILL OUT THE FEEDBACK SHEETS ON THE BUILDERS' LIEN ACT INITIATIVES IN YOUR REGISTRATION PACKAGE OR ON THE COAA WEBSITE



COAA Best Practices Conference XVII - 2009



## Industrial Construction Crew Supervisor Development ICCS

Best Practices May 2009



•Identify User Groups

- •Administrative/Management
- Decision Makers

Student Development
 (Potential/Current Supervisors)



•Create Personas

Representative of User Groups

•Identify needs of user groups/personas



Identify/Develop Necessary Content

•Based on user tasks

•Gather Resources

•Current Best Practices

•Other available relevant sources of information



•Currently working with web developer

• <u>www.iccsalberta.ca/</u>



## Industrial Construction Crew Supervisor Development ICCS

Best Practices May 2009

## Journey STARTShere

#### Industrial Construction Crew Supervisor (ICCS) Development We Can Help Point The Way

A COAA Best Practice developed by the Supervisory Training & Qualifications Sub-committee

#### Industrial Construction Crew Supervisor Development

The Construction Owners Association of Alberta (COAA) takes pride in its premier Best Practice of growing the supervisory skill capacity of construction foreman, within the industrial construction industry.

This Best Practice, presented in the form of an interactive website, provides foremen and industry stakeholders with specifically targeted information, tools and resources which correspondingly result in greater on the job success. The website contains information on:

- The Roles, Responsibilities and Requirements of a Construction Foreman.
- Industry recognized training for Construction Foremen.
- How to obtain the Industrial Construction Crew Supervisor (ICCS) Designated Occupation Certificate offered by Alberta Apprenticeship and Industry Training.
- How to identify specific training and development needs for your foremen, by using a 360 degree feedback assessment tool.
- How to select workplace coaches, along with the resources that help coaches become more successful in developing the job skills of new foremen.

Construction organization's and their foremen will find this Best Practice website useful in developing skills that improve safety, build teamwork, grow employee morale, and enhance productivity. We invite you to put the information and tools available on this website to work for you.





Website launch Fall 2009 Watch your e-mail and other publicity material for notification of the website address.



## Marketing Ideas

•Making contact

•Email notifications

Notebooks (pocket)

Posters late summer
Building Trades
Lunchrooms
Contractors
Individual Companies
Associations



## Marketing Ideas

Your ideas and suggestions?Send them our way!



#### Thank You

•Questions?



•What's your initial response to the website?



•What information could you use to develop the foremen in your organization or on your project? Is there sufficient information? Is there something missing?



•How can we as an industry promote the website ?



•Is the distinction between <u>ICCS</u> <u>Development</u> and <u>requirement for</u> <u>ICCS designated occupation</u> clear?

•Does a different name need to be used for ICCS Development? If yes, what are your suggestions?



•*The Skills Development Tool for Construction Trades Foremen* CD (an assessment tool) was launched last year at Best Practices.

• Do you know what this tool is?

•Are you using it? Explain



#### Endorsement/Contact List

•Are you interested in adding your company or organization to our website?

•Are you interested in giving us further feedback on our website?

 Contact – Elizabeth Krywolt, Co-chair elizabeth.krywolt@gov.ab.ca



#### Endorsement/Contact List

•Are you interested in becoming active on our committee?

•Contact – Elizabeth Krywolt, Co-chair

elizabeth.krywolt@gov.ab.ca



Thank You
Electrical Contractors Association of Alberta
Apprenticeship and Industry Training
CEDA

- Have sponsored/paid for major portions of our website and advertising to make this project happen!



## Thank You Also...

•Bantrel Constructors

•CLRa

•Fluor

•Syncude

•TIW Western

•Government of Alberta

•Flint

•CLAC

•ECAA (Labour Relations)

•CEDA

Lockerbie & Hole

•UA Local 488

Merit Contractors
 Association

## Improving Construction Productivity on Alberta Oil and Gas Capital Projects

#### COAA Annual Conference May 21, 2009, Edmonton

Dr. George Jergeas PEng Department of Civil Engineering Schulich School of Engineering University of Calgary

#### The Team

- Lori Schmidt Sr. Director, Productivity Industry Development Branch Alberta Finance & Enterprise
- 2. Patricia Armitage Director, Architecture/Engineering/Construction Industry Development Branch Alberta Finance & Enterprise
- 3. George Jergeas Professor of Project Management Civil Engineering Schulich School of Engineering University of Calgary

## Agenda

- Objectives of this presentation
- My mandate
- Investigation
  - Literature search
  - Industry survey
- Top 10 areas for improvement
- Workshop
  - Barriers and
  - Implementation strategies

### **Objectives of this Presentation**

- Review research findings
- Receive feedback
- Increase awareness of issues relating to construction productivity



- 1. Determine gaps in the literature
- 2. Determine productivity needs
- 3. Categorize and prioritize productivity factors



Literature search

Industry survey

#### Literature Search

- Research centers in Australia, Canada, USA, UK
  - Focus on civil and building structures
  - Less relevant to Alberta oil and gas projects
- U of A, U of C, COAA

## **Industry Survey**

- Survey question
  - What do you suggest to improve construction productivity in delivery of the oil and gas capital projects?
- 77 highly experienced people
  - Owner, EPC and Constructors
- 309 recommendations

## Top 10 Areas

- Labour Management, Conditions and Relations
- 2. Proper Project Planning and Work Face Planning
- 3. Construction Management and Support
- 4. Engineering Management
- 5. Effective Supervision and Leadership
- 6. Communication
- 7. Contractual Strategy and Contractor Selection
- 8. Constructability in Engineering Design
- 9. Government Influence
- 10. Modularization, Prefabrication, Pre-build in Shops

#### 1. Labour Management, Conditions and Relations

- Incentive programs
- Remote locations
- Access to job-site
- Labour management and relations
- Resource scheduling (shift and overtime)
- Training and certification of workforce

2. Project Front-end Planning and Work Face Planning

- Proper amount of FEL complete before execution (Design and Construction)
- Implement work face planning

# 3. Management of Construction and Support

- Tools
- Equipment
- Access to site and site layout
- Camp facilities
- Travel
- Health programs
- Scaffolding
- Safety
- Management of change and rework minimization
- Material management and supply chain management
- Quality
- Contract administration
- Progress measurement

## 4. Engineering Management

- 80 -100 rule
  - 80% of engineering complete before mobilizing to site
  - 100% of IFC drawings before construction
- Enhance quality of engineering organizations
- No fast tracking
- Design review by construction and operation

5. Effective Supervision and Leadership

- Supervision to labour ratio 1 8 to 1 20
- Accountability of scope time and cost
- Organized management
- Decision making and follow-up
- Empowerment

### 6. Communication

- Recognize challenges of communication on mega projects
- Daily communication
- Clarity of roles
- Clear lines of communications
- Minimize levels of communications
- Well coordinated team

# 7. Contractual Strategy and Contractor Selection

- Select appropriate contracting strategies
   CM
  - Lump sum
  - Make procurement/ material handling the responsibility of single company
- Break the project into smaller projects
- Use liquidated damages
- Contracts with incentives
- Avoid fast tracking
- Proper risk allocation

#### 8. Constructability in Engineering

- Involve operation and construction in detailed engineering
- Timely constructability inputs
- Seek lessons learned, best practices
- Standardize design
- Fit for purpose
- Simplify owner processes, procedures

### 9. Government Influence

- Pace the startup of mega projects
- Look at other countries experience
- Withhold regulatory approval until a target FEL is reached
- Remove cross provincial and trade barriers
- Increase royalties during boom times and use it during bust times
- Improve infrastructure in and around Fort McMuarry
- Ensure sustainable development

# 10. Modularization, Prefabrication, Pre-build in Shop

- Use standardization in plant design and construction
- Do as much work in vendor's shop
- Standardize drawings, vendors
- Modularize
- Use prefabricated units

#### Conclusions

- We can improve our performance
  - It is not impossible
  - Commitment
- Stakeholders have a role to play
  - Owner
  - EPC
  - Contractor and labour
- Lessons re-learend
  - Barriers to implementation

# Workshop

Individually answer the following two questions:

- 1. List three barriers that, in your opinion, prevent implementing productivity improvement ideas presented today?
- 2. Provide your solution to overcome these barriers?
  - You may use a chart showing a solution for each barrier.
- 10 minutes to prepare
- 10 minutes to present

#### **Construction Productivity Barriers**

	Name: B	Business:	Years of Experience:
T	Barriers	What to do	to overcome barriers?
-			



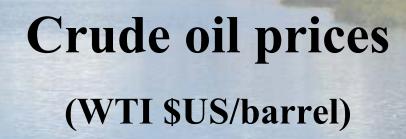
#### Economy 2009: Green Shoots of Optimism? Or False Start?

Todd Hirsch ATB Financial Senior Economist

Construction Owners Association of Alberta May 19, 2009







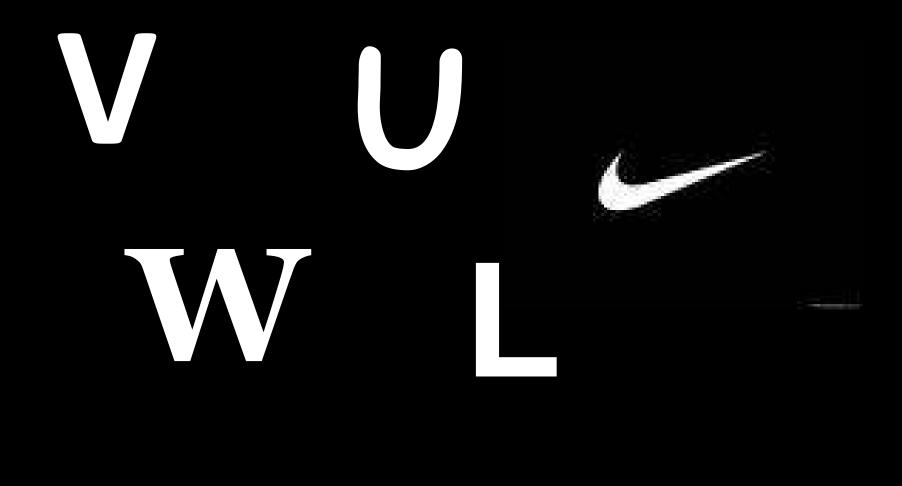
\$147

\$56





#### The shape of things to come?



and Staff at the Washington, D.t organization of movement, become an fying the organi headquarters, six regional offices natment 000 places and rev and 26 historic sites work with the nities. Recip 270,000 members and thousands of ties Medal preservation groups in all 50 states. and prov 3 vocacy 1-Jobs Available places ng Ja-Staff ded ter Sorry, no jobs! ad-S laceat the Real Estate gional This beautiful 4 bedroom, 3.5 bat th the rvation custom home has pool, hot tub 2 goldfish pond all on a v ooded flaglot.- F ncreased build-





#### **Construction Best Practices Conference**

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#### Energy -- oil sands role

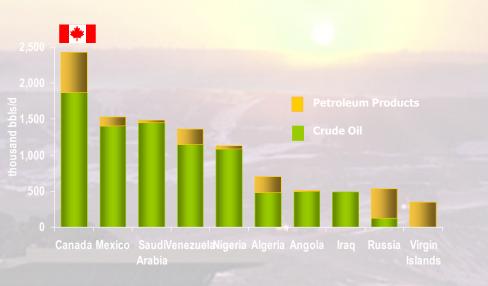
- Canada's total oil reserves 179 billion barrels<sup>1</sup>
- Oil sands represent 45% of Canada's total crude oil supply
- Canada is largest supplier of crude oil to the U.S.
- World energy demand expected to increase 57% from 2002 to 2025<sup>2</sup>
- Canada one of the few countries that can grow crude oil production

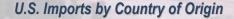


Global Oil Reserves

#### **Economy – oil sands contribution**

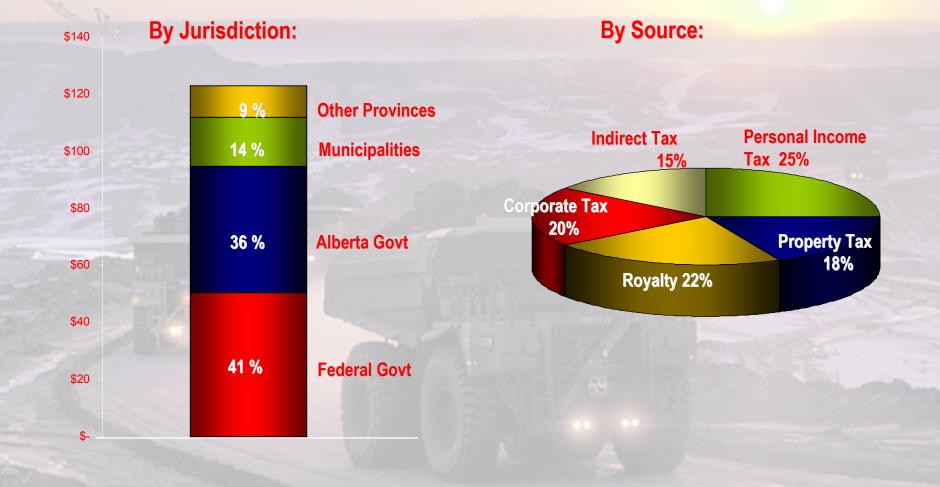
- Invests over \$10 billion annually into the Canadian economy
  - Every dollar invested creates
     \$9 worth of economic activity
- Represents 240,000 jobs directly and indirectly
- Enables Canada to be net exporter of crude oil (U.S. is net consumer)



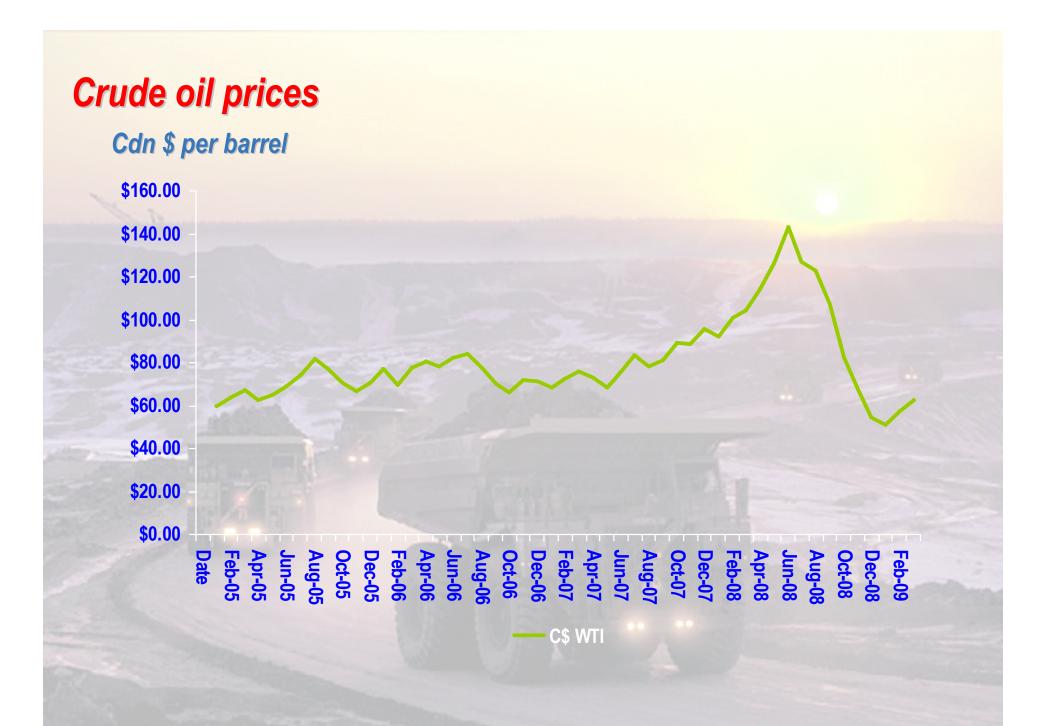


#### Government revenue from oil sands (2000 – 2020)

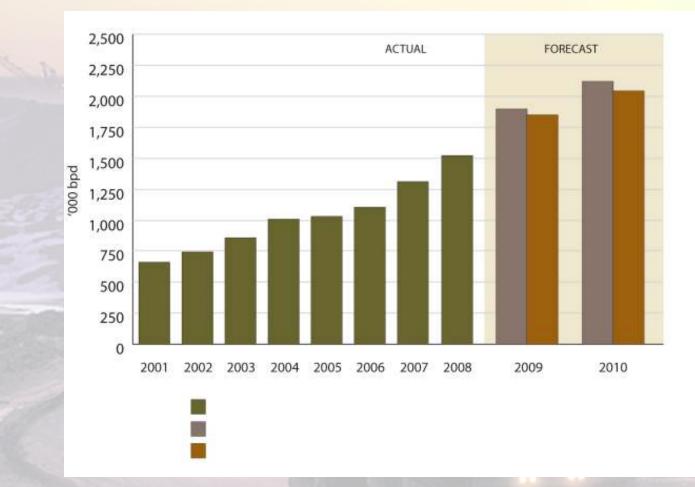
\$123 Billion



Source: CERI – Economic Impacts of Alberta Oil Sands, Oct 2005



#### **Despite setbacks, oil sands production expected to increase<sup>1</sup>**



<sup>1</sup>Bitumen forecast for all Alberta oil sands projects – original estimate (January, 2008) and adjusted estimate per public announcements (January 26, 2009)

Source: CAPP and Nichols Applied Management

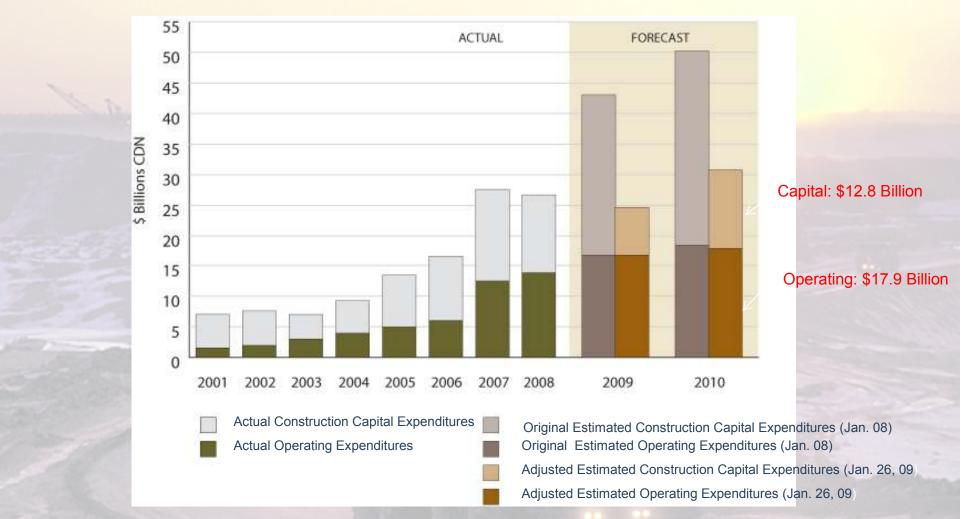
### The oil sands economy: built to last

#### Operating expenditures will continue to climb:

- As long existing facilities continue to be operated and maintained and,
- recently completed facilities start up and are ramped to full production
- Growth Capital has been significantly constrained but prudent investments are still projected

The quality and magnitude of Canada's oil sands ensures its continued contribution to secure energy supplies

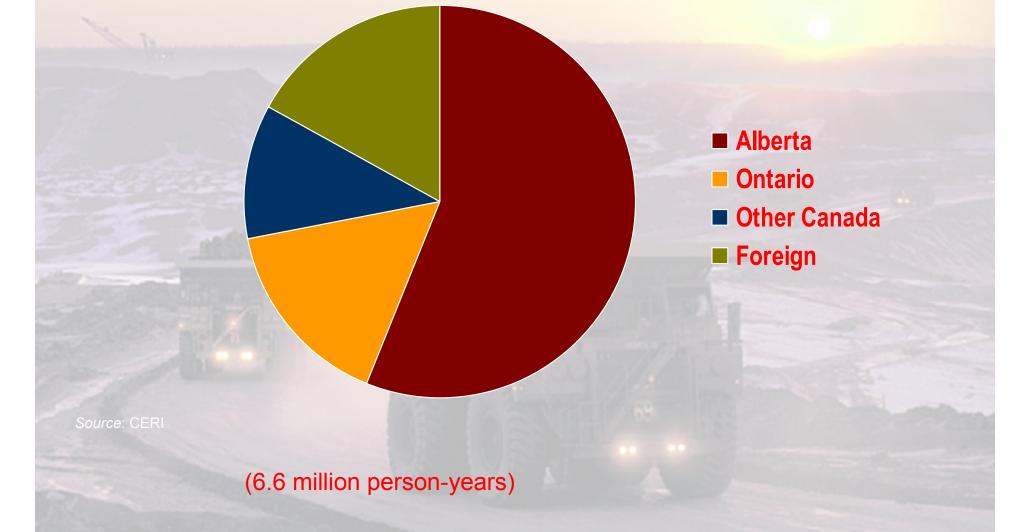
#### **Combined oil sands expenditures: historical and estimated**<sup>1</sup>



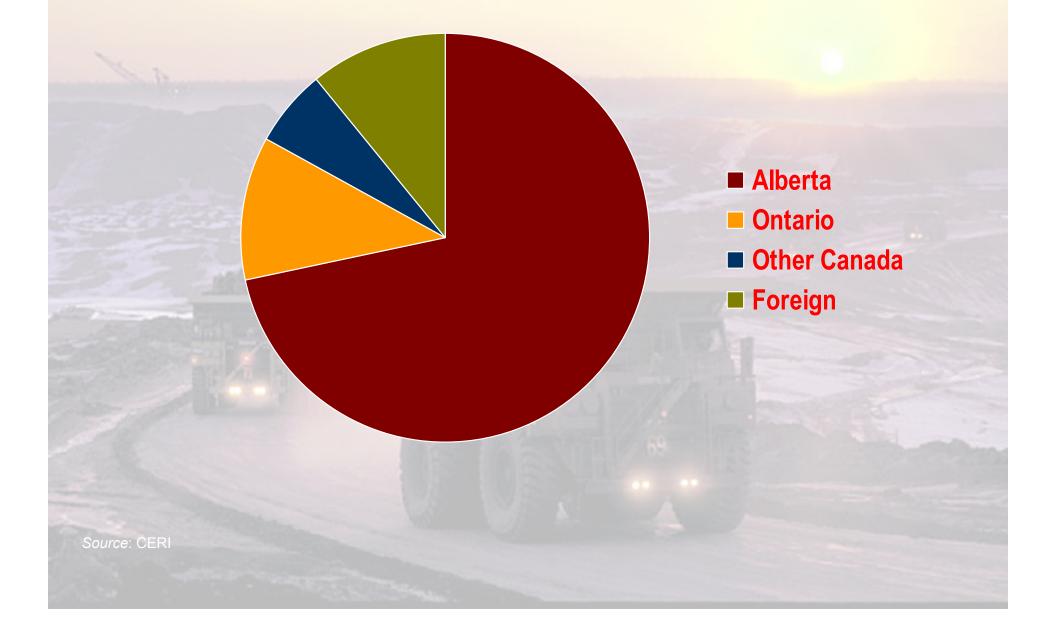
<sup>1</sup>2008 construction capital expenditure estimate for all Alberta oil sands projects, including related pipeline, upgrader and co-generation projects – original estimates (January, 2008) and adjusted (January 26, 2009) per public announcements.

Source: Construction Capital: CAPP and Nichols Applied Management, Operating Expenditure – Nichols Study

### A reliable source of employment



### **GDP Activity Contribution = \$885 billion**

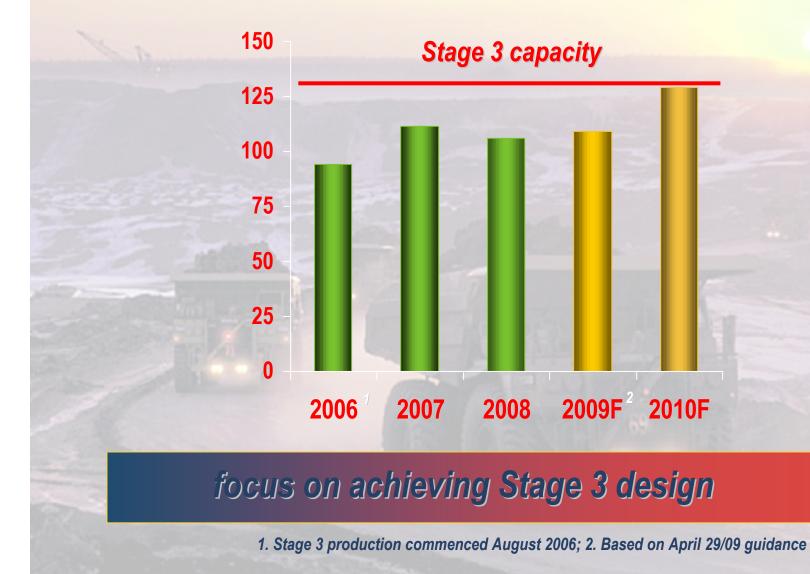


### Areas of strategic focus for Syncrude

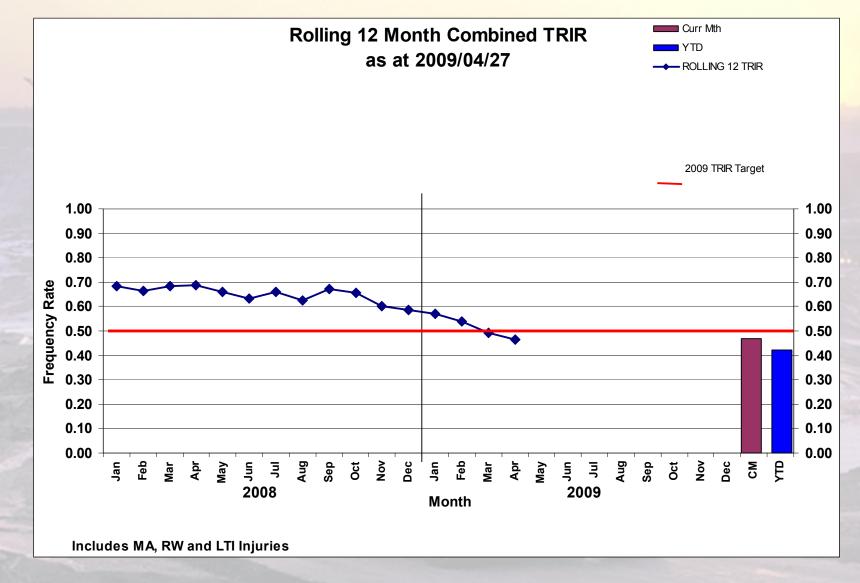
- Operations
- Growth
- Sustainability

## Syncrude total production vs. design

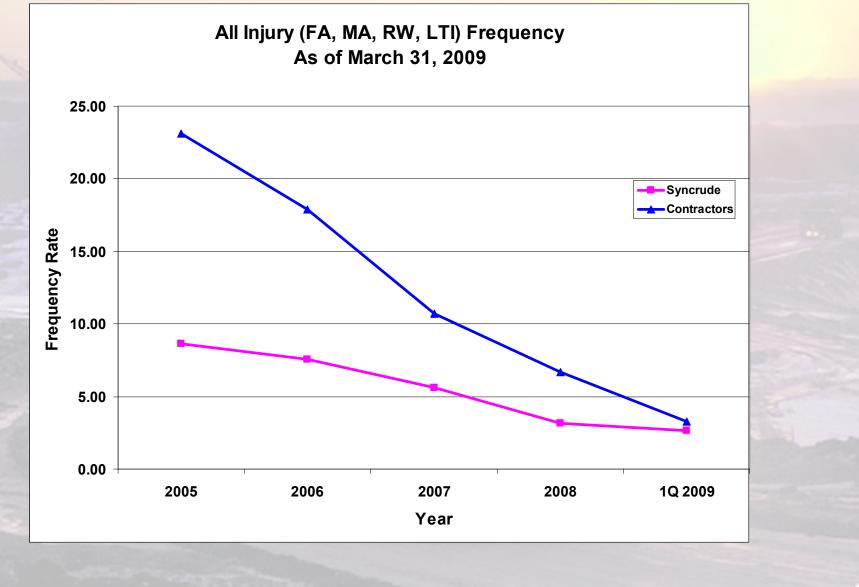
#### Million barrels annually



### A Reliable Operation is a Safe Operation



## Safety Performance: Syncrude vs Contractors



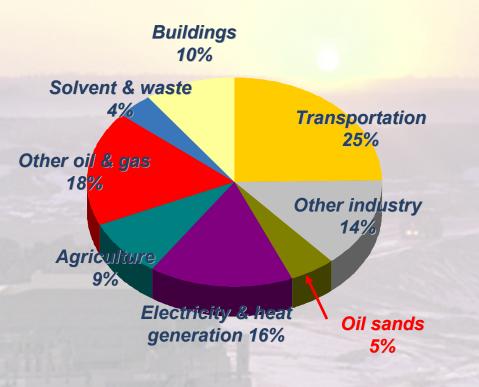
### Syncrude – industry leader in reclamation



- Reclaimed 22% of disturbed land (4,500 hectares)
- Planted 5 million trees and shrubs
- Received Alberta government's first reclamation certificate
  - Researching new tailings technologies – 2 methods currently being implemented

### **Environment – impact on air, GHG emissions**

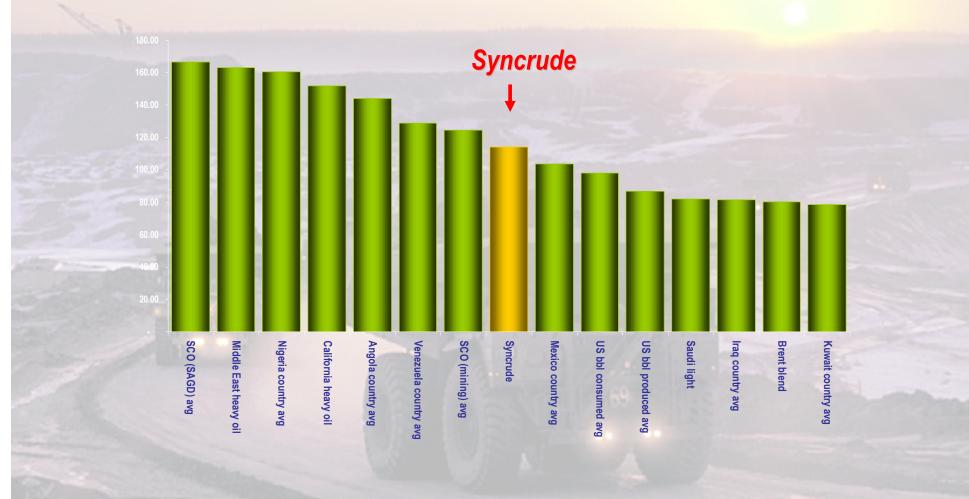
- Oil sands industry focused on reducing GHG emissions
  - reduced energy intensity by 27% since 1990
- Oil sands industry accounts for:
  - 5% of GHG emissions in Canada
  - 0.1% of global energy-related GHGs



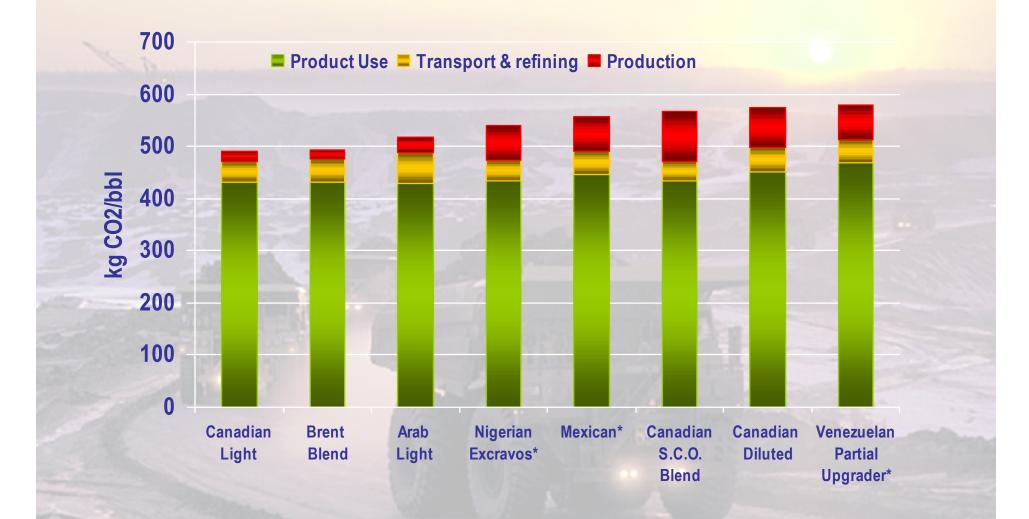
Canada's GHG emissions by sector

## Syncrude CO<sub>2</sub> emissions vs other sources of crude oil

#### Kg CO<sub>2</sub>e emitted for every bbl of crude oil



### Wells to wheels: where are the emissions?



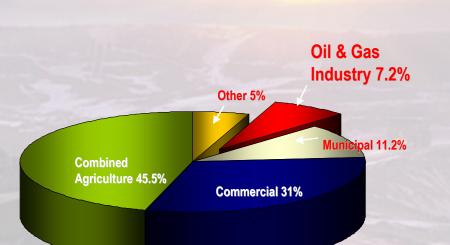
Source: CAPP, study by Tom McCann, 2001

### Syncrude performance –GHG emissions, air quality

- Focus: improve operational efficiency to reduce CO<sub>2</sub>
- Reduced flaring by 50% in 2007 vs 2006
- Member of Integrated CO<sub>2</sub> Network (ICON)
  - Explore the viability of carbon capture, transportation and storage
- Syncrude Emissions Reduction project designed to reduce:
  - Sulphur emissions by 60%; and
  - Particulate emissions by 50%

### **Environment – impact on water**

- Athabasca River one of least used river basins in Alberta
- Strict limits placed on usage
  - Less than 3% of average annual flow of the river
- Oil sands industry uses less than 1% of average annual flow
- Extensively monitored since the early 1970s, no detectable change in water quality



Total water allocation in Alberta (includes surface and ground water)

### **Responsibly Contributing to the Economy**

- The oil sands will be a reliable economic generator if we lower our cost structure, improve operational and safety performance, and progress on environmental challenges
- Much progress has been through four decades.
   Much more remains to be done
- All those who have a stake in the oil sands can contribute, and all will benefit

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Construction Best Practices XVII "It's Going to Get Better – We'd Better Get Going"

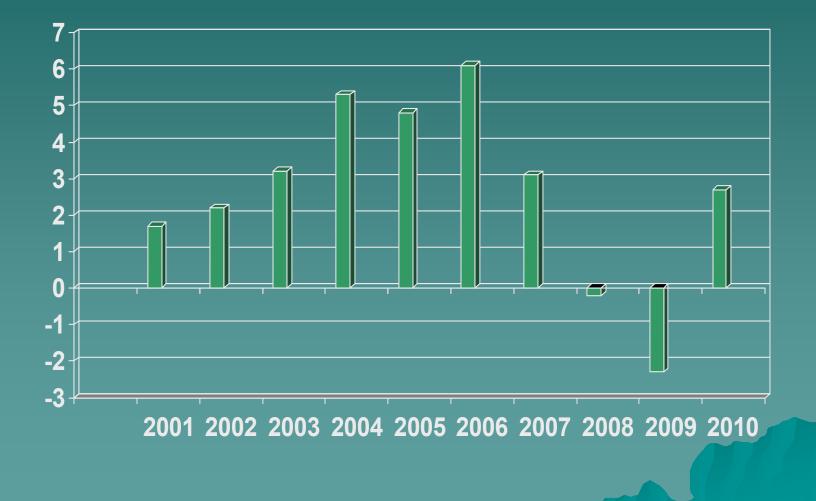
> May 19, 2009 Shaw Conference Centre Dr. Michael Percy

Where We Are Today – **Conventional Wisdom** ◆ U.S. and Europe in recession – the very worst since the Great Depression Canada is in recession – Central Canada in particular caught in backwash of U.S. downturn and long-term restructuring of its mature manufacturing sector Alberta entered recession in late 2008 but impact far less than in rest of Canada

# Key Driver of Energy Prices

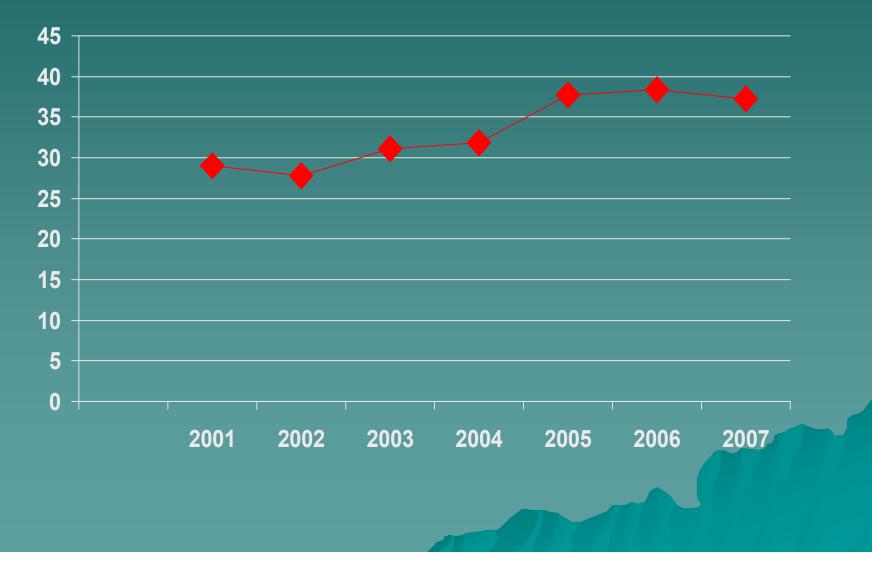
 Economic growth in China and India was key to sustaining high commodity prices and overall low inflation environment that defined the period 1990 - 2008

#### Alberta Percentage Real GDP Growth (2002 chain linked dollars) (Statistics Canada 13-016-XIE; 2009-10 (f) by RBC)



### Gross Fixed Capital Formation and Inventories as a share of Alberta GDP

(Chained (2002) dollars) Statistics Canada 13-016 XIE

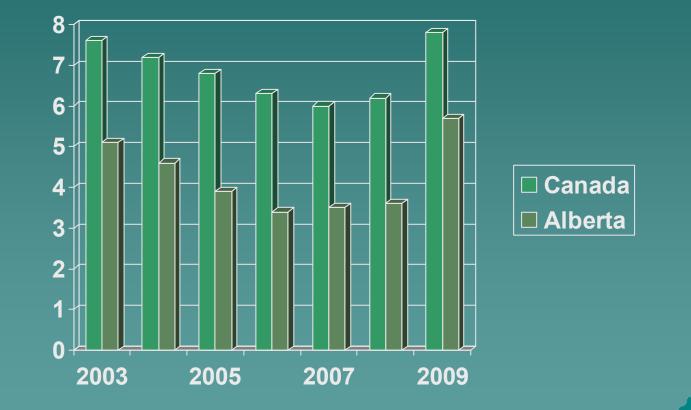


Inventory of Major Alberta Projects, (projects over \$5 million recently completed, currently under construction or are proposed to start within 2 years)

Value of Projects Billions\$ Oct/06 Nov/08 Feb/09 April/09				
С	)ct/06	Nov/08	Feb/09	April/09
– Oilsands	\$90	\$172	\$157	\$131
– Infrastructure	\$13	\$21	\$20	\$19
– Institutional	\$11	\$14	\$13	\$14
sub-total	\$114	\$207	\$190	\$164

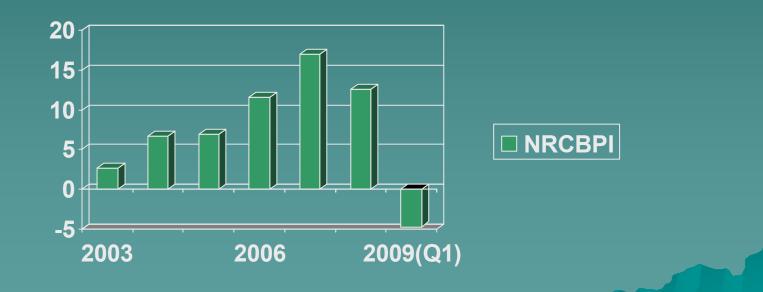
Total \$148 \$279 \$262 \$234 www.albertacanada.com/statpup/albertaConstructionProjects/)

#### Unemployment: Alberta/Canada 2003 -2009 (Statistics Canada 2003-08; RBC (f)2009



# **Construction Costs**

Annual % change non-residental construction costs (Edmonton CMA)



# Oil Sands Break Even

Sharp rise in break even in light of:

- Rising material costs
- Rising labour costs and skill shortages
- Conventional wisdom now says 70\$ barrel WTI is now break even (before de-bottlenecking)

# Energy Price Outlook

- WTI \$55 to \$75 per barrel May 2010
- Some even more optimistic given low productivity levels of state-owned energy companies globally
- Natural gas prices flat at best at current levels
- Rigs drilling down 60.8% March 08-09

# **Project Risks Remain High**

- Environmental regulations and pricing of carbon – when, how, and how much?
- Construction costs remain high and productivity variable at best
- Credit crunch and liquidity

# Good News is that...

- Oilsands plants driven by longer term perspectives on oil prices not cyclical factors
- Supply chain of operating oil sands plants source of continuing demand
  - Plants are 24/7 operating entities ¾ billion dollar expenditure on goods and services – much of it Red Deer North
- Province's expenditures on infrastructure much like countercyclical fiscal policy

# Challenges

 Over and above global recession and its impact on energy prices and demand for Alberta exports we will see:

- Provincial government will have to reduce growth of program expenditures
- Likely to see deferral of upgrader/oilsands investments until three issues resolved:
  - Credit crunch is resolved
  - Canadian and U.S. environmental policies set out and costs identified
  - Provincial Bitumen policy set out

# Challenges (2)

 Province (and likely joint EIAs) will assess cumulative impact of projects
 Pressures for full-cost accounting

- How do we price carbon?
  - Province prefers mechanisms which keep revenues in province – fund new technologies and efforts to adopt CCS
  - U.S. Administration appears committed to "Cap and Trade" → Cdn. federal govt. adopting same posture
    - Key issues allocation of emissions base free or auction
    - Exemptions

# Engaging Environmental Organizations – Absolute Necessity

- Lessons to be learned from the forest sector – third party validation tops selfpromotion
- Necessity of engaging key environmental groups
  - More established groups well funded, business plan driven
  - Well-trained, highly motivated leadership who excel in communications
  - Need success to maintain credibility what are the price-points?

## Secular Trends

 Alberta will continue to be viewed as secure source of energy in North America and investments in oil sands will continue
 Globalization will continue to see any mature manufacturing or service activity move offshore → niche of Alberta and North America is in new technologies and human capital intensive production