

# Improving Construction Productivity on Alberta Oil and Gas Capital Projects



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# The Team

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# Agenda

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- 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

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



# My mandate

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



# Investigation

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- Literature search
- Industry survey



# Literature Search

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- 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

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- 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

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1. 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

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- 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

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



# 3. Management of Construction and Support

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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 McMurray
- Ensure sustainable development



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

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



# Conclusions

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



# Workshop

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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:

Business:

Years of Experience:

Barriers	What to do to overcome barriers?

