Procurement and Supply Chain Hurdles in a Global Upturn

Rice Global E&C Forum
September 14, 2010

Jim Scotti
Senior Vice President & Chief Procurement Officer
Fluor Corporation
Agenda

- Fluor Overview
- Material Market Overview
- The Capital Project Supply Chain Process
- State of the Procurement Profession
- Supply Chain Education
Fluor Overview

- One of the world’s leading publicly traded engineering, procurement, construction, maintenance, and project management companies
- #114 in the FORTUNE 500
- Over 1,000 projects annually, serving more than 600 clients in 85 different countries
- More than 42,000 employees worldwide
- Offices in more than 30 countries on 6 continents
- Nearly 100 years of experience
Fluor Differentiators

- Executing work in challenging locations
- Mobilizing diverse workforces
- Linking global engineering resources
- Sourcing material globally
- Meeting compressed schedules
- Developing innovative and cost-effective project financing
- Optimizing assets over a facility’s life cycle
- Managing joint ventures and alliances globally
$22.0 Billion in Revenue

2009 Fluor Performance
Revenue by Business Group

- Energy & Chemicals: 54%
- Global Services: 9%
- Government: 9%
- Industrial & Infrastructure: 22%
- Power: 6%
Center-Led Global Procurement Organization

Material Management

Contract Management

Corporate Procurement

Travel

Fluor Supply Chain Solutions (Strategic Sourcing)

1,800 Resources Globally
Over 1,800 Procurement Professionals Worldwide
Fluor 10-Year Worldwide Spend Volume

Average Commitment Value Each Working Day in 2009: $40,446,381

Billions

<table>
<thead>
<tr>
<th>Year</th>
<th>Project Materials</th>
<th>Project Contracts</th>
<th>Fluor Backlog</th>
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<td>$9.5</td>
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Material Market Overview
Raw material prices are leveling off

Engineered equipment and steel fabrication prices dropped drastically in 2009 but we are beginning to see an uptick

Supplier shop space is well below capacity

Low cost country sources of supply continue to be very aggressive on price

Opportunity for both Owner’s and Contractors to secure lower prices for goods and services…but the window of opportunity will start to close soon
Economic Indicators
Raw Material Prices Are Leveling Off

U.S. Raw Material Price Escalation
January 2004 – September 2010

Source: CRU Group
MetalPrices.com
Steel Business Briefing
## Market Recovery Estimated Timing/Commodity Escalation

<table>
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<tr>
<th>Supply &amp; Demand Forecast</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
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<tr>
<td>% GDP World *</td>
<td>-3.3</td>
<td>-3.0</td>
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<tr>
<td>Oil Price $/Barrel *</td>
<td>43</td>
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### Commodity Escalation

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<th>2009</th>
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<tr>
<td>Fabricated Structural Steel</td>
<td>(10)-(5)</td>
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<tr>
<td>Pressure Vessels and Heat Exchangers</td>
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<td>(10)-(2)</td>
<td>1-5</td>
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<td>Compressors</td>
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<td>0-3</td>
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<td>Pumps</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Pipe Material</td>
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<td>3-8</td>
</tr>
<tr>
<td>Valve Material</td>
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<tr>
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<tr>
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<td>Logistics – Domestic</td>
<td>(5)-0</td>
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<tr>
<td>Logistics – International</td>
<td>(15)-0</td>
<td>(5)-7</td>
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</table>

**Legend**

- **Good**: Green
- **Med.**: Yellow
- **Bad**: Red

*Source of Oil Price and % GDP Growth Forecast: IHS Global Insight July 15, 2010*
Hurdles in a Global Upturn

◆ Challenges
  – Rising material and equipment costs
  – Longer lead times
  – Limited shop space
  – Quality issues

◆ Mitigation Strategies
  – Manage material market better
  – Constantly collect and leverage market intelligence
  – Pre-qualify Low-Cost Country Suppliers (LCCS)
  – Develop additional global supplier alliances
  – Maintain focus on supplier collaboration
    ➢ Downturn could lead to regression toward previous methods
  – Strengthen shop inspection organizations
Managing Market Intelligence

◆ Quarterly Material Market Bulletins for our projects, estimating groups, and clients that contain market specific information and trend analyses for select material and equipment categories
  – Supply
  – Demand
  – Pricing
Low Cost Country Sourcing

- LCCS provides **15-40%** total cost savings versus non-LCCS region competitive bidding
  - Lower labor costs
  - Reduced costs of manufacturing equipment
  - Reduced cost of raw materials

- Fluor rates and monitors LCCS suppliers
  - Price differentials against US baseline
  - Delivery times
  - Schedule risk
  - Quality / Pre-Qualification

- Strategic supplier agreements developed with suppliers in low cost and emerging markets

- LCCS infrastructure investment required

- CII Product Integrity efforts (counterfeit avoidance)

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**Product:** Structural Steel  
**Advantage:** Lowest Cost (33% advantage opposed to US suppliers), Short Delivery  
**Project Location:** California

**Average cost advantage is 30-40% (in 2007/2008)**

San Francisco-Oakland Bay Bridge
The Capital Project Supply Chain Process
Manufacturing versus Capital Project Supply Chain

Traditional Manufacturing Supply Chain Model

- Planning / Forecasting
- Purchasing
- Operations / Scheduling
- Distribution & Logistics
- Customer Service

Flow of Products

Flow of Information

Capital Project Supply Chain Model

- Sales
- Design
- Supplier Collaboration
- Material Suppliers
- Engineered Equipment
- Sub-contractors
- Bid Eval
- Purchasing
- Expediting
- SQS
- Logistics
- Operations & Maintenance
- Receiving & Warehousing

Client Input / Requirements
The ability to influence the cost of a project is greatest at the beginning of a project - bringing key suppliers in early is essential to success.

Construction Industry Institute (CII) indicates:
- 4-8% cost savings
- 10-15% savings in time
Case Study: Coke Drum Initiative  
Project Scenario & Outlook in 2006

◆ A number of refinery expansion projects were planned for 2006-2009 in North America

◆ Delayed Coking Units (DCU) were included as a part of these expansions
  – Capable of handling heavier crude oil; expected to be the feedstock

◆ In anticipation of an upsurge in these DCU Projects, Fluor began an investigation to access project risks and opportunities
Supply Chain risk was paramount

- Materials were required at site to support construction schedule
- Coke Drums were identified as the bottleneck for achieving Fluor client project schedule objectives
- Approximately 20-30 Coke Drums were needed to support Fluor targeted projects
Traditional coke drum fabricators had been over extended or had a large backlog
- Japanese fabricators had nearly 100% of the market share over the previous 10 years, but could not keep up with the anticipated demand

Globally, the clad plate mills were also at peak capacity and clad plate deliveries had been in the one year range and in some instances even longer

Coke drum deliveries had been in the range of 28 – 33 months and these longer deliveries extend construction commensurately
Case Study: Coke Drum Initiative
Success Partners & Stakeholders

Fluor’s Coke Drum Sourcing Strategy

Clad Plate Manufacturers

Coke Drum Fabricators

Ocean Transport, Heavy Haul & Lifting

Fluor Project Team
*Initializing & Changing Project Behavior*

(Won Fluor 5 Projects)
Case Study: United Kingdom Wind Farm
Supply Chain Needs

- **Port and Harbour Facilities**
  - Staging / Laydown Areas
  - Fabrication Areas
  - Operation and Maintenance Areas

- **Installation Vessels**
  - Foundations
  - Wind Turbine Generators (Nacelle, Tower, Blades)
  - Inter Array Cables and Export Cables
  - Operation and Maintenance

- **Turbine Supply**
- **Steel Supply**
- **Steel Fabrication**
- **Electrical Cable**
- **Engineered Electrical Equipment**
- **SCADA**
- **Installation and Construction Subcontracts**
Case Study: United Kingdom Wind Farm

Success Criteria

- Early engagement with suppliers
  - Unique expertise and product knowledge
  - Drives efficiencies in design
  - Reduce engineering effort and rework
  - Improve quality
  - Optimises life cycle costs

- Understand supplier investment plans

- Seek long term commitments / frameworks

- Consider strategic investments to address gaps in supply chain as applicable

- Develop relationships with development and government agencies to take advantage of investment funding

Lessons Learned

- Win – Win for all parties

- Flexible, collaborative approach and long term strategic vision throughout the supply chain
EPC Procurement Profession Timeline

1960’s
- Purchasing (Purchasing Agents)
- Traffic
- Expediting
- Inspection

1970’s
- Material Systems
- MRP
- Subcontractor administration
- Business Roundtable CICE study

1980’s
- Procurement
- Just-In-Time
- Material Management
- Logistics

Big Chief Tablets
Bid Tabs / Telex
Spreadsheets Fax’s
The advent of just-in-time purchasing techniques in the 1980’s made purchasing a cornerstone of competitive strategy.

Purchasing had become responsible for acquiring the right materials, services, and technology from the right source, at the right time, in the right quantity.

- The term Procurement began to replace Purchasing
- The role of Materials Management became a core-competency in Procurement
- Logistics also emerged as a core-competency of Procurement

Organizations

- AIChE founded Engineering and Construction Contracting Association in 1969
  - Fully autonomous organization beginning in 2002
- Construction Industry Institute founded in 1983
- CAPS Research organization founded in 1986
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1990’s
- Supplier partnerships
- Supply Chain
- Chief Procurement Officer
- Supplier consolidation
- SAP, etc.

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Bid Tabs / Telex
Spreadsheets Fax’s
Email

1960’s

1970’s

1980’s

1990’s

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Procurement assumed a position in organizational development and management

Procurement became more integrated into the overall corporate strategy

Terminology
- “Supply chain management” began to replace the terms “purchasing”, “transportation”, and “operations”
- The title Chief Procurement Officer began to emerge

The introduction of the CII PEPc model further elevated the role of Procurement in the EPC industry.

Organizations
- Procurement Executives Group founded
## EPC Procurement Profession Timeline

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### Technology Evolution

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<th>Period</th>
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<td>Email, EDI &amp; eProcurement</td>
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History of Purchasing and Supply Management
2000 – Present

◆ Procurement’s role and recognition in the Capital Projects industry continues to grow
◆ Most E&C firms established executive-level procurement positions
◆ Owner Chief Procurement Officers are more engaged in Capital Projects
◆ Procurement executives are commonly requested to make presentations at major industry events
◆ Creation of the first graduate-level Supply Chain Management degree focused on Capital Projects
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- Supplier partnerships
- Supply Chain
- Chief Procurement Officer
- Supplier consolidation
- SAP, etc.

2000’s
- “Seat at the table”
- Supplier collaboration
- PEpC
- Market intelligence
- LCCS
- Strategic sourcing
- Supply chain degree programs

2010
- Market intelligence
- International competition
- Dispersed execution
- EPC Supply Chain Education (Clemson)

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Spreadsheets Fax’s
Email
EDI & eProcurement
Total Collaboration Environment
Fluor Endowed Chair of Supply Chain and Logistics for Capital Projects

- $2 million investment matched with $2 million from State of South Carolina
- Announced September 11, 2007
- Unique focus on capital projects
- Fully accredited Master of Engineering
- Distance learning – no on-campus requirements
- Enrollment of 80+ students across three cohorts from Fluor and other companies in the industry
- Continued support and input from owners, contractors, and suppliers
Employers of Current Students

- Abbott
- Alstom
- BMW Group
- Boeing
- Bosch
- Capsugel (Pfizer)
- CH2M Hill
- ExxonMobil
- Fluor

- Foster Wheeler
- GE Gas Turbine
- Hatch
- Jacobs
- Kiewit
- Panalpina
- S&B
- Sandvik
- UPS
## Core Industrial Engineering Fundamentals

**IE 851 Data Collection, Analysis and Interpretation**  
Methods for effectively working with data to extract and communicate meaningful information. Excel is the software tool used.

**IE 852 Modeling and Decision Making**  
Techniques for modeling real-world problems and solving them to facilitate better decision making. Excel is the software tool used.

**IE 853 Foundations of Quality**  
 Discussions of selected topics from quality control, total quality management, and Six Sigma, especially those relating to supply chain analysis and improvement.

**IE 854 Fundamentals of Supply Chain and Logistics**  
Application of model building and analytical techniques in the design, optimization, and control of the supply chain and logistics systems.

**IE 857 Health, Safety and the Environment**  
A comprehensive look at the basics of environmental impacts and remediation programs and at the issues related to health and safety in construction, including reducing workplace injuries and implementing an effective safety management program.

## Capital Projects Supply Chain Concentration Classes

**IE 850 Introduction to Capital Projects Supply Chain**  
Introduction to the phases of capital projects and the design and control of the capital projects supply chain including the challenges associated with each of the primary roles – owners, contractors, suppliers.

**IE 855 Capital Projects Supply Chain**  
Application of quantitative and qualitative tools and techniques in the design, control, management, and optimization of the capital projects supply chain.

**MGT 856 Business Fundamentals for Supply Chain Management**  
Principles and techniques of leadership, human resources management, financial management, marketing and economic analysis, particularly as they relate to the capital projects supply chain.

**IE 858 Case Studies in Capital Projects Supply Chain**  
Integration of topics covered throughout the curriculum using a series of real-world case studies in capital projects.

**IE 859 Capstone Design Project**  
A capstone experience in industry requiring application of curriculum content to a real-world opportunity.
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