Where and by whom your materials are sourced are important aspects of the success of your project. A supply chain disruption carries significant costs in terms of time, money, and reputation. In many instances, the source of the disruption is not a tier-one relationship (direct contract) but tier-two and beyond, which makes it difficult to control. In this workshop, case studies will be utilized to demonstrate how to identify supply chain exposures and their potential implications for your project. Innovative tools, including a protocol for assessing, planning, and mitigating a supply chain disruption, will be examined, along with risk management strategies and insurance options for reducing the impact on your project.
When it comes to construction related professional liability and environmental insurance, New Day Underwriting can help you find optimal solutions that are efficient, effective and economical.

With a dedicated team armed with state-of-the-art technology, our comprehensive products are negotiated to meet your insured’s specific needs, while keeping current industry issues top-of-mind. Best of all, our “First Class Service” includes single-point access to risk management guidance and insurance products from the nation's leading carriers. Think of us as your specialty resource to help you protect your clients' businesses.
James L. Boileau, P.E.
Construction Segment Director
Zurich Services Corporation

As Construction Segment director for Zurich Services Corporation, Mr. Boileau is responsible for the technical direction of services offered to clients and underwriters. He also manages a team that studies emerging risks and leads development of new products and services for the Construction Segment to help mitigate those risks.

Mr. Boileau has held a variety of construction-dedicated technical and management roles since joining Zurich's Construction Risk Engineering team in 2002. He began his career in industrial construction as a quality assurance/quality control manager for a general contractor and advanced to direct project supervision roles in both commercial and industrial projects, holding titles such as project manager and superintendent.

Mr. Boileau is a licensed Professional Engineer, earning his civil engineering degree from Lakehead University in Ontario, Canada. He is an active member of the Associated General Contractors of America (AGC), Construction Users Roundtable (CURT), and Professional Engineers of Ontario.

Linda Conrad
Director of Strategic Business Risk Management
Zurich Insurance Company, Global Corporate

As director of Strategic Business Risk Management for Zurich, Ms. Conrad leads a global team responsible for delivering tactical solutions to Zurich and to customers on strategic issues such as business resilience, supply chain risk, enterprise risk management (ERM), risk culture, and Total Risk Profiling. Ms. Conrad holds a specialist designation in ERM and serves on the global Education Advisory Board of the Institute of Risk Management in London. She is deputy member of the ERM Committee of the Risk and Insurance Management Society (RIMS), sits on the Supply Chain Risk Leadership Council, and was chairwoman of the Asian Risk Management Conference.

She taught at the University of Delaware captive program and in the master's degree in supply chain management program at the University of Michigan's Ross School of Business, where she serves on the Corporate Advisory Council. Ms. Conrad studied at the Graduate Institute of International Studies in Geneva, Switzerland, and Fox Business School.
Notes
Supply Chain Risk Assessment: The Missing Link in Protecting Project Profitability

Presented by:
James Boileau
Director of Construction Risk Engineering
The Zurich Services Corporation

Linda Conrad
Head of Strategic Business Risk
Zurich

Learning objectives

• Define construction project supply chain materials and equipment
• Understand the challenges associated with supply chain
• Recognize where and how you could be vulnerable based on risk assessment
• Recognize and implement strategies identified in the risk assessment to mitigate supply chain risk
Supply chain definition

- **Construction materials**
  - Concrete
  - Steel
  - Equipment used for construction

- **Hard Assets** (supplied for end-use/installed during construction)
  - Processing equipment
  - Boilers
  - Elevators
  - HVAC

- **End use material supplies** (used in process post-construction)
  - Raw materials
  - Components in manufacturing process
Construction project supply chain risks

Understanding the supply chain challenges

Actions taken to drive costs out of the supply chain can drive in greater risk
Supply chain considerations

• **Key Considerations**
  - Long lead equipment
  - Critical building materials
  - Single sourcing
  - Customized equipment

• **Disrupters**
  - Labor strike
  - Material shortage
  - Political risk
  - Transportation
  - Supplier solvency

• **Results**
  - Liquidated damages
  - Extra cost to project for extended schedule
  - Reputation damaged
  - Owner dissatisfaction
  - Potential owner future loss of revenue
Supply chain statistics: disruptions are more frequent

- Over 50% had more than one disruption
- Nearly 85% suffered a supply disruption
- 42% of disruptions originated beyond Tier One

Source: Zurich-sponsored study with Business Continuity Institute

Analysis of 3,000 disruptions

- Accidents
- Production Problems
- Labor Unavailability and Shortage of Skills (external)
- Natural Disasters
- Sabotage, Terrorism, Crime, and War
- Financial losses and premiums
- Demand Variability/Volatility
- Physical and Regulatory
- Industry-wide (i.e., Market) Challenges
- Lawsuits

Source: Zurich's supply chain loss event database
Financial consequences

Nearly 55% of disruptions cost over $25 million

Source: Zurich's supply chain loss event database

Resulting impacts

Source: Zurich's supply chain loss event database
Matching duration and impact

Source: Zurich’s supply chain loss event database

Supplemental text:

Heat map shows supply chain disruptions in manufacturing and construction industries over the past decade.

Source: Zurich’s supply chain loss event database
**Project supply chain risks**

<table>
<thead>
<tr>
<th>Insolvency</th>
<th>Currency</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor</td>
<td>Fluctuations</td>
<td>Supplier</td>
</tr>
<tr>
<td>Supplier</td>
<td>Convertibility</td>
<td>Off taker</td>
</tr>
<tr>
<td>Investors</td>
<td>Liquidity</td>
<td>Contractor</td>
</tr>
<tr>
<td>Institutions</td>
<td></td>
<td>Labor/material</td>
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</table>

<table>
<thead>
<tr>
<th>Appropriations</th>
<th>Property</th>
<th>Transport</th>
</tr>
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<tbody>
<tr>
<td>Change in laws and</td>
<td>CAT</td>
<td>Delivery failure</td>
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<tr>
<td>regulations</td>
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<td>(marine, truck, air)</td>
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<tr>
<td>Political instability</td>
<td>Utilities</td>
<td>Climatic</td>
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<tr>
<td>Violence</td>
<td>Riot</td>
<td>Political</td>
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</tbody>
</table>

- Fluctuations
- Convertibility
- Liquidity
- Supplier
- Off taker
- Contractor
- Labor/material
- Shortages
- Viruses

- Change in laws and regulations
- Political instability
- Violence
- CAT
- Utilities
- Riot
- Strike
- Civil commotion
- Delivery failure (marine, truck, air)
- Climatic
- Political
- Piracy
- Customs

**What is your total risk profile?**

The diagram illustrates various risk profiles, including:
- Supply Chain Risk (SR)
- Product Liability (PL)
- Corporate Relocation (CR)
- Competition (CMP)
- Corporate Restructuring (CR)
- Credit Risk (CR)
- Accident/Health (AH)
- Regulatory (R)
- Currency Fluctuation (CF)
- Reputation Risk (RR)

The risk profiles are categorized by probability and severity, with colors representing different types of risks:
- Green - Strategic Risk (SR)
- Blue - Market Risk (MR)
- Purple - Financial Risk (FR)
- Orange - Operational Risk (OR)
- Red - People Risk (PR)
Construction project lifecycle

Potential Supply Chain Disruptions

Cost

Risk Assessment

Risk Assessment too late (common)

Risk Assessment early (ideal)

Risk Assessment

Corporation

Vulnerability identification: top-down risk assessment (e.g. Total Risk Profiling (TRP))

Operations

Specific hazard analysis: bottom-up assessment (e.g. Zurich Hazard Analysis)

Project A

Project B

Project C

Project D

Project E

Bridging the gap between corporate and project risk management
Total risk profiling

- Vulnerability identification and assessment
- Risk mapping/Risk tolerance boundary
- Risk reduction/Risk improvement advice

Total Risk Profiling video (YouTube)

The TRP process

1. Preparation
   - Internal Environment / Establishing Context
2. Preparation
   - Objective Setting and Risk Criteria
3. Identify/Assess
   - Risk Identification
4. Rank
   - Risk Evaluation
5. Improve
   - Risk Treatment
6. Improve
   - Communication and Consultation
7. Review
   - Monitoring and Review
Understanding where and how your supply chain could be vulnerable

- Identify vulnerabilities
- Quantify and benchmark risk exposures
- Prioritize mitigation actions
- Make informed decisions
- Support operational profitability

Supply chain assessment
- Determine critical supplies & suppliers
- Determine supplier risk
- Implement mitigation plans
- Calculate exposure
- Prioritize risk
- Identify alternatives & supply chain fail

Assessing supply chain disruption risk

1. Supply Chain Risk
   - Senior Management agrees supply chain risk is significant exposure

2. Risk Assessment
   - Various supply chain risks are assessed (probability x severity) and key risk is identified as exposure to one critical supplier

3. Strategic Analysis
   - More in-depth study is performed, and upside potential considered
Risk assessment stages

- Determine those suppliers most critical to protecting profitability
- Develop a supply chain/value chain map
- Gather key supply/supplier details
- Evaluate risk factor information
- Define and evaluate risk scenarios
- Develop risk grading
- Determine risk strategies

Risk assessment examples

- Two key suppliers at the next level in the supply chain were in significant financial trouble.
- Exposure due to potential failure of a supplier higher than initially estimated: USD 10M vs. USD 1M
- Actual reliance on one supplier significantly greater than presumed: 70% vs. 20%
- Company discovered that key component supplier and its alternative were located in earthquake zone.
Assessment results

- Strategic analysis produces recommended actions
- Grounded by solid facts and credible scenarios
- Reviewed by leadership and actions assigned

- Short-term actions:
  - Risk financing through insurance
- Long-term actions:
  - Risk avoidance
  - Alternate supply contract

Coverage comparison chart: supply chain insurance can close coverage gaps

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Supply Chain</th>
<th>BD</th>
<th>Professional</th>
<th>Liquidated Damage</th>
<th>Contingent BI</th>
<th>Marine / BI</th>
<th>Trade Credit</th>
<th>Political Risk</th>
<th>Product Liability</th>
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<tbody>
<tr>
<td>Supplier Insolvency</td>
<td>✫</td>
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<td>Failure to fuel supply or utilities</td>
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<td>Communications System failure</td>
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<td>Transport failure or port blockage</td>
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<td>Raw material / component damage</td>
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<tr>
<td>Delay caused by supplier's supplier</td>
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<td>Supplier staff illness or strikes</td>
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<tr>
<td>Cyber risks / virus</td>
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<tr>
<td>Denied access to supplier's premises</td>
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<td>Physical damage</td>
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<tr>
<td>Political Risk</td>
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<tr>
<td>Expropriation</td>
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<td>Product quality / recall</td>
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<td>Subcontractor failure to perform</td>
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<td>Professional acts</td>
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<tr>
<td>Liquidated damages</td>
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★★★ NOTE: SDI coverage applies only to the extent cause by subcontractor or supplier nonperformance
Policy language to look for

- Named Peril
- Named Supplier
- Differences
- How customers are using the policy
- Alignment with other policies

Project supply chain risk study: GC and elevator contractor at risk

- Large iconic sky scraper under construction
- High speed elevators designed specifically for building
- Failure or delay in delivery would cause:
  - Enormous reputation damage within the industry
  - $25,000/day in liquidated damages
  - Increased cost to mitigate the delay
- All potential problems and issues within the Supply Chain needed to be identified and addressed
Supply chain risk case study: pre-cast supplier

- Large project for key customer
- Unique concrete polishing equipment
- Sole-source supplier overseas
- Failure / delay to deliver would mean delays and millions of dollars in penalties and increased cost of work
- Supply chain risk assessment conducted to analyze potential impact and likelihood of disruption
- Key concerns identified: supplier financial insolvency, contract stipulations, alternate suppliers and transit damage / loss
- Mitigation plan developed and project proceeding on schedule
- Result: purchase of supply chain insurance

Supply chain health check

- Do you know who your critical suppliers are, and how much their failure would impact your company's profits?
- Have you fully mapped your critical supply chains upstream to the raw material level and downstream to the customer level?
- Do you have routine, timely systems for measuring the financial stability of critical suppliers?
- Is supply chain risk management integrated into your enterprise risk management approach?
- Do your tier 1 suppliers have business continuity plans that have been tested in terms of their viability?
- Is risk on the agenda at performance meetings with your strategic suppliers?
Additional resources

- Enterprise Risk Management
- Supply Chain Risk Insights
- Total Risk Profiling – YouTube

Thank you

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M2. Supply Chain Risk Management: The Missing Link in Protecting Project Profitability

<table>
<thead>
<tr>
<th>Rating scale for all questions:</th>
</tr>
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<tbody>
<tr>
<td>4 = Excellent</td>
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</table>

Overall rating for this workshop? 4 3 2 1 0

**James Boileau**
Preparation and quality of information 4 3 2 1 0
Energy and enthusiasm of delivery 4 3 2 1 0
Educational focus (not a sales pitch) 4 3 2 1 0

**Linda Conrad**
Preparation and quality of information 4 3 2 1 0
Energy and enthusiasm of delivery 4 3 2 1 0
Educational focus (not a sales pitch) 4 3 2 1 0

**Comments:**

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