1. Purpose of Entrepreneurial Risk Management
2. Types of Entrepreneurial Risks Affecting the Engineering Industry
3. Insurability Aspect
4. Specific Risks and Insurance
5. Conclusion and Outlook
Purpose of Entrepreneurial Risk Management

In the Engineering Industry:

Entrepreneurial Risk

- Risk associated with profit-driven venture
- Risk of financial nature
- Typically non-damage related such as project cost over-run, delay in completion, performance failure

“Conventional” risk

- Normally damage related

The risks that each organization faces have become more complex.

Active entrepreneurial risk management to better identify, map, control and ultimately manage this complex risk environment.
Types of Entrepreneurial Risks affecting the Engineering Industry

- Operational Risks
- Financial Risks
- Contractual Risks
- Environmental Risks
Is it a bet or an insurance product?

Risk ≠ Uncertainty

Risk

Refers to a situation where the probability of an outcome can be determined and therefore the outcome can be insured against.

Uncertainty

Refers to events whose probability cannot be known and as such disqualifies for insurability.
Insurability Aspects II

Underwriting aspects
- Must be risk, not uncertainty
- Asymmetric information
- Risk of change
- Moral risk

Risk partnering
- Motivation of insurers
- Chance to win

Actuarial aspects
- Independence
- Randomness
- Measurability
- Large number of risks
SPECIFIC RISKS AND INSURANCE
## Sabotage, Strike and Lockout

<table>
<thead>
<tr>
<th>Description of Risk</th>
<th>Underwriting Considerations</th>
<th>Market and Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Political Risk</td>
<td>▪ Socio-political situation</td>
<td>▪ Strike, Riots and Civil Commotions Extension (SRCC)</td>
</tr>
<tr>
<td>▪ Depends on political, economical, sociological factors</td>
<td>▪ Events such as elections</td>
<td>▪ Covers only material damage, no consequential loss</td>
</tr>
<tr>
<td>▪ Delay risk (even without physical damage)</td>
<td>▪ Location of project: Major city vs rural area</td>
<td>▪ To some extent more comprehensive insurance solutions for e.g. strike available. Normally sold on stand-alone basis.</td>
</tr>
<tr>
<td>▪ Carried by owner, contractor or both</td>
<td>▪ Insured projects itself prone to protests? E.g. nuclear</td>
<td></td>
</tr>
</tbody>
</table>
### Design errors

<table>
<thead>
<tr>
<th>Description of Risk</th>
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</tr>
</thead>
</table>
| ▪ Defect vs damage, condition vs occurrence  
  ▪ Main risk drivers:  
  ▪ CAR: Designer’s error  
  ▪ EAR: Manufacturer’s error | ▪ (Sub-)Contractor’s experience  
  ▪ Designer’s, Manufacturer’s experience, loss record  
  ▪ Complexity of project  
  ▪ Prototype technology involved?  
  ▪ Does an independent technical inspector exist? | ▪ DE1 – DE5  
  ▪ LEG1 – LEG3  
  ▪ Normally, full defects cover is not granted |
# Subcontractor/Supplier Insolvency

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>• Insolvency of subcontractor / supplier</td>
<td>• Detailed subcontractor prequalification process</td>
<td>• Subcontractor default insurance</td>
</tr>
<tr>
<td>• Involves</td>
<td>• Quality assurance program</td>
<td></td>
</tr>
<tr>
<td>• Additional costs</td>
<td>• Selection process</td>
<td></td>
</tr>
<tr>
<td>• Delay</td>
<td>• Insurance on portfolio basis</td>
<td></td>
</tr>
<tr>
<td>• Contractual uncertainties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Quality risk</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Insolvency of subcontractor / supplier**
- **Involves**
  - Additional costs
  - Delay
  - Contractual uncertainties
  - Quality risk
- **Detailed subcontractor prequalification process**
- **Quality assurance program**
- **Selection process**
- **Insurance on portfolio basis**
- **Subcontractor default insurance**
## Volatility of Commodity Prices, Interest Rates, Inflation and Exchange Rates

### Description of Risk
- Fluctuation of commodity prices might affect project cost
- Long term debt can be affected by changing interest rates, affecting profit
- Impact on cost and profit if foreign currencies involved

### Underwriting Considerations
- Economic environment
- Stability of currency
- Cap for commodity prices

### Market and Products
- Hedging
- To some extent implicitly insured
- ALoP, DSU losses can heavily depend on commodity prices
## Non-fulfillment of agreed specifications

<table>
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</tr>
</thead>
</table>
| ▪ Product specifications  
  ▪ Environmental  
  ▪ Throughput  
  ▪ Output  
  ▪ Quality  
  ▪ Financial  
  ▪ Availability | ▪ Type: Machinery, Plant, Structure, Fit-out  
  ▪ Clear measurement possible?  
  ▪ Portfolio / Wholesale, no adverse selection | ▪ Limited insurance market available  
  ▪ Mainly via liquidated damages insurance |

- Limited insurance market available
- Mainly via liquidated damages insurance
## Cost overrun

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Owner:</td>
<td>Contractual agreements between owner and contractor</td>
<td>Sponsor (now disappeared)</td>
</tr>
<tr>
<td>Can often push risk to contractor</td>
<td></td>
<td>Non-damage force majeure insurance</td>
</tr>
<tr>
<td>Contractor:</td>
<td>Close relationship insurer – insured</td>
<td>Liquidated damages insurance for contractor</td>
</tr>
<tr>
<td>Risk with lump sum projects</td>
<td></td>
<td>Non-damage delay cover for owner</td>
</tr>
<tr>
<td>Project delay</td>
<td></td>
<td>No direct cost overrun insurance products available.</td>
</tr>
<tr>
<td>Specific risk: Unforeseen ground conditions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Insufficient Supply Chain Management and Transport Delay / Disruption

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>▪ Supply chain relations getting ever more global and complex</td>
<td>▪ Map critical supply chains and dependencies</td>
<td>▪ DSU/ALoP can include suppliers extensions. Applies for physical damage only.</td>
</tr>
<tr>
<td>▪ Interruption of continuous construction process</td>
<td>▪ Assessment of named suppliers</td>
<td>▪ To limited extent available:</td>
</tr>
<tr>
<td>▪ Failures can increase costs and/or cause delays</td>
<td>▪ Exposure from political and economical perspectives</td>
<td>▪ Supply chain insurance</td>
</tr>
<tr>
<td></td>
<td>▪ Clear indemnity structure to be defined</td>
<td>▪ Trade disruption insurance</td>
</tr>
</tbody>
</table>

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To limited extent available:
- Supply chain insurance
- Trade disruption insurance
Conclusion and Outlook

- Traditional insurance markets “saturated”
- Entrepreneurial types of cover can provide significant opportunities
- Demand for non-traditional covers is vast

To move the boundaries of insurability significant investments need to be made in product development and new approaches for risk assessment and pricing.
Workgroup members

Chairman:
Benedikt Schermutzki (Munich Re)

Sponsor of the Executive Committee:
Max Benz (XL Group)

Workgroup Members:
- John Forder (Willis)
- Thomas Gebert (Zürich)
- Karl-Christian Hertenberger (HDI-Gerling)
- Stephan Lämmle (Munich Re)
- Katia Luz (Odebrecht)
- Federico Pereira (Hannover Re)
- Daniela Reia (Odebrecht)
- Carl-Johan Silfwerbrand (Allianz)
- Darren Smart (Liberty)
- Peter Tailby (ACR Retakaful)
- John Timothy (Infrassure)
- Francisco Triviño (XL Group)
- Marina Zyuganova (Renaissance)
- Dieter Spaar (HDI-Gerling)
THANK YOU VERY MUCH FOR YOUR ATTENTION

Benedikt Schermutzki

Munich RE