

Project Risk Engineering for General Contractors

Presented by:

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Introduced by

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Andrew D. Mendelson, FAIA

Executive Vice President, Chief Risk Management Officer

- Licensed architect with 36+ years in practice
- PM, Market Leader, Contract Officer, CFO, Director of Practice Management
- Experienced with multiple project delivery types
- Member of the AIA Documents Committee 2003-2017, LFRT Legal Committee 2000-2010, ACEC Risk Management Committee 2014- Present
- Risk Management education from the practitioner's perspective



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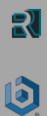
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Timothy R. Brashear, P.E. ret.

Officer/Vice President Construction Services

- Retired professional engineer, registered in PA and Ohio, and a Registered Neutral for the American Arbitration Association
- 45+ years of experience in Project Due Diligence, construction engineering, design management, construction oversight, claims analysis, performance analysis, quality management, Risk Engineering, and Contractor Default matters
- Portfolio Executive for Zurich NA between 2001-2006
- Managed and supervised the resolution of more than 2,500 claims
- Performed Technical Project Due Diligence on over 11 Combined Power Cycle plants, multiple Steel Mfg. Plants



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Today's Agenda

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- I. Project Overview and Potential Risks
- II. Contract Overview and Potential Risks
- III. Risk Exposures in More Detail
- IV. Risk Education and Monitoring
- V. Questions



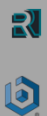
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General Project Overview - Risks

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The Project Scope of Work

- Scope experience
- Current staffing capabilities and alignment with scope
- Desire for and experience with contractual arrangements and parties
- Duration and overlap with other WIP cashflow considerations
- Status of design



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General Project Overview - Risks

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The Project Location

- Market conditions in this location
- Political and community impacts/cooperation
- Security, Safety and Logistics



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General Project Overview - Risks

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The Project Owner

- Financial capacity, financing Arrangements and character
- Expertise or experience with project type
- Past work together
- Extent of involvement, or representative involvement



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General Project Overview - Risks

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The Complexity and Constructability of the Project

- Unique or proprietary Designs/Owner sole sourcing or preferred subtrades
- Long lead deliverables
- LEED or other project certifications required, DBE/MWBE quotas
- Value engineering involvement
- Means & methods control
- QA/QC protocols (Owner or Contractor program)
- Outside agency involvement



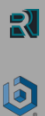
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General Project Overview - Risks

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Development of the responsibility/Risk Matrix/Register inclusive of

- Standard and custom elements of project risk
- Life cycle (start and end dates of risk)
- Assignment of weighted risk grades (considering severity, frequency, etc.)
- Risk source, responsibility
- Dynamic monitoring, critical sorting, elevating or downgrading risks



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Risk Assessment Matrix

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Category	Item #	Type	Dates		Responsible Party	Risk/Opportunity Description	Value (If Known)	Risk Mitigation Action Plan	Ratings (see Legend)		
		Risk/Opportunity	Created	Closed					Severity	Probability	Total
A. Owner/Outside Influences											
Political, experience, and sophistication	A.1										
Internal RM, Eng/Design, Procurement	A.2										
Financing schedule and interest	A.3										
Geography	A.4										
Permits, environmental	A.5										
B. Contractual											
	B.1										
	B.2										
C. Schedule											
	C.1										
	C.2										
D. Budget											
	D.1										
	D.2										
E. Scope/Complexity											
	E.1										
	E.2										
F. Sole Sourcing/Proprietary											
	F.1										
	F.2										
G. Means & Methods											
	G.1										
	G.2										
H. Commissioning/Warranty											
	H.1										
	H.2										

Legend:

- Rating 10-12 Primary Priority
- Rating 7-9 Secondary Priority
- Rating 4-6 Tertiary Priority
- Rating 1-3 Low Priority

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Contract - Risks

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General Principle: Fair and Balanced Risk Allocation Amongst the Parties

- Notice
- Unforeseen conditions
- Contiguous work
- Change orders
- Schedule/delays






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Contract - Risks

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- **Typical Notice Provisions**
A201-2017
 - 1) Notice of a “Claim” (for time and/or money) - shall be initiated within 21 days after the later of...
 - a) Event that gave rise to Claim or
 - b) Claimant first recognizes condition giving rise to the Claim
 - 2) Notice of differing site conditions shall be given promptly before conditions are disturbed and not later than 14 days after observance
- **The Due Diligence process should identify:**
 - 1) Specific contractual notice forms for each notice requirement
 - 2) Chain of command
 - 3) Time allowed and responsibility to ensure compliance
 - 4) The risk associated with each type of notice







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Contract - Risks

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- **Unforeseen Conditions**
 - 1) Liability, notice requirements, work stoppage
 - 2) Time to fully investigate once detected
 - 3) Estimating cost and schedule impacts
- **The Due Diligence process should minimally identify:**
 - 1) Specific contractual provisions and notice requirements
 - 2) Time allowed between detection and fully vetting the circumstances
 - 3) The risk associated with the provision in general, and for specific items as they become apparent


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Contract - Risks

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- **Typical Contiguous Work clauses**

Should proper and accurate performance of the contract work depend upon the proper and accurate performance of other contractors or trade work... the contractor shall carefully examine such other work, determine it is in a fit, ready and suitable condition for proper and accurate performance of this contract

- The Due Diligence process should identify each area of the project where this circumstance may exist and rank the risk as is appropriate
- These clauses often come with significant responsibility and liability, such as
Contractor shall use all means necessary to discover any defects in such other work, and before proceeding with the contract work, promptly report in writing improper conditions and defects...
Should contractor fail to comply with these requirements, it shall bear all costs incurred by Contractor, Owner and other contractors to correct the complete assembly and shall not be entitled to extensions of time and adjustments in Price



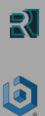
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Contract - Risks

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- **Typical Change Order (CO) clauses**

- *...Contractor shall review any Change Order Request (COR) submitted to Contractor by Owner and make a written response within ten (10) days after receiving such request. Each CO shall constitute a final settlement, including compensation for impact on, or delay or acceleration in, performing the work.*
- *...Contractor may request a change to the work. If Contractor believes a change will increase or decrease its cost of performing the work, alter the time needed for completion of the work, or require modification to any other provisions of the contract, it shall notify Owner, setting forth its justification for the change and be entitled to a COR provided no later than ten (10) business days, after gaining knowledge of the change, Contractor delivers a written notice to Owner, proposing the changes and schedule impact*



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Contract - Risks

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- Likely impossible to predict the quantity/\$ magnitude of COs on a project during the Due Diligence process
- However, it is possible to gauge the CO risk based on contract provisions for timely notice, content of notice, project budget, completeness of design, project participant relationships, Owner and/or AOR CO tendencies, and many other indicators from the other elements of the Due Diligence analysis. Therefore, the CO risk should be ranked as is appropriate



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Contract - Risks

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Timeline/Schedule - Some contract scheduling provisions that should be understood and addressed in the Due Diligence process can include

- 1) *Contractor has taken into consideration and made reasonable allowances in the project schedule for hindrances and delays incident to such work not caused by Owner.*
 - 2) *Contractor shall only be entitled to an extension of time on a day-to-day basis if a change affects the critical path, and any such extension shall be equal to, and not exceed, the number of days the critical path is delayed pursuant to such change. The proof of such impact shall be shown in a prospective time Impact analysis with the documentation necessary to justify the extension of time request and the cost to mitigate the same*
- Based on schedule float, the realistic durations and detail in the schedule, constructability, the penalties for delay, the coordination required to produce a realistic production schedule, the seasons for each trade scope in the overall schedule, etc. an appropriate risk factor can be included in the Due Diligence process



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Contract - Risks

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Risk Transfer - This includes carving out liabilities to be transferred to the Owner or others, such as

- 1) The default risk for sole sourcing/preferred trades, proprietary designs or materials,
 - 2) Procurement of long lead items
 - 3) Insurance, such as CPPI and CCIP
 - 4) Financing risk
 - 5) Contingencies, shared savings
 - 6) LD caps or waiver of certain damages
- Successful carve-outs should be risk credits or opportunities to the risk matrix in the Due Diligence process



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Risk Exposures in Detail

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- **Owner Obligations/Outside Influences**
 - 1) Political, experience, and sophistication
 - 2) Internal risk management, engineering and design, procurement
 - 3) Financing schedule and Interest
 - 4) Geography
 - 5) Special permits, environmental concerns or oversight



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Risk Exposures in Detail

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- **Contractual (Prime and Subcontract)**

- 1) Force majeure
- 2) Dispute resolution
- 3) Specific Ambiguities
- 4) Custom or modified form contract liabilities



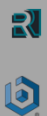
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Risk Exposures in Detail

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- **Schedule**

- 1) Validation of deliverable lead times,
- 2) Number of days on week, hours in a day to be worked
- 3) Veracity of schedule logic
- 4) Compressed durations and limited float
- 5) Concurrency with other unrelated work
- 6) Resource availability



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Risk Exposures in Detail

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- **Budget**
 - Basis for budget
 - Realistic allowances
 - Line-item contingencies
 - Containment of scope creep
 - CO and growth potential or restrictions

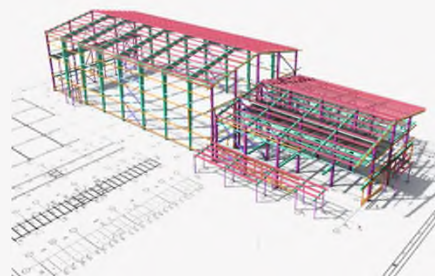


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Risk Exposures in Detail

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- **Scope/Complexity**
 - 1) Technology
 - 2) Mock-ups
 - 3) Location of fab shops, vendors
 - 4) Integration of various contractors and suppliers using BIM, 4D scheduling
 - 5) Architectural features
 - 6) Site logistics



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Risk Exposures in Detail

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- **Sole Source/Proprietary**
 - 1) Contingency plans, workarounds
 - 2) Contractual liabilities
 - 3) Integration with the work of others

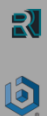
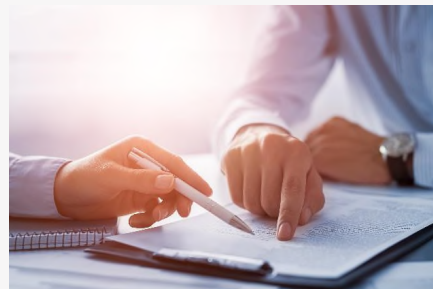


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Risk Exposures in Detail

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- **Means and Methods** - Prefabrication vs. field assembly is a good example:
 - 1) Prefab is sometimes an aid to schedule, but if all prefabs are not well coordinated for field assembly, issues often arise.
 - 2) Contract drawings/specs may require one method/condition but practically, another means, or method could make more sense, due to time, cost, material availability, or site logistics.
 - 3) The timing of when practical vs contractual issues can be addressed
 - 4) All items determined by the contractor or deemed to be so in the contract, to be the contractor's mean and methods choice, should be addressed as part of the due diligence process and risk rated.



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Risk Exposures in Detail

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- **Commissioning/Warranty**

- 1) Commissioning/startup coordination, duration expectations, service/startup experts/technicians needed
- 2) Commissioning/startup dependency on others
- 3) Warranty period desired by Owner for each CSI trade and/or equipment type
- 4) Bonds and insurance requirements

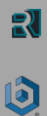


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Risk Education

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- Follow up and monitoring of risk grading and developing exposures
- Post-project analysis/tracking
- Lessons learned



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Summary

- Project overview and potential risks
- Contract overview and potential risks
- Risk exposures in more detail
- Risk education and monitoring



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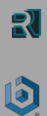
Q&A

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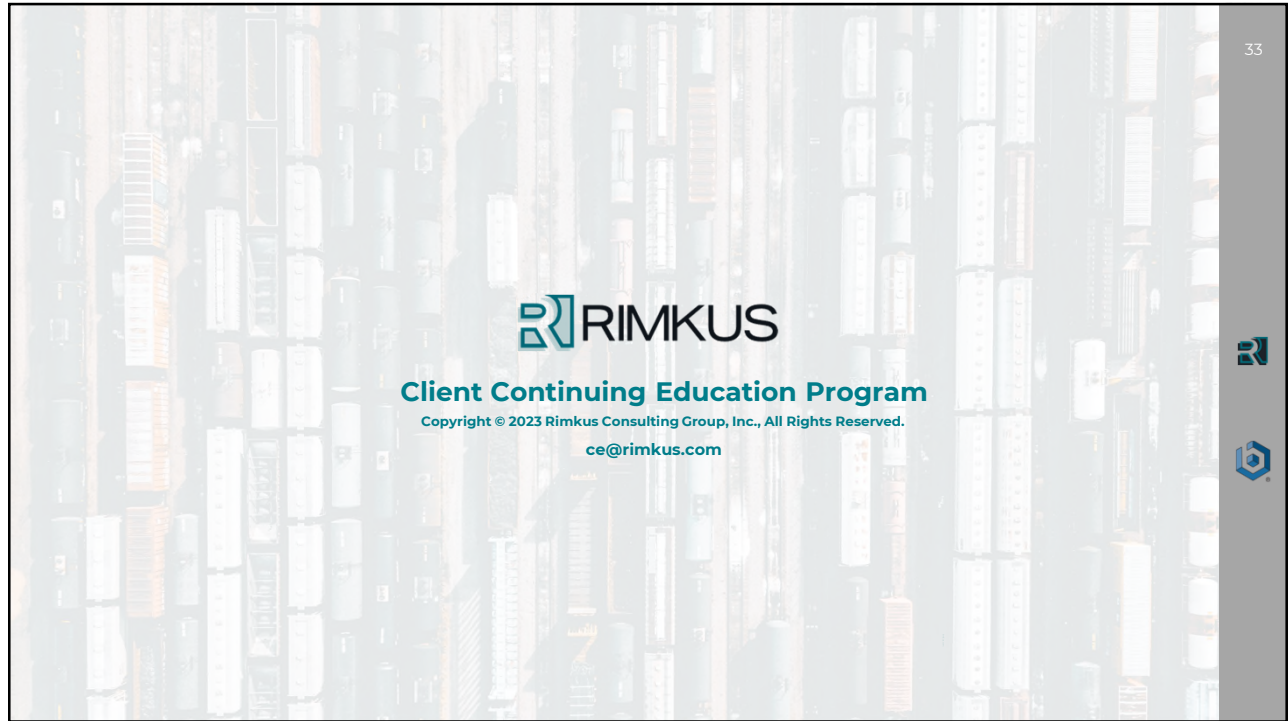
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