Contracting Methods and Risk Management
In Tunneling and Underground Construction

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Topics

• What is a Contract and why is it important?
• Project Delivery Options
• Major Factors affecting selection of type of underground construction contract
• Traditional Delivery
• Alternative Delivery
• Risk Issues in Tunneling and Underground Construction
• Best Practices and Future Trends
What is a Contract and Why is it Important?

- A Contract is simply a written agreement between two or more parties that define a relationship for a specified purpose.
- For tunneling and underground construction projects, the commercial terms and legal relationship is established by the contract documents.
- Underground construction is recognized for being different.
- The relationship defined is not always equitable and is used to assign or allocate specialized risks and responsibilities between the parties.
- Owners, Engineers and Contractors are not lawyers but need to understand contract provisions established on projects.
- Contracts do not always define all the relationships between all parties, especially on multi-project programs.
Project Delivery Options

- Traditional Design-Bid-Build
- Construction Management (CM)
- CM-at-Risk or CM/General Contractor (GC)
- Design/CM-at-Risk (or EPCM)
- Design-Build
- Program Manager/D-B/CM
- Public Private Partnerships (or PPP)
Major Factors affecting selection of type of underground construction contract(s)

- Type of Project
- Division of Responsibility between Owner, Engineer(s), Contractor(s), Operator and Maintenance Entity (Owner or Contractor) during the project lifecycle
- Funding
- Schedule
- Changed conditions and dispute resolution approach
- Insurance and Bonding considerations
- Risk Tolerance and Risk Allocation
- Owner experience and institutional knowledge
- Other stakeholder requirements
"Traditional"
Project Delivery: Design-Bid-Build

Owner holds separate contracts with the Designer (Engineer) and the Contractor(s)

- Design, procurement and construction proceed sequentially
- Construction contract awarded to lowest bidder based on complete set of plans and specifications
Conventional Approach Has Discrete Points of Responsibility

- Engineer designs project to 100 percent
- Engineer establishes subsurface conditions as basis of bid
- Bidding process to select Contractor
- Engineer (generally) provides:
  - construction supervision
  - contract administration
  - resident observation
  - startup assistance
- Contractor builds the project
Conventional Approach Has Several Advantages

- Competitive bid of design approved by Owner
- Project requirements are clearly identified
- Independent oversight by Owner’s agent
- Legal precedent allocates liabilities
- No potential COI between Designer and Contractor
Conventional Approach Has Several Disadvantages

- Limited control over equipment and subcontractors (quality)
- Less opportunity for cost savings
- Less control over construction schedule
- More time from start to finish

- Potential for increased disputes/claims between parties
- Difficult to pre-qualify experienced general contractors
Why Evaluate Alternative Delivery Methods?

- Embrace Owner preferences
- Incorporates project-specific variable
- Considers market changes
- Ability to transfer both design and construction risk to others (either single point of responsibility or dividing responsibility)
- Ability to accelerate or control project schedule
- Ability to control and schedule capital outlays ($)
- Financing or Bonding Issues
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Design-Build

• Owner contracts with single entity for project design and construction
• Designer-Builder is an engineer and general contractor
Reasons for Design-Build

• Early Completion
• Reduced Owner Staffing
• Single Source Responsibility
• Reduces Uncertainty
• Less Conflict
• Lower Costs
• Increased Quality
• Innovation
Benefits and Challenges for Design-Build

**Benefits**

- Single point of responsibility, reduced conflicts and administrative burden, eliminates error & omissions claims between contractor and engineer
- High Quality Product - Impetus for D-B team to work for the common good of the project
- Cost savings due to efficient scheduling, streamlined coordination and value engineering
- Time savings as a result of effective fast-tracking
- Early knowledge of firm costs
- Ability to respond quickly to changing conditions

**Challenges**

- Subsurface Risks
- Complex procurement process needs careful planning to avoid high administrative costs
- Owner’s needs converted to performance-based language
- Need multi-faceted insurance/bonding coverage
- Requires a customized contract
Percentage of Design
(As included in or required by Design-Build RFP)

- 35 percent design + leads to price oriented selection
- Less design provided or required - more emphasis on technical/qualifications criteria
- Owners initially provide or require more design in D-B procurements
- After initial experiences owners provide or require less design
  - Recognize cost and time required
  - Recognize additional creativity and cost saving ideas when design provided by Owner is less developed
- Experienced owners prefer more emphasis on qualifications
Design-Build and Best-Value Procurement

• Historically designer only selections are qualifications-based
• Historically constructor-only selections are low price-based
• D-B generally combines the two into a best value selection
• Best-value selection - combination of technical and cost criteria
• Best value ranges from qualifications to price oriented selections
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Program Manager/Design-Build Contractor/Construction Manager

Owner

Program Manager

Design-Build Contractor

Construction Manager
Program Manager/Design-Build Contractor/Construction Manager

Owner Selects Program Management/Engineer

Project Definition /Preliminary Design Completed by PM

Design-Build Team Shortlisted

Construction Manager

Qualified Contractors Engaged in Project Definition

Final Design/Construction Completed by Team
Benefits of Program Manager/Design-Build Contractor/Construction Manager

- Owners Benefit From Multiple Parties especially on large multi-construction packages for large programs
- Provides schedule and cash management controls over long term programs
- Allows PM/CM team to apply “Lessons Learned” from construction on next project
- Allows standardization of contracting practices
- Allows for various contract packaging and sizes – politically more acceptable to local contractors
Challenges of Program Manager/Design-Build Contractor/Construction Manager

- Owner Needs to Play Key Role as “Arbiter” between parties and multiple companies/contractors
- Non-conventional delivery requires education, acceptance and modification to standard contracts and technical specifications
- Need for Clear Risk Allocation and Risk Sharing between parties
- Quality control/quality assurance standards must be clearly defined during procurement
- Tends to cause overlapping responsibilities
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Public Private Partnerships (PPPs)

• PPPs are contracts between a Public Owner and a private sector “Concessionaire” under a Development Agreement
• Concessionaire is responsible for financing, designing, constructing and (often) operating and maintaining the Owner’s project for a specified time often including revenue collection
• Concessionaire typically has a D-B Agreement (or another form of alternative delivery agreement(s)) with Design-builder for design and construction
• PPPs are relatively new to the US
• Many of the issues with alternative delivery methods are also true for PPPs with the addition of another decision stakeholder (the financier) having a significant stake in the project
Current Issues with Contracting for Tunnels

- Alternative Approaches Becoming Increasingly Common in Tunnel Industry
- Aggressive Risk Transfer from Owners to Design-Builders
- Designers Role(s) and Contractors Role(s) Changing depending on Contract Type and many other Factors
- No standard approach currently on risk management and risk allocation on PPP
- Determining when a Differing Site Conditions claim valid is challenging for alternative delivery methods
- Cost estimating
Best Practices - Contracts

- Owner selects contracting method based on careful and informed study of project requirements and self-assessment of Owner’s capabilities and experience to administer.
- Whatever type of contract is selected, the entire package needs to be comprehensive and coherent unto itself.
- If Owner selects alternative delivery method of procurement, “standard” terms and conditions are revised for that method that appropriately sets out roles, responsibilities of various parties and that incorporate current practices in tunneling industry, e.g., use of GBR, dispute resolution, DSCs.
- Selection of D-B Team should be based on “Best Value”.
Future Trends

• Alternative Delivery Methods will become Preferred Procurement Method especially for large public projects in the near future due to funding issues

• Tunnel Designers and Contractors and other industry proponents (suppliers, manufacturers, etc.) need to continue to set the standards for industry in the alternative delivery methods through professional associations and dialogue with Owners, Concessionaires, Insurers, Lawyers and other stakeholders

• Contracting methods for tunneling will continue to evolve and will spur innovative approaches
Questions?
Thank You