Colorado School of Mines
Underground Center for Construction and Tunneling
Nov. 13, 2013
Presentation Overview

- Design-build contracting.
- SR 99 Tunnel Project.
- Construction partnering.
- Risk management.
- Questions.
WSDOT Coordination

- Washington State
- King County
- Port of Seattle
- City of Seattle

WSDOT
SR 99 Tunnel Construction Contracts

- South Access Project
- SR 99 Tunnel Project
- North Surface Street Connections
- North Access Project
What is Design-Build Contracting?

**Design-Build** – a method of project delivery in which the owner executes a single contract *with one entity* (the Design-Builder) for design and construction services to provide a finished product.

**VS.**

**Design-Bid-Build** – traditional approach for delivery of transportation projects where the owner completes the design and accepts the lowest responsive bid for construction from qualified contractors.
Design-Build Considerations

**Time**
- Allows construction to start without final design of all project elements.
- Design is tailored to contractors means and methods.
- Generally leads to earlier completion date.

**Budget**
- Requires fewer owner staff.
- Can lead to earlier cost certainty.
- Errors and omissions not owner’s responsibility.
- Additional risk is assigned to contractor.
Design-Build Procurement Process

- **Request for qualifications**
  - Design-Build teams submit statements of qualifications (SOQ).
  - WSDOT evaluates SOQs and ranks based on predetermined scoring approach.

- **Short listed teams notified**

- **Request for Proposals (RFP)**
  - Short listed teams prepare proposals.
  - WSDOT evaluates proposals based on predetermined scoring approach.

- **Best value selection** = \( \text{technical evaluation score} \times $10,000,000 \) / $ Price Proposal
SR 99 Tunnel

- Approximately two miles long.
- Two lanes with eight-foot safety shoulder in each direction.
- State-of-the-art safety systems.

Design concept of tunnel interior.
South Portal Design
North Portal Design

- Northbound SR 99 off-ramp to Republican Street
- Northbound SR 99 on-ramp from Aurora Avenue
- Southbound SR 99 on-ramp from new Sixth Avenue N.
- Southbound SR 99 off-ramp to Aurora Avenue
- New Sixth Avenue N.
- New two-way Mercer Street
Building the SR 99 TBM*
Building the SR 99 TBM
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Building the SR 99 TBM
Building the SR 99 TBM
Building the SR 99 TBM
Building the SR 99 TBM
Building the SR 99 TBM
Building the SR 99 TBM
Building the SR 99 TBM
TBM Arrival in Seattle
Unloading and Storing the TBM*
Unloading and Storing the TBM
Unloading and Storing the TBM
Unloading and Storing the TBM
Unloading and Storing the TBM
Unloading and Storing the TBM
Excavating the Launch Pit
Building the Base Slab
Assembling the SR 99 TBM
Lowering the Cutterhead
Testing the SR 99 TBM
Inside the TBM’s Control Room
Tunnel Spoils Conveyor Belt
Manufacturing Tunnel Liner Segments
Launching the SR 99 TBM
Inside the SR 99 Tunnel
Construction Monitoring Area
Protecting Structures Along the Tunnel Route

- Pre-condition surveys of buildings and utilities.
- Install monitoring equipment on nearly 200 buildings.
- Install 700 instruments under streets and sidewalks to measure any ground changes.
- Track measurements of excavated material as tunnel boring machine progresses.
- Use satellite images to assess any changes in ground condition.
## Construction Timeline

<table>
<thead>
<tr>
<th>Projects</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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<tbody>
<tr>
<td>South Holgate to South King Street Replacement</td>
<td></td>
<td></td>
<td>Overpass open to traffic</td>
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<tr>
<td>South Atlantic Street overpass</td>
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<td>SR 99 Tunnel Project</td>
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<td>Begin interior roadway</td>
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<td>Tunnel boring</td>
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<tr>
<td>Tunnel portals, cut-and-cover sections and operations buildings</td>
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<tr>
<td>North access project</td>
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<td>All ramps open</td>
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<td>South access project</td>
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<tr>
<td>North surface street connections</td>
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<td>Central waterfront viaduct demolition</td>
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**Construction**
What is Construction Partnering?

- Working together.
- Building relationships.
- Understanding the needs of the other parties’ and a philosophy of teamwork.
- Committing to cooperation and communication.
- An attitude of goodwill and trust.
- Sharing risks with a "win-win-win" attitude.
Construction Partnering Benefits

• Total project costs were reduced by 10 percent.
• Profitability increased by 25 percent.
• Overall project completion time was reduced by 20 percent.
• Schedule changes were reduced by 48 percent.
Managing Risk

- Develop Project Risk Register and Update regularly
- Develop effective contracting structure.
- Account for risks and inflation in estimates.
- Manage project as a strong owner.
- Identify and develop risk management plans.
- Engage experts with national and international tunneling experience in urban environments.
- Take extensive soil samples so the contractor starts with a very good understanding of the soil conditions.
Website: www.AlaskanWayViaduct.org

Twitter: @BerthaDigsSR99

Email: viaduct@wsdot.wa.gov

Hotline: 1-888-AWV-LINE