The Anton Anderson Memorial Tunnel

Whittier Access Project

Outline
- Project Background
- Project Issues
- Design and Implementation
- Cost-Benefit Analysis
- Results
- Critique

Whittier, Alaska

- Population: 300 residents
- Tourist destination for water recreation and vacationing
- Rail port built during WWII to provide a supply link from Prince William Sound to town of Portage

History
- 1943: 2.5 mile RR tunnel constructed through the Maynard Mountain leading to a boom in population growth
- 1950: military vacated Whittier, then became a federally-run commercial port
- Passage to Whittier only via RR flat cars that carry vehicles
- Access Project: the tunnel, the new roadway, and two bridges

Groups Involved
- Alaska Department of Transportation and Public Facilities
- Design Builder: Kiewit Construction
- Lead Consultant: HDR
- Designer: Hatch Mott MacDonald

Project Objectives
- Increase access to Whittier
- Guarantee convenient and affordable access
- Improve the safety measures of the tunnel
Alternatives

- To increase the existing rail service
- To use a high-speed electric train
- To construct a highway route over Maynard Mountain
- To construct a highway route through the tunnel
- To construct a combined roadway and railway route through Maynard Mountain and a highway leading to the tunnel

Risks and Uncertainties

- Weather
- Design-Build construction method
- Availability of materials & equipment

Tunnel Construction

- The existing railroad track and underlying crushed rock were replaced with concrete panels
- Rock excavation created space for fans and safehouses for use during emergencies
- Walls are natural rock, reinforced with steel plates where necessary

Construction Challenges

- Snow
- Tunnel Portals: had to be built to resist forces of possible avalanches
- Tight working conditions
- Time constraint: project had to be finished in two years
- Keep tunnel in operation

Addressing the Challenges

- Staging areas
- A-shaped portals
- Specialized equipment and methods, detailed scheduling of machinery sequence
- Heavy emphasis on partnering, overlapping shifts to ensure constant on-site monitoring
- Procedure was practiced outside of tunnel before actual installation

Cash Flow Diagram

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Whittier Access Project, Alaska

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Whittier Access Project, Alaska
Projected Revenue

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<th>Year</th>
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Costs and Benefits

- **Costs**
  - Cost of Construction
  - Loss of full tunnel operations
  - Environmental impacts
- **Benefits**
  - Increased accessibility to Whittier
  - Shorter commute time
  - Economic boost
  - Gain exposure to design-build

Results

- Innovative computerized control and emergency response systems that regulate rail and vehicle traffic
- Can operate in -40°F temperatures and in extreme wind and snow conditions
- First tunnel to use both portal and jet fans for ventilation

Performance

- $57 million dollar tunnel, under $59.6 million contract amount
- Early finish date: Fully operational two months ahead of schedule, June 2001
- Only combined railroad/highway tunnel in the world
- The longest highway tunnel in North America

Critique and Conclusions

- Design-build allows room for innovation in construction methods
- Careful planning and monitoring increase overall project efficiency
- End result: substantial decrease in project duration and cost

References

- ADOT&PF Facility Manager, Mr. Gordon S. Burton
- http://www.dot.state.ak.us/creg/whittiertunnel/index.htm
- http://www.kiewit.com/project/pro_5598016.html