LEARNING FROM OTHER MEGA-PROJECTS

LIKE THE TZB/I-287 CORRIDOR, EACH PROJECT IS UNIQUE...

...WHAT INSIGHTS CAN WE GAIN FROM TWO CASE STUDIES?
San Francisco – Oakland Bay Bridge, East Span (existing)
TZB Similarities

Besides looks...

- Heavily traveled connection
- Significant congestion during peak hours
- Must maintain traffic during construction
- Passenger tolls in 2007 were $4 (charged one dir.)
- In seismic zones across wide, shallow water bodies
- Requires a uniquely engineered crossing
- Complex institutional environment
SF-Oakland Bay Bridge Seismic Safety Project

- Bridge = West Span, Yerba Buena Island, East Span
- Project = 7 elements, starting from west approach

**THIS STUDY: Replacement of East Span**
- with new bridge of two side-by-side decks (5 lanes + shoulders)
- Includes a new bicycle/pedestrian path
- Cost estimated at $5.5 B
- Construction began 2002
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How’d they do that???

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Origins

1989 Loma Prieta Earthquake
- One segment of East Span collapsed, killing 1
- Collapse of Oakland viaduct, approach to bridge
  killing 42
- 1,300 buildings destroyed, 20,000 damaged
- Total of 62 deaths and 3,757 injuries

East Span repaired that year, seismic retrofits required
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Collapse of East Span segment during 1989 Loma Prieta earthquake

Source: C.E. Merri, US Geological Survey

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$ for Seismic Safety


- 1971 CALTRANS establishes SS Retrofit Program

- 1991 financing seismic projects from motor vehicle fuel tax revenues and other mechanisms

- 1996 Seismic Retrofit Bond Act (@$2B, $650M for toll brdgs)
More $ for Seismic Safety

- 1997 authorized $2.6B for Toll Bridge Seismic Safety Retrofit Program *includes $1B for East Span*
  ($1 incr on tolls on 7 state-owned brdgs; addit. State Hwy $’s)

- 2001 authorized another $5.1B for TBSSR Program
  * mostly for East Span project *
  (by bonding against future revenues from toll surcharge thru 2038)

- 2005 East Span total budget of $5.5B approved
  ($630M in State funds, plus additional toll increase to fund locally preferred design concept)

Concentration

- 1997 Bay Area Toll Authority (BATA) created
  - Administers $1 toll surcharge to fund program
  - Share with CALTRANS administration of 7 toll brdgs
  - Programming authority for toll brdgs transferred from California Transportation Commission

- 2005 Bill 144
  - Fully authorizes BATA to manage toll revenues & prgm
  - Funds East Span to max amt thru tolls & State funds
  - Establishes project oversight and control by new Toll Bridge Program Oversight Committee (TBPOC)
Current Primary Roles

**Caltrans** owns and operates the bridges; manages the design consultant and construction contracts

**BATA** administers programs, allocates toll revenues, funds day-to-day operations and administration of bridges
- Also funds long-term capital improvement and rehab of bridges, including seismic retrofit projects

**Bridge Program Oversight Committee (TBPOC)**
- Independent board, provide oversight and control of TBSSR
- Director of Caltrans, Executive Director of BATA, Executive Director of California Transportation Commission

Final Revenue Sources

- @33% from State fuel tax earmarked (1991) for seismic upgrade projects

- @30% from State Seismic Retrofit Revenue Bonds (1996) (debt paid from General Fund – mostly state personal and corporate income taxes and sales taxes)

- @37% from toll surcharges on the 7 Bay Area toll bridges (some paying off $450M TIFIA loan)
Meanwhile...

What to build?
At what cost?

**East Span: Retrofit or Replace?**

- After **1989** quake, cost comparison for East Span:
  - Replacing costs $1B more than retrofitting
  - Yet safer; in long run cheaper, easier to maintain

- **1997** replacement recommended

Senate Bill 60 called for it to be a **standard freeway viaduct bridge with a “cable-suspension span”** (to the east of Yerba Buena Island).

*Design soon modified by regional input, Engineering Panel*
Not Just Any Bridge

One suggested aesthetic criteria from the City of Oakland in 1997:

The new East Span should be a “world-class design” capable of “creating an inspirational identity for Oakland and the East Bay.”

East Span Replacement

- CALTRANS commissioned 2 designs to 30% complete for the cable-supported segment
  - Self-anchored suspension (SAS) bridge
  - Cable-stayed bridge
- Inform on seismic performance, cost and aesthetics

- 1998 DEIS Recommended Alternative:
  - Single tower SAS
  - Two parallel, five-lane roadways
  - Bicycle/pedestrian path
  - Provisions for future inclusion of rail
1998 - 2001

- 3+ yrs to reach Record of Decision (from DEIS)

- Delayed by numerous design challenges:
  California State Legislature  Governor  Caltrans
  California Business, Transportation and Housing Agency
  U.S. Navy  California Transportation Commission
  Metropolitan Transportation Commission (MTC)
  Bay Area Tolling Authority (BATA)  City of Oakland
  City and County of San Francisco

Also involved were the White House, the Army Corps of Engineers, and the Federal Highway Administration.

2002 - 2005

Procurement delays
- Lack of bids
- Market capacity
- Multiple contracts
- Rising steel costs
- Reconsider redesign options
- Additional funding
Leadership Challenges

Impacting 8 yr project design & procurement process:

- 2 Governors, several Mayors
- Turnover of Caltrans staffing on project management
- Multiple transportation entities:
  Federal  State  Regional  City
- Federal “Buy America” requirement
- Cost containment versus aesthetics
- Committed to a really complex design

Self Anchoring Suspension Span
Disputes over SAS

- Unprecedented complexity to meet demanding combination of: environmental seismic and aesthetic requirements
- Cost severely impacted by soaring steel prices
- Early cost-effective options rejected on aesthetics
- Costs continued to soar, then too late to change design

Procurement Challenges

- Design-build was not an option in CA
- In 4 contracts, then 13 to increase bidding competition
- Awarded and started construction:
  - 2002 Geofill (site prep) $8M
  - 2003 Skyway $1.0B, increased to $1.3B by 2005
- 2003: SAS Tower Marine Foundation received one bid and was 63% higher than estimated
- Contracting and bidding processes reviewed
- Rebid SAS foundation, awarded in 2004 ($50M below new estimate)
SAS Delayed

- **2004** SAS superstructure (estimate of $0.8B)
  - One bid: $1.4B foreign steel, $1.8B domestic steel
  - Not awarded; re-design options considered
  - Cable-stayed design could save $600M but risk delays with public support and canceling work in progress

- **2005** compromise reached to proceed with SAS
  - re-bid with enhancements to encourage bidding

- **2006** two bids, winning bid of $1.4B ($49M under estimate)

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Skyway complete before SAS starts construction

Source: [Unsplash](https://unsplash.com)
Author: [Denis Smith](https://unsplash.com/denis_smith)
Main Lessons?

- Delays can really impact the project
  
  Make good decisions and move on

- Avoid a really complicated design
  
  Unique = significant risk and uncertainty

- Anticipate potential material cost risks
  
  Steel costs can escalate more due to foreign factors

- Recognize risks to contractors in bid process
  
  Provide incentives to enhance competition

Any questions before the 2nd case study?
Transportation Expansion (T-REX) Project

- Denver, Colorado
- Central business district southeast along I-25 Corridor and connection with I-225
- Densely populated and fast-growing
- Address mobility, congestion and safety
T-REX

- **Highways**
  - expand 16.6 miles
  - reconstruct 8 interchanges
  - replace 13 bridges

- **Light Rail**
  - extend system 19.7 miles thru corridor
  - 13 new stations, maintenance facility

- **Cost $1.67 billion (2001 start)**

(largest surface transportation project undertaken by State of Colorado)
Extend Light Rail to Southeast, with 13 New Stations
Project Sponsors & Oversight

- CDOT – Colorado Dept Of Transportation
- RTD – Regional Transportation District (Denver)
- FHWA – Federal Highways Administration
- FTA – Federal Transit Administration

(Simpler than with TZB)

Project Origins

1970’s corridor recognized as needing major highway expansion
1992 study: I-25 exceeding design capacity, suggests incorporation of mass transit
1995 Major Investment Study (MIS) – final recommendations became core of this project
1998 started EIS process – brought attention to questions on project funding and financing
1999: Foundation Building

- legislation approved for innovative financing for T-REX, other highway projects
- CDOT and Denver RTD sign inter-governmental agreement to finance and construct T-REX
- FHWA and FTA sign interagency agreement regarding T-REX responsibilities
- Voters approve separate bond acts for highway and rail portions

< 2 Yrs to Start of Construction

- 03/00 - EIS completed, Record of Decision (ROD) issued
- 11/00 - $525 m Full Funding Grant Agrmt (FFGA) approved for light rail portion
- 11/00 - Request for Proposals (RFP) issued
- 05/01 - selection of Design-Build Contractor
- 09/01 T-REX groundbreaking
5 Yrs to Construct

- 09/01 groundbreaking
- Late ‘01 – late ‘06 construction
- 08/06 final highway alignment opened
- 11/06 new light rail corridor opened
How’d they do that???

1) Leadership & Legislation
2) Innovative Financing
3) Procurement Savings
4) Unprecedented Partnership
Facing difficult circumstances

Colorado followed “pay-as-you-go” approach

Late 1990’s – many major transportation projects on hold

Forecasting transportation revenue shortfalls

Resulting in further project delays

Created The “7th Pot”

• In 1996, Colorado Transportation Commission

• state’s 28 highest priority transportation projects  (includes T-REX)

• placed on an accelerated schedule

• $100M / yr was dedicated to this program

• Would take 50 years to complete all 28
Enhanced The “7th Pot”

- In 1997, legislature passed bill
- transfers 10 percent of sales tax revenue (considered to be motor vehicle related)
- to CDOT – earmarked specifically for the 28 projects
- Completion date reduces from 50 to 25 years

INNOVATIVE FINANCING
Funding Dilemma

Facing:
- T-REX cost at $1.67B
- Large number of competing projects
- Unpopularity of tax increases

Approach:
- Address all 28 projects, gain broad public support
- Use bond proceeds, Federal discretionary grants, existing sales taxes, and local funding
- Highway-transit nature of project will require sophisticated and coordinated funding effort

A Good Idea At The Time

No new taxes or tolls!

Get a Federal Transit Grant

And Pass a Bond Act
Debt without taxing

A) Use GARVEE bonds – which normally commits future Federal Aid to paying off debt service for 15 years

B) Senate Bill 1: directs to 7th Pot a portion of sales and use tax “surplus” receipts (over a threshold amount)

C) Use “surplus” receipts to pay debt service
   (protect Federal Aid for annual capital needs)

November 1999 Bond Act

- Two separate bond acts in general election
- 62% approval for CDOT to sell GARVEE bonds for T-REX and 24 other highway projects
- 66% approval for Denver RTD to issue bonds for rail
- CDOT and RTD then joined to seek further funding
  (traditionally compete against each other for $’s)
How Did It Turn Out?

- Worked as planned for a few years
- “Surplus” dried up - sales and use dropped below threshold

- With no other revenue source available, CDOT had to use Federal Aid to pay off debt service
- Recurring reduction to CDOT Annual Capital Program

- Recently, “surplus” sales and use mechanism replaced by $250M/yr from higher motor vehicle fees
- Annual Capital program still not made whole

PROCUREMENT SAVINGS

TIME & MONEY
Legislation Passed in 1999

To facilitate the T-REX project and allow innovative financing and project delivery for transportation projects across Colorado.

- **GARVEE Bonds** could be used for transp. projects
  
  *(Grant Anticipation Revenue Vehicles)*

- **Design-build contracts** could be awarded on a “best value” basis
  
  *(rather than traditional design-bid-build contracts solely on a “low bid” basis)*

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**RFP: Design-Build**

- CDOT and RTD chose D-B contracting

- **Goals:** accelerated project delivery reduced project cost
  
  *increased innovation  more effective risk management  minimization of owner resources*

- Procurement was based on “best value” and capped by $1.225 B “upset amount” – *maximum amount CDOT & RTD were willing to pay a single contractor*

- CDOT and RTD annual funding also limited
RFP: Encouraging Innovation

- Certain elements were designed to 70% level to assure specific standards
- Mostly 30% designed to encourage innovations
- Proposers were allowed to suggest alternatives to certain requirements
- 58 changes submitted, 41 approved
- Cost savings ranging from $500,000 to $5M

Winning Bid

- Proposals from two design-build teams:
  - SECC won with final contract of $1.18 B and commitment to finish by fall 2006, two years ahead of scheduled completion date
  - Valley Corridor Constructors would have completed by end of 2005, but bid was over “upset amount” by $146 M
UNPRECEDENTED PARTNERSHIP

Intergovernmental Cooperation

- CDOT – state highway agency
- RTD – essentially a transit agency
- FHWA – federal highway agency
- FTA – federal transit agency

- Forged unique agreements, signed in 1999
Aligned on Common Goals

All four agencies agreed on 11/11/99 to:

- Minimize inconvenience to the public
- Meet or beat a total program budget of $1.67B
- Provide for a quality project
- Meet or beat the schedule to be fully operational by June 30, 2008

Public meets Private

- Public-public partnership complemented the PPP with the design-build team
- T-REX Partnering Charter
  - Partnering values: community safety cost quality schedule teamwork
  - Associated values against which the success of the project would be measured
  - Rigorous structure of teams, meetings, reports and method for dispute resolution
GAINING PERSPECTIVE

Keys to Their Success

Regional, multi-modal approach to congestion problem
Statewide public support based on statewide package
Financial planning at EIS stage made a difference
Early quantification of funding shortfalls and possible sources provided credibility for funding request
Intergovernmental partnership led to public confidence
QUICK SUMMARY ON APPLYING THOSE LESSONS TO TZB

THEN QUESTIONS ON THE ENTIRE PRESENTATION

Both projects...

- Active public outreach, achieved public support
- Had extensive Federal involvement (policy more than $)
- Required a new organizational structure
  (new toll authority, intergovernmental partnerships)
- Required new revenues / innovative financing
- Made critical innovations with procurement
For the TZB/I-287 Project

- Active public outreach through 5 SAWG’s and other
- Established and expanding upon intergovernmental partnering relationships
- Looking for an optimal mix of
  - organizational and institutional arrangements
  - innovative financing and procurement for different phases of project
- Recognizing/anticipating that innovative solutions would need statutory authority and public staff to manage/oversee
- Broad based public support will be critical

QUESTIONS
INSIGHTS
COMMENTS
THANK YOU FOR PARTICIPATING IN THIS WORKING GROUP!