Challenges of a Construction Defect Claim Involving a Highway Concessions Project: A Private Sector Forensic Perspective

Jason D. Gregorie, M.S., P.E., CFM
Luis A. Mariaca, M.S., P.E.

Applied Building Sciences, Inc.
Charleston, SC 29405

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1. Intro:
   • Private Sector Forensic Engineering
   • Highway Concessions

2. Case Study
   • Americo Vespucio Norte
   • Anatomy of Defect Claim
   • Conclusions
Failure: “An unacceptable difference between an expected and observed performance.”

A Failure need not be a complete collapse of a structure.

ASCE: Applying engineering principles, education, and knowledge to problems where legal liability may be decided in a legal forum.

Forensic Engineer: Third party assessment with no stake in the outcome.
CONSTRUCTION DEFECT

- Risk typically borne by the private sector.
- Insurable risk.
- Must determine: Construction Defect vs. Design Defect

- Typically, the contractor is responsible to the owner for defective construction caused by faulty construction practices, unless the defective construction is caused by faulty design.

- Construction defect: carries long-term implications with maintenance costs, and thus operation and pavement management costs.
CONCESSIONS

• Agreement between government and private entity.

• Government transfers construction and/or operation/maintenance of asset to private entity for a period of time.

• The private entity charges a user fee.

• Asset is built or maintained outside the public budget with private capital.

• Also takes advantage of private-sector efficiency.
CONCESSIONS

- Risk allocation is main concern
- Risks: predicting traffic volume and operation costs
- Minimum Income Guarantee (MIG) mechanism created to offset risk
Minimum Income Guarantee (MIG)

- Optional to bidders
- Concessionaire shares extra revenue over a set threshold with government.
- If revenues fall below established threshold, government will subsidize concessionaire.
- Threshold established in bid documents.
- Result: Less risk and increased competitiveness in concessionaire bidding process.
- Government guarantees revenue flow but not cash flow.
PROJECT SUMMARY

- ABS contacted to investigate claims of premature distress
- Americo Vespucio Norte Highway
- Santiago, Chile
- The Mission: Determine Cause & Origin
- Claim and investigation before the earthquake
PROJECT SUMMARY

- Urban highway loop (northern section)
- 29 km, Constructed in segments between 2002-2005
- Asphalt surfaced
- Three lanes each direction
- HMA surface course
- HMA Binder Course
- Granular Base
- Granular Subgrade
- Tolled Highway
Designed for 47,000,000 ESALs based on 1993 AASHTO

Typical Design Section:
- 2 inch asphalt surface course
- 6 inch asphalt intermediate course
- 6 inch granular base
- 4.75 inch granular sub-base
- Natural Subgrade
OPERATIONS

- GOVERNMENT
- CONCESSIONAIRE (ADMINISTRATOR)
  - ENGINEERING CONSULTANT
  - CONTRACTOR
THE CLAIM

• Concessions contract requires yearly reports and maintenance for:
  ▪ Linear Cracking
  ▪ Fatigue Cracking
  ▪ Rutting
  ▪ IRI

• Owner’s consultant monitors pavement yearly.

• Some sections of the highway nearing service thresholds for some parameters:
  ▪ Fatigue
  ▪ International Roughness Index (IRI)
THE CLAIM

1. “Debonding” by Administrator
   - Construction Issue

2. “Top Down Cracking” by Contractor
   - Design Issue
PHASE I - Preliminary Information Gathering
- Initial site visit
- Gather preliminary project information
- Analysis of the “Situation”

PHASE II - Data Collection
- Second site visit
- Field Data collection
- Field and laboratory testing

PHASE III - Analysis & Conclusions
- Analysis of data and testing results
- Final engineering report
FORENSIC INVESTIGATION

54 Cores total

- 31 Cores from "bad" pavement
  - 12 Cores from Segment 4
  - 19 Cores from Segment 5
- 23 Cores from "good" pavement
  - 9 Cores from Segment 4
  - 14 Cores from Segment 5
FIELD INVESTIGATION
• Concessionaire: Revenues lower than anticipated.

• Concessionaire: Operation and maintenance costs much higher than anticipated.

• Concessionaire: Higher costs were because premature distresses, due to construction deficiencies.

• Concessionaire: Sought relief against the unanticipated portions of the maintenance costs by way of the construction defect claim.
Discussion

• Guaranteed minimum revenue.

• But no guarantee on cash flow (revenue vs expenses).

• Future maintenance costs were predicted by the government.
CONCLUSIONS

• Equally important to the empirical evidence was understanding the intricate circumstances of the claim and the concessions arrangement.

• The concessions contract helped mitigate traffic demand risk via revenue sharing, but did not provide mitigation for unanticipated operation and maintenance costs.

• Construction defects substantially affect long-term maintenance costs, and thus are significant factors in Concessions!
THANK YOU