



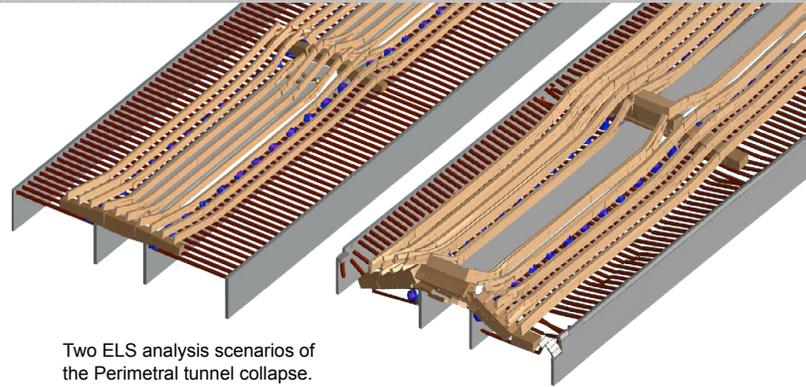
PERIMETRAL HIGHWAY DEMOLITION

PHASE 02

Rio de Janeiro, Brazil, 2013

Iterative Engineered Analysis for Determining Demolition Outcomes

In a continuation of Rio's Elevado da Perimetral demolition project the demolition team, Fábio Bruno Construções, tasked Applied Science International with discovering the best method for bringing down the elevated road in a section perched above a pair of tunnels located in Rio's Port Zone.



Two ELS analysis scenarios of the Perimetral tunnel collapse.

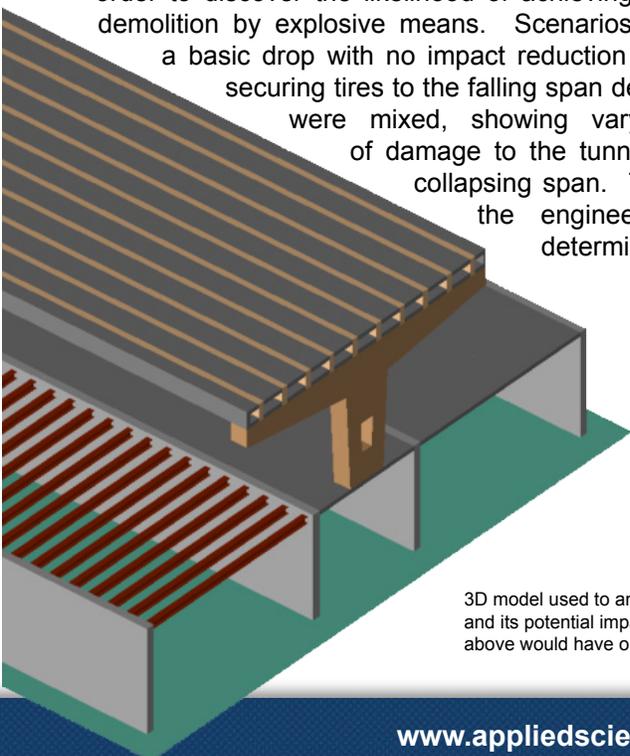


Perimetral tunnel with the bridge overhead.

tunnels would be severely damaged in all the scenarios that were run. The tires would not be able to reduce the damage to the tunnel slab, and additional testing of this method was recommended. Soil vibrations were measured at a distance of 10 meters from the Perimetral bridge edge and were determined to be the same order of magnitude as the Phase 1 demolition.

ASI engineers went to work using Extreme Loading® for Structures to create detailed models for the structural components of the span, the area below it, and two tunnels. Soil models were also created in order to perform seismic and impact force analysis. Several scenarios were run in order to discover the likelihood of achieving a successful demolition by explosive means. Scenarios ranged from a basic drop with no impact reduction measures, to securing tires to the falling span debris. Results were mixed, showing varying degrees of damage to the tunnels under the collapsing span. The results of the engineered analysis determined that the

Using ASI's analysis results and recommendations, Fábio Bruno Construções decided that a manual deconstruction rather than an explosive demolition would be a more appropriate method to take down the Elevado da Perimetral at this critical juncture. This project demonstrates the benefits of ASI's engineered analysis to give valuable insights to demolition experts and decision makers who are required to make important choices, and even to drastically alter existing plans.



3D model used to analyze the tunnel and its potential impact from an implosion above would have on the structure.



Perimetral Tunnel Structure

ASI Headquarters:

2012 T.W. Alexander Drive, Durham, NC 27709-3887
Tel: +1.919.645.4090 | Fax: +1.919.645.4085