



PhotoReal™ Modeling Provides the MBTA Precise Visual Data to Secure Liability Protection

Faced with the construction of a multi-story building above a new section of tunnel, the MBTA looked to REM's 3D PhotoReal™ modeling services to document the tunnel's structural integrity.

Project: Problem Solving:
Monitoring Structural
Integrity of Infrastructure

Client: Massachusetts Bay
Transit Authority

Location: Boston,
Massachusetts

Process: 3D PhotoReal™
Modeling

The Company:

The Massachusetts Bay Transit Authority (MBTA) operates most of the public transportation services in the greater Boston area, including subway, bus, rail, and ferry routes. The MBTA manages one of the busiest subway systems in the United States.

The Challenge:

Soon after a new section of the MBTA's Silver Line tunnel was operational, a construction company received permission to build a 10-story parking garage over a portion of the new tunnel.

MBTA authorities objected to the proposed multi-story construction, citing structural concerns due to excessive weight above the tunnel.

Structural engineers for the parking garage asserted that the building design of the garage would not disturb the integrity of the tunnel.

The MBTA secured a contractual stipulation detailing who would bear responsibility for repairs if a deviation developed in the tunnel once the parking garage was built. MBTA authorities also determined that a contract alone would not provide sufficient legal protection. The MBTA needed accurate visual data that could determine liability for possible deviations in the tunnel over time.

Without accurate baseline data, combined with regular monitoring, transit authorities had no way to prove the structural integrity of the tunnel prior to the garage construction. And they had no way to determine if a deviation was caused by the weight of the garage.

The Solution:

MBTA contacted REM to perform scanning and provide a 3D PhotoReal™ Model of the section of the tunnel below the site of the proposed parking garage. A 3D PhotoReal™ Model is especially effective for monitoring tunnels or bridges where accurate documentation of surface shape and color are critical.

REM's exclusive method of integrating laser-scanned data with color photography created an accurate 3D PhotoReal™ Model. This model provided precise baseline data.

The PhotoReal™ Model documented the base measurements of the tunnel and **accurately recorded the tunnel's exact likeness at that moment in time.** The Model allows transit authority engineers to view, measure, and analyze uncompromised image data from the tunnel including all aspects of volume and texture.

Results:

3D PhotoReal™ modeling technology provided the MBTA with the continuous qualitative and quantitative data necessary to reveal the exact location and the extent of any crack or leak in the section of the tunnel below the parking garage.

Subsequent scanning will reveal signs of fatigue or structural changes in the tunnel that might occur due to the weight of the parking garage. Any developing deformation is readily detected by a change in shape and/or a change in color.

Accurate data based on a comparison between the baseline PhotoReal™ Model and subsequent scanning will reveal any future deviation and determine whether the MBTA or the contractor for the garage bears responsibility for tunnel repair costs. The MBTA remains responsible for minor repairs of less than 1/2 inch. However, tunnel repair costs for a deviation exceeding 1/2 inch are the responsibility of the garage contractor. The MBTA is thus protected from bearing the high cost of repairing structural damage that may be caused by the parking garage.



Real Earth Models, LLC

Contact us at: 214-707-9526

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