



CASE STUDY - VOID REMEDIATION – TUNNEL ABANDONMENT BENEATH CHURCH BREEZEWAY ADDITION

Manitowoc, WI

PROJECT OVERVIEW: A church located in Manitowoc, Wisconsin was constructing a new addition and needed to convert an existing breezeway into a sloped, ADA-compliant ramp. When the original slab was removed, the construction team discovered a large, abandoned tunnel directly beneath the ramp footprint. An HMI® contractor provided an engineered void-fill solution using HMI's 201 Lightning high density polyurethane foam and FillFoam™ lightweight geotechnical foam.



THE CHALLENGE

- Large unknown tunnel void beneath a structural transition zone
- Need for stable, uniform load-bearing conditions
- Restricted access preventing traditional backfill methods
- Geotechnical uncertainty regarding settlement and structural integrity
- Tight construction schedule requiring phased work



ALTERNATIVE SOLUTIONS CONSIDERED

Flowable fill and traditional fill were evaluated but rejected due to weight concerns and limited access. In addition, traditional fill must be placed and compacted in lifts to minimize future settlement, which was not feasible here due to site constraints and restricted access. Structural reconstruction was considered but deemed too costly and invasive. Lightweight geotechnical foam provided the ideal solution with superior flowability, stability, and installation speed.



HMI SOLUTION

The contractor used a combination of HMI 201 Lightning polyurethane foam and FillFoam™ to fully seal, fill, and stabilize the void. FillFoam™ offered long-distance flow, extremely lightweight placement, and fast curing—ideal for tunnel abandonment and void remediation.



PROJECT EXECUTION PHASED APPROACH

BULKHEAD CONSTRUCTION

A bulk wall was constructed to contain material during filling.

SEALING

100 lbs of HMI 201 Lightning polyurethane foam was applied to seal the bulkhead wall, ceiling areas, and all joints.

VOID FILLING

Within one hour 4,500 lbs of FillFoam™ was installed into the approx. 6' x 6' x 14' tunnel, producing the volume of 20 cubic yards, starting from the rear and filling forward to achieve complete cavity encapsulation.

CAPPING

200 lbs of HMI 201 Lightning polyurethane foam was applied to cap the FillFoam™ mass and create a rigid sealed surface suitable for the new slab.

After capping was complete, the job site was ready for the concrete ramp installation. It was recommended that the new concrete slab be doweled into the existing foundation to improve structural support above the former tunnel.



ENVIRONMENTAL & SAFETY ADVANTAGES

Using engineered foam materials allowed the team to:

- Avoid trucking in several cubic yards of traditional fill
- Reduce fuel consumption and overall environmental load
- Minimize job-site disruption and equipment footprint
- Lower worker exposure to confined or potentially unstable underground spaces
- Eliminate dust and debris associated with traditional soil movement

This made the approach both safer and cleaner than conventional remediation methods.



QUANTIFIABLE BENEFITS

The foam-based approach delivered clear measurable advantages:

- Over 90% reduction in material weight compared to conventional fill
- Tunnel abandonment achieved with 20 cubic yards of fill material
- Eliminated the need for importing, placing, or compacting several tons of soil
- Achieved complete cavity encapsulation with minimal disruption