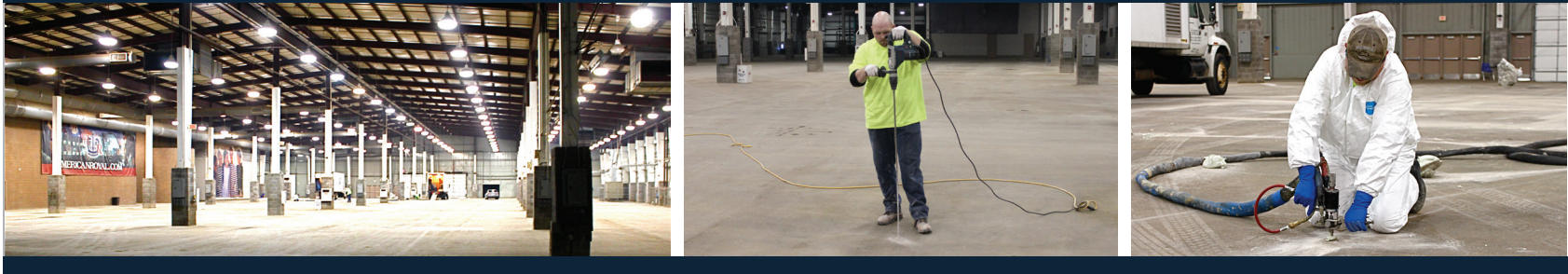


## CASE STUDY

# Soil Beneath Historic Landmark, The American Royal, Erodes and Concrete Slab Floor Becomes Uneven



## PROBLEM

Kansas City, Missouri's historic American Royal got its start way back in 1899 and today draws more than 250,000 people over an annual eight-week season of barbecue contests, rodeos, livestock shows, equestrian events and agricultural activities benefiting youth and education. The 14-acre complex's buildings, though, have a problem common to the confluence of the Missouri and Kansas rivers—the soil beneath them erodes and concrete slab floors become uneven.

The land on which American Royal stands is an ancient riverbed, or channel for retreating glacial melt and contains thick limestone, channel sandstone, and shale. While the mix is a solid, stable base, sometimes the supporting geology shifts and presents challenges for concrete sidewalks and slab floors.

The floor of Governor's Exposition Hall began shifting back in 1980s and the only remedy was to fill the voids beneath it with asphalt, and eventually to apply asphalt over the slab for a level surface. Finally last year the American Royal management was faced with a tough choice—find a better, more permanent solution or tear up the entire floor and replace it.

## SOLUTION

They chose NCFI Polyurethane's Terra Thane™ Geotechnical Polyurethane Systems.

Joe Morgan of Pro Foundations got to work "foamjacking"—a relatively new term based on the legacy method of "mudjacking" in

*"SPF is an ideal product for void filling and concrete lifting."*

which a slurry, or grout, of water, dirt and cement is pumped under a concrete slab to lift it to its original level position. Foamjacking uses TerraThane™ foam instead of the mud slurry. TerraThane™ foam is lighter than mud so it doesn't overburden the soil, yet more structurally dense so it handles heavier loads.

## RESULTS

"SPF is an ideal product for void filling and concrete lifting," says Morgan. "We use the specially formulated, dense foam system made by one of the U.S.'s oldest and most trusted foam houses, NCFI Polyurethanes. We removed the asphalt and drilled small holes in the slabs, pumped the two-part Terra Thane™ foam into the holes to fill the voids—some larger than 36"—then raised the slabs to level."

Dean Barrett, deputy director at Kansas City's Department of Convention and Entertainment Centers, says the city is pleased with the successful results of the December 2011 work. "We've got a level floor and it saved us millions of dollars. We'll be using it again for other projects here at American Royal."

Learn more at  
[www.TerraThane.com](http://www.TerraThane.com)

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# TECHNICAL SPECIFICATIONS

## TERRATHANE™ 24 SERIES SYSTEM

### DESCRIPTION

TerraThane™ 24 series, geotechnical polyurethane systems are two-component, closed-cell, rigid polyurethane foam designed for concrete raising/lifting/leveling, void fill and cavity fill applications. These are specially designed for bridge approaches and departures, highway and street sections, airport runways and taxiways and residential and commercial concrete slabs. Polyurethane foam has been used in these applications for over 40 years, and NCFI Polyurethane has manufactured these foams for over 20 years.

- Available in hydrophobic or hydro-insensitive formulations.
- Injectable through 5/8" hole making the process less intrusive.
- Flows well to ensure complete void fill and support before raising and lifting.
- Conforms to all irregular shapes.
- Controlled expansion rate to minimize over lifting.
- Fast cure enabling concrete section(s) to be put back into service quickly.
- Lightweight, minimizing pressure on potentially shifting substrate.
- Mixing of two components done by machine for speed and accuracy.
- No minimum batch size and no pre-mixing required, resulting in little to no waste.
- Only one mix design required for entire job: no re-mixing required.

## TYPICAL PHYSICAL PROPERTY RANGES FOR TERRATHANE™ 24 SERIES SYSTEMS

Densities: 2.0lb/ft<sup>3</sup> upwards to 6.0lb/ft<sup>3</sup>

Compression Strengths: 32 psi upwards to 120 psi (free rise, ASTM D1621)

TerraThane™ systems reach 90% of compression strength within approximately 15 minutes of application.

TerraThane™ polyurethane foams are tested to ASTM test methods including but not limited to, D1622, D1623, D2127, C518, D2842, Closed-cell content NCFI TM-300 and D2126. TerraThane™ polyurethane systems have excellent resistance to solvents. Maximum service temperatures range from 180°F (82.2°C) to 200°F (93.3°C).

The above values are average values obtained from laboratory experiments and should serve only as a guide. Consult NCFI for detailed technical data sheets and MSDS sheets for further details.

The information on our data sheets is to assist customers in determining whether our products are suitable for their applications. The customers must satisfy themselves as to the suitability for specific cases. NCFI Polyurethanes warrants only that the material shall meet its specifications; this warranty is in lieu of all other written or unwritten, expressed or implied warranties and NCFI Polyurethanes expressly disclaims any warranty of merchantability, fitness for a particular purpose, or freedom from patent infringement. Accordingly, buyer assumes all risks whatsoever as to the use of the material. Buyer's exclusive remedy as to any breach of warranty, negligence or other claim shall be limited to the purchase price of the material. Failure to adhere strictly to any recommended procedures shall relieve NCFI Polyurethanes of all liability with respect to the material or the use thereof.



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