

the next generation concrete surface: the quiet pavement solution

The Quietest Non-Porous Concrete Pavement Surface Available

NGCS applications grow as transportation departments seek cost-effective and sustainable pavement solutions



THE NEXT GENERATION CONCRETE SURFACE (NGCS) is the quietest non-porous concrete pavement surface available. Developed by Purdue University in partnership with the Minnesota DOT (MNDOT), IGGA, American Concrete Pavement Association (ACPA) and Portland Cement Association (PCA), NGCS combines diamond grinding and longitudinal grooving, offering a smoother ride, increased safety and decreased noise. Despite its flatter, smoother riding surface compared to traditional portland cement concrete pavement (PCCP), the NGCS still possesses and maintains reliable microtexture (friction) when constructed with quality aggregates. The longitudinal grooves provide substantial macrotexture and increase resistance to hydroplaning by providing escape channels that allow water to move out of the tire contact patch area.

» Watch [Next Generation Concrete Surface and Optimizing Highway Investments](#), presented by Nicholas Davis, IGGA Director of Technical Services, for the American Concrete Pavement Association (ACPA) Pennsylvania Chapter, Feb. 2023.

Key Benefits

- **Durability:** NGCS surfaces are designed to last longer, withstanding environmental and traffic-related wear and tear more effectively than other pavement types.
- **Increased Safety:** NGCS enhances skid resistance and reduces hydroplaning potential, contributing to fewer accidents in wet conditions.
- **Noise Reduction:** Designed to lower tire-pavement noise significantly, NGCS helps reduce noise within the vehicle and makes urban areas quieter, improving the quality of life for residents in nearby communities.
- **Smoother Ride:** NGCS provides a more uniform and smoother ride, improving the driving experience.
- **Sustainability:** NGCS contributes to reduced carbon emissions and improved fuel efficiency by providing a smoother surface for vehicles.
- **Economic Advantage:** NGCS offers a durable surface with reduced maintenance needs, leading to long-term savings for roadway maintenance budgets. Diamond grinding involved in NGCS uses fewer resources compared to traditional asphalt overlays, further enhancing its cost-effectiveness.





NGCS in Action

NORTH SPLIT, INDIANAPOLIS, INDIANA

The North Split project was initiated to modernize one of the state's most critical transportation corridors—the vital junction connecting interstates 65 and 70 in downtown Indianapolis—while minimizing disruptions to daily commutes and maintaining access to key urban areas. This area experiences significant traffic volumes, making maintaining a safe and efficient roadway essential.

The deployment of NGCS technology in the North Split project involved several key stages:

- **Planning and Design:** The initial phase focused on meticulous planning and design to ensure the successful application of NGCS. Collaboration was crucial in addressing the unique challenges posed by the intricate traffic patterns and the need to maintain uninterrupted access to the city's downtown.
- **Material and Construction:** The project's statistics highlight the scale of the endeavor:
 - » **Surface Area:** 315,000 square yards of NGCS were installed.
 - » **Concrete Pavement:** 230,000 square yards of 13" Continuously Reinforced Concrete Pavement (CRCP) was constructed, supported by 10 million pounds of CRCP reinforcing steel.
 - » **Bridge Construction:** 47 new bridges were constructed, three existing bridges were widened and another three bridges were rehabilitated, requiring 59,000 linear feet of piling, 35,000 cubic yards of structural concrete and nine million pounds of structural reinforcing steel.
 - » **Earthwork:** Approximately one million cubic yards of earthwork was required to prepare the site.

Conventional grinding was employed by subcontractor Diamond Coring Company, Inc. during the project, which included 53 bridges, to bring the pavement to a 70 inch per mile International Roughness Index (IRI) specification. This was followed by the application of NGCS on top of the smooth surface.



The North Split project in Indiana serves as a benchmark for the successful implementation of NGCS technology in large-scale infrastructure projects. By addressing noise pollution, enhancing safety, and providing a smoother driving experience, NGCS has demonstrated its potential to revolutionize roadway construction. The project's success underscores the importance of meticulous planning, collaboration and commitment to innovation.

Project Team

Owner: Indiana DOT

Lead Contractor: Superior Construction

Lead Designer/Engineer: Janssen & Spaans Engineering, Inc. (JSE)

Subcontractor: Diamond Coring Company, Inc.



NGCS Adoption

See the map below for examples of NGCS applications across the U.S.

» AVONDALE ROAD NORTHEAST

Redmond, WA

Highlights: NGCS applied to a two-lane road, reducing noise and improving surface consistency.

Outcome: Notable reduction in noise, with praise from residents for the improved road surface.

» MONTICELLO TO CLEARWATER EXPANSION

I-94, MN

Highlights: NGCS installed as a cost-effective alternative to noise walls, enhancing rideability and safety.

Outcome: Significant noise reduction, with decreased salt usage in winter due to better surface retention.

» I-35 MEGA PROJECT

Duluth, MN

Highlights: First large-scale NGCS application in urban areas. Achieved a substantial noise reduction, making traffic noise comparable to half the number of vehicles.

Outcome: Enhanced safety and satisfaction from local residents due to reduced noise levels.

» NORTH SPLIT PROJECT

Indianapolis, IN

Highlights: NGCS applied to ensure noise reduction, improved safety and enhanced smoothness.

Outcome: Served as a benchmark for the successful implementation of NGCS technology in large-scale infrastructure projects.

» US-50 BETWEEN HAZEL AND SUNRISE

Rancho Cordova, CA

Highlights: NGCS used on 30-year-old concrete to improve ride quality and address noise sensitivity.

Outcome: Successful noise abatement leading to positive feedback from community members.

» KATY FREEWAY (I-10)

Houston, TX

Highlights: Addressed noise complaints from local villages by replacing transverse grooving with NGCS.

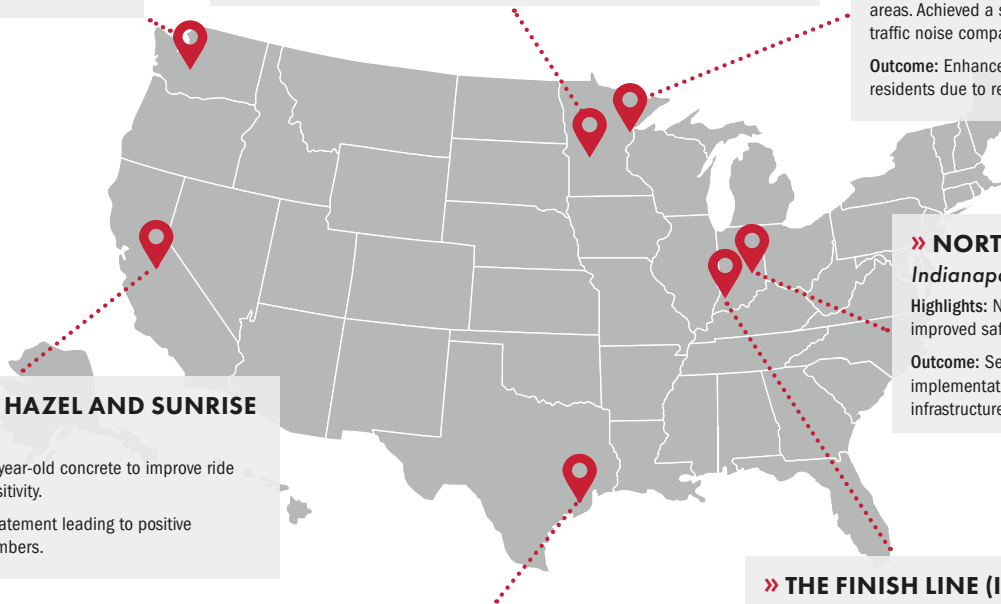
Outcome: Significant noise reduction, with delighted feedback from residents and local officials.

» THE FINISH LINE (I-69 EXTENSION)

I-69, IN

Highlights: NGCS applied to ensure smoothness and noise reduction on 42 bridges, enhancing safety.

Outcome: Demonstrated superior rideability and decreased tire/pavement noise, meeting modern roadway demands.



Since its introduction, NGCS has been implemented by 16 states across the U.S. and numerous countries around the globe. The technique is gaining in popularity due to its durability, low maintenance and noise-reduction capabilities. Its application continues to grow as transportation departments seek cost-effective and sustainable pavement solutions. As we look ahead, NGCS technology holds promise for future projects, paving the way for quieter, safer and smoother roadways across the nation.

For more information on the Next Generation Concrete Surface, visit the International Grooving & Grinding Association (IGGA) at www.igga.net



Your Pavement Preservation Resource® since 1972

ABOUT IGGA

The International Grooving & Grinding Association (IGGA) is a non-profit trade association founded in 1972 by a group of dedicated industry professionals committed to the development of the diamond grinding and grooving process for surfaces constructed with Portland cement concrete and asphalt. In 1995, the IGGA joined in affiliation with the American Concrete Pavement Association (ACPA) to form what is now referred to as the Concrete Pavement Preservation Partnership (IGGA/ACPA CP3). The IGGA/ACPA CP3 now serves as the lead industry representative and technical resource in the development and marketing of optimized pavement surfaces, concrete pavement restoration and pavement preservation around the world.