

NATIONAL CENTER FOR ASPHALT TECHNOLOGY
ANNUAL REPORT 2023



AT AUBURN UNIVERSITY

NCAT.US



**ANNUAL REPORT
2022-2023**

October 1, 2022 –
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NCAT

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DIRECTOR

Randy West

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DIRECTOR'S MESSAGE

Last year, I wrote optimistically about the outlook for NCAT in 2023 despite uncertainties about a looming recession. 2023 was indeed a good year for NCAT, and I am still optimistic about our future in the near-term and the long-term. It's easy to feel good with the excellent team of dedicated researchers, instructors and support staff who work hard to serve the needs of our stakeholders. Those needs, no matter how they are quantified, are daunting.

An estimated 43% of our existing public roadways are in poor or mediocre condition based on ASCE's 2021 Annual Report Card for America's Infrastructure. While addressing those needs, NAPA and FHWA have also set ambitious goals to decarbonize asphalt production and construction by 2050. The current and the next generation of pavement engineers have our work cut out for us.

As you will see in the annual report, NCAT staff strives to make a difference every day.

In 2023, our training program continued to hold strong, with 55 in-person courses training over 800 attendees. Two webinar series held 16 unique offerings with an attendance of over 1,300 people. One of the most amazing measures of impact for NCAT is our outreach effort through workshops and conference presentations in 38 states and five foreign countries in 2023.

Our research efforts are also producing positive results, evidenced by studies completed for NAPA, FAA, FHWA, NCHRP, NRRRA, CAPRI, and state DOTs of Mississippi, Virginia, Wisconsin, Florida, South Carolina, Alabama and Ohio. Our research workload continues to be very strong, with more than 50 active projects, including 16 new major projects started in 2023. It is a testament to the diligent work and strong reputation of our lead researchers who keep preparing outstanding proposals for a growing portfolio of clients.

An inward perspective reveals that our team is growing to help us meet the opportunities ahead of us. We ended 2023 with a full-time staff of 45 employees, plus another 16 graduate students and 15 coop or temporary students. New folks who have joined the NCAT team in 2023 are presented on page 17.

In the upcoming months, we plan to fill a few additional positions, most notably an Assistant Director for Test Track Research to take Buzz Powell's place after he retired in October. We're grateful that Buzz will continue to help us as a temporary employee as the new Assistant Director takes on that role.

Another piece of positive news for our staff in 2023 was Auburn University's market adjustment study that resulted in salary increases of 20% to 30% for many positions. Those well-deserved raises will help us retain a very talented and productive staff.

Looking ahead to 2024 is exciting.

We will wrap up the 8th research cycle on the NCAT Test Track, capped off with the end-of-cycle conference scheduled May 7-9.



There are many good outcomes and research findings to share. We'll also begin preparing for new Test Track experiments with lab work, roll up our sleeves to build new test sections with several innovative technologies and begin trafficking for the 9th research cycle.

There are also big projects to advance pavement resiliency and sustainability to serve the nation's future transportation needs with better-performing roads and airfields under growing traffic and more extreme weather events. This includes continued support of a range of implementation needs for Balanced Mix Design, as that is an essential step to utilize innovative technologies for longer-lasting and lower-carbon pavement materials.

We are also looking forward to continuing the growth of our graduate program in pavement engineering with higher research assistantship pay and more industry-supported scholarships. We are eager to attract students who are ready to learn from our outstanding faculty and get hands-on experience in the best pavement research facility in the world so that they are equipped to take on the grand challenges ahead.

A handwritten signature in black ink that reads "Randy C. West". The signature is fluid and cursive.

Randy C. West, Ph.D., P.E.
NCAT Director and Research Professor

CORE COMMITMENTS



MISSION

NCAT's mission is to provide innovative, relevant and implementable research, technology development and education that advances safe, durable and sustainable asphalt pavements.

VISION

NCAT will maintain its prominence as a world leader in asphalt pavement technology. Central to all its functions will be NCAT's historic partnerships with NAPA, state transportation departments, the FHWA and all stakeholders involved in the asphalt pavement industry. NCAT will continue to be recognized for the quality of its research, training, education and technology transfer. NCAT will ensure the quality of its programs through a careful focus of its resources with emphasis in areas of national and economic need.

VALUES

Provide for the well-being of team members and visitors by ensuring a culture of safety consciousness through our attitude and actions.

Provide an environment where all employees feel welcomed into an NCAT family that respects our differences and works together to accomplish the task at hand, where members have our full support and the value of the home family is recognized.

Conduct ourselves with integrity by acting with honesty and fairness without compromising the truth, cutting corners or adding intentional bias.

Conduct and pursue deployable and valuable research and technical services that result in positive change for agencies, innovation for industry and an improved traveling experience for the public.

STRATEGIC PLAN

Operational Excellence

STRATEGIC OBJECTIVE:

Build NCAT's reputation as the most operationally effective asphalt pavement research center, turning research dollars into implementable advances in asphalt pavements.

- Strengthen the culture of safety
- Build and develop staff with diverse capabilities and expertise to support NCAT's mission
- Continue to improve cost effectiveness and output of operations
- Seek and adapt to feedback from stakeholders
- Maintain existing and develop new long-term technical capabilities and advantages
- Serve clients' needs such that they will view NCAT as essential for technical support

Outreach & Education

STRATEGIC OBJECTIVE:

Build NCAT's education and training capabilities to become the most knowledgeable and effective asphalt training center in the world.

- Work closely with allies and partners to support issues that benefit all organizations
- Assist all stakeholder organizations to implement high value research findings
- Expand training and outreach as an enhanced revenue stream
- Deliver high quality training on the most needed topics
- Adapt to the evolving training landscape to meet the growing demand for mobile delivery
- Grow the Auburn pavements and materials graduate and certificate programs

Innovation & Influence

STRATEGIC OBJECTIVE:

Grow NCAT into the preeminent research center and technical advocate for the asphalt industry.

- Strengthen capabilities that differentiate NCAT from other asphalt research organizations
- Continue to build the NCAT Test Track's reputation as the world's best accelerated pavement testing facility and proving ground for evaluating innovative technologies
- Develop CAPRI as a means to better prioritize research needs and facilitate implementation
- Identify emerging research needs and quickly mobilize resources to initiate tasks that will enable future development and implementation
- Pursue commercialization revenue opportunities aligned with NCAT's mission
- Collaborate with Auburn and external researchers as needed to expand research
- Raise the visibility of NCAT and strengthen the ability to compete for federally funded research through the Auburn Transportation Research Institute

Major Research Projects completed in 2023 ///

\$122,856

NCHRP 9-63, Calibrated and Validated Performance Specifications for Emulsions

Associate Research Professor Adriana Vargas: “The objective of this research is to develop a national performance-related material specification for emulsified asphalt binder for use with chip seals and micro surfacing/slurry seals. These specifications are similar in concept and format to AASHTO Standard Specifications M 320, Performance-Graded Asphalt Binder, and M 332, Performance-Graded Asphalt Binder Using Multiple Stress Creep Recovery (MSCR) Test, and are calibrated and validated with performance data from field test sections to reflect varying climatic and traffic conditions.”

\$75,000

NCHRP 10-107, BMD Implementation Guide

Director and Research Professor Randy West: “NCAT researchers completed a guide for BMD implementation as part of NCHRP project 10-107 to aid state DOTs with planning for a generational change in mix design and acceptance specifications. The guide presents recommendations based on the research team’s experiences from Superpave implementation, guidance in existing AASHTO standards and reports, lessons from early adopter states, and the evolving body of research on BMD testing. The guide is presented as eight chapters that coincide with the eight major steps to implementation. The research team followed the publication with conducted a series of regional workshops to share the guide contents and discuss the challenges DOTs face. The feedback on the guide has been wonderful, with many participants offering gratitude for the information that will help them move the implementation process along in a well-thought-out manner.”

\$100,000

NRRA Validation of Loose-Mix Aging from BMD, Phase I

Assistant Director and Associate Research Professor Fan Yin: “The overall project aims to validate loose mix aging procedures for cracking resistance evaluation of asphalt mixtures in balanced mix design (BMD) with a broad range of field projects covering various mixture components, pavement ages, and climatic conditions. Phase I started with a literature review primarily focusing on the development and preliminary field validation of existing loose mix aging procedures and the impact of loose mix aging on asphalt binder and mixture properties. A gap analysis was then conducted to identify knowledge gaps that might hinder the implementation of loose mix aging for cracking resistance evaluation in BMD. Finally, a Phase II work plan was developed to address the knowledge gaps through two experimental tasks: 1) further validation of 95°C loose mix aging maps, and 2) conversion of different loose mix aging procedures based on a kinetics aging model.”

\$95,000

MSDOT Revising PCR Models

Associate Research Professor Adriana Vargas: “This research reviewed the Mississippi Department of Transportation (MDOT) Pavement Condition Rating (PCR) calculation procedure and proposed a new method that focuses on predominant distresses for each pavement type, developing individual rating indices for each distress that are weighted to obtain the overall PCR. The new proposed PCR values are compatible with the existing ratings (a database containing 25 years of information) such that continuity of performance data is maintained for the development of deterioration models.”

\$250,000

WisDOT BMD Test Sections and Shadow Projects

Director and Research Professor Randy West: “As the Wisconsin Department of Transportation (WisDOT) continues to make progress toward implementation of BMD specifications for asphalt mixture design approval and Quality Assurance, this research project included two important steps: (1) validation of BMD tests and criteria, and (2) assessing the overall variability of the BMD test results in a mix production setting. In the first part of the study, the research team assisted WisDOT in the experimental design and preliminary testing of six test sections for the BMD validation

experiment. The final report documents the planning of the test sections and challenges encountered during construction. The second part of the study involved testing mixture samples obtained from 10 shadow projects across the Wisconsin. The test results were used to quantify production variability for the BMD test parameters. Key variability statistics were summarized and used to illustrate how contractors should target mix production to achieve the desired quality and full pay based on WisDOT’s preliminary BMD specification criteria. NCHRP 10-107, BMD Implementation Guide.”

\$240,000

FDOT Determining the Effect of Recycled Binder Availability

Assistant Director and Associate Research Professor Fan Yin: “The project determined the impact of adding additional virgin binders in consideration of 80% recycled binder availability (RBA) on the performance properties of RAP mixtures in Florida. Overall, the RBA adjustment significantly improved the cracking resistance of RAP mixtures, but it reduced the rutting resistance of 40% RAP mixtures with a soft PG 52-28 binder. At the RBA-adjusted optimum binder content, 20% RAP mixtures with a PG 76-22 polymer-modified asphalt binder showed balanced rutting and cracking resistance based on mixture performance testing, demonstrating their potential to improve the long-term performance and life span of asphalt pavements in Florida.”

\$88,355

ISSA Slurry Seal Sampling and Asphalt Content Determination

Associate Research Professor Adriana Vargas: “This research proposed a field sampling procedure for slurry surfacing systems and a test method to determine the asphalt binder content in a slurry surfacing system that can be used to assure compliance with the approved job mix formula (JMF) for a given project. Test methods used routinely in the hot mix asphalt (HMA) industry to obtain the asphalt content of mixtures can be adapted for use with slurry surfacing mixtures within a reasonable degree of confidence.”

\$32,751

Ohio Enhanced Moisture Susceptibility Testing

Associate Research Professor and Lead Professor Carolina Rodezno: “The project objectives were to: (1) Identify existing moisture susceptibility test(s) that can more precisely predict performance of asphalt pavement mixtures in regard to moisture relate distresses based on a comprehensive literature review and limited testing; and (2) provide recommendations, based on existing literature, regarding the use of antistripping additives in asphalt mixes.”

\$208,734

VDOT Impact of Production Variability on BMD

Professor Benjamin Bowers: “The Virginia Department of Transportation (VDOT) is in the process of implementing Balanced Mix Design (BMD) for asphalt surface mixtures throughout the state. However, a question that plagues any agency or contractor looking to implement BMD is whether the tests can be used in quality control and acceptance. This study investigates whether or not asphalt mixtures designed the tests selected by VDOT for cracking (IDT-CT, a.k.a. IDEAL-CT), rutting (APA), and durability (Cantabro) will still produce passing results when the gradation and binder content of the mixture is pushed the the limits of currently accepted production tolerances. In other words, if the mixture is running “acceptably” fine with respect to gradation, will the mixture still pass the IDT-CT, APA, and Cantabro tests? How about if the mixture is “acceptably” course. All mixtures were produced in the laboratory and the gradation and binder contents were varied according to the production acceptance criteria. The final results were that nearly all mixtures would fail the BMD specification with at least one acceptable production variation, many with multiple acceptable production variations. Thus, agencies and contractors need to decide how to approach BMD if used for acceptance. Two options provided are (1) adjust test threshold limits for design so that the potentially worst performing production variation should meet current BMD threshold limits or (2) inform contractors of the potential impacts of acceptable production variations so that they can adjust mix designs appropriately to ensure mixture performance despite plant and material variability.”

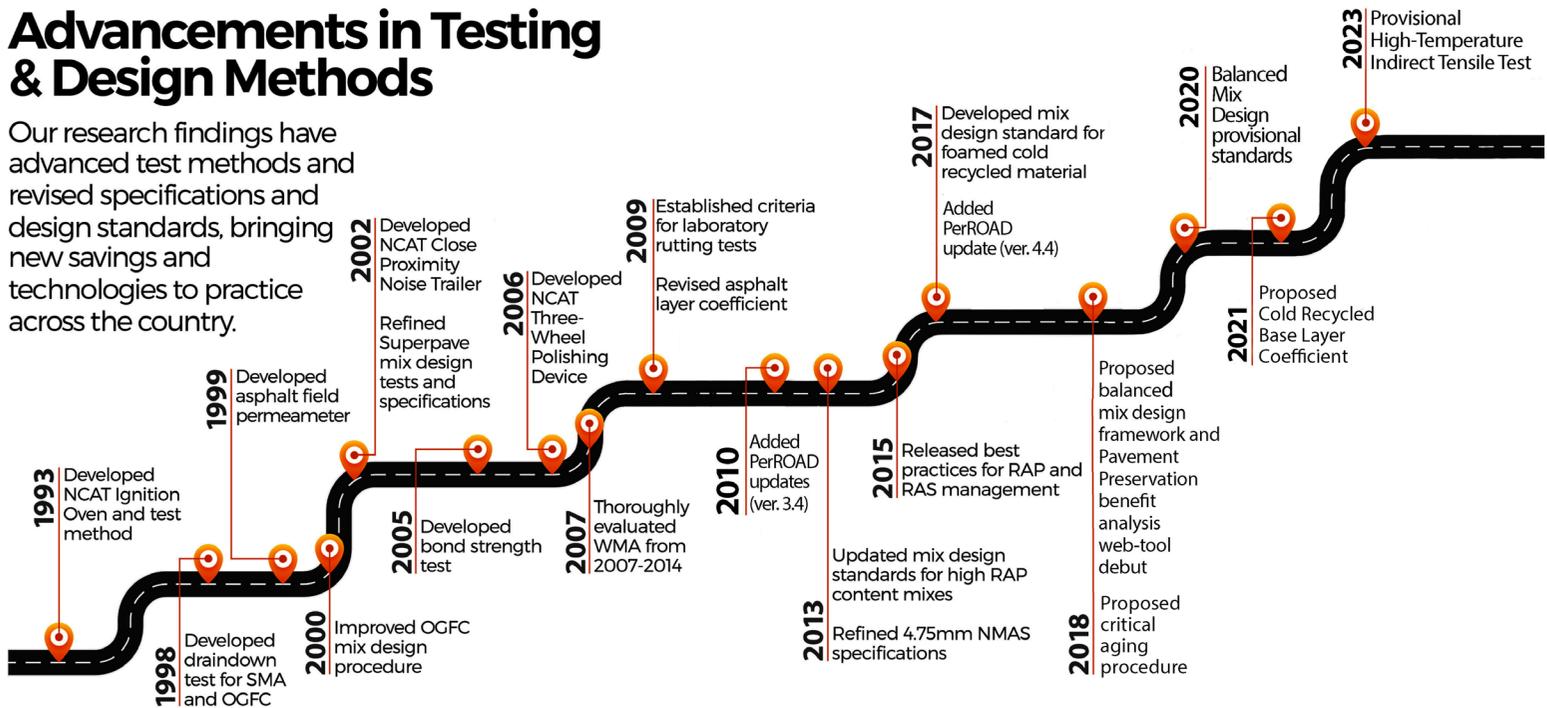
\$75,000

CAPRI Guidelines and Recommendations for Field Validation of Test Criteria for BMD Implementation

Senior Research Engineer Tom Harman: “This guide provides highway agencies with a framework they can follow when constructing BMD field validation experiments.. Through the pioneering efforts of The Consortium for Asphalt Pavement Research and Implementation (CAPRI), we are accelerating essential products to ensure continued asphalt pavement excellence. The new Guidelines and Recommendations for Field Validation of Test Criteria for Balanced Mixture Design (BMD) Implementation (Report No. CAPRI-23.001-R) provide the framework for establishing robust relationships between BMD test results and field performance. To date, there have been only limited studies to establish lab-to-field relationships. The efficacy of BMD requires developing lab-to-field relationships through well-controlled field experiments that consider factors specific not only to an agency’s traffic, climate, materials, and existing pavement structures but also to the types of distresses commonly encountered in the state.”

Advancements in Testing & Design Methods

Our research findings have advanced test methods and revised specifications and design standards, bringing new savings and technologies to practice across the country.



This chart tracks the updates in testing and design methods over the past 30 years.

For more than four decades, NCAT has led the advancement of asphalt pavement testing and design. From the development of the NCAT ignition method, which substantially improved the process of determining the asphalt content of asphalt mixtures while providing safer, faster and more environmentally friendly alternative to traditional solvent extraction methods, to the development of the AASHTO provisional standard for Balanced Mix Design, NCAT has played an integral role in technologies significantly improving asphalt pavements.

Many of the advancements have been in the development of new test methods. However, NCAT has also been at the forefront of pavement design through the development and refinement of the perpetual pavement design program, PerROAD, and updating

pavement layer coefficients for asphalt mixtures and cold-recycled asphalt base layers. Additionally, NCAT has been heavily involved in improving national standards for asphalt mix design specifications and quality control guidelines.

A recent major focus has been advancing Balanced Mix Design, or BMD, which uses practical, performance-based tests to ensure a mixture can resist common pavement distresses. The most important benefit of BMD will be better performing, longer lasting asphalt pavements, as demonstrated with several experiments on the NCAT Test Track. However, BMD also promises to unshackle mix designers from restrictive legacy criteria and use more sustainable materials to meet the needs of each pavement application.

Notable Staff Achievements ///



NCAT Director **Randy West** was invited to become a member of the Federal Highway Administration Research and Technology Coordinating Committee. This committee advises the Federal Highway Administration on its RD&T programming, evaluation, and strategic direction.



Assistant Research Professor **Raquel Moraes** was invited in 2023 to serve as a member of the Scientific Committee of the International Society for Asphalt Pavement (ISAP) conference held in Montreal, Canada, in June 2024.

Two new inductees onto the NCAT Wall of Honor ///



(Left) A Wall of Honor plaque was presented to former NCAT Board member Peter Wilson of New Orleans, who retired as President/CEO of Barriere Construction in 2022. Pictured are, from left: Emeritus Board member Jay Winford Jr., Wilson's wife Lisa, Wilson, NCAT Director Randy West, National Asphalt Pavement Association (NAPA) President & CEO Audrey Copeland, NCAT Board Chairman Ron Sines, and NCAT Director Emeritus Ray Brown. West noted how Wilson served on NAPA's Board for three decades, served as NAPA Chairman in 2003, and served multiple terms as president of the Louisiana Asphalt Pavement Association (LAPA).

(Right) A Wall of Honor plaque was presented to Associate Director Buzz Powell. Pictured are, from left: Civil Engineering Professor Dave Timm, Emeritus Board member Jay Winford Jr., Powell's wife Cindy, NCAT Director Randy West, National Asphalt Pavement Association (NAPA) President & CEO Audrey Copeland, NCAT Board Chairman Ron Sines, and NCAT Director Emeritus Ray Brown. Powell retired in Fall 2023 but continues to contribute to NCAT.



New ‘Hey NAPA’ chatbot brings NCAT’s Knowledge to the Web ///

The National Asphalt Pavement Association’s (NAPA) online resources now include a free AI-powered chatbot that can provide conversational answers to a wide range of questions — and step-by-step solutions to even complicated challenges — related to asphalt pavement. Launched in 2023, and functionally similar to ChatGPT, Hey NAPA (www.heynapa.com) is powered by a large publication database largely consisting of technical and research reports produced by NCAT, the most comprehensive asphalt pavement research program in the United States.

“We’re proud that our expertise is helping to shape Hey NAPA,” said NCAT Director Randy West. “It is truly a great, easy-to-use resource for pavement industry stakeholders or anyone who wants to know more about a pavement-related topic.”

NAPA Director of Engineering and Technical Support Brett Williams calls the innovation “revolutionary.”

“You can now have a wealth of knowledge from NAPA, the Asphalt Pavement Alliance (APA), NCAT, the Federal Highway Administration,

HEY NAPA



Asphalt technology meets Artificial Intelligence with the introduction of the ‘Hey NAPA’ website by the National Asphalt Pavement Association.

and other trusted asphalt industry partners at your fingertips,” Williams said. “As the leading association for asphalt pavement producers and contractors in the United States since 1955, this is a tool we’re excited to offer to the more than 1,200 companies we represent, as well as the general public.”

Kenyon Fellowship awards for NCAT graduate students announced ///

Established in 1999 through a \$1 million endowment by Ronald D. and Margaret L. Kenyon of Des Moines, Iowa, NCAT’s Kenyon Fellowship is an invaluable resource — both financially and professionally — for graduate students pursuing exceptional research in asphalt technology.



Ronald Kenyon, president of the Ronald Kenyon Construction Company and Chairman of the Board of the National Asphalt Pavement Association, was instrumental in raising NCAT’s original \$10 million endowment. The Kenyon Fellowship has awarded \$934,000 to 79 graduate students who have gone on to serve as ambassadors for both NCAT and the asphalt industry.

For eligibility requirements and more information on how to apply, please visit our website.



The latest Fellowship Kenyon Award recipients are, from left: Tanvir Hasan Shaon, Trung Tran, Madhav Verma, Josue Garita Jimenez, Trace Fontana, Kevin Ambrose, Brooke Earls, Elizabeth Turochy and Maede Mottaghi. Kneeling: Mohammad Sadeghi and Anthony Jose Brenes Calderon. Not pictured: Matthew Kmetz.

Application Steering Committee an essential part of NCAT Oversight ///



The Application Steering Committee plays a vital role in reviewing the work of NCAT researchers and operations by providing expert input and monitoring the quality of the center's projects and programs. The Committee, consisting of diverse stakeholders who offer a range of perspectives, reviews the scientific and technical quality of NCAT's programs and reports their findings to the Board of Directors.

The Application Steering Committee meets twice each year and discusses ongoing research projects and outreach efforts with the NCAT team. This interaction with industry and government leaders is a tremendous value to NCAT's research, training, and outreach programs. The committee also peer reviews all reports published on the NCAT website. It is a significant time commitment that committee members make to provide feedback at the meetings and review the technical reports. The small payback they get in return is to learn firsthand about many of the advancements in emerging technologies.

Officers are Chair Peter Capon of Rieth-Riley Construction Co., Inc., and Vice Chairman Mike Law of Scotty's Contracting and Stone. Standing Committee members include NCAT Board of Directors Chairman Ronald A. Sines of CRH Americas Materials, Brett Williams of NAPA, Tim Aschenbrenner of the FHWA Office of Infrastructure, Grover Allen of the Asphalt Institute, National Airport Pavement and Materials Research Center Program Manager Navneet Garg, Scott George of the Alabama DOT, Cheng Ling of Pike Industries, and Derek Nener-Plante of the FHWA-Resource Center.

Other Committee members include Heather Dylla of Construction Partners, Inc.; Parnian Ghasemi of Solterra Materials; Heather Hall from the Tennessee DOT; Carl Johnson of Stark Pavement Corp.; Thomas Kane from the New York DOT; Todd Mansell from Catepillar Paving Projects, Inc.; Robert McGennis of HF Sinclair; Marty McNamara from Granite Construction; Brandon Milar of California APA; Elizabeth Pastuszka of E&B Paving, Inc.; Robert Rea of the Nebraska DOT; Katherine Erwin of The Walbec Group; Elie Hajj of the University of Nevada, Reno; and Greg Renegar of Astec Industries. The Application Steering Committee also includes invited and virtual Friends of the Committee.

The June 6-7 meeting included the following topics:

- Stabilized Foundation and Thick Lift Paving led by Professor David Timm
- Comparative Life Cycle Assessment led by Research Engineer Suri Gatiganti
- MSDOT Revisions to Pavement Condition Rating (PCR) Models led by Associate Research Professor Adriana Vargas
- NCAT Round-Robin Studies led by Associate Research Professor Carolina Rodezno
- NTPEP Evaluation of Recycling Agents led by Assistant Director and Associate Research Professor Fan Yin
- Use of Loose Mix Aging for Cracking Resistance Evaluation also led by Fan Yin
- The Summer Implementation Workshops led by Associate Director and Research Professor Buzz Powell.

The November 15-16 meeting included the following topics:

- Preliminary Findings of FDOT Enhanced Friction Study led by Assistant Research Engineer Nathan Moore
- Guidance for Selection of Proper Asphalt Binder Grade for Airfield Pavements led by Assistant Research Professor Raquel Moraes Puchalski
- Developing Performance and Safety Specifications for Rejuvenating Seals also led by Raquel Moraes Puchalski
- Guidelines and Recommendations for Field Validation of Test Criteria for BMD Implementation led by Senior Research Engineer Tom Harman
- Mix Design and Laboratory Characterization of SMA for South Carolina DOT led by Assistant Research Engineer Adam Taylor
- A Case Against Using BMD Approach A led by NCAT Director Randy West
- An update on NCAT's Training Program led by Training Manager Travis Walbeck
- Operations of the NCAT Test Track led by Test Track Manager Jason Nelson

NAPA Chair visits ‘Cutting-Edge’ NCAT Facilities ///

NCAT was visited July 26 by the chairman of the National Asphalt Pavement Association (NAPA), Christian Zimmermann, who serves as the president of the New England Group for CRH Americas Northeast Division, Belmont, New Hampshire.

Zimmermann said, “When I toured NCAT facilities at Auburn University over the summer, I was nearly as wide-eyed as the incoming first-year students attending orientation.

“Working in the asphalt pavement industry, I had often heard about the cutting-edge research at the Test Track – but seeing the facility in person gave me an immediate appreciation for all of the testing that goes on in the labs, as well. I knew that the surfacing on the track came from different state DOT partners across the country, but learning how the test sections also use local materials in the subgrades showed me how NCAT research takes problem-solving to a new level for contractors in those states,” he said.

Zimmerman’s visit included information about NCAT, the Test Track and pavement preservation initiatives. NCAT, which was initially formed through a partnership between Auburn University and the NAPA Research and Education Foundation, has maintained a strong connection to the organization over the past 34 years. NAPA was actually founded in 1955 and counts more than 1,100 companies as members.

Zimmermann said the Test Track makes a big impact on the asphalt pavement industry.

“The fleet of semis that drive the oval track daily, putting millions of equivalent single axle loads (ESALs) of wear on the test sections over two years to see how they perform under heavy use. Using those

loaded-down trucks to put additional wear on the roads contributes directly to our knowledge of mix performance, and indirectly it can make the case to road owners for innovations, like the use of reclaimed asphalt pavement (RAP) in mix designs,” he said.

Since his visit, Zimmermann has also promoted the value of NCAT’s Professor Training Course, which provides Civil Engineering faculty from across the country with all of the information needed to include asphalt pavement technology in a Civil Engineering Materials course to undergraduates. “Civil engineering professors visit NCAT and take what they learn back to the classroom to engage a new generation of learners,” he said.

He referred to NCAT as “one of the gems of our industry: A place where science, transit, economics, and sustainability all overlap to develop solutions to keep America moving. I always knew it was a place for research, but I never considered how it’s a great recruiting tool, as well.

“Working with top-notch faculty on world-class innovations gives Auburn graduate and doctoral students a well-paved path toward gainful employment in the asphalt industry, and when that knowledge is amplified and shared across the country it can lead even more asphalt enthusiasts to Toomer’s Corner, and into our industry in general,” Zimmerman said.

“All of us in the industry benefit from the breadth of research being performed at NCAT, but it took me seeing it all for myself to understand just how valuable NCAT is for the roads of the future.”



NAPA Chair Christian Zimmermann (center) joined by Research Professor Buzz Powell (left) and Test Track Manager Jason Nelson (right).

NCAT supports TOPS innovations to offer solutions for highways ///



The Federal Highway Administration's Targeted Overlay Pavement Solutions Program, aka TOPS, offers life-extending benefits to existing pavements.

It's frightening to realize that many of the pavements in the nation's highway system have reached or are approaching the end of their design life. Scarier still, these roadways still carry daily traffic that often far exceeds their initial design criteria. It would cost an estimated \$836 billion to repair America's highways and bridges.

Approximately half of all infrastructure dollars are invested in pavements, and more than half of that investment is in overlays.

This involves placing a new layer of hot mix asphalt (HMA) over existing asphalt or concrete pavement to extend the life of the pavement, improve ride quality and to restore surface characteristics such as smoothness, friction, and appearance.

NCAT worked on the Federal Highway Administration's Targeted Overlay Pavement Solutions Program, aka TOPS, to pursue solutions for agencies to consider integrating innovative overlay procedures on high-priority maintenance locations such as primary or interstate pavements, intersections, bus lanes, ramps and curves.

NCAT supported the TOPS innovation through the development of case studies, how-to guides, webinars, technical assistance and highly interactive workshops, according to NCAT Training Manager Travis Walbeck.

"The Federal Highway Administration's Every Day Counts (EDC) program is a state-based model that identifies and rapidly deploys proven yet underutilized innovations," Walbeck said.

"In 2021, under round 6 of EDC, Targeted Overlay Pavement Solutions (TOPS) was launched. TOPS advances solutions for integrating innovative overlay procedures into practices that can improve performance, lessen traffic impacts, and reduce the cost of pavement ownership."

For TOPS the asphalt toolbox includes:

- Crack Attenuating Mixture (CAM)
- Highly Modified Asphalt (HiMA)
- Enhanced friction overlay
- Stone matrix asphalt (SMA)
- Asphalt Rubber Gap-Graded (ARGG)
- Open-Graded Friction Course (OGFC)

Targeted overlays can improve the condition of these highways significantly in a relatively short time and typically require less subsurface work, which makes them consistently cost-effective while minimizing impacts to utilities and pedestrian facilities.

By enhancing overlay performance, state and local highway agencies can maximize this investment and help ensure safer, longer-lasting roadways for the traveling public.

TRAINING THE WORKFORCE

Highlights of the Year:

- NCAT offered a Professor Training course during 2023, benefitting 25% minority-serving institutions.
- Taught a mix design course with the Northeast Transportation Training and Certification Program.
- Two of our asphalt industry partners held custom courses for their staff.



PRESENTATIONS AND WEBINARS

800
ATTENDEES

55
FACE-TO-FACE
COURSES

16
WEBINARS
HOSTED

“Training continued to hold strong during 2023, with 55 in-person courses training over 800 attendees. To supplement the in-person training, two NCAT webinar series held 16 unique offerings with an attendance of over 1,376 people.

“Some notable new training opportunities conducted during the year were courses commissioned by two of our longstanding

equipment manufacturing partners to better inform their design staff and a mix design certification course held by a regional certification body.

“As we look forward to 2024, registrations appear to be strong, and new opportunities with DOT look to add 300 or more attendees to the coming year.”

- NCAT Training Manager, Travis Walbeck

**FROM RESEARCH TO
IMPLEMENTATION**



Scan the QR code to see the latest offerings in the From Research to Implementation webinar series.

NEW ADDITIONS

Faces joining NCAT in 2023



CODY BAKER
MEDIA PRODUCTION
SPECIALIST



MIKE ELLENBERGER
LAB
TECHNICIAN



TOM HARMAN
SENIOR RESEARCH
ENGINEER



ROBERT SCROGGINS
MEDIA PRODUCTION
SPECIALIST



CHRIS SULLIVAN
MAINTENANCE
MECHANIC



JASON ACHORD
MAINTENANCE
MECHANIC

Professor Training Course grows asphalt knowledge base ///

NCAT's Professor Training Course in Asphalt Technology started in 1988. This program educates college and university instructors on the fundamentals of hot mix asphalt (HMA) technology so they can incorporate this knowledge into their civil engineering curriculum and facilitate asphalt-related research at state and national levels.

The five-day course includes intensive lectures, laboratory exercises, and discussions to understand all basic phases of asphalt technology for undergraduate instruction, enabling them to teach future engineers effectively. The course combines classroom lectures with laboratory sessions and tours of asphalt facilities.

It is designed to help increase the pool of qualified civil engineers and technologists knowledgeable in asphalt technology by providing faculty with appropriate educational material such as the NCAT textbook on HMA technology, which serves as a valuable reference for teaching and research. The program has hosted participants from

across the United States, contributing to the widespread dissemination of HMA knowledge.

To get in the course, endorsements are required from department heads and state asphalt association or state bituminous engineer. The NCAT Research and Education Foundation supports the costs associated with conducting the course.

The course reflects NCAT's commitment to advancing asphalt pavement technology through education and collaboration, fostering a well-informed community of educators and researchers that can pass on their knowledge to the next generation of engineers.

Our 2025 course will be held in June 2025 at NCAT's main facility in Auburn, Alabama. Please contact Stacie Hunter for more information.



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