

NATIONAL CENTER FOR ASPHALT TECHNOLOGY

ANNUAL REPORT 2022



[NCAT.US](https://ncat.us)

ANNUAL REPORT 2022

October 1, 2021 —
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NCAT

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DIRECTOR

Randy West

**COMMUNICATIONS
AND MARKETING**

Kyle Lubinsky

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DIRECTOR'S MESSAGE

As 2022 winds down and I reflect on the year, I'm pleased with our accomplishments and feel a real sense of optimism, not just for NCAT, but for the entire asphalt pavement community. 2022 has been a good year for NCAT. We stayed focused on our mission through the pandemic and managed well financially without government assistance. We adapted well to numerous challenges and returned to a sense of normalcy with in-person meetings, training classes without masks, real handshakes, and the madness of airline travel.

Reflecting on the year, key metrics are trending in the positive direction. This year we reached record numbers of people with training and outreach efforts, far exceeding pre-pandemic numbers. Total attendance for training classes was 1,241, plus another 1,295 that attended our webinars. This growth can be attributed to three things: (1) the backlog of people needing training built up during the pandemic, (2) more class offerings throughout the year, and (3) reaching stakeholders through new webinars series.

We are proud of our 14 graduate students who have learned from Auburn's outstanding faculty and contributed to expanding the body of knowledge through our research efforts. Five students who worked on NCAT research projects completed their degrees this year, with three landing great jobs in the industry and two staying on to pursue PhDs. Their success is our success.

Sponsored revenue in FY22 exceeded \$9 million including projects for several national research programs, individual state DOTs, as well as large and small private-sector businesses. Our hard-working team prepared 30 successful proposals in FY22, with eight more pending final award negotiations.

Every day, the NCAT family embodies the Auburn Creed. We believe in work, hard work. We believe that this is a practical world, and we believe in education, which gives us the knowledge to work wisely. I am grateful for the dedication of the NCAT family to serve our clients with integrity and relentless focus to improve the safety and sustainability of the highway system that we all depend upon.

Looking ahead, we are optimistic despite news reports of a looming recession. The 2021 Infrastructure Investment and Jobs Act (IIJA), along with 18 states that have increased gas taxes or other highway funding mechanisms in the last five years will provide stronger funding levels for transportation infrastructure. We are enthusiastically working with industry stakeholders on new projects aimed at addressing climate change through several efforts including the National Asphalt Pavement Association's Road Forward initiative and the Federal Highway Administration's Climate Challenge to reach net zero emissions for highways by 2050. We are also excited about the growing momentum in the Consortium for Asphalt Pavement Research and Implementation (CAPRI) and its mission to discuss and prioritize research needs and support the implementation of positive changes. We are also delighted to work with several other organizations on airfield related projects through the Airfield Asphalt Pavement Technology Program, and we continue to put a lot of energy toward implementation of Balanced Mix Design because we are convinced that it will result in longer-lasting asphalt pavements and open the door to innovative materials that help reduce the carbon footprint of our pavement infrastructure.

I hope you enjoy NCAT's 2022 Annual Report and find more interesting details about the work we are doing.



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
- Seek and adapt to feedback and input from stakeholders
- Continue to improve cost effectiveness and output of operations
- 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

RESEARCH DRIVEN

STRENGTH IN NUMBERS

29 NEW CONTRACTS
AWARDED in 2022

\$45 MILLION ACTIVE
CONTRACTS

LARGEST NEW CONTRACTS

\$750,000

ALDOT: MnROAD Additive Group Experimental Plan – Randy West

\$500,000

NCHRP: Recycled Asphalt Materials: Binder Availability and Its Impact on Mix Performance – Fan Yin

\$300,000

NCHRP: Developing Performance and Safety Specifications for Rejuvenating Seals – Raquel Moraes, Adriana Vargas, and Nam Tran

\$250,000

Cargill Asphalt Performance: Optimization of Asphalt Mixture Performance with Rejuvenator – Nam Tran and Buzz Powell

\$250,000

Wisconsin DOT: Balanced Mixture Design Pilot and Field Test Sections – Randy West

\$250,000

Aztec Asphalt Technology: Field Performance Evaluation of Spray-on Rejuvenator from Aztec Asphalt Technologies – Raquel Moraes and Buzz Powell

AIRFIELD ASPHALT CERTIFICATION PROGRAM



NCAT's Airfield Asphalt Certification Program prepares the workforce for the unique challenges of asphalt pavement performance.

Airfield asphalt pavements present unique performance challenges as compared to highway pavements. Started in January 2021, NCAT's Airfield Asphalt Certification Program (AACP) is intended to increase the quality of construction for work in airfield asphalt specifications.

The certification program helps to ensure that project team members are knowledgeable in airfield asphalt pavements, with respect to specification and testing requirements, acceptance, and quality control, as well as inspection during construction. Three certifications are currently offered through AACP: Lab Technician, QC Manager, and Paving Inspector. To date, 184 certifications have been awarded.

Each course ranges from 2.5 to 3.5 days long and provides both classroom instruction and hands-on laboratory training using the laboratory tests involved in the design and testing of asphalt mixtures.

Multiple airfield research projects have also gone through the Airfield Asphalt Pavement Technology Program (AATP), including Improving Performance of Longitudinal Joints in Airfield Asphalt Pavements, Guidance on Selection of Asphalt Binder Grade, and Mitigation of Plastic Flow and Delamination at High-Speed Exits.

TEST TRACK CROSSES TEN MILLION MILES



NCAT's Test Track unites real-world pavement construction with live heavy trafficking, allowing researchers to quickly analyze and implement findings.

The Test Track crossed ten million miles driven on May 4, 2022. Opened in 2000 as a testing facility for asphalt research, the track has provided pavement engineers with an outdoor laboratory where they can experiment with pavement designs while avoiding risks associated with damaged pavements on real-world roadways.

The Test Track offers researchers a unique chance to design, implement, and show their findings on asphalt technology in one location, and has saved state departments millions of dollars each year with its results.

NCAT's Test Track is a 1.7-mile oval where research is conducted on experimental asphalt pavements. Located on a 309-acre site 15 miles east of Auburn's campus, the track is comprised of 46 200-foot test sections funded as a cooperative project among highway agencies and asphalt industry sponsors. The

track was designed and built to simultaneously evaluate the performance of a range of roadway cross-sections and materials, and use those findings to improve sustainability, safety, and cost effectiveness of roadways.

MnROAD Partnership



NCAT's partnership with the Minnesota DOT Road Research Facility (MnROAD) has allowed for the organization to expand its reach into northern states and other research opportunities through the National Road Research Alliance (NRRRA).

The original PG study began in 2012 and had seven DOT sponsors. The partnership between NCAT and MnROAD was formally established in 2015, and since then, has grown to include 24 sponsors.

The partnership has bolstered NCAT's research and visibility in pavement preservation, including through journal articles and conference presentations. Presentations at the annual Transportation Research Board meeting, Association of Asphalt Paving Technologists Annual Meeting, International Society for Asphalt Pavements (ISAP) Conference, International Airfield and Highway Pavements Conference, International Conference on Low-Volume Roads, Eurasphalt & Eurobitume Congress, and International Conference on Accelerated Pavement Testing (APT) have highlighted NCAT's research in pavement preservation.

The ongoing partnership between NCAT and MnROAD now features 145 test sections that are continuously monitored and analyzed. New research includes an Additive Group experiment featuring test sections on the NCAT Test Track, as well as on the MnROAD mainline test road on I-94 near Albertville, MN.

CAPRI



CAPRI representatives attending the Fall 2022 meeting at Ingevity headquarters in Charleston, SC.

The Consortium for Asphalt Pavement Research and Implementation (CAPRI) brings together stakeholders in the highway construction and maintenance industry working to improve asphalt pavement cost effectiveness, sustainability, and safety. Eight organizations joined the consortium in 2022. Currently, CAPRI includes 23 DOTs and 21 other organizations that are improving asphalt pavements by addressing knowledge and research gaps in the industry.

CAPRI is broken down into four subcommittees tackling important challenges throughout the asphalt industry: Critical Issues, Technology Evaluation, Technology Transfer, and Research Roadmap.

The Critical Issues subcommittee is identifying aspects of asphalt pavement performance and sustainability that need to be improved. The Technology Evaluation subcommittee is identifying technologies that can improve asphalt pavement performance and sustainability, evaluate the readiness level of those technology levels, and recommend strategies to move

those technologies toward implementation.

The Technology Transfer subcommittee identifies technologies and best practices that are ready for implementation and recommend strategies to move those into practice. Finally, the Research Roadmap subcommittee is assembling recommendations of research and technology transfer needs from other CAPRI subcommittees and other sources.

The CAPRI Executive Committee includes balanced representation from major stakeholder groups serving with limited terms. The Committee drafts consortium by-laws and policies (ratified by members), approves budgets, sets meeting agendas, and serves as the final authority to approve deliverables.

The full consortium met twice in 2022. In March, CAPRI members had a hybrid meeting at NCAT, and in October, met for the fall meeting at Ingevity headquarters in Charleston, SC.

NTPEP Asphalt Mixture Additives



Since summer 2019, NCAT has served as the designated testing lab for the National Transportation Product Evaluation Program's (NTPEP) technical committee on warm mix asphalt (WMA). Through this collaboration, NCAT has evaluated 23 WMA and anti-strip additives (ASA) over the last three years and is evaluating eight new products in the current testing cycle.

In spring 2022, NTPEP expanded and renamed the committee to include the evaluation of recycling agents for recycled asphalt mixture applications, called the Asphalt Mixture Additives (AMA) committee. Adding the evaluation of recycling agents will significantly benefit state highway agencies, material suppliers, and asphalt contractors as the industry progresses toward the "The Road Forward" initiative to achieve net zero carbon emission asphalt pavements by 2050.

Using RAP and RAS in asphalt mixtures can provide significant economic and environmental benefits if the pavement meets performance expectations. However, asphalt mixtures containing high RAP/RAS contents can be susceptible to pavement cracking and durability issues because the aged asphalt binder in RAP/

RAS is stiffer and more brittle than virgin binder.

Numerous studies have shown that adding a recycling agent has the potential to improve the cracking resistance of high RAP/RAS mixtures, but effectiveness varies greatly from product to product. Many state agencies have evaluated recycling agents through lab testing and field projects, but they generally lack a robust procedure to assess these materials for product approval purposes. Fortunately, this dilemma has a potential solution thanks to the NTPEP AMA committee.

Co-op Program

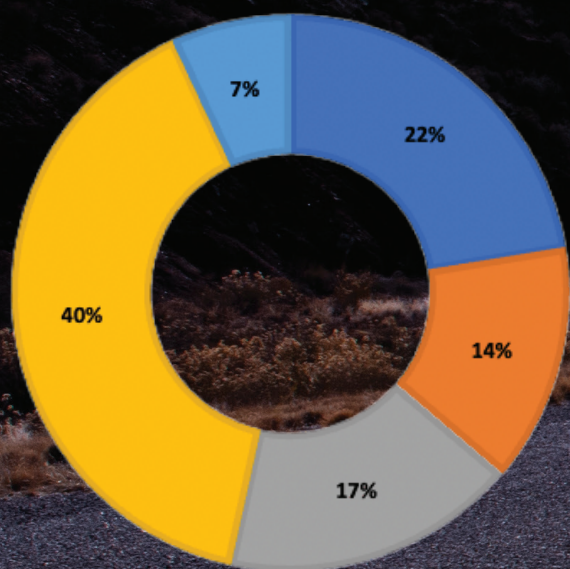
Established in 1937, Auburn University's Co-op program is a planned and supervised program that alternates semesters of full-time college classroom instruction with 3 semesters of full-time paid employment. Students also get the opportunity to work closely to their academic program to prepare for a professional career by combining academic training with practical work experience.

NCAT's Co-op Program builds on these tenets, allowing students to gain experience at a world-class asphalt research center while completing their coursework.

"The Co-op program is very beneficial to NCAT," says Lab Manager Jason Moore. "Our Co-ops are a key piece in the research NCAT has performed over the years, and many of them obtain jobs in the industry after graduation."

To date, NCAT has supported 75 Co-op students, many of whom have gone on to work for contractors, Departments of Transportation, and material suppliers in the asphalt industry, thanks to real-world experience gained from the state-of-the-art research and testing facility.

NCAT CO-OP **SNAPSHOT**



Employment by Industry



STUDENT FOCUS

NATIONAL RANKINGS

(SAMUEL GINN COLLEGE OF ENGINEERING)

33rd Undergraduate program ranking among public universities¹

37th Graduate program ranking among public universities¹

17th Graduate online program ranking among all engineering colleges¹

¹U.S. News & World Report, 2022

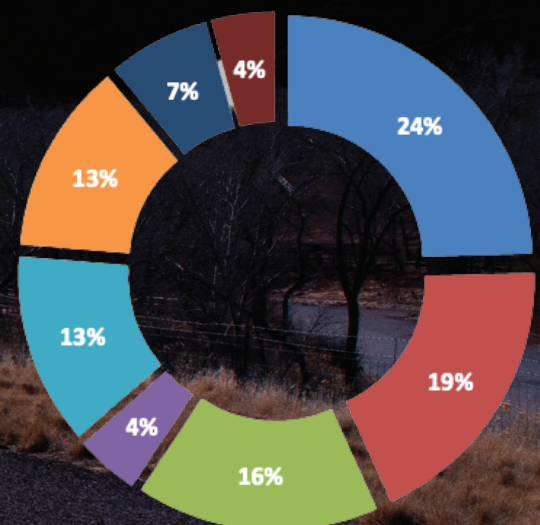
Auburn Engineering offers 13 undergraduate degrees across 10 engineering disciplines as well as a host of graduate programs.

Ranked 5th¹ in Best Online Engineering Programs, our online Master of Civil Engineering with an emphasis in pavements and materials combines traditional instruction with modern delivery methods to offer graduate degrees beyond Auburn's campus.

NCAT GRADUATE SNAPSHOT

Our exceptional students are trained on the most up-to-date technologies and graduate prepared to apply their skills to various industries. Since 1989, NCAT has developed 118 graduate students with a combined total of 83 master's and 35 doctoral degrees.

Employment by Industry



A map of the United States with states colored in two shades: dark blue and light gray. A white dot is located in the state of Maryland. The map includes state abbreviations and labels for Alaska, Hawaii, and the District of Columbia.

State	Abbreviation	Color
Alabama	AL	Dark Blue
Alaska	AK	Light Gray
Arizona	AZ	Dark Blue
Arkansas	AR	Dark Blue
California	CA	Dark Blue
Colorado	CO	Dark Blue
Connecticut	CT	Light Gray
Delaware	DE	Light Gray
Florida	FL	Dark Blue
Georgia	GA	Dark Blue
Hawaii	HI	Dark Blue
Idaho	ID	Dark Blue
Illinois	IL	Light Gray
Indiana	IN	Dark Blue
Iowa	IA	Dark Blue
Kansas	KS	Dark Blue
Kentucky	KY	Dark Blue
Louisiana	LA	Light Gray
Maine	ME	Dark Blue
Maryland	MD	Dark Blue
Massachusetts	MA	Light Gray
Michigan	MI	Dark Blue
Minnesota	MN	Dark Blue
Mississippi	MS	Light Gray
Missouri	MO	Dark Blue
Montana	MT	Light Gray
Nebraska	NE	Light Gray
Nevada	NV	Light Gray
New Hampshire	NH	Dark Blue
New Jersey	NJ	Light Gray
New York	NY	Dark Blue
North Carolina	NC	Dark Blue
North Dakota	ND	Dark Blue
Ohio	OH	Light Gray
Oklahoma	OK	Dark Blue
Oregon	OR	Light Gray
Oregon	OR	Light Gray
Pennsylvania	PA	Dark Blue
Rhode Island	RI	Light Gray
South Carolina	SC	Dark Blue
South Dakota	SD	Light Gray
Tennessee	TN	Dark Blue
Texas	TX	Dark Blue
Utah	UT	Dark Blue
Vermont	VT	Dark Blue
Virginia	VA	Dark Blue
Washington	WA	Light Gray
West Virginia	WV	Dark Blue
Wisconsin	WI	Dark Blue
Wyoming	WY	Light Gray
District of Columbia	DC	Dark Blue

During 2022, NCAT taught 11 courses for the Puerto Rico Highways and Transportation Authority. The courses taught this year included Roadway Technician, Asphalt Level 1 Laboratory Technician, and Earthwork and Base Field Technician. Through the 11 courses, 142 participants received training and were tested for certification. To ensure valid testing, NCAT partnered with the University of Puerto Rico at Mayaguez professors to administer the exams. In 2022 Puerto Rico also joined the Consortium for Asphalt Pavement Research and Implementation (CAPRI). We are excited to see them join and participate in this organization. Membership not only allows them to access the research community but can also enhance the training and material testing programs.

TRAINING THE WORKFORCE

NCAT’s training program includes asphalt technician certification programs for multiple highway agencies, a range of courses for the asphalt industry and specialized workshops conducted within the United States and abroad.

2022 saw the enrollment for courses grow to pre-pandemic levels. With the addition of the Airfield Asphalt Certification Program, it has a very busy training year. NCAT trained more than 1,200 individuals in courses ranging from basic asphalt laboratory testing to balanced mix design.

1,241
ATTENDEES

82
FACE-TO-FACE
COURSES

FROM RESEARCH TO IMPLEMENTATION



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

Research to implementation

In 2022, NCAT launched a new webinar series: ‘From Research to Implementation.’ Each month NCAT researchers cover a different topic that has been studied over the years at NCAT. The topic is then discussed by an agency or industry representative that has implemented the practices. This series has been well attended and continues to be a highlight of each month.

PRESENTATIONS AND WEBINARS

The Asphalt Engineers Workshop was held in mid-February 2022. This course was sponsored by NAPA and is for agency engineers only. This year, 14 agency engineers learned about how to design asphalt pavements, the materials for asphalt mixtures, mix design, plant production, laydown, and compaction. Each afternoon featured a workshop discussion session that allowed the attendees to contribute their experience to the overall learning of the group. These sessions were led by NCAT instructors with agency experience to help steer the discussion which provided an engaging learning experience.

NOTABLE ACHIEVEMENTS

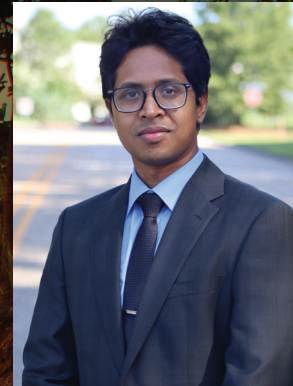


Administrative Associate Stacie Hunter (left), Mechanical Engineer Matt Sasser (center), and Lab Technician Vickie Adams (right) were awarded Auburn University's Spirit of Excellence Award in 2022.



NCAT engineers Fan Yin (left), Adriana Vargas (center), and Nam Tran (right) were promoted from Assistant to Associate Research Professors.

NEW STAFF



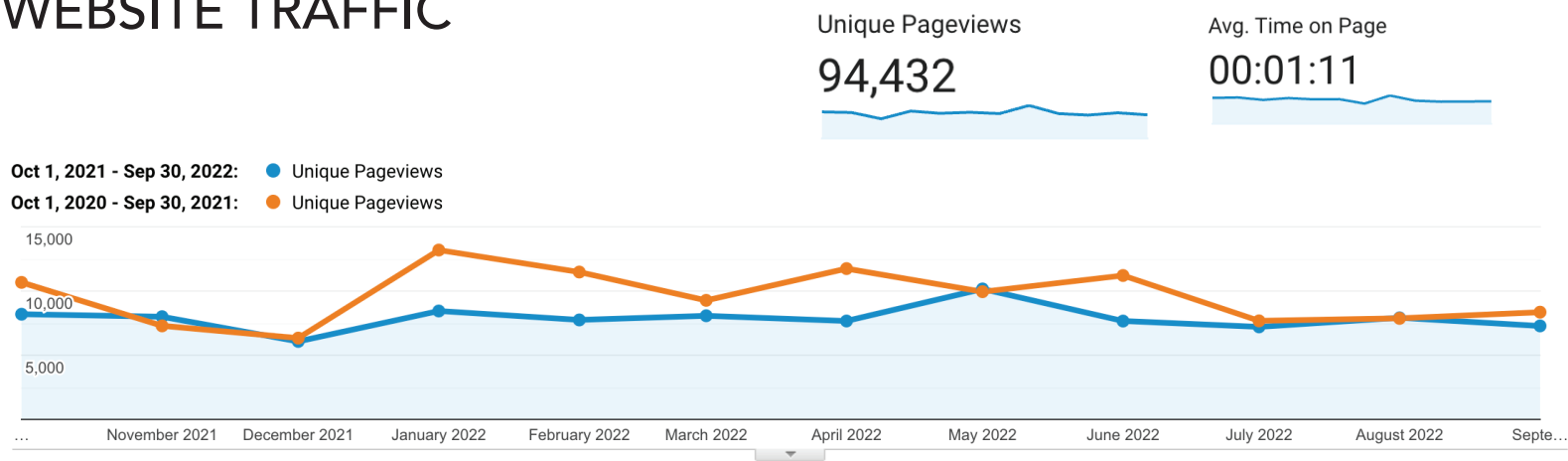
NCAT welcomed research engineers Chen Chen (left), Suri Gatiganti (Center), and postdoctoral research fellow Biswajit Bairgi (right) in 2022.



Communications Specialist Kyle Lubinsky (left) and Assistant Director, Business Operations and Planning Manager Anita Robinson joined NCAT's staff in 2022.

COMMUNICATIONS REACH

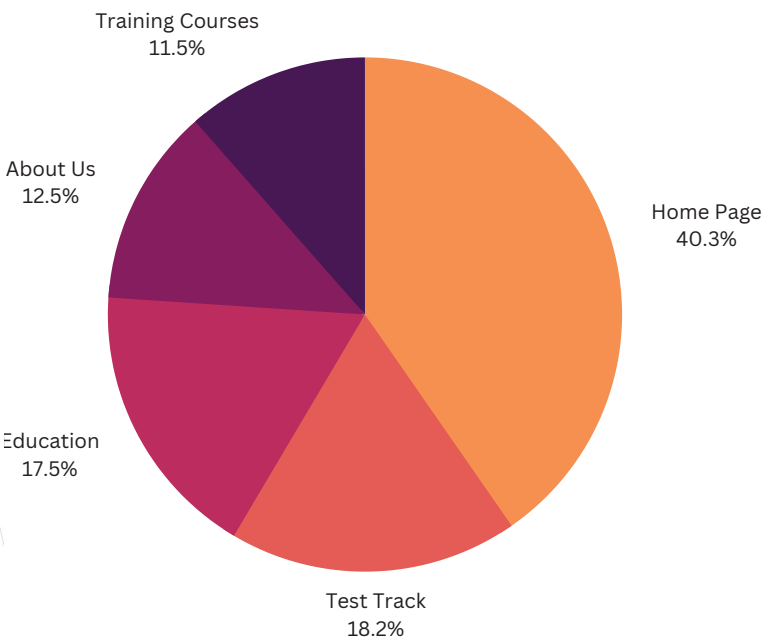
WEBSITE TRAFFIC



Acquisition

1. Organic Search	14,085 (47.98%)
2. Direct	10,314 (35.13%)
3. Referral	4,023 (13.70%)
4. Social	931 (3.17%)

Unique Pageviews By Topic



Top Visitors By Country

	United States 18,425		Canada 666
	China 2,272		Iran 407
	India 870		

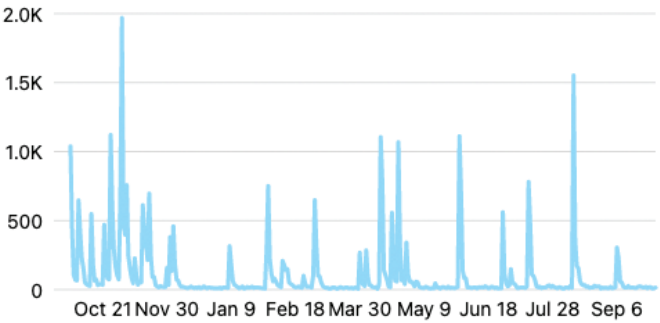
18 National Center for Asphalt Technology

SOCIAL MEDIA FOLLOWING



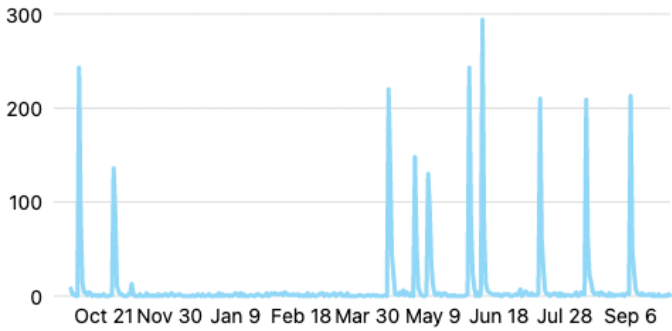
Facebook Page reach ⓘ

22,822 ↑ 13.2%



Instagram reach ⓘ

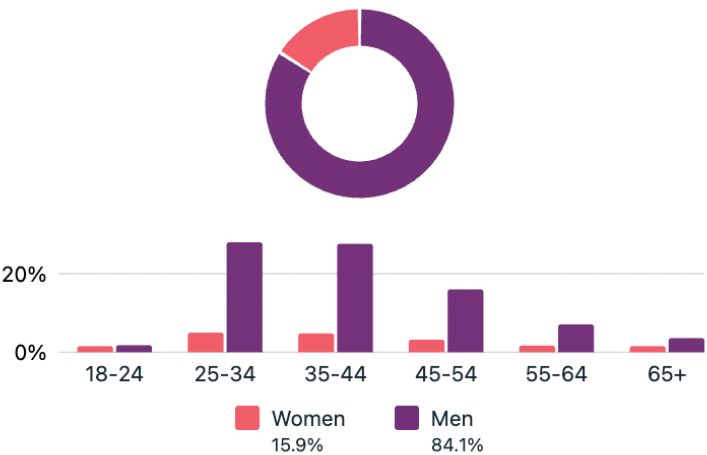
998 ↓ 35.8%



FACEBOOK AND INSTAGRAM DEMOGRAPHICS

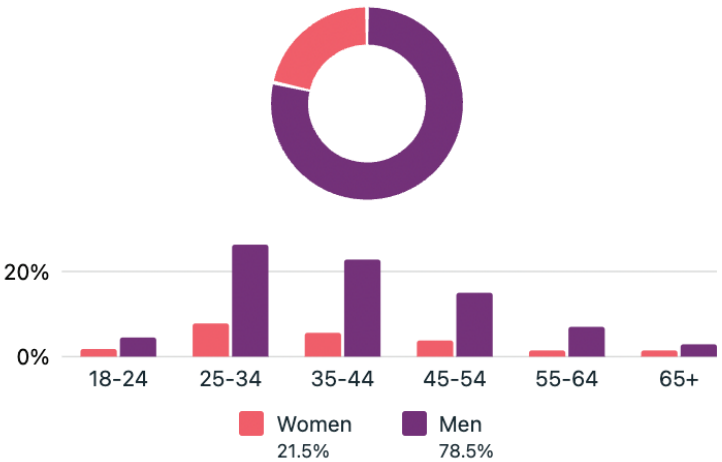
FACEBOOK

Age & gender ⓘ



INSTAGRAM

Age & gender ⓘ





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