

TXLTAP MONTHLY NEWSLETTER

Enhancing Performance with Internally Cured Concrete

According to the FHWA EDC 7 website, internally curing concrete increases its resistance to early cracking, allowing the production of higher-performance concretes that may last more than 75 years. As residents of Texas, we're all familiar with the crumbling roadways we face every day. Whether it be giant potholes, rutting, cracking or depressions, our roadways are in need of constant repair. Innovative solutions are required to make headway in this uphill battle.

So how does internally cured concrete work? Unlike conventional curing where water is supplied on the concrete's surface, internal curing provides a source of moisture from the inside of the concrete mixture, improving its resistance to cracking and overall durability. The technique can be used with any concrete mixture by adjusting the mixture proportions. A portion of the normal-weight fine aggregate is replaced by a pre-wetted lightweight fine aggregate. This saturated, porous fine aggregate distributes the curing water throughout the concrete body. As the concrete loses water naturally, water from the fine aggregate is pulled out and creates the internal curing. This process of moisture transfer prevents the dehydrated mixture pores from shrinking in as there is no negative pore pressure. Internally cured concrete is used primarily on bridge decks where the mixture can protect the underlying steel structure.

Benefits

Versatility: Can be used anywhere traditional concrete is.

Durability: Mitigates shrinkage cracking and exposure degradation.

Cost Savings: Mixture can last several times longer than traditional concrete curing, reducing the need for repair and replacement.

Embodied Carbon Reduction: Can be designed with low water-to-cementitious materials ratios and increased utilization of natural, waste, or recycled cementitious products without reduced performance or enhanced risk of cracking.

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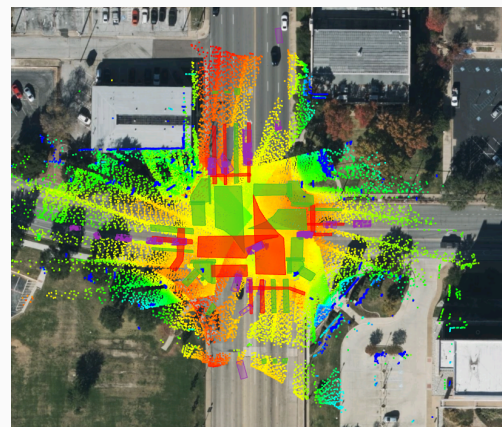
Build a Better Mousetrap Spotlight: City of Arlington Public Works

Entry Title: Equitable Street Solutions for Vulnerable Road Users

Background: Arlington, Texas is the largest US city without a regular public transit system, leaving many residents to walk or bike for transportation. This makes equitable safety for vulnerable travelers, such as pedestrians and bicyclists, absolutely critical. With a large percentage of financially disadvantaged residents, the City of Arlington (COA) is in dire need of more inclusive technologies to upgrade its roadways and ensure better mobility, safety and equity for all users. In 2020, after implementing the Vision-Zero safety plan, COA recognized a need for innovative solutions to combat the city's high rate of pedestrian fatalities at intersections. The city's top priority is to identify and deploy "unconditionally" effective and cost-effective solutions, focusing on the vulnerable traveler.

Innovative Idea: The City of Arlington (COA) implemented a groundbreaking LiDAR-based system at intersections in order to enhance traffic safety for all users. The partners in this endeavor were the University of Texas at Arlington (UTA) and Cepton Technologies Inc., with COA leading the deployment efforts, hardware installation, and network sensor connection while setting up the central data platform for data-driven evaluation. COA provided valuable feedback on system functions throughout the project. The novel aspect of this solution lies in its use of emerging automobile-grade LiDAR sensors, which offer several advantages over traditional radar and video sensors. These benefits include superior detection performance in dark and foggy conditions due to independent firing and reflection of active laser beams; strong perception of slow and stationary objects such as pedestrians and waiting vehicles; and high-quality, future-proof raw data that ensures flexibility in more challenging environments.

Following successful initial deployment and proof of concept over several years, the system was fully matured for scaled-up implementation at two intersections. COA remains committed to fostering an open and forward-looking spirit in working with academia and industrial partners to lead the cutting-edge effort of integrating LiDAR sensing technology with other physical systems, such as traffic signal systems and connected-automated vehicle infrastructure, to pioneer the application of smart transportation technologies and improve equitable safety at intersections.





Build a Better Mousetrap Spotlight: City of Arlington Public Works Continued...

This project was financed by USDOT under the university transportation center program, with the initial funds going to the University of Texas Arlington (UTA). COA participated in early discussions with UTA to determine necessary functions and a feasible system architecture. Researchers at UTA then chose to use Cepton's LiDAR platform, a top-tier manufacturer of LiDAR based in California. The system includes data collection and disruptive traffic control measures. To cover a typical four-leg intersection, four directional power-over-ethernet (PoE) LiDAR sensors were installed at the corners. These sensors are connected back to the LiDAR processor in the traffic signal cabinet, which includes general object perception software as well as add-on software developed by the project team. Multiple data sources were combined to improve traffic safety, and the data are uploaded to the central office system for evaluation and visualization. Overall, the system's complexity and hardware costs are comparable to existing traffic detection systems, such as video or radar detections.

The collaboration between UTA and COA has been instrumental in bringing the LiDAR-based traffic safety system to life. UTA played a crucial role in the early stages of the project by procuring the LiDAR sensors and conducting the proof of concept. COA, recognizing the potential of this transformative technology, stepped in and provided invaluable in-kind contributions to the field test, including the city's traffic control network, central database, and the installation, networking, and calibration of the LiDAR sensors.

Although the cost of the hardware LiDAR sensors was roughly \$21,000 per intersection, the benefits of this cutting-edge technology far outweigh the initial investment. UTA also contributed additional funds to support this effort, demonstrating its commitment to advancing research and innovation for the betterment of the community. Together, UTA and COA have set an inspiring example of what can be achieved through collaboration and a shared vision for a safer, more equitable transportation system.

This transformative project aims to revolutionize the roadways and intersections of Arlington by utilizing cutting-edge LiDAR sensors and disruptive control strategies to promote equitable safety and reduce traffic control delays while mitigating their negative impact on the environment. With the deployment of a smart traffic signal system in the central area of the city, the project team is poised to make significant progress towards achieving the goals set forth in the city's Vision Zero program, reducing crashes involving vulnerable pedestrians and bicyclists. The collected new behavioral data, such as near misses are being used to identify potential crashes under certain conditions (e.g., permissive left-turn vehicles .vs opposing through vehicles).

The success of this project has garnered widespread attention and acclaim within the traffic community, with Utah DOT recognizing its potential and sponsoring two additional projects at UTA to further evaluate the benefits of LiDAR sensors for traffic safety improvement. By sharing the results of this groundbreaking project with the wider community, we hope to inspire others to pursue innovative solutions that prioritize the safety and well-being of all road users while minimizing the environmental impact of traffic control systems.



NLTAPA Tailgate Talks: First Aid Tips for Heat Exposure

When it's time for spring and summer work here in Texas, it's also a good time to discuss heat stress with your crews. Any operation involving high air temperatures, high humidity, or strenuous physical work has a high potential for causing heat stress.

Heat stroke is always life-threatening. Heat exhaustion is a milder condition, but both can happen on hot days during heavy work. Know the symptoms. Certain people may be more prone to heat disorders if they have been drinking, have high blood pressure, or are not used to hard work in the heat. In the case of heat stroke, the person's body temperature controls stop working. The body temperature rises so high that brain damage and death will result if the person isn't cooled down right away.

You will notice red or flushed skin that is hot and dry. The person may be dizzy, vomit, have a headache, rapid pulse, and lapse into unconsciousness. Cool the victim quickly. Use cool but not ice-cold water. Get medical help right away.

Heat exhaustion is much less dangerous. The major signs are pale, clammy skin with heavy sweating and extreme weakness. The body temperature may be near normal, and the person may have a headache and may vomit. For mild heat exhaustion, take a break, loosen clothing, and slowly drink water to cool down. You can take steps to prevent heat disorders by drinking plenty of water throughout the day. Don't take salt tablets because they actually cause additional dehydration and can cause blood pressure to elevate.

Sunburns can be as simple as turning slightly red or enough to cause blistering, fever, nausea, and permanent scarring. Almost everyone has suffered through a sunburn sometime during their lifetime. A sunburn is a skin reaction to light rays, not heat rays. There are many common misconceptions about when people will and will not get a sunburn. Some people think they will not burn on hazy, overcast days. Actually, these conditions can enhance the effect of the sun on the skin.

Another misconception is that portions of the body covered by water can't burn. Experiments have shown that the burning rays of the sun are capable of penetrating water and reaching your skin. Sunburns can be avoided by practicing common sense in exposing yourself to sunlight.

Redness doesn't appear at once, but several hours after exposure. If you stay in the sun until your skin turns red, you're in for a really good burn.

The best way to provide relief from the discomfort without doing further damage is to apply an ointment, wet compress, or soothing lotion. Most mild sunburns will heal without treatment if left alone. If the pain is excessive or if the skin shows extreme blistering, see your doctor. Prevent a bad sunburn by using a lotion that has a chemical sunscreen or block and spread it on freely!



Focus on Training: Basic Supervision and Management Skills

This 16-hour course is **available now** and is an introduction for new or aspiring supervisors. It will equip them with the basic skills of an effective and highly functional leader. The course provides practical tools and proven techniques and can also serve as a refresher for experienced supervisors. The course will be conducted through a combination of lectures, interactive discussions, and practical exercises. The course will also provide resources, tools, and practical tips that supervisors can apply in their daily work. Topics covered in the course include:

- Making the Transition: Employee to Manager
- Management vs. Leadership
- The Basics of Being a Supervisor or Manager
- The Fundamental Skills of Being a Leader
- When Management and Leadership Merge Together – Situational Leadership
- Developing Yourself and Your Employees
- Coaching, Documentation and Disciplinary Actions
- Employee Evaluations
- Managing Conflict and Preventing Violence in the Workplace
- Basic Do's and Don'ts of Federal and State Laws

To request this course, please email TxLTAP at txltap@uta.edu or kerri.farley@uta.edu.

Instructor Spotlight



ED WILLIAMS

Ed has been involved in safety training for over 30 years and has been instructing for UTA since 2008. He has vast experience in the manufacture, distribution, and use of construction safety equipment. Ed is an experienced Safety Director with significant involvement in Risk Management for the construction industry. It's this diverse background along with his safety responsibilities in plant operations and industrial applications, that makes his presentations so well rounded, informative and very understandable by the attendees.

"Nice teacher." "Trainer has awesome personality." "Instructors were very professional." "Very informative, good instructors." "This was a good class and the teacher was great." "Mr. Williams is a good instructor."

What was the most valuable part of this course?

"The instructor."

"The way the teacher explains things."



INSTRUCTORS WANTED

Are you looking for your next
adventure in the great state
of Texas?



TxLTAP IS LOOKING FOR EXPERTS IN:

Email Your Resume and
Letter of Interest to:
TxLTAP@uta.edu



- ✓ Work Zone
- ✓ Infrastructure
- ✓ Safety
- ✓ Heavy Equipment
- ✓ Management
- ✓ Flagging
- ✓ Environmental
- ✓ Electrical



UTA | Division for Enterprise Development | TxLTAP
817-272-2581 | txltap@uta.edu | 140 W. Mitchell St. Arlington, TX 76019