

PROJECT FOCUS

Flow Control Techniques and aerodynamic improvements developed at the Georgia Tech Research Institute could save the U.S. trucking industry hundreds of millions of gallons of fuel per year.

Imagine applying techniques based on systems originally developed for jet aircraft wings to tractor-trailer trucks and increasing fuel economy by as much as 11 to 12 percent. The improvements could also enhance braking and directional control, potentially improving safety for the big vehicles.

The aerodynamic improvements produced by geometry changes – which generate fuel savings of as much as 6 to 7 percent – involve rounding aft trailer corners, installing fairings and making other changes that smooth air flow over the boxy trailers. Fuel savings of an additional 5 percent come from pneumatic devices that blow air from slots at the rear of the trailer to further improve and prevent separation of air flow.

Supported by the [U.S. Department of Energy](#), the project directed by Robert Englar, principal research engineer in the Aerospace, Transportation and Advanced Systems Laboratory of GTRI, began in the late 1990s with tests of simple scale-model tractor-trailers in GTRI's low-speed wind tunnel.

Working with Volvo Trucks of North America and Great Dane Trailers – manufacturers of the basic tractor and trailer respectively – Englar's research team and Smyrna, Ga., prototype shop Novatek installed a new set of aerodynamic features and revised the blowing system at the rear of the trailer. A series of higher-speed test runs at the Transportation Research Center's Ohio fuel-economy test track in September 2004 then demonstrated the real fuel savings that had been expected.



Researcher Robert Englar (right) and co-op student Daniel Hegeman adjust blowing slots on a model truck inverted in GTRI's low-speed wind tunnel. The testing helped assess the value of fuel-saving improvements.

PHOTO BY GARY MEEK

The tests involved operating a blowing-equipped test tractor-trailer for several different 45-mile runs around a 7.5-mile oval at highway speeds of 65 and 75 miles per hour. A control truck that did not have the aerodynamic improvements or pneumatic control system was operated under the same conditions to provide a comparison. For additional comparisons, the test truck was also run without the experimental blowing equipment.

Beyond boosting fuel efficiency, the pneumatic system can also provide a form of aerodynamic braking to assist the mechanical brakes. Differential blowing could also improve control of trailers in crosswinds by helping compensate for the wind direction. According to Englar, this would allow a driver to have the blown equivalent of an airplane rudder on the trailer, without any physical additions. Beyond increasing fuel efficiency, the pneumatic system could be a drag reducer, drag increaser, safety factor and a stabilizing device. Both the improved braking and directional control could be part of an automated system that would not require special attention from drivers.

Further energy savings could come using a pulsed-pneumatic system -- shown in preliminary wind-tunnel studies on wings to produce the same aerodynamic efficiency with less energy consumed by the blowing system. Englar hopes to get further funding to study how this might affect the truck aerodynamics – as well as fuel consumption.

For more information, contact Robert Englar at 770-528-3222 or bob.englar@gtri.gatech.edu

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METH LAB TRAINING EFFORT



In December 2004, four people – including two children -- were killed in Texas when a methamphetamine lab exploded. Estimates suggest that as many as 100 public safety officers have been injured while seizing meth labs over the past several years.

Meth labs are also creating hazardous waste problems in rural communities. But perhaps the most worrisome aspect of the labs is the hidden hazard they may create for the unsuspecting new occupants of homes, apartments and hotel rooms not properly cleaned up after being used for methamphetamine production

How GTRI is Helping

To help law enforcement personnel, emergency medical technicians, firefighters and others deal with the threat from these clandestine drug laboratories, the [Georgia Tech Research Institute](#) (GTRI) has developed a new training initiative that will teach these "first responders" how to recognize the labs and protect themselves from the contents. The program, which includes training at a simulated methamphetamine lab, will also provide information about proper clean-up techniques.

Course Summary & Benefits

This course is designed to provide professionals with an increased awareness of methamphetamine and the impacts to assets, communities, and residential and commercial real estate. Clandestine methamphetamine (meth) laboratories have been found in homes, churches, businesses, apartments, condominiums, and on vacant and undeveloped property throughout the Southeast. For property managers and real estate professionals, the hazardous precursor chemicals, meth residue, and hazardous wastes generated during the meth manufacturing process present significant legal and environmental issues for current and future landowners. This course will provide asset managers and agents with the skill sets to aid in the identification of potential meth manufacturing sites and materials, and the associated hazards and concerns.

Who Should Attend

First Responders
Retail and Property Managers
Environmental and real estate professionals that have been or could be impacted by the methamphetamine epidemic
Hotel Managers
Condominium Managers
Administrators
Facility Managers
Developers
School Administrators and Teachers
Community Housing Professionals

COURSE DATES - \$125.00 per offering

July 13, 2005 * September 14, 2005 * November 10, 2005*

How to Sign-Up

Go to www.pe.gatech.edu – Keyword – "Meth" or
CALL 404-385-3500 TO REGISTER TODAY

COURSE QUESTIONS? CONTACT: Katie Pyner katie.pyner@dlpe.gatech.edu

LET US KNOW WHAT YOU'RE UP TO!

In future issues of Alumni Notes this section will be used to share information about the things that are keeping our alumni busy following a successful GTRI career. We want to know what you're up to and will use this space to share your good news with other alumni all across the country. Whether you're researching how to improve your golf game, traveling to exotic places, or simply enjoying your grandchildren we want to know about it.

Please send all information to GTRI-ALUM@gtri.gatech.edu (Please include the dates you worked for GTRI and the position(s) you held during that time.)

SPECIAL THANKS to Rich Combes, Bill Owens, and Bill Rhodes for contributing to GTRI HISTORY and helping to identify the picture in last quarter's Alumni Notes (on right). We've determined they are (l to r) Harold Engler, Bill Rhodes, Allen Garrison, and David Hartup — Dave is demonstrating a sophisticated acousto-optic signal processor for the analysis of radar signal information.



Alumni Notes is produced by the GTRI Communications Office

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