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PROPANE PROJECTS MEET THE CHALLENGE

By Mark López

University students from the eighteen teams participating in the 1997 International Propane Vehicle Challenge attended "Media Day/ Emissions Testing" on May 8, at Southwest Research Institute to offer comments on their projects and the weeks upcoming events.

The Propane Vehicle Challenge offers student engineering teams a forum to showcase their abilities in a real-world situation. The Challenge demonstrates and displays to the general public the characteristics of propane that make it an ideal fuel in an environmentally sensitive region.

"The Propane Vehicle Challenge is a fantastic opportunity for our state's brightest young minds to prove the value of alternative-fueled vehicles and put us on the leading edge of alternative-fuels technology," said Texas Railroad Commissioner Carole Keeton Rylander.

Chrysler Corp. provided teams from the U.S., Canada and Puerto Rico with a gasoline powered pickup truck or minivan to be converted to run on propane.

Technicians at the SwRI laboratory, strapped down Texas A&M University's project vehicle to the newly installed 48-inch single-roll, electric chassis dynamometer to demonstrate the emissions testing each teams' vehicle would undergo as part of the Vehicle Challenge.

Coordinator of the emissions testing at SwRI Kevin Whitney, said he has been organizing the testing program for the better part of a year and is responsible for overseeing all of the testing. Mr. Whitney explained the vehicles would be evaluated according to federal test procedure used by EPA to certify manufacturers' new vehicles.

Accordingly, each vehicle entry was run at an average speed of 20 mph on the dynamometer, with top speeds only reaching 55 mph. This range of speed simulates urban driving between stop signs and stop lights.

SwRI technicians collected emissions samples using large

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Kevin Whitney (right) overlooks emissions testing on this propane-powered minivan at Southwest Research Institute. *(Photo by Larry Walther)*

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NEGOCIOS Y FINANZAS

BUSINESS & FINANCE

BUSINESS-WISE

U.S. INVENTORIES UP; SALES DOWN

Inventories held by businesses rose again in March, the Commerce Department said, but sales eased at all levels of manufacturing, wholesale and retail activity. Total business inventories rose 0.3 percent in March to a seasonally adjusted $1.02 billion after a revised 0.4 percent jump in February, the department said. Previously, the department said inventories had risen only 0.3 percent in February. The report fit with other signs of a tapering off in demand, including Tuesday's report from Commerce showing a 0.3 percent decline in retail store sales during April.

BOEING SEES PROBE ENDING IN JUNE

A senior Boeing official said he expects the U.S. Federal Trade Commission to complete a review of its acquisition of McDonnell Douglas by the summer. "The latest I have heard is that the U.S. authority is trying to complete their assessment towards the end of June, early July," Jim Frank, Boeing's vice president for European affairs, said. If this is confirmed, it indicates that the FTC intends to take the lead in investigating the mega-merger between the two aircraft makers – over which the European Commission has raised strong doubts.

Boeing and McDonnell Douglas are projected to have 1997 sales of $48 billion together.

CAMPBELL SOUP: PROFITS M'm! M'm! GOOD!

Campbell Soup posted record profits and sales for its fiscal third quarter, led by a 15 percent increase in worldwide sales of its soups. Campbell, which also markets Goldfish snack crackers and Godiva chocolates, said its net income for the three months, ending April 27, grew 8 percent to a record $157 million, or 34 cents a share, from $145 million, or 29 cents a share. Wall Street reacted positively to the news, sending Campbell's stock up $1.375 to $49.375 on the New York Stock Exchange.

REPUBLIC BUYS TWO MORE DEALERS

Republic Industries said today it has definitive agreements to acquire two more companies in Florida for a total of $62 million in stock. The dealerships are Gulf Management, which operates Lexus of Tampa Bay and Lexus of Clearwater, Fla.; and the Steve Moore General Motors automotive group of Palm Beach, Fla., which includes Chevrolet, Cadillac, Pontiac, Oldsmobile, Buick and Geo brands. Republic, led by Florida billionaire Wayne Huizenga, owns the nation's largest chain of new vehicle dealerships and is building a chain of used car megastores it operates under the AutoNation USA brand name.

DIGITAL SUING INTEL OVER PATENTS

Digital Equipment Corp. says it is suing Intel Corp. for allegedly infringing patents on 10 of its computer chip products. The suit, filed in a federal district court in Massachusetts, charges that Intel "willfully infringed" the patents in making, using and selling products from Intel's Pentium, Pentium Pro and Pentium II microprocessor families. The suit alleges that Intel's patent infringement caused Digital economic injury that would cause irreparable harm if not stopped. The powerful Pentium and X86 computer chips are a major force in driving the demand for new computer purchases. News of the suit sent Intel's stock to close at 6 3/4 points lower at 152 3/8 on the Nasdaq index, where it was the most active issue. Digital rose 2 1/8 to 35 1/4 on the NYSE where it was the most active issue.

COFFEE PRICES SPIRAL HIGHER

Coffee prices soared to their highest level since July 1994 Tuesday as continued worries about tight supplies sent speculators on a buying spree. Dealers said long-term weather outlooks calling for a cool air mass to push across Argentina and into Brazil in 8 to 10 days contributed to Tuesday's bullish tone.

However, forecasters said the chance of damaging frost was extremely slim, with the earliest deep freeze in Brazil recorded on May 30-31. But with inventories near 20-year lows, traders said any sign of cool weather in top-grower Brazil was likely to spark buying. At New York's Coffee, Sugar and Cocoa Exchange, arabica coffee for July delivery rose to a lifetime high of 243.00 cents per pound before slipping back slightly to close at 241.15 cents, up 11.50 cents.

GM STRIKE MAY HIT INDUSTRY

The third strike to hit General Motors in about five weeks threatened to force a broad shutdown of GM's North American vehicle operations and affect other automakers that buy GM electrical components. In Warren, Ohio, about 8,200 members of the International Union of Electronic workers walked off the job at 18 plants operated by GM's Delphi Packard Electric Systems division just after midnight. The issues keeping IUE Local 717 and GM from reaching a new local labor agreement, like ongoing assembly plant strikes in Oklahoma City and Pontiac, Mich., involve job security. Negotiations to resolve the dispute resumed about 13 hours after the strike began.

La Ford busca recuperar sus propias concesionarias

DETROIT (ARB).- En el cambio más radical aplicado hasta ahora por una fabricante de automóviles para mejorar su red de concesionarias, la Ford Motor Co. informó que tiene planes para adquirir sus agencias en Indianápolis y otras dos ciudades, para reemplazarlas con superagencias de automóviles y centros de servicios satélites.

La compañía se acercó esta semana a sus concesionarios de Indianápolis a fin de presentarles un plan para adquirir las 18 agencias independientes de modelos Ford y Lincoln-Mercury, que serían reemplazadas por cuatro o cinco megaconcesionarias.

Hay 5,100 concesionarias de esos modelos en Estados Unidos, y funcionarios de la Ford no han ocultado su deseo de reducir esa cantidad. La consolidación disminuiría los costos y la competencia entre las mismas concesionarias de la Ford por atraer a los mismos clientes.

Rehacer la red de distribución tan solo en Indianápolis podría costarle a la Ford 155 millones de dólares. La segunda fabricante de automóviles de Estados Unidos informó que también analiza realizar pruebas similares en otras dos ciudades, a las que declinó identificar.

El experimento llega en momentos en que la Ford y otras grandes fabricantes de automóviles luchan para reducir sus relaciones con las concesionarias, al mismo tiempo que combaten una embestida de publicidad de los dueños de superagencias de automóviles. Otras fabricantes han puesto a prueba innovaciones para la venta, pero ninguna es de largo alcance como la de la Ford.

"Esta es una llamada de la Ford para decir a sus concesionarios que el mundo de la venta de automóviles está cambiando", comentó Donald Keithley, analista de la industria y socio de la firma J.D. Power & Co.

Propane projects meet the challenge

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flexible tubes and clamps connected to the exhaust system both before and aft the catalytic converter. The sample before the converter tests how the engine is operating and how clean the engine is. The tail-pipe sample determines how well the catalytic converter is cleaning up the exhaust.

Broken down into three parts, the emissions test consisted of a 'cold start phase', in which the vehicle is started at room temperature and runs for 10 minutes. During the 'hot stabilized phase', the vehicle is run for 12 minutes and then turned off before the final phase, the 'hot start test.' The 'hot start test' simulates a driver commuting to the local convenience store to grab an item and then quickly returning to restart their vehicle.

Each of the phase's emissions are collected in separate bags whereupon they are weighed in order to determine a total amount of exhaust. The bags are measured in grams per mile.

Emissions testing also determines fuel economy and derives the city and highway fuel economy figures seen listed on a new vehicle's manufacturer sticker.

The emissions testing category is the most heavily weighted category points-wise in the Propane Vehicle Challenge. This is because the Challenge is meant to demonstrate the clean-burning qualities of propane versus gasoline.

Chemical analysis shows that propane cuts emissions of toxins and carcinogens by up to 96 percent when compared to gasoline.

There are numerous options the teams encounter during the gasoline-to-propane conversion, but two topics of particular interest are the difficulties associated with employing a conformable propane tank, and the students' option to run their vehicles on liquid or vapor propane.

"With liquid propane, it occupies smaller space than vaporized. Although the vaporized form is more widely used than liquid form," said co-Captain Charles Roberts of the University of Texas at Austin. When asked why his team chose to work with the more unfamiliar form of propane to power their minivan, the Ph.D. student simply said, "We wanted to go with something more high-tech."

Mr. Whitney pointed out two of the advantages of running liquid propane versus the vaporized form. First, liquid is denser than gas, so it is possible to push more of the propane and air mixture into the engine cylinders. The result is more horsepower. Secondly, liquid is easier to meter through a fuel injector, and lastly, liquid propane is less apt than the gas form to change density with temperature variation.

Mr. Whitney also offered insight on some of the problems teams were experiencing using the liquid propane, by mentioning that these vehicles were running into heating problems.

As the temperature of propane rises, sometimes liquid propane will convert into a gaseous form. Consequently the engine will not receive the correct amount of propane, and the result is hard starting due to the leaning out of the propane injection. However, Mr. Whitney went on to mention that Chrysler has a full-size minivan in production which runs on liquid-injected propane and is sold in Canada.

Representing her native country, Canadian Melanie Salomons of the University of Alberta discussed her team's decision to use a liquid propane-injection system and a conformable fuel tank. "Up in Canada there's a problem with vapor propane because when it gets down to -30 degrees or -40 degrees Celsius (-22 degrees to -58 degrees Fahrenheit) and it liquefies, you can no longer run your vehicle. But with liquid, it is easier to run."

Team Leader Salomons mentioned everything was not going as smoothly for her team as she might have hoped. Even so, Salomons said the week was exciting for her entire team and it gave them the opportunity to see other university's ideas and visit the San Antonio Riverwalk. "One of our goals was to have fun," said Salomons.

The 21-year-old civil engineering senior commended the team's effort and success in overcoming obstacles. When asked if she got down on her hands and knees to turn some wrenches and get some hands-on experience, Salomons laughed, "Oh yeah! I grew up in the country, so it's not fun unless you get dirty!"

The unfamiliar Texas weather was blamed for some of the Canadian team's problems, because the heat caused vapor lock and hot start problems for their vehicle. The late arrival of their new conformable propane tank added to their problems.

Conformable tanks for propane are still developmental projects, because propane needs to be contained under pressure, and it is simpler to exert this needed pressure using conventional cylindrical containers. Propane naturally occurs as a gas, but by subjecting it to slight pressure, it can be transported, stored and used as a liquid.

"The industry is trying out working with conformable tanks - shaped to fit- but it is hard to do because they are pressurized and when you get into other designs, it is hard to keep the pressure," said Kevin Whitney.

The conventional round tanks are somewhat difficult to position underneath a vehicle, compared to ordinary tailored-to-fit gasoline tanks. Conformable propane tanks also have the ability to store more fuel on board in the same amount of space as gasoline tanks.

The aluminum conformable propane tank used by University of Alberta's "Pandora" project, measures 56 inches long, 27 inches wide and 8 inches deep. Without fuel, the tank weighs 190 pounds and can hold 35.4 gallons of fuel.

Texas Tech University took a different approach from University of Alberta and UT at Austin when developing their project vehicle, which they labeled the "Edible Incredible EGG." Aside from opting to employ vapor propane, a solution was required to compensate for power and acceleration lost after the conversion. The answer was to use a super-charging system, whereby the student engineers were able to find a 14 percent increase in horsepower over stock set-up, and increased towing capacity.

Team leader Richard Howlett was candid about his interests in automotive engineering and how he came to be involved in the Propane Challenge. "I've been into cars since I was 14. My father had a '66 nasal-blue Corvette and I used to work with it. It wasn't running and it just sat in the front of the house for three years. I rebuilt the engine, put a new clutch in it, everything you could imagine," recalled the first-year graduate student.

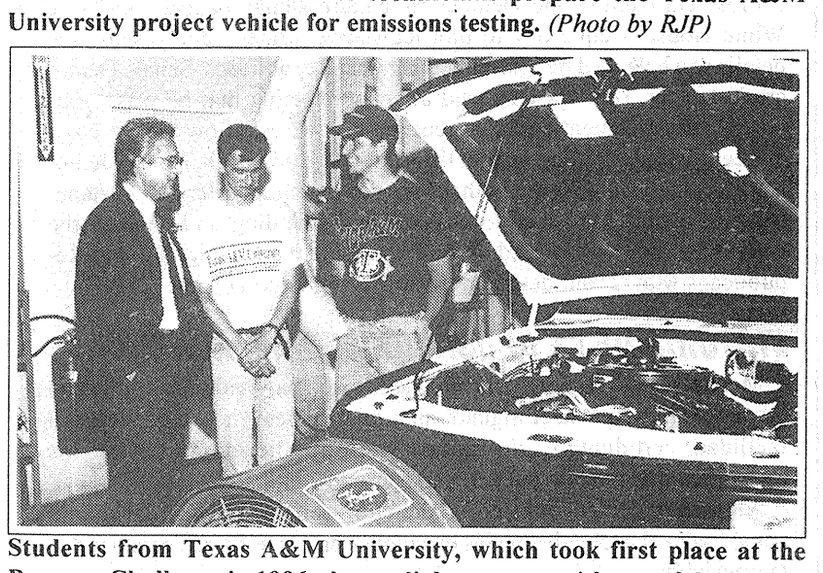
According to Mr. Whitney, students had to strip their vehicles of a number of gasoline-related components in order to make room for the propane conversion. The list of items included the gas tank, fuel lines, fuel injectors and modifying the engine controller.

Some safety concerns cast on propane-powered vehicles are that the propane containers are under constant internal pressure and also finding a safe, strong-engineered mounting for the cylindrical propane tanks. According to a Dutch study though, propane-fueled vehicles are actually safer in crashes than their gasoline-powered counterparts.

Propane has been used as an alternative fuel for more than 60 years, and fuels more than 350,000 vehicles in the U.S. and 140,00 in Canada.

The international Vehicle Challenge represents a belief that the benefits of propane as an alternative fuel source are invaluable.

Southwest Research Institute technicians prepare the Texas A&M University project vehicle for emissions testing. *(Photo by RJP)*



Students from Texas A&M University, which took first place at the Propane Challenge in 1996, share a light moment with one of the event's coordinators. *(Photo by Roberto J. Pérez)*