

## What's Inside

National Car Care Month **6**Technical Assistance Hotline **7**Human Resource Seminar **8**

## Late-Breaking News

### The Legislative Key to Service Information

**New regulations will provide easier access to vehicle data**

Service information has long been an important tool in the automotive repair industry. General Motors and ACDelco have been leaders in this area and continue to set the pace by supporting activities and regulations that will give repair technicians access to the latest vehicle service information.

Having access to the latest diagnostic and repair information is vital to the independent automotive repair industry if it is to remain competitive.

A proposed federal Environmental Protection Agency (EPA) regulation requires automakers to provide all emissions-related vehicle service information to aftermarket service providers and tool and equipment companies that manufacture or remanufacture emissions-related parts. This regulation is still pending and is expected to pass later this year.

The California Air Resources Board (CARB) has also created a

*continued on page 4*

## Smart EVAP System Diagnosis

Technician-friendly diagnostics help meet tougher emissions-control regulations



**S**ervice technicians have lived with second-generation On-Board Diagnostic (OBD-II) vehicles and I/M testing requirements for some time now.

Yet one of the least understood and most often misdiagnosed systems on those cars and trucks is the Evaporative Emissions Control System, or EVAP for short.

Basic problems in the diagnostics of the EVAP system include a lack of authentic service information, certain vehicle operating conditions and something as simple as failing to tighten the gas cap. Too often, technicians end up searching for EVAP problems that do not exist when the vehicle comes into the shop.

The latest technician-friendly Engine-Off diagnostics will help take some of the mystery and uncertainty out of diagnosing and repairing EVAP concerns. These diagnostics are part of the automakers' plans for meeting tougher emissions-control regulations like Super Ultra-Low Emissions Vehicles (S-ULEV).

*continued on page 2*

continued from page 1

## Understanding EVAP technology

The EVAP system and diagnostics have a single purpose: Prevent vehicle fuel vapors such as hydrocarbons from escaping into the atmosphere. Since 1996, GM light-duty vehicles have been equipped with OBD-II that performs specific component and system diagnostics and monitoring. The diagnostic results can turn on the Malfunction Indicator Lamp (MIL) and set a Diagnostic Trouble Code (DTC) whenever a possible fault is detected.

Theoretically, proving the EVAP system's performance and integrity is straightforward. But, as many technicians have come to learn, nothing is ever simple. Many times, the system diagnostics would set a DTC and illuminate the MIL for a potential fault that can be very difficult to pinpoint.

Today's enhanced EVAP systems typically include:

- **A system canister** containing "activated charcoal," a vapor-absorbent carbon;
- **A pressure sensor** that measures the difference between fuel-tank pressure (vacuum) and outside (atmospheric air) pressure;
- **A purge solenoid** that opens during a purge cycle, allowing vapor flow to the engine;
- **A vent solenoid** that allows fresh air into the canister during purge, and closes during diagnostics to reduce the pressure in the fuel tank (below atmospheric);
- **A fuel-level sensor input**, which provides a measurement to the diagnostics for the proper range of fuel level;
- **An On-Board Refueling Vapor Recovery (ORVR) system** that prevents hydrocarbon vapors from escaping to the atmosphere during refueling;

▪ **A high-tech gas cap** with special sealing and valve mechanisms.

## EVAP self-diagnostics can be complex

For the PCM to run its EVAP diagnostics, specific conditions called enable criteria must be met during the vehicle operation. These criteria (refer to the service information manual for the vehicle-specific enable criteria) can include, but are not limited to:

- Fuel level greater than 15% and less than 85%;
- System voltage between 10 and 18 volts;
- Coolant temperature between 36 and 96 degrees Fahrenheit;
- Intake air temperature between 36 and 96 degrees F;
- Coolant and intake air temperatures within 57 degrees F of each other;
- Barometric pressure at or above a specified level.

If the enable criteria are not met, the diagnostics will not run. If all of the enable criteria for the respective vehicle are met, the diagnostics will run and record a "pass" or "fail" event. One of the most

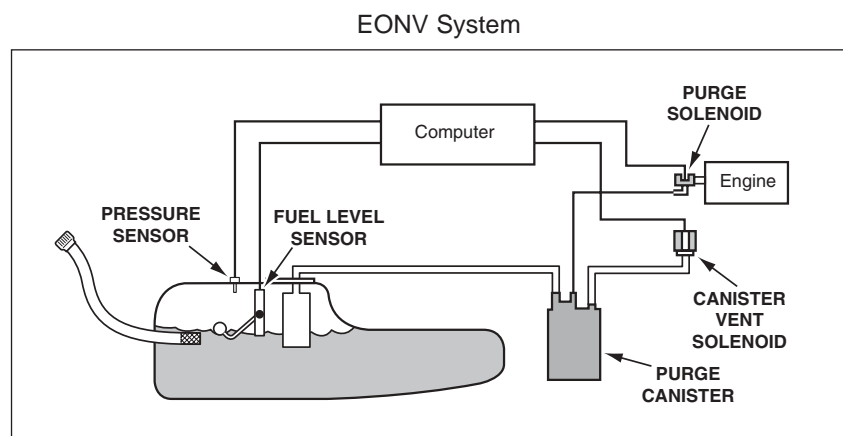
common circumstances for an EVAP DTC is a loose or damaged fuel cap.

When EVAP service is required, proper tools and equipment are essential. When used with authentic service information, technicians typically perform the diagnostics with ease and accurately make the repair.

## New meaning of "enhanced"

With S-ULEV regulations, automakers are charged with cutting emissions to a fraction of what is allowed today. System integrity hasn't been an issue to date. However, diagnostic methods of today will not meet the next generation's requirements. As a result, test methodologies have changed.

Previous systems were required to identify leaks in the system equivalent to 0.040" or greater. Today's vehicles are now required to identify leaks equivalent to 0.020". Previous enhanced EVAP systems were not capable of this requirement, so Engine-Off Natural Vacuum (EONV) diagnostics technology has been developed. Diagnostic testing of the vehicle's EVAP system during operation on earlier systems is going away due to the 0.020" leak-detection requirements and



One minor change made to accommodate the EONV system (above) includes wiring the canister vent solenoid to battery voltage.

several variables in the vehicle's environment of operation.

The EONV scheme does not involve any new hardware, but the PCM and EVAP vent solenoid wiring has some minor internal changes.

Most 2003 GM trucks, with the exception of minivans and some light-duty models, are EONV equipped. Passenger cars are slated to have EONV starting with the 2004 model year, with the transition completed by the 2006 model year.

### Initializing EONV diagnostics

In General Motors' approach, the EONV diagnostic is a two-phase test that monitors ambient temperature, fuel level, run time, coolant temperature and the distance the vehicle has

traveled since the last EVAP test. The PCM initiates the diagnostic only after a trip with a cold start has occurred, to ensure that the fuel-pressure sensor has been properly re-zeroed.

To preserve battery life, the EONV system will not run unless the time since the last complete test exceeds a predetermined amount of time. When a complete test is successful and no apparent EVAP system problems are identified, the time between tests is extended. Although this will reduce the frequency of the test results, it will increase the potential life of the battery.

### EONV diagnostic details

The EONV system test begins with the canister vent open. During initialization, the PCM calculates system pressures based on ambient air temperature over a

given period of time. After comparing these results with preprogrammed values, the PCM can then determine evaporative vapor volatility of the fuel in the tank.

If the volatility is too high, the PCM aborts the test. If the volatility is moderate, the PCM runs both phases of the test and adjusts Phase I pressure to compensate for the vapor volatility. If the volatility is low, the PCM simply completes the diagnostic without making any pressure corrections. During the EONV system initialization, the PCM will record a "failed" test result if the system pressure builds with the canister vent open.

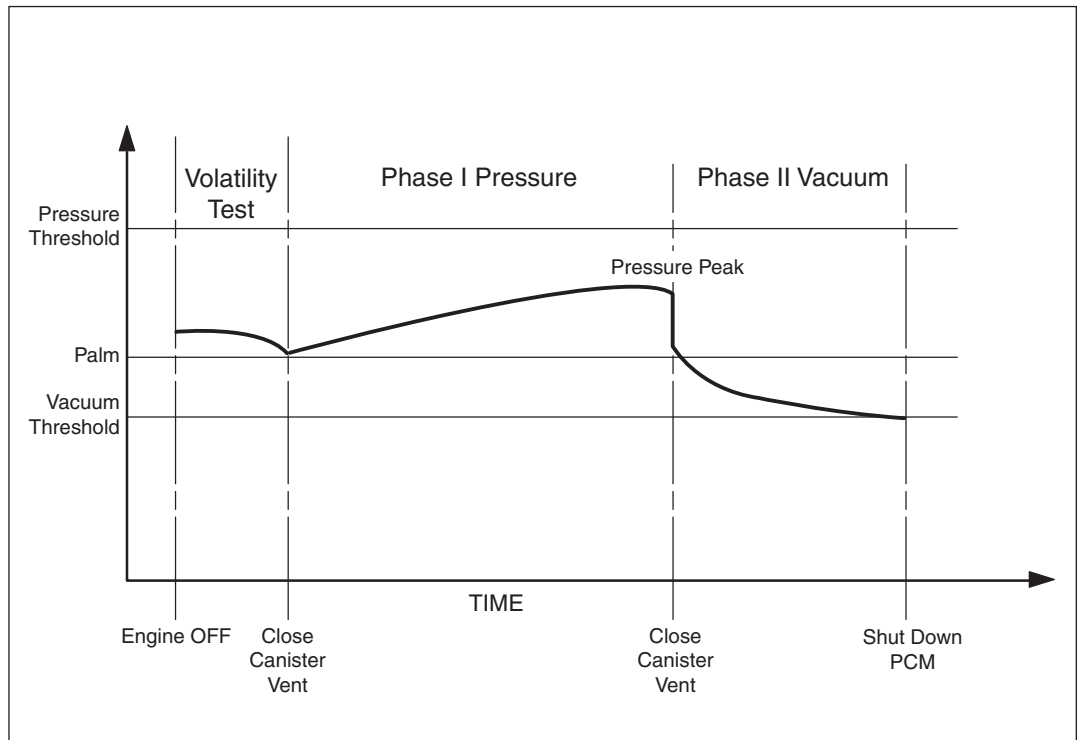
EONV diagnostics will limit the number of either completed or noncompleted tests run in a specific amount of time. In addition, the diagnostics will run only after the vehicle has a minimum distance travelled since the last test. Also, the sys-

tem will not be enabled if DTCs are set for Intake Air Temperature Sensor, Engine Coolant Temperature Sensor, Vehicle Speed Sensor, Ignition-Off Timer Performance or the EVAP system.

Phase I of EONV diagnostics checks system pressure (or vapor volatility test). With the engine off, the canister vent is closed and the PCM reads the system pressure build. If the "pressure threshold" is reached as a function of fuel level and ambient temperature, the diagnostic passes. If the threshold is not reached, the PCM watches for a pressure peak, then it opens the canister vent to bleed down the pressure. If a decrease in pressure occurs, Phase I diagnostics passes and records the pressure values to be used in the "pass-fail" calculations in Phase II.

In Phase II, the diagnostic starts with

EONV Diagnostic



**The EONV diagnostic consists of two phases, the first measuring the pressure and the second measuring the vacuum. The line in the middle of the graph represents pressure during the tests.**

*continued on page 4*

*continued from page 3*

system pressure continuing to be monitored from Phase I. If the system pressure does not stabilize, the PCM will open and close the vent solenoid a number of times before aborting the test and trying again. Next, a “vacuum threshold” is calculated — this is the difference between the pressure threshold and pressure peak determined earlier in Phase I. If the vacuum threshold is reached, the diagnostic passes. Otherwise, the PCM looks for a vacuum peak and uses that in a formula for determining whether the system passes or fails the diagnostic.

The formula takes into account the pressure and vacuum peaks and the pressure threshold. Parameters are set for a

perfectly passing system and a perfectly failing one. In between, a certain “fail threshold” is pre-set. If that threshold is reached, the PCM sets a related DTC and illuminates the MIL based on the type A or B requirements.

Subfunctions of the EONV diagnostics include estimating ambient air temperature and distance traveled before allowing the diagnostic to run. The system re-zeroes the pressure sensor upon cold starts and before each test phase. The diagnostic also monitors the fuel level and tank pressure to detect a refueling event. If a refueling event is detected, the PCM stops the diagnostic and performs a “rationality” test by comparing the current fuel level with an initial level. After a

given period of time, if the PCM is unable to verify a greater level, the refueling event is declared invalid and a Small Leak DTC is recorded.

### **At the end of the day**

EONV diagnostics will take some of the mystery out of diagnosing and repairing Evaporative Emissions-Control systems. Compared to previous EVAP diagnostics that required specific vehicle operating conditions while driving, EONV is far more technician-friendly with its Engine-Off diagnostics.

Chances of false DTCs being set and the MIL lighting up over an incorrect test parameter (or an occasional loose gas cap!) are greatly reduced.

## **Late-Breaking News**

*continued from page 1*

similar regulation relating to vehicle emissions, which passed in September 2002 and went into effect on March 31, 2003.

These measures have prompted the automotive organizations Alliance of Automotive Manufacturers (AAM) and the Association of International Automobile Manufacturers (AIAM) to send a letter to U.S. Senator Byron Dorgan to support an initiative that will continue the viability of the automotive service industry and preclude the need for further federal legislation while also meeting the California requirements. In part, the letter reads:

“Automobile manufacturers are committed to make available by August 31, 2003, emission- and nonemission-related service infor-

mation, training information, and diagnostic tools in the same manner and to the same extent as specified by the CARB regulations for emission-related systems and components. This means that 1) the same service and training information related to vehicle repair will be made available to independent repair shops either via the Internet, or in the same manner and extent as it is made available to franchised dealerships and 2) the same diagnostic tools related to vehicle repair that are made available to the franchised dealers will be made available to the independent repair shops. These will be made available at a reasonable price consistent with the guidelines provided in CARB regulations. The service and training information

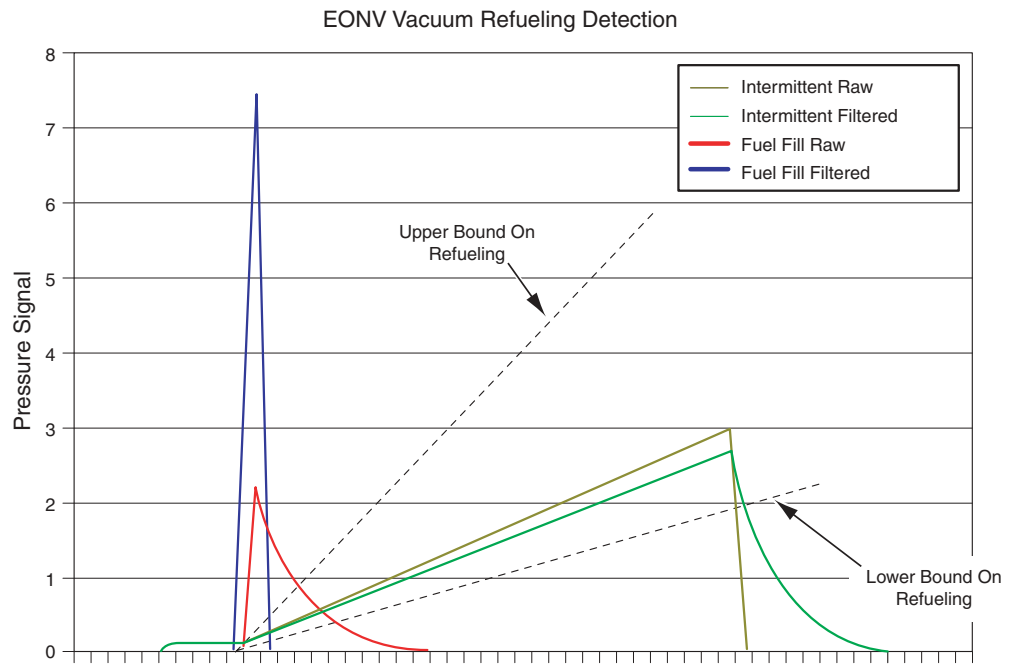
and manufacturer tools will be available to independent repair shops without the need for them to return to a franchised dealership (to the extent allowed by law).

Manufacturers recognize the value of third-party providers of tools, service and training information. They are committed to making available to information providers and tool companies the service and training information, tools and tool information needed. The National Automotive Service Task Force (NASTF) will continue to provide a forum for the industry and the aftermarket to resolve service information issues.”

The U. S. Senate Subcommittee on Consumer Affairs, Foreign Commerce, and Tourism has agreed to accept the commitment proposed by

Advanced EONV diagnostics will pinpoint real problems, and not send technicians off chasing after something that might not be there. “Smart” EVAP system diagnostics are here to stay.

ACDelco followed development of the new diagnostic strategy and first documented it in the “General Motors On-Board Diagnostics II” (FC-12) technical training course. Additional information on the innovation and hands-on experience with the EONV system is available at the FC-12 training course. For more information, log on to [acdelcotechconnect.com](http://acdelcotechconnect.com). ■



**One of the other functions of the EONV diagnostic includes monitoring the fuel level and tank pressure to detect a refueling event. This chart shows how the system monitors the pressure to accomplish this task.**

the AAM and the AIAM and has tabled proposed Senate bill (S.2617), which would have required vehicle manufacturers make available necessary service information and diagnostic tools to Independent Service Centers (ISCs).

The CARB and EPA regulations require providing information in these five main areas:

- **Diagnosis and Repair Procedures**
- **Wiring Diagrams**
- **Technical Service Bulletins**
- **Training Materials**
- **Troubleshooting Guides**

The regulations will assist independent technicians by providing access to the latest vehicle service information and procedures which will keep them on the forefront of the technology and information curve. This will

allow technicians to continue to provide customers with quality diagnostic and service repairs for their vehicles.

General Motors Electronic Service Information (eSI) can be accessed via the Internet at [acdelcotechconnect.com](http://acdelcotechconnect.com) and at the recently launched [gmtechinfo.com](http://gmtechinfo.com). Both Web sites contain the five main topic areas (service information, reprogramming, tools and equipment, technical training, and technical training materials) from which all relevant information desired could be accessed.

For additional information on this or related topics, send e-mail to [gmtechinfo@gm.com](mailto:gmtechinfo@gm.com), log on to [acdelcotechconnect.com](http://acdelcotechconnect.com) or call 1-800-825-5886. ■

### Key features of the proposed EPA regulation include:

- 1) OBD II: Information to include a description of each monitor, how it operates, diagnostic trouble codes and malfunction thresholds.
- 2) On-board Computers: Initialization procedures, anti-theft systems, tools and procedures showing proper installation of emission-related parts.
- 3) System Diagnosis: Diagnostic and reprogramming information provided to tool and equipment companies. Included are data files and software.
- 4) Data Stream & Bi-directional Controls: Information included to read, format and reprogram emission-related equipment.

# Good Vehicle Care Translates Into Good Business

**T**his year, National Car Care month moves from October to April to target consumers who are planning summer vacations. This gives Total Service Support (TSS) shops a great chance to increase business.

Since the early 1980s, National Car Care Month has been a great promotional tool, educating consumers on the high costs of neglected maintenance such as poor fuel mileage, expensive repairs and even lost lives. Today, the message continues — and, thanks to a long-term national campaign, it should keep going all year 'round.

“Be Car Care Aware™” is an ongoing campaign spearheaded by the Automotive Aftermarket Industry Association (AAIA) on behalf of the industry. The Car Care Council serves as the brand and messaging source for the cam-



**We Support**



paign. Its focus is to educate consumers about the benefits of regular vehicle care, maintenance and repair. The campaign was created in response to the automotive aftermarket industry's interest in securing a share of the estimated \$60 billion in annual unperformed vehicle maintenance.

ACDelco is an affiliate sponsor of this integrated marketing and public relations campaign. “We are supporting this initiative because we see it as an opportunity for our customers to increase their business and provide great customer service,” explains Susan Christophersen, ACDelco manager of product service and training development,

and a member of the Be Car Care Aware Women's Board. “Increased consumer awareness should encourage vehicle owners to visit their local service facility more often — which is good news for TSS accounts.”

She points out that the timing of the campaign is particularly favorable. “People are likely to keep their vehicles longer in a weak economy, and a well-maintained vehicle retains its value and has better gas mileage,” says Christophersen.

Consumers who are car-care aware will be looking for a reliable place to take their vehicles. TSS shops can capitalize on this campaign by promoting vehicle maintenance awareness during National Car Care Month — and every other month of the year, too. Christophersen recommends being proactive about scheduling appointments for customers to come back at regular maintenance intervals. This is just

## National Car Care month facts

- Moves to April this year
- Helps TSS shops tap into share of \$60 billion in annual unperformed vehicle maintenance
- Shops can host ACDelco's consumer car care clinics
- Log on to [www.carcare.org](http://www.carcare.org) for more helpful resources

one example of using vehicle care as a business-building strategy.

The Car Care Council's Web site ([www.carcare.org](http://www.carcare.org)) features a broad array of helpful resources and information TSS accounts can use to promote the importance of routine vehicle care in their shops. There are downloadable Web banners and logos, telephone on-hold message scripts — even a complete Event Planner a TSS shop can use to develop a customized National Car Care Month promotion, such as a vehicle check lane inspection event.

ACDelco offers some additional resources to support the efforts of TSS accounts. They can host one of ACDelco's popular consumer car care clinics to educate consumers on basic maintenance and vehicle care — building relationships that encourage customers to come back the next time they need service.

A number of business training courses are available from ACDelco to help service writers and service providers sharpen their customer relations and selling skills so they can take full advantage of the opportunities that "Be Car Care Aware" is designed to generate.

"It's an excellent opportunity to go after increased business," says Christophersen. "And, as always, ACDelco is there to provide the tools and support our TSS accounts need to make the most of it." ■

# Turning Time Into Money

## ACDelco hotline offers a direct connection to technical assistance

**I**t's estimated that the average consumer spends about \$1 for every minute it takes a technician to diagnose his or her vehicle repair. Factor in the costs shops incur while service bays sit idle during this process and it's apparent that time is money.

When uncertain about a difficult repair, put a quick call in to ACDelco's Technical Assistance Hotline. For just \$2.85 per minute, Total Service Support (TSS) technicians can speak with experienced automotive specialists who can help them quickly determine repair solutions, cutting down on the costs of lengthy diagnosis times. What's more, TSS participants receive 10 minutes at no charge when they mention they're first-time callers.

"We have specialists available to answer calls about any vehicle repair," says Leo Koganov, ACDelco TSS national coordinator. "Even if the lines are unusually busy, a specialist can return a call within minutes."

Each hotline technical assistance consultant has years of hands-on dealership and factory training, is Automotive Service Excellence-certified with master status, and is equipped with multiple resources to handle any questions TSS technicians may have about repairs on passenger vehicles sold and serviced in the United States and Canada.

Along with the ability to walk the technician through a repair, hotline operators can provide — at the caller's request — wiring diagrams, diagnostic trouble trees for Diagnostic Trouble Codes, Technical Service Bulletins and manufacturer specific recalls. Descriptions of operations and systems, service repair labor times, remove and replace instructions, and oscilloscope wave-form patterns to aide in the diagnosis of system components are available as well.

In addition, a fax-back service is offered for technicians who only want specific information faxed to them without the further cost of speaking to a specialist.

TSS accounts can have their hotline accounts automatically billed to a Visa, MasterCard, American Express or Discover credit card at the time of invoicing. Hotline administrators also can fax the bill directly to the shop. The invoice can then be attached to the repair order, which passes the cost of the call on to the consumer.

Invoicing is detailed with the name of the technician who called; year, make and model of the vehicle being discussed; case number assigned to that vehicle; number of minutes clocked for the call, and total charge for the call. Invoices are mailed the 15th and last day of each month.

To learn more about the ACDelco Technical Assistance Hotline, call 1-800-825-5886 and select option #2. ■



# New ACDelco Seminar: Human Resources Management

## A new course helps shops deal with personnel issues

**E**very service center owner and manager wants employees they can count on — team players with the technical expertise to get the job done. Good employees are key to a successful business. But hiring those employees and keeping them can be challenging.

ACDelco launched a new human resources management seminar this spring to help guide Total Service Support (TSS) shop managers and owners through personnel issues. An ACDelco training staff with more than 100 years of combined experience designed the one-day seminar specifically for service centers.

“We understand the Independent Service Center’s business needs,” says Charlie Fewell, business management and sales training coordinator for ACDelco. “We know the business, the market and the customer. The class content is driven from obtaining feedback from our TSS participants across the nation.”

Fewell, a former service technician and sales manager, has taught technical and business management courses for General Motors for 22 years. The seminar’s three sections are designed to help participants become more effective managers who successfully hire, train and retain employees:

### Have a business plan

The first part of the seminar will focus on the first and most important step: how to

identify business direction. Participants will learn why a business plan is essential, and how developing one can clearly define the direction of the business. Once the vision is defined, then the skills needed by the potential employee can be defined. Those issues might seem difficult to define at first, but this frequently skipped step is what helps a business thrive. “Most TSS shops haven’t seen the benefits they can receive by taking the time to develop a plan for their business,” Fewell says. “Developing clear roles and responsibilities with obtainable objectives for each employee is just one part of the business planning process.”

### Review technical information

Using the personal resource kit given to TSS participants, this portion of the seminar answers questions based on the more technical part of human resources issues. The kit is the basic guide for hiring, maintaining records and terminating an employee. It contains a standard job ap-

plication and guidelines for conducting a successful interview including notes on which questions to be sure to ask and which are illegal. The manual also lists tips on how to interview consistently from applicant to applicant, knowing how to “read between the lines” on an application.

### Personality types

One of the keys to keeping good employees is learning how to communicate with different personalities. Another part of the class measures the participant’s own personality and gives tips on how to communicate effectively with other personalities. Another key role for service center owners and managers is to conduct routine progress reviews with each employee. The seminar demonstrates listening skills exercises that teach participants how to listen physically, verbally and nonverbally.

The seminar is one of three business management courses offered to TSS participants. For more information, contact your ACDelco representative. ■



*TechConnect* is published for ACDelco by Campbell-Ewald Publishing, 30400 Van Dyke, Warren, MI 48093. All materials and programs described in this newsletter are subject to change. All submissions should be sent to the editor. Submission of materials implies the right to edit and publish. Copyright 2002, Campbell-Ewald. All rights reserved. Find us at: [www.acdelcotechconnect.com](http://www.acdelcotechconnect.com) or Service Parts Operations, 6200 Grand Pointe Drive, Mail Code MC 2-322, Grand Blanc, MI 48439. ATTN: Total Service Support