

# Fleet Management in the Electronic Age

By Bradley Kelley and Gary Hatfield

Over the last two decades, virtually every facet of fleet management and operation has changed in one way or another. Among the most significant catalysts for change in the fleet industry have been legislation, economic globalization, and technological development. Whereas legislation and globalization can lay claim to significant gains in engine efficiency, reductions in vehicle emissions, and improvements in equipment safety, technological change has made contributions in these areas and many others.

Most people would agree that the electronic age -- specifically, the emergence of information and telecommunications technology -- has had a profound impact on fleet management. However, they would also agree that the affect these things have had on the industry has been uneven. By breaking the business of fleet management down into its constituent parts, we can better appreciate the *transformative* impact that technology has had on the fleet profession and industry.

## Vehicle maintenance and repair

One group that has been affected dramatically by the electronic age is the technicians that maintain and repair vehicles and equipment. Due to the extensive computerization of modern vehicles, technicians have virtually had to become Microsoft engineers to keep up! For example, as part of the troubleshooting and repair process, most modern pieces of equipment require laptops and other electronic media to interface with on-board computers and interpret system codes.

Technicians must then address specific sub-systems, which oftentimes are highly integrated with other systems, and this requires additional tests of sensors and electronic modules. Clearly, advances in automation and electronic sophistication that have increased driver comfort and safety and vehicle efficiency and environmental friendliness have made the task of repairing and maintaining today's fleets much more complicated for technicians.

At the same time, software solutions and other technology-related tools such as fleet management information systems, electronic equipment repair and parts manuals, e-mail, barcode readers, and hand-held devices have added significant value to fleet maintenance operations by supplementing technicians' first-hand experience and mechanical expertise.

In fact, many of these tools have become as indispensable to fleet maintenance as screwdrivers and wrenches. Many fleet operations have responded to the need to put more information in technicians' hands by putting computer workstations on the shop floor, thereby giving them access to electronic information resources and data

processing tools through local and wide-area networks. This has resulted in increases in technician productivity and effectiveness and reductions in fleet maintenance costs.

In addition to placing workstations on the shop floor, many organizations are arming shop technicians, mobile mechanics, and fuel-management personnel with ruggedized PDAs (personal digital assistants) and, more recently, pen-tablet computers. These devices, when combined with bar coding and wireless communications technologies, can vastly simplify data capture, increase data integrity, and expand worker knowledge all at the same time. Moreover, these tools allow decision makers to manage fleet maintenance resources, workflow, and customer service levels more effectively through the use of real-time information.

Productivity increases attributed to the use of technology have enabled many fleet managers to maintain or even improve service despite leveled budgets and increases in fleet size.

## **Parts management**

Parts management and procurement is another area of fleet management that has experienced changes in traditional business processes due to advances in technology. Most fleet operations that maintain vehicles and equipment in-house manage their parts inventories with the automated parts management modules of their fleet information systems. When properly used, such modules can assist parts managers to optimize inventory size and composition, determine re-order points, meet seasonal parts needs, and place stock replenishment orders.

Many progressive fleet organizations are also beginning to use e-commerce solutions and procurement cards to further streamline parts procurement and supply processes, thereby reducing inventory carrying costs and purchasing division overhead charges, and increasing mechanic productivity.

Other tools that have made an impact on parts management include the aforementioned ruggedized PDAs, tablet devices, wedge and wireless bar-code scanners, and bar-code printers. These solutions have simplified inventory audits and daily parts order processing, increasing operational productivity and data integrity.

Two-dimensional bar codes are also changing the landscape of parts management and other areas of fleet operations. Whereas traditional, one-dimensional bar codes represent only one piece of information, like a part number, 2-D codes can contain dozens of pieces of information. This has allowed parts operations personnel to label materials with more detailed information, such as warehouse, bin location, primary vendor, and even the type of equipment that uses the part.

## **Fuel management**

Over the past decade, most fleet organizations have implemented computerized fuel management systems to replace fuel-station attendants and manual record-keeping processes. This has allowed fleet operations to reduce their overhead expenses and improve record-keeping.

A typical bulk fuel site today includes tank monitors, leak and spill detection systems, and fire warning systems to ensure safety and maintain Environmental Protection Agency (EPA) compliance.

Additionally, radio-frequency-activated sensors, fuel cards, key pads, and touch screens allow the capture of important transaction information, such as the driver's name, vehicle number, and vehicle meter reading, at the point of sale. This information can then be transmitted from the fuel management system to the fleet management system via electronic interface, supporting fuel inventory management and control, vehicle utilization tracking, preventive maintenance scheduling, customer billing, and other processes.

Continued developments in purchasing and fuel-management card programs also have improved fleet managers' control over commercial fueling and maintenance activities. A traditional problem with the use of commercial fuel sites has been the difficulty of controlling unauthorized purchases of products and services by drivers. This is no longer the case. Most of the major fuel card providers in the industry have built checks and balances into the process that almost eliminate unauthorized purchases. In fact, some fuel-card companies have these controls built into the logic of the card itself, relieving the retail clerk of the uncomfortable task of policing drivers' purchases.

## **Fleet management**

The management and administration activities of nearly every fleet operation have felt the impact of technology. One of the most significant effects of the electronic age has been a veritable explosion of quantitative data on vehicle and fleet management organization performance and costs. The sources of these data are legion: fleet-management information systems, fuel-management systems, ERP (enterprise resource planning) and financial-management systems, professional-association databases, manufacturer and fleet-management service provider Web sites, global positioning systems (GPS), and automated vehicle-locating (AVL) solutions, ad-hoc report writers, and document imaging systems.

The increased availability of data on the fleet and the fleet-management organization has placed significant pressure on fleet managers and staff to maintain and produce a wide array of management information for employees, fleet users, finance and audit departments, management decision makers, elected officials, and the general public. A major challenge for fleet managers has been, and will continue to be, the struggle to keep these entities sufficiently informed in a timely manner. Some of the best fleet

managers in the industry have addressed this requirement by implementing software solutions that *push* information to stakeholders on a regular schedule.

“Push” technology can automatically deliver key management decision-making information via e-mail, printers, fax machines, pagers, PDAs, and other communication devices. An increasing number of fleet management organizations are using their own Web sites as a means of distributing invoices, reservation confirmations, recall notices, and the like to their customers. This sort of communication capability will continue to increase in importance, particularly with the advent of new communication devices and telematics.

At the same time that fleet managers are awakening to the myriad analytical and communicative capabilities of modern technology, they need to guard against the danger of being diverted from their core mission of serving fleet users by the demands of managing, maintaining, and upgrading this technology. As constraining as the mainframe-based information systems of the past were, especially when a fleet manager wanted to perform any kind of ad hoc analysis, they at least were supported by a dedicated staff of IT professionals. Many fleet organizations today are largely on their own when it comes to meeting the demands of network engineering and system administration.

### **Emerging trends and technologies**

***Application service provider platforms:*** An increasing number of organizations are exploring the merits of “renting” fleet management and other information systems and application software from application service providers (ASPs) rather than installing them on in-house computers as has traditionally been done. Under this approach, an outside company -- either the software developer or a third party -- is responsible for providing the server platform on which the fleet system resides. Ideally, servers are located in a commercial-grade data center, which ensures 24/7 system availability, security, daily data backups, and plenty of network bandwidth. System users (maintenance, parts, management, and administration personnel) access the system through the Internet.

Although some express concern about the use of an ASP platform, particularly with respect to the security of data stored off-site, we believe such concerns are largely unfounded. Internet security technologies and services are among the most well-developed and well-represented industries in the world. With the advent of e-commerce, Web-enabled database and information stores, e-mail, and wide-area networks, there has been an obsession in the IT industry with protecting and encrypting everything. ASP platforms are no less secure than any other network with connections to the Internet. Indeed, an improperly configured firewall or inadequate power back-up system can damage an in-house fleet system in a way that is unlikely to happen with a system running in a dedicated, professionally designed and managed data center.

Two key advantages of the ASP approach are that it allows fleet management organizations to focus on their primary competency and mission -- managing vehicles and equipment and serving fleet users -- and reducing up-front and ongoing expenses associated with buying, implementing, and managing a state-of-the-art technology platform.

**Wireless technology:** Wireless communication is an important emerging technology because it increases the availability of information. Currently, most people use a networked workstation in order to retrieve electronic information, whereas wireless communications allow mobile users to use and interact with software applications, data, and other users on demand.

Wireless solutions are also dropping in price, making the initial investment in this technology less formidable than it used to be. At the same time, the security of these solutions has improved significantly. With the integration of 128-bit encryption, Certificate Authorities, Virtual Private Networking, and other security measures, a wireless-enabled or enhanced network can be as secure as a traditional, hard-wired one. Although implementing a protective level of security does take some knowledge of networking and wireless protocols, it is a task that a knowledge professional can manage fairly easily.

Some of the most popular wireless technologies, such as Bluetooth, 802.11b, and 802.11a, offer the benefits of short-range, broadband communications. This allows fleet operations to distribute information to and receive information from the shop floor, parts warehouse, mobile service or fuel truck, and other locations. We are also seeing this same technology being integrated into telematics and other "smart" devices.

Other wireless technologies, like CDMA and CDPD, offer a wider area of coverage to certain geographic areas. The coverage is determined by the service providers in your area. A good rule of thumb is that if there is adequate cell phone connectivity in your area, then it is likely that other wireless data-based protocols are available.

**Telematics:** Telematics is an emerging technology that is of interest because these solutions combine the functionality of internal vehicle electronics, wireless communications, and information technologies, such as the Internet and GPS, for the delivery of information, services, communications and applications. Telematic services include emergency roadside assistance, mileage records, vehicle location tracking, automatic accident notification, remote equipment diagnostics, remote fuel management, email, text messaging, application access, video conferencing, and telephone.

We are also now beginning to see the second generation of telematics, which focus on predictive and preventive maintenance by allowing the telematic device to transfer system codes from the vehicle's computer to a database. This will allow fleet operations

to proactively address maintenance issues, before they become expensive repairs or breakdowns.

## **Conclusions**

The electronic age has provided fleet management with a breathtaking array of solutions and tools offering fleet owners and managers countless opportunities to improve the efficiency and effectiveness with which employee mobility needs are met, vehicles and equipment are used, and fleet services are provided. For many organizations, the biggest challenge presented by the developments of the last few years is trying to determine how best to invest their money in new technology. The key thing to remember is that if it doesn't clearly contribute to better *informed* analysis, planning, and decision making, it's information technology that you probably can do without.

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