

# Transmission TRENDS

How transmission technology has changed the work practices of the fleet technician



**W**hat are the most significant technology trends facing trucking fleets today? More importantly, which technology trends will have the greatest impact on the work of fleet technicians in the coming years? In a time when fleet maintenance managers are forced to focus more and more on squeezing costs and extending the lives of their trucks, it may seem incongruous to discuss the value of high-level technology, but if that technology can contribute to more efficient performance, both on the road and in the maintenance shop, how can it be ignored?

In a column last year in *Fleet Maintenance*, Mary-Beth Kellenberger, a consultant with market research firm Frost & Sullivan, stated that automated and automatic transmissions were among the top ten technologies that would be challenging fleet technicians ("Embracing Change," May, 2008).

In her column, Kellenberger said that "Each new vehicle technology requires new equipment, diagnostics and information access... and the costs associated with operating repair facilities continue to rise..."

With that in mind, we went to Penske Truck Leasing, a fleet that has a vast amount of experience with automated and automatic transmissions, to see how this technology has affected its overall maintenance operations. Mike Hasinec, Vice President of Maintenance for Penske Truck Leasing, had a lot to say on the topic:

**Fleet Maintenance: When and why was the decision made to spec' automatic and/or autoshift transmissions in your trucks?**

**Mike Hasinec:** You have to remember our business model: we have a fleet of trucks that we use in the rental fleet, as well as our full service leasing/contract maintenance business. With that said, when Uncle Sam came out with the CDL regulation in the early 1990s, saying anything under 26,000 GVW doesn't need to

have a CDL drivers' license, anything over does, that's really when you started to see this move from manual to automated or automatic transmissions in those vehicles with that GVW of less than 26,000 lbs.

When that regulation came out, the class of driver—from a training standpoint for that non-CDL operation—kind of pushed the manuals to the automated, because obviously driver training time is reduced. You don't necessarily have that professional driver in there so obviously you reduce maintenance costs from an abuse point-of-view. That's when it really started to take off, especially in the straight trucks.

Now tractors are another story. In tractors you started to see this move over the last five or six years. There it was because of the driver shortage. With automatic and automated transmissions in a Class-8 vehicle, your training time is greatly reduced, as is driver fatigue. The pool of drivers you have to select from is increased, because you don't necessarily need someone with 20 years' driving experience, or someone who has a lot of experience using a manual transmission.

So for us, customer demand was the biggest factor.

**FM: Was a needs analysis done? What were some of the biggest factors influencing the choice for new transmission technology?**

**MH:** Especially in the rental product line, a lot of that was driven by customer demand. In other words, if we had a fleet of 10,000 medium-duty trucks, and let's say that 30 percent of that population was at one time automatics, you would see those having a higher rate of rental. The others probably got used less often. So, obviously, to increase utilization, we decided to start moving it towards 100 percent for that particular class of vehicle in the rental fleet, and for the most part we have done so. Just about every vehicle we have in our rental fleet under that GVW is automatic or automated.

An automatic transmission is just like what's in your car today. It is totally hydraulic and it has a fluid-driven torque converter. With an automated transmission, they took your standard manual transmission, they've literally

taken the gearshift lever off of the transmission, they changed the clutch and they added an ECM that does all the shifting for the driver, based on inputs from the engine. The driver's only input is his foot on the accelerator pedal; the electronics does all the shifting, and the ECM on the transmission works in conjunction with the engine based on RPMs, load, etc. There is a difference from a maintenance perspective.

**FM: What sorts of maintenance issues were you experiencing with manual transmissions?**

**MH:** Especially in the lighter-duty vehicles, with a driver who hasn't had the proper training or experience, you have many issues with the manual transmissions. You're going to have clutch problems, you're going to experience problems with driveshaft failures, and then of course the internal gears inside the manual transmission, because they don't know the proper time to shift and the proper way to shift.

**FM: What don't people "get" about manual shifting?**

**MH:** When you get into a Class-8, it does require a skill—and I mean that sincerely—because you have a range in which, from an RPM standpoint, it's ok to shift the transmission. In a tractor, you do not have synchronizers like you do in your lighter-duty vehicles. A synchronizer is like a miniature clutch between the two gears: if you're going from second gear to third, it has friction material that disengages the engine from the transmission. It slows down the transmission because now that you've disengaged it from the engine, that transmission still has an RPM higher than the engine does, because remember that when you go to shift you take your foot off the accelerator pedal. So the synchronizer synchronizes the engine speed and the transmission speed on those lighter-duty transmissions so you have a smoother shift.

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On tractors, they never had synchronizers, so it was a fine art for the driver to pause when he went from, say, second gear to third gear. Typically, you would have to double clutch. You engage the clutch, so you disengage the transmission from the engine, you pull the transmission from second gear to neutral, literally—and this is all done in seconds. They let the clutch out really quick, for the engine and transmission to catch up to each other, then they push the clutch back in and they go into third gear.

There's a real skill involved; it's not something you learn overnight. And if you don't do it properly, you can do a lot of damage in a very short period of time and end up costing somebody six or seven thousand dollars—these components are expensive.

**FM: From a maintenance operations standpoint, does it make more sense to repair or a replace a faulty transmission?**

**MH:** This will most certainly affect the truck market, and for the most part it already has. Rebuilding components in the shop is becoming a lost art. It's literally gone right out of the business model. The only thing that today typically still gets rebuilt right there in the shop where the truck is parked and has been torn down, is the heavy-duty diesel engine. For the most part, if you take a light-duty vehicle—one of these under 26,000 GVW trucks—they troubleshoot the thing and they say, 'Ok, this transmission

is bad,' and at most places they're going to take that transmission out, they're going to take one off the shelf that's been remanufactured, put it into that truck and give that truck back to the customer.

There are a lot of reasons for that: downtime is very critical, so obviously you can do something like that—what we call “swinging” the component rather than rebuilding—so downtime is drastically reduced. And then you go and send it off to a “clean” atmosphere where you have experts that work on an assembly line and can overhaul that transmission in a shorter amount of time. Obviously that reduces the cost and in the end the remanufactured transmission costs less than it would to have someone rebuild it.

**FM: Have maintenance issues been eliminated (or minimized) with the use of automatic and automated transmissions?**

**MH:** Yes, it reduces your downtime and maintenance costs by going to automatics or automated.

In the medium-duty product line, where you typically have the less-experienced driver, we have fewer transmission failures and less clutch work and driveshaft work than we've had in the past, so I can tell you obviously it does help out cost-per-mile.

There is a little bit more of an investment going into it when you purchase it new—in other words, an automated transmission versus a manual in a less than 26,000 GVW truck might cost the average

person off the street a \$4,000 to \$5,000 upcharge—but over the period of time that he owns that vehicle, he sees that back in reduced maintenance costs.

**FM: How have automated and automatic transmissions affected your fleet cost-per-mile?**

**MH:** Obviously we have fewer transmissions that we have to pull and replace due to, shall we say, a lack of driver experience. When you don't have to do that, then you don't have to have the vehicle down for such a length of time, and it allows you to focus on other core competencies.

**FM: How have the new transmissions affected your maintenance operations?**

**MH:** Depends on how you use the term “transmission maintenance.” You don't have people overhauling transmissions, as I described, and though you still have mechanical issues now and then, because they are totally electronic, you'll always have those challenging electronic issues.

Today, for example, when the engines and transmission talk to each other, it's not uncommon to start getting fault codes where perhaps the engine and transmission have gone out of sync. You have various inputs that tell the transmission when to shift, and you may have to replace sensors. So for transmission repair—and I'm not sure if the term “repair” is a very good one—from a diagnostic standpoint, it's actually gotten more complicated.



Penske's fleet downtime has been reduced through the use of automated and automatic transmissions. One reason: the newer gearboxes aren't as susceptible to wear and abuse at the hands (and feet) of inexperienced drivers.

With a manual transmission, you would put some gauges on there; if it's a fully automatic with hydraulics, certain pressures will tell you if there's something wrong with that particular gear. But today you've got to hook up electronics—typically a shop diagnostic computer—to that thing, and it tells you what the problems are. A lot of the time, they are things that can be fixed externally, so you don't have to go in the transmission. So, it's a little more technical.

**FM: How do you make sure your technicians are properly trained on transmission diagnosis and maintenance?**

**MH:** We work very closely with our key suppliers, and they help get hands-on training to us as well as web-based training.

We also have a proprietary system that we have for our diagnostics. And this is for engine, transmission, etc., we've got everything on one common platform. We work with Nexiq Technologies, which has been one of our partners for at least ten years. They take the various suppliers' software and they do their programming, so now we have everything on one platform, so we have one tool to troubleshoot and diagnose literally anything that we have running in our facilities, whether it's a transmission or an ABS system or an engine.

**FM: Have you tried different brands of transmission and transmission fluid? What brands do you use now, and why?**

**MH:** Fully automatic: typically it's going to be Allison; automated: Eaton, or Fuller.

From a transmission fluid standpoint, because they are two different types of transmission, the fluids are different. Actually, they each develop their own spec' that the various suppliers have to meet. We have a major supplier that typically handles all our lubrication products, which is Chevron. So, for example, if they want to market and develop their own transmission fluid for one of these transmissions, they have to work with these two suppliers to pass a series of tests so that they can be approved on their list.

**FM: How does the use of automatic and autoshift transmissions play into**

**the company's overall operations philosophy?**

**MH:** Being in the type of business that we're in, it's typically customer-driven. I've already told you that everything under 26,000 lb. GVW is all automated/automatic in our fleet; then

again, in the medium-duty straight trucks from 26,001 to 33,000 lbs. GVW, which would be up to a Class-7, we probably have about 40 percent automated/automatic and 60 percent manual. But since they have CDL drivers' licenses, you still have the more experienced drivers, who tend to like a manual transmission.

Now in the tractor fleet, if you asked me about automated transmissions eight years ago, I would have had

to search high and low, out of our 65,000 or so vehicles, to find a handful of them. In the last five years we have seen a pretty drastic increase in the demand for the automated transmissions—and it has been primarily automated in the Class-8 trucks, versus automatic. We're up to about five percent of our tractor fleet right now that's automated.

**FM: What advice would you offer a fleet manager who was considering changing over to automatic or autoshift transmissions?**

**MH:** I've worked with a lot of larger fleets, with 20 tractors or more, and typically, based on experience, you could take a fleet of 20 tractors and improve your fleet miles-per-gallon, because what you'll end up doing is you'll take those drivers who aren't performing as well as the better drivers, from an mpg standpoint—perhaps they don't have the experience to know when to shift correctly or things like that—the automatic transmission takes all that guesswork out of when to shift, so you end up improving those lower performers, which ends up bringing up your overall fleet average.

Driver retention is also a factor to consider. Matter of fact, if you speak with some of these larger truck fleets—for example, I know some people we are very close with—they've gone almost 100 percent to these automated transmissions because they did an evaluation and they saw less driver fatigue, which ended up driving up their mpg, and ended up reducing their accident costs. **FMX**

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