

The Dowdles' Dream

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An Eagle bus conversion project proved no match for this multiskilled FMCAer and his wife.



One day on his way to work, Leon Dowdle, F170939, of Texarkana, Texas, saw some one working on an 01 Eagle bus. Leon and his wife, Ginny, had owned a variety of trailers and fifth wheels, so they were familiar with the RV lifestyle. When he stopped to learn more about the Eagle bus, Leon met diesel mechanic Leroy Waldrum, F150562, who has since become Leon's good friend and a fellow member of FMCA's Southwestern Bus Nuts chapter. This meeting sparked Leon's passion for Eagles.

In 1991 the Dowdles were planning to retire in three years. They had decided they wanted an Eagle bus, but to fit it in their budget they would

have to restore and convert their own. Leon noted that he asked a lot of people a lot of questions to learn as much as he could before he tackled this project. He was advised to purchase a later Eagle bus, at least a Model 10, with an automatic transmission and power steering. At the time, these models cost between \$35,000 and \$50,000, which was out of the Dowdles' budget.

Leon came from a family of builders and had spent many years in the construction trade. He is one of those people who can fix or build anything, so he was not apprehensive about converting an older bus. He finally found the perfect bus for them

— a 1975 05 Eagle —from Greyhound in Dallas, Texas. The 05 had been used by Trailways Package Express for hauling cargo and a limited number of passengers. It had been out of service since 1990. Greyhound had removed the back 20 seats and added Model 10 end caps, a side loading door, and a partition for cargo. The engine, a naturally aspirated Detroit Diesel 8V71 with 76,000 miles, had been changed in 1989. Greyhound provided recent service records, and the bus seemed to be mechanically sound. The brake drums and linings looked new, and the front suspension appeared to have been recently rebuilt.



Photos courtesy of Leon and Ginny Dowdle



Leon and Ginny Dowdle performed a Cinderella-like transformation on a 1975 05 Eagle bus. The bus went from cargo and passenger hauler to a sparkling home on wheels.

During the conversion process, Leon still had a full-time job, so he worked on the bus in the evening and on week-ends. Although Leon primarily prefers to work alone, Ginny, a retired art teacher, helped out when he needed an extra pair of hands. She also made a videotape that

documents the entire conversion.

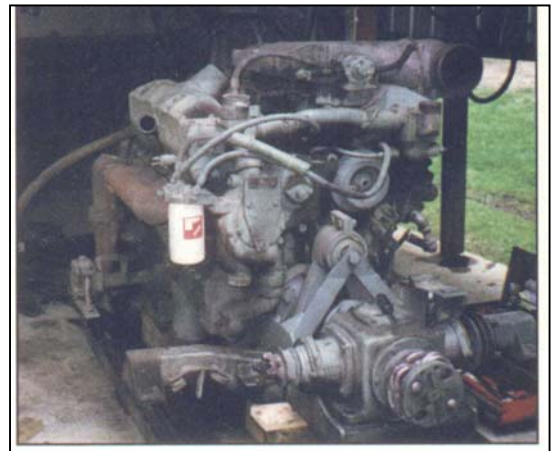
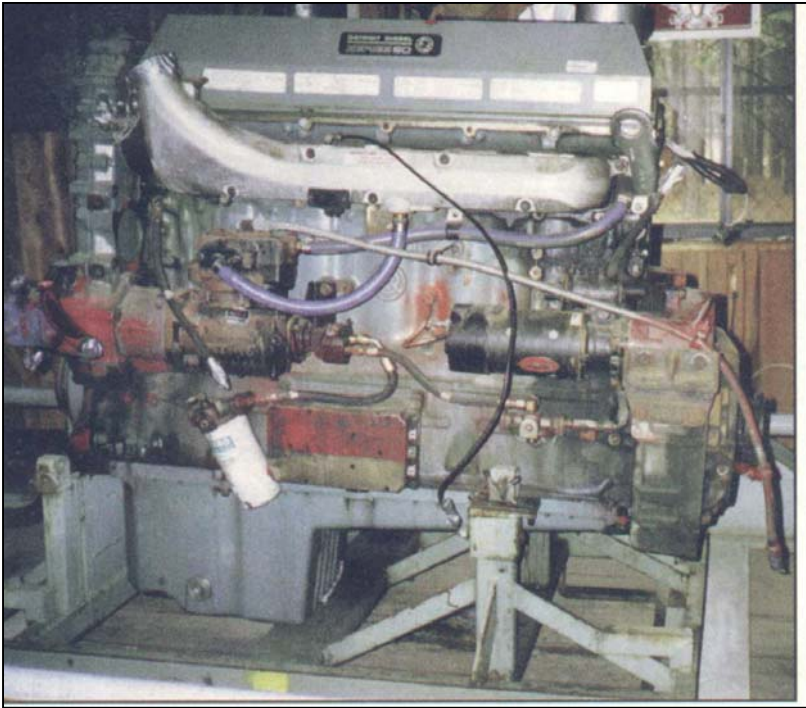
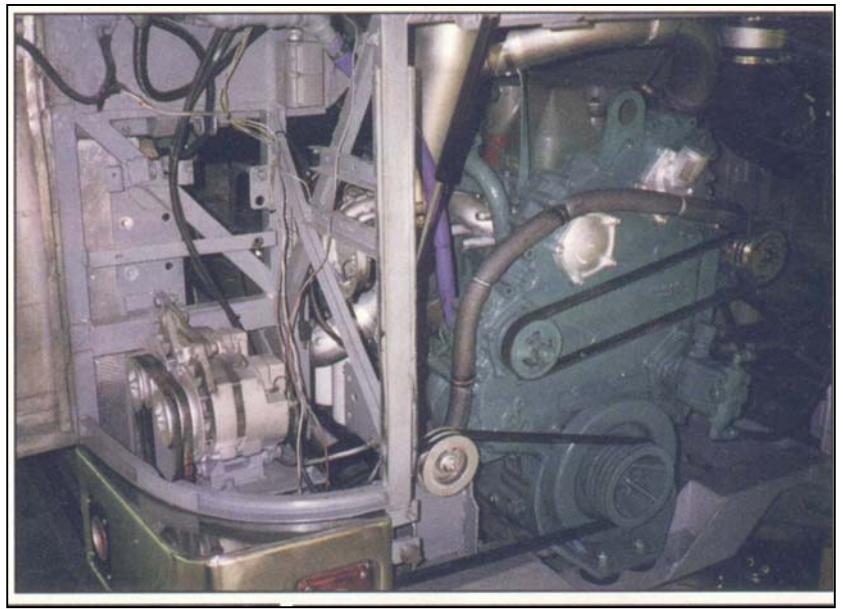
Texarkana does get some snow during the winter months, so Leon built a protective structure on a cement pad adjacent to the garage to house the bus. The first step of the conversion was to remove the seats and the existing interior and exterior panels to expose the entire frame.

Leon sandblasted the frame to remove rust and then painted it with primer. This work is easy to describe in just two sentences, but it took several painstaking months to perform.

The exterior work began with raising the roof. Leon knew it could be done, but he wasn't quite sure how. He asked many more questions and relied on common sense and his construction experience. According to Leon, the fiberglass work on the end caps was very difficult. Still, he did all the work himself, aided by a friend's verbal instructions. He now says that if he were doing another restoration, he would hire someone else to do the fiberglass, or install new caps. Sanding is a terrible job, and the fiberglass scatters everywhere like thousands of pine needles.

Always resourceful, Leon found a single piece of salvage aluminum at a good price for the exterior skin. Ginny's impressive video footage shows Leon using a series of ropes to lift and hold the aluminum, and a come-along to stretch it so he could tack it in place. New extruded siding was added from the bay door hinges downward. At this point, Leon measured for new windows and placed an order. After Leon completed the outer skin, he installed the windows.

The next major project was the coach interior. The Dowdles adapted a production motorhome floor plan that closely met their needs, and they laid it out on the floor with tape. Next, they purchased appliances and



The mechanics of the Dowdles' conversion are illustrated here in various stages. One of the major changes Leon made was to remove the old Detroit Diesel 8V71 engine and replace it with a Detroit Diesel Series 60 engine (above). Changes were made to the Allison 740 transmission to adapt it to the higher-torque engine, and a new radiator and charge air cooler were installed.

fixtures. The Dowdles bought these items a year before their planned installation, because they needed to be on hand to measure for fit. No matter what a product's specifications state, Leon said, the actual measurements may vary slightly. Since a coach has very tight tolerances, these measurements are crucial.

For the 12-volt-DC electrical system, a #10 wire pair was run from front to rear above the windows. These wires were weather-coated industrial braid. Loops were dropped at intervals where the need for a 12-volt-DC supply was anticipated. At the center of the coach, the wires split

for two circuits across the width of the coach. AC wires were run along both sidewalls below the windows, with proposed outlet areas in the kitchen, living room, bedroom, and bath. The AC wires were then pulled to a breaker box in the clothes closet.

The walls and ceiling are layered

with foam insulation, window framing, furring strips, and 1/4-inch lauan. At the ceiling side curve, two layers of 1/4-inch lauan held with a liquid adhesive and staples are used to more easily conform to the ceiling curve. An automotive-type headliner was also installed on the ceiling.

After the walls were completed, Leon roughed in the plumbing and stubbed out the hot and cold water supply lines on the passenger side of the rear bay. Solid copper was used throughout the plumbing system. He positioned the commode to drop straight down into the 52-gallon black water tank located in the rear bay. The rear bay also houses a 100-gallon fresh water tank and a 100-gallon gray water tank. All of the tanks are polyethylene and are sandwiched in a plywood enclosure for stability. A three-way 10-gallon Atwood water heater (AC, gas, and heat exchange) is also included in the rear plumbing bay.

The old air-conditioner condenser compartment, aft of the rear axle, houses a Heart Freedom 25 inverter/charger and a vented battery compartment with six 6-volt golf cart batteries in a series/parallel arrangement rated at 660 amp-hours 12-volt DC. Three Group 31 batteries, each rated at 650 cca, provide engine starting power. A 45,000-Btu Suburban furnace is located in the middle bay with ducts front to rear, and a 50-gallon LP-gas tank is enclosed across the width of the coach. A Power Tech 10-kw diesel generator and storage areas complete the layout of the bays. Air conditioning is supplied by two 13.5-Btu Coleman roof units.

Leon hired a cabinetmaker for the interior finish work, but he was always present to help and learn. The cabinetmaker was very precise and willing to teach; in fact, Leon learned so much that he was able to finish the front of the coach by himself. Interestingly, Leon painted the cabinets with a high-quality automotive paint, which we initially thought was a laminate.

After the interior carpentry was completed, the exterior was painted. Ginny designed the paint scheme along with Jim Burton, a friend of the Dowdles who is a body-shop manager. The painting was done at night over a

three-week period.

Ginny's artistic skills are evident in the interior decor, and her superb flair for simple elegance is everywhere. In the living room, amethyst carpeting is highlighted by gray leather captains' chairs and a gray sofa by Villa. Ginny opted to use a convertible dining table between the captains' chairs in the living room, so the kitchen is open and expansive. In the kitchen, Ginny chose a single large stainless-steel sink rather than one with two small basins. The counter is covered with ceramic tile, and 4-inch strips of mirror with beveled edges form the backsplash. Along with the usual appliances, including a microwave oven and an icemaker, the kitchen contains an appliance garage for storing small appliances. Ginny also selected a combination washer-dryer, which is located near the bath area.

The walk-through bath boasts a garden tub with a custom-made shower enclosure that features a "raindrop" glass design. The bedroom continues the amethyst and gray color scheme in the comforter and window coverings, and the beveled-edge strip mirrors covering the bed's headboard add just the right amount of glitz.

Leon followed the advice that he would need to install power steering if he intended to keep the manual transmission. All components for the power steering, including a tilt-telescopic steering wheel, were purchased as a kit. Installation of the steering box was difficult, since the new box was bigger and heavier than the old one. New brackets had to be fabricated, and the power steering pump required a Detroit Diesel adapter kit for mounting to the 8V71 engine. The total labor was 32 hours; total cost, \$2,700.

One final adjustment was necessary to make the coach sit level and handle correctly. The front suspension was raised and the bogie axle was lowered to put more weight on the rear.

After the conversion was finished in the fall of 1994, the Dowdles immediately started traveling. They were pleased with their conversion, but Leon found the performance in the mountains severely lacking and soon decided he wanted an automatic Allison transmission. The experts he talked with told him he had several choices. An Allison 740 transmission

would fit, but only with a driveline modification. An Allison 746 transmission would fit and would not require a driveline modification, but a coach application transmission would be very hard to find. The Allison 750 transmission had the same low and high ratios as a 740, with one extra gear in between, but the 750 was 4 inches too long. The Allison 754 transmission had one lower gear with the same 2 through 5 ratios as the 740, but it also was 4 inches too long.

Ultimately, Leon decided on a 740 transmission. Tucson Engine and Transmission Exchange performed the work. The transmission, rebuilt from a truck application, cost \$8,500. This transmission performed well, and Leon was happy with the end result, although he believes he might have been happier if the shift schedule had been modified for coach application.

The Dowdles continued using their coach for another year and a half. Then it became apparent that the engine power was inadequate, especially for mountain travel. Leon began to investigate repowering alternatives. He inquired about the possibility of installing an 8V92, a Caterpillar 400 in-line, or a Detroit Diesel Series 60 engine. Turbocharging the 8V71 did not appear to be a viable option, because of the added expense incurred by modifying the pistons and cooling system.

Leon visited the Eagle bus plant in Brownsville, Texas, to see how Series 60 engines were being installed in new buses. He asked whether it is possible to install a Series 60 in a 96-inch-wide coach and was told that this had been done by Dale Henry of Ozark Mountain Coach. Leon learned from Mr. Henry that the coach had been widened to 102 inches before the engine was installed. Meanwhile, a friend of Leon's in the truck salvage business had located a Series 60 engine in a wrecked truck. The engine had logged 200,000 miles and appeared to be in good shape. In January 1996, Leon purchased the engine for \$6,000.

Several people said he couldn't install a Series 60 engine, because it was too long for his Eagle conversion. However, after visiting Mr. Henry, Leon was confident that the engine would work. Mr. Henry furnished

engineering drawings of the required angle, motor mount positions, and information on adapting the transmission to the Series 60 engine.

The Series 60 had a truck application oil pan, which was not appropriate for a motor coach. When Leon started shopping for the shallow coach oil pan, he found them to be very expensive. The fleet price was quoted at more than \$1,600, but he finally managed to find a pan for \$1,400. The oil pickup tube and bracket added another \$300.

While preparing to install the new pan, Leon decided to inspect the rod and main bearings. Although they showed little wear, he decided to replace the bearings while the pan was removed. The cost of the new bearings was \$325. An oil dipstick and oil fill spout were also needed.

Around this time, Leon met Richard Higgins, the Detroit Diesel representative in the Dallas area, who suggested purchasing an installation application manual. The manual cost \$80 but provided valuable information.

After Leon furnished certain specifications, such as rear end ratio, tire size, type of transmission, and the transmission serial number, Mr. Higgins conducted a performance evaluation and recommended the changes needed to adapt the 740 transmission to the higher torque engine, per Detroit Diesel specifications. He also recommended that Industrial Automatic, C7772, an Allison dealer in Irving, Texas, do the transmission work. The modifications included changing the stator and the pump, and reprogramming the valve body to change and modify the shift schedule. Some rebuilt parts were used. The total cost was \$2,200, although this amount would have been higher if all new parts had been used.

The final engine work included adjusting the valves and changing the Jake brake springs, as recommended by Detroit Diesel. That cost \$65. The total price of purchasing the Series 60 engine, modifying it for a bus installation, and adapting the transmission was \$17,370.

After the engine was ready to be installed, Leon prepared the coach to

receive the new transmission-engine assembly. He removed the old engine and radiator and then cleaned and repainted the engine compartment. The floor under the bed was raised approximately 10 inches to provide clearance for the taller engine. Other than minor modifications and re-carpeting, no other changes were made to the coach interior.

Some hoses and wiring had to be relocated and extended to fit the new engine. The power steering pump on the 8V71 engine is positioned on the back of the engine, toward the front of the coach. The power steering pump on the Series 60 engine is on the front of the engine, toward the rear of the coach. This meant that the power steering hydraulic lines had to be extended. The air dryer was also moved to the rear of the coach, and the air lines were extended to it.

Eagle Coach Corporation, C3031, makes motor mounts for the 102-inch-wide coach, but because Leon's coach is a 96-inch-wide model, he had to fabricate his own motor mounts. The location, angles, and alignment of the engine were determined from specifications obtained from Eagle and Mr. Henry. Leon used a 4-inch channel iron that measured 3/8-inch thick. He decided to use the same kind of motor mounting assemblies that were used in the original truck application; those assemblies were purchased new and installed on the fabricated brackets. Next, the transmission was assembled to the engine. This required a crankshaft hub for the Series 60 engine. The hub was the only part required to adapt the installation of the transmission to the engine. A new driveline was purchased from Eagle Coach Corporation and connected to the transmission. The engine, transmission, and driveline were then rolled into position for an alignment and length check. The engine must be far enough into the engine compartment to allow for proper alignment of the miter-box drive belts.

The driveline was then coupled to determine how much travel remained in the slip joint. Leon already had been advised by Spicer Engineering

that it was important not to bottom out the driveline at the slip joint and that a minimum of 1 1/8 inches of travel was required. When Leon measured, he had 1 1/4 inches — a full 1/8 inch to spare! At this time all dimensions were confirmed. The engine was rolled back out, and Leon drilled the holes needed to attach the motor mount assemblies to the frame rails. The engine was then rolled in and checked for fit. Leon noted that the fan hub was not compatible with the fan of choice, so he ordered a Model 10 fan hub from Eagle Coach. This hub is compatible with the nine-blade plastic fan. At the same time, he ordered the current production radiator and charge air cooler assembly.

Leon was told there would be at least a two-month wait to receive the radiator assembly. During this time, he modified the engine compartment to accept the new radiator and charge air assembly. He received the fan and fan hub along with an installation drawing, so he was able to install those parts without difficulty.

When the engine compartment modifications were completed, Leon decided to install the engine while waiting for the radiator. Once the engine was installed, he determined where to mount the truck-style air breather. He found that this breather was less expensive and an easier fit than the coach-style air breather. The air intake tube was modified to enable mounting the breather above the air dryer and under the air intake box on the curb side. The miter box was Prevost part #550688, purchased from Prevost EXPAR for \$275. A third pulley, which is aligned with the crankshaft pulley and the fan hub pulley, is used to pull two 130-amp alternators that are mounted side by side above the miter box.

After three months, the radiator and charge air cooler arrived. These components were temporarily mounted in place while Leon built and installed the radiator mounting brackets. The final positions of the radiator and charge air cooler were set to maintain clearance with the fan. Leon then fabricated support brackets. He then installed the air piping from the filter to the turbocharger.

Radiator-to-engine pipe is expensive, so Leon utilized less expensive, used pipe, which he cut and welded to fit the Series 60 application. He then purchased a head tank for a Western Star truck application, which he mounted on the street side where the old air intake box had been. Vent lines from the radiator high point, the thermostat housing, and the water pump positive head pressure supply were connected to the head tank. A coolant level sensor was wired to the electronic control module (ECM) of the Detroit Diesel electronic control system (DDEC) and installed in the tank.

Leon determined the belt length needed to extend from the engine drive pulley to the miter box and from the miter box to the fan hub. Fan speed was set at 89 percent of engine rpm by sizing the drive pulleys according to Detroit Diesel specifications. He used a three-belt system to the miter box and a two-belt system to the fan hub. The extra belt from the engine to the miter box was used to drive the two alternators.

Now it was time to install the DDEC ECM module. This involved pulling 22 14-gauge wires from the engine compartment to the dash. These wires deliver power to the cruise control, Jake Brake, engine check lights, stop engine light, override button, code indicator, and diagnostics connector. All connections were soldered and sealed with heat-shrink tape to minimize any additional resistance.

Finally the engine, transmission, and radiator were filled with fluids. Initially, only water was used in the radiator while checking for leaks. The engine was pre-lubricated before Leon attempted the first start. After several tries, the engine fired. When no water leaks were detected, the water in the coolant system was drained and the system was refilled with a 50-50 antifreeze solution.

Because of the gearing of the rear end and transmission, higher rpm from the engine were required for top end speed. Leon removed the ECM and took it to a Detroit Diesel service center, where it was reprogrammed for coach application per Detroit Diesel

specifications. This resulted in increasing the peak engine rpm from 1,800 to 2,100. In the truck application, the engine was rated at 425 horsepower at 1,800 rpm, but with the increase to 2,100 rpm, its rating was decreased to 400 horsepower.

Next, Leon found that whenever the cruise control was set with an rpm resulting in a speed in excess of 35 mph, the "check engine" light illuminated. This was caused by a vehicle speed sensor incompatibility and was corrected by programming the ECM to sense rpm for cruise control rather than for vehicle speed. However, this reprogramming deleted the fast idle function. The fast idle function was restored by rewiring with proper resistors through the fast idle switch.

The final modification to the engine involved installing Eagle original-equipment skid plates to provide extra protection for the engine and oil pan, and to give additional support to the frame.

Since completing this major undertaking, Leon and Ginny Dowdle have enjoyed many miles of trouble-free travel in their Eagle — even to Alaska. Leon's building skills and ability to improvise, coupled with Ginny's eye for style, have created an elegant bus conversion that is worth more than two times their actual out-of-pocket costs.

Leon offers to share any information he has accumulated with folks who are seriously considering doing their own conversion or repowering a coach. He can be reached at 2804 Jonathan, Texarkana, TX 75501; (903) 838-0437.