

Who Would Have Thought that Tires Could Be the Culprit?

Torching a Power Transfer Unit

They were negligent in having their vehicle serviced. But who would ever believe that failing to have the tires rotated could result in the destruction of a \$1200 power-train component? I have seen about the same amount of money spent needlessly on drive-train components, trying to eliminate a four-wheel drive performance condition, when the culprit was worn or incorrect tires. Later, we will identify the vehicles involved and why the power transfer unit encountered a meltdown.

With the demise of full service gas stations, and an increase in shops that have all the business they can handle, a lot of suggested maintenance recommendations fall by the wayside. And let's face it, most of us are guilty of putting off routine maintenance, especially when everything seems to be performing perfectly. Due to the growing number of SUVs, you will definitely encounter more four wheel drive related problems. Tires are a major contributor to some of these problems, which involve much more than vibrations resulting from the normal dipping or scalloping of the tires. Let's cover a couple of failures resulting from tire related issues.

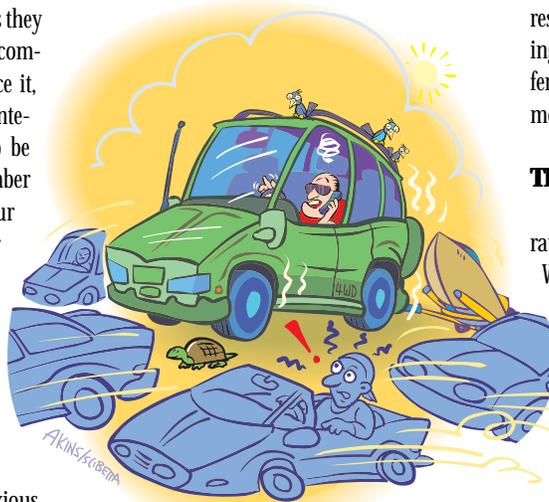
LOCKED IN FOUR WHEEL DRIVE

The owner of the Ford Ranger 4x4 was anxious to try out his new ride. While attempting to pull his boat out of the river, the rear wheels started to spin on the algae covered ramp. A touch of a switch on the dash locked the front end and the vehicle pulled the boat up the ramp without a slip of a wheel. He was sold on the benefits of a 4x4 and vowed never to be without one. Moments later, his excitement was replaced by frustration, as he attempted to shift from 4x4 low range back to two wheel drive. The transfer case would not shift. A 60-mile drive home in low range at a snail's pace, with the engine screaming and trying to spit its lower end out through the air cleaner, complemented by other vehicles blowing their horns, did not make him a happy camper.

The repair facility diagnosed the problem as a defective control switch in the dash. The switch was replaced and while the vehicle was sitting on the lift, the switch would engage and disengage the transfer case with a push of the button.

A few days later, with his wife in the vehicle, he encountered the same condition. His wife had not been pleased with the purchase of his toy, and was

really putting some pressure on him. This time the repair facility recommended that a new shift motor be installed in the transfer case. Following the replacement, the system functioned perfectly while being tested on the lift. That same afternoon, the "locked into and won't shift out of 4x4" condition occurred again. Another visit to the repair shop resulted in a new electronic shift control module being installed, to no avail. By now, several hundred dollars had been spent and the vehicle owner had



SIXTY MILES AWAY AND CREEPING LIKE A WORM IN 80 MPH TRAFFIC, FRANK FIGURES HE'LL BE HOME IN ABOUT TWO WEEKS.

vowed never to engage the transfer case again. He was so paranoid that he taped the control switch in the dash to prevent someone from inadvertently activating the unit.

It would always work perfectly when sitting on the lift, but the technician never drove the vehicle on a road test. If he had, he would have noticed the same drive disengagement condition. And if the vehicle had been off-road instead of on pavement, some slippage could have occurred, eliminating the binding and locked-in-and-won't-let-go symptoms. *No one ever considered checking the tires.*

This whole encounter had been the result of a tire of a different brand and circumference being installed. The variation in the rotational rates of the different size tires loaded the transfer case, making a disengagement impossible, especially with the electric shift. If the vehicle had been equipped with



a manual shift control, enough force could have been exerted, making the disengagement possible. Tire sizes vary with various manufacturers, even though they may be marked the same size. And I have seen tires from the same manufacturer, stamped the same size, that varied in circumference. Worn tires, low air pressures or mixed tread types may result in the same conditions, in addition to promoting jerking and popping noises. The outer circumference of the tires should be measured with a tape measure and compared.

TIRES DESTROY TRANSFER UNIT

Chrysler has acknowledged that a high failure rate of Power Transfer Units (PTU) on 1996-2001 All Wheel Drive Town & Country, Caravan and Voyager vehicles is the result of lack of tire rotation, which results in variations of the circumference of the front and rear tires.

The All Wheel Drive system used on the mentioned applications utilizes a PTU unit to connect the front drive components to the rear drive components. If identical tires are not used on all four wheels, an extreme heat build-up may result in the PTU unit. This occurs as a result of a variation in the tire rotational speeds and torque transfer between the front and rear drive components. A circumference variation of as little as 0.5% is enough to destroy the PTU unit. Chrysler advises that tires should be rotated every 7,500 miles or less to maintain even tread wear. Proper air pressure must be maintained. And when a tire replacement is necessary, all four tires must be replaced with a *matched set* from the same manufacturer.

Most 4x4 owners do not have a clue as to the problems associated with mismatched tire types and sizes on a four wheel drive vehicle. Advising them of this will not only save a lot of expensive parts, but will make us look good and give us the opportunity to provide additional needed services.



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