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FAMILY BUSINESSES & FRAUD

PG 23

JEWELRY CLAIMS

PG 14

TECHNOLOGY
& AUTO FRAUD

PG 20

BIG DATA & PRIVACY

PG 25

SUCCESSION PLANNING

PG 28

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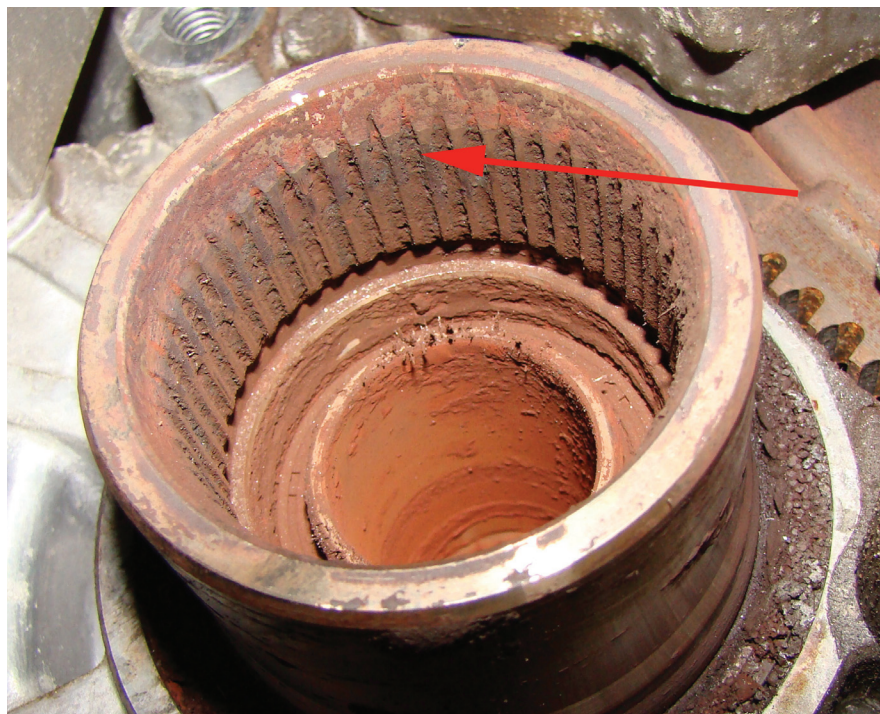
Fretting Fatigue: A Form of Mechanical Failure

An insured struck a deer with his automobile, and the damage was repaired. Shortly afterward, the vehicle transmission failed, leading to an expensive repair. The insured claimed the transmission failure was a result of the impact with the deer. This precipitated a detailed inspection of the vehicle and transmission.



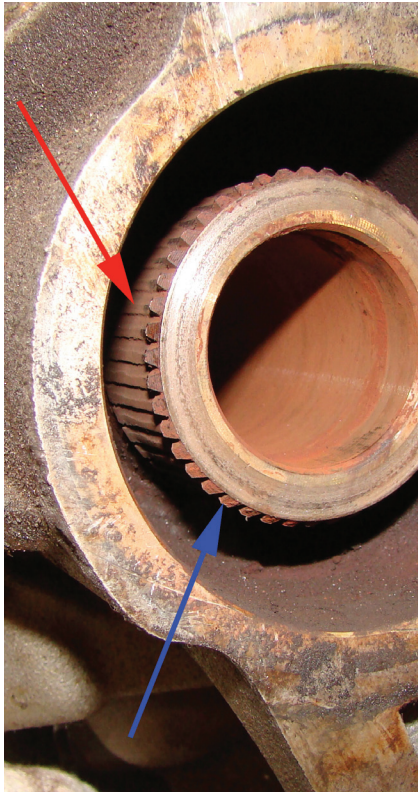
▲ Figure 1

Figure 1 is a view of the underside of the vehicle. There was no evidence of direct damage to the transmission or neighboring parts of the vehicle structure.



◀ Figure 2

Figures 2 and 3 show views of a splined driveshaft connection at the transmission. The splines had worn to the point where power could not be transmitted and the connection began to slip. In Figure 2, the arrow points to the worn splines. Figure 3 shows the mating part of the splined connection. The upper red arrow in Figure 3 points to worn splines on the mating shaft. The original shape of the splines is indicated by the lower blue arrow.



▲ Figure 3

The condition of the mechanical components shown in Figures 2 and 3 is characteristic of fretting fatigue. Fretting fatigue is wear on a mechanical surface caused by relative motion (vibration, road condition variation) and drive train loading that causes micro pitting of the metallic surfaces, increased roughness and reduction of metal fatigue strength. This occurs over a period of time and is not the result of a single incident. This was not a result of impact with the deer, but a form of mechanical failure. 🍷

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