

## PASSENGER CAR AND LIGHT TRUCK AXLES

**1. Scope**—This SAE Recommended Practice is intended to outline basic nomenclature for axle designs in common use for automotive drives. Over a period of years, there have been many different designs; however, for the purpose of this report, only the most common designs have been selected and only their general construction is illustrated to show the nomenclature of the various parts.

### 2. References

**2.1 Applicable Documents**—There are no referenced publications specified herein.

### 2.2 Definitions

**2.2.1 UNITIZED CARRIER HOUSING CONSTRUCTION**—This construction is one in which the housing that supports the ring gear, bearings, and differential case, also supports the vehicle load carrying members. See Figure 1.

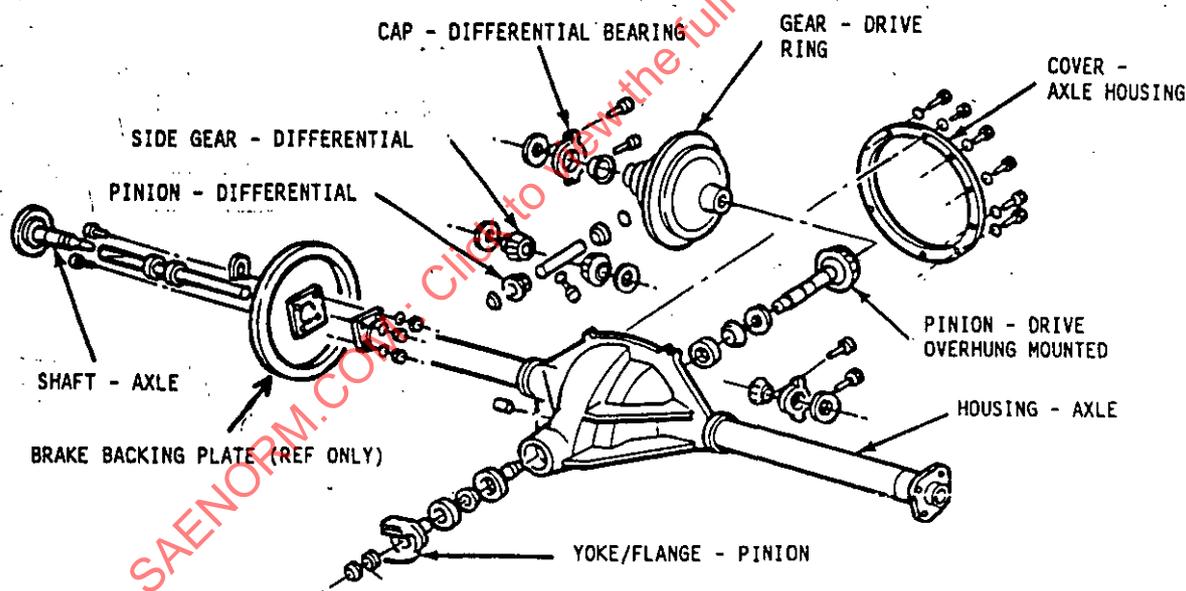


FIGURE 1—UNITIZED CARRIER HOUSING CONSTRUCTION

**2.2.2 SEPARABLE CARRIER HOUSING CONSTRUCTION**—This construction is one in which the carrier that supports the ring gear, bearings, and differential case is separable from the housing that supports the vehicle loads. See Figure 2.

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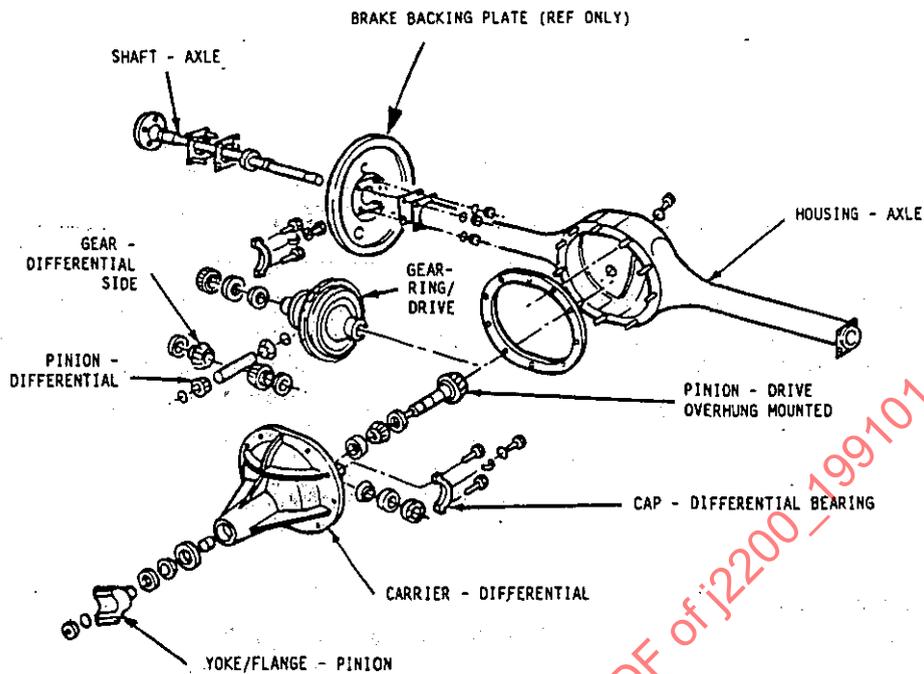


FIGURE 2—SEPARABLE CARRIER HOUSING CONSTRUCTION

2.2.3 OVERHUNG MOUNTED DRIVE PINION—This construction is one in which the drive pinion teeth are located outside of the span of the bearings. The overhung mounted pinion is illustrated with either Figure 1 or 2.

2.2.4 STRADDLE MOUNTED DRIVE PINION—This construction is one in which the pinion teeth are located between bearings. The straddle mounted pinion is illustrated in Figure 3.

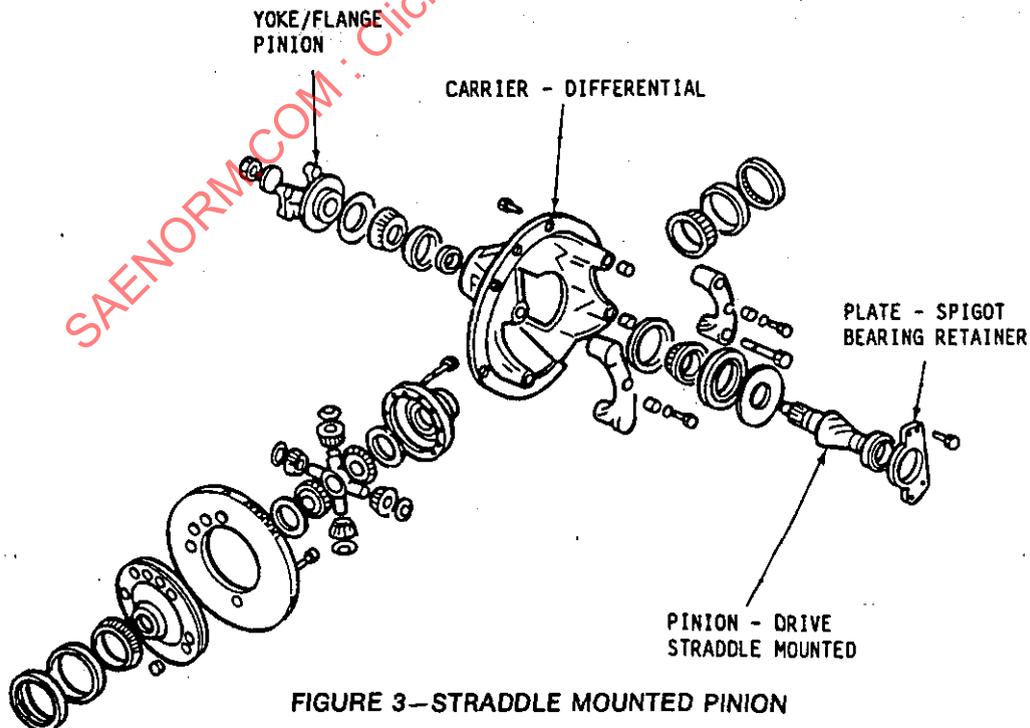


FIGURE 3—STRADDLE MOUNTED PINION

2.2.5 DIFFERENTIAL PINIONS—Two or more differential pinions are used to apply torque to each differential gear. The configuration can consist of different numbers of pinion gears such as the two-pinion design in Figure 1 or the four-pinion design in Figure 4A. For optional construction see Figure 4B.

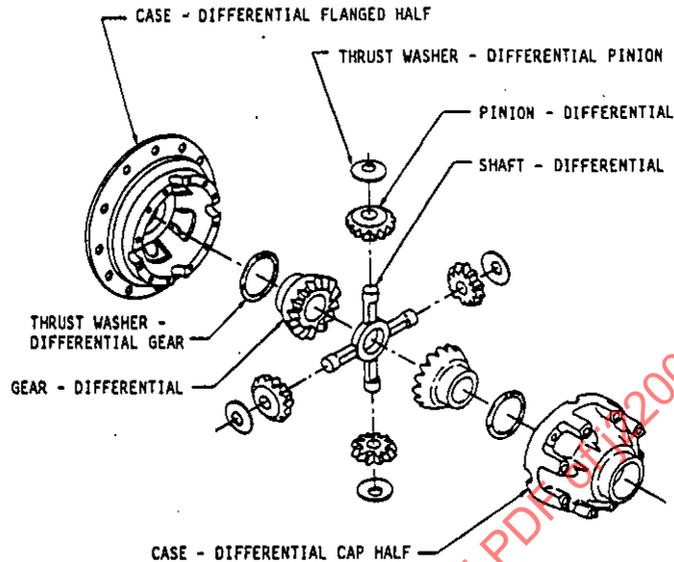


FIGURE 4A—MULTIPLE PINION DIFFERENTIAL

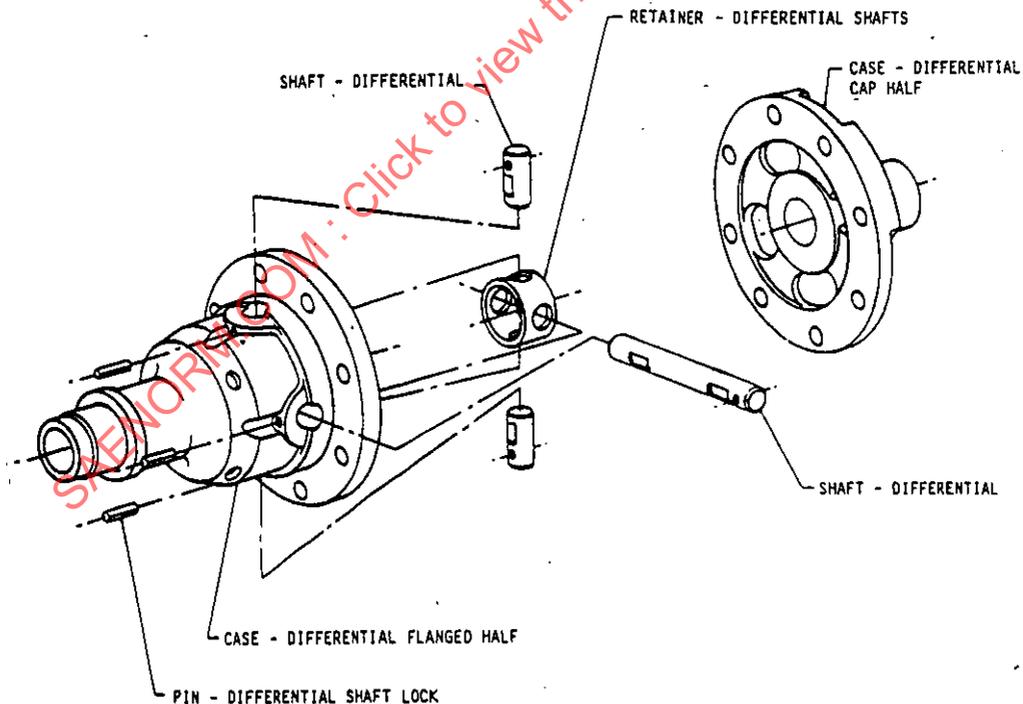


FIGURE 4B—MULTIPLE PINION DIFFERENTIAL (OPTIONAL CONSTRUCTION)

2.2.6 SEMIFLOATING AXLE SHAFT—In this type of construction (semifloating) the shaft carries vehicle loads as well as torque. Various types of wheel bearings such as ball bearings or roller bearings are used with this construction. The shaft may have an integral or separable flange. See Figure 5.

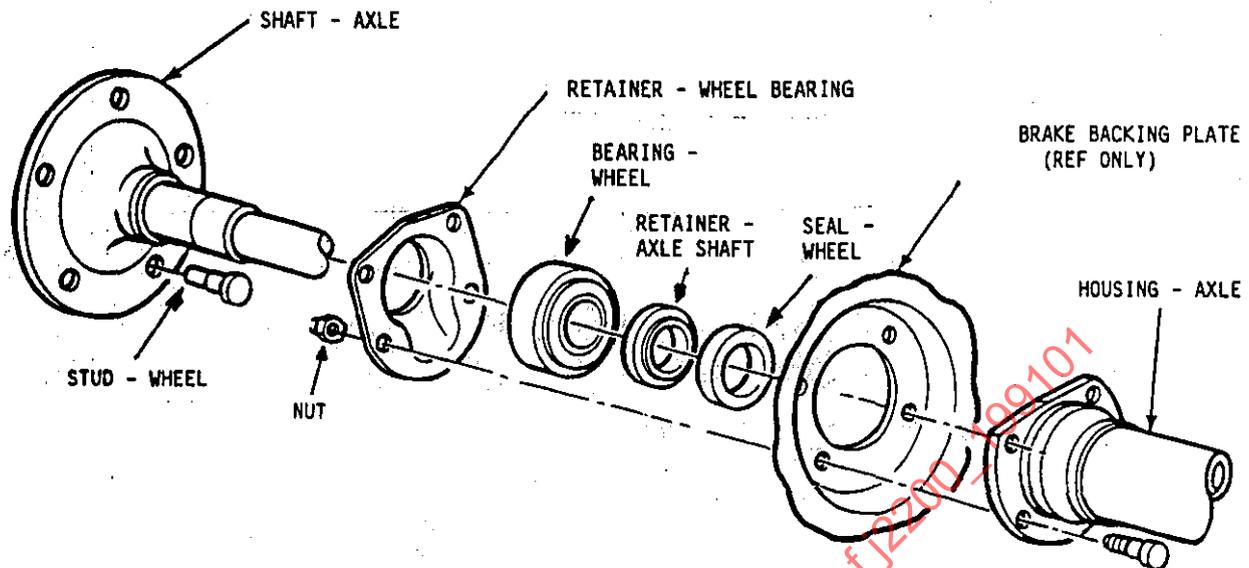


FIGURE 5—WHEEL END SEMIFLOATING-FLANGED AXLE SHAFT

**2.2.7 FULL-FLOATING AXLE SHAFT**—In this type of construction the axle shaft does not carry vehicle loads. It only transmits torque. The vehicle loads are transmitted through bearings, directly to the axle housing. See Figure 6.

**2.2.8 SPRUNG DIFFERENTIAL**—This construction is one in which the differential carrier assembly is mounted to the chassis or body. The wheel bearings are mounted separately to suspension members. Torque is transmitted from the differential to the wheel spindles through drive shafts (commonly called half-shafts). See Figure 7.

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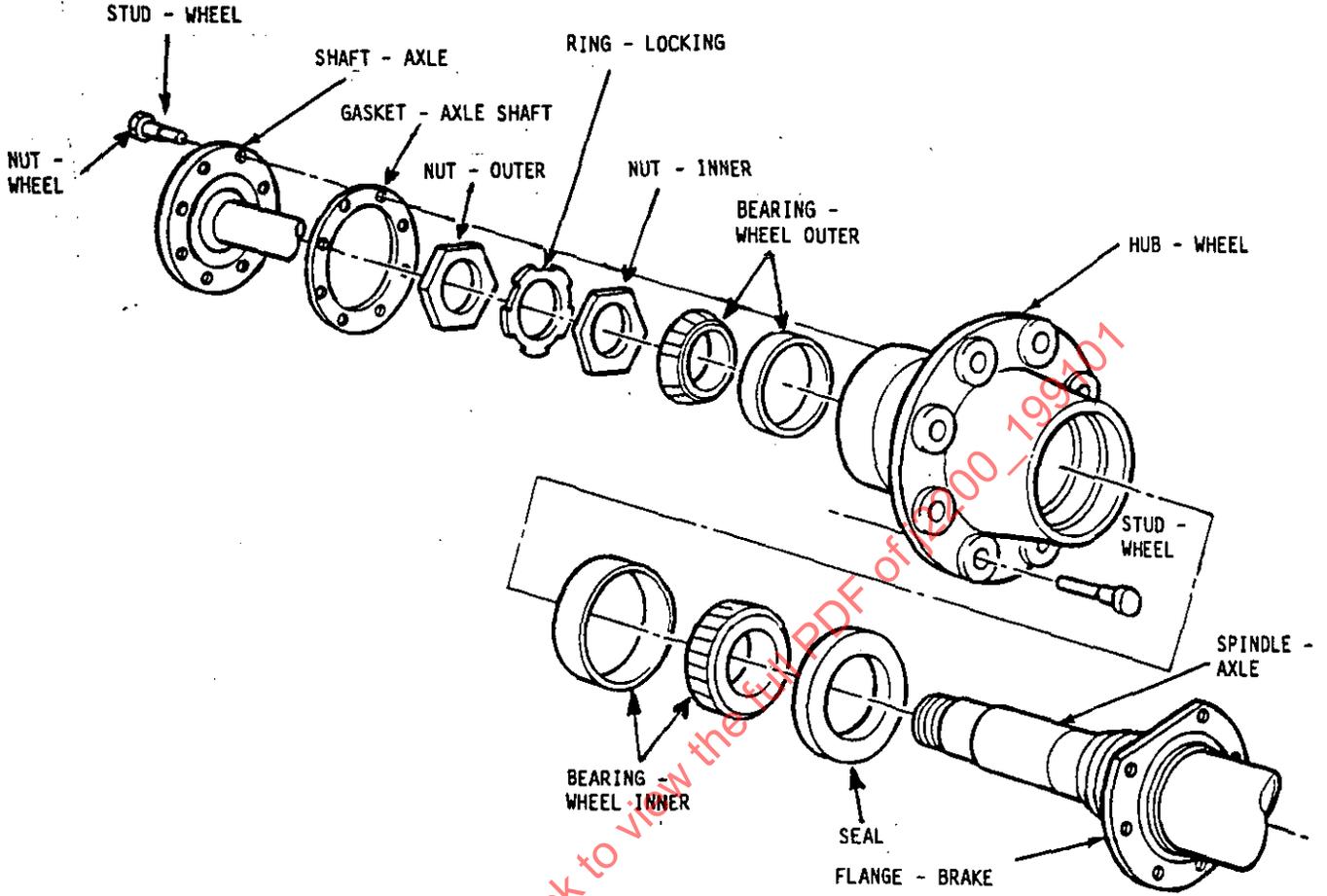


FIGURE 6—WHEEL END FULL FLOATING AXLE SHAFT

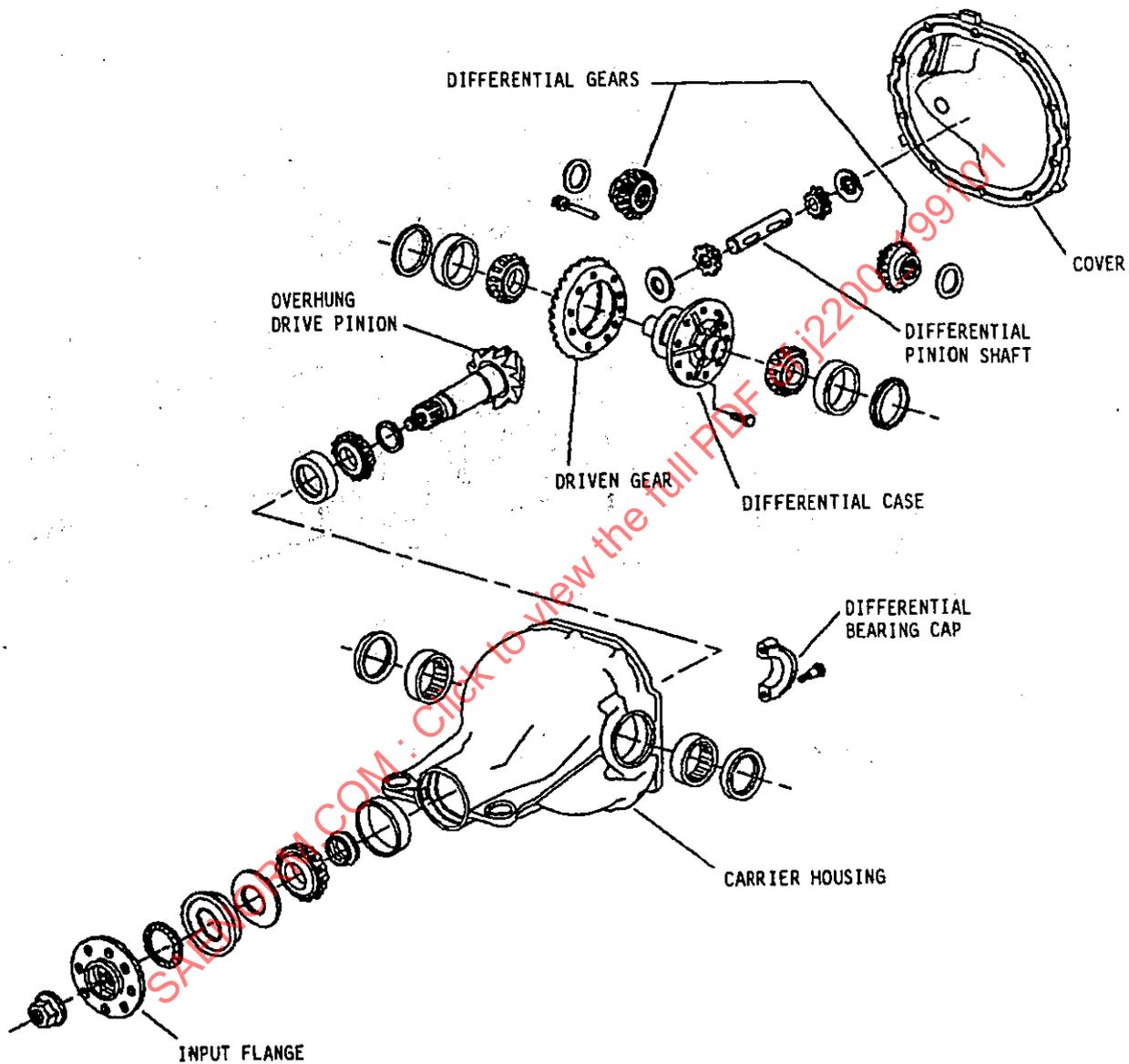


FIGURE 7—SPRUNG DIFFERENTIAL