Front Drive Axle

Outer CV-joint
   Allows wheels to steer while axle is rotating

Inner CV-joint
   Allows axle shaft to change length while axle is rotating

Axle shaft
   Transmits power from inner to outer CV-joint
Outer Joints must operate at extreme steering angles
Inner Joints “plunge” to change length on Jounce & Rebound
CV-Joint = Constant Velocity

Transfers torque at the center of the driving and driven shaft.

RPM of both shafts operate at constant velocity

(U-joints speed up and slow down twice per revolution)
Tripod joint operation.
CV-Joints are Ball Type or Tripod
CV-Joints are Fixed or Plunging

Fixed joint

Can be Ball type or Tripod

Does not move in or out

Operates at sharp steering angles

Fixed are used for the *outboard* joint
Rzeppa CV-Joint

Most common type of Fixed outboard CV-joint
Outer tripod fixed CV joint.
Tri-pod assembly

- Drive shaft
- Roller bearing
- Retaining rings
- Trunnion
CV-Joints are Fixed or Plunging

Plunging joint

Can be Ball type or Tripod

Change length during Jounce and Rebound of the suspension

Plunging used for the *inboard* joint
Double Offset CV-Joint

Plunging Inboard CV-joint
Double-Offset CV joint.
Cross Groove CV joint.
Tripod CV-Joint
Inner tripod plunge CV joint.

Diagram showing the components of an inner tripod plunge CV joint, including:
- Boot Clamp
- Boot
- Boot Clamp
- Tripod Retainer Tabs (3) (if used)
- Closed Type Tulip Assembly
- Cover
- A-Closed Type Housing
- Driveshaft
- Snap Ring Groove
- Boot Lip Groove
- Tripod Assembly
- Cap & Spring Assembly (if used)
- Stop Ring (if used)
- Rubber Fastener
- Cover
- B-Open Type Housing
- Tripod Retainer Tabs (if used)
- O-Ring Groove
- O-Ring
- Open Type Tulip Assembly
Replacing CV-joint Boots
Replacing CV-joint Boots

Ripped boots allow contamination that accelerate wear in the CV-joint

Replace CV-Joint AND CV Boot

Replacing entire drive axle shaft is the Most Reliable repair
Split replacement boot is NOT RECOMMENDED
Replacing CV-joint Boots

All old grease must be completely removed

Leave no trace of cleaning solvent.

Balls, rollers, cages, races are wear mated.

Easy to switch positions of ball, roller and race causing accelerated wear/vibration
Each ball must stay in original position for cage AND inner race AND outer race
If a CV joint boot is to be replaced...
Boot must be properly located,
Specified amount of special lubricant used
Clamp secured with a special tool
New ½ shaft is more reliable and cheaper in long run
Diagnose Front Drive Axles

Check suspension and wheel balance before assuming that the problem is the axle assembly

Outer C/V joint most likely to fail

Clicking or Popping on sharp corners is worn Rzeppa style CV-joint
Worn outer cv joint may cause a clicking or popping noise when turning.
Diagnose Front Drive Axles

Vibrations can be a worn inner CV joint

A clunking noise during acceleration and deceleration (torque changes) can be worn out Inner CV-joint
Torque steer is created when halfshaft operating angles are unequal.

The shaft with the least operating angle will require less effort to turn leading to quicker acceleration and torque steer
Torque Steer

Torque steer occurs when vehicle pulls or steers to one side upon hard acceleration

Torque Steer is caused by unequal CV-Joint angles from left to right side of vehicle

Two designs used to minimize torque steer
Above is link to good article on causes of Torque Steer:

Torque Steer caused by any shift in position of transaxle to drive wheels

- Worn tie rod ends
- Worn Ball Joints
- Worn Suspension Bushings
- Worn Motor Mounts
- Improper Alignment of Sub frame
Replace CV drive axle

Never use Impact wrench to remove Axle Nut (Damage to bearing and CV-joint)

Many suspension components are removed and wheel alignment often required after replacing ½ shafts (C/V drive axle)

Do not pull on axle shaft to remove inner C/V-joint from transaxle
Replace CV drive axle

Do not use impact wrench to install drive axle hub nut

Use new cotter pin or NEW self locking nut when replacing drive axle

Recheck alignment angles if front strut is removed from spindle during repair
Any hub nut that has been staked MUST be REPLACED

DO NOT RE-INSTALL