MUSTANG STEERING

Mustang steering has been popular with hot rodders since the early '70's. The design of the steering box makes it a natural for early Ford installations as it offers convenient mounting and a long sector shaft, long enough to go underneath a boxed frame. A removable column on later Mustang boxes ('69-'73) also allows the adaptation of tilt columns from other cars. The common mounting position sets it back out of the way of most factory or custom exhaust systems. Another not too well known feature is that the Mustang (also Cougar) steering gears are available in 2 ratios: 4 turns lock to lock (most common) or 5 turns (slower steering). All in all, Mustang is one of the most favorable steering set-ups to use.

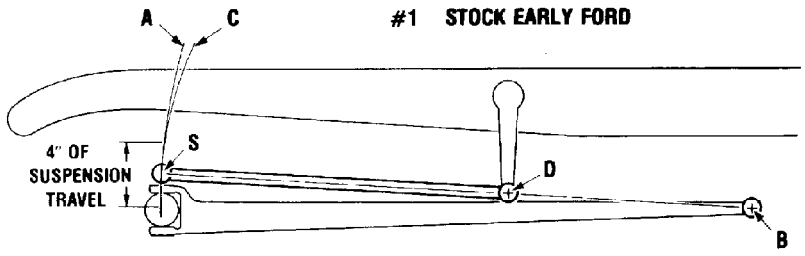
When it comes to steering installations, however, there is more to it than just mounting the box and hooking up the drag link. What appears to look good and work right when the chassis is sitting on stands in the garage may in fact be all wrong. The arbitrary placement of steering components can mean incorrect steering geometry and serious handling problems once the car is on the road.

Hot rods built in the old days didn't seem to have major steering problems (other than they were hard to steer). This is because the front end design and steering set-up was left basically stock. Even if the car had a dropped axle and a later ('49-'56) Ford pickup steering gear, the steering geometry had not changed enough to cause trouble. In the meantime rodders started installing the smooth operating Mustang steering. What seemed to be a great improvement only made the car handle dangerously strange. When going through a dip or over a bump the car would turn to the left and right. At the same time the steering wheel would rotate a small amount to either direction. This strange action became known as Bumpsteer.

Bumpsteer results from incorrect steering geometry which causes the car's steering to change direction during vertical suspension travel. With the design of the Mustang box the pitman arm is opposite that of the early Ford steering box in that it rotates above the sector shaft instead of below the sector shaft. This drastically changes the drag link angle and steering geometry in relation to a basically stock style front end design. By stock we mean a front end using either stock or split wishbones or hairpin type (single pivot) radius rods.

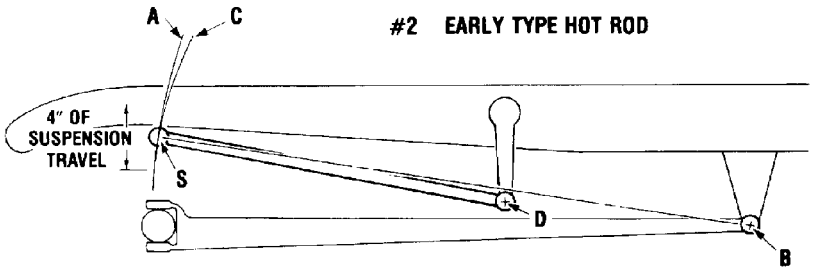
Bumpsteer can be eliminated from a Mustang steering installation if a parallel radius rod (4-Bar) set-up is used. The parallelogram design features of the 4-Bar keep vertical suspension movement of the axle and spindles relative to the movement of the drag link. It's simply a matter of making sure that the drag link is parallel to the 4-Bar.

If you are designing your own front end set-up be sure to keep these things in mind and follow the geometry principles described in illustrations #1 or #4, depending on the type of steering gear to be used.



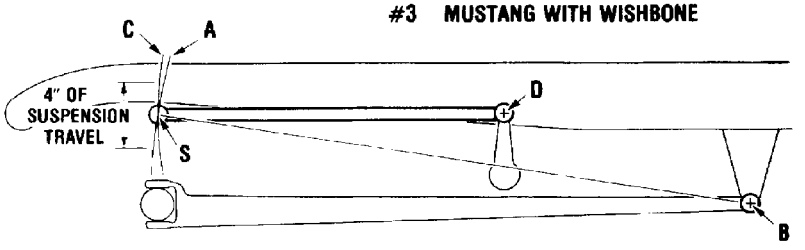
#1 STOCK EARLY FORD

There are 3 basic points that determine the steering geometry of an early Ford front end. They are the pivot points at each end of the drag link, and the point from which the front end assembly pivots. Point S is the center of the ball inside the rod end attached to the spindle steering arm and the drag link. During vertical suspension movement, point S, as part of the axle/spindle assembly, travels an arc (A) centered at the wishbone pivot point (B). Point S also travels an arc (C) centered at the other end of the drag link (point D) which is connected to the pitman arm. Although point S must travel 2 different arcs at the same time, these arcs will be very close for a limited amount of vertical movement if points S, D, and B are all on the same centerline. In other words, steering geometry will be at its best if the drag link (S-D) is parallel to the imaginary link (S-B).



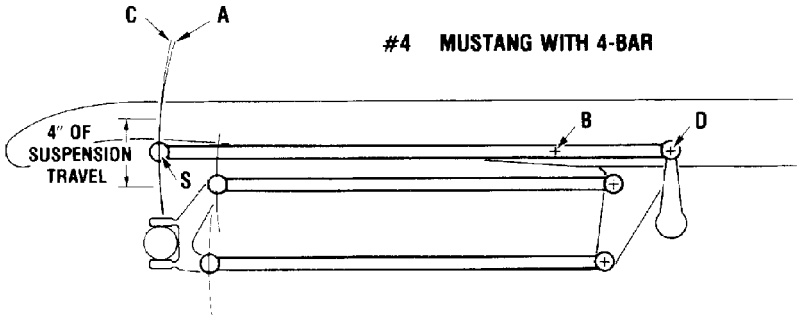
#2 EARLY TYPE HOT ROD

Modifications to the stock suspension cause the steering connection points and the geometry to change. In this case, point S has moved up 4" vertically with the installation of a dropped axle and reversed eye spring. Point D has moved up only a little because a shorter pitman arm is used with the pickup steering. However, point D has also moved 1" to 1½" away from the centerline S-B. Because the drag link (S-D) is no longer parallel to the imaginary link (S-B), arc C will not follow arc A as closely and point S will be forced to move back and forth as it travels both arcs. Fortunately the difference in the arcs is still very slight within the limited amount of vertical suspension movement and bumpsteer, if any, will be insignificant.



#3 MUSTANG WITH WISHBONE

The installation of Mustang steering using a wishbone (single pivot) set up causes a drastic change in steering geometry. The unsuspecting builder has been told that correct steering geometry will result from mounting the drag link parallel to the wishbone. This is misleading information! As shown in illustration #1, the drag link (S-D) should be parallel to the imaginary link (or centerline) S-B. Because of the steering box design and the position of the pitman arm, point D has moved a considerable distance from the centerline S-B which means that arcs A and C will no longer be close even within the limited amount of vertical suspension movement. This in turn forces point S, the steering ball on the spindle arm, to move a great amount as it travels both arcs. The result is bumpsteer!



#4 MUSTANG WITH 4-BAR

Mustang steering installed with a 4-Bar set up offers an ideal steering geometry situation where bumpsteer is eliminated. Based on the parallelogram, point S being part of the axle/spindle assembly travels an arc (A) equal to the length of the parallel radius rods, centered at a point (B) parallel to the rods. Point S also travels an arc (C) centered at the other end of the drag link (point D) which is connected to the pitman arm. If the drag link (S-D) is parallel to the imaginary link S-B, arcs A and C will be close enough within the limited vertical suspension movement as to not cause bumpsteer. If the drag link is not parallel to the radius rods, points S, B, and D will not be on the same centerline as in illustrations #2 & #3, and the resulting bumpsteer will again depend on the degree of angle difference.