

# BODY BUILDER'S BOOK BULLETIN

DATE: JUNE 15, 2009  
MODEL YEAR: 2005 & later  
CHASSIS MODEL: ALL  
BULLETIN NUMBER: BBB-2 (REV. C), REPLACES BULLETIN DATED SEPTEMBER 2, 2008

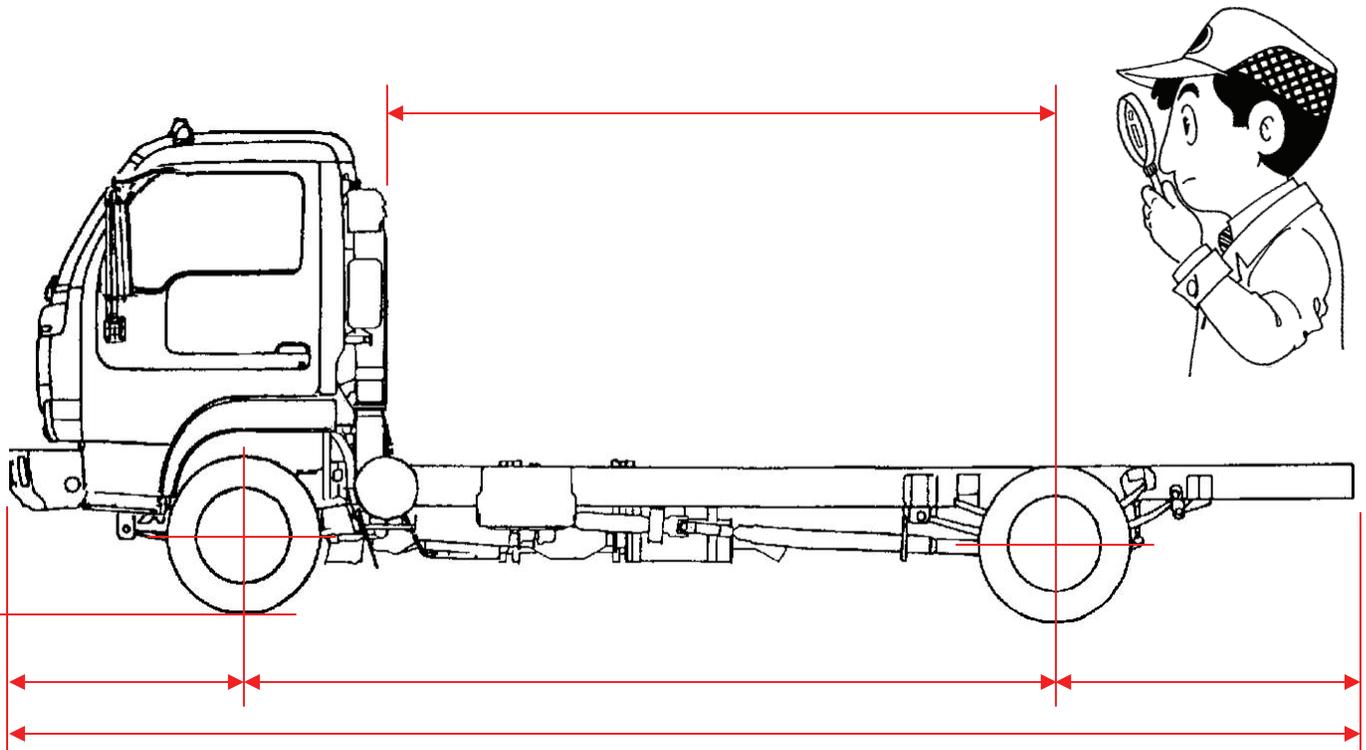
## WHEELBASE ALTERATIONS

### PURPOSE

UD Trucks are available in all popular wheelbase lengths. The wheelbases available satisfy customer requirements for body lengths between 10 and 30 feet, depending on the vehicle model. But on occasion a wheelbase length may need to be lengthened or shortened as in the case of a customer with a special body length or if the correct wheelbase is not available.

Wheelbase alterations do not cause problems if the modification is performed correctly and is completed without workmanship errors or mistakes. Wheelbase alterations that are not performed correctly may cause failures and in some cases may cause catastrophic and expensive failures. The vehicle's warranty is not affected or "voided" by a wheelbase alteration as long as the alteration does not cause a failure. If a failure is a direct result of the wheelbase alteration the failure will not receive coverage from NDA under the standard warranty coverage.

This bulletin contains a summary of the Body Builder's CD or Book recommended procedures for correctly altering a wheelbase.

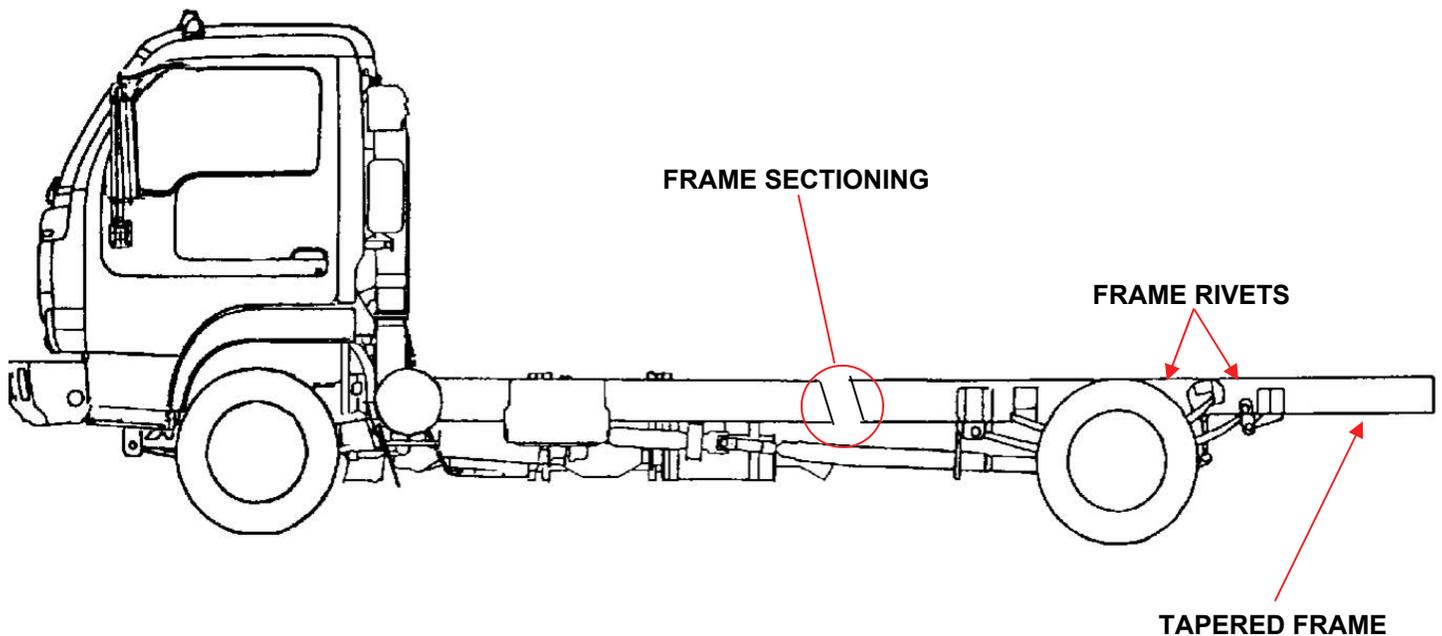


## I. FRAME ALTERATION

UD Trucks use riveted frames and riveted frame components. Light Duty UD Truck models also use tapered frames at the rear axle. For these reasons it is not always possible to move the rear axle forward or rearward when changing a wheelbase length. To do so may create problems such as:

- a. installation of the cross member for the rear leaf spring, rear bracket
- b. changing the rear axle inclination (caster) and therefore changing the driveline angles
- c. reassembling with bolts instead of rivets

For these reasons modifiers generally section the frame as shown. A piece of matching dimension frame channel is added for lengthening or a piece is removed for shortening the wheelbase. Sectioning the frame channel with proper reinforcements will not cause problems if done correctly. UD Dealers should consult with the frame vendor or modifier to verify that they will utilize an approved method for lengthening or shortening the frame.

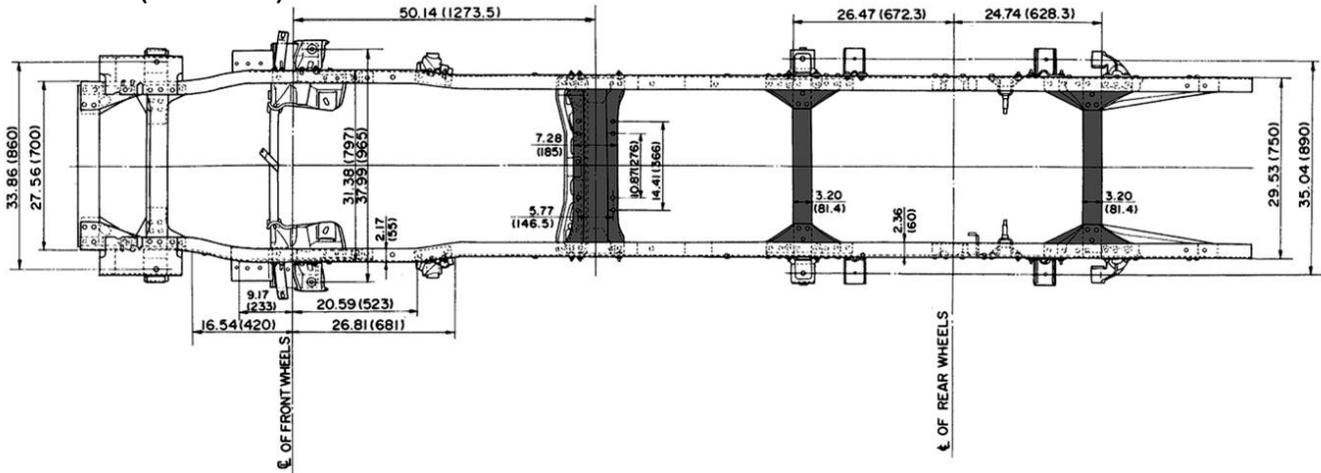


## II. CROSS MEMBERS

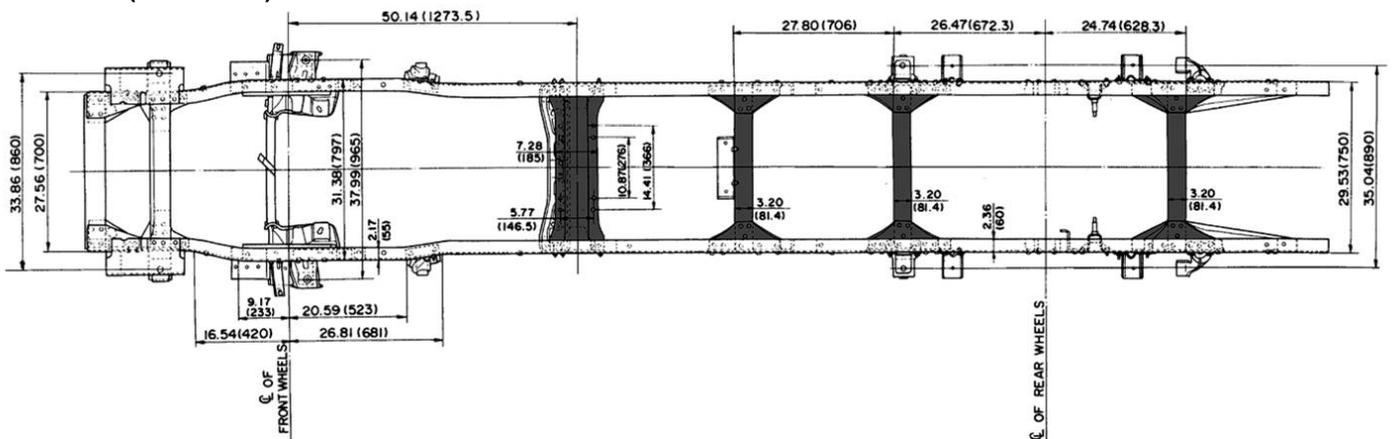
UD Trucks recommends lengthening or shortening wheelbases to a wheelbase that already exists for the same model of truck and year. The Body Builder's CD or Book will contain the necessary dimensions and measurements for all wheelbases produced by UD Trucks.

In the examples shown you will note the differences between one wheelbase and the other. By reviewing the Body Builder's CD or Book for the original wheelbase and the targeted wheelbase before a frame is cut the frame modifier can plan accordingly so that the correct amount of frame is removed (or added) in order to accomplish a wheelbase that meets all factory specifications when completed. The addition or subtraction of frame cross members will effect the engineered side strength of the frame assembly.

### UD1400C (EXAMPLE)



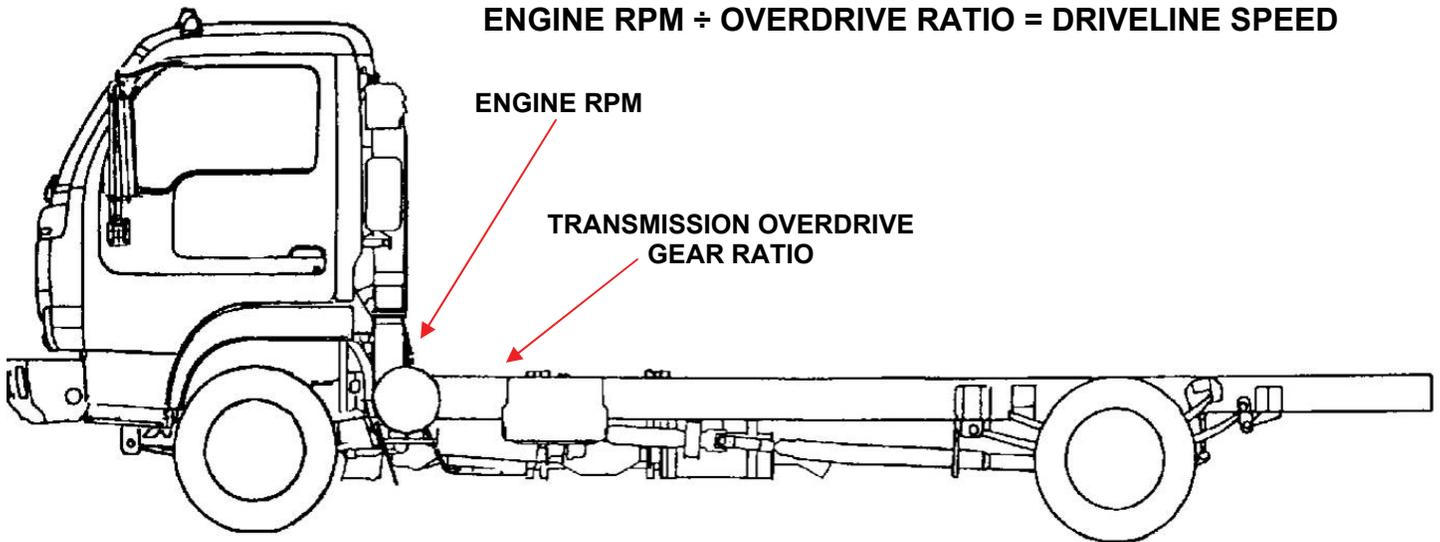
### UD1400E (EXAMPLE)



### III. DRIVELINE SPEEDS

The most common cause of failures attributed to wheelbase alterations are drivelines that do not meet the factory recommendations.

UD Trucks incorporate high RPM engines and overdrive gear transmissions which result in the drivelines reaching high rotational speeds. The high rotational speed is not a problem in itself unless other factors are introduced such as excessive driveline run-out or excessive driveline length. At high speed any looseness in driveline components, imbalance in the driveline, improper working angles or excessive length will cause failures due to run out or torsional vibration. All UD Truck Service CD's or Manuals provide the maximum run-out limits for drivelines. These run-out specifications vary from vehicle model to model. The appropriate UD Truck Service CD or Manual should be referenced by the modifier on each occasion.



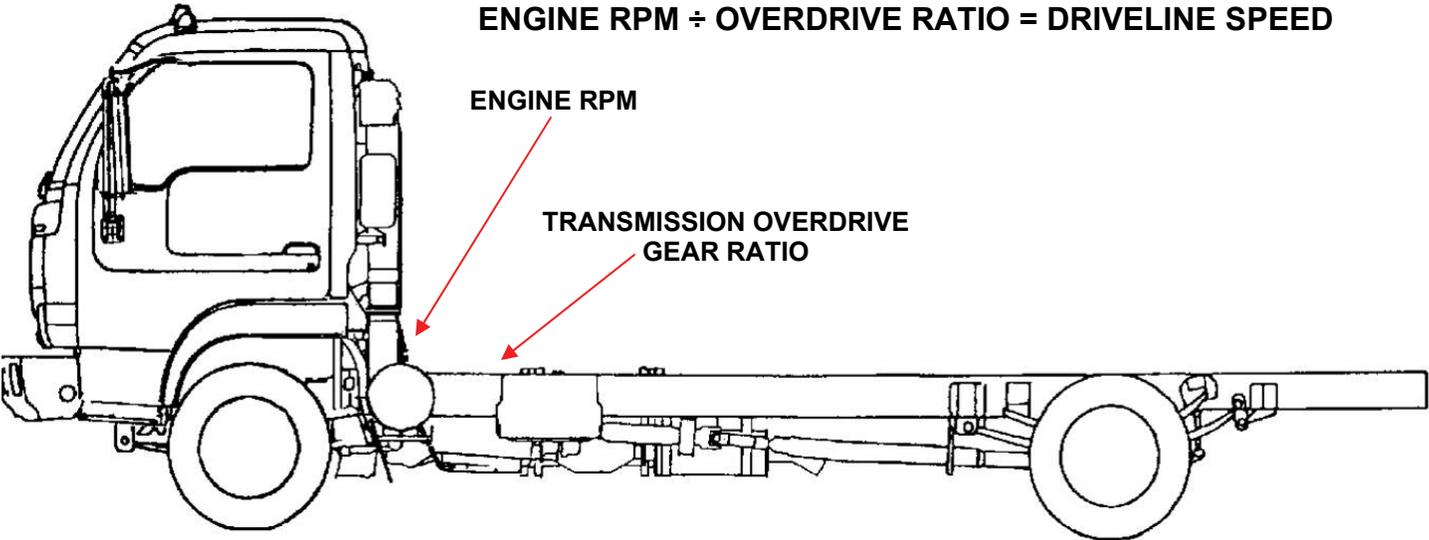
ENGINE	TRANSMISSION	ENGINE RPM	OVERDRIVE RATIO	DRIVELINE SPEED (RPM)
<b>J05D-TA</b>	Aisin Automatic	3,000	0.70	4,286
	MHS62A Manual	3,000	0.79	3,797
<b>J08T-TE</b>	MLS63B Manual	2,600	0.74	3,513
	Allison 1000 Automatic	2,600	0.71	3,662
	Allison 2400 Automatic	2,600	0.74	3,513
	Allison 2500 Automatic	2,600	0.74	3,513
<b>J05D-TF</b>	Aisin Automatic	3,000	0.70	4,286
	MHS62A Manual	3,000	0.79	3,797
<b>J08E-UJ</b>	MLS63B Manual	2,600	0.74	3,513
	Allison 1000 Automatic	2,600	0.71	3,662
	Allison 2200 Automatic	2,600	0.71	3,662
	Allison 2500 Automatic	2,600	0.74	3,513

**IV. DRIVELINE LENGTHS**

Driveline speeds require the use of minimal length drivelines to limit the effects of torsional vibrations and to remain well below the driveline's "critical speed" where damage can occur. Refer to the Glossary on Page 9 for an explanation of driveline "critical speed". Do not use one long driveline to replace two short drivelines because a driveline's critical speed is reduced as the driveline increases in length.

Please note UD Truck's recommendation for driveshaft lengths which states that the driveshaft should not be shortened to a length shorter than the shortest offered by Nissan Diesel Motor Co., Ltd in the same model. Likewise, the driveshaft should not be lengthened to a length longer than the longest offered by Nissan Diesel Motor Co., Ltd in the same model. The propeller shaft layout should correspond with a wheelbase offered by Nissan Motor Co., Ltd.

When lengthening the wheelbase on vehicles with Anti-lock Brake Systems (ABS), the wiring for the wheel speed sensors and ABS components **cannot and should not be altered, cut, spliced or repaired**. The use of approved ABS extension cables is recommended whenever a wheelbase is lengthened. Whenever the wheelbase is shortened, ensure that excess ABS cables are securely tied to the inside of the frame rail to prevent interference. Refer to UD Parts Bulletin UD99-116 for ABS extension cable information.



**ABS EXTENSION CABLE INFORMATION**

**Light Duty Truck UD1300/UD1400**

Part Number	Description	Harness Length
2402829D01	Harness	600mm

**Medium Duty Trucks UD1800CS/UD1800HD/UD2000/UD2300/UD2600/UD3300**

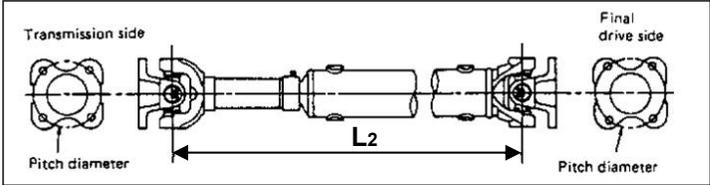
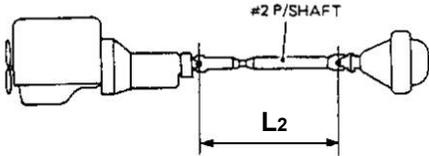
Part Number	Description	Harness Length
2402733Z07	Harness RH	600mm
2402733Z08	Harness LH	600mm
2402733Z09	Harness RH	1000mm
2402733Z10	Harness LH	1000mm

**V. DRIVELINE DESIGN**

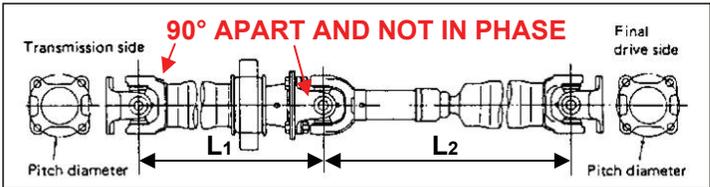
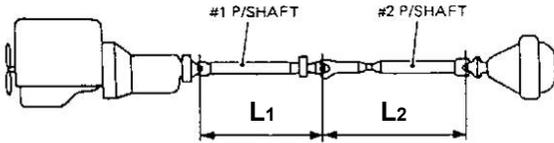
Another important fact involves the “C” and “E” wheelbase for the UD1300 and UD1400 models which have two drivelines. The yokes in the first driveline **are 90 degrees apart and not in phase**, as indicated in the examples below. The driveline configuration in these vehicles were designed to operate with 90 degree phasing and the driveline should not be changed or a driveline vibration could result. The second sliding driveline in these vehicles incorporates normal phasing.

The 90 degree phasing does not apply to the “A” wheelbase because this vehicle uses one sliding driveline with normal phasing. This is an important fact to remember whenever drivelines are serviced.

**UD1400A (EXAMPLE)**



**UD1400C & UD1400E (EXAMPLE)**

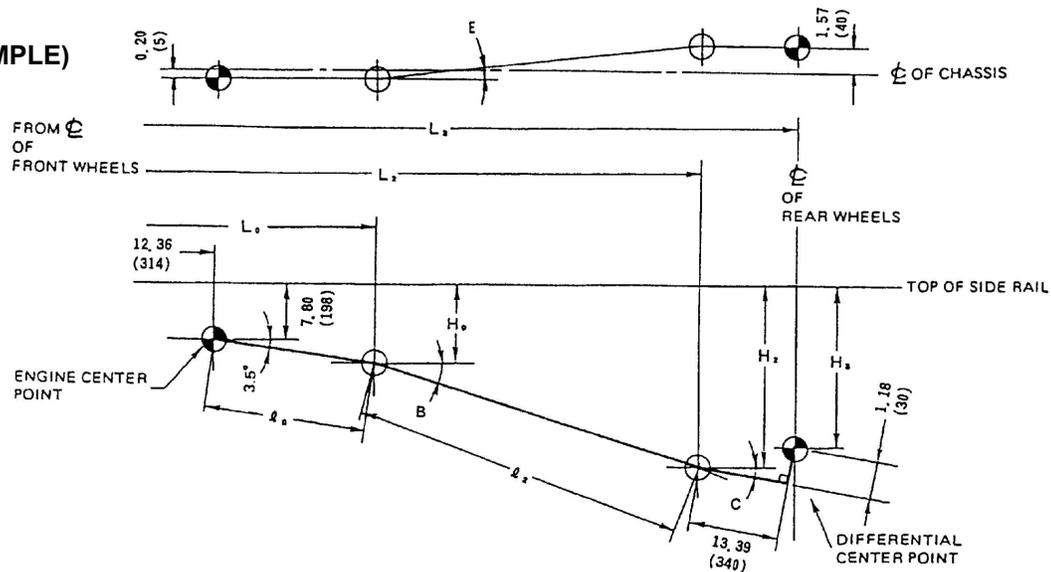


## VI. DRIVELINE ANGLES

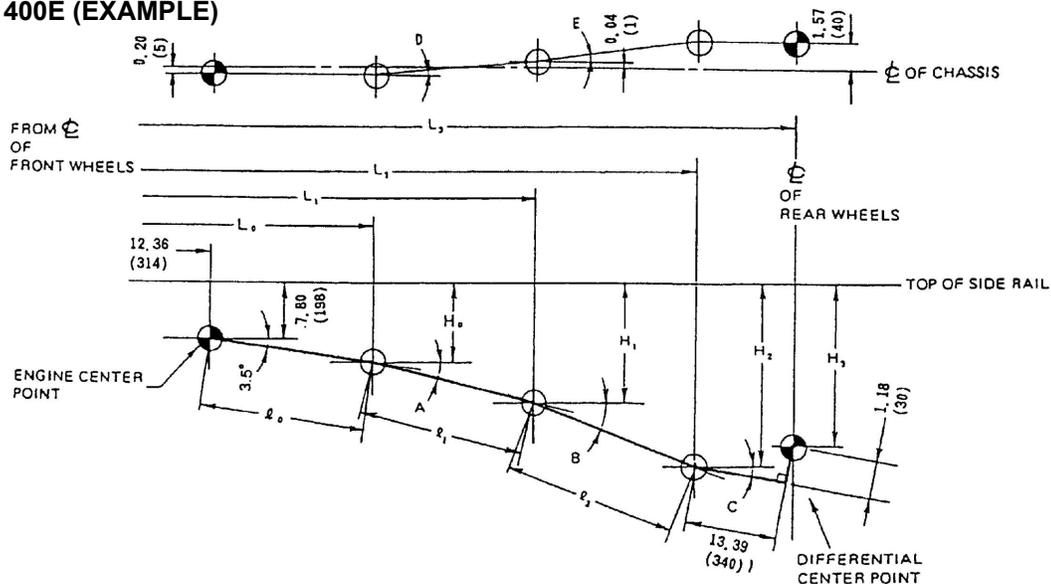
The Body Builder's CD or Book provides driveline angles for all years and all models. Whenever wheelbase alterations are performed, the drivelines in the finished vehicle should match the factory driveline angles and lengths that are in the Body Builder's CD or Book. To understand the examples below, please review the following notes:

- The  mark indicates the perfect geometric centers of the engine and the rear axle.
- The  mark indicates universal joint connections.
- The engine and the rear axle inclination (caster) are both fixed and not adjustable. This also applies to the rear axle off-set angle.
- The top portion of each schematic shows the drivelines when viewed from the top. The lower portion shows the drivelines when viewed from the driver's side of the vehicle.
- Please consult the Body Builder's CD or Book for details that apply to the involved model year vehicle.

### UD1400A (EXAMPLE)



### UD1400C & UD1400E (EXAMPLE)





## VIII. GLOSSARY OF TERMS

**Critical Speed** – this is a phenomenon associated with any elastic shaft rotating at a high speed. At some specific speed the shaft will start to vibrate and, in some instances, the vibrations are so severe that the shaft will “whip” resulting in premature wear or fracture in the drivetrain components. It is contingent upon the mass of the shaft, its length, and the style of the shaft.

**Phasing (inline)** – a relationship that exists between the yokes when they are inline from “ear-to-ear” and their centerlines are parallel.

**Phasing (90 degree)** – a relationship that exists between the yokes when they are not inline from “ear-to-ear” but are rotated relative to one another.

**Resonance** – is the natural frequency of the drivetrain. This frequency is a result of the combination of the rotational inertias of the transmission, driveshafts, and axles sprung on the torsional springs of the clutch and axle shafts. This resonance will “ring” and cause huge dynamic, oscillatory torques and displacement when the engine and/or universal joints are operating at a speed where their pulses occur at its “natural frequency”.

**Runout** – applies to the allowable off center limits of a driveline.

**Torsional Vibrations** – will occur twice for every time the driveshaft rotates. These result from excessive angles in the universal joints or improperly phased driveshafts.