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# **International Soap Box Derby, Inc. Super Stock Car Plans**

REVISED 3/2010

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# **SUPER STOCK DIVISION PROGRAM**

Welcome to this exciting experience known as Soap Box Derby Racing! The International Soap Box Derby, Inc. program is designed to be an enjoyable learning experience for both the adult *and* the child. The program provides an opportunity to develop mutual respect and trust while demonstrating the importance of individual pride and sportsmanship.

The Super Stock car is a sit-up car designed to be driven in a lean forward position at all times for builders of a specific age range. The combined weight of the assembled car and the driver shall not exceed 230 pounds including the Z-Glas™ wheels. A combined weight of less than 230 pounds may be increased by the addition of owner provided weight.

The written rules, plans and regulations are designed for the participant to construct the car from a Super Stock Car Kit purchased from the International Soap Box Derby, Inc.

For rules and regulations, including eligibility and age range information, see the “Rule Book” available from the International Soap Box Derby, Inc. at [http://www.aasbd.com/SBD\\_rules.htm](http://www.aasbd.com/SBD_rules.htm). The established rules, plans and regulations shall be applicable to all races and events and shall be taken into account as to all issues involving the construction of a car. By participating in these events, all participants are deemed to have consented to the rules and authority of person who shall enforce the rules.

**No expressed or implied warranties of any kind, including any warranty of safety, shall result from the publication or compliance with these rules, plans and regulations. In no event shall the International Soap Box Derby, Inc. be liable for any loss, indirect, special or consequential damages even if the International Soap Box Derby Inc. has notice of possibility of such damages. The International Soap Box Derby, Inc. makes no warranties, including any warranties of fitness for a particular purpose with respect to the publication or compliance with these rules, plans or regulations. In all situations, the rules and regulations promulgated by the International Soap Box Derby, Inc. shall govern and control over any conflicting provision in these plans.**

**Each participant understands and agrees that a prerequisite to competing in any Championship Race sanctioned by the International Soap Box Derby Inc. in Akron, Ohio, that the racer and his or her car shall undergo and pass inspection conducted at Akron, Ohio by the International Soap Box Derby Inc. Each participant further understands and agrees that such inspection shall be conducted using the manner and methods deemed appropriate by the International Soap Box Derby Inc. in its sole discretion to determine compliance with the rules, plans, regulations, Spirit of the Rules and specifications applicable to that division and that the decisions of the International Soap Box Derby Inc. and its officials regarding qualifications and disqualification in compliance with the rules, Spirit, plans, regulations and specifications applicable to that division shall be final and binding upon all parties.**

# GENERAL ASSEMBLY GUIDELINES

A parent, guardian or mentor is expected to help in the construction of the car. The parent, guardian or mentor must *not* build the car for the child, but instead share this educational experience by being present and giving help only when and if necessary.

This plan booklet shall be followed when assembling your car. The hardware provided in the International Soap Box Derby, Inc. Super Stock Car Kit must be used and assembled as shown in the latest rules, plans and specifications. No changes, modifications or additions, other than the inclusion or omission of specified optional parts, shall be made to the car. All new and existing cars shall be updated to the latest set of rules and plans for the Super Stock division.

In the event there is any conflict between the written portions of this plan booklet and the pictures or diagrams, the written portions in all situations will control.

Replacement of all hardware, as well as optional parts, is available from the International Soap Box Derby, Inc. In general, replacement parts are sold in bags specified for each installation step of the car's construction and optional parts are available on a per item basis.

## HELP, GUIDANCE & SUPPORT

Questions or inquiries for clarification pertaining to the rules, plans and/or regulations shall be directed primarily to your Local Race or Regional Director. The International Soap Box Derby, Inc. also offers a web site at <http://aasbd.org> that provides additional assistance to the parent, guardian or mentor and child. The website contains links to useful information such as the latest rules and plans, ordering kits or parts online, race cities and their local directors, national and international regional directors, and frequently asked questions to name a few. In addition, this website allows you to join the mailing list to receive updates from the Derby Headquarters and/or participate in an online message board with other Derby enthusiasts!

If further explanation is needed, questions shall be directed to the International Soap Box Derby, Inc. **National Control Board**. All questions or inquiries for clarification shall be requested in writing, including the full name and contact information (address, phone number) of the participant, to:

Post Office Address: International Soap Box Derby, Inc.  
P.O. Box 7225  
Akron, Ohio 44306

Email Address: [SOAPBOX@AASBD.ORG](mailto:SOAPBOX@AASBD.ORG)

FAX: 330-733-1370

**Please note that a response to a specific participant's question may *not* apply to all other participants.**

# SUPPLIES & TOOLS

The following list of tools is a guideline to aid in the basic assembly of the Super Stock Car Kit. The International Soap Box Derby, Inc. does *not* provide these tools as part of the kit. Sources for these tools include, but are not limited to, hardware and automotive supply stores.

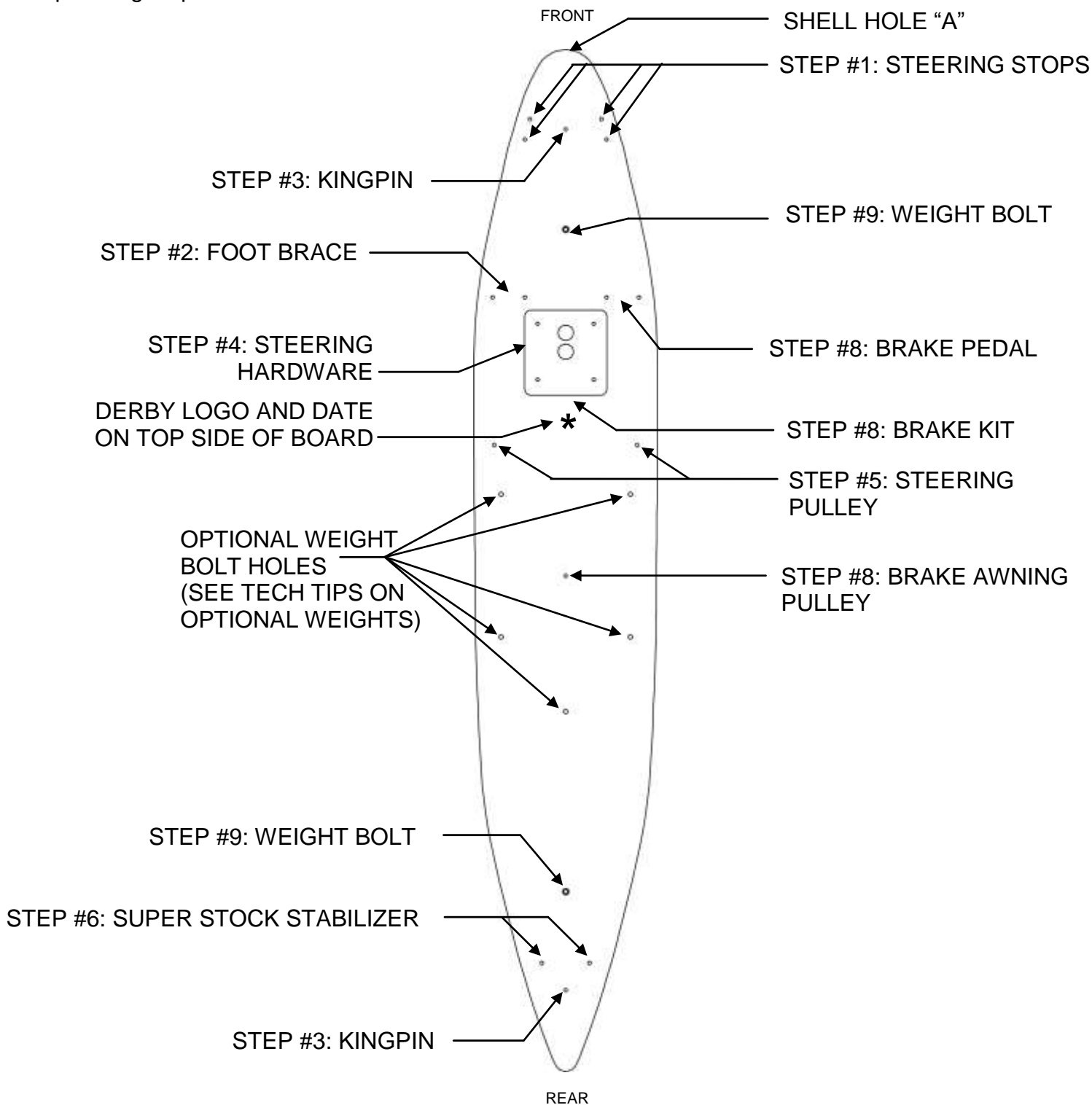
1. Screwdrivers
  - #2 Phillips screwdriver
  - Wide flat blade screwdriver
2. Wrenches or Sockets
  - 3/8" open-end box wrench
  - 7/16" open-end box wrench
  - 1/2" open-end box wrench
  - 9/16" open-end box wrench
3. Allen Wrenches
  - 5/64" Allen Wrench
4. Pliers
  - Standard Pliers
  - Wire Cutter Pliers
5. Measuring Tape
  - 10' minimum length
6. Hammer
  - Standard Hammer or Mallet
7. Soldering Iron with lead-free solder and flux
8. Support Boards
  - (2) 2 x 4 x 18" ±
9. Triangulation Materials
10. Feeler Gauges
11. "C" Clamps
12. Battery Powered Drill

The following list of tools or supplies is a guideline to aid in the basic finish of the Super Stock Car Kit. The International Soap Box Derby, Inc. does *not* provide these tools or supplies as part of the kit. Sources for these tools include, but are not limited to, hardware and automotive supply stores.

1. Metal Cleaning Materials
  - Steel wool
  - Non-metallic abrasive pad
2. Adhesive
  - Contact Cement
3. Tape
  - Electrical Tape
  - Clear Tape
4. Finishing
  - Automotive wax
  - Paint (See Tech Tips on Optional Finishes)

# LET'S GET STARTED!

This is the Super Stock Floorboard Legend. This diagram will give you a brief overview of some of the steps in the assembly process. Each step listed on this page will be explored in greater detail in upcoming steps.

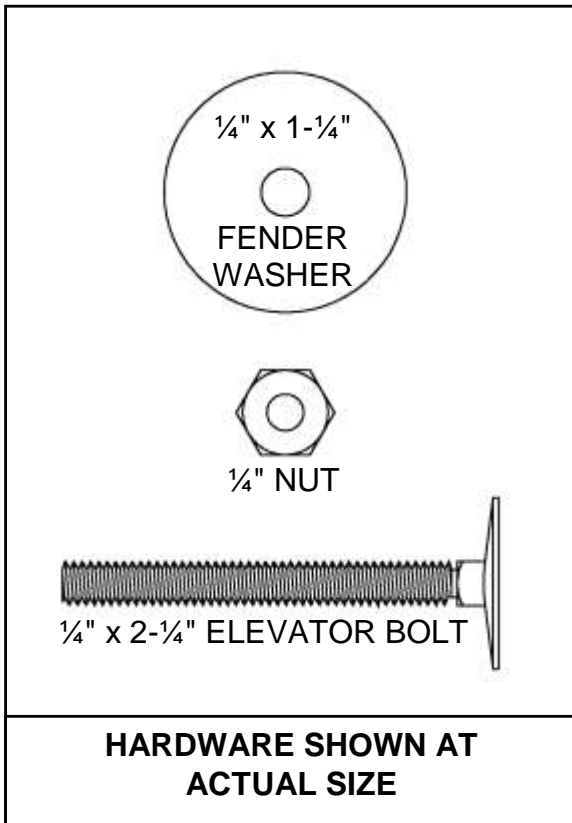


## SUPER STOCK FLOORBOARD LEGEND

# **STEP ONE**

## **Steering Stop Installation**

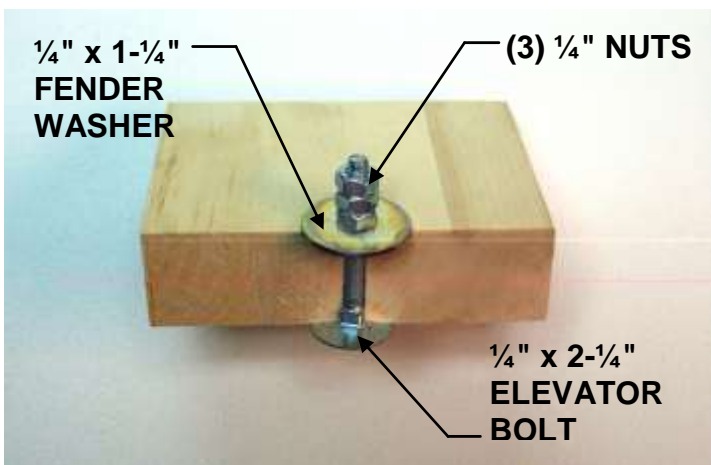
**Required items: Steering Stop Bag, Floorboard, Tools**



**Steering Stop**  
(Legend area highlighted)

### **Steering Stop Installation**

- 1.1 Insert one 1/4" x 2-1/4" elevator bolt through the floorboard bottom at a steering stop hole location and press through the floorboard. See legend for location of holes.
- 1.2 Place a 1/4" x 1-1/4" fender washer on the elevator bolt on top of the floorboard.
- 1.3 Install 1/4" nut on 1/4" x 1-1/4" fender washer. Tighten nut until elevator bolt is drawn in flush with bottom of floorboard. Install two additional 1/4" nuts for a total of three. See Photo # 1.3
- 1.4 Repeat Steps 1.1 through 1.3 for the other three steering stop locations. See Photo # 1.4



**Photo # 1.3**

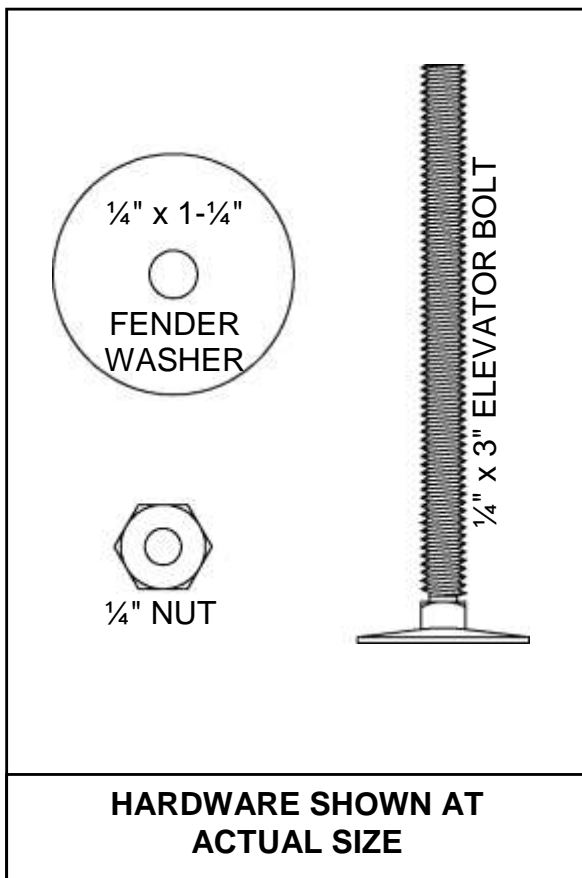


**Photo # 1.4**

# **STEP TWO**

## **Foot Brace Installation**

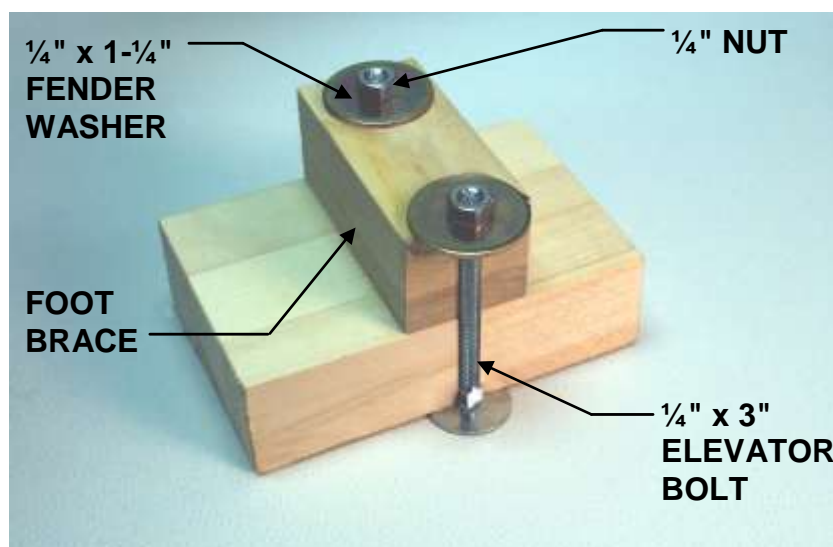
**Required Items: Foot Brace Bag, Floorboard, Foot Brace, Tools**



**Foot Brace**  
**(Legend area highlighted)**

### **Foot Brace Installation** **\*See Tech Tip E24.3**

- 2.1 Insert one 1/4" x 3" elevator bolt through the floorboard bottom at a foot brace hole location and press through the floorboard. See floorboard legend for location of holes.
- 2.2 Place foot brace on the 1/4" x 3" elevator bolt.
- 2.3 Place a 1/4" x 1-1/4" fender washer on the 1/4" x 3" elevator bolt on top of the foot brace.
- 2.4 Install 1/4" nut on 1/4" x 1-1/4" fender washer. See Photo # 2.4
- 2.5 Repeat Steps 2.1 through 2.4 for the second foot brace bolt location.
- 2.6 Tighten nuts until elevator bolts are drawn flush with bottom of the floorboard.

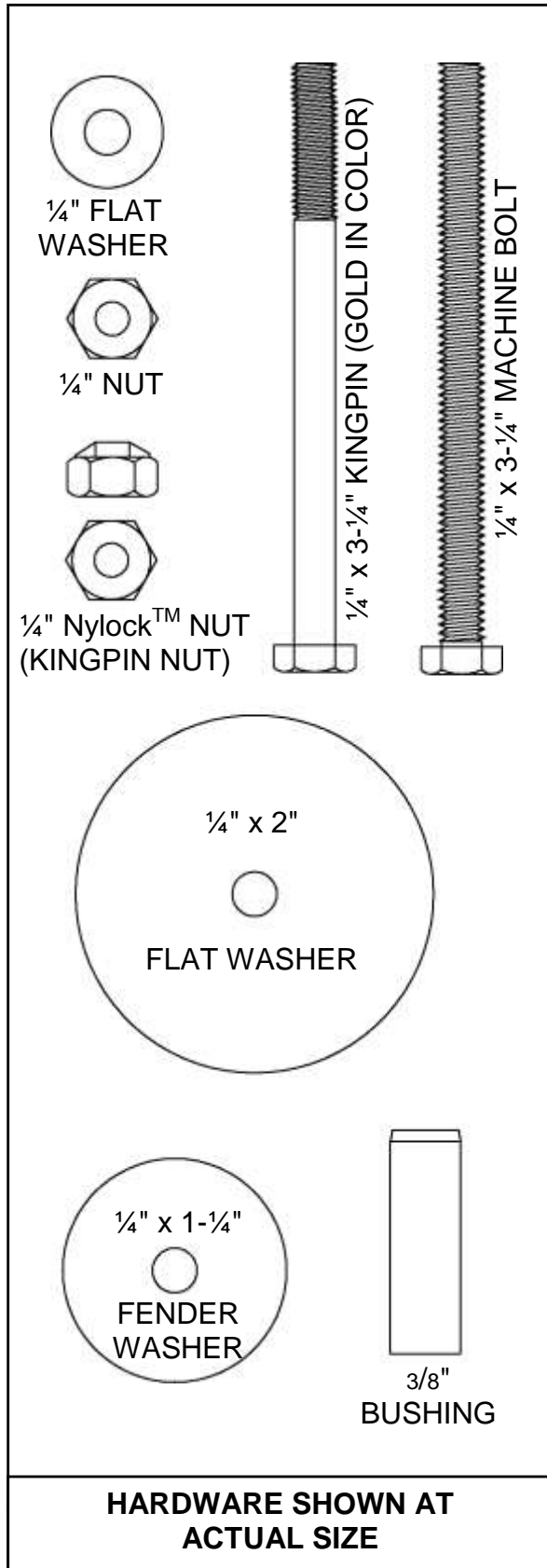


**Photo # 2.4**

# STEP THREE

## Kingpin Installation

Required Items: Kingpin Bag, Floorboard, Set of Axles, SS Rear Axle Plate, Tools



**Bushing Installation**  
(Legend area highlighted)

### Bushing Installation Sub-Assembly

**\*See Tech Tip E24.1**

- 3.1 Place 1/4" x 1-1/4" fender washer on 1/4" x 3-1/4" machine bolt. Bolt is silver in color.
- 3.2 Place bushing with flat end against fender washer on the 1/4" x 3-1/4" machine bolt.
- 3.3 Insert assembly through the top or bottom of floorboard until bolt extends through opposite side of floorboard at kingpin location. See legend for location of holes.
- 3.4 Place a 1/4" x 1-1/4" fender washer on the machine bolt against the floorboard.
- 3.5 Install a 1/4" nut on the 1/4" x 1-1/4" fender washer. See Photo # 3.5

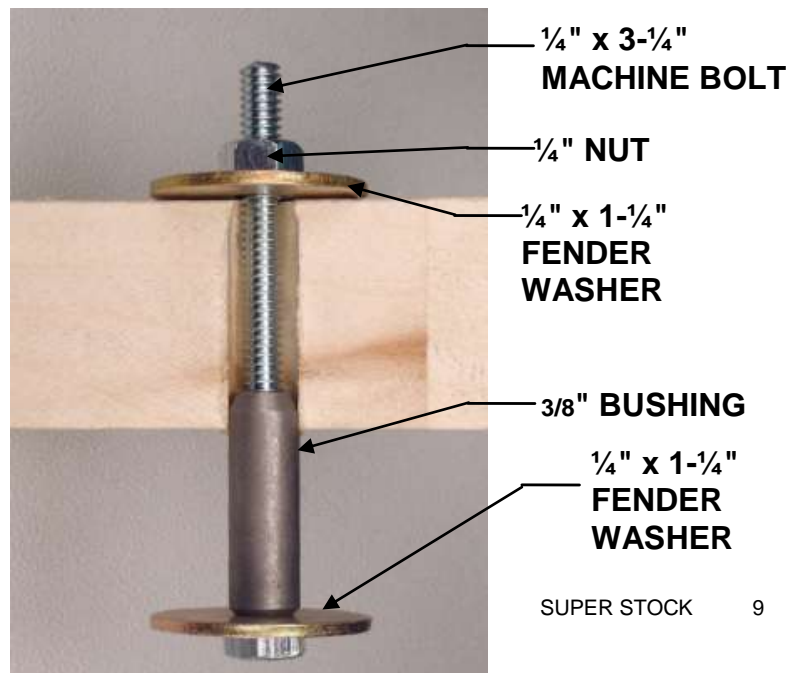
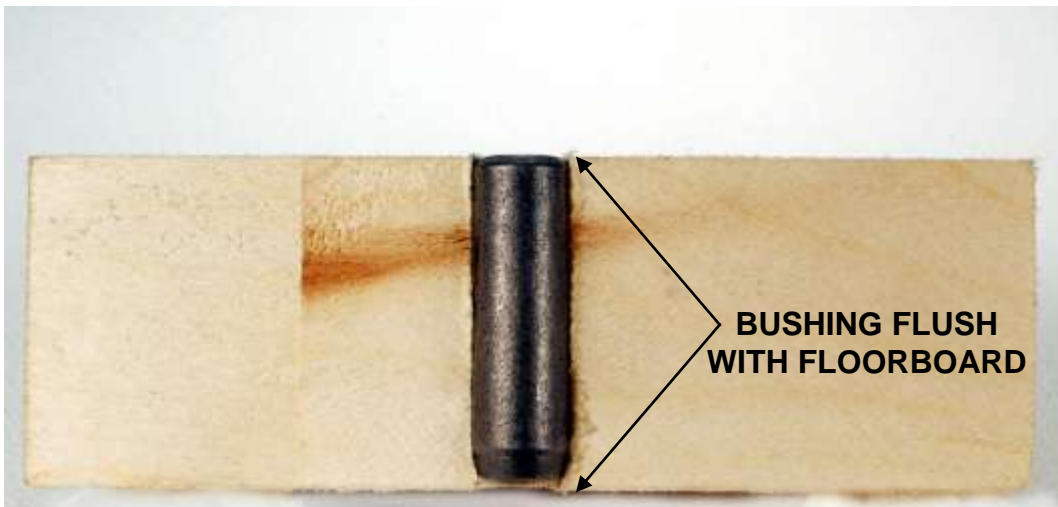


Photo # 3.5

## **Bushing Installation** **Sub-Assembly Continued**

- 3.6 Tighten machine bolt assembly until bushing ends are flush with floorboard.
- 3.7 Remove  $\frac{1}{4}$ " nut from  $\frac{1}{4}$ " x  $3\text{-}\frac{1}{4}$ " machine bolt and  $\frac{1}{4}$ " x  $1\text{-}\frac{1}{4}$ " fender washers. See Photo # 3.7
- 3.8 Repeat steps 3.1 through 3.7 for second kingpin bushing location.
- 3.9 Save  $\frac{1}{4}$ " nut,  $\frac{1}{4}$ " x  $3\text{-}\frac{1}{4}$ " machine bolt and  $\frac{1}{4}$ " x  $1\text{-}\frac{1}{4}$ " fender washers for future use in Step Six.



**Photo # 3.7**

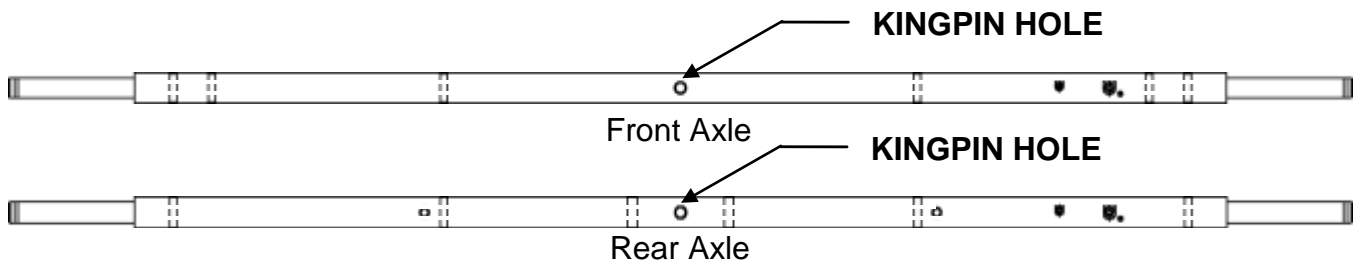


Figure # 3.15



**Kingpin Installation**  
(Legend area highlighted)

**Front Kingpin Sub-Assembly**

- 3.10 Place a 1/4" x 2" flat washer on 1/4" x 3-1/4" kingpin. Kingpin bolt is gold in color.
- 3.11 Insert kingpin/washer assembly through the bottom of floorboard at front axle location and press through floorboard. See legend for location of hole.
- 3.12 Place 1/4" x 2" flat washer on 1/4" x 3-1/4" kingpin.
- 3.13 Place 1/4" x 1-1/4" fender washer on 1/4" x 2" flat washer.
- 3.14 Place 1/4" flat washer on 1/4" x 1-1/4" fender washer.
- 3.15 Place front axle on 1/4" flat washer. See Figure # 3.15 for front axle identification.
- 3.16 Place two 1/4" flat washers on top of the axle.
- 3.17 Install two 1/4" Nylock™ nuts (kingpin nuts). Tighten kingpin assembly. See Photo # 3.17

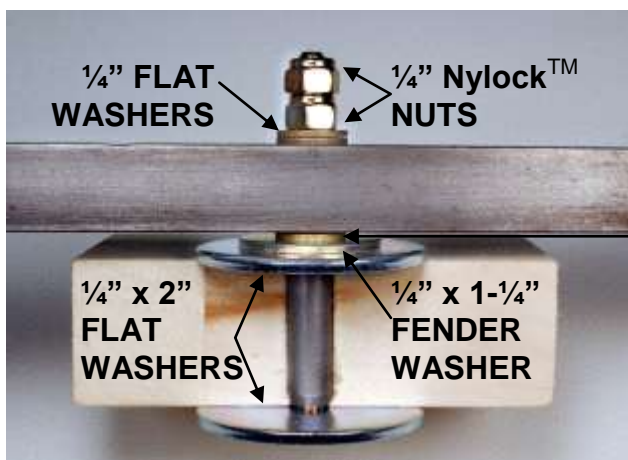


Photo # 3.17  
(Front Kingpin Washer Stack)

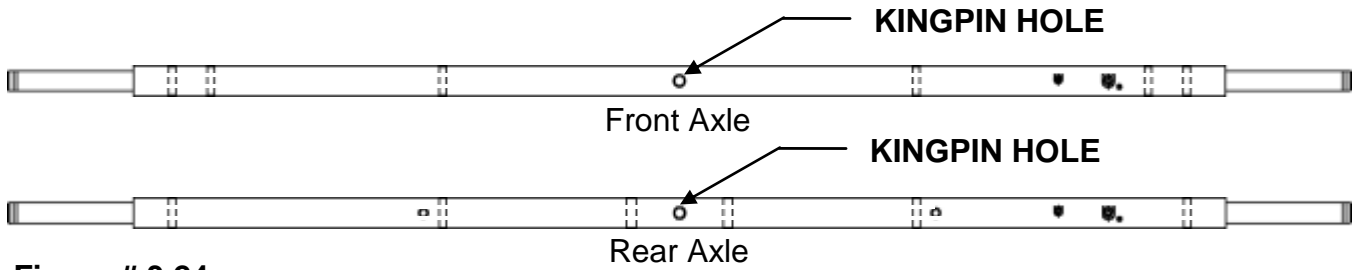


Figure # 3.24



**Kingpin Installation**  
(Legend area highlighted)

**Rear Kingpin Sub-Assembly**

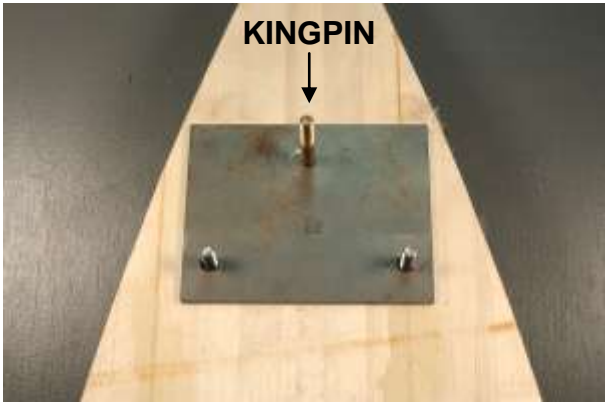


Photo # 3.20  
(Bolts other than the kingpin are not part of this step; they are shown for clarity only.)

- 3.18 Place a 1/4" x 2" flat washer on 1/4" x 3-1/4" kingpin. Kingpin bolt is gold in color.
- 3.19 Insert kingpin/washer assembly through the bottom of floorboard at rear axle location and press through floorboard. See floorboard legend for location of hole.
- 3.20 Place SS Rear Axle Plate on 1/4" x 3-1/4" kingpin. Align holes in SS Rear Axle Plate with those in the floorboard. See Photo # 3.20
- 3.21 Place 1/4" x 2" flat washer on 1/4" x 3-1/4" kingpin (on top of the SS Rear Axle Plate).
- 3.22 Place 1/4" x 1-1/4" fender washer on 1/4" x 2" flat washer.
- 3.23 Place 1/4" flat washer on 1/4" x 1-1/4" fender washer.
- 3.24 Place rear axle on 1/4" flat washer. See Figure # 3.24 for rear axle identification.
- 3.25 Place two 1/4" flat washers on top of the axle.
- 3.26 Install one 1/4" Nylock™ nut (kingpin nut). See Photo # 3.26 **Do not completely tighten kingpin assembly.** Further adjustments to occur in future Step Fourteen.

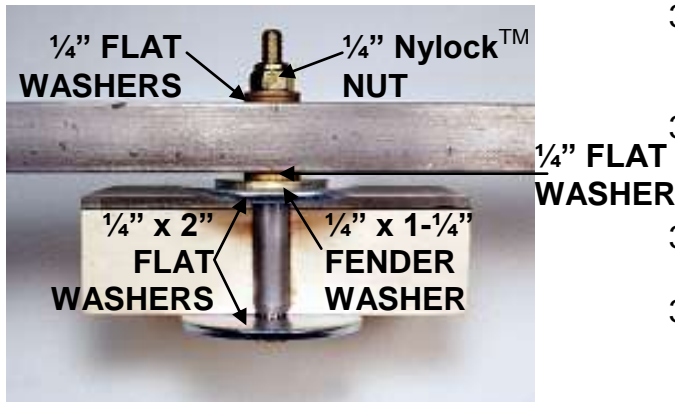
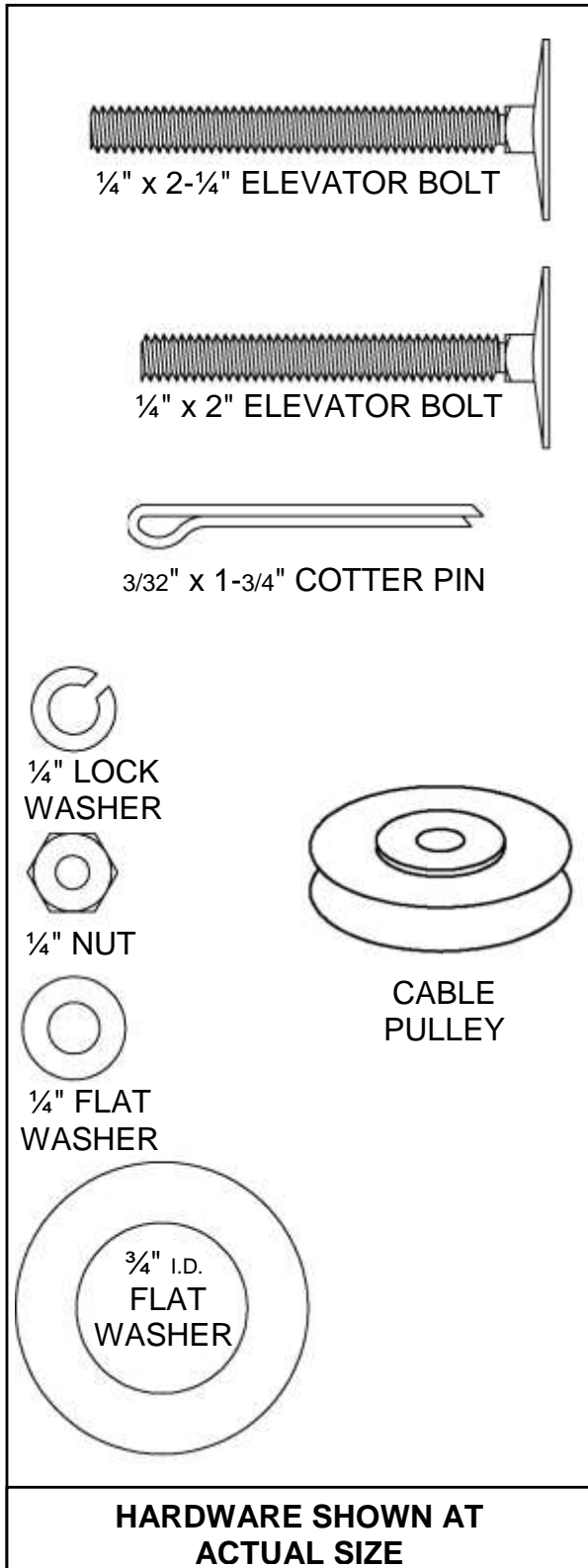


Photo # 3.26  
(Rear Kingpin Washer Stack)

# STEP FOUR

## Steering Hardware Installation

Required Items: Steering Bag, Floorboard, Brake/Steering Mount, Steering Wheel, Tools



**Brake/Steering Mount**  
(Legend area highlighted)

### Brake/Steering Mount Sub-Assembly

\*See Tech Tip E24.2

- 4.1 Insert a quarter or washer (provided by others) into the recessed floorboard area where the steering wheel shaft is to be installed. See Photo # 4.1
- 4.2 Align brake/steering mount with square tube over large hole drilled through floorboard and large round hole over quarter recessed floorboard area. See Photo # 4.2



Photo # 4.1

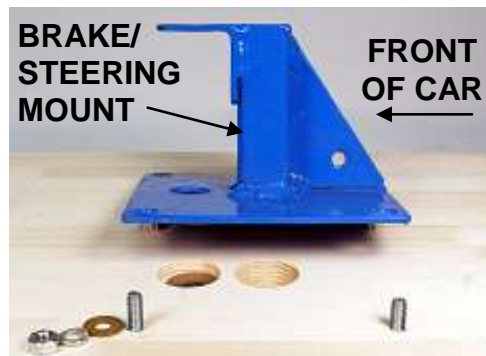


Photo # 4.2  
(Bolts shown for alignment only)

## Brake/Steering Mount Sub-Assembly Continued

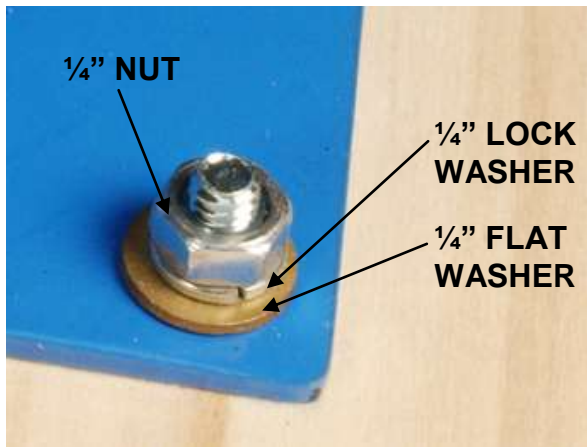


Photo # 4.7

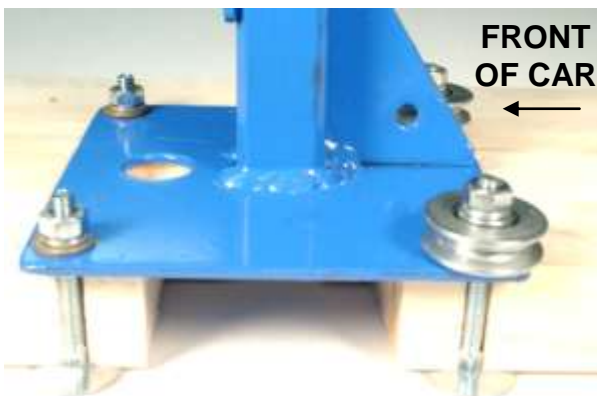


Photo # 4.13(a)

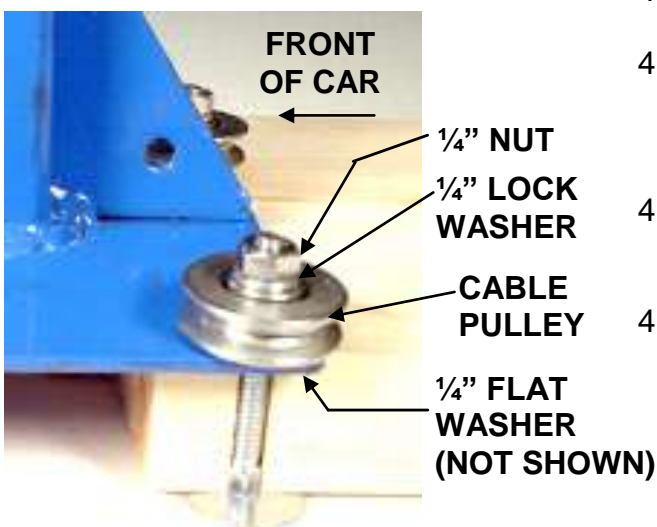


Photo # 4.13(b)

- 4.3 Insert one 1/4" x 2" elevator bolt through the floorboard bottom at front brake/steering mount hole location and press through the floorboard. See floorboard legend for location of holes.
- 4.4 Place brake/steering mount on 1/4" x 2" elevator bolt.
- 4.5 Place 1/4" flat washer on 1/4" x 2" elevator bolt (on top of brake/steering mount).
- 4.6 Place 1/4" lock washer on 1/4" flat washer.
- 4.7 Install 1/4" nut over 1/4" lock washer. See Photo # 4.7 **Do not completely tighten nut.**
- 4.8 Repeat Steps 4.3 through 4.7 for second front brake/steering bolt location.
- 4.9 Insert one 1/4" x 2-1/4" elevator bolt through the floorboard bottom at rear brake/steering mount hole location and press through the floorboard.
- 4.10 Place 1/4" flat washer on 1/4" x 2-1/4" elevator bolt (on top of brake/steering mount).
- 4.11 Place cable pulley on 1/4" flat washer.
- 4.12 Place 1/4" lock washer on cable pulley.
- 4.13 Install 1/4" nut on 1/4" lock washer. See Photo # 4.13(a) & Photo # 4.13(b). **Do not completely tighten nut.**
- 4.14 Repeat Steps 4.9 through 4.13 for second rear brake/steering bolt at cable pulley location.
- 4.15 Tighten all four nuts until bolts are drawn in flush with bottom of floorboard. Insert brake plunger through floorboard and brake/steering mount to check for proper alignment.

## Steering Wheel Sub-Assembly

**\*See Tech Tip E24.4**

- 4.16 Insert steering wheel shaft through the round hole on the brake/steering mount.
- 4.17 Raise the steering wheel and slide the  $\frac{3}{4}$ " I.D. flat washer on to the bottom of steering wheel shaft.
- 4.18 Push steering wheel down through brake/steering mount hole until shaft rests on top of quarter or washer installed in Step 4.1.
- 4.19 Push  $\frac{3}{4}$ " I.D. flat washer up against the brake/steering mount and insert  $\frac{3}{32}$ " x  $1\text{-}\frac{3}{4}$ " cotter-pin through the upper steering wheel shaft hole. See Photo # 4.19
- 4.20 Bend end of cotter pin around steering wheel shaft.

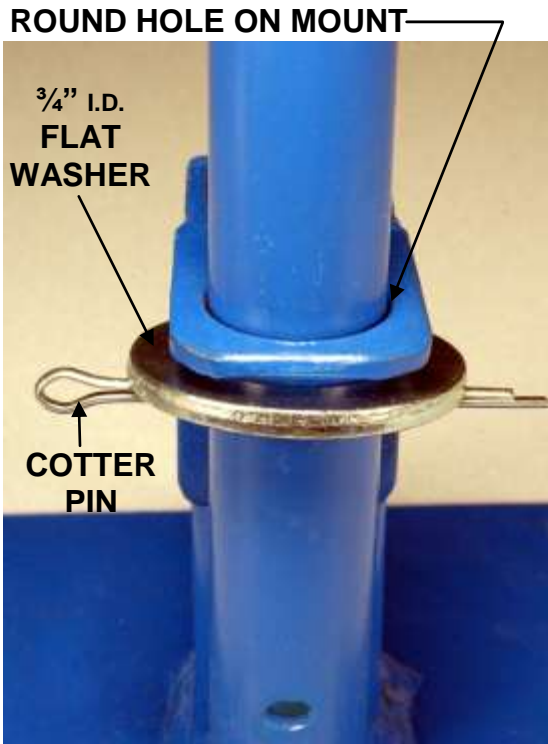
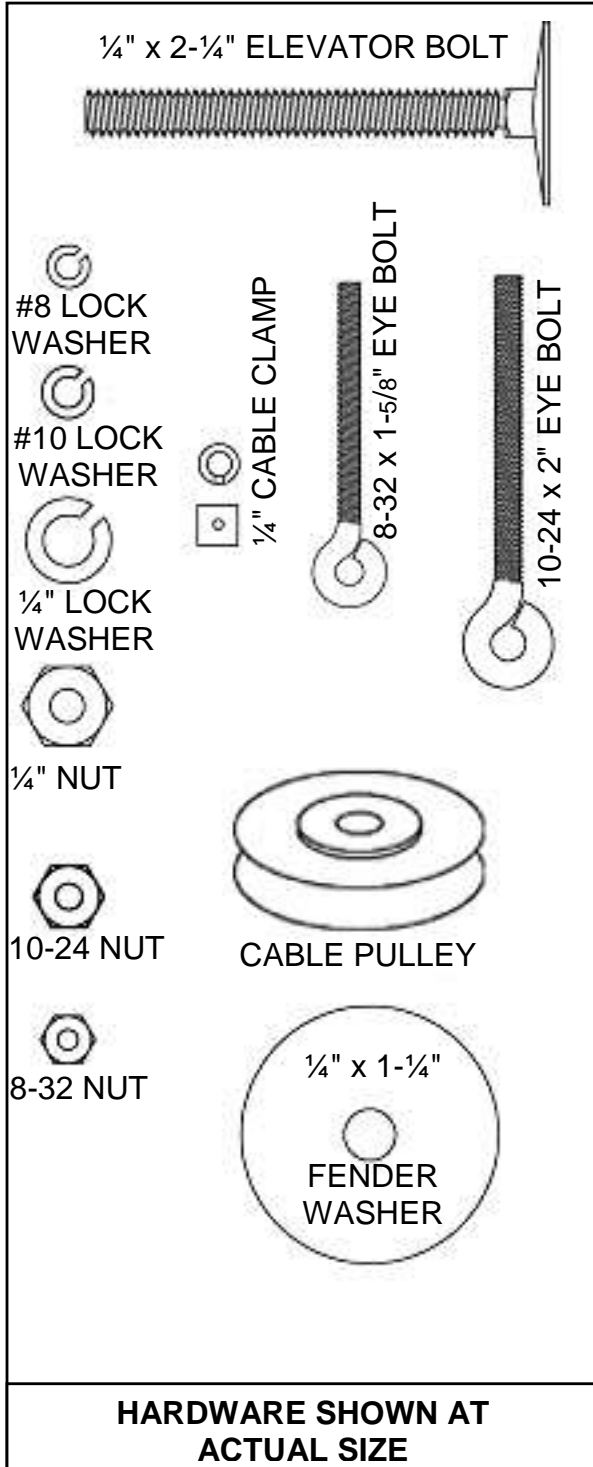


Photo # 4.19

# STEP FIVE

## Steering Cabling Installation

Required Items: Steering Cable Bag (complete with Steering Cable and Cable Adjuster), Floorboard, Steering Cable, Tools



**Cable Pulley Sub-Assembly**  
(Legend area highlighted)

### Cable Pulley Sub-Assembly

- 5.1 Insert one 1/4" x 2-1/4" elevator bolt through the floorboard bottom at a steering cable pulley hole location and press through the floorboard. See legend for location of holes.
- 5.2 Place a 1/4" x 1-1/4" fender washer on 1/4" x 2-1/4" elevator bolt on top of the floorboard.
- 5.3 Place cable pulley on 1/4" x 1-1/4" fender washer.
- 5.4 Place 1/4" lock washer on cable pulley.
- 5.5 Install 1/4" nut on 1/4" lock washer. See Photo # 5.5
- 5.6 Tighten nut until bolt is drawn flush with bottom of floorboard.
- 5.7 Repeat Steps 5.1 through 5.6 for second cable pulley hole location.

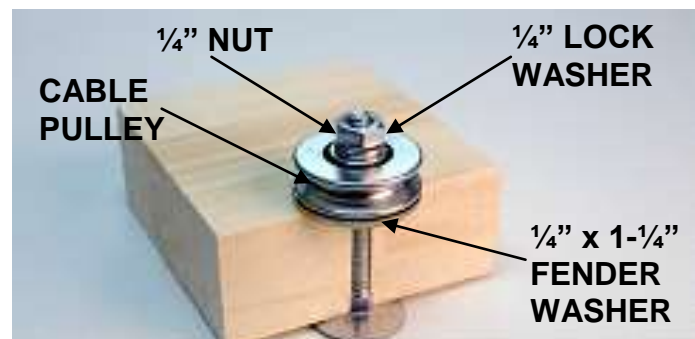


Photo # 5.5



Figure # 5.9

### Axle Eyebolt Sub-Assembly

- 5.8 Install 10-24 nut on 10-24 x 2" eyebolt. Tighten the 10-24 nut to the end of threads on eye bolt.
- 5.9 Insert assembly through driver side of front axle at eye bolt location. See Figure # 5.9
- 5.10 Place a #10 lock washer on 10-24 x 2" eyebolt.
- 5.11 Install 10-24 nut on eyebolt assembly.
- 5.12 Tighten eyebolt assembly. See Photo # 5.12
- 5.13 Repeat Steps 5.8 through 5.12 for second axle eyebolt assembly.



Photo # 5.12

### Cable Adjuster Sub-Assembly

- 5.14 Install 8-32 nut on 8-32 x 1-5/8" eyebolt.
- 5.15 Insert eyebolt through any of the three holes of cable adjuster and push through.
- 5.16 Place a #8 lock washer on 8-32 x 1-5/8" eyebolt.
- 5.17 Install 8-32 nut on # 8 lock washer. See Photo # 5.17
- 5.18 **Do not completely tighten assembly.** Further adjustments to occur in Step Fourteen.
- 5.19 Repeat Steps 5.14 through 5.18 for second cable adjuster assembly.

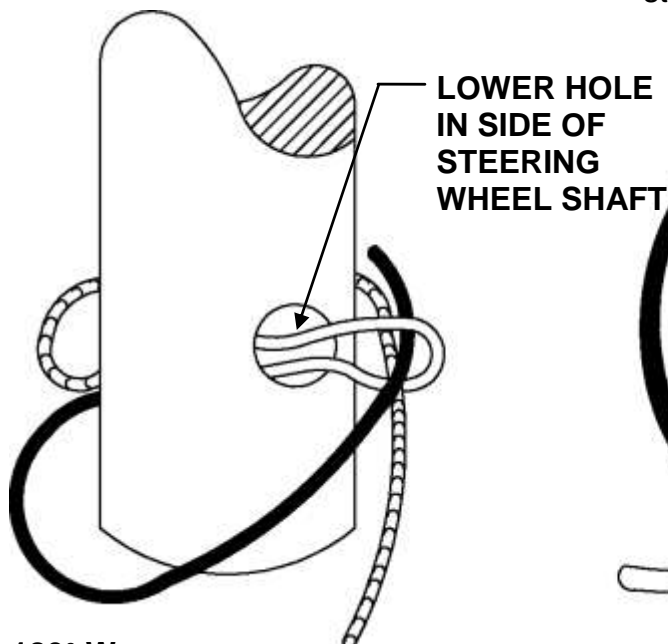


Photo # 5.17

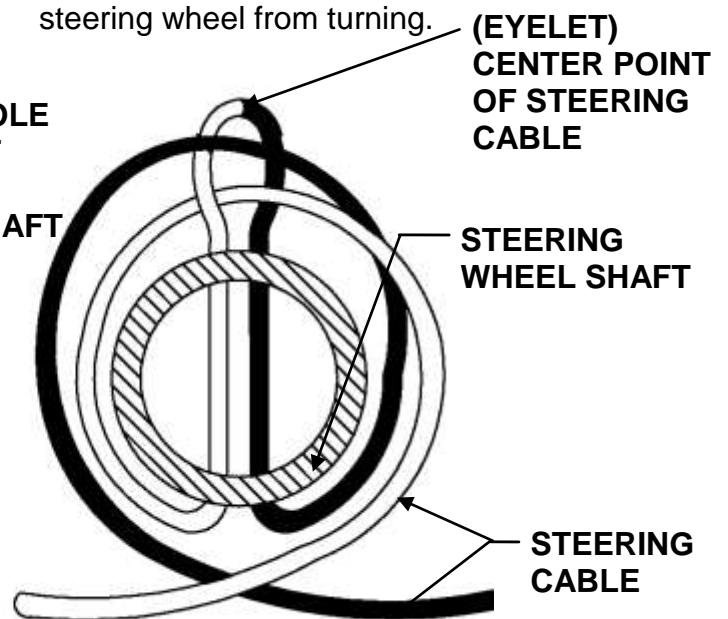
## Steering Cable Sub-Assembly

**\*See Tech Tip E24.5**

- 5.20 Determine the center point of the steering cable by folding the cable in half.
- 5.21 Insert the two loose ends of the steering cable through the lower hole of the steering wheel shaft located horizontally above the floorboard.
- 5.22 Pull the two loose cable ends through the hole until an eyelet is formed at the center point of steering cable.
- 5.23 Wrap one loose end of cable around shaft 180 degrees and thread through eyelet. See Figure # 5.23
- 5.24 Wrap other loose cable end in other direction around shaft 180 degrees from first cable, and thread through eyelet.
- 5.25 Pull both cable ends to tighten eyelet to secure cable.
- 5.26 Continue first cable around steering shaft to a minimum of 360 degrees (at least one complete wrap). See Figure # 5.26
- 5.27 Center steering wheel and temporarily clamp steering wheel from turning.



**180° Wrap  
Figure # 5.23**

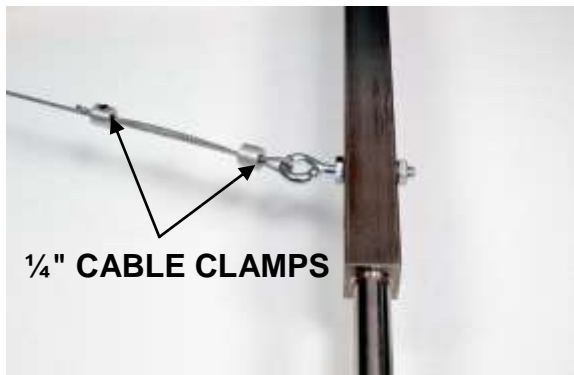


**360° Wrap (or more)  
Figure # 5.26**

## Steering Cable Sub-Assembly Continued



**Photo # 5.31**  
**(Cable Adjuster Assembly)**



**Photo # 5.36**

- 5.28 Thread one cable around steering pulley located on brake/steering mount.
- 5.29 Thread this cable through the outside of one of the two remaining holes in the cable adjuster and into the inside of the cable adjuster.
- 5.30 Thread cable through eyebolt inside cable adjuster.
- 5.31 Thread cable through the remaining hole in the cable adjuster. See Photo # 5.31
- 5.32 Thread cable around cable pulley located on floorboard.
- 5.33 Slide two 1/4" cable clamps on cable end.
- 5.34 Thread cable through the front axle eyebolt assembly.
- 5.35 Insert loose end of cable back through both cable clamps.
- 5.36 Pull cables tight and tighten both cable clamps with a 5/64" Allen Wrench. Cable clamps can be placed next to each other. No space between cable clamps is required. See Photo # 5.36

## Steering Cable Sub-Assembly Continued

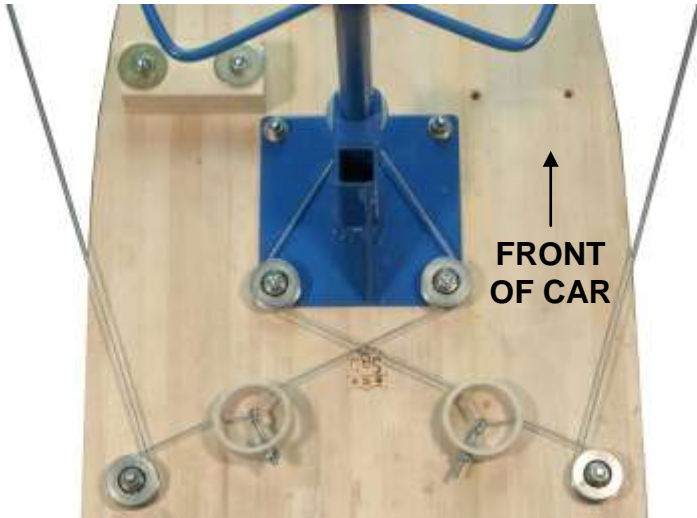


Photo # 5.37(a)

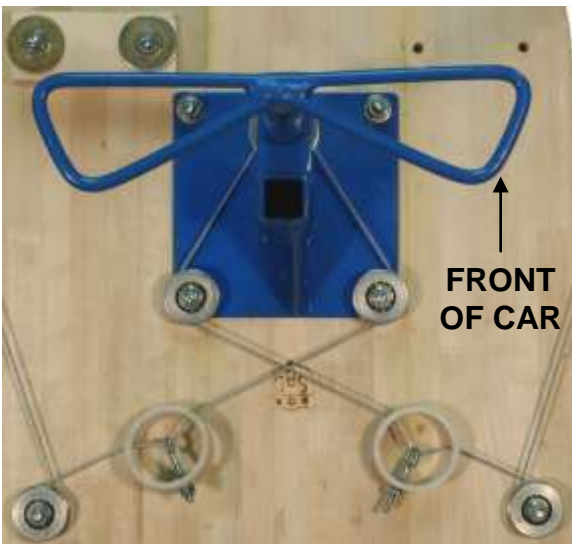


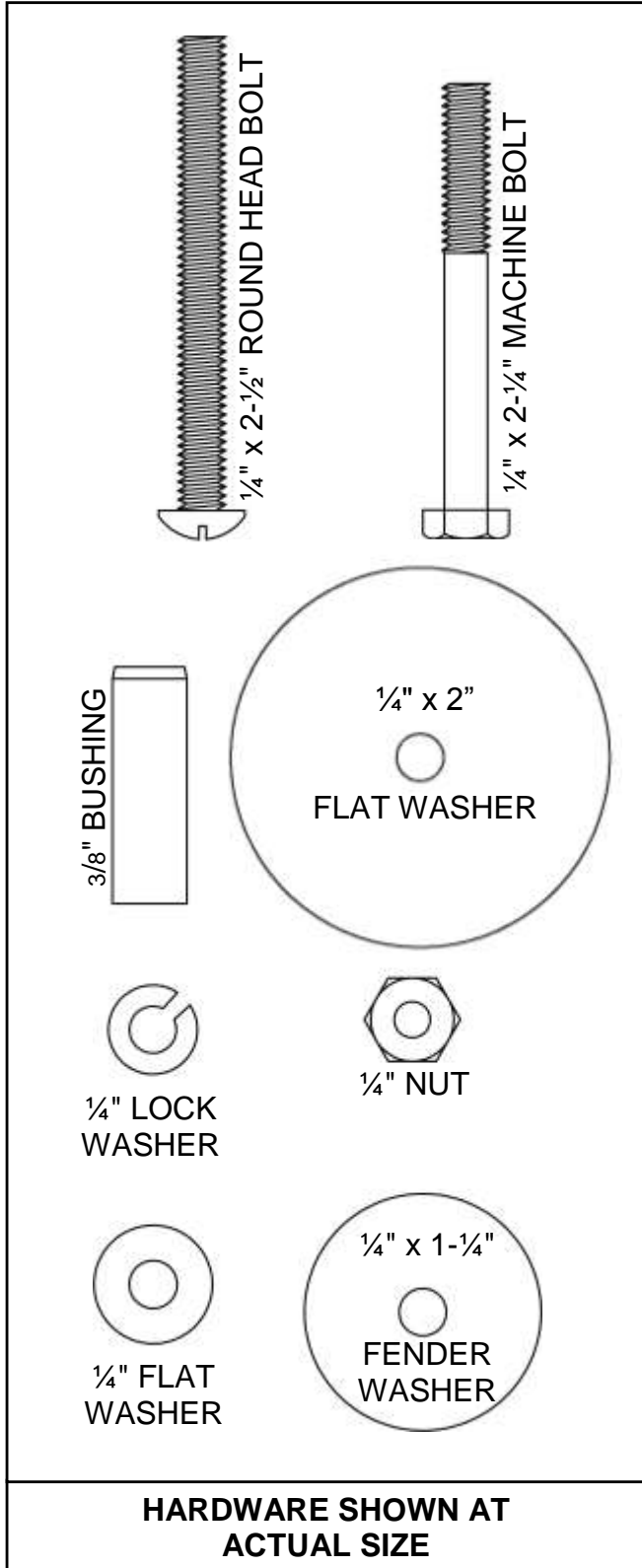
Photo # 5.37(b)

- 5.37 Repeat Steps 5.28 through 5.36 for the other cable. Refer to Photo # 5.37(a) & Photo # 5.37(b) for cable route.
- 5.38 Adjust steering cables by adjusting 8-32 x 1-5/8" eyebolts in cable adjuster assemblies.
- 5.39 Secure both cable adjusters by tightening both of the 8-32 nuts. Cable adjusters may be located anywhere along the cable in floorboard area between pulleys. Remove temporary steering wheel clamp from Step 5.27.
- 5.40 Test by turning steering wheel to the right while seated facing the front of the car. The front axle must turn to the right.
- 5.41 Excess steering cable may extend past second 1/4" cable clamp and may be removed by cutting. To avoid cable fraying it is recommended that solder be applied to a 1/4" +/- on either side of the proposed cut **prior to cutting**.
- 5.42 Steering cable adjustment to occur in future Step Fourteen.

# STEP SIX

## Stabilizer Installation

Required Items: Super Stock Stabilizer Bag, Angle Iron, Parts for Bushing Installation from Step Three ( $\frac{1}{4}$ " x  $3\frac{1}{4}$ " machine bolt,  $\frac{1}{4}$ " nut and two  $\frac{1}{4}$ " x  $1\frac{1}{4}$ " fender washers), Tools



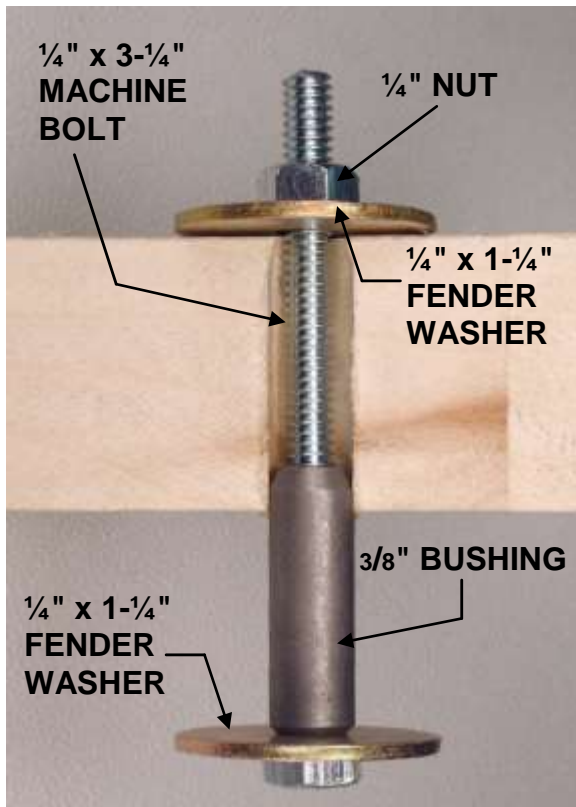
**Stabilizer Installation**  
(Legend area highlighted)

### Stabilizer Bushing Sub-Assembly

**\*See Tech Tip E24.1**

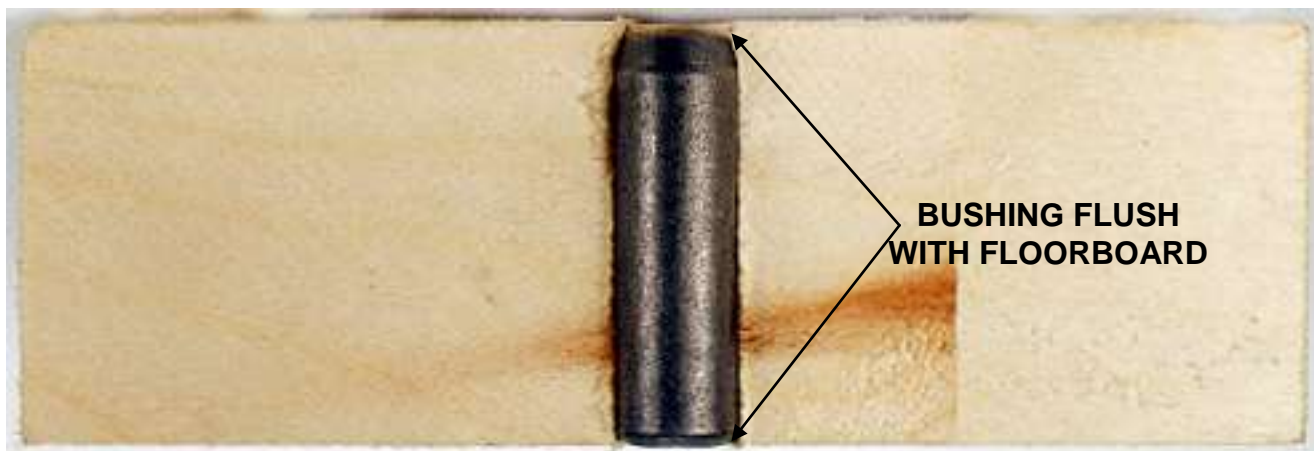
- 6.1 Rotate SS Rear Axle Plate installed in Step Three away from stabilizer bolt holes. See legend for location of holes.
- 6.2 Place  $\frac{1}{4}$ " x  $1\frac{1}{4}$ " fender washer on  $\frac{1}{4}$ " x  $3\frac{1}{4}$ " machine bolt saved from Step Three.
- 6.3 Place bushing with flat end toward washer on  $\frac{1}{4}$ " x  $2\frac{1}{4}$ " machine bolt.
- 6.4 Insert machine bolt assembly through the top or bottom of floorboard with beveled end of bushing against floorboard and press through floorboard at stabilizer bolt location.

## Stabilizer Bushing Sub-Assembly Continued



**Photo # 6.6**

- 6.5 Place a 1/4" x 1-1/4" fender washer on 1/4" x 3-1/4" machine bolt against floorboard.
- 6.6 Install 1/4" nut on 1/4" x 1-1/4" fender washer. See Photo # 6.6
- 6.7 Tighten machine bolt bushing assembly until bushing end is flush with floorboard.
- 6.8 Remove 1/4" nut, machine bolt and washers. See Photo # 6.8
- 6.9 Repeat Steps 6.2 through 6.8 for second stabilizer bushing location.
- 6.10 Save 1/4" nut, 1/4" x 3-1/4" machine bolt and two 1/4" x 1-1/4" fender washers for possible future use.
- 6.11 Realign the SS Rear Axle Plate with the stabilizer bolt holes.



**Photo # 6.8**

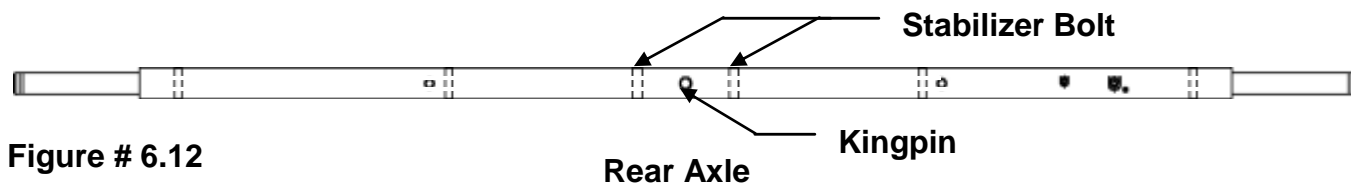


Figure # 6.12

## Angle Iron Sub-Assembly at Rear Axle



Photo # 6.18

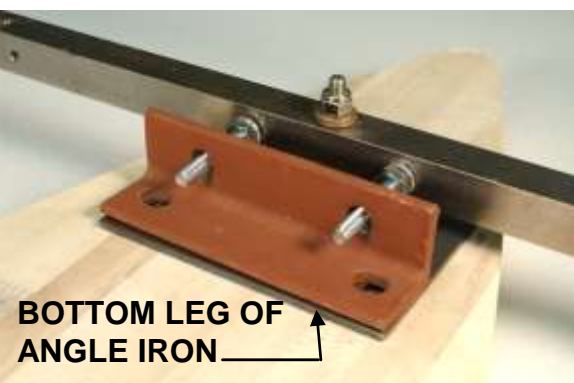


Photo # 6.19



Photo # 6.22

- 6.12 Insert  $\frac{1}{4}$ " x  $2\text{-}\frac{1}{2}$ " round head bolt through back side of rear axle at a stabilizer bolt hole location. See Figure # 6.12 for stabilizer bolt hole locations. Round head bolt should be tight to the axle.
- 6.13 Place a  $\frac{1}{4}$ " lock washer on  $\frac{1}{4}$ " x  $2\text{-}\frac{1}{2}$ " round head bolt.
- 6.14 Install  $\frac{1}{4}$ " nut on  $\frac{1}{4}$ " lock washer. Tighten nut.
- 6.15 Repeat Steps 6.12 through 6.14 for the second stabilizer bolt hole.
- 6.16 Install a second  $\frac{1}{4}$ " nut on  $\frac{1}{4}$ " x  $2\text{-}\frac{1}{2}$ " round head bolt leaving a 1" +/- gap between the axle and the second  $\frac{1}{4}$ " nut.
- 6.17 Place a  $\frac{1}{4}$ " flat washer against the second  $\frac{1}{4}$ " nut.
- 6.18 Repeat Steps 6.16 and 6.17 for second stabilizer bolt hole. See Photo # 6.18
- 6.19 Slide the angle iron over the two bolts keeping the bottom leg flat against the SS rear axle plate. See Photo # 6.19
- 6.20 Place a  $\frac{1}{4}$ " flat washer on  $\frac{1}{4}$ " x  $2\text{-}\frac{1}{2}$ " round head bolt.
- 6.21 Place  $\frac{1}{4}$ " lock washer on  $\frac{1}{4}$ " flat washer.
- 6.22 Install  $\frac{1}{4}$ " nut on  $\frac{1}{4}$ " lock washer. **Do not completely tighten.** See Photo # 6.22
- 6.23 Repeat Steps 6.20 through 6.22 for second stabilizer bolt hole.

## Angle Iron Sub-Assembly at Rear Axle Continued



Photo # 6.25

- 6.24 The angle iron upright should be parallel with the rear axle. By maintaining the 1" +/- gap, the holes in the bottom leg of the angle iron should be aligned with those in the SS rear axle plate/floorboard.
- 6.25 Tighten both sets of the 1/4" nut assemblies on each side of the angle iron. See Photo # 6.25

## Angle Iron Sub-Assembly at Floorboard



Photo # 6.27

- 6.26 Place 1/4" x 2" flat washer on 1/4" x 2-1/4" machine bolt.
- 6.27 Insert bolt assembly through the bottom of floorboard at stabilizer/bushing location and press through the floorboard, SS rear axle plate and angle iron. See Photo # 6.27
- 6.28 Place 1/4" flat washer on 1/4" x 2-1/4" machine bolt.
- 6.29 Place 1/4" lock washer on 1/4" flat washer.
- 6.30 Install 1/4" nut on 1/4" lock washer. See Photo # 6.30
- 6.31 **Do not completely tighten.** Further adjustments to occur in future Step Fourteen.
- 6.32 Repeat Steps 6.26 through 6.31 above for second stabilizer bolt hole.

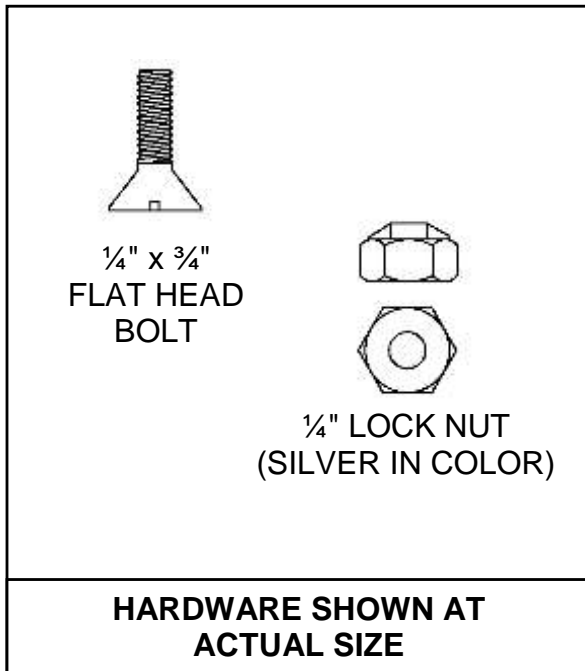


Photo # 6.30

# **STEP SEVEN**

## **Brake Pad Installation**

**Required Items: Brake Pad Bag, Plunger, Tools**



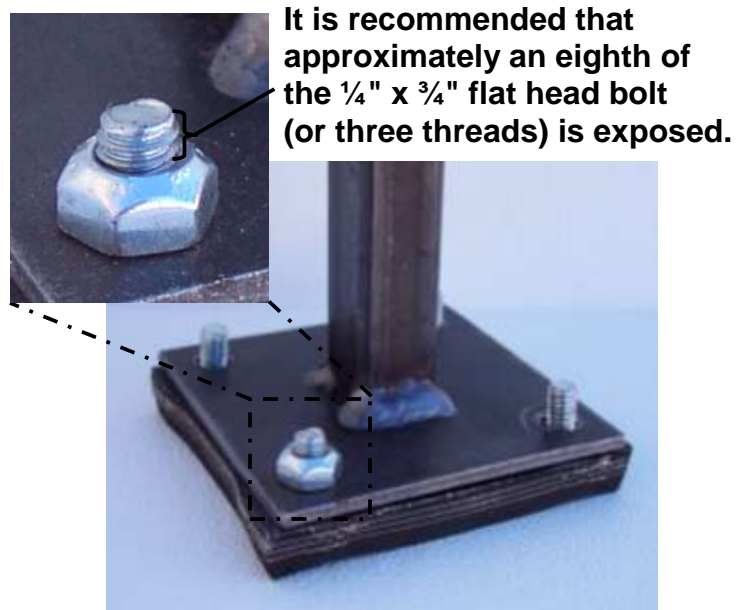
### **Brake Pad Installation**

**See Tech Tip E24.6**

- 7.1 Insert one 1/4" x 3/4" flat head bolt through each hole of the brake pad. Either side of the brake pad may be used. See Photo # 7.1
- 7.2 Align bolts in brake pad with holes in flat bottom of the plunger and insert.
- 7.3 Place a 1/4" lock nut (silver in color) on 1/4" x 3/4" flat head bolt. See Photo # 7.3
- 7.4 Tighten assembly. It is recommended that approximately an eighth of the 1/4" x 3/4" flat head bolt (or three threads) is exposed. The 1/4" x 3/4" flat head bolt will be recessed in the bottom of the brake pad. See Photo # 7.4
- 7.5 Repeat Steps 7.1 through 7.4 for other three bolt locations.



**Photo # 7.1  
(Brake Pad)**

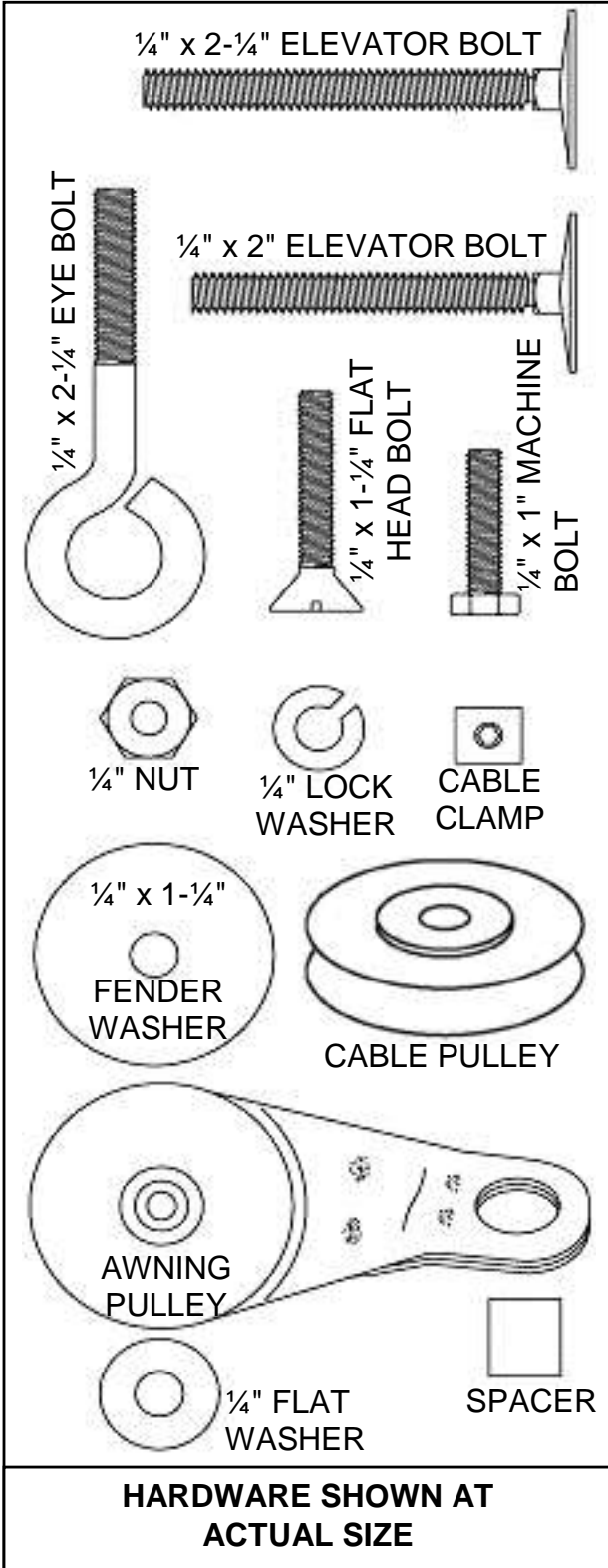


**Photo # 7.4  
(Brake Pad/Plunger Assembly)**

# STEP EIGHT

## Brake Installation

Required Items: Brake Bag, Floorboard, Brake Pad/Plunger Assembly from Step Seven, Brake Spring, Tape (provided by others), Tools



### Brake Pedal Hinge Sub-Assembly

- 8.1 Align the four hinge holes with the brake pedal. Top of the wood brake pedal has rounded corners and the bottom is straight. The fifth hole located at the rounded corner is for brake pedal eyebolt installation.
- 8.2 Insert 1/4" x 1-1/4" flat head bolt through brake pedal and through one of the four hinge holes.
- 8.3 Install 1/4" lock washer on 1/4" x 1-1/4" flat head bolt.
- 8.4 Install 1/4" nut on 1/4" lock washer. See Photo # 8.4 **Do not completely tighten.**
- 8.5 Repeat Steps 8.2 through 8.4 for other three bolts.
- 8.6 Tighten nuts until bolt heads are flush with face of brake pedal.



Photo # 8.4  
(Partial image shown for clarity)

## Brake Pedal Eyebolt Sub-Assembly



**Photo # 8.12**  
**(Eyebolt will face rear of car)**

- 8.7 Install 1/4" nut on 1/4" x 2-1/4" eyebolt. Tighten nut to the end of threads on eyebolt.
- 8.8 Place 1/4" x 1-1/4" fender washer on the eyebolt.
- 8.9 Insert eyebolt assembly through the hole in the wood brake pedal on side opposite hinge.
- 8.10 Place 1/4" x 1-1/4" fender washer on the brake pedal eyebolt assembly.
- 8.11 Install 1/4" lock washer on 1/4" x 1-1/4" fender washer.
- 8.12 Install 1/4" nut on 1/4" lock washer.  
See Photo # 8.12
- 8.13 Tighten eyebolt assembly.



### Brake Assembly Installation (Legend area highlighted)

### Brake Pedal Hinge Sub-Assembly at Floorboard **\*See Tech Tip E24.3**



**Photo # 8.19**

- 8.14 Align the two outer holes of the brake pedal hinge with holes in floorboard at brake pedal location (center hole of hinge not used).  
See legend for location of holes.
- 8.15 Insert one 1/4" x 2" elevator bolt through the floorboard bottom at a brake pedal hole location and press through the floorboard and brake pedal hinge hole.
- 8.16 Place 1/4" lock washer on 1/4" x 2" elevator bolt.
- 8.17 Install 1/4" nut on 1/4" lock washer.  
**Do not completely tighten.**
- 8.18 Repeat Steps 8.14 through 8.17 for second bolt.
- 8.19 Tighten both nuts until bolts are drawn in flush with bottom of floorboard. See Photo # 8.19

## Cable Pulley Sub-Assembly at Brake/Steering Mount

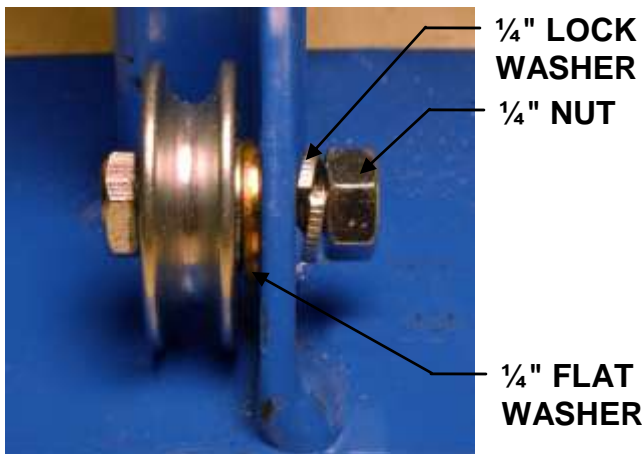


Photo # 8.25

- 8.20 Insert 1/4" x 1" machine bolt through cable pulley.
- 8.21 Place 1/4" flat washer on 1/4" x 1" machine bolt.
- 8.22 Insert 1/4" x 1" machine bolt with cable pulley and flat washer through hole in the left side of the vertical plate of the brake/steering mount.
- 8.23 Place 1/4" lock washer on the machine bolt assembly.
- 8.24 Install 1/4" nut on 1/4" lock washer.
- 8.25 Tighten assembly. Cable pulley shall spin freely. See Photo # 8.25

## Plunger Sub-Assembly



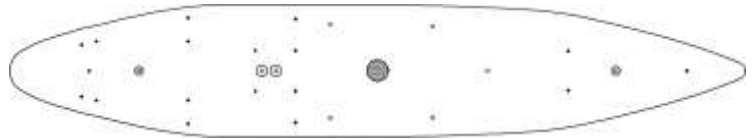
Photo # 8.27  
(Steering wheel and steering cables not shown for clarity)

- 8.26 Install 1/4" nut on 1/4" x 2-1/4" eyebolt. Tighten nut to end of threads on eyebolt.
- 8.27 Insert square tube end of brake plunger assembly through bottom of floorboard at large round hole of brake/steering mount and push through top of brake/steering mount. See Photo # 8.27
- 8.28 Place brake spring over brake plunger.
- 8.29 Compress brake spring coil and insert eyebolt assembly through hole of plunger. (Eyebolt faces rear of car).
- 8.30 Place 1/4" lock washer on the eyebolt assembly.
- 8.31 Install 1/4" nut on 1/4" lock washer. See Photo # 8.31
- 8.32 Tighten eyebolt assembly.
- 8.33 Push assembly down several times to ensure smooth operation.



Photo # 8.31

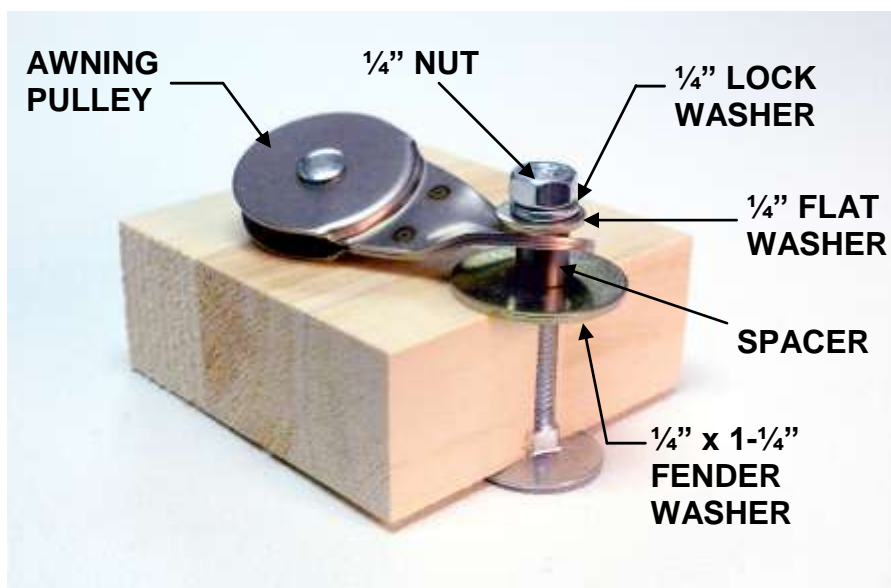
REVISED 3/2010



**Awning Pulley Installation**  
**(Legend area highlighted)**

**Awning Pulley Sub-Assembly**

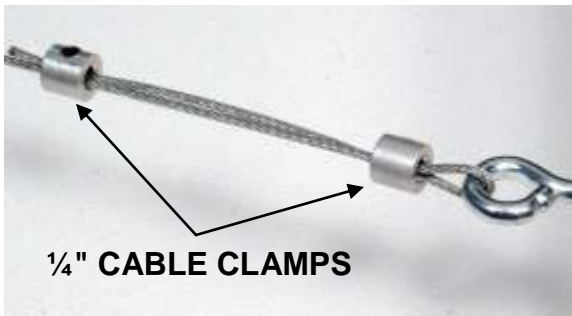
- 8.34 Insert one  $\frac{1}{4}$ " x 2- $\frac{1}{4}$ " elevator bolt through the floorboard bottom at awning pulley hole location. See legend for location of hole.
- 8.35 Place  $\frac{1}{4}$ " x 1- $\frac{1}{4}$ " fender washer on the elevator bolt on top of the floorboard.
- 8.36 Place spacer on  $\frac{1}{4}$ " x 1- $\frac{1}{4}$ " fender washer.
- 8.37 Place awning pulley hole on spacer.
- 8.38 Place  $\frac{1}{4}$ " flat washer on awning pulley.
- 8.39 Place  $\frac{1}{4}$ " lock washer on  $\frac{1}{4}$ " flat washer.
- 8.40 Install  $\frac{1}{4}$ " nut on  $\frac{1}{4}$ " lock washer.
- 8.41 The awning pulley swings freely and should be pointed toward the front of the car. See Photo # 8.41
- 8.42 Tighten nut until bolt is drawn flush with bottom of floorboard.



**Photo # 8.41**

## Brake Cable Sub-Assembly

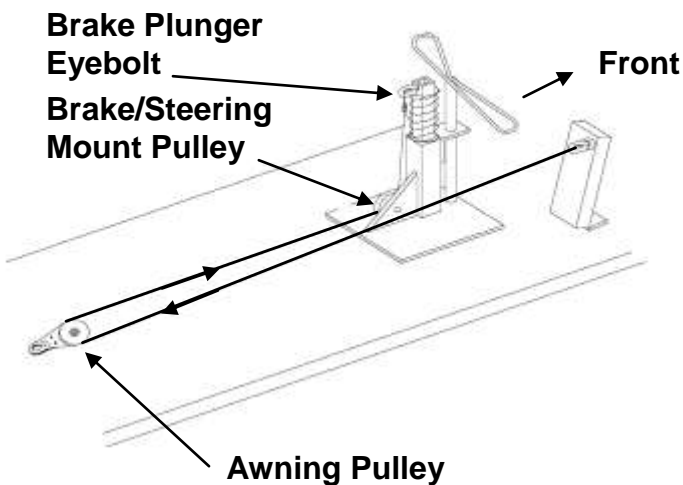
**\*See Tech Tip E24.5**



**Photo # 8.45**



**Photo # 8.47**



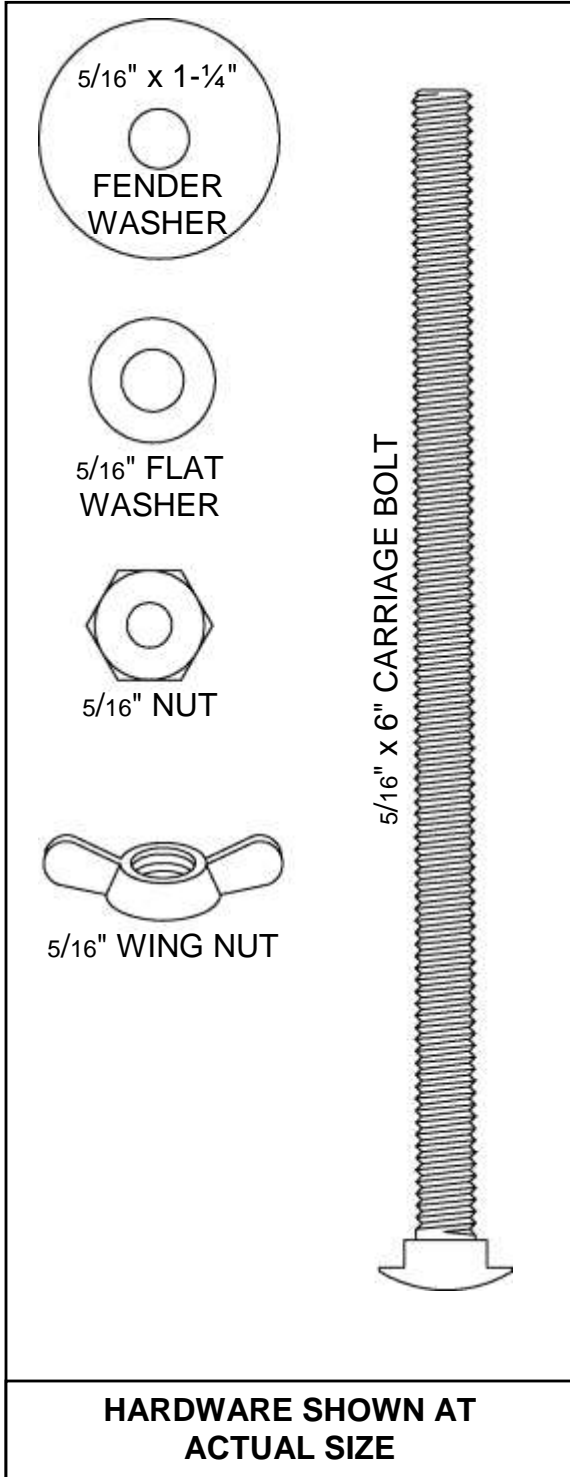
**Figure # 8.50**

- 8.43 Slide two cable clamps on one end of the brake cable.
- 8.44 Thread end of brake cable (approximately six inches) through the brake pedal eyebolt creating a loop around eyebolt.
- 8.45 Thread cable back through the two cable clamps. See Photo # 8.45
- 8.46 Tighten cable clamps with a 5/64" Allen Wrench.
- 8.47 Thread other end of brake cable through awning pulley and continue through cable pulley at brake/steering mount. See Photo # 8.47
- 8.48 Slide two cable clamps on the cable and continue the cable up through brake plunger eyebolt.
- 8.49 Insert loose end of the cable back through both cable clamps creating a loop around the eyebolt.
- 8.50 Pull loose end of cable tight and tighten cable clamps with a 5/64" Allen Wrench. See Figure # 8.50
- 8.51 Apply pressure to brake pedal and check for smooth operation of brake plunger. Lubrication of the plunger shaft and adjustment of the brake cable may be required. When brake is applied, brake plunger should extend sufficiently to the ground surface to stop the car.
- 8.52 Tighten all cable clamps securely.
- 8.53 Excess cable length may be removed by cutting. To avoid cable fraying it is recommended that solder be applied to a 1/4" +/- on either side of the proposed cut **prior to cutting**.
- 8.54 It is permitted to secure the loose ends of the cable with tape (provided by others).
- 8.55 Push brake pedal several times to ensure proper operation.

# **STEP NINE**

## **Weight Bolt Installation**

**Required Items: Weight Bolt Bag, Floorboard, Weights (provided by others), Tools**



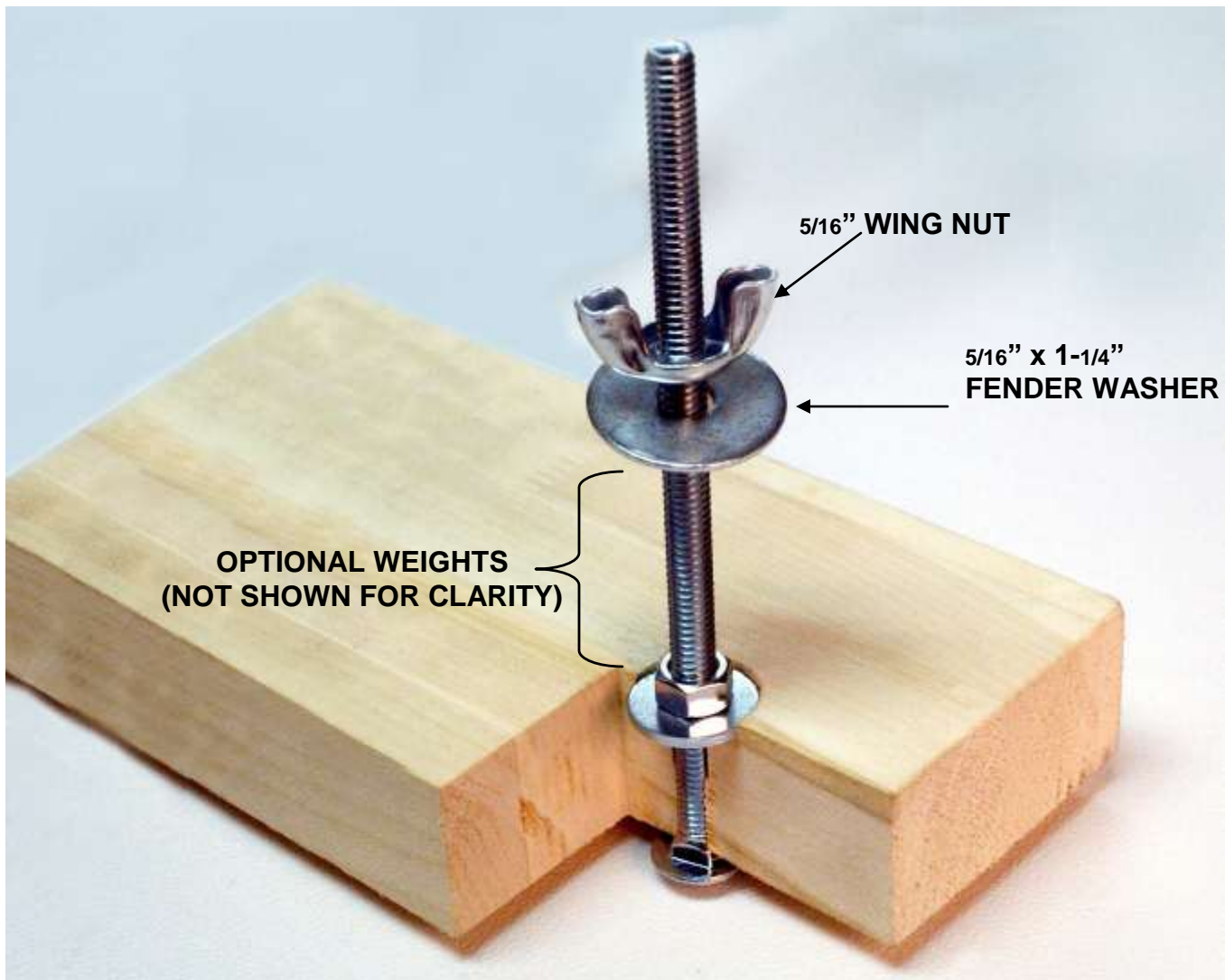
**Weight Bolt Installation**  
**(Legend area highlighted)**

### **Weight Bolt Installation**

- 9.1 Insert threaded end of 5/16" x 6" carriage bolt through the floorboard bottom at the weight hole location and press through the floorboard. See legend for location of holes.
- 9.2 Place a 5/16" flat washer on the 5/16" x 6" carriage bolt.
- 9.3 Install 5/16" nut on 5/16" flat washer.
- 9.4 Tighten bolt assembly.
- 9.5 Repeat Steps 9.1 through 9.4 for second bolt location.
- 9.6 These adjustable weight bolt assemblies are required.
- 9.7 See Tech Tips E20 – Optional Weights.

## Weight Bolt Installation Continued

- 9.8 Place owner provided weights as needed over either, or both, of the  $\frac{5}{16}$ " x 6" carriage bolts.
- 9.9 Place  $\frac{5}{16}$ " x 1- $\frac{1}{4}$ " fender washer on owner provided adjustable weight on both bolts.
- 9.10 Install  $\frac{5}{16}$ " wing nut on  $\frac{5}{16}$ " x 1- $\frac{1}{4}$ " fender washer of both bolts. See Photo # 9.10
- 9.11 Tighten wing nuts. **Note that  $\frac{5}{16}$ " x 1- $\frac{1}{4}$ " fender washer and  $\frac{5}{16}$ " wing nut must be installed even if weight is not used.**
- 9.12 See Tech Tips E20 – Optional Weights.

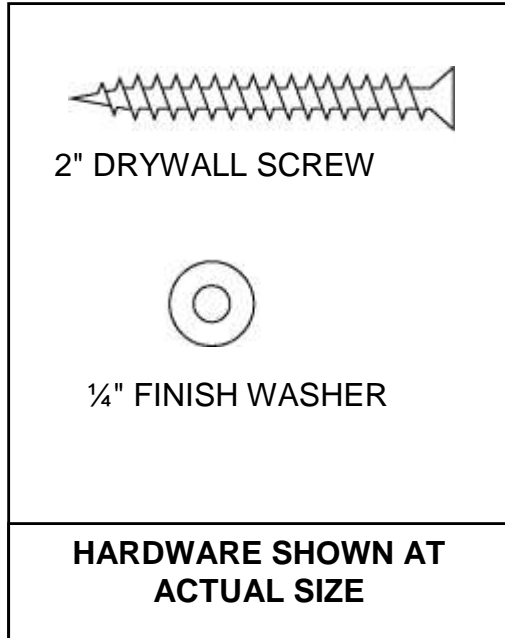


**Photo # 9.10**

# STEP TEN

## Airfoil Installation

**Required Items: Airfoil Bag, Airfoils, Floorboard Assembly, Tools**



### Front Axle Airfoil Installation

**NOTE: Airfoil used for front installation requires cutting (by others) at indicated line. Cut may be sanded to ease edge. See photo 10.0**

- 10.1 Slide airfoil over the front axle square stock. Airfoil must not extend into the spindle (round stock) portion of the axle. Clip portion is closest to axle spindle. See Photo # 10.1
- 10.2 Place a 2" drywall screw through a 1/4" finish washer.
- 10.3 Insert 2" drywall screw with 1/4" finish washer through rear surface of axle square stock. Tighten assembly. Recommend hand driver only. See Photo # 10.3
- 10.4 Repeat Steps 10.2 through 10.3 for the second attachment.
- 10.5 Repeat Steps 10.1 through 10.4 for second front axle airfoil.
- 10.6 No painting or covering of the airfoils.

**NOTE: Cut airfoils to be used at front axle only.**

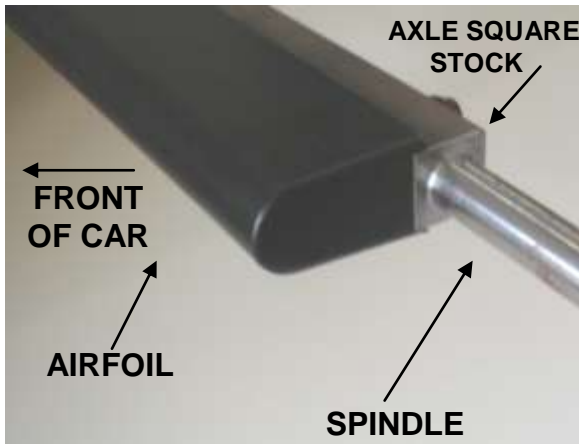


Photo # 10.1

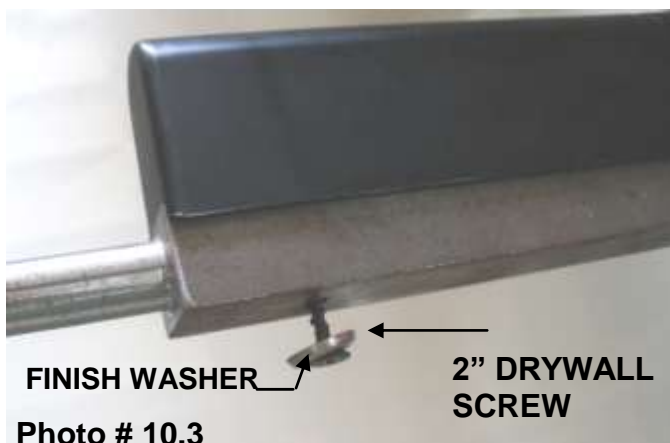
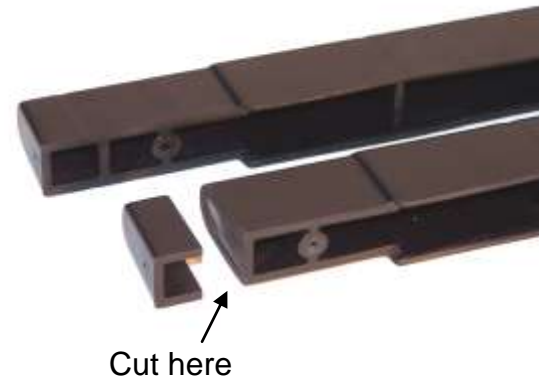
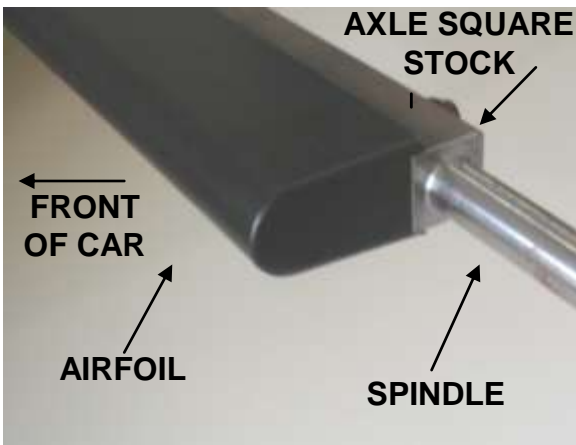


Photo # 10.3



## Rear Axle Airfoil Installation



**Photo # 10.7**

10.7 Slide airfoil over the rear axle square stock. Airfoil must not extend into the spindle (round stock) portion of the axle. See Photo # 10.7

10.8 Place a 2" drywall screw through a ¼" finish washer.

10.9 Insert 2" drywall screw with ¼" finish washer through rear surface of axle square stock. Tighten assembly. Recommend hand driver only. See Photo # 10.9

10.10 Repeat Steps 10.8 through 10.9 for the second attachment.

10.11 Repeat Steps 10.7 through 10.10 for second rear axle airfoil.

10.12 No painting or covering of the airfoils.

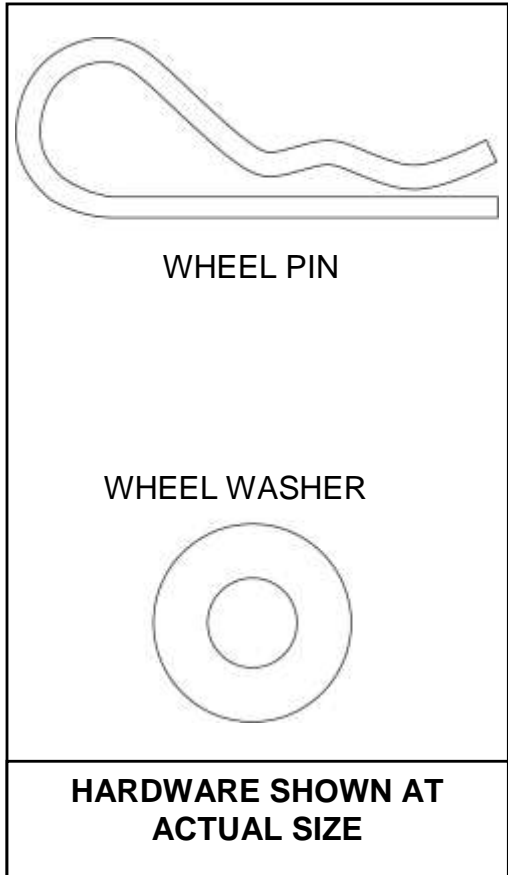


**Photo # 10.9**

# **STEP ELEVEN**

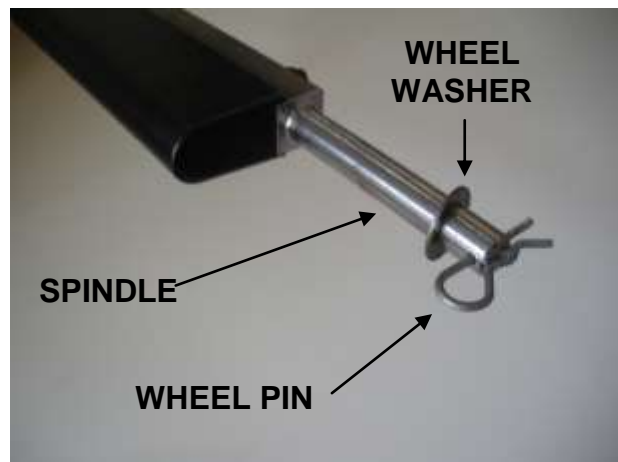
## **Wheel Kit Installation**

**Required Items: Wheel Kit Bag, Z-Glas™ Wheels (purchased separately), Tools**



### **Wheel Kit Installation**

- 11.1 Place a Z-Glas™ wheel (purchased separately) on an axle spindle.
- 11.2 Place a wheel washer on the axle spindle with the Z-Glas™ wheel.
- 11.3 Install wheel pin from front of axle through horizontal hole in axle spindle. See Photo # 11.3 Round portion of wheel pin must face the front of the car.
- 11.4 Repeat Steps 11.1 through 11.3 for the other three wheels.



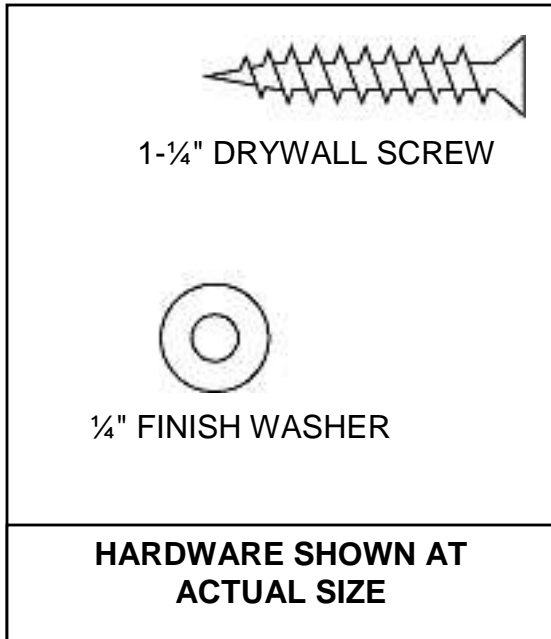
**Photo # 11.3  
(Wheel not shown for clarity)**

# STEP TWELVE

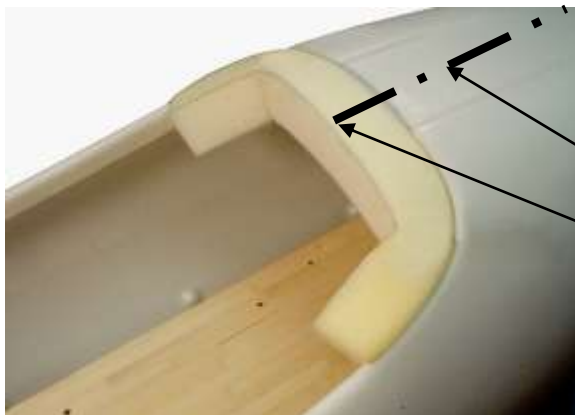
## Shell Installation

**Required Items: Body Mounting Bag, Foam, Shell, Floorboard Assembly (completed to this point), Adhesive and Tape (provided by others), Tools**

### Front Foam Sub-Assembly



- 12.1 Determine the front center point of the shell cockpit and temporarily mark on top shell. This will establish the center of the foam.
- 12.2 Temporarily mark the center of the long dimension of the foam.
- 12.3 Apply adhesive (provided by others) to the surfaces per adhesive manufacturer's instructions.
- 12.4 Being sure to keep the top of the foam flush with the top of the shell, apply the foam to the front inner lip of the cockpit starting in the center and working outward on both sides. **Foam must be installed in full dimension and may not be cut or altered.** See Photo # 12.4
- 12.5 Use tape (provided by others) to temporarily clamp foam until adhesive is set.
- 12.6 See Tech Tips E22 – Cockpit Foam.

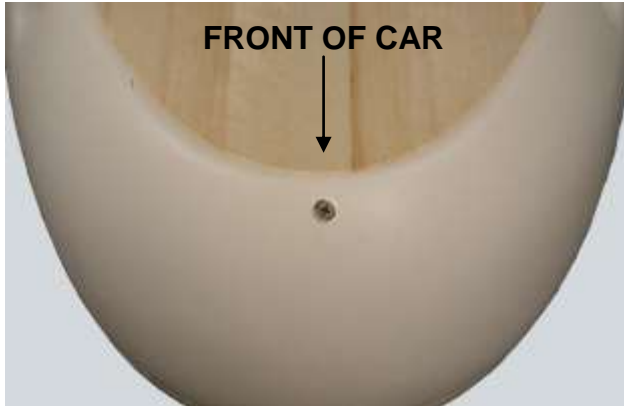


**Photo # 12.4**



**Shell Installation**  
**(Legend area highlighted – axles and other parts not shown for clarity)**

**Shell Installation Sub-Assembly**



**Photo # 12.11**  
**(Bottom view of floorboard and shell)**

- 12.7 Support floorboard off floor with two support boards wider than the floorboard width. Boards need to be the same thickness.
- 12.8 Lower shell over floorboard carefully slipping steering cables through slots at each side of the shell until shell is flush with bottom of floorboard.
- 12.9 Insert a 1-¼" drywall screw through a ¼" finish washer.
- 12.10 Insert the first screw/washer assembly through location "A" located at the front center of the car. **Note that the hole for this location is not pre-drilled.** See floorboard legend location "A".
- 12.11 Tighten screw/washer until nose of shell is flush to the front of the floorboard. No gap is permitted between shell and floorboard at the nose of the car. See Photo # 12.11
- 12.12 Adjust shell bottom to be flush with bottom of floorboard.
- 12.13 Insert another 1-¼" drywall screw through a ¼" finish washer.
- 12.14 Insert screw/washer assembly through any other shell hole of the car. Tighten assembly until the shell is tight to the floorboard.
- 12.15 Repeat Steps 12.13 through 12.14 until all holes in the shell are filled with screw/washer assemblies.
- 12.16 **Front airfoils will need to be trimmed to the shell as noted in Step Ten.**
- 12.17 Check for clearance at axles and steering cable openings; axle and steering cable openings may be trimmed to ensure clearance.

# **STEP THIRTEEN**

## **Signage, Lettering & Decoration**

**Required Items: International Soap Box Derby, Inc. Decals, Signage, Lettering, and Decoration (provided by others)**

### **Signage, Lettering & Decoration**

- 13.1 Specific areas of the shell are restricted as to the signage, lettering and decoration permitted.  
See Photos # 13.1 Top and Side Views

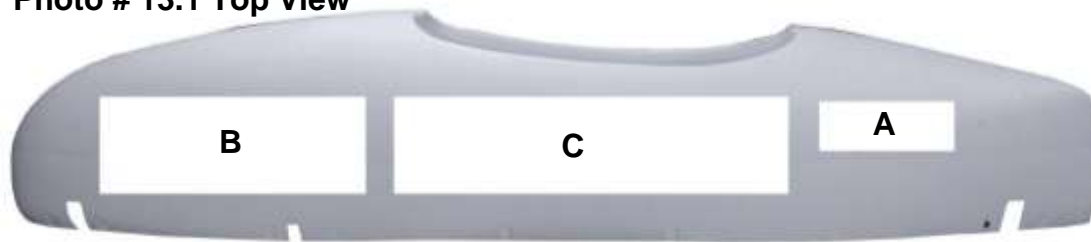
The following decals must be in place during any local, rally, and/or the International Soap Box Derby, Inc. Championship Race:

- A. International Soap Box Derby, Inc. Number\*
  - B. Title/National Sponsor\*
  - C. Local Sponsor (Race City or Rally Division)
  - D. International Soap Box Derby, Inc. Logo\*
- \*Provided by International Soap Box Derby, Inc.

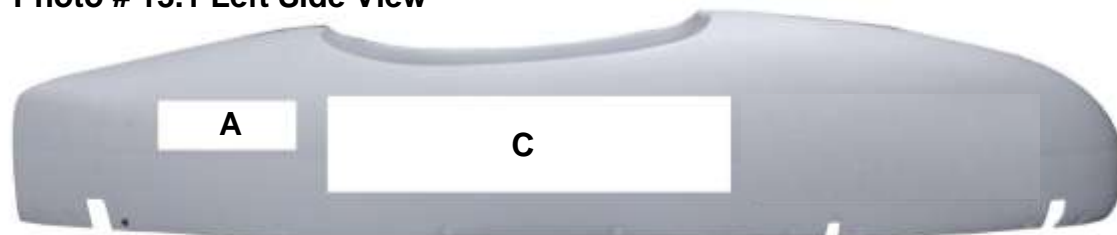
Optional signage, lettering and decoration may include the car sponsor and/or driver's name.  
No signage, lettering and/or decoration may cover any screw attachments.



**Photo # 13.1 Top View**



**Photo # 13.1 Left Side View**



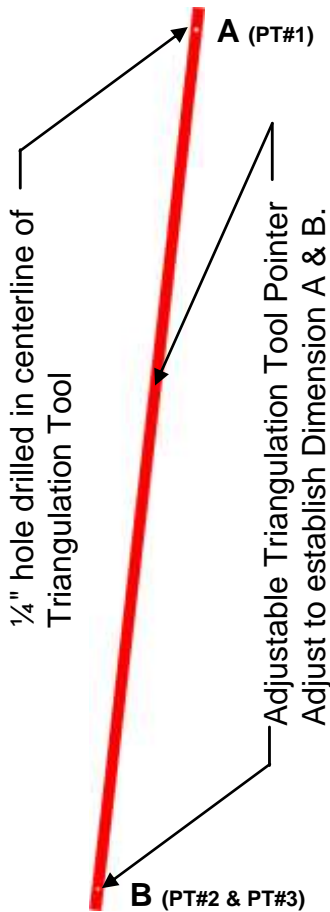
**Photo # 13.1 Right Side View**

# FOURTEEN

## Axle Alignment & Triangulation

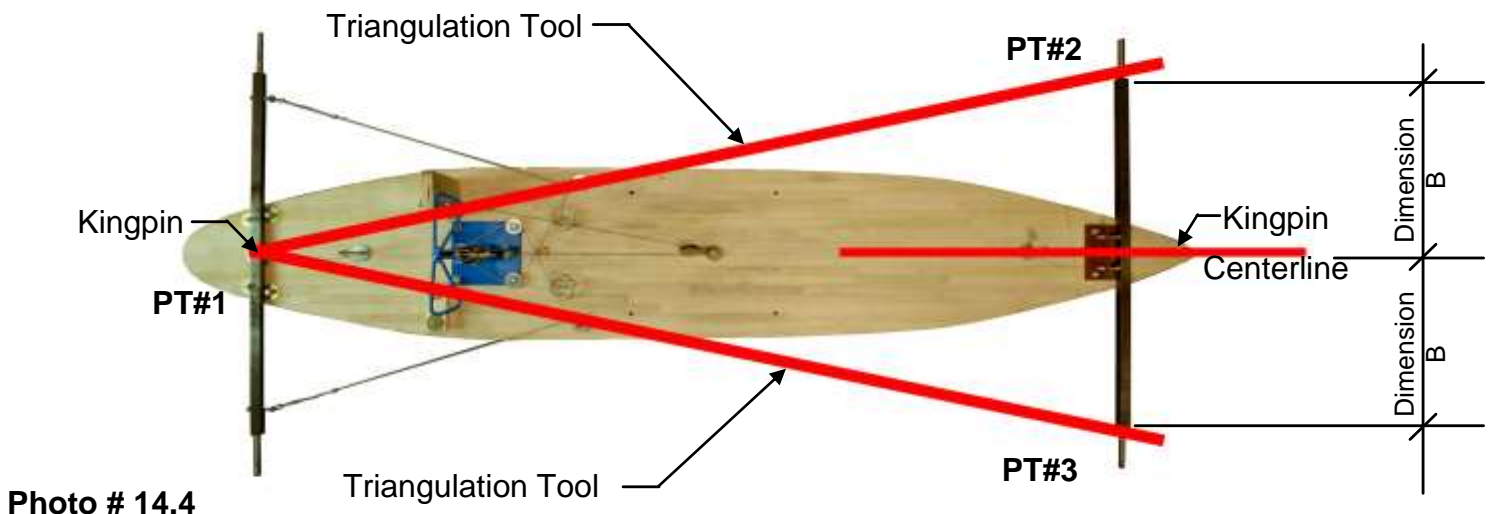
**Required Items: Tape Measure and Triangulation Tool (provided by others), Tools**

### Rear Axle Triangulation



**Figure # 14.2**

- 14.1 The rear axle will need to be aligned to ensure that the car tracks properly in a straight line. This is known as Triangulation. Contact your local Derby Director for other available methods and assistance.
- 14.2 Obtain a long straight piece of wood or metal to create a "Triangulation Tool". Drill a 1/4" hole in one end and fix an adjustable pointer at the other end. See Figure # 14.2
- 14.3 Slide the 1/4" hole end over the front axle kingpin and use the adjustable pointer to establish Dimension B (PT#2 and PT#3) close to the end of the square stock. Mark locations PT#2 and PT#3.
- 14.4 Semi-tighten the rear stabilizer assembly and adjust the rear axle until both dimensions are exactly the same between PT#1 and PT#2, and PT#1 and PT#3. See Photo # 14.4
- 14.5 When both dimensions are equal, tighten the rear stabilizer assembly.
- 14.6 Check the measurement to ensure it is equal.



**Photo # 14.4**

## Front Axle Alignment



Photo # 14.8(a)  
(Cable Adjuster Eye Bolt)

- 14.7 The front axle will need to be aligned to ensure that the steering wheel is properly centered to allow the car to properly track in a straight line. Contact your local Derby Director for other available methods and assistance.
- 14.8 Center the steering wheel. Measure from the front edge of the rear axle to the front edge of the front axle on both sides. Tighten or loosen the steering cables at the cable adjuster eye bolt until Dimension C is exactly the same on both sides. See Photo # 14.8(a) and Photo # 14.8(b)
- 14.9 Tighten nuts on both sides of the cable adjuster.
- 14.10 Check the measurement to ensure that it is equal. The steering cable should be tight; however, not so tight that it bows the front axle.
- 14.11 Make sure that the axle turns in the same direction as the steering wheel.
- 14.12 Tighten all parts of the steering assembly as shown in Step Five.
- 14.13 Steering cable excess length may be cut off past the cable clamps. To avoid cable fraying it is recommended that solder be applied a  $\frac{1}{4}$ " +/- on each side of the proposed cut **prior to cutting**.

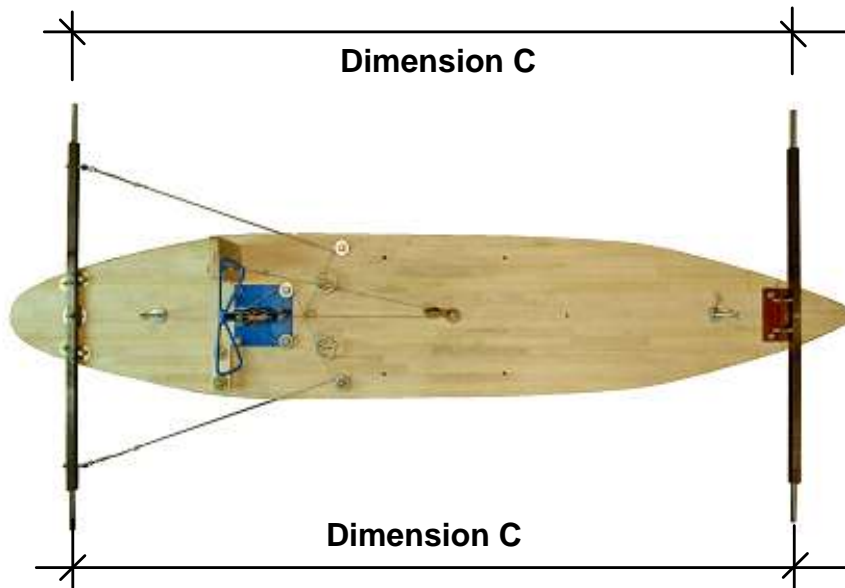


Photo # 14.8(b)

# **STEP FIFTEEN**

## **Assembly Checklist**

---

Carefully review the checklist below to ensure that you have completed the assembly of your car. The Installation Steps and Tech Tips are provided so that you may easily reference the work completed at each item identified.

- |                                     |                 |
|-------------------------------------|-----------------|
| ___ Steering Stop Installation      | (Step One)      |
| ___ Foot Brace Installation         | (Step Two)      |
| ___ Kingpin Installation            | (Step Three)    |
| ___ Steering Hardware Installation  | (Step Four)     |
| ___ Steering Cabling Installation   | (Step Five)     |
| ___ Stabilizer Installation         | (Step Six)      |
| ___ Brake Pad Installation          | (Step Seven)    |
| ___ Brake Installation              | (Step Eight)    |
| ___ Weight Bolt Installation        | (Step Nine)     |
| ___ Airfoil Installation            | (Step Ten)      |
| ___ Wheel Kit Installation          | (Step Eleven)   |
| ___ Shell Installation              | (Step Twelve)   |
| ___ Signage, Lettering & Decoration | (Step Thirteen) |
| ___ Axle Alignment & Triangulation  | (Step Fourteen) |
| ___ Optional Weights                | (Tech Tip E20)  |
| ___ Optional Finishes               | (Tech Tip E21)  |
| ___ Cockpit Foam                    | (Tech Tip E22)  |
| ___ Alignment                       | (Tech Tip E23)  |
| ___ Permitted Modifications         | (Tech Tip E24)  |

**Congratulations on completing your car. You are now ready to race!**

# TECH TIP E20

## Optional Weights (Provided by Others)

### General Requirements

E20.1 The car may be increased to the maximum weight of 230 pounds (including the driver, car and Z-Glas™ wheels) by the addition of weights. The additional weight must be securely bolted through the floorboard and pass all safety requirements of the inspection committee.

There are two types of weight:

- 1) Adjustable Weight
- 2) Fixed Weight

E20.2 Fixed and adjustable weight is available for purchase from the International Soap Box Derby, Inc.

E20.3 Weight may consist of wood or metal materials. Weight in the form of angles, channels, tees or other structural shapes are not permitted. If bar bell type weights are used, the large center hole must be filled or a dowel rod must be used until the weight fits securely on the weight 5/16" bolt.

E20.4 If 10 or less pounds of weight is used in a car, *all* of the weight must be adjustable.

E20.5 If more than 10 pounds of weight is used in a car, a combination of fixed and adjustable weight is permitted. However, at least 10 pounds of the weight *must be* adjustable (3-two-pound, 3-one pound, and 2-eight ounce or any other combination).

E20.6 Weight may not be located between the original holes of the foot brace and the brake pedal back to the steering pulleys as shown in Photo # E20.6.

E20.7 A 1/8" clearance must be maintained between the weights, shell, axles, stabilizer assembly and the weight-free zone.

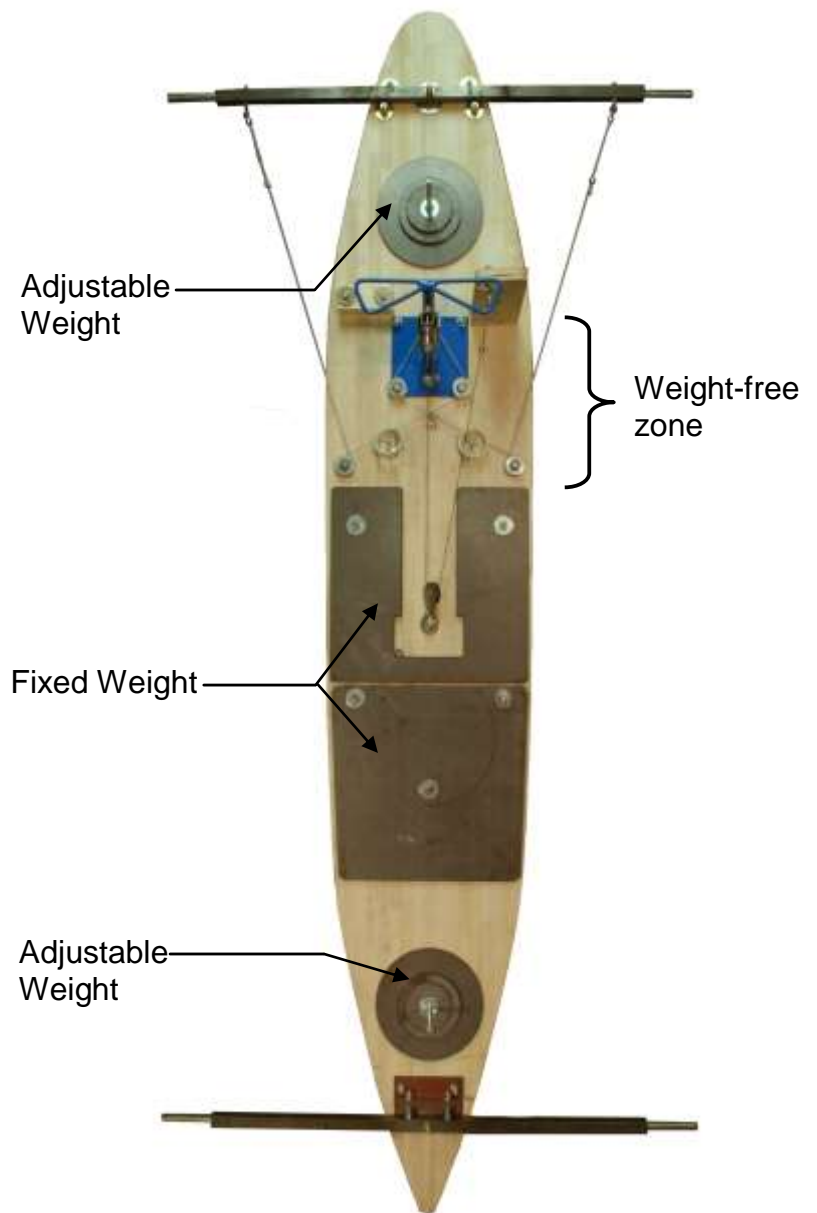


Photo # E20.6

## General Requirements Continued

- E20.8 All weights must be easily removable with adequate bolt clearance. Weights must not:
- 1) Disconnect or remove any hardware components
  - 2) Conceal any components
  - 3) Be permanently attached to the car
  - 4) Be threaded on the weight bolt
  - 5) Be poured into the car
  - 6) Touch the side or other components of the car
  - 7) Be chained to the car

- E20.9 Weight materials must be painted and the weight of each piece clearly marked.

### Adjustable Weights

- E20.10 Two locations are dedicated for the adjustable weight. The bolts for these locations were installed in Step Nine. These two bolts are the *only* location that adjustable weight will be placed. See floorboard legend. Adjustable weight height is limited only by the length of the bolt. The size of the adjustable weight is limited by the required 1/8" clearance to the shell, axles, and stabilizer assembly and/or cannot exceed 12" lengthwise. See Photo # E20.10

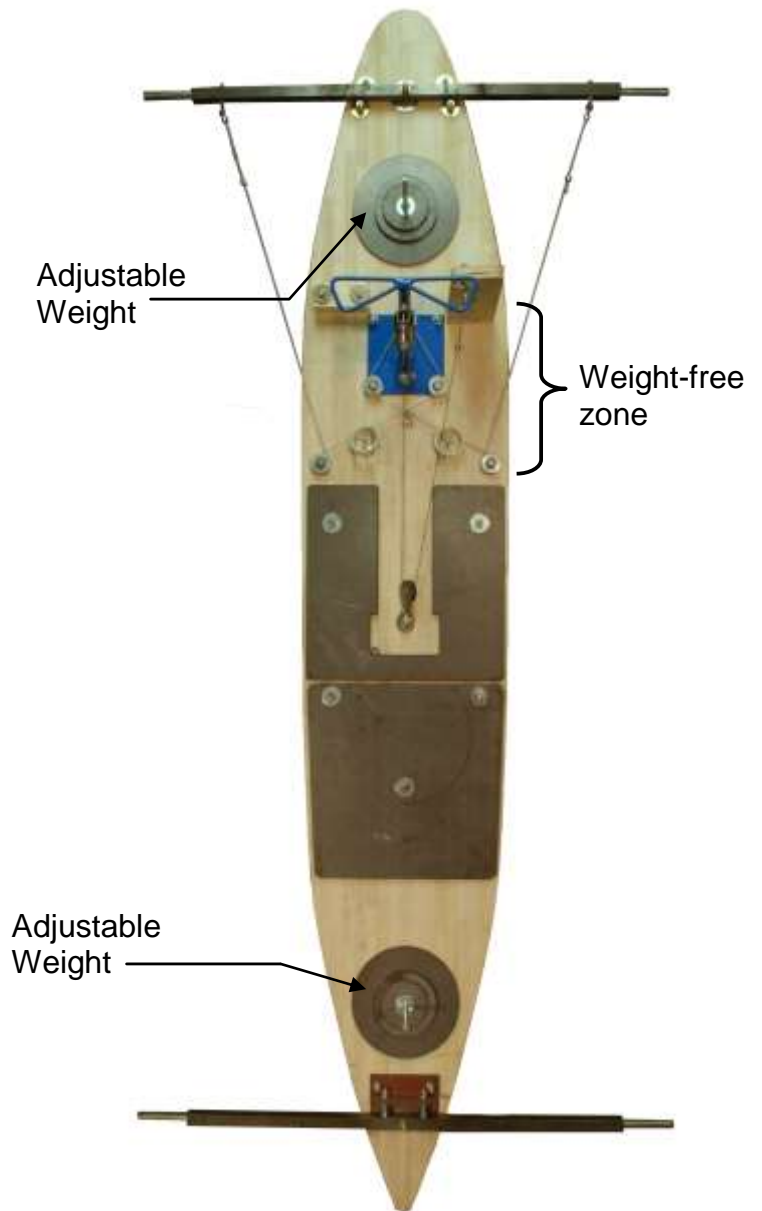
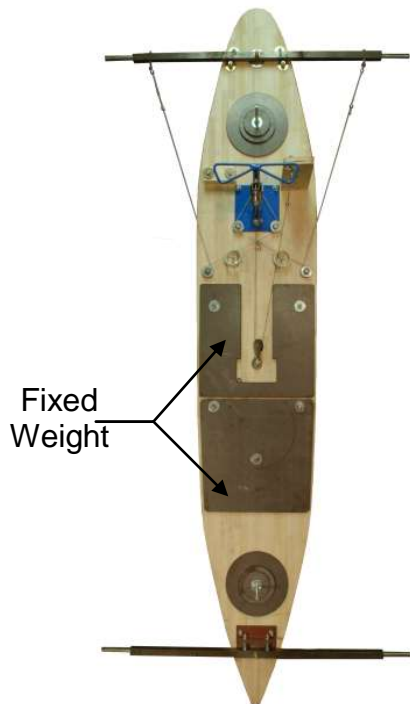
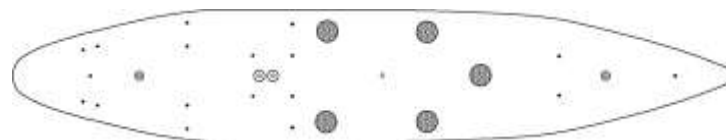


Photo # E20.10



**Photo # E20.11**



**Fixed Weight Bolt Installation**  
**(Legend area highlighted)**

**Fixed Weight**

- E20.11 Five bolt holes in the center/seat location of the floorboard are dedicated to fixed weight only. These five bolt areas are the *only* location that fixed weight may be anchored. See legend above for location of holes. Any combination of bolt locations may be used, but each weight must be secured by a minimum of one bolt. See Photo # E20.11
- E20.12 Fixed weight must not exceed a maximum height of 1-½" above the floorboard or exceed a 12" lengthwise dimension. Weight must be secured to prevent shifting or any type of movement with a 5/16" bolt, 5/16" x 1-¼" fender washer and a 5/16" nut (provided by others).
- E20.13 Added weight in the form of bars, plates or flat shapes will be permitted but must not exceed 12" lengthwise, must stack evenly on each other in the car, and must not exceed an overall total height of 1-½". A minimum horizontal clearance of 1/8" must occur between weights in the fixed weight area.
- E20.14 See Photo # E20.14 for examples of adjustable and fixed weight.



**Photo # E20.14**  
**(Weight materials must be painted and the weight of each piece clearly marked.)**

# **TECH TIP E21**

## **Optional Finishes (Provided by Others)**

---

### **Floorboard**

E21.1 All existing Super Stock floorboards and floorboards engraved with the derby shield and 06 may be finished with tung oil. New floorboards engraved with the derby shield and 07, then and thereafter, will be pre-finished by the manufacturer. Particle floorboards are no longer legal in the Stock and Super Stock divisions. "SBP" branded floorboards cannot be used after August 1<sup>st</sup> 2010. See photo E21.1a and E21.1b. See exception to phase out at [http://aasbd.whitespace-creative.com/media/1652/floorboard\\_phase\\_out\\_and\\_airfoil\\_update.pdf](http://aasbd.whitespace-creative.com/media/1652/floorboard_phase_out_and_airfoil_update.pdf)

E21.2 Only a thin coat of clear wax may be applied to the top, bottom and/or sides of the pre-finished floorboards. Note that the machine marks on the sides of the floorboard shall remain. No finish build-up thickness shall occur.



Photo E21.1a

### **Airfoils**

E21.3 No finish is required for the airfoils. The only optional finish material permitted is:  
1) A thin coat of clear wax



Photo E21.1b

## Shell

- E21.4 The only optional finish materials permitted, but not required, are:
- 1) Decorative permanent markers
  - 2) Self adhesive vinyl materials
  - 3) A thin coat of automotive-type wax
  - 4) Paint
- E21.5 The materials used in the shell manufacturing may cause permanent markers to not properly adhere; therefore, caution is advised when using this optional finish.
- E21.6 The exterior surface of the car shell may be finished with solid sheets or decorative cutouts of self adhesive vinyl material applied in a single layer on the exterior.  
Exceptions:
- 1) If sheet adhesive vinyl material is used, all International Soap Box Derby, Inc. sponsor decals must be placed over the finished surface of the shell
  - 2) A 3" minimum wide strip starting from the bottom of the floorboard up center of nose, over top of the shell, and down the rear shall not be covered. See photo E21.6a.
  - 3) Bottom 2" of shell may not be covered. See photo E21.6b.



E21.7 The exterior shell may have automotive type wax applied as a finish. Caution is advised as some waxes contain colorings that may stain the material.

E21.8 The exterior of the shell may be finished with paint. Seam shall be visible effective August 1, 2011. No paint finish is permitted inside the shell. Note that many paints may crack or may not properly bond to the Super Stock shell. Contact you local Derby Director for methods and assistance.

## Foam

E21.14 Foam may be dyed using clothing dye.

# TECH TIP E22

## Cockpit Foam



Photo # E22.5

### Shell-Cockpit Opening Rear Foam

- E22.1 An additional rear foam piece may be optionally installed in addition to the required foam shown in Step Twelve.
- E22.2 Determine the rear center point of the shell cockpit and temporarily mark on top shell. This will establish the center of the foam.
- E22.3 Temporarily mark the center of the long dimension of the foam.
- E22.4 Apply adhesive (provided by others) to the surfaces per adhesive manufacturer's instructions.
- E22.5 Being sure to keep the top of the foam flush with the top of the shell, apply the foam to the inner lip of the cockpit starting in the center and working outward on both sides. **Optional rear foam must be installed in full dimension and may not be cut or altered.**  
See Photo # E22.5

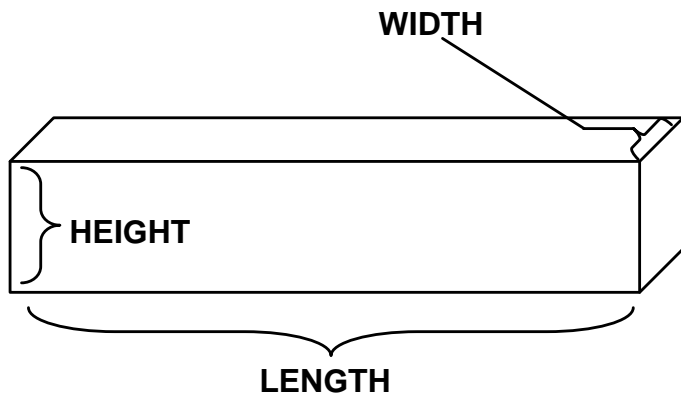


Figure # E22.8  
(Only the length of the optional side foam may be trimmed; the height and width may not be cut or altered.)

### Shell-Cockpit Opening Side Foam

- E22.6 Additional side foam may be optionally installed in addition to the required foam shown in Step Twelve.
- E22.7 Apply adhesive (provided by others) to the surfaces per adhesive manufacturer's instructions.
- E22.8 Being sure to keep the top of the foam flush with the top of the shell, apply the foam to the inner lip of the cockpit. **The length of the optional side foam may be trimmed. The height and width of the optional side foam may not be cut or altered.**  
See Figure # E22.8
- E22.9 Adhesive (provided by others) may be applied at the end-to-end connections of the foam.

## Shell-Cockpit Rear Lip

E22.10 A portion of the shell's inner lip may be removed in an area starting 6-1/2" behind the front center of the cockpit opening continuing to the rear of the opening. A minimum of 1/4" of lip must remain intact.

See Figure # E22.10 and Photo # E22.10

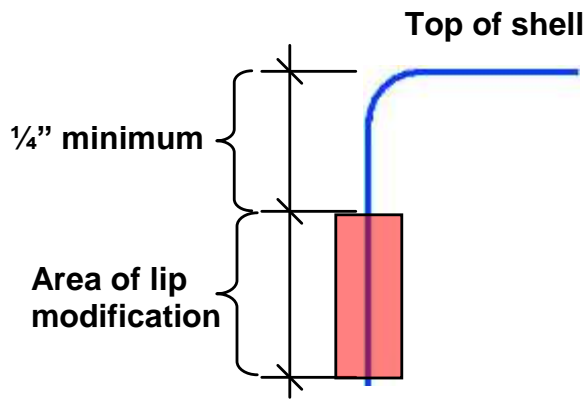


Figure # E22.10

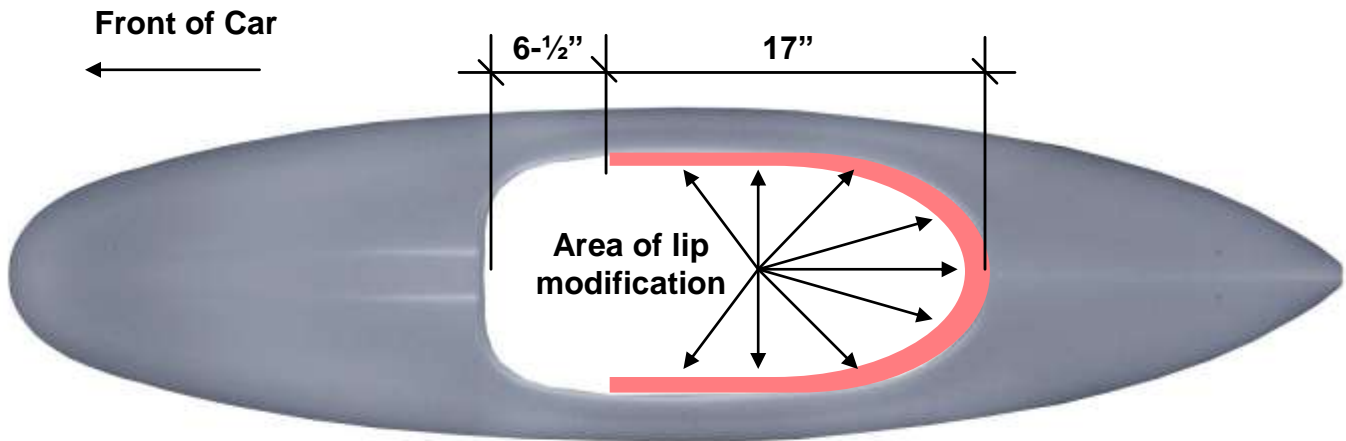


Photo # E22.10

# TECH TIP E23

## Alignment

### Axle-Alignment – Cross Bind Adjustment



Photo # E23.3  
(Feeler Gauge Set)



Photo # E23.4

E23.1 Cross bind adjustment is used to create a parallel horizontal plane between the front and rear axles. A single shim placement at either the front or the rear axle, **not both**, may be installed to eliminate cross bind between the two axles. This procedure is offered as guidance but is not the only method available. Contact your local Derby Director for other available methods and assistance. See Photo # E23.1

E23.2 Elevate the floorboard and view the horizontal alignment of the front and rear axles from one end of the car. Determine if shimming is needed based on whether or not the axles are parallel.

E23.3 The permitted shim must be a single, complete, uncut, feeler gauge (set available at any automotive store). Shims are available in thickness starting at one thousandth of an inch (.001). **Only one shim may be used in a car.** See Photo # E23.3

E23.4 Install the single shim at the kingpin bolt assembly between floorboard and a washer or between two washers, all occurring below the axle bottom and at only one axle kingpin location. Small nails may be used to hold one or both ends of the feeler gauge in place. See Photo # E23.4

E23.5 Tighten all parts of the kingpin assembly as shown in Step Three.

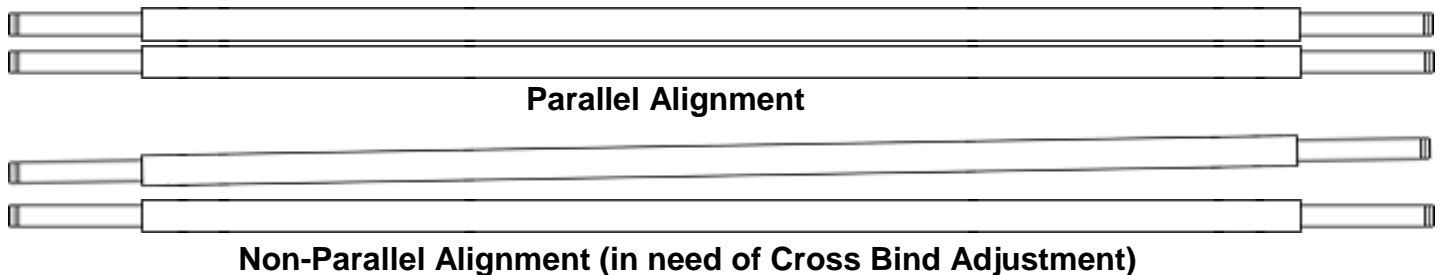


Photo # E23.1

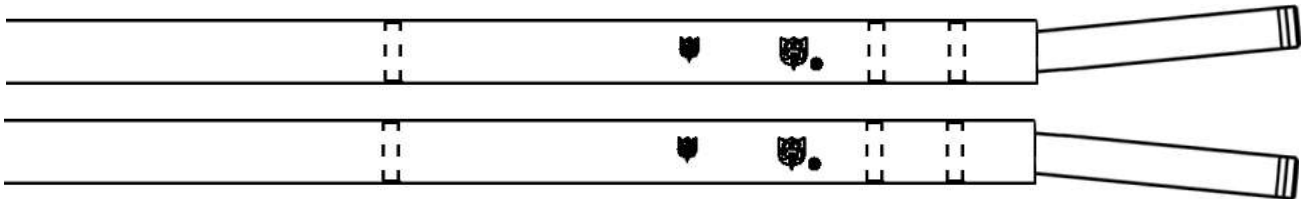
## Axle Alignment – Spindling

E23.6 Spindling is an optional adjustment of the spindle (round portion) of the axle to gain Toe or Camber Alignment.

This is an advanced procedure that requires specialized tools, knowledge, patience and extreme caution to ensure that the axles are not modified and declared disqualified. Contact your local Derby Director for methods and assistance.

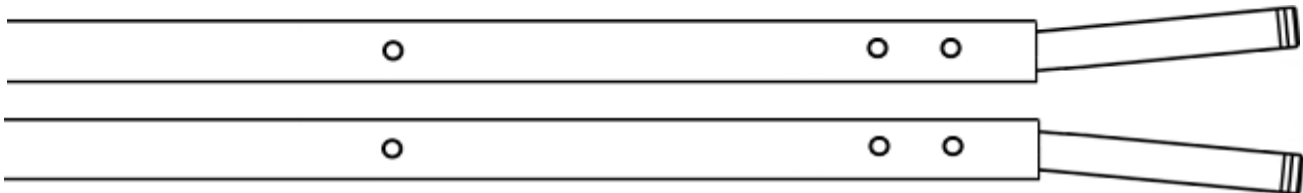
See Figure E23.6(a) and Figure # E23.6(b)

### Top View of Axle showing Toe Alignment (Distorted for Clarity)



**Figure # E23.6(a)**  
(Partial Front Axle (with all hardware removed) shown as an example only.  
This figure can be used for both front and rear axles.)

### Side View of Axle showing Camber Alignment (Distorted for Clarity)



**Figure # E23.6(b)**  
(Partial Front Axle (with all hardware removed) shown as an example only.  
This figure can be used for both front and rear axles.)

# **TECH TIP E24**

## **Permitted Modifications**

---

### **Bushings**

E24.1 The use of epoxy is no longer permitted.

### **Brake/Steering Mount**

E24.2 Brake/Steering mount may be moved **forward only** to accommodate a driver.

### **Brake Pedal and Foot Brace**

E24.3 Brake pedal and foot brace may be moved forward or back to accommodate a driver.

### **Steering Wheel**

E24.4 Steering wheel bowtie may face in either direction.

### **Cable Clamps**

E24.5 Brake cable and steering cable may be double looped.

### **Brake Pad Installation**

E24.6 The brake pad may be installed to the plunger using *both* a 1/4" lock washer and 1/4" nut (provided by others) instead of using the 1/4" lock nut.

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