

# Larry Shaw Race Cars Recommended Tuning Guidelines And Setup Sheet

Please read before deciding what changes to make to your chassis

All tuning recommendations are based on starting at the baseline setup.

Remember the amount of traction offered by the race track or the amount of traction due to what tires you use, will influence the changes you will make to your race car. Also dirt tracks offer up inconsistent surfaces, Example; the amount of traction that the left rear tire sees may be quite a bit different than the amount of traction that the right rear tire sees.

There are basically five types of race track surfaces we generally see these days and the tuning methods we use will be different for each track condition. The five types of tracks are: Greasy-Slimy, Heavy-Tacky, Streaky has slick spots and traction spots on the track, Dry-Slick or very little traction available and rubbered up tracks which are dry but the rubber from the tires is adhering to the track surface offering up a lot of traction.

(Note: In the future I hope to have what setups generally work in what conditions)

Race track configurations and Series rules will also dictate what setups work best for your race car.

We currently have about 20 different tire rules available, across the country. What setup works good on one tire may not work as well on a different tire. For this reason you must be willing to make changes to your car or how you drive the car to get the best results.

Most cars are too tight on corner entry and the driver has to make the car turn by whatever means that are available to him. Which means most of the time the driver will break traction to get the car to turn and then the car is loose off the corner. In this instance fixing the tight on corner entry problem will also fix the loose exit problem. Always analyze your car in this order and tune your car in this order also:  
1: Corner Entry, 2: Middle of the Corner, 3: Corner exit.

Drivers are also part of the chassis tuning equation. Drivers need to be aware that they have to change the way they drive. As the track conditions change during the course of a race night they will not be able to apply throttle, brakes or steering effort the same way at the end of the night as they did at the beginning of the night. Also drivers need to search around on the race track for other grooves that may be more favorable to their setup.

Any of the following recommended changes will affect the chassis in the problem area listed. We have also incorporated a color coded guide to tell you which of the changes would be more suited for the given track conditions as well.

The following is a list of the track conditions and the color that represents that track condition. Also some of the recommended changes would be more suited for small stop and go type tracks and some are more suited for faster momentum type tracks. The **(1)** will represent a small stop and go type track and the **(2)** will represent a faster –momentum type track. The best way to use this guide is determine the problem you have first then see what the track conditions are like and then determine if you are on a small stop and go type track or a faster –momentum type track. If no number is listed beside the recommended change, then the change is suited for any race track size.

Greasy/ Slimy- Yellow \*

Heavy/ tacky lots of traction- Green \*

Streaky- Has slick and traction spots- Blue \*

Dry Slick- Very little Traction- Red \*

Rubbered Up- Dry but lots of Traction Usually on Exit of Corner- Purple \*

**This Tuning Guideline can be used for Late Models, Modifieds or B-Mods**

Problem:

Car is tight on corner entry, when on the throttle:

- Take Wedge out of Car \*\* 1
- Add 1/2 in. wheel Spacer to Right rear \* \* \* 2
- Lengthen Right Side WheelBase (1/4 in. ) \* \* \* 2
- Soften RF Spring \* \*
- Increase Caster Split \* \* \*
- Raise RR Upper Link on Chassis \* \* \* 2
- Move Ballast to the LF \* \* \* 2
- Stiffen RR Spring \* \* \* \* 2

Problem:

Car is tight on corner entry, when off throttle:

- Add 1/2 in. wheel spacer to Right Rear \* \* \* \* 2
- Lengthen Right side Wheel Base (1/4 in.) \* \* \* 2
- Raise J-bar on Pinion ( 1/2 in.) \* \* 1
- Add Wedge \* \* 1
- Soften RR Spring \* \* 1

- Stiffen RF Spring \* \* \* 1
- Stiffen Compression on LR Shock \* \* \* \* 1
- Raise RR lower link on chassis \* \* \* 2

Problem:

Car is Loose on Corner Entry:

- Reduce Left Side % \* \* \*
- Take Wedge out \* \* 1
- Shorten Right Side wheelbase \* \* \* 1
- Stiffen RR Spring \* \* \* \* 2
- Soften RF Spring \* \* \* 1
- Raise RR Upper Link on Chassis \* \* 2
- Lower RR Lower Link on Chassis \* \* \*
- Lower J-bar on both sides ( 1/2 in.) \* \*
- Add Ballast in front of RR Spring up high \* \* \* \*
- Index into RR Spring ( 2 rounds top and Bottom) \* \* \* \* 2

Problem:

Car is loose in the middle of the corner

- Reduce stagger \* \*
- Lower Left rear Lower Link on chassis \* \* \* 2
- Shorten Chain (1/4 in. Increments) \* \* \* \* 2

Note: as you shorten chain you may need to raise LR upper link on the chassis

Also as you start shortening the chain you may have to go to stiffer rebound on

the Left Rear shock.

- Shorten Rightside Wheelbase   **1**
- Add 1/2 in. wheel spacer on the left rear   **2**
- Add wedge   **1**

Problem:

Car is tight in the middle of the corner

- Lengthen Right Side Wheelbase    **2**
- Add Stagger    **2**
- Raise LR Lower Link on Chassis    **1**
- Move LR wheel inboard 1/2 in.     **2**
- Reduce Wedge   **2**
- Put 1/2 in. wheel spacer on Right Rear    **2**
- Lengthen Chain (1/4 in.)    **1**

Note: As you lengthen chain you might want to lower both the upper and lower trailing arms on the chassis one hole.

Problem:

Car is Tight on Exit

- Reduce Wedge    **2**
- Raise RR upper Link On Chassis    **2**
- Stiffen LR Spring    **1**
- Index out of LR Spring ( 2 rounds top and bottom)     **1**
- Move pull bar to the Right  

- Reduce Caster Split \*

Problem:

Car is loose on Exit

- Add Wedge \* \* \* 1
- Soften LR Spring \* \* 2
- Index into LR Spring (2 rounds top and bottom) \* \* 1
- Add 1/2 in. wheel spacer on LR \* \* 2
- Move Pull Bar to left on chassis and rearend \* \* \*
- Add Caster Split \* \*
- Put new Pull Bar bisquits in \* \* \* \*

Problem:

Car needs more Straightline drive but is good everywhere else \* \* \* \*

- Raise the pull bar on both ends  
( Note: when moving pull bar up or down on rearend housing , you are affecting the rate of the pull bar spring . Higher up on rearend will use softer Pullbar spring and lower on rearend will use stiffer pull bar spring.
- On Smaller Tracks Increase Rear %
- Put new Pull Bar Bisquits

Tune pull bar rate to motor ,track conditions, and driver. If your car is busting the tires loose when you apply throttle . You will want to soften the pull bar rate . If the car is not busting the tire loose but is just not going forward , you would want to stiffen the pull bar rate.

If the car feels like it is more on top of the track rather than down in the track. The car is more than likely not getting the weight transferred into the right rear tire patch early enough in the corner. This is a timing issue on when the tire patch accepts the load being transferred. Either moving more of the ballast towards the right rear corner or softening the compression valving of the right rear shock will help correct this problem.

There are hundreds of ways to tune your race car but these are just a few of the more influential changes that we have found.

We will continue to strive to give our customers the best info we have available for them to have good results.

Thanks Kevin Shaw

Setup info for 02-13 4-bar Modifieds

Shocks and Springs

LF 74-600 RF (75 or 74-6 (650) UMP or Wisconsin) (RF 600 for IMCA or USMTS Rules)

(Crate Engine cars we use LF-550- RF-550)

LR (97-2 or 97-4 (200) RR 94- (175)

Ride Heights

Ride height is measured from the ground to the center of the lower a-frame bolt on the front and from the bottom of the frame rail to the top of the birdcage on the rear.

LF- 8 RF- 7 3/4 LR-11 1/4 RR- 10 3/4 IMCA TIRES

LF-8 3/8 RF- 8 1/8 LR- 11 RR- 10 1/2 UMP TIRES

LF- 8 1/8 RF- 7 7/8 LR- 11 RR- 10 1/2 WISSOTA TIRES

These ride heights will change if using higher or lower wedge Settings.

#### REAREND LOCATION

Measure from inside of left rear frame rail to edge of Pullbar plate on Left on rearend. Measurement is (11 1/4) ON ALL CARS Using Centered Rearend other than 35 series car.

(ON 35 SERIES IF USING A CENTERED REAREND THE MEASUREMENT IS 12 1/4)

(ON 35 SERIES IF USING (+2-2 offset) REAREND THE MEASUREMENT IS 10 1/4)

Birdcage Locations and Clamp bracket locations on rearends for centered or Offset rearends is the same if using a 60 in. Rearend on Older cars and 35 series.

From Inside of rotor to center of trailing arm on LR is: 6 3/4 in.

From inside of rotor to center of trailing arm on RR is: 5 in.

Birdcage shock and spring drop is : 6 in. drop on RR Spring

6 in. drop on LR spring. Front to rear spacing 5 1/2in. on both sides from

Center of trailing arm to center of Slider or coilover.

#### **SOME GENERAL NOTES ON SQUAREING REAREND ON 3-link setups**

From the back of the axle tube to the back of the square tubing where trailing arms

Weld onto the chassis will be (19 1/4 in. Both sides at ride height to be square.) With

Any rear suspension (2-link or 4-bar). Check these measurements with driver in car.

(Wissota trailing arm lengths will be 17 1/2 in. in middle of the plate on chassis)

(Mount the Trailing Arm directly under the axle tube at 6 o'clock Position on Wissota)

(IMCA ,USRA trailing arm lengths will be 16 1/8 in. in middle of the plate on chassis)

The IMCA-USRA mounts on the rearend are 2in. forward of (centerline CL) and 2in. below CL.

**When mounting the clamp brackets on the rearend for Midwest Mods or Sport Mods**

**Set pinion angle at 6 deg. And level clamp brackets on rearend. To locate the brackets**

**Left to right on the rearend is : 22 ¼ in. From top Center Stud to center of Trailing Arm  
On RR , 19 in. From Top Center Stud to Center of Trailing Arm on LR**

#### 4-bar lengths and Mounting Positions at Ride Height

Left Rear Lower Link- 14 1/8 (5-6 deg. Uphill)

Left Rear Upper Link- 16 1/8 (21-23 deg. Uphill)

Right Rear Lower Link- 14 1/8 (level)

Right Rear Upper Link- 16 1/8 (17-19 deg. Uphill)

Upper Links will be in the Back set of holes on the chassis.

Lower links will be in the Middle set of holes on the chassis. These are 3 5/8in.

Back from the square tubing on the bottom.

These bar lengths will have the rearend square and birdcages will be square.

We start with birdcages square at a (6 o'clock and 12 o'clock position)

All trailing arms will be in top holes on birdcages

#### Panhard Mounting Positions

Mount J-bar centerline of Yolk on 9 in. Ford rearend and 1/2in above yolk on quickchange. Put the slide mount on the chassis at 5 1/4 in. up on chassis.

We generally run 3 in. of split in j-bar with IMCA tires and 3 1/2 in. to 4 in. of split with UMP , Wissota, USMTS Tires

When using Rear mounted Panhard bar for IMCA Sport Mods start with rearend

Mount at centerline of axle tube and run level with drivers weight in car.

Use 2in. offset wheels on the front and 3 in. offset wheels on rear. Use 3 in. Offset on RF

To help turn into the corner better. Use 4 offset wheel on RR for side bite.

We will use a ½ in. wheel spacer on the RR to loosen the car up on entry and a ½ in.

Wheel spacer on the LR to tighten the car up on exit.

## Pull Bar Mounting

Use the Triple Bushing pull bar with Orange bushings and start with it in the Middle holes on the chassis and back bottom holes on rearend with IMCA tires And raise to middle hole on rearend for UMP –KK704 tires. We use the top hole On the rearend when using a spring bar ( Spring bar rates we like is 1200 or 700-2000 Hyperco spring.) When using Solid pull bar on rearend for Sport mods use bottom hole On rearend and top hole on chassis.

## Front End Settings

New 35 Series Front end

LF Camber 3 deg. Pos    RF camber Neg 5 ½

LF Caster 2 deg Pos    RF Caster Pos 5

35 Series Ball Joint Stud Numbers (Howe)

LF Lower-22460    LF Upper-223310

RF Lower-22430    RF Upper-22335

New 35 series Upper A-arm Measurements

From C/L of Ball Joint to C/L of Heim

(LF- 10 7/8 ) (LR-9) (RF-9) (RR- 8 7/8)

2006-2012 front end settings

LF Camber 3 deg Positive    RF camber 4 Deg Negative

LF Caster 1 1/2 deg Positive    RF Caster 4 deg Positive ( We will add caster to the RF on Small stop and go type race tracks . As much as 5 ½ positive Caster.

2006-2012 Shaw Modified Ball Joint Stud Numbers

LF and RF Lower Howe Stud 22460

LF-223310    RF- 22330 (Howe)

Set toe-out at 1/4in. on IMCA Tires and 1/2 in. on UMP or Wissota Tires

## Scaling

Left Side % 52-53    Rear % 55-56    These #'s are without Driver in car. Add 1.7 to 2 % to These #'s if scaling with Driver in Car.

Smaller stop and go type tracks you will want to run more rear percent and run less rear Percent on faster momentum type tracks. Try to always run the least amount of rear percent as possible.

Try to keep ballast in the middle of the car as much as possible

Wedge Settings 15 to 25 lbs of Left Rear

### Chain Separation Measurement

Start with the distance between the bottom of the left rear frame rail and the top of the axle tube at 16 in. We will generally tune this from 15 1/2in. to 16 1/4 in.

### **Shock Tuning Guidelines**

#### **To Tighten Corner Entry:**

Increase Compression on Left Front

Increase Compression on RF

Decrease Compression on RR

#### **To Tighten Middle of Corner:**

Increase Compression on LR

Decrease Rebound on LR

Increase Rebound on RR

#### **To loosen the car on Corner Entry:**

Decrease Compression on LF

Increase Compression on RR

Decrease Compression on RF

Increase Compression on LR

#### **To Loosen the car on Corner Exit:**

Increase Rebound on RF Shock

Increase Rebound on LR

## **4-Link Adjustment Guide**

### **RR upper link Adjustment**

Raise on chassis will tighten entry slightly and loosen exit

Lower on Chassis will loosen entry slightly and tighten exit

### **RR Lower Link Adjustment**

Raise on Chassis will loosen entry, middle and exit

Lower on chassis will tighten entry, middle and depending on the amount of traction is

Available can tighten exit, but for the most part will have minor effect on exit

### **Left Rear Upper Link Adjustment**

Raise on Chassis will loosen entry slightly and tighten exit

Lower on chassis will have little change on entry and loosen exit

### **Left Rear Lower Link Adjustment**

Raise on chassis will loosen entry, middle and loosen exit if there is no traction available

In the track. However if there is traction in the track it will tighten exit.

Lower on chassis will tighten entry, especially middle and exit if there is no traction available ( Note: We generally will not go below a level Position with driver in the car)

**Note: Stock Mounting Positions is best in most all conditions**

### **Pre-indexing Birdcages can be a tuning aid**

#### **Left Rear Indexing**

Shorten LR upper and Lengthen LR Lower (2 rounds) will loosen entry and tighten exit

Lengthen LR Upper and shorten LR Lower (2-rounds) will have little effect on entry and loosen exit

#### **Right Rear Indexing**

Shorten RR upper and lengthen RR Lower (2 rounds) will loosen entry and have little effect on exit

Lengthen RR Upper and Shorten RR Lower (2-rounds) will tighten entry and have little effect on exit

All these adjustments are with the LR spring behind the rearend on the birdcage and the RR spring in front on the birdcage.

When making Index changes to your birdcages make sure to maintain your wedge settings.

Riding the brake or throttle on corner entry can be a tuning aid once you pull onto the track.

## **Late Model Chassis Set-ups**

### **Shocks and Springs**

LF-(74)- 550    RF-(74-10)-375

LR- (96-3)-225 Coilover Behind    (RR-94-3)-250

Lift Arm (73-7)-350 at 34 in. out (400 lb. Spring on 6<sup>th</sup> Coil)

### **Ride Heights**

#### **Underrail car**

LF and RF    3 1/8 in.

RR 4 1/4 in. to top of under rail and LR will vary with wedge 3 1/2 is close

#### **Overrail car**

LF and RF 3 1/8 in.

RR 10 1/2 in. Lr will vary with wedge but 11 3/4in. should be close

Front end settings

(LF Caster +2 LF camber +3) (RF Caster +4 RF Camber – 5)

Toe –out 1/2- 3/4 in.

Percentages

20 gals of fuel without driver

Left Side % 52.5- 53.0%

Rear % 53.5- 54%

(Wedge 120 lbs. open cars) (30lbs Right Rear Crate Cars)

Air pressure and Stagger

Stagger Front 1 in. to 2 in. Rear 4in. to 5 in.

Air Pressures

LF- 10 RF- 12 LR- 8 RR- 10

Trailing Arm Angles and Lengths.

LR Upper- 17 in. @ 25 deg. LR Lower- 15in. @ 6 deg

RR Upper- 17 1/4in. @ 21 deg. RR Lower- 15 1/2in. @ Level

J- bar Position

1 in. Below the Pinion on rearend and 6 1/2in. of Rake In J-bar Split

Rearend Location

Underrail Chassis 10 1/4 in from inside of RR lower Frame Rail

Overrail Chassis 15 in. From Inside of Frame Rail on RR Upper Rail

Set Chain Length at 15 in. of drop on Left Rear with over Rail Chassis

### **Additional Adjustments Basic**

Shorten Lr Upper Link to 16 3/4 in. for instant traction (Small Race Tracks)

Decrease Wedge for Heavy Race Track Conditions

Raise the left side ride heights for Dry slick Conditions (LF- 3 rounds, LR-6 rounds)

If car is tight on Entry Raise J-bar on Pinion.

If car needs to be Looser everywhere- Roll Wheelbase back on RR  $\frac{1}{4}$  in.

If car needs to be tighter everywhere- Roll Wheelbase Forward on RR  $\frac{1}{4}$  in.

When Side bite is Needed -pull Rearend to the Left  $\frac{1}{2}$  in. and reset wedge

A shorter RR Lower link is also a good tuning tool for tightening up corner entry