NASCAR SIMRACING - THE INSIDE LINE

THE GARAGE

One of the questions most often asked about NASCAR SimRacing is: How do I use the Garage options to improve my setup?

To answer this question, we have created this overview which will help both new and experienced players to develop their own setups using the advanced garage screens.

In NASCAR SimRacing, the garage screens allow the player to adjust their setup to suit the characteristics of each track, and their own unique driving style. Developing the right setup will considerably improve the lap times of any player.

Race drivers will generally describe their car as having one of three key turning characteristics: over-steer (loose), under-steer (tight) or neutral.

The term over-steer (Loose) is used to describe a car where the rear tires get loose and lose traction before the front tires. A car with over-steer will tend to spin, and the rear swaps ends with the front when driven aggressively.

The term under-steer (tight) is used to describe a car where the front tires lose traction before the rear tires. A car with under-steer will tend to slide straight-on and refuse to turn when driven aggressively.

The term neutral is used to describe a car where both the front and rear tires lose traction simultaneously, enabling drivers to execute controlled four wheel drifts.

Most NASCAR drivers setup their real cars to have a slight over-steer characteristic. It's common place to hear the phrase 'loose is fast,' which is least true when the car is kept under control. You should also note that as tires wear and fuel decreases, NASCAR cars become tighter. In real life, drivers often start races with a little more over-steer than desired and have to exercise a little extra caution on the first few laps.

***Before you make any setup changes, always be sure of the current setup's primary turning characteristic and the characteristic you desire.**

The default setups provided were designed as described below:

- The Rookie setups are intended for Beginners and while they are not especially fast, they are generally stable and forgiving.

- The Race setups are intended for experienced players. Faster than the Rookie setups, the Race setups are challenging to drive and good enough to win races at all but the very highest of difficulty levels.

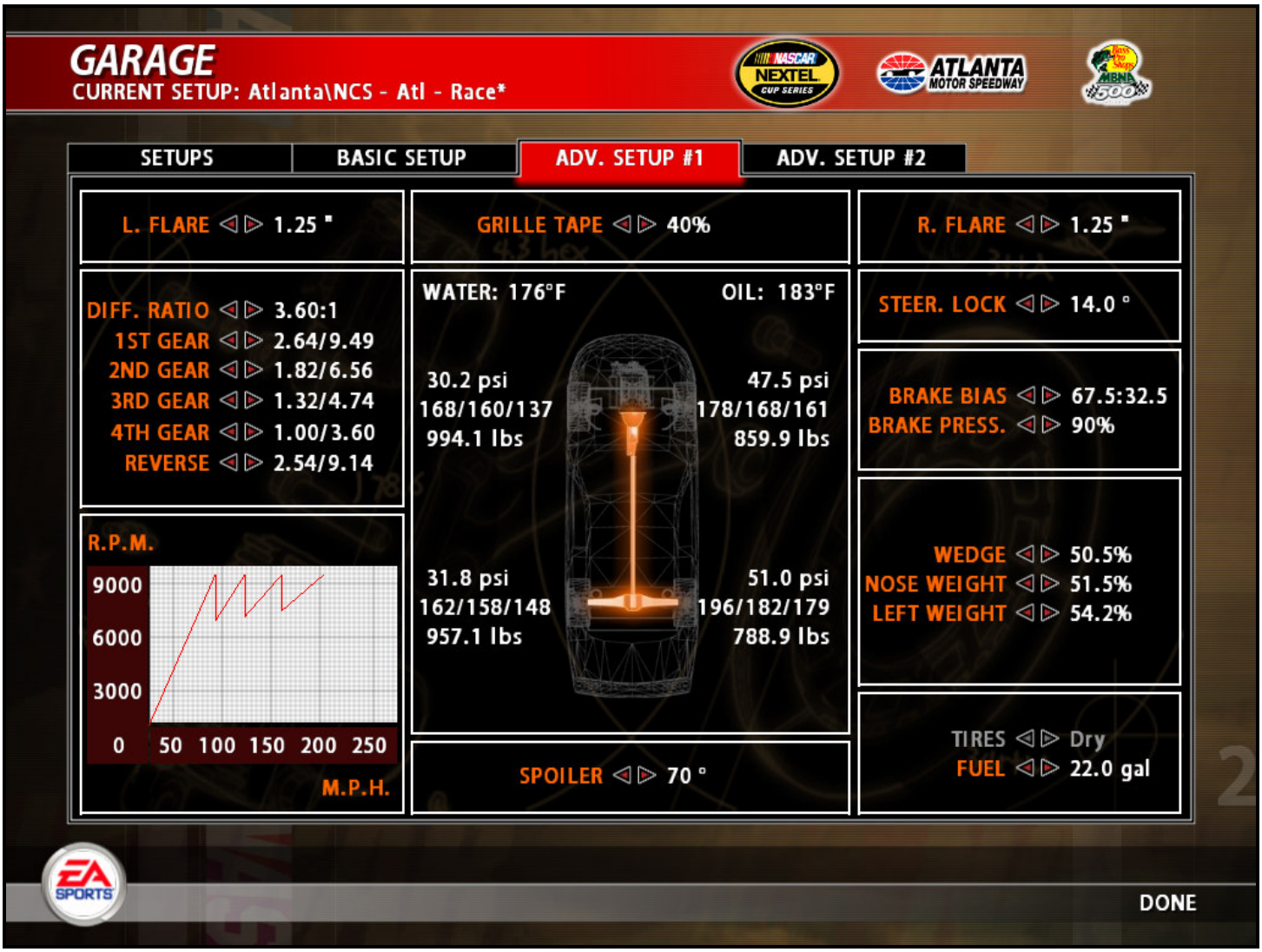
- The Qual setups are designed exclusively for use in Qualifying, and the engine will only last for a few laps.

GEARING

The options to adjust gear ratios are all located on the ADV. SETUP 1 screen.

Increase or decrease your 4th gear ratio so that the RPM warning light in the cockpit (also indicated on the HUD via the numbers highlighting in Red) comes on just as you lift off the gas at the end of the longest straight to prepare for the turn ahead.

Having set 4th gear you should now set 1st gear to peak at approximately 80 MPH and space the 2nd and 3rd gears evenly between 1st and 4th, as can be seen in the graph area on the image below.



To avoid wheel spin when accelerating through the lower gears, you must ‘short shift’ just as a real NASCAR race driver must. The phrase ‘short shift’ implies that you shift up to the next gear before reaching maximum RPM in your current gear. In NASCAR SimRacing, you should ‘short shift’ up when you reach approximately 4,000 RPM in first, 5,000 RPM in 2nd and 6,500 RPM in 3rd.

AERODYNAMICS

Unlike open wheel series such as Formula 1, aerodynamics are much less important from a setup perspective in NASCAR. While aerodynamics play a key role in regards to your cars ability to grip and turn, the rules of NASCAR are such that every driver essentially uses the same settings.

For all Short Tracks, Speedways and the Road Tracks you should use no less than 1.25" of L. and R. Flare, and always set the Spoiler to 70°.

The rear spoiler is locked at 55° for Superspeedways in accordance to real life NASCAR rules.

Grille Tape will vary from track to track, but for a race setup, a setting of 30-45% is normal. The general rule is to increase Grille Tape until the air-flow into the engine is so restricted that the engine blows prematurely. At this stage, you should remove some Grille Tape to establish the right balance. Use testing to complete full fuel runs and establish the optimum amount of Grille Tape.

For a Qualifying setup, where you only need to complete two laps, it is common to use close to 100% Grille Tape. Use testing again to find the right level for your qualifying setups.

All of the options to adjust aerodynamics are located on the ADV. SETUP 1 screen.

BRAKE BIAS AND BRAKE PRESSURE

Brake Bias may be adjusted to change the amount of brake pressure applied to the front or rear wheels.

If you find that you are locking the rear wheels under braking and skidding, decrease Brake Bias to increase the front Brake Bias.

Brake Bias is displayed in the format of Front Brake Bias: Rear Brake Bias and collectively must add up to 100. For example, Brake Bias 67.5:32.5 indicates that Brake Bias is set 67.5% to the front and 32.5% to the rear.

Locking the rear wheels is worse than locking the front wheels because it is easier to 'catch' the car when the front wheels are locked than it is when the rear wheels are locked.

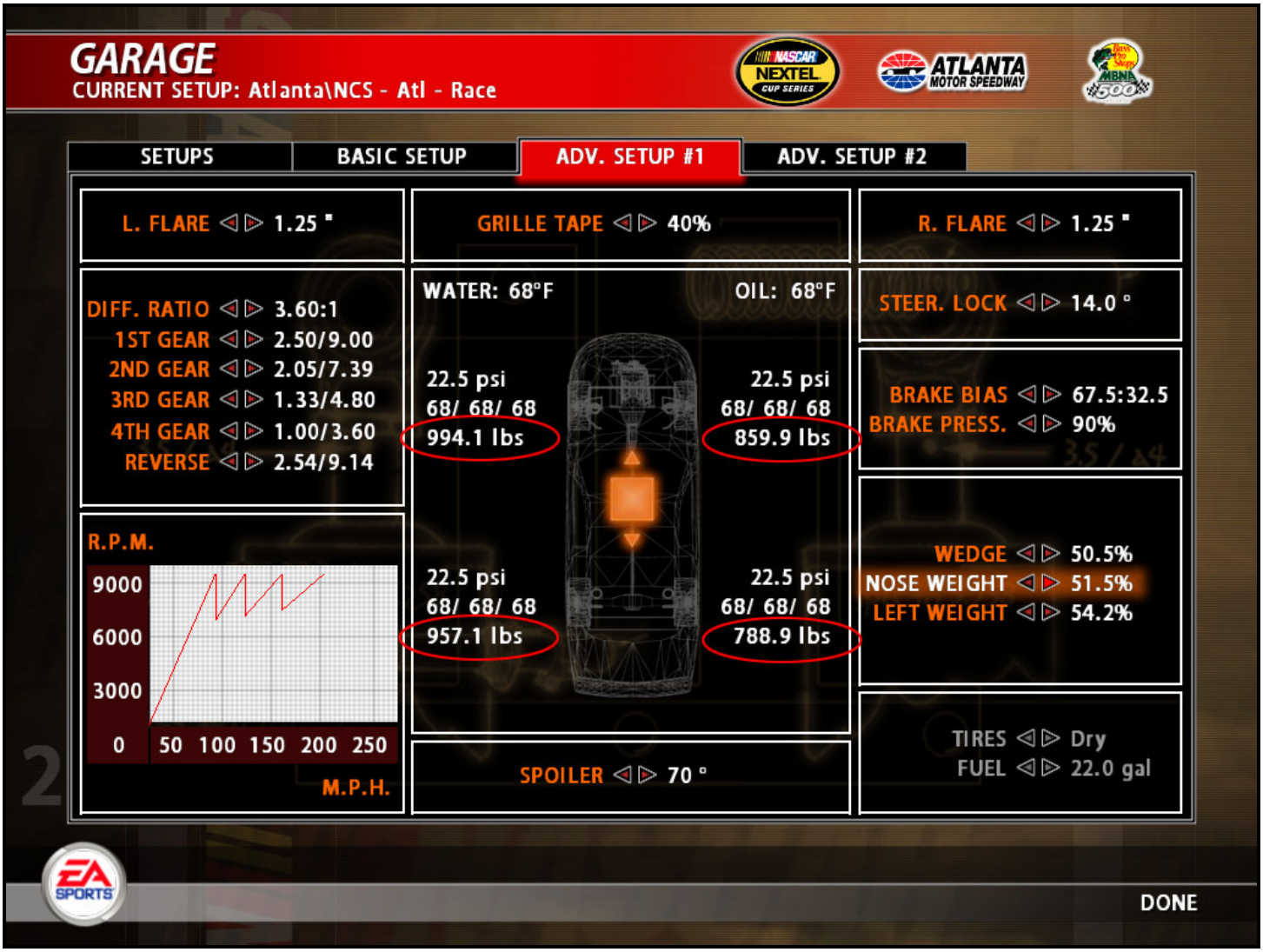
Brake Bias should be moved forwards in proportion to Nose Weight being increased as stated below within the notes regarding Weight Distribution.

Brake pressure (BRAKE PRESS.) can be decreased to reduce brake wear and make the brakes softer and more forgiving.

The options to adjust Brake Bias and brake pressure (BRAKE PRESS.) are both located in the ADV. SETUP 1 screen.

WEIGHT DISTRIBUTION

Let's move on to weight distribution and the options available to adjust weight distribution located in the ADV. SETUP 1 screen, as shown in the image below. Notice that some of the numbers in the center of the screen are circled. In NASCAR SimRacing, these numbers display the weight over each wheel.



Generally speaking, the faster a turn, the slower you will need to turn. One way to influence the rate at which a car turns at speed is to adjust Nose Weight.

Increasing Nose Weight naturally causes a vehicle to turn more slowly, and so long as the Brake Bias is increased proportionally towards the front, as Nose Weight is increased it will also help to stabilize the car during periods of deceleration.

Increasing Nose Weight also moves your center of gravity forward, making it easier to 'catch' the car in the event that you get 'loose' at any time. The less Nose Weight, the more difficult it is to 'catch' the car in the event you get 'loose' because there is more weight at the rear to 'catch' and control.

On the flip side, increasing Nose Weight decreases the efficiency of the front tires. Too much Nose Weight will introduce under-steer.

Increasing Nose Weight can also increase wheel-spin, but at most speedways and all superspeedways the turns are so fast that you never shift down from 4th gear during braking, and acceleration is such that less rear weight is unlikely to induce wheel-spin.

Before we move on to suspension you should also note the following:

- For all Short Tracks, Speedways and Superspeedways where you only need to turn left, Left Weight should be increased to place the maximum (54.2%) amount of weight possible over the left side wheels.

- For Road Tracks, where you need to turn both left and right, Left Weight should be set symmetrically (50%) to distribute weight evenly over the left and right side wheels.

- If a Road Track is heavily biased towards left or right turns, you may try moving a little Left Weight to the left side or right side to see if you can gain any benefit by making the car turn better for the left or right turns while compromising the turns in the opposite direction.

- For Short Tracks, Speedways and Superspeedways where you always turn left, a NASCAR setup typically has Left Weight set to 54.2%, Nose Weight set less than or equal to 50% and stiff front springs, with the front right spring being the stiffest of all.

- Generally, the front right tire carries the most load in the turns and it may very well overheat.

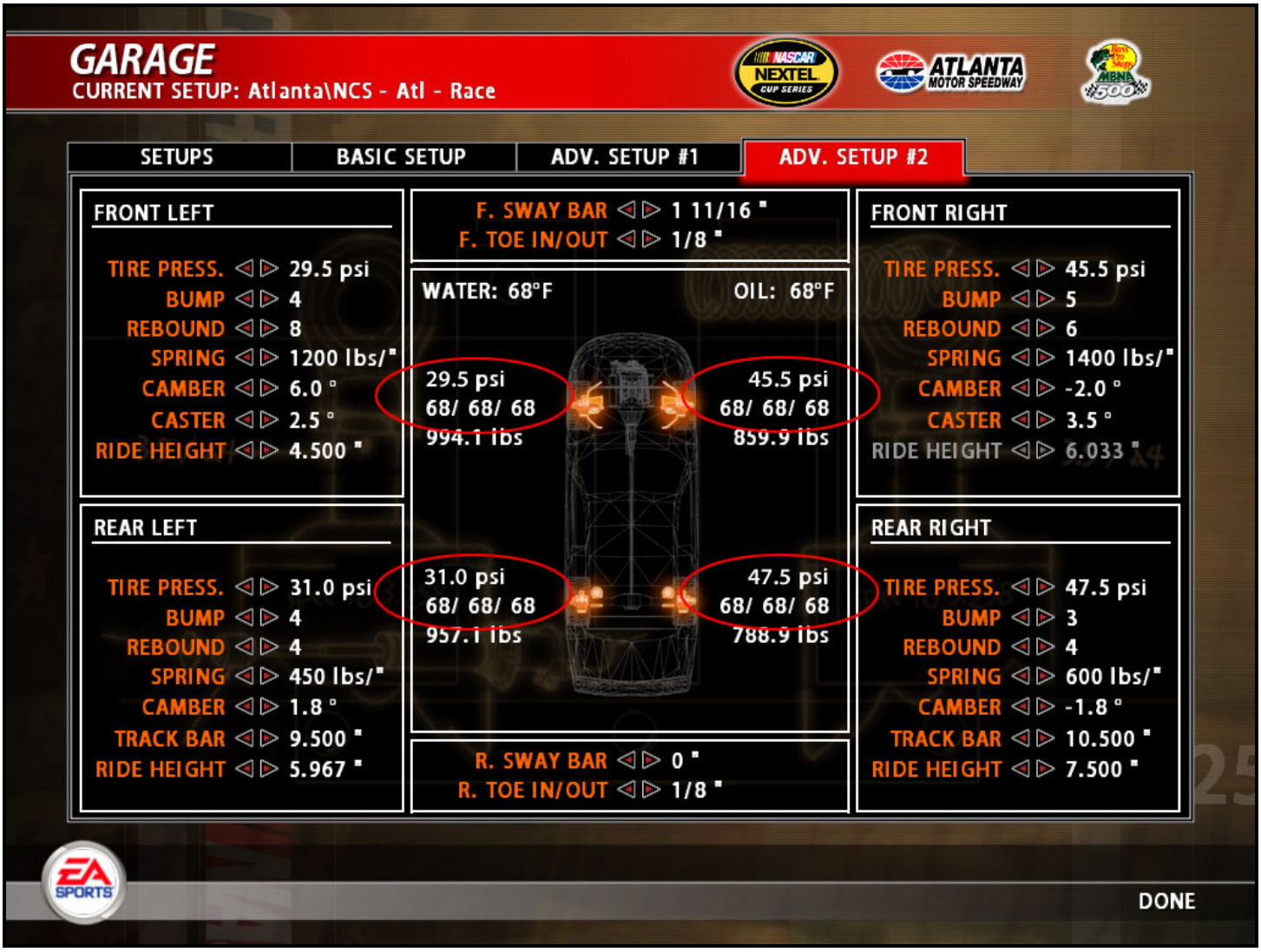
- In the case that your setup feels good, but the front right tire is overheating, Wedge can usually be decreased to 47.5-50% to decrease load on the front right tire and thus prevent that tire from overheating.

- Note, however, that decreasing Wedge will also introduce more over-steer, and may make the car start to feel a little loose. You will very likely have to make other adjustments to compensate for this, such as increasing the front sway bar as described below within the notes regarding Sway Bars.

While your front right tire will almost always carry the most load in the turns, the rear right tire may actually be your hottest tire due to the fact that the rear wheels drive the car. If your setup is on the loose side, keep an eye on the rear right tire temperature, especially if wheel-spin is also occurring when you accelerate.

TIRES

Tire pressures (psi) and Temperatures (Inside/Middle/Outside) are shown for each tire in the area at the center of the ADV. SETUP 1 and ADV. SETUP 2 pages as indicated below.



Whenever you press ESC to return to the garage during Testing or any other practice session, the pressure and temperature that your tires were running at when you pressed ESC are displayed.

The starting pressure (TIRE PRESS.) of each tire may be configured on the ADV. SETUP 2 screen.

The lower the tire pressure, the faster the tire will heat, the hotter the tire will run, and the faster the tire will wear. Note, that the more laps you drive impacts tire pressure as well as temperature.

For tracks with banked turns, the optimum tire pressure and temperature are different for the left and right side tires as per the table below. Optimum tire pressures are usually achieved for the main part of each fuel run and it is normal for tires to operate below the optimum tire pressure and temperature listed in the table below for the first and last few laps of each fuel run.

TRACK TYPE	OPT. PRESSURE (LEFT SIDE)	OPT. PRESSURE (RIGHT SIDE)	OPT. TEMP. (LEFT SIDE)	OPT. TEMP. (RIGHT SIDE)

Short Track	25-30 psi	40-45 psi	210-225 ℉	230-245 ℉
Speedway	30-35 psi	55-60 psi	210-225 ℉	230-245 ℉
Superspeedway	30-35 psi	55-50 psi	210-225 ℉	230-245 ℉
Road Track	25-30 psi	25-30 psi	210-225 ℉	210-225 ℉

When driving, for each tire, the greatest difference in temperature of any two areas (Inside/Middle/Outside) for that tire will ideally be <= 15 ℉.

For Short Tracks, Speedways and Superspeedways where you always turn left, a NASCAR setup typically has Left Weight set to 54.2%, Nose Weight set to >=50% and stiff front springs with the front right spring being the stiffest of all.

Generally, the front right tire carries the most load in the turns and it may very well overheat.

In the case that your setup feels good but the front right tire is overheating, Wedge can usually be decreased to 47.5-50% so as to decrease load on the front right tire and thus prevent that tire from overheating.

Note however that decreasing Wedge will also introduce more over-steer and may make the car start to feel a little loose. You will very likely have to make other adjustments to compensate for this such as increasing the front sway bar as described below within the notes regarding SWAY BARS.

While your front right tire will almost always carry the most load in the turns, the rear right tire may actually be your hottest tire due to the fact that the rear wheels drive the car. If your setup is on the loose side, keep an eye on the rear right tire temperature, especially if wheelspin is also occurring when you accelerate.

SUSPENSION

Almost all of the Short Track, Speedway and Superspeedway tracks in NASCAR SimRacing have banked turns which increase the cornering speed above and beyond that which may be achieved in any flat turn of the same radius. The combination of banked turns and increased speeds also increases vertical loading on your suspension and tires.

In order to prevent the increased vertical loading causing your suspension and tires to compress so much that the bottom of the chassis would hit the track surface or ‘bottom out’, in banked turns, you must use stiffer springs than you would for any flat turn of the same radius.

While stiffer springs will be required for banked tracks, it is not normal to increase the stiffness of each spring by the same amount.

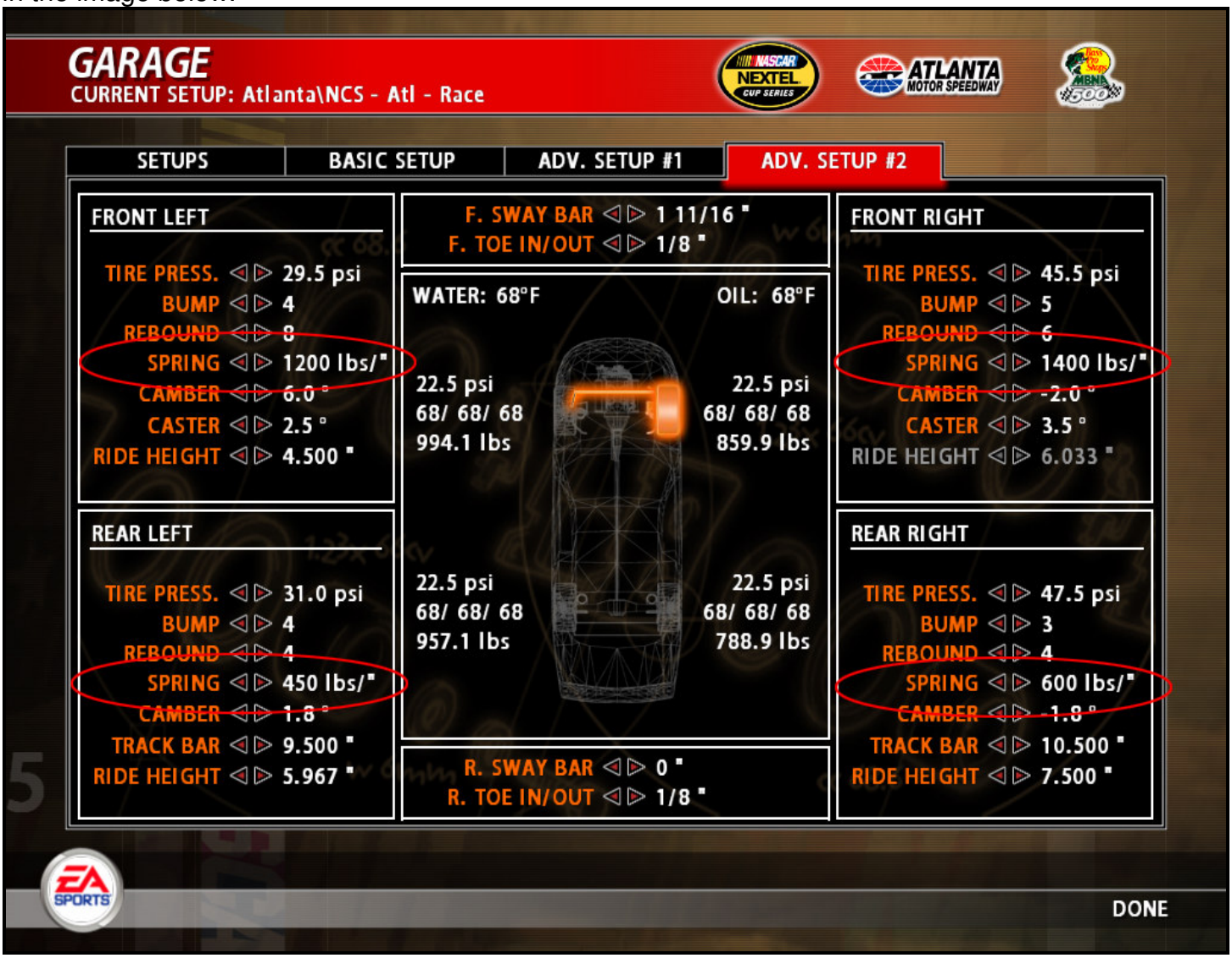
Usually, your car will have Nose Weight (see Weight Distribution) set above 50%, dictating the use of stiffer springs at the front. The general rule is that the faster the cornering speed, the greater the amount of Nose Weight, and the stiffer the front springs.

Rear spring stiffness is greatly impacted by cornering speed. For example, a fast Speedway and slower Short Track with similarly banked turns may use almost the same spring stiffness at the front while the rear will vary greatly, the rear being much software for the Short Track because the higher speeds achieved at the Speedway generate a lot of aerodynamic grip (down force) resulting in increased vertical loading on the springs and tires, which ultimately dictates the use of stiffer springs at the rear to avoid bottoming out.

In addition to this, for tracks with banked turns, the right side springs are typically a little stiffer than those on the left. This is to account for weight transferring to the right side when turning left. In this case, the stiffer right side springs stop the right side from bottoming out through a combination of their increased stiffness and the softer left side springs allowing the car to compress more toward the apron. As a general rule, the steeper the banking, the greater the difference between the left and right spring stiffness.

On Road Tracks where you must turn both left and right, the left and right sides spring stiffness is usually identical or symmetrical.

The stiffness of the spring at each wheel may be adjusted on the ADV. SETUP 2 screen as indicated in the image below.



Front spring stiffness is most often between 500 and 1500 lbs/”, while rear spring stiffness is usually between 200 and 750 lbs/”.

Make changes in increments of no greater than 100 lbs/” and use Testing to drive as many laps as you need to validate whether any changes you make are for the better.

The right rear spring especially may be used to increase or decrease over-steer and the ability of the car to turn. With any of the default race setups, you may generally increase the right rear spring stiffness to increase over-steer and decrease it to reduce over-steer.

Bump and Rebound control the rate at which the spring is allowed to compress (Bump) and decompress (Rebound). Restricting the rate at which the front springs are allowed to Rebound at the faster tracks with banked turns, such as Atlanta, can help to increase down force and grip in the turns.

The higher the setting for Bump and Rebound, the greater the resistance of the damper to the spring—i.e. If Bump/Rebound is set to 5, the spring will compress/decompress much more slowly than it will with Bump/Rebound set to 1.

Note that rear springs Bump and Rebound are locked for Superspeedways, as they are in real life so as to prevent drivers from exploiting the benefits of setup changes in this area, and to keep the competition closer.

Camber is usually adjusted to help the car turn. At all of the banked tracks where you must turn only left for a Qualifying setup Front Left Camber should most often be set to 8.0°, the Front Right Camber set to -6.0°, the Rear Left Camber set to 1.8° and the Rear Right Camber set to -1.8°. For a race setup, Camber should be decreased because too much Camber increases tire temperatures and wear.

The front left and front right Camber may also be decreased a little for Qualifying at tracks with very steep banking, such as Bristol, where the banking is so steep that you don't need as much Camber for the car to turn as desired.

For Road Tracks, the Front Left and Right Camber will usually be set to –X.X° and the Rear Left and Right Camber set to -1.8° to allow the car to turn equally to the left and right.

Finally, the Caster and Track Bar may be adjusted in regards to the suspension.

Increasing the Caster angle generally decreases the turning circle of the car, while increasing over-steer and making the car looser when turning.

Increasing the Track Bar will generally create more over-steer and make the car looser. Assuming that the right side is set higher than that the left side, then the greater the difference, the looser the car will be when accelerating and negotiating fast banked turns, and the tighter it will be when braking.

SWAY BARS

When the setup seems pretty good and you are looking to increase or decrease over-steer/under-steer just a little, adjusting the F. Sway Bar may be a good idea.

Increase the F. Sway Bar to decrease over-steer and tighten-up the car a little. Decrease it to increase over-steer and make the car a little looser.

The rear sway bar is rarely used in reality except for on the road tracks. Theoretically, using a R. Sway Bar allows for flatter cornering with less body roll. Adjustments have the same effects as those

of the F. Sway Bar. Increase the R. Sway Bar to decrease over-steer and tighten-up the car a little. Decrease it to increase over-steer and make the car a little looser.

Both the F. Sway Bar and R. Sway Bar options are adjusted on the ADV. SETUP 2 screen.

RYAN NEWMAN SETUP Q & A

Here are some questions put to and answered by Ryan Newman during one of the development focused testing sessions we held.

If the car is tight on entrance, what would you most likely change in the garage?
Increase front left spring.
Decrease front right spring.
Decrease rear left spring.
Decrease nose weight.
Increase rear brake bias.
Decrease front sway bar.
Increase left and right track bar.

If the car is tight during the turn, what would you most likely change in the garage?
Increase rear right spring.
Decrease rear left spring.
Decrease wedge.
Increase rear sway bar.
Decrease front sway bar.

If the car is tight on exit, what would you most likely change in the garage?
Increase rear right spring.
Decrease rear left spring.
Decrease wedge.
Increase rear sway bar.
Decrease front sway bar.

If the car is loose on entrance, what would you most likely change in the garage?
Decrease front left spring.
Increase front right spring.
Increase rear left spring.
Increase nose weight.
Decrease rear brake bias.
Increase front sway bar.
Decrease left and right track bar.

If the car is loose during the turn, what would you most likely change in the garage?
Decrease rear right spring.
Increase rear left spring.
Increase wedge.
Decrease rear sway bar.
Increase front sway bar.

If the car is loose on exit, what would you most likely change in the garage?
Decrease rear right spring.
Increase rear left spring.
Increase wedge.
Decrease rear sway bar.
Increase front sway bar.

What is your preferred turning characteristic?
Slight over-steer.
Optimal setup dictates that the car is somewhat loose at the start of any fuel run because the front tires wear faster than the rear tires, causing the car to get tighter as laps are completed.

How different is the qualifying setup in comparison to the race setup?
Increased grille tape.
Increased tire pressures.
Increased nose weight.
Increased camber.
Slightly shorter gear ratios.

THE TRACKS

The tracks in NASCAR SimRacing are categorized as Short Tracks, Speedway, Superspeedway and Road Tracks as broadly described below.

SHORT TRACKS

Defined as any track less than one mile in length, a short track usually features high, sharp turns on a narrow oval. Short track races are heavy on contact and light on opportunities to pass. Setup will primarily be about finding a compromise between grip and acceleration.

SPEEDWAYS

Between one and two miles in length, NASCAR's speedways come in all shapes and sizes including ovals, D-ovals, tri-ovals, and quad-ovals. Setup will primarily be about finding a compromise between speed and acceleration.

SUPERSPEEDWAYS

Over two miles in length, NASCAR's Superspeedways are tri-oval in shape. Setup will be primarily about finding a compromise between speed and stability. Drafting is a key to victory. Be patient and work with other drivers to move up to the front of the field.

ROAD COURSES

Road courses present unique challenges in the NASCAR Winston Cup Series, as you must master both left and right turns. Setup will be about finding a compromise between speed, acceleration, grip, and stability. Knowing the layout of the road tracks is a key to success. Use testing and pre-race practice sessions to drive plenty of practice laps before you race.

When learning any track, look for the tire groove on the asphalt. This marks the commonly used racing lines. Try to drive around the track using the existing grooves, and gradually establish your own line that works best for your driving style.

The table below lists all the tracks featured in NASCAR SimRacing and their key statistics.

TRACK NAME	TRACK TYPE	LAP LENGTH	BANKING
Atlanta	Speedway	1.540 Miles	24° turns, 5° front & back.
Bristol	Short Track	0.533 Miles	36° turns, 16° front & back.
California®	Speedway	2.000 Miles	14° turns, 11° front & 3° back.
Chicagoland	Speedway	1.500 Miles	18° turns, 11° front & 5° back.
DARLINGTON®	Speedway	1.366 Miles	23-25° turns, 2° front & back.
DAYTONA®	Superspeedway	2.500 Miles	31° turns, 18° front & 3° back.
Dodge Raceway Stadium	Short Track	0.375 Miles	10° turns, 3° front & back.
Dover	Speedway	1.000 Miles	24° turns, 9° front & back.
Homestead-Miami™	Speedway	1.500 Miles	20° turns, 3° front & back.
Indianapolis	Speedway	2.500 Miles	9° turns.
Indianapolis Raceway Park	Short Track	0.686 Miles	12° turns, 2° front & back.
Infineon Raceway	Road Track	1.990 Miles	N.A.
Kansas Speedway™	Speedway	1.500 Miles	15° turns, 10.4° front & 5° back.
Las Vegas	Speedway	1.500 Miles	12° turns, 9° front & 3° back.
Levi Strauss Signature Speedway	Short Track	0.500 Miles	10-18° turns, 6° front & back.
Lowe's	Speedway	1.500 Miles	24° turns, 5° front & back.
Martinsville	Short Track	0.526 Miles	12° turns.
Michigan™	Speedway	2.000 Miles	18° turns, 12° front & 5° back.
Milwaukee	Speedway	1.000 Miles	9.25° turns.
Nazareth	Speedway	1.000 Miles	3-6° turns, 3° front & 2.7° back.
New Hampshire	Speedway	1.058 Miles	12° turns, 2° front & back.
North Carolina®	Speedway	1.017 Miles	22-25° turns, 8° front & back.
PHOENIX™	Speedway	1.000 Miles	9-11° turns.
Red Ball Raceway	Short Track	0.625 Miles	19° turns, 9° front & back.
RICHMOND™	Short Track	0.750 Miles	14° turns, 8° front & 2° back.
TALLADEGA®	Superspeedway	2.660 Miles	33° turns, 18° front & 2° back.
Texas	Speedway	1.500 Miles	24° turns, 5° front & back.
Watkins Glen®	Road Track	2.454 Miles	N.A.

Unfortunately, the process of setting up a race car is not an exact science. Every setup change will impact various aspects of the car's performance. Testing, accepting compromise and patience are the keys to success!

FURTHER READING

The list below is comprised of books available that will provide you with even more information with which to develop and improve your own setups and driving style.

BOOK TITLE	AUTHOR
Think to Win	Don W. Alexander
Drive to Win	Carroll Smith
High Performance Driving	Bob Bondurant & John Blakemore
The Racing & High Performance Tire	Paul Haney
Speed Secrets	Ross Bentley
Race Car Engineering & Mechanics	Paul Van Valkenburgh