Roller Test Bench Tips

This document describes some basic items to check when tuning your car using the Roller Test Bench.

With the body removed, set car on roller test bench. Set power so the rear wheels/axle are rotating as **SLOWLY** as possible.

Observe the tires and wheels. Ideally they should appear stationary – no movement will be visible. If there is movement, possible causes:

- **Bent axle** – For cars with pressed on plastic wheels and gears, you will have to replace the rear axle assembly. For cars with set screw gears and wheels, disassemble the rear axle assembly and measure/observe runout of the axle. Replace if necessary.
- **Excessive slop in bushings** – If you are using a stock rear axle assembly on a car with plastic wheels that are pressed onto a knurled axle, you will probably have slop in the bushings. This is because the inner bore of the bushings must be enlarged so the knurled end of the axle will pass through the bushing. Potential solutions:
    - Replace stock rear axle assembly with aftermarket parts including smooth axles (no knurling) and aftermarket "set screw" aluminum wheels. This will allow using bushings with a tighter inner bore relative to the [smooth] axle. The downside to this approach is cost.
    - Minimize slop in stock bushings by applying super glue. This requires applying a thin coat of oil on the axle, rotating the axle on the roller test bench, and applying a small amount of super glue into each bushing via capillary action. A more detailed description of this technique is beyond the scope of this document. Details of this technique can be found by searching online slot car forums. The downside is you can potentially glue the bushing to the axle.
    - Check for lubrication – be sure bushings are not running dry.
- **Out-of-round wheels** – Stock plastic wheels are notorious for being out-of-round. Potential solutions:
    - True the plastic wheels using something like the Tire Razor Wheel Buddy (no longer manufacturerd). If you decide to true the wheels, be very careful to remove as little material as possible to true the wheel without affecting how the tire fits. If you remove too much material, the contact patch will be adversely affected (typically it will become concave).
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- **Out-of-round tires** – If you are using stock plastic wheels, the tire may be out-of-round because the wheels are out-of-round. Potential solutions:
    - Make sure the tire is properly seated on the wheel. For plastic wheels, check the wheel to see if any flashing is present and remove it with a sharp knife or sandpaper. Turn the tire inside out and make sure there is no debris on the inside of the tire that will prevent

the tire from seating on the wheel properly. Lift the sidewall off the wheel slightly and let it "snap" back in place. Rotate the tire and repeat until you've gone all the way around the tire. Repeat for the other side of the tire.
    - True the wheels (or replace the wheels with aftermarket wheels as part of replacing the rear axle assembly as described above).
    - True the tires – While you can true the tires by simply taping a piece of sandpaper to a section of track, lifting the car rear wheels, apply power so the rear wheels spin, and let the tires come in contact with the sandpaper, results may be less than satisfactory. A tire truer designed for this purpose will yield much more consistent results.
- **Examine gear mesh** – With the rear axle assembly rotating as slow as possible, observe the gears. Are they making excessive noise? Are they rotating smoothly? Does either gear slip? Does side-to-side axle play affecting gear mesh? Possible solutions:
    - Replace rear axle assembly with higher quality aftermarket components. The downside is cost.
    - Check gears for excessive wear. If present, determine the root cause. Is either gear cracked or damaged? Are all teeth present? Is there adequate lubrication?
    - For aftermarket gears (or gears on higher end cars such as Slot.It, NSR, Sideways, Thunderslot, etc.) is the gear mesh smooth? If not, adjust as required. It may be necessary to add axle spacers and/or a "stopper" to ensure proper gear mesh.
- **Check for Body Interference** – Replace the body and place on the roller test bench running at slow speed. Simulate body roll be LIGHTLY pressing on one corner of the body. Carefully observe and listen for interference between the body and tires, the main chassis plate, the interior, etc.. Eliminate any interference that may be present.
- **Does the motor lift or move as power is applied?** If so, this will affect the gear mesh and place additional strain on drivetrain components. Glue the motor in place using GOOP or similar and retest. If the car has a motor mount with holes for screws to secure the motor, be sure to use them.
- **Repeat steps above.** Increase the roller test bench speed slightly and observe the items listed above again. Take corrective action as required. Repeat until you are satisfied potential problems do not exist (or have been minimized as much as possible).

Looking for a more comprehensive tuning checklist? Please check out the Slot Car Corner Tuning Checklist.