



## HPI Tutorial – How to Maintain your Savage X Differentials

The Savage X, like most other 1/8<sup>th</sup> scale nitro buggies and trucks, uses gear differentials front and rear. The differentials allow the outside wheels to rotate faster than the inside wheels in turns, improving the cornering performance of the truck.

The differentials in the Savage X have a hard life; they transmit all the torque from the centre driveshafts, through 90 degrees to the driveshafts that turn the wheels of the truck. They are durable but it may be necessary to perform periodic maintenance on them.

Inside the differentials there are a number of gears. These gears may wear and cause the differential to slip under power. This may result in a loss of drive through the differential and thus a loss of drive to the wheels.

One of the new features of the Savage X is the 'Easy Access Differentials' which will make diff maintenance very easy. In this tutorial we show you step by step the procedure to follow to maintain the differentials in your Savage X to keep them in top condition.

These are the parts that you may need when maintaining the differential:-



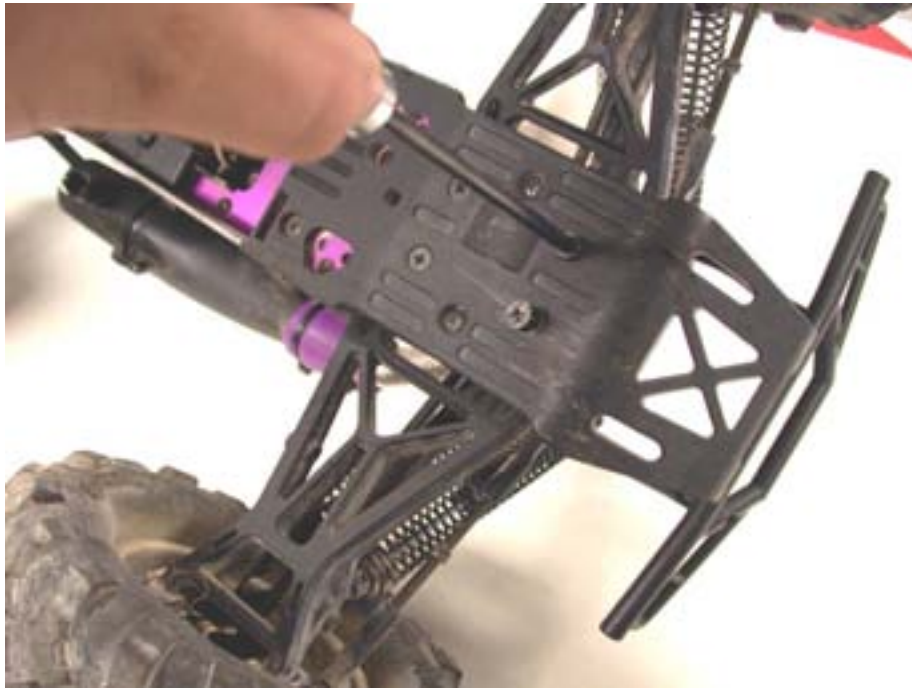
You will also need some Heavy Duty Grease, HPI part number Z164 to re-grease your differential when reassembling your truck after cleaning. Also you will need some lighter grease, HPI part number Z160 to re-grease the front and rear gearbox gears.



In this tutorial we show you how to remove the rear differential from a Savage X. Removal of the front differential is the same as removal of the rear differential.

## Step 1 – Removing the differential

First remove the 2 screws from the underside of the truck.



Then remove the 4 screws that attach the upper part of the gearbox housing.





For the removal of the rear diff you also need to remove the 2 screws that hold the rear turnbuckle links to the gearbox casing, so you can completely remove the casing.



Now you can remove the upper part of the rear gearbox housing and the alloy brace from the truck.



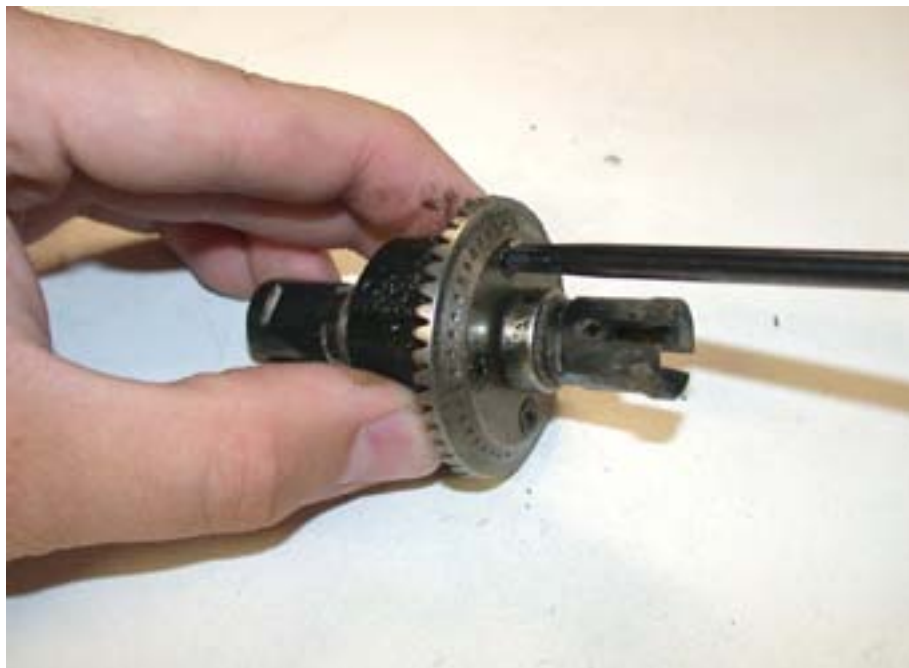
With the gearbox housing and the alloy brace removed you can now remove the differential from the truck.



Now with the differential removed from the truck you can start the task of dismantling the differential.

## **Step 2 – Dismantling the differential**

The first step when dismantling the differential is to remove the 4 screws that hold the 43-tooth bevel gear to the differential housing.



With these 4 screws removed you can lift off the 43-tooth bevel gear from the differential housing.



Now you can remove the large bevel gear from the differential and then the small bevel gears from inside the differential. These small bevel gears should lift out with the shafts. Also you can then remove the large bevel gear from the diff housing.



With the bevel gears removed you need to remove the pins that pass through the output shafts of the differential. The one on the side of the diff with the 43-tooth gear should simply push out. On the other side of the differential you need to remove the grub screw in the plastic housing so that you can push the pin out through the hole in the diff housing.



With these pins removed it is now possible to remove the differential output shafts. This will allow the bearings and rubber o-rings to be removed from the differential parts.

Now you have disassembled your differential.



### Step 3 – Cleaning and inspecting the Differential parts

With the differential in parts form it is easy to clean. Place the parts from the inside of the differential in a suitable container and clean them with [HPI Nitro Cleaner](http://www.hpi-europe.com) or a similar cleaner.



Let the parts soak for a short while then lift them out of the cleaner. They should be free of dirt and grease.

With the parts cleaned you are now ready to inspect the gears for wear and damage.

In the pictures below you can see the difference between a new gear (on the left) and a worn out gear.



If you see that your gears are worn then they will need replacing. Worn gears will cause the differential to slip resulting in a loss of drive.

You should also inspect the differential housing for signs of wear. Wear in the differential housing normally shows as an indentation where the cross-pins push against the plastic housing. This wear will allow the cross-pins to move and the bevel gears to become badly meshed. This may cause the bevel gears to become damaged.



You may also see wear in the diff case where the large bevel gear sits. This wear will cause the mesh of the gears in the diff to become loose and may cause the gears to strip if used.

The picture below show a differential housing that has worn (right), next to a new differential housing (left). If your differential housing is worn we recommend that you replace it as it could cause the bevel gears to fail.



With the differential parts cleaned, and worn parts replaced it is now time to rebuild the differential.

#### **Step 4 – Rebuild the Differential**

If you have a replacement differential housing we recommend that you replace the gasket on the 43-tooth bevel gear. The old gasket should simply peel off. The new gasket is included in the 85044 spare parts set. With the old gasket removed peel off the backing on the new one and stick it to the 43-tooth bevel gear.



The next step is to attach the differential output shaft to the 43-tooth bevel gear and the differential housing. The differential output shafts push through the housings and are held in place with a pin.

This is easy on the side with the 43-tooth bevel gear as the pin simply slides into place. On the side with the plastic housing you need to push the pin through the hole in the housing and then screw a grub screw into the hole.



When building these parts don't forget to put the rubber o-rings in place.

Now you need to apply grease to the back of the large bevel gear that goes inside the diff. Grease in this area will reduce the friction between the gear and the diff case or 43 tooth bevel gear. This will reduce wear of the diff case and the 43 tooth bevel gear. You should use [Z164 Heavy Duty Grease](#) on these gears.





With grease applied to the back of the gears you can now slide the larger diff bevel gears onto the pins that pass through the diff output shafts. You need to put some more of the Z164 Heavy Duty Grease onto the front of these gears.

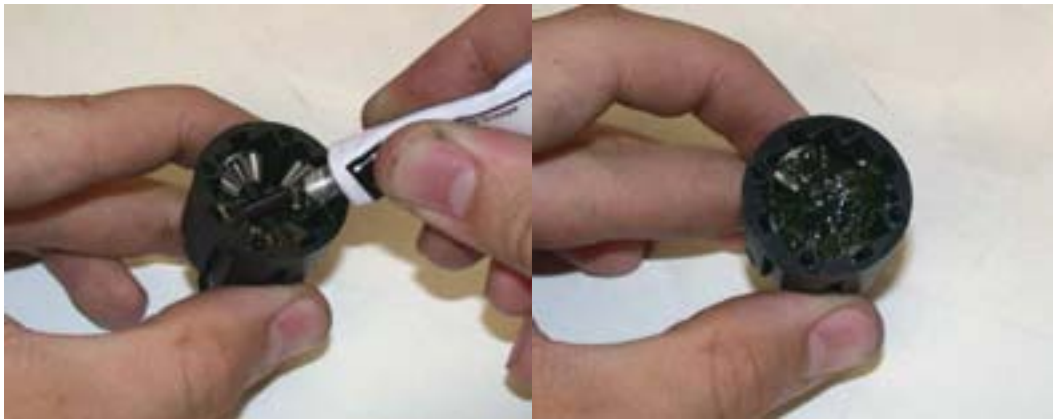


Now you need to assemble the small bevel gears and the cross shafts. Place 2 small gears onto one shaft and drop it into the diff housing, ensuring that the flat on the shaft is facing upwards.

Now assemble the other 2 small gears onto the other shaft and drop them into the differential housing, ensuring that the flat on the shaft is facing downwards.



With these small bevel gears assembled in the diff housing place plenty of Z164 heavy-duty grease on them.



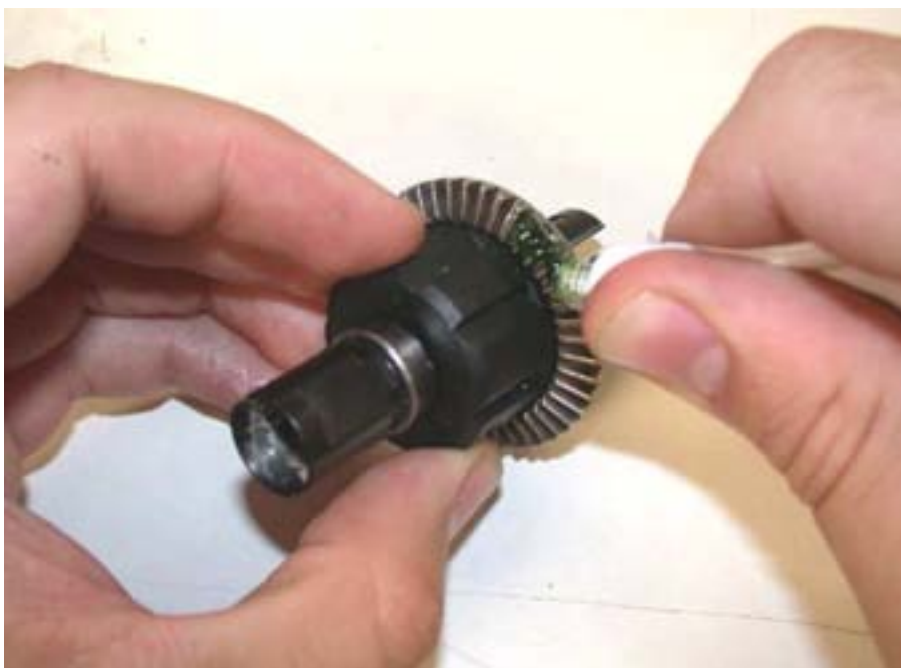
With grease applied to the bevel gears you need to place the side of the differential with the 43-tooth gear over the differential housing and screw the two together.

Now your differential is rebuild and ready to be fitted to your Savage X.

## Step 5 – Refitting the Differential

Refitting the differential to the Savage X is a simple task, due to the easy access differentials.

Before replacing the differential into your Savage X you need to add some grease to the 43T bevel gear. We recommend HPI grease part number [Z160](#) for this.



The differential should now drop into place. Remember to insert the driveshafts into the differential outputs when inserting the diff.



When the differential is in place you need to replace the top piece of the gearbox, remembering to replace the alloy brace.



With these parts in place you need to replace the screws that hold the gearbox in place.

Now you have refitted the differential and your truck is ready to run again.