

1971 S2 Lotus Europa

Conversion of Rear Drum Brakes to Disc Brakes

Having had the brake conversion kit from one of our list members for a couple of years, I decided it was time to undertake the project. The brake calipers are from a Mazda Miata, I believe anywhere from MY 1990 to 1998 will work. I think the rotors are from an Acura Integra, circa '92. If so, it has been reduced in diameter, the center index hole enlarged and the mounting holes elongated. It includes a specially fabricated mounting bracket for the caliper.

Doug Alexander

REMOVING THE REAR DRUM BRAKES

1. Find a suitable spot to jack up the rear of the car.
2. Chock the front and back of one of the front wheels to ensure the car doesn't roll once jacked up.
3. Bend the tab back on the D-washer behind the hub nut, then loosen the hub nut.



This has been torqued to 150 ft-lbs so it will take some effort to get it loose, especially if someone used Loctite on it. Do both sides.

4. Loosen the lug nuts on both wheels
5. Jack up the rear of the car and place it on Jack stands at the rear frame rails as per the service manual. Those hockey pucks come in handy here.



6. Remove the lug nuts, hub nuts and the wheels.



7. Back off the rear brake adjuster using an open end wrench in order to be able to pull the drum off the hub.



8. Remove the drum.
9. Remove the hub using a hub puller if necessary. It should come off pretty easily.



10. Remove the small coil springs holding the brake shoes to the back plate. Push the spring down and from the back side of the backing plate turn the central pin 90 degrees to allow the flattened end to pass through the slot in the retaining cap. There is one of these springs for each shoe.



11. Pull back on the top of the brake shoe on the stationary (non-piston) end of the wheel brake cylinder and swing it off the end of the wheel cylinder. This should release all the pressure on the top return spring.



12. Do the same at the bottom of the shoes at the adjuster



13. Remove brake shoes and return springs.



14. Remove the cotter pin from the emergency brake cable pivot pin. Remove the pivot pin.



15. Remove brake line from the wheel cylinder using a 7/16" open end wrench.



16. Using a 1/2" socket remove the four bolts holding the brake backing plate to the hub carrier. Remove the backing plate with wheel cylinder and brake adjuster attached.

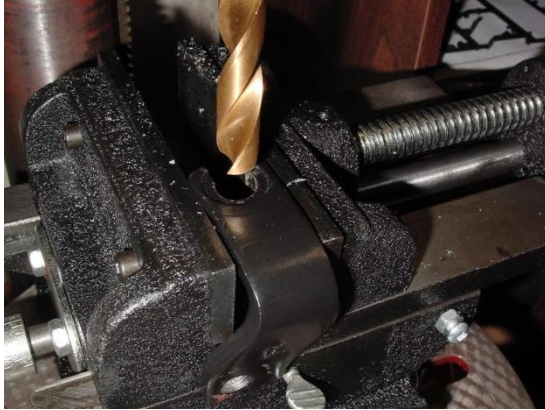


17. Disconnect the hard brake line at the forward frame-end of the trailing arm. Remove the hard brake line from the trailing arm.



Preparing the caliper prior to installation

18. Remove the emergency brake cable bracket from the caliper and enlarge the large "C" hole to $\frac{1}{2}$ ".



19. Obtain a $\frac{5}{16}$ " clevis pin from your hardware store. I got one that was 2" long that had multiple holes predrilled for a cotter pin and cut it to a length of 1- $\frac{1}{8}$ " from the shoulder.

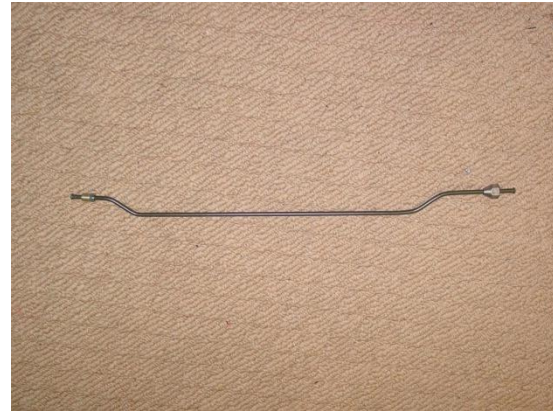


20. Using a round file or Dremel tool, remove about $\frac{1}{16}$ " of material from the emergency brake lever arm on the caliper as per the photo to allow the clevis end of the emergency brake cable to accept the $\frac{5}{16}$ " pin.



Preparing the brake lines

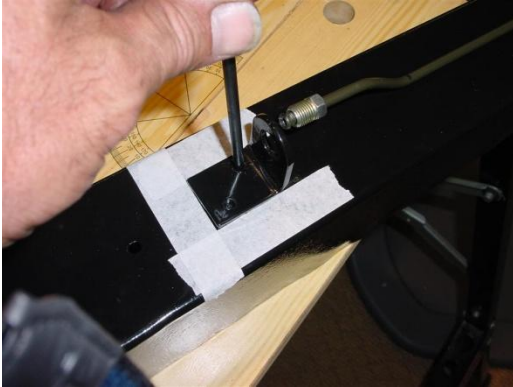
21. You could reuse your original lines, but I recommend you obtain new brake lines from your favorite automotive supply house. I got a couple of 40" lines flared on both ends from the NAPA store. They were more than long enough. Thirty inch lines would probably suffice. Using a tubing cutter, cut off one of the flared ends. I bent the lines as per the photo and flared the end which was previously cut off (don't forget to install the fitting before bending and flaring). After bending, the flare-to-flare length was about 20.5 inches.



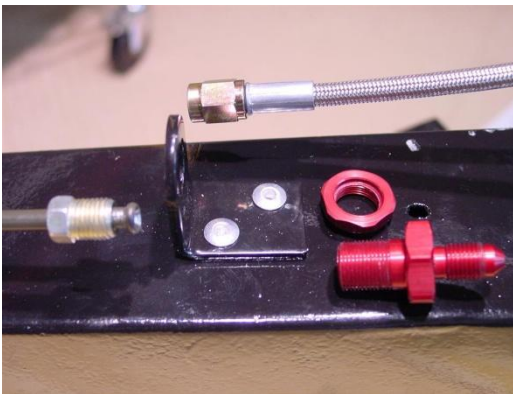
22. I obtained 12" size 3 TFE stainless steel braided lines (straight swivel to 3/8" banjo) and 3AN brake fittings with frame mounting tab from Pegasus Auto Racing Supplies along with M10 X 1.0 banjo bolts and 3/8" (or 10mm) soft copper crush washers.



23. When installing the tab mounting for the 3AN brake fitting, I found it easier to connect the newly formed hard line at both ends and then mark the location of where the tab naturally rests on top of the trailing arm. Outline the located area with masking tape, then mark the hole centers with a punch for drilling. Drill with a 3/16" drill bit.



24. Rivet the mounting tab using 3/16" dia. – 1/8" deep rivets.



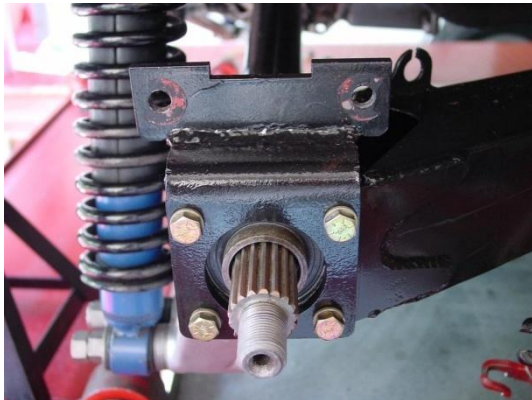
That completes all the prep work. It's now time to put it all together

Assembly

25. Install one end of the newly fabricated hard brake line to the brake hose on the forward end of the trailing arm and the other end to the adapter fitting installed on the new mounting tab.



26. Bolt the fabricated caliper mounting bracket to the hub using the four bolts removed earlier when you removed the drum brake backing plate.



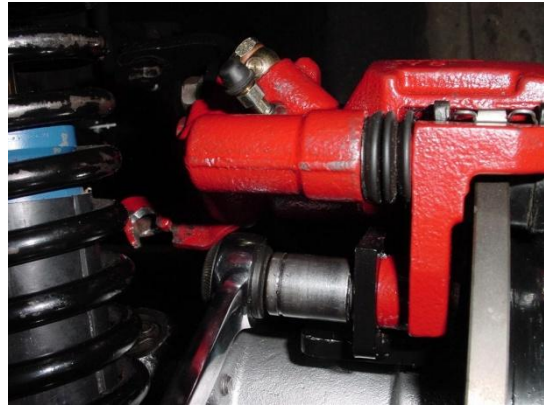
27. Slide the spacer ring over the splined shaft followed by the hub



28. Slide the disc top hat over the wheel stud bolts. Screw a lug nut onto one of the studs to hold the disc in place.



29. Slide the brake disc between the brake pads as you position the caliper for bolting to the mounting bracket. Don't tighten down the bolts at this time as you will be removing the caliper again when bleeding the brakes.



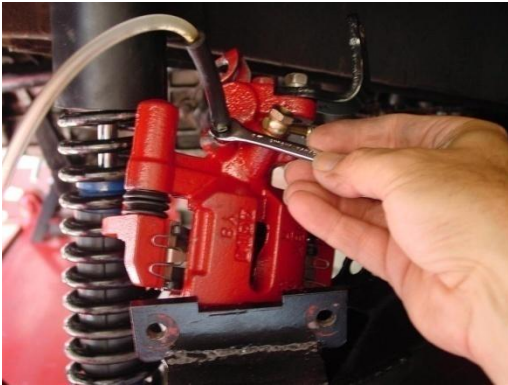
30. Connect the flexible brake hose to the tab mounted fitting.



31. Install the banjo end of the flexible hose to the caliper using the banjo bolt with a copper crush washer on each side of the banjo.



32. Now that the brake lines are all connected, it's a good time to bleed the brakes. It's easier to orient the caliper for getting air out before connecting the emergency brake cable. Remove the caliper from its bracket and place it in an orientation with the bleed screw at the top. I found if you don't do this, any air trapped in the caliper is very difficult to get pushed out the bleed screw. Bleed using your preferred method and/or apparatus. I personally use the EZ-Bleed.



33. Remount the caliper and test to be sure you have a firm pedal. If not, redo the previous step, but allow the caliper to sit undisturbed overnight. Sometimes this helps.

34. Slide the brass ferrule fitting on the emergency brake cable through the cable bracket hole you enlarged earlier. Place the yoke end of the emergency brake cable over the lever arm on the caliper, push the pin through, place a washer over the outer end and use a cotter pin to secure the assembly.



Adjusting the Emergency brake

35. Remove the cover bolt from the emergency brake adjuster screw on the caliper.



36. Insert a 5/32" allen wrench into the adjuster screw and turn clockwise until the piston clamps the brake disc. Back off about ½ turn. Reinstall the cover bolt.



That's it. Here's what it looks like all together.

