Checking and Adjusting Frame Alignment

Symptoms of a mis-aligned or bent frame/fork:

- Poor tracking (bike pulls to one side when riding with no hands)
- Wheel axle does not easily slide into dropouts
- With vertical rear dropouts, a true and dished wheel is off-center between seatstays AND chainstays.
    - If a true and dished wheel is centered between seatstays, but not chainstays (or vice versa) the rear triangle was built crooked and cannot be aligned.
- Visibly bent or bowed seatstays
- Cracked or chipped paint on the top surfaces of the top tube and down tube at the head tube joints
- Cracked or chipped paint on forward surfaces of fork blades near fork crown.
- Little to no clearance between front tire and down tube
- Inside of dropouts faces not parallel to axle locknut faces
- Bent or broken axles

1. Measuring frame alignment
    a. Mount the frame in a repair stand.
    b. Using a digital angle gauge or iPhone “level” app:
        i. Place the angle gauge or phone against the non-drive-side edge of the head tube and make note of the angle reading.
        ii. Take another reading from the non-drive-side edge of the seat tube. This reading should be within one degree of the head tube reading. If it is not, the front triangle is twisted. (No solution other than complete reconstruction of front triangle)
    c. Use the Park Tool FAG-2 to check rear triangle alignment. (bit.ly/2EYB9oN)

2. Measuring side-to-side fork alignment
    a. Remove fork from frame.
    b. Cut a piece of string or twine two and a half times as long as the fork is tall.
    c. Stand the fork on a workbench facing towards you.
    d. Loop the center of the string over the top of the steerer tube, and pull the two ends taught against the outside of the dropout faces.
    e. Take a look at the two places where the string crosses the fork crown.
        i. If the fork is aligned, the string will be equidistant from the center of the crown on each side.
        ii. If the fork is not aligned, the string will be closer to the center of the crown on one side.
    f. A secondary test is to install a perfectly dished front wheel into the fork and check if the distance between the braking surface and inside of the fork blade is equal on each side of the rim. Use a digital caliper to measure if necessary.

3. Measuring front-to-back fork alignment

a. Remove fork from frame.
b. Lay the fork flat on a work bench
c. Using a digital angle gauge or iPhone “level app:
    i. Take an angle reading with the gauge or phone resting on the steer tube
    ii. Take a second reading against the non-curved section of each fork blade, near the crown. These three readings should all be within a degree or two of eachother.
d. Use Park Tool FFG-2 to check dropout alignment. (bit.ly/2jpun2T).

THE FOLLOWING PROCEDURES CAN ONLY BE USED ON STEEL FRAMES & FORKS. “COLD SETTING” (aka bending) ANY OTHER FRAME / FORK MATERIALS WILL RESULT IN A CRACKED OR BROKEN FRAME / FORK.

4. Aligning a front triangle
    a. You can’t. Customer either needs to live with it, send the frame to a framebuilder for front triangle replacement, or scrap the bike.

5. Aligning a rear triangle
    a. This procedure is very well laid out by Sheldon Brown (bit.ly/2I8RIUv)
    b. Be sure to read the entire page before undertaking a rear triangle alignment.
        i. Patience is key! Aim to make very small bends, and re-measure the dropout spacing and alignment using the FAG-2 between every adjustment.
    c. After aligning the rear triangle, be sure to realign the rear dropouts using the Park Tool FFG-2 (bit.ly/2jpun2T).

6. Aligning a fork
    a. With the fork removed from the frame, clamp the steerer tube in the pipe jaws of the bench vise (located immediately below the flat jaws).
    b. Bend the fork blades according to you measurements form parts (2) and (3).
        i. Aim to maintain 100 mm dropout spacing for easy wheel installation. Aligning the fork with a series of small bends will make this easier.
    c. Remeasure fork alignment according to parts (2) and (3).
    d. Repeat steps b and c until fork is aligned
    e. Align dropouts using Park Tool FFG-2 (bit.ly/2jpun2T).