

# *Bicycles* *by Design*

## Frame building course overview



The objective of the course is to enable you to build a lugged frame using hand tools and basic brazing techniques that will be ready for painting on the final day of the course.

All course are tutored in a 1:1 basis, either by Peter Bird or Robert Wade and sometimes both.

Your frame can be either road, track, hybrid/trekking, mountain or utility bike made from suitable Reynolds 525, 725, 853 or some selected Columbus tubing with or without matching steel fork. Joints will be lugged and brazed with bronze solder. Frame fittings will be soldered with silver solder where possible. The design, tubing and fittings will need to be discussed and decided on at least 7 days before commencing the course to enable us to supply all the parts in time for the first day. If you are supplying forks then you must bring these along with you or if we are supplying them for you, then we will need sufficient time to get these for you.

Everyone learns in different ways, so we will work out your preference and work with you to ensure that you are comfortable with all procedures and processes to get the most from the course. Please feel free to take photos, videos, notes, drawings and ask as many questions as you want.

The 5 days will be spent as roughly as follows:

Day one:

- Overall design discussion continued (we will have discussed some things briefly prior to the course in order to choose the tubing and fittings) to enable a greater understanding of bike design and use of materials.
- You will be measured for a custom made-to-measure frame using our Calfee sizer. This process will be a more detailed one for you to enable you to understand how sizing and design works for each individual.
- Your measurements will be transferred to Bike Cad to complete the design and produce your working drawing and mitre templates.
- Introduction to the workshop, tools and health and safety.
- Produce a practice piece:
  - cutting and filing tubes, filing lugs prior to brazing, preparing joint for brazing.
  - Brazing the joint.
  - Cleaning and filing the finished joint.
- Recap and Q&A session.

Day 2

- Recap on day 1 as you'll probably have thought of loads of questions overnight.
- Continue any work not completed from day 1.
- Cut and prepare chain-stay dropout joints.
- Braze chain-stay/dropouts.
- Clean and file chain-stay/dropouts.
- Introduction to the building jig and transferring your measurements to set the jig
  - understanding the relationship of frame dimensions/geometry
- Prepare lugs and bottom bracket prior to mitring tube joints
- Mitre main tube joints.
- Drill main tubes for bottle cages and/or other fittings and breathing holes as required.
- Set all main tubes and lugs in jig.

- Tack main tube joints.
- Recap and Q&A session.

### Day 3

- Recap on Day 2
- If making forks – cut and prepare fork-blade/dropout joint and crown/steerer joint.
- Braze fork-blade/dropouts
- Braze crown/steerer joint.
- Remove main frame from jig and check track
- Replace main frame in jig and braze joints.
- Clean and file fork-blades/dropouts and crown/steerer
- Remove main frame from jig, check track, ream seat-tube and cut slot.
- clean main frame prior to filing joints.
- Recap and Q&A session.

### Day 4

- Recap on Day 3
- File main frame joints.
- Mitre chain-stay BB joints
- Braze chain-stay BB joints
- Prepare seat-stays and braze top eyes.
- Clean and file chain-stay BB joints.
- File top eyes seat-stays
- Check chain-stay track.
- Cut seat-stay/dropout joints
- Braze seat-stay/dropout joints
- If making forks – cut blades, track ends and braze to crown.
- Cut and mitre rear brake bridge and chain-stay bridge
- Recap and Q&A session.

### Day 5

- Recap on Day 4
- file seat-stay/dropout joints
- file fork crown joints
- Braze stay bridges
- Check frame track
- clean stay bridges
- Add all other braze-ons
- Ream head-tube and BB
- Finish filing and cleaning.
- Recap and Q&A session.

If you are unable to finish the frame in the time allocated, then you can come back at an agreed time to finish it or we can finish for you (for which we may charge a fee). You can arrange painting yourself or we can use our usual painter. We can also sort out decals for you if you wish to.

### **General workshop understanding**

You will be working in fully functional workshop using hand tools and some machinery. We

will give you a health & safety overview on the first day and it is your responsibility to adhere to those guidelines. We hope that we will not have to keep reminding you of safe practices, and if we do and we feel that you are not behaving responsibly, we may stop the course.

**Clothing and shoes**

As with most workshops you will get dirty so bring clothes that you do not mind getting dirty – we do issue aprons. Shoes should be sturdy and have leather (or synthetic leather) tops. Long hair will need to be tied back and excess jewellery removed.