



BASSO WORKSHOP

Alcide Basso started his own company in a garage in 1974, then he registered the BASSO trade mark in 1977. In 2007 we have celebrated the 30th anniversary of Basso brand. Since 1977, Alcide Basso has developed several lines of products which have found great acceptance in many markets around the world. BASSO new work shop is in the northern part of Vicenza, 60 km north-west of

Venice, only 5 kilometres from the historical plant of Campagnolo.

It is a magnificent area where you can ride on secondary roads and green hills, between ancient Palladian Villas and vast landscapes.



R&D DEPARTMENT

At the beginning there was steel and all racing bicycle frames were made with it. Now, the variety of compounds available is amazing.

Why use Carbon Fibres, Steel, Titanium or Aluminium?

Each of these materials is very suitable for a bicycle frame. But each material has pros and cons which can result in high performances or dangerous failures.

For example, it is important to know that titanium is 50% as dense as steel and steel is twice as rigid as titanium, therefore a titanium frame can be as rigid as a steel frame but you would not save any weight, for a lot more money. Also, it is interesting to know that carbon's weak side is elongation. Carbon fibres can be compared to "spaghetti": a handful of spaghetti will not stretch if you pull them from both sides, but it will easily smash if you compress them; therefore, we need to use the correct amount of resins to keep the fibres together and give them compression strength along with elongation strength, and even more important, there must not be any air molecules or dust in the cohesion between carbon and resins.

All this is studied in our R&D department, by testing each new idea or project in the testing machines and using the results for further developments.



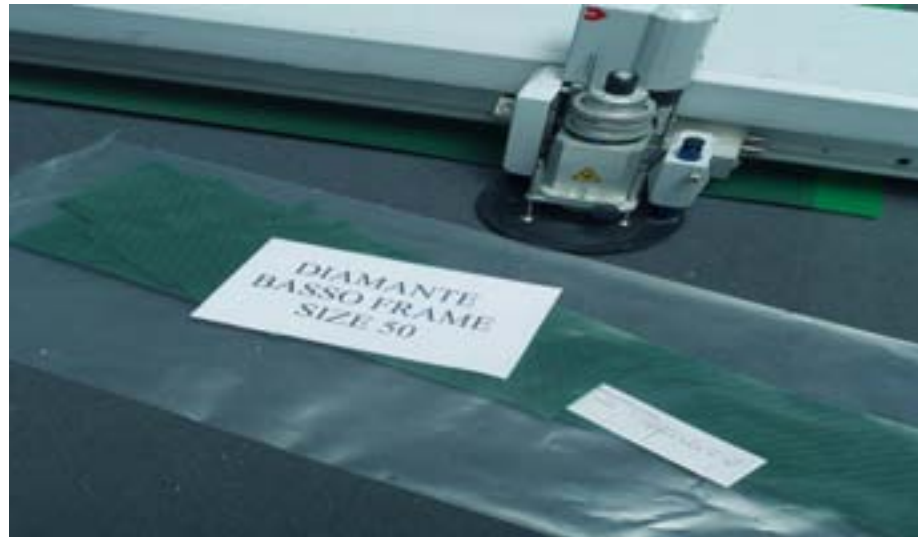
EXPLOITATION OF LASER TECHNOLOGY TO CUT CARBON FIBRES

Carbon is 60 % the weight of aluminium, it is one third the weight of titanium and it is 25% stronger than both. But as mentioned previously, it has some cons. Basso uses T700 Toray carbon fibre sheets which have the correct combination of carbon (65%) and cohesive resins (35%) for the use in the bicycle industry.

CARBON FIBRES SET FOR CUTTING



BASSO DIAMANTE - SIZE 50





CARBON PARTS LAY IN THE MOULD

But what will make your bike perform better in races, is the ability to lay up a laminate, which is absolutely the most important factor to give stability to your ride. Rigid in torsion, soft in bending, it all depends on the direction you lay the fibres in the different parts of the frame. Thinking about "spaghetti" again, you can guess that the amount of work the fibres must do around the BB-shell is tremendous. Any mistake in the project or in the work will result in a failure of the frame. Carbon sheets are cut by a laser controlled through a computer. Each frame size has its own pattern. The two shells of the mould (made of carbon) are firstly wetted by liquid wax in order to obtain an easy detachment at the end of the process. Afterwards, each carbon foil already cut in the correct shape and size is laid according to a pattern fixing the position in the half of the mould, the number of layers and the orientation of the fibres (from 30° to 90°).



MOULD POSITIONED IN THE VACUUM CHAMBER ROOM

We use three types of carbon weave pattern: 2x2 twill (200 gr/m²), 4x4 twill (280 gr/m²) and unidirectional 230gr/m². Nevertheless, almost all carbon frame failures in the industry happens because of the resins fail, not the carbon weave. So, the more compact the resins and carbon fibres are, the less you will see crack propagation.

BASSO uses a very costly but effective process for the carbon moulding which is done in a "vacuum chamber". In the two half shells where the carbon fibres are positioned properly, we insert the aluminium CNC parts for head-tube and BB shell; this ensures smooth edges and controlled thickness. Lastly, we insert the rubber tubes that will be inflated to create the internal pressure, and we close the half moulds one on the other and insert of this in the vacuum bag.



VACUUM CHAMBER

The vacuum bag is now slowly heated in the chamber up to 70°C., then pressed at 4 bar and then slowly heated again up to 125°C, with 1°C increase per minute. No air or dust remain inside the mould and the final "frame" is a unique piece, a real monocoque.

The "raw" frame extracted from the mould is already smoothly finished, no need to "scratch it" with sand-paper. The precious outer fibres are what protects the frame from the outside damages.

FRAMES READY FOR FINISHING PROCESS



BOTTOM BRACKET FINISHING





Marking of BB shell with an individual number which states year/month/production lot/size



MOULD SETTING FOR PRE FIT FRAME GEOMETRY

Tubes are set in the "welding mould". The welding mould clamps are set to keep in place the tubes for point welding in the correct geometry and size.

A word about TITANIUM

As we said before, titanium is as half dense than steel, therefore it has a very light weight. But it is also half as rigid than aluminium. To cope with this disadvantage, BASSO uses tube diameters and shapes that provide a supple, shock absorbing ride. But to make super light titanium frames is a limited task. Titanium performs better than any other material when it comes to fatigue strength. It is a fact that "titanium frames are forever", if welded correctly.

Its cost is not only due to the material or to the expensive tools necessary to cut and smooth it, but also to the fact that it is very costly to weld it properly, as it must be done in a controlled atmosphere. Meticulous preparation and welding is essential, or you would risk contaminated welds, which can result in weld failure.

A word about ALUMINIUM

In the range of density, aluminium is between steel and titanium. In the range of rigidity, aluminium is between steel and carbon. Therefore, light weight and rigidity are its advantages when compared to materials used in the bike industry. Its weak point is fatigue strength. Almost none of the aluminium used for making a bicycle frame has a defined endurance to fatigue stress thus, it is necessary to work on design to make it the most safe and long lasting as possible. It is very easy to weld aluminium, but a contaminated weld will certainly show a defect in a short time. A less than perfect extruded tube, will also crack, without any warning, in a short time.

We use ALLOY 7005 which is known for having a safe amount of flexibility in its compound, therefore, it is safer to ride as it shows failures for some time before it cracks.

In our profi-bikes we use carbon rear stays combined to aluminium front triangles as our carbon stays are designed to give some vertical flex and to have a very rigid lateral flex, this will give comfort during long races and better handling on uneven roads.



"3M" SAND PAPER SMOOTHING PROCESS (320 grit) before painting

Our R&D works in cooperation with BASSO paint suppliers, BASF and DUPONT. The correct paint process is developed for each frame material, to make its beauty last as long as possible, without colour fading or yellowing under the sun.

We use 5 layers of paint for carbon fibre frames and 6 layers of paint for aluminium or steel frames, being the first layer a protection against oxidization. No paint at all is necessary on titanium frames.

Our paints undergo 4 quality tests: corrosion chamber, saline solution, UV strays and chemical stress. We only use water-soluble paints, to avoid any dangerous chemicals to come into contact with our technicians or to be dispersed in the environment after the paint process.

Since the very early days, after chemical tests proved the dangerous effect of it, Alcide banned the use of chrome colours for his frames; despite the fact that it was in very high fashion those days.

PAINTING PROCESS

Paint is not a subject of secondary importance. All alloys have the tendency to oxidize and carbon fibres must be protected from scratches: surface scratches will eventually open the way to UV rays in the fibres, and deep scratches will simply cut the fibres.

It is important to inform customers to check carefully their frames after a crash or any big impact, and look for cracks or bumps. Should they find any, advise them to show it to the dealers who can judge if any serious damage, or can send us a picture for advise.





**FRAMES READY
FOR DRYING PROCESS**

After each layer of paint or protective varnish, frames are placed in an oven where temperature is controlled by microprocessors. Every layer of paint must dry perfectly before we apply the next one.

Decaling is also done by hand and two tone paint frames are obtained by covering one part with masks and marking tape. A true artisan job.

PAINTING ROOM / SETTING AT 30°



PAINTING ROOM / - SETTING AT 45°





FLEXION TEST

Tests are done every time we receive a bulk of tubes made on custom specification for Basso. We check that the materials are correct and matching the certification that we have obtained and registered for safety liability. Frame tests of flexion, torsion and "return to normal" are simple but very effective. A mistake in the tube supply will give us many more problems and unsatisfied customers.

STATIC AND TORSION TEST

