



**COLNAGO**





*Ernesto Colnago*

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COLNAGO

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CARBON FIBRE





**CARBITUBO**



**What does  
the trade  
press say  
about us?**

**C O L N A G O**

# The Colnago «Carbitubo»

By Sergio Meda/Foto Yes Advertising

*The latest frame devised at Cambiago, with the cooperation of Ferrari Engineering, uses carbon fibre tubes and special aluminium alloy fittings. A stroke of genius in the double oblique tube solution to increase cross rigidity, useful for the sprint and riding safety.*



**T**he great designers, those who live the term «horizon» as though it were their nose, something to be seen beyond without denying any possibility, have an assignment permitting any latitude. As they have innovational material available, better than all previous construction material, it is only right that every

new product should be conceived as a function of the new material and not viceversa. The reason is simple: because of the tendency to conservatism inborn in each of us, it is instinctive to imitate the form of the previous object, with changes in the structural material, but this attitude — which, as we have said, is human comprehensible because reassuring — finishes by becoming a serious mistake, as the potential offered by the new

material is not fully grasped. Often the entire operation is affected to the point that the innovation is dropped and looked upon as a failure because its exploitation has been along the wrong lines.

On the subject of bicycles, and purely for the sake of example, we therefore see philosophies that are bound, structurally, to the materials normally used. With high quality steel available (in the form of drawn



*In the insert we can see not only the central gearbox, but also the frame, without fork, in which the accuracy of the details and the oblique section obtained with two twinned tubes should be noted. On the opposite page, the perfect geometry of the complete structure with the special aluminium alloy fork.*

tubes of differing diameters) and with the intention of devising a bicycle frame, a designer worthy of the name must endeavour to select tube in which diameter and thickness will be limited. This enables him to enhance the qualities proper to steel, which are strength and toughness. Hence a sufficiently strong and rigid frame, with relatively small dimensions for the sections used.

If the material available is aluminium on the other hand, it is clear that to obtain frame performances comparable with those of a steel structure, the diameters or thicknesses of the aluminium tube will grow visibly. Hence his thinking runs in the opposite direction to that underlying the philosophy of steel.

Magical from the design standpoint, is the degree of freedom off-

ered to the designer by carbon, or the composite materials in general. In this case a new frame can be designed with more complex geometrical forms.

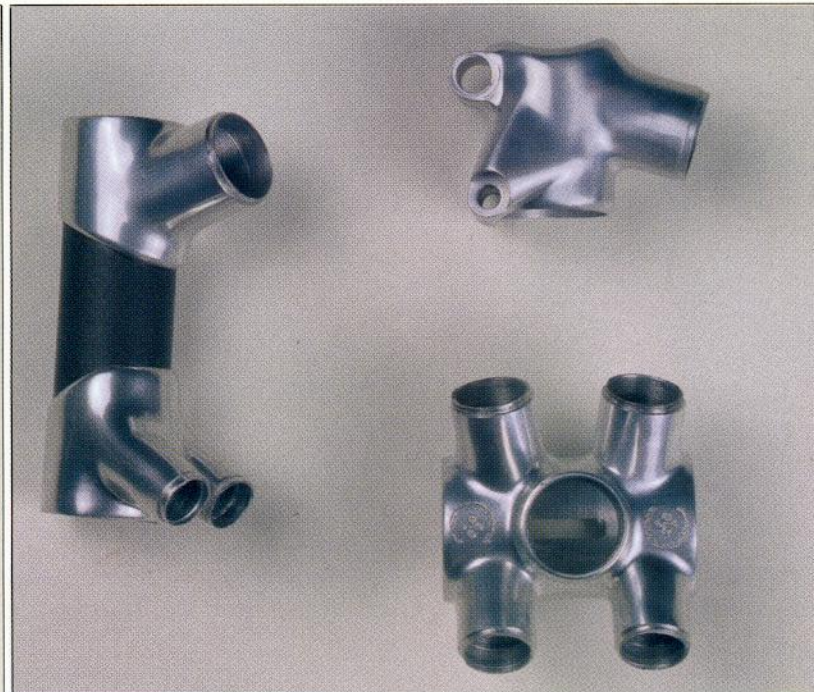
All the carbon frames that have appeared on the market or that are eyed in company or craftsman engineering shops have variable sections between the connecting zones (steering column, gearbox, saddle tube) and the tube centre.

It is therefore anachronistic, and consequently penalising, to bind a project to inopportune illogical designs that do not exploit the specificity of carbon and the compounds that make wide use of it. It is not therefore by chance that the section dimensions employed do not come within the limits of present international cycling rules, even though

these have undergone, and will undergo, innovations. But they will always be slower than the rapid progress of technological innovations and the possibilities of use of new materials.

If for example we take Ernesto Colnago's latest brainchild, the Carbitubo frame, it is immediately apparent that the idea of reduced weight, the first evident advantage of carbon compounds, has been obliged to take account of frame rigidity, a rigidity that must resist both bending and twisting. It is precisely through this rigidity that the athlete is able, without losses, to transfer his power to the wheels, while a flexible frame induces insecurity and gives him the disagreeable sensation of the gearbox slipping to right and left, without for-

## The Colnago «Carbitubo»



*Detail of the joints and frame during the processing stage. The carbon fibre tubes are screwed and glued with an aeronautic compound to the original fittings.*

getting the distortion energy dissipated by pedalling power. The phenomenon is all the more evident the greater the athlete's strength: hence the service of a champion are essential in perfecting a new frame of this type.

In Colnago's case nobody could act as tester better than Giuseppe Saronni, and in fact the critical observations that have enabled the structure to be optimised in a correct marriage of lightness and rigidity come from Saronni. Carbitubo is the happiest compromise between these two characteristics, and not only because Saronni had said so.

In devising this structure Colnago made good use of cooperation by Ferrari Engineering, specifically the en-

gineers Razelli and Cassese, who gave the utmost consideration to the problems.

There was no difficulty in harmonising the intuitions of a great craftsman like Colnago with the positive engineering design outlook of a staff accustomed to other utilisations (four wheels, it should always be remembered, are not simply twice two).

And we spoke to Cassese about the presuppositions and characteristics of Carbitubo.

Let us hear what he says. «One of the tendencies, or temptations, arising out of the freedom of choice allowed by carbon fibre, is to construct a unibody with varying tube section to give strength only in the zones where it is required, at the same time achieving

reduced weight and high rigidity.

Frames have emerged in recent times that appear to be rather large and heavy — even though in reality the exact opposite is true — and not all bicycle enthusiasts have shown appreciation for them. A point of decision has thus been reached, where styling must be satisfied without reducing performance. With Colnago we devised cylindrical tubes with particular characteristics. It is in fact right to replace the classic large diameter diagonal tube with a pair of thin tubes which, starting from the zone below the steering column, finish at the two ends of the gearbox.

This is a typically motorcycle solution that allows working with traction only and compression only, replacing the bending stress that exists with the classic frame scheme».

The result of a good «dual-tube» frame like the Carbitubo is to give the frame greater cross rigidity.

This allows greater riding stability both on the flat and downhill, as also, by no means a negligible factor, in the sprint. Hence the enthusiastic reactions shown by Saronni, increasing even more the bond of friendship with Ernesto Colnago, who brought him into the world and couldn't wait to provide him with a winning machine.

