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JULIO FERRY BORGES, THE SCIENTIST AND THE MAN

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ABSTRACT

The branch of engineering for the development of which Julio Ferry Borges was called on to contribute is the oldest of all: civil engineering.

It is taken to cover the planning, design and construction of major fixed equipment intended for controlling and developing the forces and resources of Nature, providing a suitable environment for Man's spiritual and material needs.

Dr. Ferry Borges, as a research engineer, could, of course, only be responsible for a part - vast though it might be - of civil engineering: structural engineering.

In approaching so classical a field, Ferry Borges has contributed towards to removing some simplifications of the kind that are introduced into Science, sometimes as a working hypotheses, at others as fatalities due, at a certain period, to lack of development in the available scientific instruments.

Such simplifications, by remaining longer than would be reasonable, and affecting mathematical or physical models whose construction is proper to scientific method but which the great majority of engineers tend to confuse with reality, are transformed into veritable prejudices which block progress of Science.

Owing to them, structural engineers acquire vices of formation some of which only now, with the support of powerful computation means and sophisticated experimental techniques, engineer educators can try to eliminate.

Norms and codes themselves, which in every epoch reflect the state of advance of scientific knowledge, were recently, in the area concerned, based on simplifications of this type that made them purely static, linear, elastic and deterministic.

The contributions made by Ferry Borges stand exactly in the line of the efforts made in order to perfect the basic mathematical models of structural engineering.

The thesis that he defended thirty years ago at LNEC was a pioneer work with which he tried to eliminate, from structural engineering, the fatality of determinism. In using for that purpose statistical concepts, as well as techniques drawn from Statistics, he efficaciously helped to formulate on scientific lines the theory of structural safety.

Many other papers famous one, which, by exerting a noteworthy influence on national and international codes in the domain of structural engineering, brought them closer to their present form.

The instrument forged by Ferry Borges in this way enabled him also to approach with originality and pragmatism themes of reinforced concrete engineering and seismic engineering . In both cases, his contributions were so outstanding that the CEB, the top international organization in the field of reinforced concrete engineering, elected him as its chairman.

International prestige was achieved by him, in fact, very soon, and it did much also to enhance the world reputation of LNEC. It also facilitated the international contacts of his disciples, a group to which I am proud to belong.

Julio Ferry Borges was also one of the first to grasp the importance of computational methods and the nature of the revolution that they caused and are still causing in civil engineering.

That is why, seeing in computers something that was far more than mere calculating machines capable or processing quickly the calculations that had hitherto been done by hand, it was he, for example, who conceived - and in the end imposed to designers - the method of analysis that was used in the structural analysis of the suspension bridge over the River Tagus in Lisbon, the first suspension bridge to be analysed by modern techniques.

In more recent times, Dr. Ferry Borges started to devote more of this time to the great questions concerning Man and his social behaviour, thus bridging the gap between the so-called hard and soft sciences and technologies.

He decided thus to put his remarkable humanistic culture and intellectual capacity once again at the service of the engineering community, this time in non-traditional fields, like engineering Ethics, a new field of engineering research.