Sustainable Construction:  
A Life Cycle Approach in Structural Engineering

Malta, 23rd – 25th July 2010  
University of Malta

Pro-Rector, Chairman, Colleagues,

On behalf of the Faculty for the Built Environment, I would like to welcome you to the International Symposium on Sustainable Construction, which, as you know, will be followed by International Training School on Sustainable Construction: A Life Cycle Approach in Engineering.

Sustainability is today’s term. It has the magic of attracting the public’s and the politicians’ attentions. For every research project we propose, we have to explain how the work will be sustainable; every budget that is proposed has to be sustainable; and, in our area, everything we build should be sustainable. We now refer to sustainable development, sustainable energy, sustainable construction, sustainable pension reforms, sustainable taxation, sustainable life-style?

The applicability of the term is so wide, and nowadays, so common place – journalists use it regularly (no disrespect to journalists implied here) and the public read it so often - that its meaning has
become diluted, or even distorted. As a result, it has almost lost its efficacy as a concept.

Or perhaps not. The meaning of the term is still the same, and can be applied universally to economics, sociology, tourism, cultural heritage, physical development, ecology, energy production, selling of hamburgers, and wars. To be sustainable means to be capable of being maintained, of enduring, in time. To have sustainability means to satisfy today’s needs whilst making sure that future needs of future generations could also be satisfied.

In our world, that of construction, physical development, architecture and engineering, it is my modest opinion, however, that we have to be careful not to miss the wood for the trees.

In a recent talk by Malcolm Millais, From Master to Servant, the rise and fall of the structural engineer, the comment was made that at the beginning of the separation of the profession of structural engineer from that of the architect – effectively, following the re-invention of modern steel, and later, modern cement, in the 19th century Industrial Revolution - the structural engineer used his knowledge of the material, and his mastery of the behavior of forces and deformations, to erect “useful” structures. The forms that the materials and the force resultants determined became an aesthetic in themselves. The Engineer was, in this sense, the Master. Nowadays, our IT tools give us powers of analysis and of visualization which are unprecedented. The current construction design industry is nowadays, as a result,
mostly dominated by architects who can dream up any form or configuration of building, because the engineer can follow, and find ways of analyzing and building …. anything – hence now a Servant. Millais’ talk was obviously deliberately provocative. Nevertheless, I believe it has relevance to this symposium.

Sustainable construction has already become, in the mind of the public, associated solely with energy efficiency. If one looks at what is being built around the world, which is published in journals with an international readership – and therefore, by implication, what is being promoted as laudable, admirable, and to be emulated, one finds a large number of iconic buildings – with all sorts of dramatic forms and exotic materials, which are then touted as forms of sustainable construction simply because they have some photo-voltaic panels stuck to the roof, some holes dug into the ground to obtain cooling water or tempered air, or some wind turbines stuck to the roof, to generate “renewable energy”. No reference is ever made to the choice of structural form, the choice of structural configuration, structural efficiency, or the choice of materials, structural or otherwise. Some very exotic materials are being used in the interests of new “sustainable” technologies. And some very exotic end-of-life disposal problems are bound to arise with these new materials.

This is not to say that sustainability in construction implies a limit to creativity. On the contrary, the limitations imposed by such considerations should be a spur to creativity. Later, next week, we will have the occasion to show you some of the remains of a civilization
that sustained itself, for a thousand years, five thousand years ago, that understandably had very limited resources, and hence had to husband them carefully, and yet fostered an impressive level of creativity. In the end, however, it seems, it did collapse because, probably, its sustenance ran out.

This symposium, commendably, addresses and promotes a Life Cycle Approach to Sustainability. Less satisfactorily, it somehow implies that there could, or indeed should, be a Life Cycle Approach to Structural Engineering, separate from a Life Cycle Approach to the whole construction process. In today’s construction processes, the structural components are not necessarily the most demanding of financial resources, or of finite material resources, or of energy consumption, or the components that give the greatest problems of waste disposal or recycling. The other components, internal and external finishes, services, fixtures, furnishings, taken together, often constitute a far larger use of financial, material and energy resources – not to say anything of the eventual operational stage of the building.

In order for the structural engineer to become a Master again, it is necessary for the profession to take the initiative again, as in the 19th century. We have to get to know the science, without obfuscation, and we must become masters of communication of that science. In order for our ideas about the need for Sustainability in Construction to be relevant, structural engineers must take a more prominent public platform, and must take the lead in educating the public, and
therefore politicians, to be more critical of what is touted as sustainable in contemporary construction.

I am sure I am talking to the converted. I am also sure that the Symposium will be an opportunity for you to exchange ideas, and to promote common approaches in our respective countries. In any case, I once again welcome you, and wish you a pleasant stay in Malta – not too hot, I hope.

Alex Torpiano