

Engineering for the (sustainable) Development of Humanity

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SUMMARY

Since the early days of Human History, the concept of Engineering has always been associated with activities that aim to promote human development and the development of Communities.

The motto of this UNESCO WFEO World Engineering Day, 2024, 'Engineering Solutions for a Sustainable World' is, therefore, a motto that 'says it all', that encompasses everything, that truly opens this World Engineering Day to the entire dimension of Engineering! A dimension that we can identify simply – "*There is Engineering in everything, where we are right now, around us and outside in the World*".

With this vision and feeling, when invited to propose a title for my Opening Conference, my decision was so immediate - Engineering for the (sustainable) Development of Humanity.

This leads me to a short, somehow philosophical, comment: I like the number 3; It has indeed a special meaning in different cultures (and religions), but also, and from a more earthly perspective, in communications, an art where we are 'taught' that when we want to emphasize some idea, we have to say the arguments 3 times.

This number 3 is embedded in my Conference, from the very first step of the title, which I constructed around 3 words/ideas - Engineering, Development and Humanity.

Now, speaking of the structure and substance of the Conference:

I shall start my talk, as I usually do, by the end... conveying, in the form of 3 ideas/conclusions, the message that I would like people to retain, to take home, a message that I naturally justify, subsequently, throughout the presentation:

- Affirm the vital role of Engineering in ensuring the future, in promoting the socio-economic development of Countries/Communities, for a sustainable development of Humanity;
- Affirm that the necessary increase in productivity and competitiveness, for any Nation or Community, is only feasible with the CAPACITY OF DOING that characterizes Engineering and the Engineers;

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- Further affirm, on another level, that Engineering is a condition of the future, through its example of ORGANIZATION, QUALITY, AND RESPONSIBILITY, which is so badly needed in so many countries.

Following this opening, my first group of formal notes is around the questions 'Engineering for Development, since always... What evolution? What changes? What is to be an Engineer today?'. I shall specifically provide some brief historical notes on this trajectory that brings us from the First Industrial Revolution to our days of artificial intelligence, and, also, discuss the scope of the term 'Engineering for Development', in the current state of social, economic, scientific and technological progress.

I shall continue with five groups of thoughts, indeed to provide some 'food for thought', around the following themes and ideas:

- (i) The attitude we should adopt, given the evolution of Humanity;
- (ii) The extraordinary evolution of the spectrum of knowledge, of the subjects that are today Engineering;
- (iii) Prevailing Values, at School and in the Profession;
- (iv) Evolution of work and training models, working conditions;
- (v) The role of Innovation, Entrepreneurship, and the major political issue of talent retention.

And, concerning all the relevant comments, I anticipate that I dedramatize the challenges that we face: we live, today, in times of changes... as others have lived, before; we simply have to be up to the times... as others had to be, before.

My final group of notes aims at supporting the dimension and relevance of Engineering, with a set of 4+4 Engineering cases.

The first subgroup addresses 2 classical developments, going through lab and pilot scales, to the final plant stage, ending up in remarkable solutions that are disseminated worldwide; and 2 other works of significant complexity that represent the many hidden engineering activities that are always behind and supporting the restoration/rehabilitation of iconic patrimony.

The second subgroup addresses 4 cases led by young companies that involve a high entrepreneurial and innovation dynamic, in two of today's hot topics for Humanity: energy transition and water resources.

Yes, Portuguese Engineering, with its dimension and potential. is an equal competitive partner in the World.

In all, my case is that Engineering is a fundamental activity for ensuring our collective development and that with the immense available human heritage of engineering knowledge and practice, worldwide, the World has a future.