

IVS PRESS RELEASE: Interview with Carlo Mapelli, member of the Scientific Committee of IVS 2017, teacher at Politecnico di Milano and AIM(Associazione Italiana di Metallurgia) President

The IVS 2017 Press Office proposes an interview with Carlo Mapelli member of the Scientific Committee of IVS 2017, teacher at Politecnico di Milano and AIM (Associazione Italiana di Metallurgia) President

1. What are, according to your knowledge and experience, the trends in materials and developments which will be used in designing industrial valves in the near future?

The attention will be focused on the increase of toughness and corrosion to increase the safety of the plant and of the equipment, while the increase in terms of strength will be performed in order to decrease the weight of the equipment and to improve its handling. The increase in terms of corrosion and toughness will be obtained by intensive use of super-duplex, nickel-based superalloys and the maraging stainless steel grades. These are also known as PH stainless grades and combines the high strength typical of the martensitic stainless steels with the improved corrosion resistance deriving from their low carbon concentration. Interesting development in the next future can be observed also for the possible introduction of austenitic chromium-free high manganese and aluminium steels characterized by decreased weight, improved corrosion resistance and significantly high combination of strength and ductility: the first application of this material could be represented by the components which have undergone wear phenomena.

2. How do you see the growth of material standards in different parts of the world?

In certain specific cases the growth of the number of the material standards is due to the increase of the environment and of the corrosion aggression featuring the new gas and oil fields, the on-shore and off-shore plants, that can be subjected to working conditions unusual until several year ago. On the other hand, this tendency can suggest actions that are not favourable to a correct and transparent competition awarding the quality and the real reliability.

3. What about new emerging production technologies in manufacturing?

In my opinion, the introduction of new technologies will interest mainly the use of steels and alloys featured by an improved homogeneity in terms of the chemical composition, so a lot of forged products will not be produced starting from traditional ingots but from re-melted product or by the new continuous casting machines able to produce large diameter blooms. Moreover, the forging procedure will be modified carefully in order to obtain products featured by a better internal soundness. I do not believe that emerging technologies can substitute the foundry and forging technologies in a short time, because the new emerging technologies are more expensive and cannot assure the same mechanical reliability.

4. If we consider for instance the recent developments offered by 3D printers, how do you see this new approach applied to valves? Will it be mainly used at prototyping level?

In my opinion, for the metallic goods 3D printers or the so called Additive Manufacturing will cover an important role in the prototyping applications or for the components that have not to point out significant toughness, because the final obtained microstructure is the result of a solidification process and so it cannot offer the same mechanical reliability of a forged or rolled microstructure. We must not forget that the significant effort spent during the plastic deformation of the metals aims at erasing the microstructure derived from the solidification process because it is not reliable enough to assure a safe behaviour of the applied components.

5. Don't you think that so many similar material standards, sometimes in conflict vs. each other, create market turbulences and confusion, obliging users and engineering companies to stick to "de-facto" specifications reducing one of the main advantages offered by "real" internationally used and accepted codes?

Such a trend often hides some protectionist position of several companies and of the controlling governments and it implies more confusion and the difficulty to standardize the products. The homogeneity among the different technical standards is a need to avoid confusion and to address the engineering companies to consider carefully the real requirement and needs of the customers and of the safety requirements carefully.

6. Looking at the total cost of ownership, what is your opinion on the specific task of correct material selection and which are the main drivers for all industry stake-holders?

The material selection represents the fundamental starting point once the mechanical performances have been defined by the engineers. Actually, the material represents the basic element to satisfy the structural requirements and the durability of the valves. On the hand, the competitiveness of the product requires to achieve the correct balance between the required mechanical properties and the material cost. Actually, the cost of the material and of its technological treatment is an important fraction of the overall cost of the goods and so an efficient material selection is a key factor for the competitiveness of the products not only in terms of their production costs, but also of their maintenance costs and the duration of their technical life. The engineering companies and all the end users are sensitive to all these aspects.

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