A word from our Editor-in-Chief

NONCONVENTIONAL TECHNOLOGIES – TECHNOLOGIES OF THE FUTURE

Nonconventional Technologies, and therefore dimensional processing technologies, are generally defined as those methods and technological procedures which are still in the phase of elucidation and the command of constructive solutions, their intrinsic technological possibilities and condition of practice is still in an incipient or a development phase.

As well, the dialectic character of these delimitations is generally accepted, due to the permanent evolution of this field towards that of conventional technologies, determined by the scientific and technological achievements.

Concomitantly, the nonconventional sphere of processing technologies is continuously enriched with new possibilities, which are now part of fields that belong to the more or less remote future.

Practically, these new technologies have evolved during the last 60 years from their "invention" to a wide industrial employment that followed, and nowadays they represent alternative technologies, complementary of classical technologies.

The foundation of these technologies is represented by elementary mechanisms with interconnections – which are sometimes surprising – and which are governed by a totally different "legislation" in comparison with the classical, nonconventional technologies.

These technologies are nowadays more and more employed in the processing of certain machine parts, components and apparatuses which operate under special temperature, pressure and velocity, respectively heavy-duty conditions, and which therefore made of hard and ultra-hard, ultra-resistant materials.

For such processing procedures, dimensional processing methods such as casting, plastic deformation, and powder aggregation, as well as the splintering processing procedures are unsatisfactory from an economical point of view or even impossible to be employed.

Other causes that made the identification and development of these new processing procedures, as alternatives to the classical one, possible are:

- the configurations of the surfaces to be processed are complex;
- the rigidity of the tool or object to be processed is insufficient (micro-dimensional processing).

The contribution of these new technologies to the processing of machine parts with special features considerably increases along with these applications, namely, where these new processing procedures complete or actually compete with nonconventional processing technologies as a result of the precision and efficiency improvement.

Having certain distinct features, the concentrated energies processing method essentially differs from the other processing methods, but by its effects, particularly the removal of a (bigger or smaller) quantity of

material at the level of the object being processed it perfectly fits in the family of material removal processing methods.

Conceptually, the notion of nonconventional technology should be considered from a dialectical perspective. It includes all new technological procedures, which are different from the technologies known at a certain moment, and which are in process of studying and phenomenological elucidation, and thus have a very narrow or at best limited applicability potential. The dialectic of this notion especially refers to the procedures migration "into" and "from" the area of nonconventional technologies, on one hand, by discovering some new procedures which augment the number of nonconventional technologies, respectively by leaving their area by a "complete" elucidation of their phenomenological and applicative aspects. Thus, they enter the area of conventional technologies.

From this perspective, one can state that at the beginning of their industrial employment, all dimensional processing procedures (casting, plastic deformation, splintering) were located within the area of nonconventional technologies and only the intense phenomenological and applicative research activity which followed, and which has not yet been completed, has transferred them within the area of nonconventional technologies.

These complementary alternative technological procedures have been defined as **nonconventional technologies** in several international languages:

- In English: non(un)conventional machining processes;
  non(un)traditional machining processes;
- In French: procédés nonconventionnels;
- In Italian: lavarationi non convenzionali;
- In Spanish: maquinado no tradicional.

Nevertheless, it should be pointed out that the term of nonconventional technologies, term which comprises all new dimensional processing procedures, has a wider area of meaning, which includes new procedures from other domains of human activity.

Due to this reason, in order to restrict the area of this notion to the new dimensional processing procedures, another notion has been proposed, a notion which is nowadays widely used, namely "**erosion processing procedures**". This notion fundamentally characterizes the basic mechanisms for material removal on the surface of the processed object. Erosion is the term used as well in German – Abtragen.

This notion can be as well considered as limited from the viewpoint of its usage, on one hand because the notion of erosion also includes other actions that are essentially different from dimensional processing, thus allowing certain confusions, and on the other hand, this notion does not include the signs that lead to the possibility of dimensional processing.

The third alternative of globally defining these new technologies is that of "**processing technologies with concentrated energies**". This term highlights the fact that in the case of these dimensional processing procedures the increase, sometimes significant, in the concentration of energy available at the level of the processed object surface. These energy concentrations can cause on one hand favorable conditions for

conventional processing procedures or on the other hand they can determine material removal on the processed surface by new mechanisms.

The justification of this last term can be provided by the main feature of the concentrated energies processing procedure.

This main characteristic refers to the mechanic contact between the two objects in interaction (tool-processed object) proper to the conventional processing methods.

In case of the concentrated energies processing (by erosion) there is no immediate mechanic contact between the two rigid objects, the immediate contact of the object being processed takes place only with the erosive agent. When we try to obtain for the processing with concentrated energies an assimilation of the notions proper for the processing method by splintering, then by the notion "tool" we have to attach the notion "erosive agent", that means that the "tool" through which we achieve the material removal by the processing with concentrated energies (by erosion) is the erosive agent.

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