

TECHNOLOGIES: A MODERN UNDERSTANDING

Ya. Zubrilina
Universitatea Tehnică din Moldova

INTRODUCTION

The initial meaning of the term «technology» (Greek — mastering and study) is denoted as a totality of various processes, methods and constraints used for the various kinds of processing, alteration of properties and states of initial raw materials, stuffs, half-products required for the manufacturing of a finite product in any spheres of production activity. The notion «technological process» includes a preliminarily determined sequence of actions (operations) required for the production of finite product. The technological operations themselves are based on natural (physical, chemical, etc.) processes and human labor.

Technology is directly related with one more notion - «techniques», that denotes a system of machines, mechanisms, controls, power, informational resources, etc. directly participating in the technological processes. The totality of machines of certain destination comprising a single unit initially represented a simple threesome system: instruments (working tools) - motors – transmission mechanisms. The modern production machines became more sophisticated, in the process of evolution they turned into production lines that are currently forming the basis of nowadays' technologies.

The term «technology» is also denoted as a science and study discipline aimed at determination and substantiation of general principles, physical, mechanical and other regularities, generalization of practical experience for use in the elaboration of specific production processes. The importance of technological study is determined by the fact that it is some sort of link in the transition from natural scientific investigations to technical elaborations. For the modern technologies is characteristic the orientation towards the use of results of fundamental scientific investigations and their quick implementation into practice in order to maintain competitiveness in our complicated and dynamic age of scientific-technical revolution. Another characteristic point is that unlike the artificial simulation of natural processes and materials the modern technologies are based on scientific discoveries and inventions that create materials and production processes having no analogies in nature.

1. SYSTEM APPROACH IN TECHNOLOGIES

In this order of ideas the technology itself turns into a system that may be presented in the following manner: «fundamental science -- applied (technological) scientific investigations — engineering development — creation of technics – organization and setup of production». Compared to the previous traditional technologies, in this system has been substantially increased the share of scientific research and experimental construction works in the total cost of both technologies themselves and products produced with their application, i.e., there is a growth of scientific component in technologies and production.

The first ever technologies of mankind, beginning with trimming of stones for getting even a primitive implement were based primarily on the mechanical processing of materials. Gradually, to the extent of perfection of mechanical technologies they were supplemented and substituted by physical and chemical technologies.

All these fully apply to the construction technologies. Recently many new technologies have been elaborated, for example, the microphysical ones based on the movement forms of materials typical for its sub-atomic organization levels and the biotechnological ones based on the use of natural and specially created live systems for the purposes of production processes.

The changes occurring in technologies in course of development are specific for each branch, including construction. However, there are many common points. First of all, one must mention the growing scientific component, as new technologies are created primarily on the scientific and theoretical but not empiric basis as before, till the middle of XXth century.

Has become characteristic the systemic approach when technologies are presented in the form of large and complicated probabilistic systems. The contemporaneity of technologies is now determined by their flexibility in the production of small-series and wide nomenclature products, transition from mechanized labor to automated production, resource saving, environmental friendliness.

Compared to the other branches, the construction technologies to a certain extent are more conservative to the innovations that change their essence. There are numerous causes for that, some of them are reasonably objective — considerable impact of surrounding environment, dimensions of final products — buildings and structures, duration of production cycle. In construction are much easier perceived the new kinds of finishing, installation and other similar materials that do not introduce significant changes into the construction structure, as well as methods of assembly and transportation of product elements. Because of these the construction technologies are slower than others, mutually penetrating into each other, gradually replacing the previous ones.

The sudden and principal changes that cardinally alter the old technologies are often slowed down because of use of old materials and labor techniques, sometimes even due to modest engineering thinking, absence of necessary efficiency and initiative. For example, the idea of factory production of not a flat or linear building element but of a part of its volume is revolutionary compared to the previous technologies of industrial construction. Simultaneously the implementation of this technology even in the countries suffering acute insufficiency of dwelling space is lasting for many years with rather modest results.

The technology using volume elements was approached with old yardsticks using the slowly consolidating Portland cement concrete similar to other technologies. In the cases where it has been managed to divert from the old practices the results appeared to be much more efficient.

In the industrial construction the additional costs for the preparation and reinforcement of volume elements are quickly covered by the accelerated introduction of objects into exploitation. Besides these, use of non-traditional modes of transport, transportation of elements via waterways, via seasonal ice allowed to increase significantly the mass of transported products (superblocks).

2. TOP LEVEL TECHNOLOGIES: DEFINITION, CONTENT, SPHERES OF APPLICATION

When the primitive man, having collected some sharper stones, decided to trim other stones in order to manufacture his first implements, he has created the first ever and the genially simple technology. However, he did not stop on that. He went forward, having intended to manufacture some sort of axe. To do this the stone had to be fastened to the stick. A suitable stick was required. It could be found or broken off from a tree. Then there was something needed for fastening the stone. Flexible twigs, grass, lianas could be weaved in order to obtain the first ever prototype of rope. But only

the next technological process — assembly crowned all that work.

So, for the manufacturing of a simple tool the man had to employ several primitive technologies. Even from this example one may see that the technological development of mankind has a consecutive character. It is denoted by the fact that to the extent of complication of technologies one of them appears to be of some higher level requiring the support of the lower ones. The lower level technologies are used to produce products that themselves can be used not only for the top level technologies. The stick could be used not only as handle for the axe, while the rope could have many other applications. Being all aimed at manufacturing of an axe, these technologies have formed a system in which they got their own places and levels of significance for the final product.

The modern technologies that are designed for the production of some common type products may be conditionally divided into different levels but all serving to one common scope. In industrial construction the branch that we have chosen as an example, one may distinguish technologies of the following basic levels:

- extraction, processing and preparation of raw materials;
- production of materials;
- production of half-finished products;
- production of industrial construction products;
- transportation of elements, half-products and materials to the construction sites;
- mounting of construction products on the site;
- after-mounting works.

Such complexes of technologies are usually based on one or several serious scientific-technical ideas that form the basement for the main methods and devices. Namely these ideas determine the interaction of all elements within such complexes, they form their «cement», directing towards the final scope.

For example, in large panel construction such an idea is the division of a building into factory produced plane elements — panels sized «per room». This forms the basis for constructing the buildings, for producing the panels, for their transportation, mounting, etc. At last appears a system of different technologies joined by a common scientific conception and common expected result. The complex of technologies of this kind is proposed to be named general technology.

A general technology is a material production system for the manufacturing of certain finite products, including a complex of technologies for the production of separate elements for such products, being united by a common direction for the achievement of final system indicators in general and has in it the leading methods and mechanisms based on the principally new scientific-technical ideas.

So, the complexes of modern industrial construction technologies are referred to the category of general ones. However, only the ones that are based on perspective scientific-technical ideas and have potential possibilities for further modernization may be chosen for further research.

A transnational technology is a technological system that includes a complex of technologies used simultaneously in a number of states (regions) and united by a common scope, identical standard for all territories and using the corresponding local raw materials. In a number of cases the raw materials with elements of know-how are delivered from central bases.

An example of such technology may be the „Coca-Cola" Company, „McDonalds" and others.

A global technology is a technological system based on state-of-the-art scientific-technical ideas without any common controlling sub-system and using various intra-system regulations but comprising the entire world with free access for the citizens of any country.

An example of such technology is the Internet network.

Table 1. Technological systems – classification breakdown

No.	Breakdown links
1	Forms of technological systems
1.1	Unitary
1.2	Complex (without common scope)
1.3	General (with common scope)
1.4	Transnational
1.5	Global
2.	Importance of technological systems
2.1	Ordinary (simplified and previously known)
2.2	New (based on rationalization proposals)
2.3	New and high-end technologies (based on results of scientific investigations, inventions and know-how)
2.4	Pioneer (without analogies)

3.	Destination of technological systems
3.1	Technical
3.2	Organizational-managerial
3.3	Informational
3.4	Humanistic (with social orientation), etc.

CONCLUSION

1. The modern technologies may be considered as systems or the solution of quantitative and qualitative problems in various branches of national economy.
2. Construction as one of the widest and most complicated systems is the most adequate subject for researches aimed at creation of various technological systems.
3. The proposed classification breakdown of technological systems allows to evaluate with a suitable degree of precision their importance in a specific branch of economy.

SUMMARY

Presentation of technologies as systems is a practical tool in the process of their elaboration and implementation into practice. Such a methodology is the most efficient in the wide and multilateral construction branch.

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