

# ECONOMICS

## CLASSIFICATION OF BASIC PRODUCTION PLANT PETROLEUM-PROCESSING INDUSTRY (A DISCUSSION)

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Under the new conditions of planning and economic incentives the results of the economic activities of enterprises will be influenced considerably by the cost of their production plant and the efficiency with which they are used.

An analysis of primary accounting of the basic production plant at the petroleum refineries of the Ural-Volga region shows that according to the existing system of group accounting of the basic plant, the latter are distributed among groups, disregarding the purpose for which they are actually used. The group "operating machines and equipment" (the most active portion of the basic plant) accounts for not only the production apparatuses and equipment of the technological units, but also structures (platform, supports, and shelves), pipelines and drainage of all types and purposes, the system of instruments and automatic devices; i.e., the full cost of the technological units, except the buildings, is taken into account.

The basis for including "technological units" in this group was the concept of "inventory item" for the group of operating machines and equipment formulated in the standard classification.\* The term "unit" introduced into the list of items that are related to operating machines and equipment can be extended to mean the technological units of refineries. A technological unit in a refinery is neither an apparatus nor a machine but a complicated production complex, in which the technological process (cracking, reforming, dewaxing) is divided into numerous operations (each taking place in definite apparatuses) connected through a system of pipelines.

Various labor tools are required for conducting a technological process in the unit. Some of them take direct part in the process and others only indirect, fulfilling the auxiliary functions. The roles of the dehydrators, columns, furnaces, and reactors concern the direct transformation of the states or inner structure of the petroleum products; therefore, they should be included in working machines and equipment. Despite direct contact with crude oil and products, the pipelines have no effect on their state and structure, and transport the products from one of the apparatuses to another. Process pipelines and particularly steam pipes, water pipes, drainage system, and cable network should be included in transmission devices. Shelves, supports, and metal structures permit attending on the production process, as well as repair of apparatuses, and should therefore be considered as structures. The instruments of the technological unit should be separated in an independent group. Although certain instruments, particularly the primary ones, are located close to the apparatuses, all these instruments, as well as those installed on the panel in the operations rooms, constitute a single system for monitoring and regulating the interconnected parameters of the technological process.

In the refineries considered, the technological units accounted for 53% of the total cost of production plant (as on January 1, 1966), the structures and transmission devices constituted 30% of the cost of working machines and equipment of technological units, and instruments 4.6%.

The inclusion of structures, transmission devices, and instruments of the technological units in the working machines and equipment group artificially increases the proportion of the active part of basic plant and distorts the latter's structure (Table 1). Table 1 is based on the enterprises' annual reports and on refined data.

The importance of classification of the basic production plant is underrated, and there are no instructions to indicate whether the standard classification can be applied to certain industries. As a result, the stipulations of this classification are interpreted variously, and the accounting is different at different enterprises. We can cite the

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\* The Standard Classification of the Basic Plant of the USSR National Economy, approved by the Central Statistical Bureau on July 31, 1954 with modifications introduced on December 7, 1959.

TABLE 1. Structure of Basic Production Plant for Five Large Petroleum Refineries of the Ural-Volga Oil Region as on January 1 (% of total)

Items	Annual report data		Refined data*	
	1960	1966	1960	1966
Buildings	9.8	14.4	13.0	12.6
Structures	17.2	14.5	21.2	19.5
Transmission devices	24.2	22.6	32.3	30.9
Power machines and equipment	2.2	1.6	2.2	1.6
Working machines and equipment	45.7	45.9	28.0	32.3
Measuring and regulating instruments and devices, and laboratory equipment.	0.3	0.3	2.7	2.4
Miscellaneous basic production plant	0.6	0.7	0.6	0.7
Total	100	100	100	100
Active part (included in total)	48.2	47.8	33.3	36.3

\* Calculated from the primary accounting data by introducing the classification of the basic plant going into technological units.

following examples: up to 1964 the refineries of the Kuibyshev region included the full cost of technological units, including buildings, in the group of working machines and equipment; in 1964 the New-Kuibyshev Petrochemical Combine included in the first group not only the cost of buildings for technological equipment; in contrast to others, the Ufa Refinery does not include the structures of the technological units' in the group of working machines and equipment, the instruments of the units go into this group as well as form an independent group; and so on. Therefore, the structure of basic plant calculated from the enterprises' annual reports can sharply change in a short time. Thus, at the New-Kuibyshev Chemical Combine the proportion of buildings in the total cost of the basic production plant was 4.3% on January 1, 1964, and increased to 28.3% in 1965, while their cost increased almost five-fold. On the other hand, on January 1, 1966, the proportion of buildings came down to 17.1% and their cost reduced by 25% though new production plants were put into operation in addition to the functioning ones. This was accompanied by corresponding changes in the proportion of working machines and equipment (57.0, 40.0, and 48.4, respectively).

The shift in the group composition of the basic plant was reflected in the sum of annual depreciation deductions. With 6% rise in the average annual cost of basic production plant in 1964, compared to 1963, sum of depreciation deductions reduced by 5.5%. The average annual cost of the basic production plant increased by 10% in 1965 from 1964, while the depreciation deductions increased by 18.6%.

If the technological units are considered as "single inventory items," the accounting is unjustifiably simplified and the cost of basic production plant reduced. Thus, for the purpose of major repair the apparatuses and equipment of a unit (columns, pumps, and heat exchangers) are considered as components, which can be replaced by new ones during repair. As a rule, every major repair at refineries has some elements of reconstruction in order to eliminate bottle-necks in the operation of units, raise its efficiency, and so on. In many cases, this concealed reconstruction does not entail less labor and cost than the reconstructions carried out on State Bank loans, but is done against the account of major repair without any increase in the cost of basic plant. The apparatuses installed during major repair as replacements continue to be reckoned against the cost of the old ones, irrespective of their cost; only the technical characteristics are changed in the card.

This practice of accounting distorts the cost of the functioning basic plant and the associated running expenditure, and leads to different cost data for exactly identical apparatuses. Thus, for example, with the replacement of different heat-exchanger fittings the heat-exchanger 720 x 16 (130 x 2) (manufactured by the Lyudin Locomotive Factory) at the New-Ufa Refinery "acquired" seven different costs from 2989 to 9303 roubles. The cost of equipment replaced every year during major repairs of units is reckoned in hundreds of thousands of roubles at the enterprise. The equipment meant for replacement is accounted for in the working capital under the spare parts group.

The cost of this equipment is many times more than the cost of spare equipment included in the basic capital of the enterprise.

The group composition of the basic plant can be represented correctly in the structure only when it is properly accounted for at the enterprise. The accounting of the basic production plant largely depends on correct and thorough technical lists of items put into operation, since inventory cards and analytical accounting are based on these lists. The comparison of the data of technical lists and estimates for the technological units of the New-Kuibyshev Petrochemical Combine showed that these lists contain several serious errors. These lists are approximate, and do not give the data for many expensive apparatuses and structures; they do not give the cost of instruments, one charging of catalysts, and so on.

For many units put into production after 1960, the cost of buildings included the cost of technological equipment contained in them to the extent of 10 million roubles. Only the calculation for 1966 showed that the current expenditure of the combine diminished by more than one million roubles owing to differences in the depreciation deductions; of this amount 620,100 roubles was for renovation.

Under these conditions it is not possible to introduce a correct classification of the basic plant for a unit, nor to ensure an accurate documentation of its delivery, movement, wear, and replacement.

The structure of the basic production plant is largely predetermined in the designing stage and during capital construction. The study of the structure of the basic plant, the factors that affect it, and their relation with the plant-efficiency indices at the functioning enterprises is very important for the correct planning, design, and construction that will improve the utilization of investments.