

CHRONOLOGICAL SPECIFICS OF DYNAMICS AUTO-ROAD NETWORK OF UKRAINE

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Abstract

Analyzed chronological signs and retrospective of the formation of the dynamic of the development of automobile roads in Ukraine. The history of the community and the state has been restored to the local road network of Ukraine. The prospects for the development of the motorway resource for car roads and the main signs of specific natural-technological geological and ecological systems are in perspective.

Key words: *a network of highways, communication and economic factors, historical features, chronology, heredity.*

Actuality of work. The quality of the highway is determined primarily by the reliability under which it is understood the property of the road to perform the specified functions, while preserving, laid down during design, performance indicators at specified limits within a predetermined time or a specific technical resource. The technical resource of the highway must be determined by a certain term of its production, and more often its actual condition, for which the operation of the road should be discontinued due to safety requirements, that is, with the possibility of emergencies, or in connection with the transport-operational, economic or environmental inexpediency of its further exploitation.

The main limiting factor of the technical resource of the highway is the unsatisfactory condition of its road clothing as a result of its deformation and destruction. Deformation and destruction of highways occurs under the influence of many factors, the main of which is the operating factor, due to the workloads on the road cloth as a result of contact with the motorists. At the same time, an important factor limiting the life of the motorway is the hereditary historical features of the formation of a road network of one or another region, country, and eventually one or another natural-technological geological-ecological system.

Therefore, the analysis of the chronological features of the formation of a road network of one or another region is extremely important for increasing the resource of highways at the stages of development of technical documentation for their construction or reconstruction.

Material and results of research. The main characteristic feature of the formation of a road network in Ukraine is that the appearance and further improvement of most modern automobile roads of the country is characterized by purely stochastic processes. These processes are conditioned by certain historical peculiarities of the dynamics of communication and economic relations of separate territories. Indeed, the ways of connecting between separate settlements, places of production and sales (regional fairs) of products, sources of supply of vital raw materials (salt, metal ores, forest, etc.) arose purely spontaneously, often completely subjective, without taking into account landscape, relief, soil - climatic, hydrological and other features of the natural-territorial complex, without any expedient justification for their tracing. Thus, a network of dirt roads, the so-called “bytiy shlyakh” (“beaten paths”) was formed (Fig. 1).



Fig. 1. “Bytiy shlyakh” (“beaten path”)

Subsequently, the ground roads improved, as before, solely by stochastic subjective principles. Artificially, changed the relief of natural-territorial complexes exclusively for the benefit of users or the owner of a particular territorial area (Fig. 2). At the same time, no rational justification as to the tracing or construction of the road was not fulfilled.

The next stage of improvement of communication was the stage of utilization of waste from the stone-making industry for the reconstruction of road pavements (Fig. 3), which eventually led to the appearance of gravel-gravel roads (Fig. 4). Such rubble-gravel roads have been called - "jumped road" (“shutrovana doroga”).



Fig. 2. Dirt road



Fig. 3. Use of waste from the stone industry for road pavement



Fig. 4. "Jumped road" ("shutrovana doroga")

The appearance of roads with gravel-gravel coating, as an alternative to soil roads, was caused by the need to reduce the influence of weather-climatic factors on the reliability of the functioning of communication links of the economic and demographic components of society. At the same time, roads with gravel-gravel coating were only a certain reconstruction of ground roads and consequently inherited from them the whole list of landscape and structural disadvantages. The most significant drawback was the lack of an appropriate design of the underlying layers of the road with gravel-gravel coating.

The further development of wheeled vehicles has necessitated the creation of roads with rigid, slightly deformed coatings during operation. As a road covering, the use of stone materials - cobblestones began. At the same time, if only roughly tufted stones were used as a pavement at the beginning (Fig. 5), then the pavement was carefully prepared for its intended purpose and according to the requirements for its quality (Fig. 6).

Of course, the construction of roads with solid stone pavement can be characterized as a certain "bifurcation jump" in the field of road construction. However, if in some European regions the construction of hard-coated roads was carried out as a new construction with the corresponding "engineering training" at that time (Fig. 7), then the vast majority of roads on the territory of modern

Ukraine were simply reconstructed. At the same time, the mentioned reconstruction concerned only the pavement without a corresponding adjustment of the entire profile of the road construction (Fig. 8).



Fig. 5. Road with hard stone cover



Fig. 6. Specially prepared stone paving stone for road construction

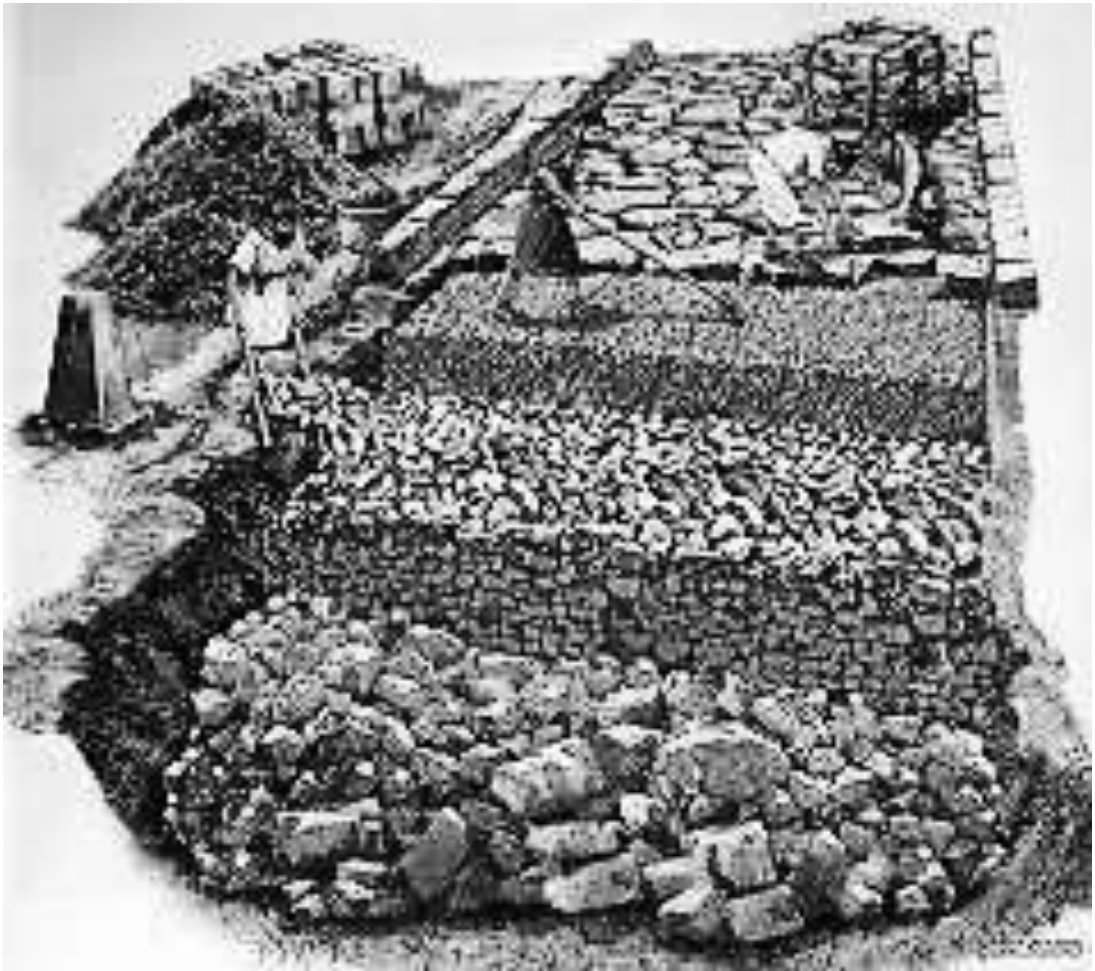


Fig. 7. Construction of the road in the Roman Empire



Fig. 8. Reconstruction of a dirt road in a road with a solid pavement

The emergence of high-speed and relatively economical internal combustion engines has led to the rapid development of vehicles, which were soon equipped with engines in the form of a wheel with an inflatable rubber periphery (bus). There was a need to create fundamentally new constructions of roads with coatings that would meet the relevant transport and technological requirements. Construction of roads with hard concrete and asphalt-concrete coatings begins. At the same time, the widespread use of asphalt concrete and tar compounds was due exclusively to the relatively low cost of oil materials compared with concrete mixtures in the middle of the twentieth century, which was subsequently completely leveled.

As in the previous stages of improvement of the routes, the equipment of most roads with hard asphalt-concrete coating and further reconstruction and repair of these roads was carried out in the absence of any significant engineering-geodetic trace of the road in terms of both longitudinal and transverse profiles, as well as without proper justification of the road construction (Fig. 9).



Fig. 9. Road with solid asphalt-concrete coating

Thus, a chronological analysis of the formation and development of a network of highways in Ukraine suggests that modern highways inherited the

entire spectrum of negative features that were inherent in the processes of stochastic formation of the archaic network of communication communications. This is clearly seen in Fig. 10, which shows how the hard asphalt concrete coating of the reconstructed section of the highway does not improve its operational quality, but rather strengthens the inherited engineering-geodesic, constructional and operational negative features that were acquired, even at the stage of the formation of a "broken path" ("bytiy shlyakh", "beaten paths").



Fig. 10. Inherited negative engineering-geodetic, structural and operational features of the dirt road during reconstruction of the highway

Conclusion. The operational quality and the resource of motor roads of the motor transport network of Ukraine are largely determined by a complex of hereditary negative features, which are the result of stochastic historical processes of formation of communication links within certain natural-territorial and economic complexes.

Only the new construction of highways with the corresponding system engineering geological, structural, technological, operational justification of the created projects will allow to increase the operational resource of motor transport networks, transport and technological and ecological safety of the network of highways within the limits of considered natural and man-made geological and ecological systems.

It is necessary to limit as much as possible the practice of unreasonable reconstruction of old roads which do not meet modern requirements of modes of movement, intensity, density, operational safety of motor transport flows.

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