

## HISTORY OF TRANSPORT: INNOVATIVE DIMENSION OF A TRADITIONAL EDUCATIONAL COURSE

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### ABSTRACT

The article considers the current state and prospects for development of the history of transport as an academic discipline, the study of which is an integral part of training of specialists for the industry. Based on its understanding as of an interdisciplinary scientific field and integrative training course, the authors propose approaches to solving theoretical and methodological problems, and also show its

significant heuristic potential, which allows to give answers to current challenges met by the transport sector. Special attention is paid to the issues of defining the boundaries of the subject field of the history of transport, the organic combination of the general transport and specific aspects met by the content of this academic discipline, as well as to the particularities of the global, national and regional levels of the genesis and evolution of transport.

**Keywords:** history of transport, transport science, interdisciplinary approach, traditions and innovations, higher education, staff training.

**Background.** It would not be an exaggeration to assert that the discipline «History of Transport» paradoxically turned out to be on the periphery of the attention of curriculum developers in many universities, training specialists for the transport industry. This is confirmed by its absence in the curriculum of a significant number of transport training courses and by the very modest number of relevant educational materials found in the electronic catalogs of leading Russian libraries and at industry-specific educational portals. On the other hand, in the world there are countless publications on the history of transport [4–13] – from scientific fundamental to popular children's editions, that objectively reflects the continued and great interest in this topic. Another question is how this array of publications can serve as a model for educational tasks.

Meanwhile, the history of transport, on the one hand, as a complex interdisciplinary scientific field, on the other hand, as a polystructural and invariant academic discipline, becomes an integral part of transport education in modern conditions, reveals a huge heuristic potential. Indeed, as was very fairly noted by the Minister of Transport of the Russian Federation E. I. Dietrich at a meeting of the Coordinating Council on Transport Education on October 25, 2018. «The progressive development of new professions, knowledge and skills is a prerequisite for moving the transport industry forward. At the same time, the system of higher professional education should be focused on the needs of the industry, on the needs of transport organizations – the future employers of our students» [1].

What are the reasons for such a paradoxical attitude to the history of transport?

**Objective.** The objective of the authors is to consider history of transport as a part of curricula in modern education process.

**Methods.** The authors use general scientific methods, comparative analysis, evaluation approach, scientific description.

**Results.** First of all, attention is drawn to the ongoing for quite a long period and sometimes sluggish discussion about the «belonging» of the history of transport to one or another block of disciplines and, accordingly, to the subject fields of science: engineering or social and humanities sciences. A practical reflection of the opposing positions of the participants in this dispute is the content of the programs of this training course. In the first case, the emphasis is on the genesis and

evolution of a specific transport equipment, machines, units, components, parts, etc. (for example, the history of aircraft manufacturing, locomotives, cars, etc.), attention focuses solely on technical and technological aspects, thus transport becomes a «thing in itself» and «for oneself». In the second case, as a rule, an attempt is made to cover a wide historical context, often beyond the scope of the transport problem itself and sometimes affecting such a large number of problems that the course of transport history actually turns into a course of domestic and even universal history.

Both of these approaches, with their possible usefulness in relation to the solution of particular problems within a particular area of training or a specialty, do not allow graduates of transport universities to fully master the general cultural and professional competencies. Moreover, they form a polarized and at the same time fragmentary, simplified vision of an objective picture of the world that does not correspond to modern reality, either through the prism of technological determinism or from the standpoint of social universalism.

In particular, in the first case described above, when studying the history of transport, there is inevitably a lurch towards extremes such as primitive technicalism, radical technocracy, which turns into dangerous illusions about the omnipotence of technology and technology that eliminates the so-called «human factor». At the same time, the transport specificity itself is often emasculated, the disclosure of the logic of formation and development of the industry in the whole diversity of its constituent elements is replaced by attempts to trace certain aspects of scientific and technological progress, to limit it to the listing of individual inventions – steam engine, electric traction, etc. It is not surprising that the chronological principle of presentation is often violated, single and random phenomena are presented as generally valid and stable trends, private discoveries and individual improvements fit into the sometimes historic logic that is rather artificially driven by them, on the basis of which rather unconvincing conclusions are drawn about high development of some transport systems and corresponding approaches to organization of the transport process and underdevelopment and inefficiency of others, etc.

In the second case, the linear paradigm of analysis becomes the linear pattern of development of human civilization, the axiomatic nature of its general historical

model, which entails ignoring both national and local specifics, as well as features of genesis and evolution of modes of transport. At the same time, in an attempt to overcome these extremes, many authors directly or indirectly generate others: either turn the analysis of the history of transport into the apologetics of the «special way» of its development (in a given country, region, etc.), or «pull out» one or another mode of transport from the system-wide context, ignore the general transport imperatives, forget about the specific circumstances of place and time, etc. As a result, one has to deal with a lengthy and not very lengthy justification for all sorts of ideas about possibility of simply copying external ideas, about self-sufficiency of a particular mode of transport and the need for its priority development. All those approaches are presented in an expressive form, but are not quite scientific in content.

In addition, more and more often, to our deep regret, we meet an approach to the historical aspects of the study of the transport, pretending that history has nothing to do with the innovative dimensions of its transport developments that are in demand today. Why, they say, this whole story (as well as theory), if it does not give answers to the most urgent questions about how to reduce transport costs, make transport more profitable within the national economy, etc.? Where is the key to implementation of such priority areas of the industry, as its digitalization, integration of various modes of transport on a «seamless» basis, and others? Where, finally, is its practice orientation, is there any demand for it expressed by specific modes of transport? Undoubtedly, these questions are sharp. But giving answers that claim unambiguity without understanding the essence of the problem would be completely wrong.

We believe that in today's conditions, when transport becomes the driving force of social development in all senses of the word, affecting various aspects of society's life, as well as one of the most important factors and at the same time an instrument of the state's internal and foreign policy, it's time to draw a line under the long and unproductive debate on the ontological status of the history of transport (including its place and «number» in the curriculum ranking grid). It is necessary to determine its object, to delineate the boundaries of the objective field, to identify possible interdisciplinary relationships of the discipline, etc. This is especially important for the Russian transport education and science – areas that are assigned with strategically significant tasks related to implementation of national priorities. After all, «for development of cities and towns, business growth, ensuring the «connectedness» of the country, we need to literally «flash» the entire territory of Russia with modern ways of transportation» [2].

In our opinion, the history of transport in its content should integrate both general transport measurements and cross-transport aspects, as well as the specifics of certain modes of transport. It is in this integrative quality that this academic discipline today allows us to reach a fundamentally new level of scientific analysis, significantly enriching the study of genesis and evolution of transport as a general phenomenon characteristic of the historical development of all human civilization, revealing the features characteristic of its individual species. It is clear, for example, that the process of the emergence of railways and aviation, finding its general historical background in the objective need to move a large number of people and goods over considerable

distances, however, demonstrates a set of specific reasons that caused the genesis of only one of these modes of transport of common use, as well as the trajectory of its subsequent evolution. For example, a significant number of spatially dispersed objects of production infrastructure, linear nature of operation, year-round and all-weather conditions, etc., are characteristic of railway transport.

In practice, the profiling of the discipline «History of Transport» in relation to a particular mode of transport can be embodied by highlighting separate modules, sections and topics in its structure, that reveal the corresponding didactic units in the volume necessary for a particular area of training (specialty).

Such an approach to transport, as, if you like, «to a higher order system», in the context of studying its history, will make it possible to more clearly see the facts, events, circumstances that served as the primary basis for deployment of certain processes in individual subsystems – transport modes, transport sectors activities, became impulses for originating and development of subsequent general historical trends, determined their logics, dynamics, direction. Thus, the history of transport appears as a multidimensional, multi-factorial and polysubject process, reflecting complexity and inconsistency of formation and evolution of a given sphere of social relations and related fields of science and technology.

Comprehension of this process in all its unity and diversity of its forms and manifestations becomes an integral component of training for the industry of highly qualified representatives of various transport professions, and – equally important – of bringing up a widely educated, harmoniously developed and creative person, who is a modern person of society.

Integrating the general transport aspects and the particularities of modes of transport, the history of transport allows us to move from statics to dynamics, from the past and the present to the future, from describing what happened and stating what is available to the field of forecasting and goal setting. In other words, the potential of the history of transport as of a scientific field and academic discipline is not limited to develop a factual core, collect the most extensive set of data, characteristics, dates and other historical information, and then to build on this basis a set of statements and conclusions of theoretical and methodological order, claiming to be complete and unambiguous.

The task of the history of transport is, based on systematization of the available historical information on development of transport in general and its individual modes in particular, in the relevant spatial and temporal conditions of the past, as well as on the comprehensive analysis and comprehensive synthesis of assessments and interpretations of this information formulated to date in the scientific literature, to propose a multidimensional conceptual-analytical model of the vision of the future, to reach through retrospective analysis the capacity to design perspectives. In other words, while «looking» back, the task is to start a confident movement forward. This is the significant heuristic potential of the history of transport, its innovativeness for scientific theory and practice, including production and management.

Another important point is that integration of the history of transport, and a viewing of the subject of its research as of a system-wide phenomenon allows focusing on specific spatial features of transport development in general and of its individual modes in particular, to identify the specificity of genesis and



evolution of transport systems and their relevant elements within individual states, regions, municipalities.

The development of transport cannot be divorced from its historical «soil», from that particular place of geographical space, where at a certain stage of evolution of mankind objective needs for movement arose, which, as they are understood, brought about relevant ideas, inventions, and then gave rise to attempts of their implementation. Moreover, it is not possible to talk about the prospects of transport in general, and even more so to plan the main directions and set targets for its development, without taking into account the realities and needs of individual territorial entities, specific cities and rural settlements, the volume of their resources, points and growth limits. For Russia – the country with a vast territory, distinguished by significant interregional contrasts and imbalances, including in development of transport infrastructure – this is especially important.

Such an emphasis in the content of the history of transport will contribute to training of staff, to one degree or another mastering deep knowledge of transport and, all other things being equal, able to work in any industry enterprises and adjacent sectors, as well as within a wide range of occupations, both in engineering and humanities fields. Highly qualified specialists trained in this way will be able to confidently orient themselves in the complex issues of particular regions and cities, to satisfy the demands of municipalities, various types of territories regarding development of transport and the corresponding transport infrastructure. Moreover, the requests are not only current, but also promising, taking into account potential resource capabilities and limitations, the dynamics of interregional relations, the vectors of cross-border cooperation of various spatial entities.

In the content of the discipline «History of Transport», it is expedient to focus on the study of the nationwide specifics of its formation and development along with global trends. Knowledge of the historical prerequisites and factors of the genesis of the national transport system, understanding of the conditions and trends of its evolution in different periods of history, the ability to identify the driving forces of its growth, as well as possession of skills of disclosing causal relationships between the adopted political and administrative decisions and the dynamics of transport development allow, in addition to other, to adequately perceive the existing national realities in this field and to develop a conceptually grounded vision of its future. The basis of this lies in the rational-critical perception of domestic experience, in an objective assessment of the possibilities and limits of the use of foreign practices, as well as in their balanced combination.

Moreover, the inclusion in the content of this discipline of sections covering formation and development of Russian transport and its specific modes, showing the historical role of the transport complex at the turning points of the past, deepening and expanding knowledge of industry achievements in various periods, will have a stimulating effect on the growth of the interest of future graduates to study the history of their country, native land, city, district. At the same time, the study of the history of domestic transport is the key to formation of the corporate identity of representatives of the transport industry, one of the most effective ways of maintaining continuity between older and younger generations of employees in this field. It is thanks to this that it is

possible to instill in yesterday's graduates who are just starting to perform their official duties, a sense of responsibility for the assigned work, as well as observance of order and maintenance of production discipline in transport, the smooth and safe work of which affects the lives and health of millions of people.

As for the discussion mentioned at the very beginning of the article concerning the belonging of the history of transport to technical or human sciences (in its essence rooted in the dispute between so-called «physicists» and «lyricists»), our principled position in this regard is as follows.

Since historically emergence and development of a particular mode of transport was ultimately a response to a request received from society in a specific period of time, the task of transport history is to trace the course and nature of formation of this request, stages of its understanding by scientific and social thought, reaction to it by the state, other social and economic entities that determine the priorities and directions of transport development. And all this is the most social and human dimension of the history of transport. Its technical dimension – scientific research and experimentation, engineering solutions and discoveries, development and testing of new types of equipment, changes in industrial design as an answer to a public inquiry – is certainly important, but studying it in this case is of an auxiliary nature, with an emphasis on the relevance of the technical response in its form and content to the expectations and needs of society.

We proceed from the fact that no convincing and full-fledged alternative to the humanistic paradigm has been found yet, and according to it, the man is the primary element in the «man-machine» system. As E. I. Dietrich, Minister of Transport of the Russian Federation, quite aptly put it: «People do not exist for transport, but transport exists for people. This should be for us, transport employees, the main source principle. And this is precisely what the state policy in the field of transport is aimed at today» [3].

Moreover, with all the omnipotence of technology, domination of technological progress, dominance of scientific rationality, seen by some authors, they should not forget that the last word still belongs to society. If society and its individual members – politicians, scientists, public figures, ordinary individuals – are ready for innovation, for a positive perception of technical innovations and improvements, then the latter will become an integral part of social life. If a society is not ready for changes, it looks with caution at unusual (in terms of established approaches) engineering solutions, ironically or critically perceives inventors, or is so motivated, then scientific discoveries have a risk of remaining on paper and not finding practical use, or even being rejected, and their authors are subjected to all kinds of persecutions and harassment. The history of mankind is replete with examples of how the emergence of technological innovations that are of the same nature as technical innovations, improvements, discoveries, including in the field of transport, led to fundamentally different results and entailed completely different consequences for their development.

It is known, for example, that the world's first two-cylinder steam engine was designed by Russian inventor I. I. Polzunov in 1763–1765 – almost a decade earlier than creation of a similar device by J. Watt. However, in Russia at that time, unlike in England, the labour of serfs was considered more economically viable, than mechanization of production in order to





increase its efficiency. As a result, the invention of Polzunov gave absolutely nothing for development of the country in that historical period. Neither the purchase of steam excavators abroad did increase the pace of construction of the railway from St. Petersburg to Moscow in the middle of the 19<sup>th</sup> century, they were simply put out of action. The volume of land work they did was amenable to accurate accounting, in contrast to the labour of the same serfs, whose indicators became the subject of various manipulations and tricks by contractors who sought to lower its final cost under various pretexts.

Another example is the fierce resistance of Moscow's possessing classes and bureaucrats to the ideas of building in the city of such an advanced mode of transport as the metro. All subway projects from the second half of 19<sup>th</sup> century until 1917 were decisively rejected, sometimes with the active use of near-religious rhetoric («the sin of digging in the underworld», etc.), just because their implementation would have made available for living of wide circles of the population the outskirts of Moscow, that could have resulted in reduction of costs of rental housing in apartment buildings in the downtown. This can also be attributed to the fierce discussions that unfolded at that time in the ruling circles and Moscow media regarding feasibility of building of ring railway, as well as connecting the existing lines to organize transit passenger traffic through the city. Only in our time, these ideas are embodied in the already functioning Moscow central circle and Moscow central diameters being engineered (see *World of Transport and Transportation*, Iss. 6 (2018)).

And now not all innovative ideas in the field of transport development find a uniquely positive response among various categories of the public. In many Western European countries, it is often necessary to convince (including through large-scale PR-actions and information campaigns in the media) residents of the settlements, through which it is planned to lay high-speed rail lines, of expediency of their construction. Or, for example, introduction of advanced technologies (including digital, range, unmanned, etc.), which inevitably entails reduction in the number of employees maintaining the transport infrastructure, is becoming a factor of concern for many representatives of the industry, and that has obvious reasons.

In other words, the history of transport should not focus only on the processes associated with creation, testing, implementation of transport equipment and related technologies, but on highlighting the main stages of scientific research in the transport sector. It is intended primarily to reveal time and space, the degree of readiness of society in general and its individual layers and groups, in particular, for evolutionary and revolutionary changes in the field of transport, one way or another affecting their livelihoods, to identify the main reasons for this, as well as to show the invariant nature of development of transport, its dependence on the actions of various social actors, social forces.

**Conclusion.** Summing up our analysis, we can draw the following conclusions and generalizations.

The history of transport is an interdisciplinary scientific field and a comprehensive academic discipline that studies the genesis and evolution of transport in general and the main modes of public transport, in particular, in specific historical world, under national regional and local conditions. Its purpose is to reveal the main prerequisites of a socio-natural and technical-technological nature, which have determined the course, dynamics and direction of development of transport and its respective modes, as well as to identify public and state needs for various types of transportation in relevant historical periods and their impact on further development of transport systems of regions, countries and the world at large.

The subject field of the history of transport is formed by the intersection of, on the one hand, such areas of historical science as universal history (study of fundamental problems of the world-historical process, coverage of historical reality in its specific aspects), history of science and technology (history of discoveries in the transport sphere, main trends of evolution of theoretical and applied transport research, formation and development of transport infrastructure facilities), as well as national history (studying the past of the country and its peoples, disclosure of the main activities of society and the state in the field of transport and related areas, analysis of totality of relevant facts and phenomena), on the other hand, of a number of areas of transport science, in particular, of general theory of transport (transport as technical phenomenon, its role and importance, features of functioning), transport systems (levels of integration of various modes of



transport, their interaction in specific conditions), transport management (transport administration models, transportation process stages and management specificity) etc. These areas and directions of scientific knowledge serve as a theoretical, methodological and factual basis for the history of transport.

At the same time, this does not mean that the history of transport is meaningfully a simple sum of «histories» of transport science and technology, economics of transport, and transport policy that took place in individual countries or regions in certain eras. The history of transport is a single spatio-temporal continuum, affecting the corresponding – directly or indirectly related to the phenomenon of transport and transportation – part of the past of human civilization, the present and future of this phenomenon being its logical and chronological continuation. And because of this the history of transport is inextricably rooted within a wide context of social, humanities and natural sciences, in one way or another interacting with a significant number of relevant research areas.

In the structure of the subject «History of Transport» there are at least four large problem-thematic blocks, each of which, taking into account the goals and priorities of a particular field of study, can be turned into an independent field of research with its own specifics:

- general history of transport, which considers the issues of genesis and evolution of the transport industry as a whole, specific historical background and conditions of scientific and technological progress in transport, factors of emergence and progress of introduction of transport innovations;
- history of the mode of transport (rail, road, air, sea), considering the ways of development of the relevant mode of public transport, general historical contexts and specific factors of its formation, development trends;
- history of domestic transport, considering the course and nature of formation of transport within the country, in our case within Russia, features of formation of the national transport system, the stages of its evolution, domestic traditions and the features of transport development;
- history of a region's transport (city, economic region, federal district), considering genesis and evolution of the transport system as a whole and its individual elements in particular within the framework of a specific spatial (administrative-territorial, etc.) entity.

Such an approach, in our opinion, seems to be universal, applied to all countries.

Being an interdisciplinary scientific field, the history of transport can be an incentive for deployment of a number of general and particular theoretical and applied researches in the field of transport problems, including search for optimal models for development of national and regional transport systems, development of effective tools for modernization of transport and logistics infrastructure, introduction of

innovative technologies to the transportation process, ensuring transport safety and security, development of effective mechanisms of private-public partnership.

As a complex academic discipline, the history of transport integrates a number of important links within the educational process in the transport university, fundamental and applied specialized knowledge. It is designed to facilitate training of staff for the transport industry, fully owning the necessary set of highly demanded competencies in modern conditions (including creativity, willingness to work in a team, project thinking), while it is also able to creatively implement them in the course of their professional activities.

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