

*Suvorova TA soisk., Assistant,  
Dnieper State Academy of Construction and Architecture, Ukraine*

## **COMFORT FOR ALL PASSENGERS SPEED RAILWAYS**

*Abstract: A number of problems related to issues shaping the interiors of high-speed railway passenger transport, in particular in terms of fitness for passengers with disabilities. The analysis of the issue on the example of interior modern high-speed trains. We consider examples of new technologies that meet current operational requirements.*

*Keywords: design, high-speed railway trains, interiors, car, equipment and ergonomics.*

**Statement of the problem.** Requirements modern passengers to ride apply to the safety, cleanliness, convenience, accuracy and speed at an affordable price. This list includes the basic requirements that operators must provide for the conservation of commuters, but to attract new their performance is not enough.

To coach used effectively, you should pay attention not only to optimize the individual zones, but also on the overall ride comfort. For this it is necessary to consider all possible requirements of passengers and revised to reflect the possibility of their implementation plan principles salons and other areas.

Today increasingly common functional modernization of rolling stock and not its radical reworking. In such cases, the focus is not significant technical improvement and increase the level of comfort for passengers.

Full implementation of the requirements of the law in relation to adaptation of rolling stock for passengers with disabilities, it creates a problem for the railways.

The most significant costs of compliance with the requirements of accessible toilets, wide doorways, the height of the handrail, the location of the emergency door opening buttons and a set of system functions to inform passengers.

**Analysis of recent achievements and publications.** Analysis of materials studies on the issue rassmatrivaemuemomu showed that in most countries surveyed, consumers in the estimates provided by the service satisfaction preference for air transport companies and only three countries ahead of their railway companies [1]. In studies of A. Roden, K.Cathelin, V. Cuny treated dannyi question [3,4,5]. That in at least several countries preference is still given to the railways, said the reality of the task of entering on an equally high level of railway companies from other countries.

**Formulation of the objectives of the article.** Formulate a general idea about the features of internal space with high-speed trains, taking into account passengers comfortable use of all categories and ages.

**Onovnom part.** Railway companies are focused on providing reliable, accurate, friendly service for passengers. Efforts are made to ensure the technical and technological amenities and comfort trips.

*Changes in the passenger cabin.* Plans replace access with new leather upholstery in the first class met understanding and intention to abandon the tables

in the second grade with increasing number of access "airplane" type sparking fears due to the possible reduction of legroom and growth fares.

In fact, fears proved groundless. Furthermore, it became clear that many travelers do not like the balance of access, in which a passenger sitting face to face with three unfamiliar fellow travelers. Therefore, special attention was paid to the design of chairs, arranged according to the scheme 2 + 2 series. Increasing the distance legroom compared with previous designs, passengers with laptops provided an opportunity to extend the folding table by sliding panels (Fig. 1).

Most of the passengers, 72%, believe that a trip with luggage - a significant reason not to use rail. Two-thirds of respondents are willing to travel by rail if they are more comfortable conditions following surround or heavy luggage. This leads to the occupation of luggage close seats for the other passengers. If you can, some can afford to put your feet on the seat opposite, to take a comfortable position. These are just two examples that show how the number of employed persons is greater than the number of passengers included. This problem has not previously paid attention.

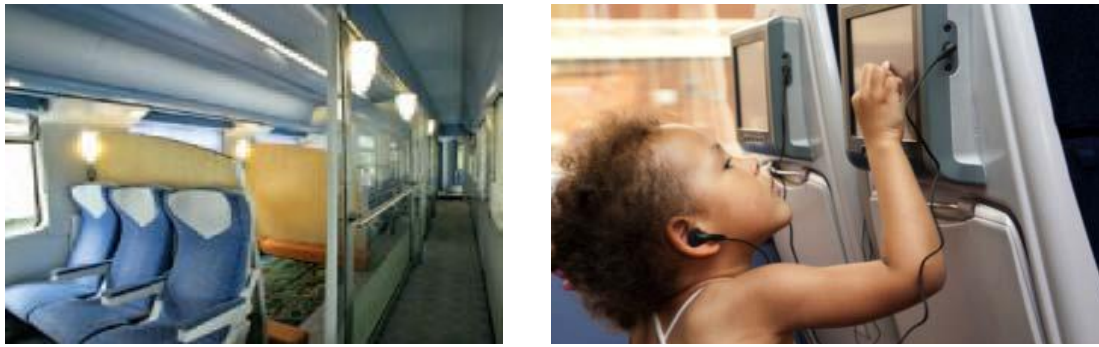


*Fig. 1. MDB design*

Luggage racks are arranged in many cars high above his head. Many passengers can not pick up the luggage to the height and prefer to arrange it below, or on the floor. Bulky luggage left in the aisle in front or behind his chair. This leads to the fact that generally only 80% of available seats occupied by passengers and their luggage others.

*Increase the number of seats for a particular group of people.* Railway Company introduced the space reserved for the disabled, elderly passengers, expectant mothers and people with young children, constantly increasing the number and clarity of notation. All this allows to improve the convenience and comfort of travel specified persons [2].

Created caboose with seating compartments for travel friendly, age does not require the purchase of separate tickets. In these compartments are mounted one or two extra beds for children, and is arranged near a small lounge with banquettes and a special floor covering, where children can play under the "hearing" the supervision of parents, which partitions are arranged not at full height (Fig. 2).



*Fig. 2. Family Coupe*

*Information in wagons.* With expansion of text messaging, social networks and the proliferation of electronic mail more and more passengers prefer to travel, during which they will be able to use handheld devices.

Cars are equipped with a new generation of passenger information system with liquid crystal displays, which are real-time information about the road stops and time of arrival at the next station, meeting the expectations of modern society (3).



*Fig. 3. Information systems and multimedia entertainment*

Comfortable chairs, folding tables and onboard Wi-Fi high-speed trains provide a significant advantage in terms of passengers who want to use computers in the road or other devices with liquid crystal screens.

*Multifunction toilets.* Like public toilets that are subject to constant criticism of the users, toilets high-speed trains, characterized by limited space, but frequented by passengers, also, unfortunately, did not escape this fate. Is not news that passengers at questioning the lowest rating given to this aspect of the trip.

Changes have been made regarding color toilets, lighting, etc., in other words, in those aspects that directly affect the user experience, all of this has been asked in different design options. [3]

Given the increase in the proportion of passengers elderly and disabled and a trend toward increased mobility of persons, firms, manufacturers of high-speed rolling stock are guided by the use of multi-functional toilets, user-friendly for all passengers, including those with disabilities, the elderly and traveling with young children.

In the toilets installed special equipment to improve the quality of water used by passengers. Processing is carried out by injecting water via a metering pump a certain quantity (in proportion to consumption of water) the reagent based on hydrogen peroxide of small flow capacity [4].

These toilets have handrails, toilets and flushing device, convenient not only for wheelchair users, but also for passengers of all ages and categories. In addition, for infants provided changing tables (Fig. 4).



*Fig. 4. Multifunction toilets new generation*

*Devices for passengers with impaired vision and hearing.* To facilitate movement through the carriage of passengers with impaired vision or hearing perfected used signs and indicators are established guiding systems with inscriptions executed in relief dot font in Braille or with a warning beeps.



*Fig. 5. Contrasting color interior elements*

Around the outside and inside of the wagon used contrast coloring of individual elements (Fig. 5). Thus, the edge of the steps and sills are painted yellow, clearly distinguishable numbers on the doors and emergency button on the places intended for persons with reduced mobility, there are logos, etc. [5]

*Terms of embarkation and disembarkation of passengers with disabilities.* One of the main weaknesses of masses is currently the place of transition from the passenger car platform. With traditional carriages passengers in wheelchairs can not simply unassisted get on the train.



*Fig. 6. Auxiliary devices for lifting passengers in the car wheelchairs*

All other categories of passengers with disabilities move (persons with certain disorders of the musculoskeletal system, the elderly, passengers with heavy luggage or buggies, etc.) also have serious difficulties in boarding and disembarking from the train (Fig. 6) .

To solve the problem of access passengers developed various assistive devices that are either installed on rolling stock, or a passenger platform and are intended mainly for the rise in car passengers in wheelchairs.

Modern Railways faced with intense competition, so operating efficiency is an important factor in the prosperity of railways. In passenger transport efficiency depends on the ability to carry more passengers at the same cost to reduce unit costs per passenger service. It's true direction and in car, where an increase in the number of seats in the car means lower unit costs.

Reasons for the low actual filling passengers wagon explains individual requirements for comfort of travel, which can determine the nature of their behavior. If a passenger is dissatisfied provided at time of travel space, he tries to find a way out of this situation and create a favorable environment for yourself.

**Conclusions:** It is important for the growth of traffic to optimize the solution of the interiors of passenger cars to meet the requirements of comfort transportation of various target groups, also at design-design to draw attention to the communicative advertising , trains devices for passengers with impaired vision and hearing, multipurpose toilets conditions embarkation and disembarkation of passengers with disabilities, tosho.

**Prospects for further research.** Improving optimization solutions interior passenger cars.

### Literature

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### Анотація

*Розглянуто ряд проблем, пов'язаних з питаннями формоутворення інтер'єрів швидкісного залізничного пасажирського транспорту, особливо з точки зору пристосованості для пасажирів з обмеженими фізичними можливостями. Проведено аналіз стану питання на прикладі інтер'єрів сучасних швидкісних потягів. Розглянуто приклади нових технологій, що відповідають сучасним експлуатаційним вимогам.*

**Ключові слова:** дизайн, швидкісні залізничні потяги, інтер'єри, вагон, устаткування, ергономіка.

### Аннотация

*Рассмотрен ряд проблем, связанных с вопросами формообразования интерьеров скоростного железнодорожного пассажирского транспорта, особенно с точки зрения приспособленности для пассажиров с ограниченными физическими возможностями. Проведен анализ состояния вопроса на примере интерьеров современных скоростных поездов. Рассмотрены примеры новых технологий, отвечающих современным эксплуатационным требованиям.*

*Ключевые слова: дизайн, скоростные железнодорожные поезда, интерьеры, вагон, оборудование, эргономика.*