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# ARCHITECTURE

## THE CONCEPT OF THE COMPLEX LINE OF THE ELECTRIC TRANSPORT THE HIGH-SPEED TRAM – THE MONORAIL IN ODESSA IN THE CONDITIONS OF RENOVATION OF THE PORT TERRITORY

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### ABSTRACT

In article the concept of development of the high-speed electric transport across the coastal territory of the city in the conditions of renovation of the port territory is described.

**Keywords:** renovation, port territories, the high-speed tram, monorail.

*The monorail is extraordinary in that it can be built elsewhere and then carried in and installed in mid-street with little confusion and no destruction of businesses.*

*Ray Bradbury*

One of town-planning problems of Odessa is high load of the existing thoroughfares with the motor transport and a lack of capacious parking.

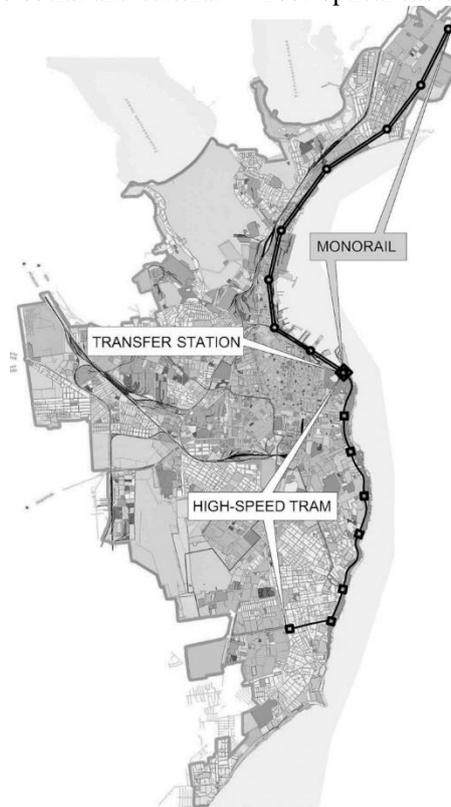
Due to a linear design of the city along the coast the historic center sated with architectural monuments and subjects to cultural, entertaining and recreational appointment was remote from neogenic areas – settlements Kotovsk and Tairova.

At considerable time expenditure on arrival to the historic center and return to the place of residence such trips lose meaning. Compensating measures, in the form of development of alternative social and cultural

facilities directly in new massifs, are not equivalent replacement and lead to isolation of inhabitants of these massifs from the central part of the city rich with historical and cultural heritage, to creation of the closed condominiums which are grouping based on territory.

For fast and comfortable access to touristic, recreational and sanatorium venues which already exist and which are supposed to be placed in the conditions of renovation of port territories and for perfect communication with the historical and cultural territory of the city and the remote urban areas, it is proposed to carry out construction of difficult structured multilevel overpass (see pic 1).

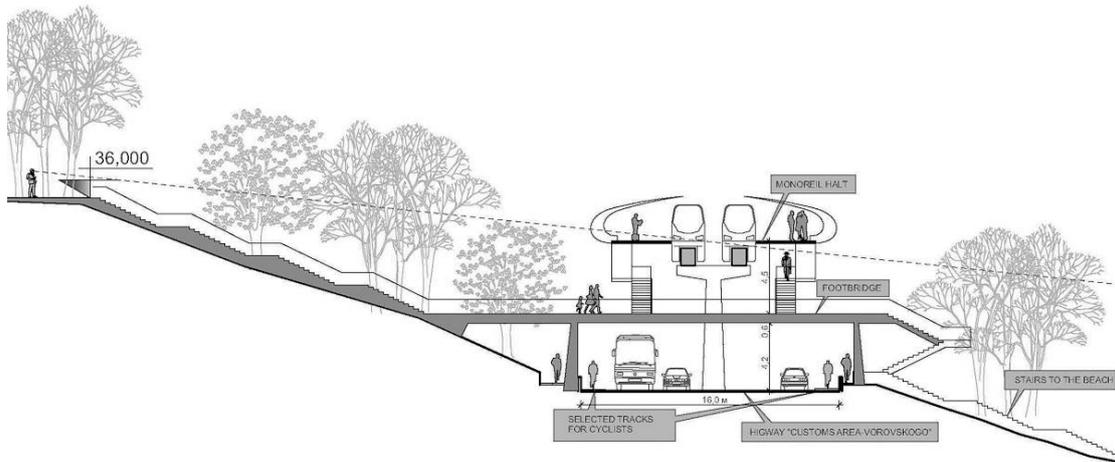
Its structure will include crosswalks, the high-speed tram, the highway and the monorail road, the main engineering communications - high-voltage and fiber-optical cables.



*The fig. 2 Scheme of the Complex Line of the Electric Transport the high-speed tram monorail in Odessa*

Such decision is made not incidentally. For reduction of the territory of slopes of the Anniversary park to appropriate level it is necessary to carry out a package of measures for laying of the high-level engineering networks, and also for strengthening and a flattening of slopes at unconditional observance of easy pedestrian access from territories of the institutions of sanatorium appointment located along Frantsuzsky Boulevard.

Multilevel overpass at the minimum withdrawal of valuable recreational lands will allow to solve all complex of these problems with maximum efficiency and "to be lost" in a relief, without interfering with perception of a sea panorama from the top viewing points of the coastline and without interfering at the same time with free pedestrian access to a beach zone (see pic 2).



The fig. 2 Scheme of the Organization of the Overpass on slopes

The choice of vehicles was made for public transportations taking into account the maximum preservation of the existing green plantings, minimization of influence on an ecological situation and prevention of sound discomfort at the unconditional requirement of preservation of pedestrian availability and the main specific points of a sea panorama. Monorail transport with the minimum time expenditure will bring inhabitants and city visitors from the inhabited massif of Tairov district to the vacation spots chosen by them - from the 13th station of the Big Fountain to Shevchenko's park or further by the high-speed tram on Morvokzal, to Luzanovk, Kotovsk.

In the place of the organization of the central communication knot, in the territory of the invalid ship-repair plant (SRP-2), the construction of the modern public center with the transfer station from the high-speed tram on a monorail is intended. Thanks to specifics of a relief there is an opportunity to build this volume so that to provide preservation of the existing specific points of a sea panorama from the Monument to the Unknown sailor and from the Walk of Fame, having integrated a multipurpose construction into slopes (see fig. 3).

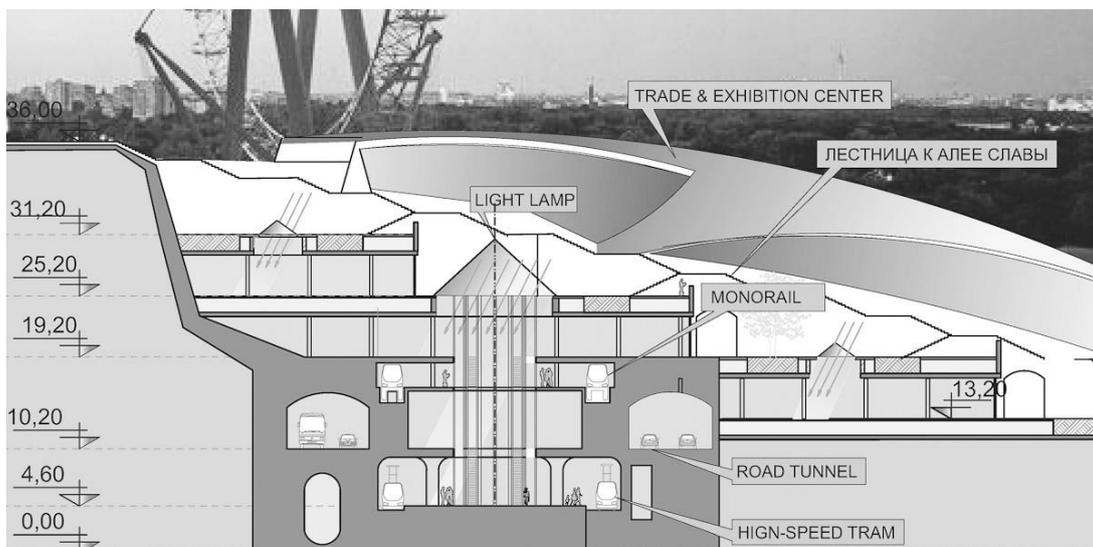


Fig 3. The transfer station of the high-speed tram on a monorail integrated into slopes

In the course of a slope terracing, arrangement of a ladder on an axis of the Walk of Fame to the embankment and constructions of retaining walls there is a possibility of additional placement of small architectural forms and venues of trade and public catering that will give an impetus for development of small business.

The automobile platform with two ring outcomes has to connect Tamozhennaya Square and Lidersovsky Boulevard to further continuation of the 4-band highway to Lermontovsky Lane.

Considering pressing need in parking spaces, on certain sites of the overpass the multilevel parking integrated by places into a slope will be arranged.

**The factors influencing the cost of construction of the monorail road "The park of T. G. Shevchenko – Arkady – Tairovo":**

1. Total length of system: 11,2 KM
2. Topography (whether the area flat or hilly, crossings of roads is):
  - the designed line passes on the top road of flattening Odessa slopes on a mark 24,00-28,00m from sea level (monorail top on OTM. 32,00-36,00 m; - the line of a monorail is below the top plateau and does not close a sea overview.
3. An arrangement (access for the construction equipment whether construction by a traffic or other obstacles for construction is complicated): - there are no obstacles;
4. Utilities (transfer of water supply systems, power lines, phone lines, etc., what can have significant effect on increase in expenses): - the line almost does not cross the utility and itself can serve for an arrangement in a design of a monorail of electro-and fiber-optical cables;
5. Site (land acquisition or easements): - all lands belong to the Anniversary park and are state ownership;
6. Passenger requirements (the size and the number of vehicles, waiting time at stations): on the line it is intended to involve from 6 to 12 structures on 4 cars depending on a season; - 10 minutes;
7. The high-speed mode (high-speed requirements to system, distances between stations): - 60 km/h at average distance of 2 km between stations;
8. The number of stations (the additional station increases a payback period):
  - 6-10;
9. Special designs (constructions of tunnels, bridges, overpasses and reconstruction of city structures): - is not present;

10. Geospecifications (geological conditions): - difficult, the device of bored piles on depth 20-30m is necessary;

11. Mitigation of ecological consequences (protection and restoration of green plantings): - insignificant consequences, compensation actions are provided in the project.

**The factors influencing the cost of construction of the line of the high-speed tram "The Park of T. G. Shevchenko — Morvokzal — Kotovsk":**

1. Total length of system: 16 KM
2. Topography (whether the area flat or hilly, crossings of roads is):
  - the designed line passes in the artificial tunnel under park slopes of T. Gshevchenko, near the existing platform, under the bridge leading on Morvokzal;
3. An arrangement (access for the construction equipment whether construction by a traffic or other obstacles for construction is complicated): - there is a number of complex engineering challenges;
4. Utilities (transfer of water supply systems, power lines, phone lines, etc. that can have significant effect on increase in expenses):- are available, requires the complex solution;
5. The site (sort of soil acquired or easements need to be got):- available, requires a comprehensive solution;
6. Passenger requirements (the size and the number of vehicles, time they are expectations at stations): - on the line it is supposed to involve from 12 to 18 structures on 4 cars
7. The high-speed mode (high-speed requirements to system, Distances between stations): - 60 km/h at average distance of 2 km between stations;
8. The number of stations (the additional station increases a payback period):
  - 6-10;
9. Special designs (need of construction of tunnels, bridges, overpasses and reconstruction of city structures): - is, requires the complex solution;
10. Geospecifications (geological conditions): - normal;
11. Mitigation of ecological consequences (protection and restoration of green plantings): - insignificant consequences, compensation actions are provided in the project.

COST OF CONSTRUCTION MONORAIL (1 KM)			
	Location / operator	The cost \$ million / km	Year Built
	Okinawa Japan/ (HITACHI)	27	2003
	Kuala Lumpur Malaysia/ (MTpans)	36	2003
	Las Vegas United States/ (HITACHI)	55	2004
	Mumbai India/ (Scomi)	27,25	2008
	Palm Jumeirah UAE/ (HITACHI)	73,4	2009
	Moscow Russia	20	2006

*Fig. 4. Examples of monorail lines*

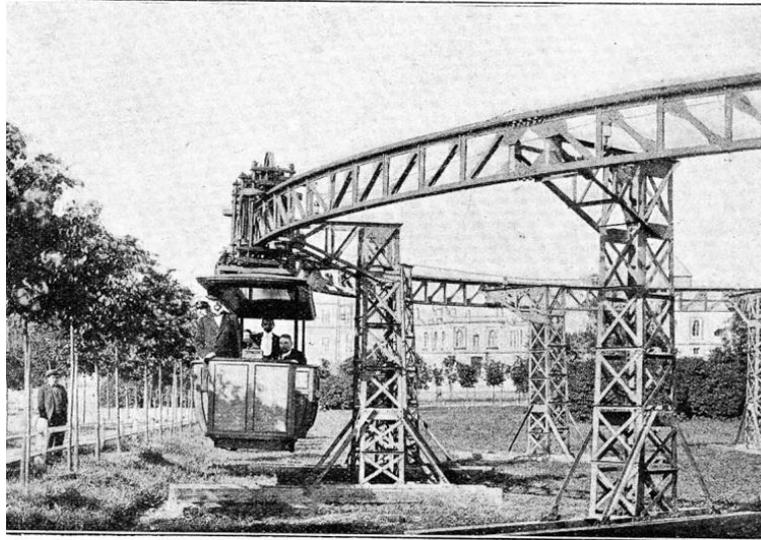
The device of the dedicated line of the high-speed tram connecting the item. Kotovsk with the downtown, it is possible at re-equipment of a part of the railway cloth relating to port and the device of the platform repeating a profile of a port platform.

Cost recovery of the transport line is not less than 10 years and realization perhaps only on the basis of public-private partnership. But, it should be taken into account that creation of infrastructure of city's "skeleton" will create prerequisites for growth of attractive zones in terms of investment around it and will start the mechanism of inflow of investments into tourist and social objects that in turn will give tax receipts in the city budget.

## CONCLUSIONS

This decision in the conditions of renovation of port territories will allow:

- To connect the North and the South of Odessa city by high-speed ecological transport – a monorail and the high-speed tram;
- To provide transport availability to the park of T. G. Shevchenko and to the stadium;
- To equip the central embankment for inhabitants and city visitors;
- To create investment-attractive space.



Подвѣсная электрическая дорога. Съ фот. авт. «Нивы».

***Historic facts. Monorail Odessa was in 1900!***

Первые опыты съ подвижной дорогой были сдѣланы въ 1895 г. въ Одессѣ. Затѣмъ модель была демонстрирована въ 1897 году въ VIII отдѣлѣ Императорскаго русскаго технического общества и на выставкѣ судоходства. Теперь подвѣсная дорога установлена, въ видѣ пробнаго участка въ 100 саж. длиною, въ Гатчинѣ на участкѣ земли между Балтійскою ж. д. и гатчинскимъ дворцомъ. Вагонъ открытый, лѣтняго типа, вѣсомъ до 100 пудовъ поднимаетъ 20 человекъ пассажировъ.

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