# SKYWAY: OVERVIEW OF TRANSPORT SYSTEM BENEFITS

## BASIC BENEFITS

1. Social impact of systems
2. Efficiency of system
3. Environment safety
4. Traffic safety
5. Comfortable transit
6. Minimum land acquisition
7. Low construction costs
8. Low transportation costs
9. System longevity
10. Resistance to vandalism and terrorism
11. Energy efficiency of system
12. Innovation system

## ADDITIONAL BENEFITS

1. High speed (up to 500 km per hour)
2. All-weather operation
3. All-landscape trace
4. Availability and perennial of construction
5. Wide operating temperature range
6. Possibility of coastal water areas development
7. Possibility of new territories development with providing of mining in hard-to-reach areas
8. Possibility of automation on a high level
9. Ability to use personal vehicles
10. Opportunity to improve the economy and quality of life

# SKYWAY: 1. SOCIAL IMPACT OF SYSTEMS

Implementation of SKYWAY project through the creation of innovative highly effective over-ground transport network will allow to give impulse to the development of the productive forces of the country, including the involvement of underdeveloped areas in the commercialization, and to provide:

- increase of the employment rate by creating new jobs, both during construction and during the operational phase of transport system

- increase of social opportunities of the state due to the fact that it creates a demand for labor, not only in the transport sector, but also in related sectors of the economy, increasing tax revenues

- improvement of life quality, based on a dynamic economy which generates and requires highly skilled personnel

# SKYWAY: 2. EFFICIENCY OF SYSTEM

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**Executive Summary**
**Of Innovative Transport Technology**
**"String Transport Unitsky"**

**1. Introduction**

Analysis of transport state-of-the-art and its perspectives was carried out as the part of the Transport Strategy of Russian Federation till 2030. It proves that there are a number of limitations for transport development in Russia. Among them one can mention high rate of capital and energy output, severe climatic conditions, long period of project implementation, low transport infrastructure payback.

In such conditions formation of competitive transport services market is impossible without progressive achievements of techniques and technologies which are in conform to the security standards. The most important development direction becomes the implementation of innovative technologies in transport sphere. Therefore, introduction of Unitsky String Transport (STU) may become one of the most perspective directions in innovative transport technologies development. In November, 2008 Transport Committee of State Duma of the Federal Assembly of the Russian Federation admitted STU to be the best innovative project in terms of Consultative Council "Transport unites Russia" on project "Innovative Types of XXI Century Transportation in Russia". STU was also recommended for early implementation to the economic scheme of the country.

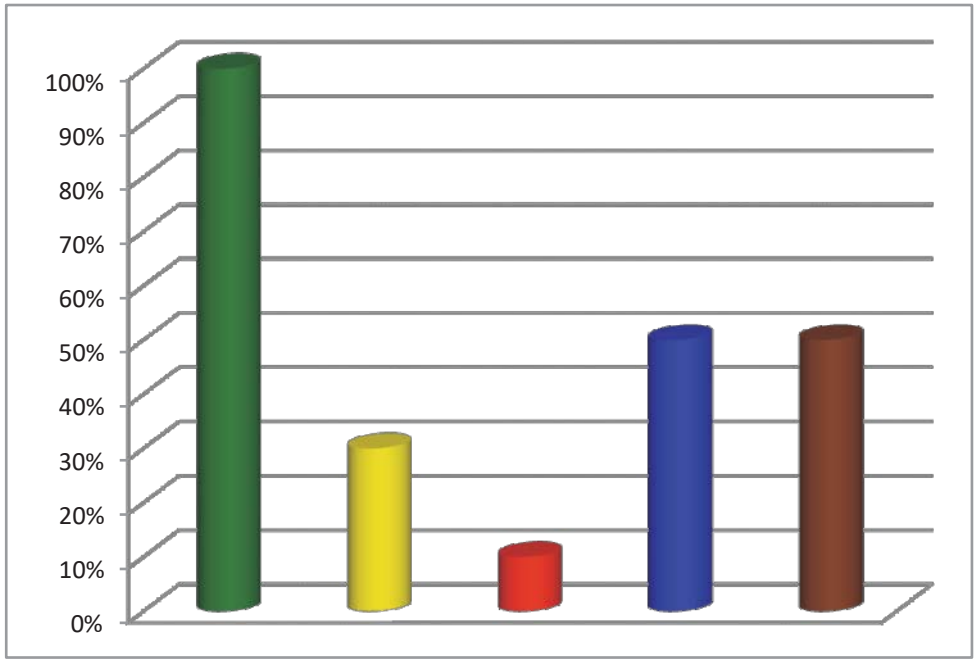
From the Execute Summary of the Institute of Transportation Problems of the Russian Academy of Sciences:

"... String Transport Unitsky (now known as SKYWAY) is the most economical transport system ever known.

In comparison with:

- plane — 8 times more economical
- train on magnetic suspension — 9 times more economical
- rapid rail — 3 times more economical.

# SKYWAY: 3. ENVIRONMENT SAFETY




Comparative level of environmental safety:

| | |
|---|---|
| SKYWAY | 100% |
| Rail transport | 30% |
| Automobile transport | 10% |
| Monorail | 50% |
| Train on the magnetic suspension | 50% |

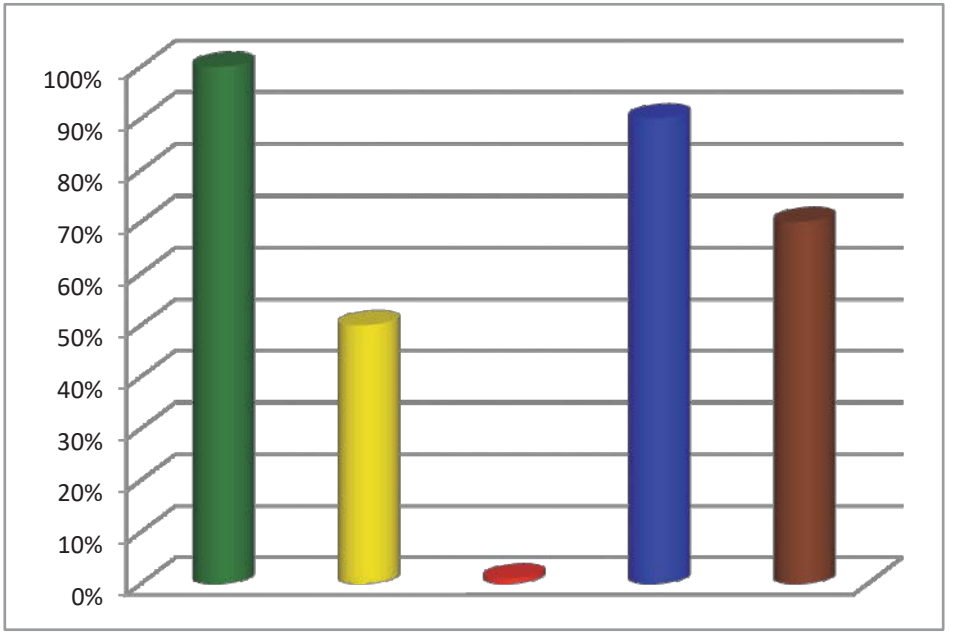
Factors that are ensuring the reduction of pollution:

- Lack of dust and environmentally dangerous embankments and excavations
- No barriers to animal migration
- Lack of preconditions for creating of swamp soil, in the absence of obstacles to the natural water flow
- Low proportion of fuel to move people and goods
- Lack of high electric voltages and strong electromagnetic fields while using electric traction

# SKYWAY: 4. TRAFFIC SAFETY

Factors for high traffic safety:

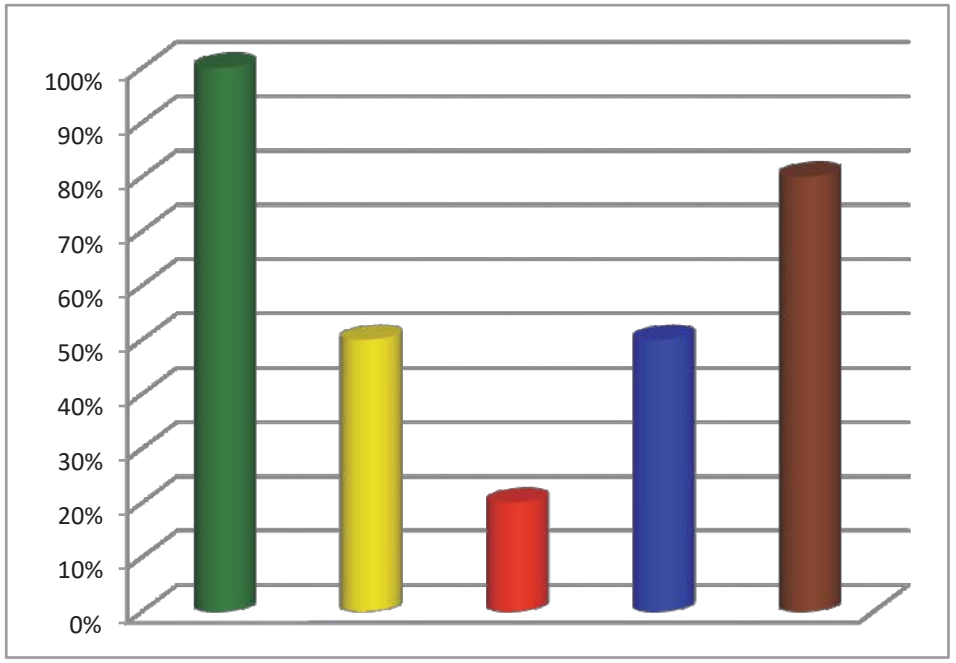
- High stability of the rolling stock due to anti-derailment system and independent suspension for each wheel
- Avoiding of collisions with vehicles, people, animals, due to the placement of track structure above the ground on supports
- Reduction of emergency accidents due to lack of the possibility of grounds erosion by groundwater and surface water
- High sustainability of transport system for floods, tsunamis, earthquakes and other natural disasters because of above-ground placement, the continuous construction and pre-tension




Comparative level of traffic safety:

| | |
|---|---|
| SKYWAY | 100% |
| Rail transport | 50% |
| Automobile transport | 1% |
| Monorail | 90% |
| Train on the magnetic suspension | 70% |

# SKYWAY: 5. COMFORTABLE TRANSIT




Comparative level of traffic comfort:

| | |
|---|---|
| SKYWAY | 100% |
| Rail transport | 50% |
| Automobile transport | 20% |
| Monorail | 50% |
| Train on the magnetic suspension | 80% |

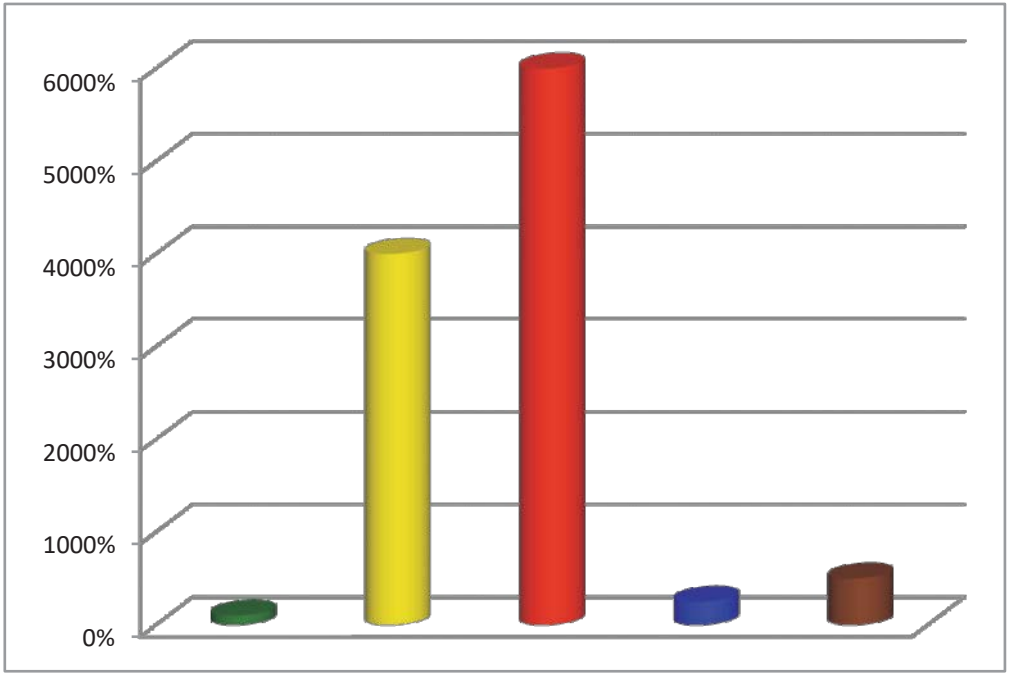
Factors for high passenger comfort:

- High smoothness of route and low noise while moving
- Low speeds of acceleration and deceleration of rolling stock due to lack of obstacles
- Lack of "blocks" on the "second level" of the movement
- Automated control system and the absence of dangerous and unreliable transport interchanges
- Low waiting time and time in transit, as well as an opportunity to travel "door to door" with the use of individual transport modules

# SKYWAY: 6. MINIMUM LAND ACQUISITION

Minimum land acquisition is provided by:

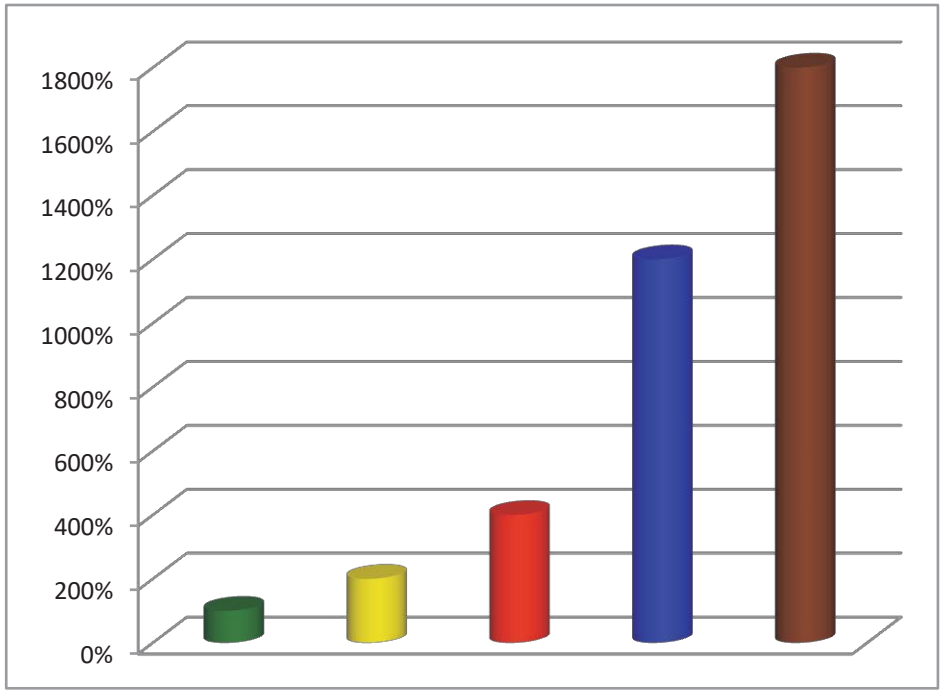
- Lack of embankments, cuts, culverts, grade intersections, due to above-ground placement on supports
- Except for bridges, overpasses and interchanges, on the way to which a high and extended mound is required for roads and railways
- Lower cross-section of supports compared to monorail 2–3 times and thus bearing of supports on the minimum area of land foundation




Comparative level of land acquisition:

| | |
|---|---|
| SKYWAY | 100% |
| Rail transport | 4000% |
| Automobile transport | 6000% |
| Monorail | 250% |
| Train on the magnetic suspension | 500% |

# SKYWAY: 7. LOW CONSTRUCTION COSTS




Comparative level of construction costs:

| | |
|---|---|
| SKYWAY | 100% |
| Rail transport | 200% |
| Automobile transport | 400% |
| Monorail | 1200% |
| Train on the magnetic suspension | 1800% |

Components of low cost of construction of transport system, including track structure and supports, rolling stock and infrastructure:

- Minimum amount of land acquisition and minor earthworks
- Low material consumption of string-rail track structure, supports, rolling stock and the basic infrastructure
- Low cost of components due to the use of traditional materials, machine components and assemblies
- High production rate and the rate of "second level" route and infrastructure construction in all climatic conditions

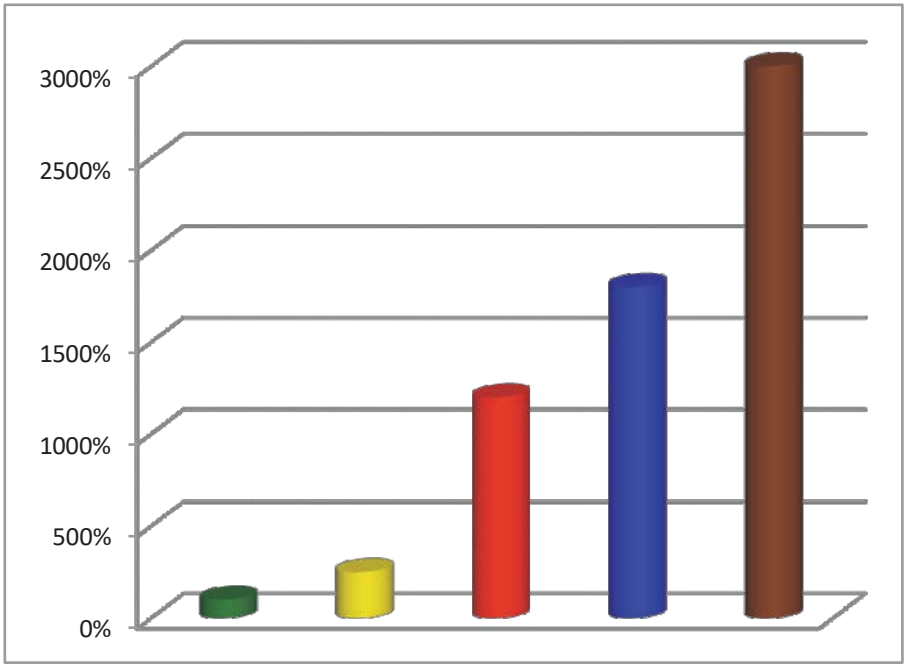
# SKYWAY: 8. LOW TRANSPORTATION COSTS

The low cost of passenger and freight transport is based on:

- The low cost of construction:
  - — minimum area of land acquisition
  - — low volume of excavation
  - — low materials consumption of track, rolling stock and infrastructure
  - — high productivity of construction and manufacturing of all components of the system

- Low operating costs:
  - — all-weather
  - — high speed of transportation
  - — automatic control system
  - — low fuel consumption (energy) on movement
  - — low-crowded system maintenance

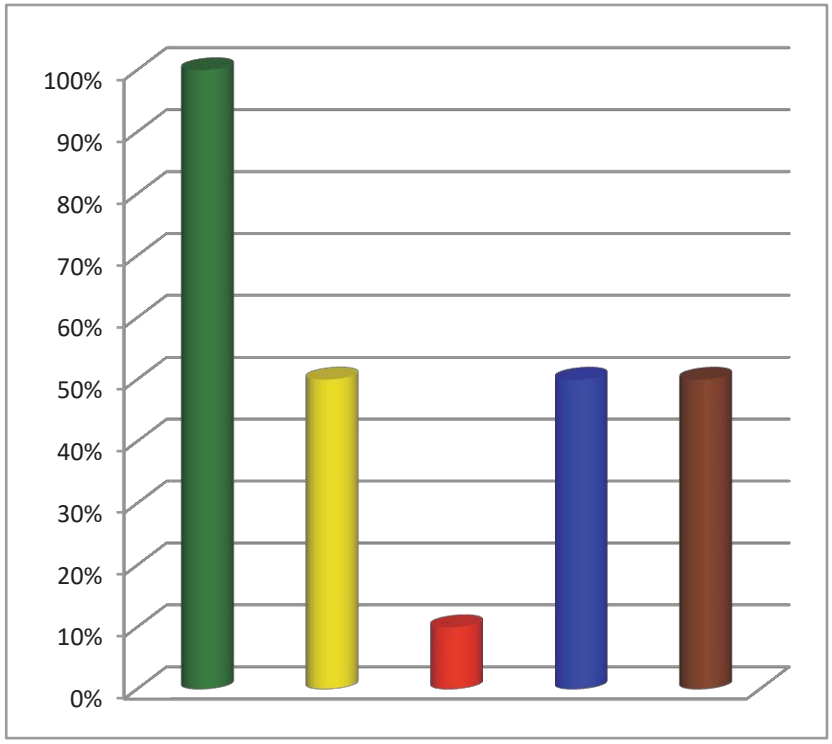
- Low depreciation charge:
  - — low-cost of transport system
  - — longer life of track structure, supports, rolling stock and infrastructure




Comparative level of transportation costs:

| | |
|---|---|
| SKYWAY | 100% |
| Rail transport | 250% |
| Automobile transport | 1200% |
| Monorail | 1800% |
| Train on the magnetic suspension | 3000% |

# SKYWAY: 9. SYSTEM LONGEVITY




Comparative level of durability:

| | |
|---|---|
| SKYWAY | 100% |
| Rail transport | 50% |
| Automobile transport | 10% |
| Monorail | 50% |
| Train on the magnetic suspension | 50% |

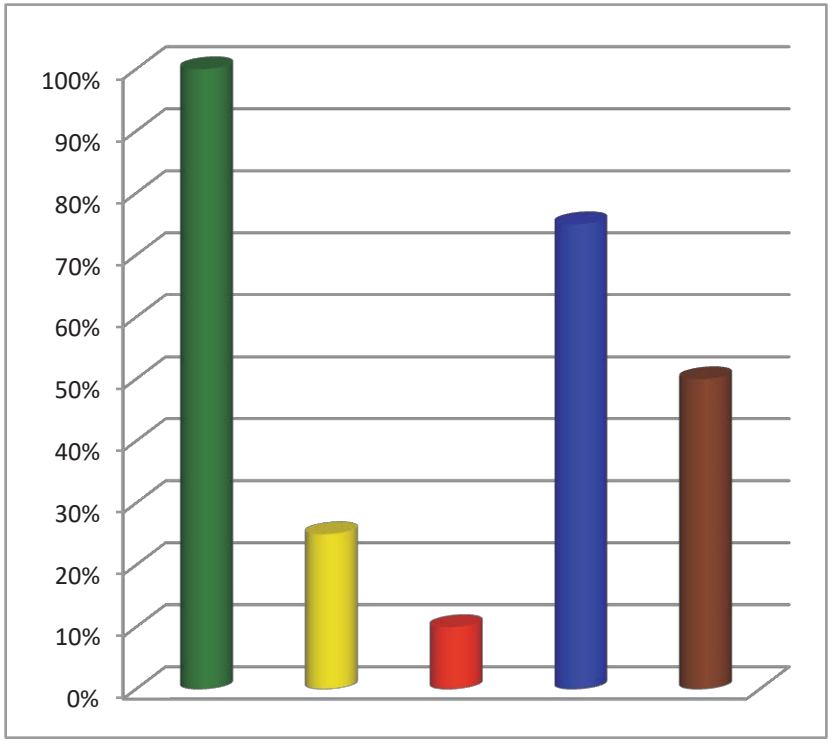
Factors that ensure durability of the system:

- Ten-fold margin of safety for supports and track structure
- High resistance of transport system to floods, tsunamis, earthquakes and other natural disasters
- Transport system is not dependent on the strength and stability of the underlying soils (bogs, permafrost, desert, etc.)
- Transport system is not adversely affected by strong frost heat, snow and ice, as well as other adverse climatic factors
- Low wear + high resistance to corrosion of string-rail route
- Lack of unstable and short-living earth mounds

# SKYWAY: 10. RESISTANCE TO VANDALISM AND TERRORISM

Anti-vandalism and anti-terrorism protection are provided by:

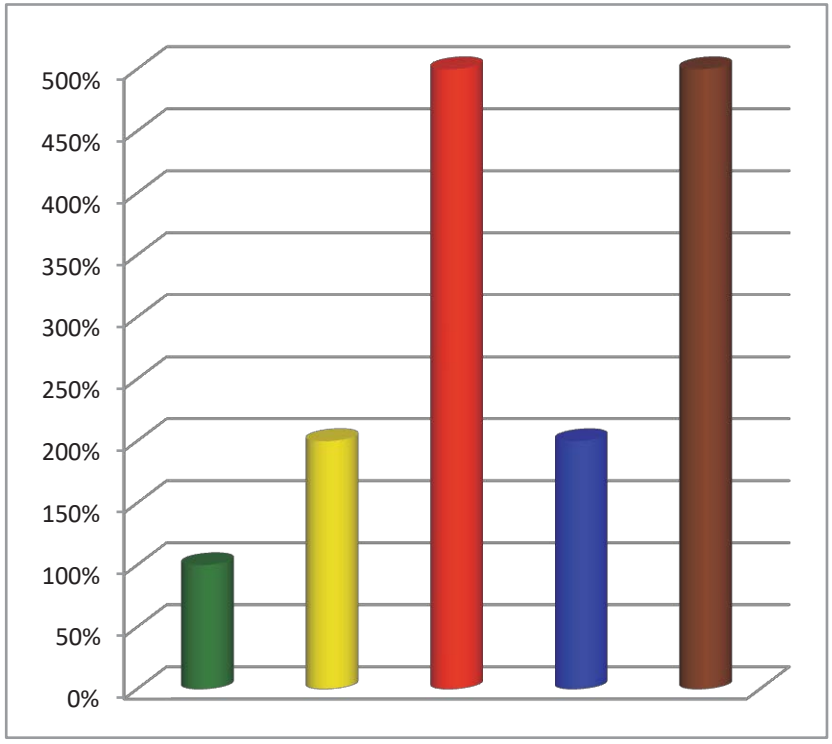
- «second level» of path location and lack of solid fabric makes placing of mines and of large objects on it, hardly possible
- «second level» of path location facilitates the monitoring of security and allows automating it
- The need for larger quantity of explosives to destroy the string-rail compared to railway
- Fracture of supports and/or fall of several supports in a row are not critical and will not bring down the continuous pre-stressed string-rail route
- Strong need for at least 100 kg of explosives to destroy the anchor support (note: to disable an aircraft 100 g is enough)




Comparative resistance to vandalism and terrorism:

| | |
|---|---|
| SKYWAY | 100% |
| Rail transport | 25% |
| Automobile transport | 10% |
| Monorail | 75% |
| Train on the magnetic suspension | 50% |

# SKYWAY: 11. ENERGY EFFICIENCY OF SYSTEM




Comparative level of specific energy consumption:

| | |
|---|---|
| SKYWAY | 100% |
| Rail transport | 200% |
| Automobile transport | 500% |
| Monorail | 200% |
| Train on the magnetic suspension | 500% |

Reduction of energy consumption is provided by:

- Reduction of the design of rolling stock proportion to 200 kg/pass., which is much less than a compartment car on the conventional railroad
- High aerodynamic performance of transport module (compared to a sports-car, it is 4 times more aerodynamic)
- Reduction of the rolling resistance of steel wheels (improved 2 times in comparison to the wheel pair of conventional train)
- Excluding the effect of the screen, by the absence of a solid surface directly underneath the transport module