ADGEX

ONE BELT
ONE ROAD

UPRAIL

UNIFIED TRANSPORT OF THE XXI CENTURY
CONNECTING ALL CONTINENTS OF THE EARTH

HIGH-SPEED HIGHWAYS

HAULAGE OF BULK CARGO AND CONTAINERS

TRANSCONTINENTAL TRANSPORTATION OF PASSENGERS AND CARGO

XXI CENTURY TRAFFIC ACCELERATOR

Generates the volume of transported cargo up to 2.8 million tons/hour with speeds up to 500 km/h and load up to 6000 tons of payload per 1km of track structure.

Brings forth quick payback for both low-budget and full-scale highways due to the lowest cost of transportation per ton/km and low capital expenditures.

Provides all-weather passenger and cargo transportation over virtually any terrain, over any distance, with high speed and accuracy, and with the highest level of reliability and comfort.

Maintains the integrity of the Tier 1 ecosystem as the UPRAIL track structure does not intersect with existing ground infrastructure and does not interfere with people.

Operates non-stop, ensuring maximum safety, in extreme weather conditions: floods, snowfalls and blizzards, freezing rain, heat and dust storms, earthquakes up to magnitude 9.

Preserves flora and fauna without having a negative impact on the environment, allowing humanity to preserve the pristine appearance of our planet.

UPRAIL

GOLD STANDART TRANSPORTATION INDUSTRY

UPRAIL IS THE MOST PERFECT TRANSPORTATION SYSTEM OF THE SECOND LEVEL, MEETING ALL TRANSPORTATION TASKS OF THE MODERN STAGE OF HUMAN DEVELOPMENT.

Featuring the exceptional superiority of elevated track structure, ability to provide high speeds, high cargo flow, and unprecedented levels of safety UPRAIL surpasses all existing modes of transportation. UPRAIL is the new gold standard in the transportation industry, changing the present and future of freight and passenger transportation!

UPRAIL takes carriage safety to an unprecedented level and opens a new page of modern environmentally friendly and safe transportation!

UPRAIL PURPOSE

Today, information in the world spreads in a fraction of a second and cargo travels at an average speed of 40 km/hour. The modern world demands new speeds of cargo and passenger delivery, as well as schedule accuracy, guaranteed and safe cargo turnover, regardless of climate and the most unfavorable weather conditions.

HIGH-SPEED HIGHWAYS

UPRAIL's lightweight cable-stayed track structure raised above the ground avoids bulky and expensive reinforced concrete trestles of traditional high-speed railroads and makes it possible to organize high-speed highways over almost any rough terrain with speeds of up to 500 km/h.

RAPID URBAN TRANSPORT

A modern solution for cities! Regardless of the density of urban development, presence of rivers, lakes, complex terrain, presence of pedestrian, reserved and protected areas UPRAIL will easily connect remote areas of the city with the center and vital infrastructure: train stations, airport, hospitals and other places.

HAULAGE OF BULK COMMODITIES AND CONTAINERS

UPRAIL is specially designed for non-stop conventional haulage operation of bulk commodities and containers. This approach significantly reduces capital costs and operating costs for transporting 1 ton per km, which provides a significant advantage over traditional railway solutions.

TRANSCONTINENTAL CARGOING

UPRAIL is capable of replacing maritime transportation, which today carries 93% of the world's cargo traffic. UPRAIL has clear advantages over sea transportation, such as cargo safety, resistance to adverse weather conditions, high capacity and low cost of transportation.

ECONOMIC FEASIBILITY

COST OF CARGOING

UPRAIL has low cost of cargo transportation per ton/km due to energy efficiency of rolling stock, durability of track structure, low operating costs.

QUICK PAYBACK

UPRAIL ensures quick payback for both low-budget and full-scale highways due to large cargo flow, the lowest cost of transportation per ton/km and CAPEX, process automation.

HIGH TROUGHPUT CAPACITY

The rolling stock is able to move around the clock in automatic mode with high traffic intensity. Combined cars move both independently and are formed into trains.

GREAT SAFETY

TRANSPORTATION COMFORT

The design of UPRAIL's track structure and rolling stock reduces noise and vibration levels and eliminates environmental hazards.

INDEPENDENCE FROM NATURAL DISASTERS

The UPRAIL structure is resistant to floods and floods, soil corrosion, landslides, earthquakes, dust storms, blizzards and freezing rain.

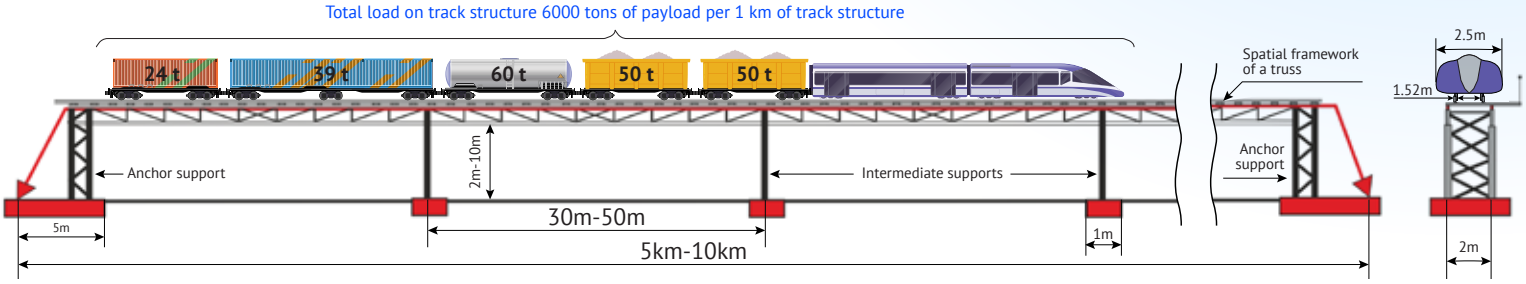
RESISTANCE TO TERRORIST ACTS

UPRAIL can withstand the detonation of an intermediate support. The entire load is evenly distributed over the entire track structure installed on reliable anchor supports.

UPRAIL TRACK STRUCTURE

The UPRAIL track structure is a prefabricated cable-stayed system consisting of anchor supports between which prestressed ropes (cables) are attached. Each cable has an individual adjustable tension level. Longitudinal and transverse cables together with rigid struts along the entire length of the track structure form a defined geometric framework of truss oriented in the vertical and longitudinal planes. The truss has a stabilizing upper and load-bearing lower chord.

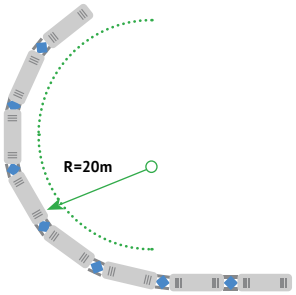
The frame of the spatial truss of the track structure rests (lies) on intermediate supports, which serve for uniform distribution of the rolling stock weight (load) along the entire length of the ropes between the anchor supports. Thus, the load does not act on a specific point of the track structure during the passage of the rolling stock, but is distributed over the entire length of the cables, which evenly transmit it and absorb it at the anchor supports.



The intermediate supports are not load-bearing in design, so they are light and slim, which is particularly important in urban environments. As a result, the UPRAIL track structure is compact and uncluttered. It seems to disappear into the air, both in the urban landscape and in nature, becoming invisible to the human eye.

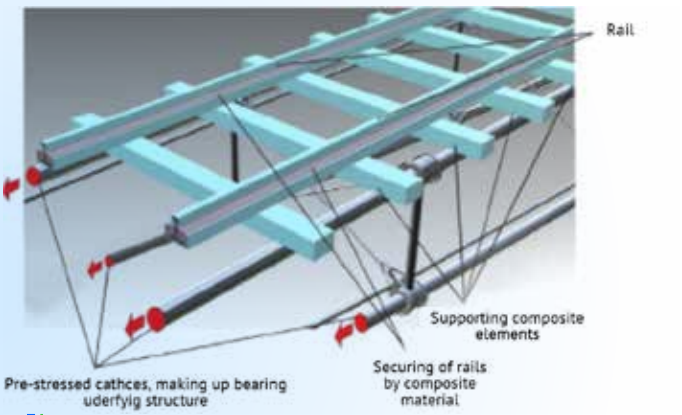
TECHNICAL SPECIFICATION OF UPRAIL TRACK STRUCTURE

- Span between anchor supports — up to 10 km;
- Average span between intermediate supports — 50 meters;
- Load on the track structure for every 50 meters — up to 300 tons;
- Maximum length of unsupported spans — up to 100 meters;
- Maximum gradient — 30%;
- Track width — 1520 mm (if necessary, it can be changed and adjusted to the required standards);
- Service life of the track structure — 150 years.



The articulation angles between the cars ensure that the UPRAIL has a minimum turning radius of 20 m.

RAIL FASTENING TO THE TRACK STRUCTURE



The rails are movably attached to the top chord of the truss, the design of which allows the second level to hold a reasonable design load. The stability of the longitudinal and transverse ropes is ensured by a high level of tension, which makes the structure geometrically unchanged even under strong static and aerodynamic loads.

TECHNOLOGICAL SUPERIORITY OF UPRAIL

LIGHTWEIGHT AND STURDY CONSTRUCTION

The track structure is lightweight, yet incredibly strong. It can withstand enormous overloads, ensuring safe and reliable operation.

ALL-WEATHER OPERATION

UPRAIL operates in all climatic conditions from -50° C to +80° C under all adverse weather conditions such as snowfall, freezing rain, hurricane, floods, fog, etc.

HIGH CROSS-COUNTRY CAPABILITY

UPRAIL is capable of traversing virtually any terrain, including mountainous terrain, forests, rivers and shelves up to 90 meters deep.

TRANSPORTATION AUTOMATION

Cargo flow management of UPRAIL's second-tier transportation system is fully automated. A human is present in the tracking and maintenance service.

EASY TO BUID

All elements of the track structure are prefabricated at the production site. The finished components are only assembled at the construction site.

INFRASTRUCTURE SIMPLIFICATION

By loading and unloading rolling stock on the move and with the entire train at the same time, UPRAIL needs fewer transshipment and loading points, reducing depots and marshalling yards.

HIGH TRAVEL SPEEDS

The UPRAIL track structure ensures a completely level track underneath the passing train. A level track means unlimited travel speeds.

LOW ENVIRONMENTAL IMPACT

UPRAIL minimizes the use of land and water resources. The construction of UPRAIL does not require the construction of dams, canals, deforestation and other works destructive to the ecosystem.

CONSTRUCTION AND MOUNTING OF UPRAIL TRACK STRUCTURE

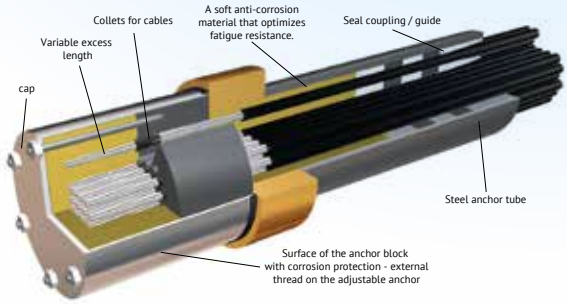
The basis of bunch of cables is high-strength wires with diameter of 5 mm each.

Bearing cables are manufactured, certificated and delivered in the form of reels with length of 1700 m. each. Their straining and attachment to anchor towers is carried out on construction site.

Application of cables is based on the principle of absolute self-dependence of each cable strand.

The basis of cable tension is anchors. They carry all necessary for such cables properties:

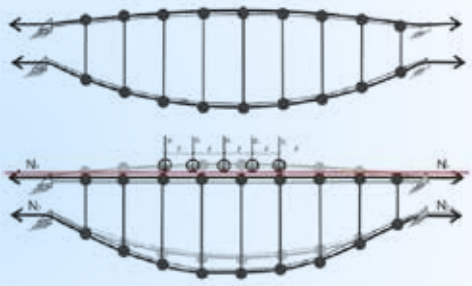
- Resistance to corrosion of all uncovered strand ends, which are additionally secured by cable seals in the light of all the latest advanced scientific research results in waterproofing field.
- Great axial fatigue strength, which is mainly reached by means of collets, specially designed to bear the strain within the range of 300 MPa at 45% of breaking tension during 2 million cycles.



- Individual mounting and adjustment of strand tension that allows monitoring cables condition over a span of time by means of control strand replacement.

ENSURING A PERFECTLY LEVEL TRACK

The track structure has a specially designed technological double convexity of the transverse and longitudinal ropes. Under the load of passing rolling stock, these ropes straighten and become perfectly straight. Thanks to this, when the wheels of the rolling stock pass over the rail, the UPRAIL track structure is stretched and becomes perfectly level under the rail like the surface of standing water.

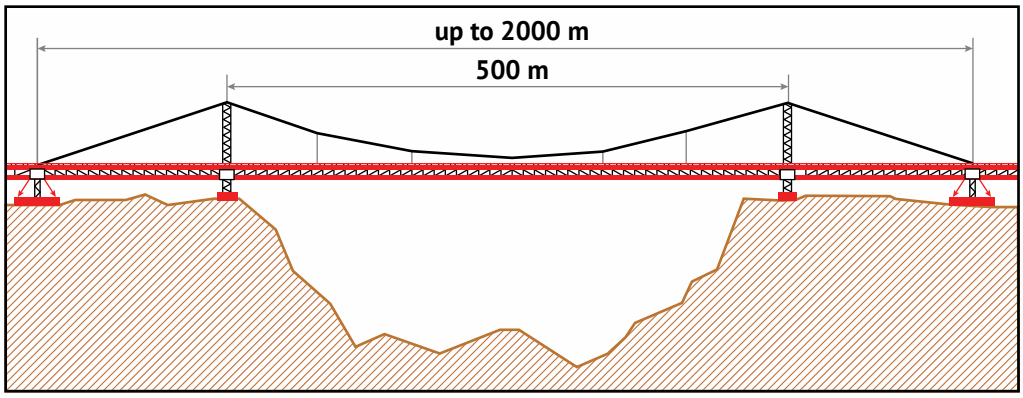


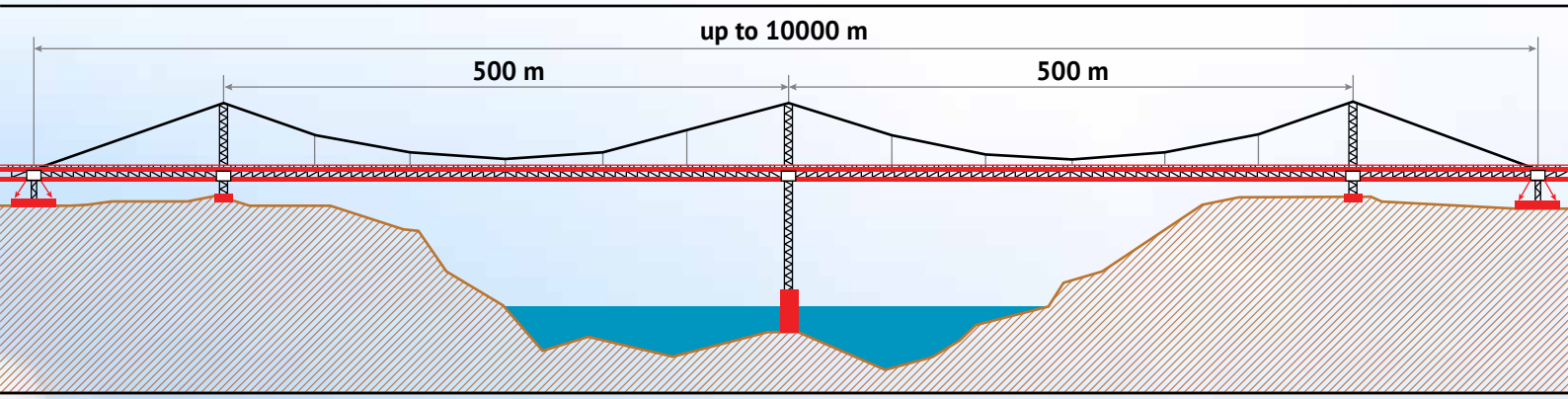
RELIABILITY AND ORIGINALITY OF THE DESIGN IS CONFIRMED BY EURASIAN PATENT 031238 B1 DATED 29.08.2016.

TRAVERSING DIFFICULT TERRAIN

The UPRAIL track structure overcomes difficult terrain by means of cable-stayed bridges.

For safety reasons and to ensure multiple safety margins, the UPRAIL unsupported suspension span is 500 m long.





EASY CONSTRUCTION AND DURABILITY OF UPRAIL TRACKS

MINIMAL LAND ACQUISITION AND EASE OF CONSTRUCTION

UPRAIL construction requires no more than 100 m2 of land surface per kilometer. The UPRAIL track structure is constructed without dams, bridges or any culverts. There is no need for deforestation, removal of soil layers and other destructive works that distort and disrupt the integrity of the landscape.

All elements of the track structure are pre-manufactured at the production site. UPRAIL components are delivered to the installation site in standard 40-pound containers. Installation and assembly is performed on-site using specialized equipment and tooling.

MATERIALS USED FOR TRACK STRUCTURE

Special composite materials made of basalt fiber are used as much as possible in the manufacture of track structure. Such structures have unique properties such as resistance to temperature changes, chemical resistance, high tensile strength, low specific weight, dielectric constant.

Basalt fiber structures have enhanced structural properties:

- Environmentally friendly;
- High strength with low weight;
- Increased sound insulation;
- Resistance to ultraviolet radiation;
- Durability, with a service life of 150 years

ENVIRONMENTAL INTEGRITY & SOCIAL RESPONSIBILITY

UPRAIL

UPRAIL is a sustainable solution that integrates perfectly with wildlife and urban infrastructure, preserving the integrity of any ecosystem.

The Level 2 track structure **has no underlying surface**, allowing UPRAIL to be constructed and operated with minimal soil disturbance.

Reduced resource consumption – saving of raw materials, land, energy, labour and finances.

Reduced amount of hazardous emissions into the atmosphere due to less energy consumption.

UPRAIL has a low level of noise and vibration, so there is no negative impact on people, ensuring environmental safety and preserving the health of the nation.

The UPRAIL track structure is raised above ground and does not cut the migration paths of animals, does not swamp rivers and lakes, and **preserves natural ecosystems** and geobiocenoses.

HIGH-SPEED PASSENGER ECO-LINKER

ECO-LINKER CHARACTERISTICS:

- **Number of seats:** 120 (changeable configuration lying down, half-sitting with 180g turn).
- **Floor height:** 360 mm.
- **Lean:** 80% of the cabin, which ensures that the center of gravity is pressed against the rails and stability at high speeds.
- **Luggage compartments:** located in the inter-car coupling.

EXCELLENT DESIGN:

- **Modular** carriage design and unrivaled appearance.
- **The shuttle's exterior glazing** is made of a special impenetrable coating — transparent on the inside and mirrored on the outside.
- Each seat offers a **magnificent panoramic view** of the skyline.

A unique aerodynamic shape with a durable and lightweight sturdy framework. The glazing is made of polycarbonate using environmentally friendly technology without the use of epoxy resins.

ECO-LINKER weighs no more than 5 tons. Its drive requires the energy of a conventional urban electric bus. For comparison, modern superfast trains weigh about 100 tons. To accelerate them up to 500 km/hour requires the energy of an entire energy station.

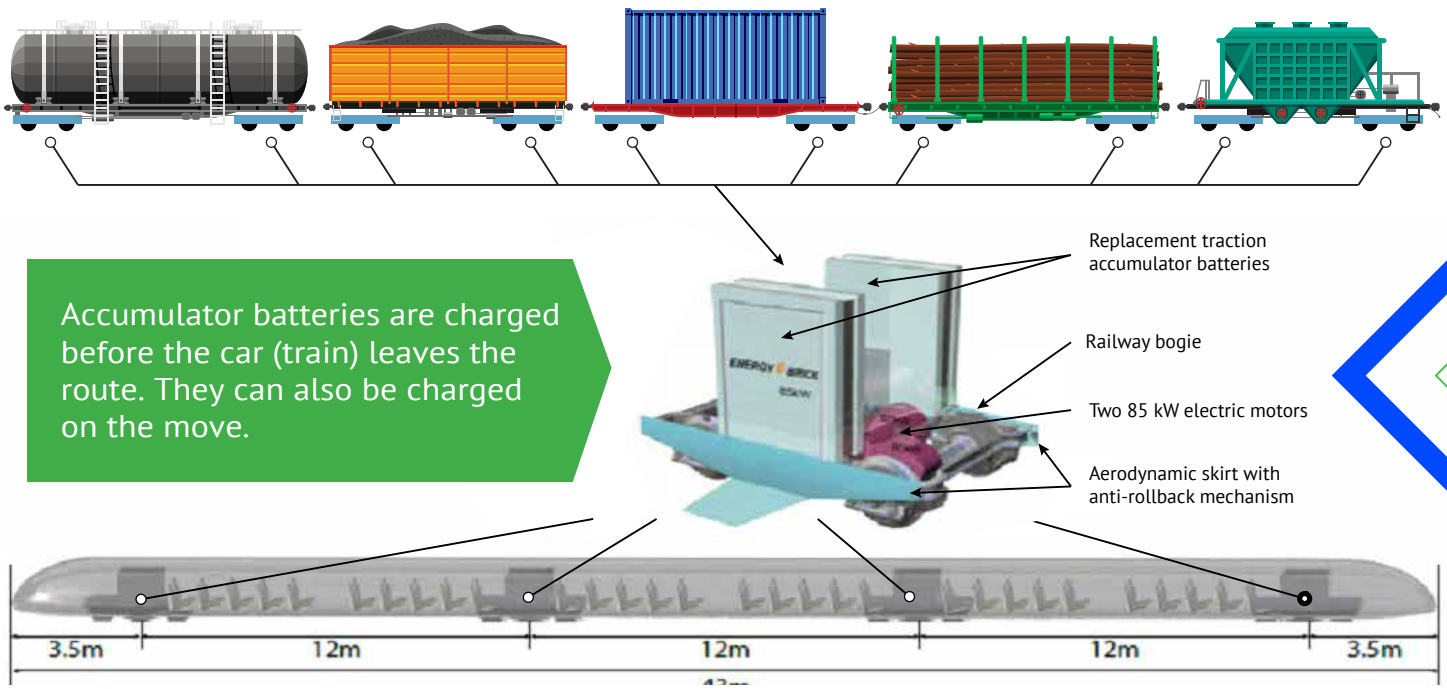
UPRAIL ROLLING STOCK

UPRAIL rolling stock consists of unmanned traction modules, each of which has mounting sockets for attaching any type of car (passenger or cargo).

The traction modules operate without noise, vibration and are capable of providing the necessary power drive for each individual car.

TRACTION MODULE CONFIGURATION:

- **2 electric motors** of 85 kW each, providing autonomous drive of the module.
- **Pulse speed gearbox** regulating the rotation speed of the wheels of the traction module.
- **2 removable batteries** – energyBRICK accumulators, which are charged or changed at stations before the car (train) goes out on the route, as well as can be charged directly on the move.
- **Unique aerodynamic skirt,** which presses the car at high speeds against the track structure, and at the same time is an anti-travel mechanism.



PULSE SPEED GEARBOX

The box is of reversible type, has no clutch. The technical solution is realized according to the principle: motor – flywheel – box. The flywheel is used as an energy storage and recuperator. The engine spins the flywheel and keeps its revolutions not lower than the set value. The box smoothly regulates the rotation speed of the wheels of the traction module in the full range of its rotation (from 0 to 2000 rpm – depends on the weight of the car and its speed) with a corresponding increase in torque when the speed decreases.

GRADIENT HANDLING 30%

The use of a pulse speed gearbox allows unlimited variation of the ratio of engine speed to wheel speed of the traction module. With this approach, the pulse box is able to provide the traction module with the maximum load that the track structure can hold, the maximum tractive effort required to guarantee overcoming gradients of up to 30% at reduced speed.

UNIVERSAL APPROACH IN ORGANISING TRANSPORTATION

ROLLING STOCK' MODULARITY

In UPRAIL the same typical principle of steel wheel and rail interaction is used as this one of the most advantageous and effective ways of moving. Nevertheless, distribution of rolling stock weigh is completely different. UPRAIL doesn't have such technical parameter as locomotive capacity. UPRAIL simply doesn't have a locomotive at all. Rolling stock of UPRAIL system consisted of independent modules, at that every module is equipped with autonomous power unit and can be used for various transportation purposes, allowing combining different modules into one multi-function train.

LOAD CAPACITY

Load capacity of entire UPRAIL rolling stock is characterized by the load, applied on a point of track structure, but not by the max capacity of a wagon or locomotive. Every such point, even situated in 3 cm between each other, is able to withstand 3 tons of load under each wheel. Thus, we can distribute weight of a wagon or entire train through the wheels proportionally and increase wagon payload by as much as we need without risk to overload the track structure and the entire system.

THRUST-TO-WEIGHT RATIO

Every UPRAIL module embodies a tiny ant, capable of carrying weight, exceeding his own mass by several times. How is it possible to happen? Ants are able to line up and distribute carrying weight among several species. And if billions of ants are to form up a long line, they will be able to carry massive weight without any load on ground. The same principle of weight distribution is used in UPRAIL system and allows having one of the lowest thrust-to-weight ratio among all other transport systems.

COMPARISON WITH A TRADITIONAL RAILROAD

TRADITIONAL RAILROAD	UPRAIL

COST & PAYBACK

High capital intensity and long payback due to limited and inefficient use of railway tracks, rolling stock and infrastructure.

UPRAIL's capital costs are 40% lower and operating costs are 50% lower. This ensures the payback of both low-budget and full-scale federal highways.

TRASSING

To lay the railroad track requires flat areas, removal of soil layers, cutting of forests, construction of bridge crossings, overpasses, cutting of tunnels.

Trails run above ground, traversing virtually any landscape. The use of land and water resources is an order of magnitude lower.

TRANSPORTATION SPEED

Carriage speed is limited by the tractive effort of the locomotive and the limited capacity of the railroad bed.

Due to the straightness of UPRAIL tracks and the energy-autonomous nature of each traction module, speeds of up to 500 km/h can be achieved.

THROUGHPUT CAPACITY

Depends on the number of rolling stock, as well as infrastructure: transshipment and reloading terminals, large areas for empty wagon sumps.

Higher by an order of magnitude and depends on travel speed. With a load of 6,000 tons per 1 km of track allows to transport per km of track:

- 120 km/h — 720,000 tons
- 250 km/h — 1,500,000 tons
- 500 km/h — 3 000 000 tons

UPRAIL'S STRATEGIC TRANSPORTATION OBJECTIVES:

- Connecting countries and continents into a single high-speed network.
- Hourly availability of remote areas for delivery of perishable cargo.
- Ensuring the lowest cost of transportation in the world.
- Non-stop transportation in all unfavorable weather conditions.
- Automation of transportation and unloading of terminal infrastructure.
- Safety of cargo, the highest comfort and quality of passenger transportation.
- Constructing environmental standards for transportation safety.

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