Ufa Railway Technical School

Research Project in English
Topic: **Railway Ecology**

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The aims of the project are:

– investigation of the railway ecology problem;
– comparison of railway transport with another vehicles;
– solution of the rail noise problem;
– analysis of environment peculiarities;
– using this material on the lessons

The problem of protecting nature is of primary importance today. Through their daily activities people pollute water, air, soil. If we do not stop these activities the damage may become irreversible.

Waste of railway stations

One of the most dangerous sources of pollution of the Earth is railway transport. Now railway pollution accounts for 9% of all harmful substances. Every year railway enterprises throw into the atmosphere nearly 40 thousand tons of harmful substances.

It is known that one locomotive exhausts as much harmful waste into air as 40 or 50 cars.

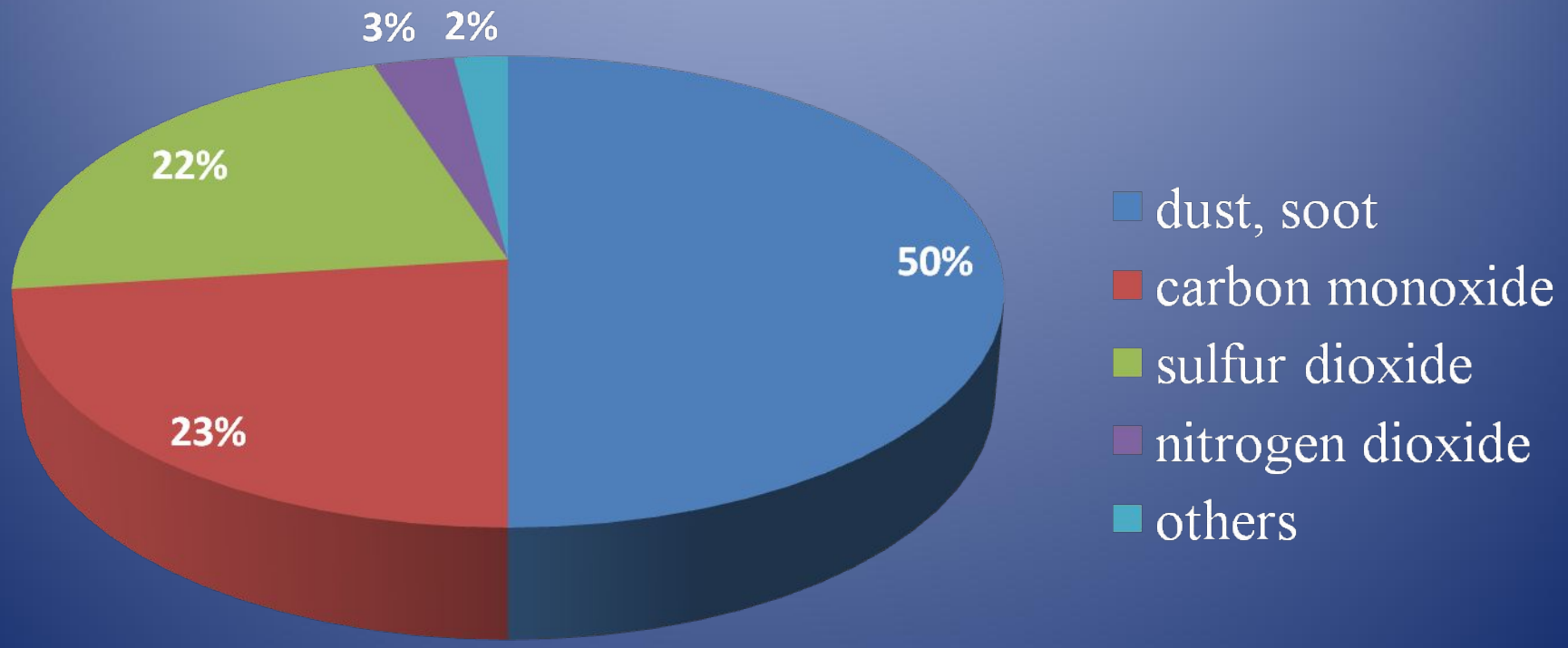
Coal fuel

The most dangerous and uncomfortable impact of transport on a person is considered to be pollution by hydrocarbons.

When coal is burned, a large amount of harmful substances are released into the environment, including coal containing a large number of heavy metals and hydrocarbons.

Impact of carbon dioxide

Atmospheric emissions of railway transport enterprises contain solids, organic and inorganic origin:



Pollution of the environment along railways

- High
- Medium
- Low

Transport pollution in human settlements

- Very high
- High
- Medium
- Low

Emissions of harmful substances

Annually for each kilometer of the path passenger cars pour up to 200 m^3 of sewage, containing pathogenic microorganisms

and emits up to 12 tons of dry waste. This leads to contamination of the railroad track and the environment.

Impact on living organisms

Railway lines are laid at the established migration routes of living organisms, violate their development and even lead to the destruction of entire communities and species.

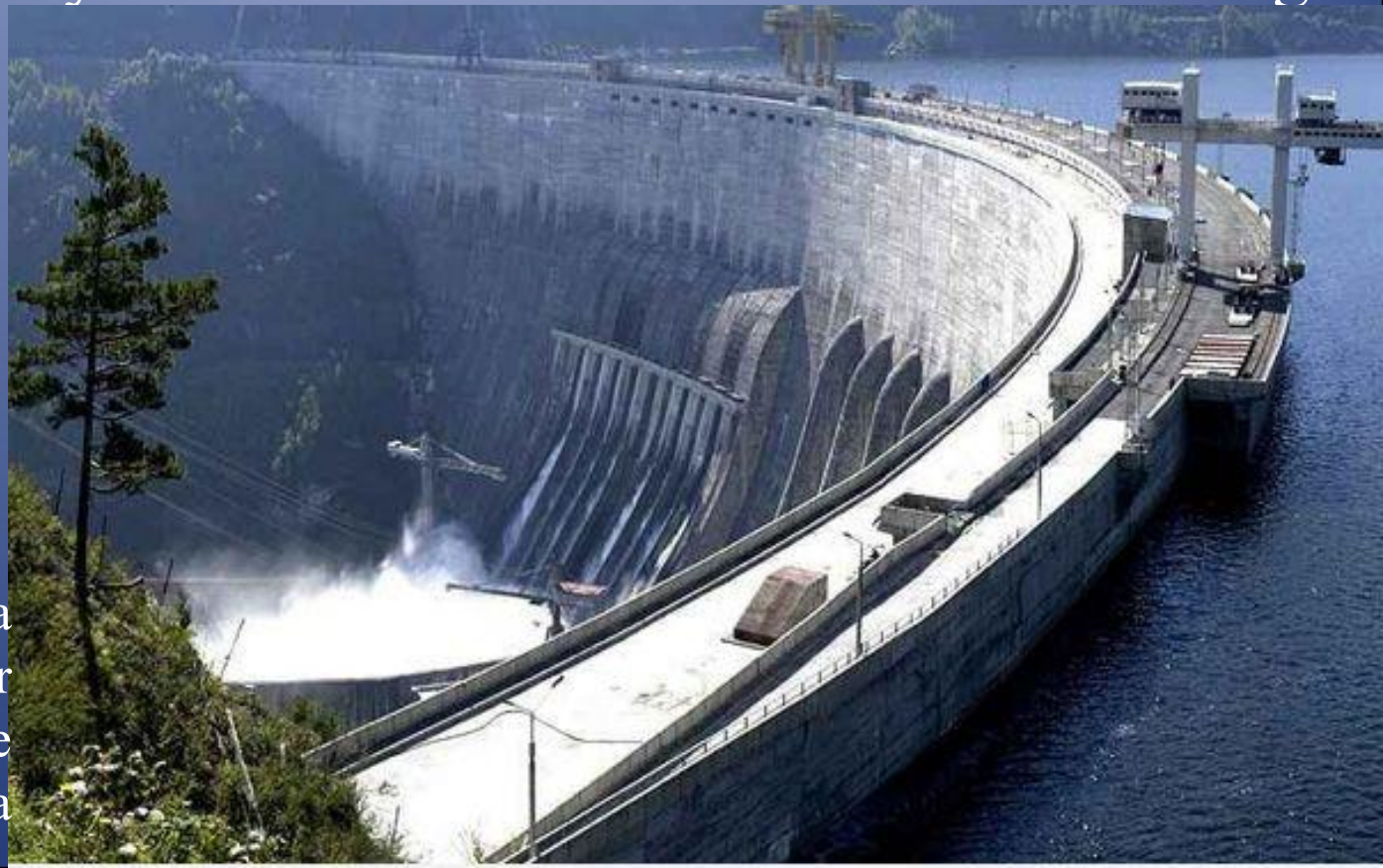
Solution of rail noise

At the same time railway transport is a great source of noise. As we know noise is a special kind of environment pollution. The most efficient way for the reduction of rail noise is the proper track layout and reduction of noise of the diesel engine.

However, if the rail noise can not be reduced in origin, then the solution is in noise barriers. They should be placed as close as possible

to the track and have a height no less than 2 meters. In addition noise barriers should be made of special absorbing materials for additional noise reduction.

The transport sector consumes annually 1/3 of the total energy in the world community. Railway have the lowest unit energy consumption compared to other transport modes. Besides, in electrified railways, energy can come from clean forms such as hydro power stations rather than from oil, especially now when the oil reserves are becoming exhaustible.



Sayano-Shushenskaya hydroelectric power station is the largest one in Russia

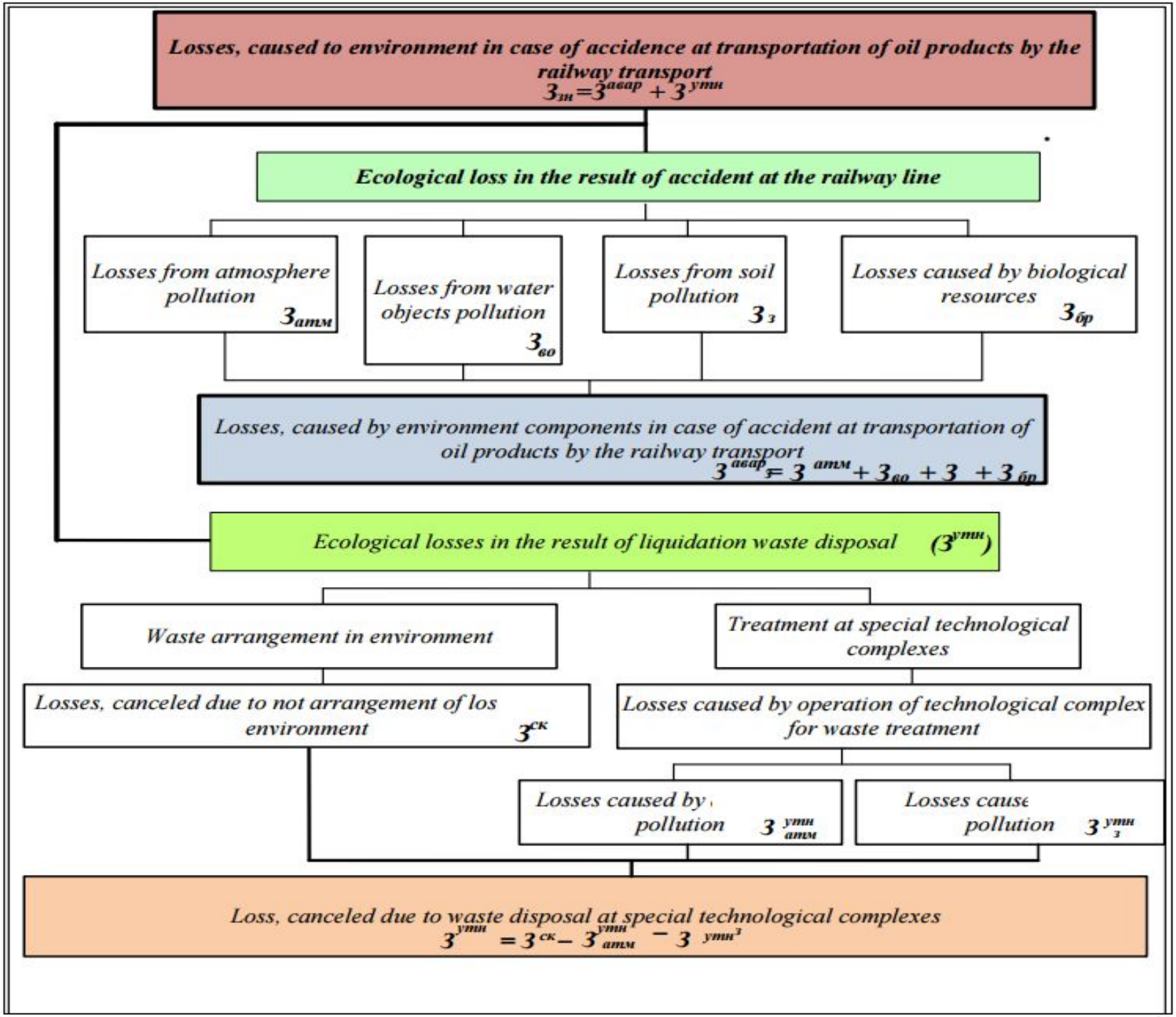
Occupation of land

Land occupation is much less for rail transport than for other transport modes and specifically fifty times less than for road transport.

Land occupation in the world for:

– road transport 68 937 575 км

– rail transport 1 370 782 км


Losses, caused to environment in case of accidence at transportation of oil products by the railway transport
$З_{зн}=З^{авар}+З^{утн}$
Ecological loss in the result of accident at the railway line
Losses from atmosphere pollution $З_{атм}$
Losses from water objects pollution $З_{во}$
Losses from soil pollution $З_{з}$
Losses caused by biological resources $З_{бр}$
Losses, caused by environment components in case of accident at transportation of oil products by the railway transport
$З^{авар}_{з}= З^{атм}+З_{во}+З_{з}+З_{бр}$
Ecological losses in the result of liquidation waste disposal $(З^{утн})$
Waste arrangement in environment
Treatment at special technological complexes
Losses, canceled due to not arrangement of los environment $З^{ск}$
Losses caused by operation of technological complex for waste treatment
Losses caused by pollution $З^{утн}_{атм}$
Losses cause pollution $З^{утн}_{з}$
Loss, canceled due to waste disposal at special technological complexes
$З^{утн}=З^{ск}-З^{утн}_{атм}-З^{утн}_{з}$

The list of literature:

- eadnurt.diit.edu.ua – EaDNURT
- en.wikipedia.org – Wikipedia
- Sciencedirect.com – ScienceDirect
- trendelfindelmundo.com – The End Of The World Train

Thanks for attention!