

The use of local building materials in the Baltic States

2012-04-12 Vilnius



Mining industry is one of the most important branches of national economy, though Lithuania is not rich in natural resources. However, Lithuania has the sufficient reserves of gravel, dolomite, limestone, etc. for local demands.

Over the last 15 years the industry of mineral materials has been developing unsteady and with much difficulty. In about 1980-1999, in Lithuania consumption of mineral materials was estimated at approximately 18 million m³ per year. Almost half of materials were used for roads, another half – for construction needs.

After Lithuania gained its independence in 1990 a well-marked reconstruction of industry and construction sector took place. The owners of non-ferrous material enterprises, the forms of ownership and the structure of industry management were changing. In about 1992 the volume of construction works fell down by almost 5 times. Correspondingly, the demand for non-ferrous materials also decreased.

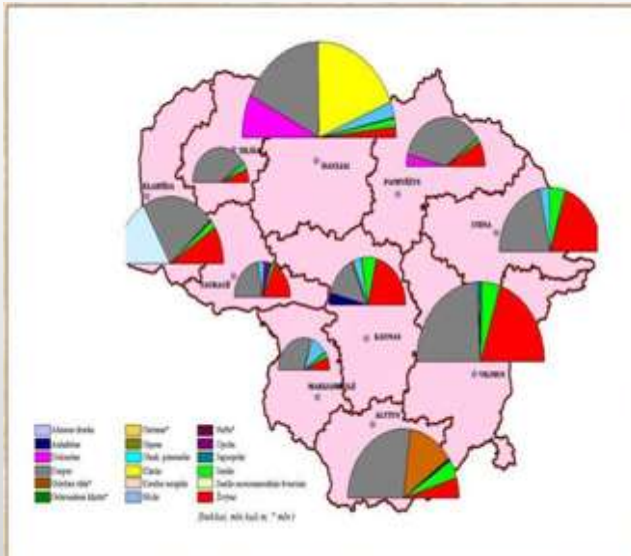


In 2002 - 2007 the volume of road and other purpose construction was rapidly increasing. Extraction and processing in certain enterprises used to increase twice every year.

Over the last decade the quality of products from non-ferrous materials has become much better. Processing technology and production quality are controlled and assessed in accordance with the new European standards.



In the territory of Lithuania, at the surface layer of the earth's crust the rocks of sedimentary origin lie. At present the geologists of Lithuania have confirmed 20 names of minerals, nine of them are in use: clay, sand, gravel, quartz sand, dolomite, limestone, opoka, peat and oil.



One can find the main building materials (clay, sand, gravel, dolomite, limestone) in Vilnius region (Trakai, Vilnius, Švenčionys districts), in Akmenė – Jurbarkas zone (especially in Akmenė district). Also, much of building sand and gravel could be found in Kaunas and Jonava districts, of dolomite – in Pakruojis and Joniškis districts.

LITHUANIAN MINERAL MAP

Clay



ŠALTIŠKIŲ CLAY QUARRY

Clay is a plastic sedimentary rock composed of clay minerals: kaolinite, montmorillonite, hydromica and others. More than half particles of these minerals are smaller than 0.01 mm and not less than 30 % - smaller than 0.005 mm. Clay contains quartz, feldspar, carbonate particles and admixtures of organic materials.

Clay which contains impermissible carbonate admixtures is not suitable for ceramic industry. In part of deposits pure clay lies. It is of good quality and having an industrial value.



ŽAGARĖS CLAY QUARRY

Till now 45 clay deposits have been prospected in Lithuania and only 20 of them are in use. Every year about 2 million tonnes of clay are mined out. According to the suitability the resources are as follows: for cement - 26 million tonnes, for bricks - 61 million tonnes, for expanded clay - 16 million tonnes. The best clays are located in limnoglacial plains of Jūra - Šešupė, Kaunas – Kaišiadorys and Dysna. Here the largest clay deposits have been prospected. Clay is used for the production of many building ceramics: bricks, tiles, drainage pipes, expanded clay and ceramic tiles.

Gravel



RAŠIŠKIO GRAVEL QUARRY

Gravel and sand are sedimentary mechanical loose rocks. They are composed of boulders (diameter > 63 mm), pebble (4 - 63 mm), sand (0.063 - 4 mm), silt (0.063 – 0.005 mm) and clay (< 0.005 mm).

Gravel deposits contain pebble particles from 5 to 60 percent. Gravel is suitable for the construction works when it contains more than 10 % of pebble and less than 5 % of clay - silt.

There are 555 gravel deposits in Lithuania prepared to industrial use. According to their industrial categories about 560 million m^3 are prospected and about 500 million m^3 are prepared for development. Based on preliminary data 107 other deposits were detected which contain about 325 million m^3 of raw material. The majority of deposits are small – up to 0.5 million m^3 , and there are only 23 deposits where the raw material cover more than 5 million m^3 .



PAKRUOJO GRAVEL QUARRY

The deposits are mostly located in alluvial benches of river valleys and in river beds of Nemunas, Neris, Venta, Dubysa, Šventoji and other rivers. Almost a quarter of prospected gravel deposits suitable for construction works are of glacial origin. The quality of the majority of deposits is good, the thickness of a useful layer is unchanging. Therefore, those deposits are thoroughly prospected and are used, for example the deposits of Kalnėnai, Dovilai, Poškai, Lembertiškis, Šilai, Ginevė, Nemakščiai, Svėdasai and other. The gravel deposits of other composition are situated in the sediments of identical deltas of northern Lithuania, for example in the zones of Lėvuo, Pyvesa, Apaščia, Nemunėlis and other rivers. Here the fluvioglacial deltas are less distinctive, and sediments contain prevailing debris of local dolomites crushed by glaciers.

Sand



SAND

In 139 industrial deposits the resources of all kind of sand make about 146.5 million m. The demand of sand for construction works is limited, therefore the use of sand deposits is lower than that of gravel. Sand is mostly used for road building works and for the production of silicate bricks. The average resources of one sand deposit make about 2.8 million m³, these are not large strata.



The largest sand deposits are situated in the south-eastern part of Lithuania, also in the region of Šimonių forest, in Kaunas, Klaipėda, Raseiniai and other districts.

The sand and gravel sediments are outspread at the bottom of a narrow coastal zone of the Baltic Sea, at a depth of 25 - 30 m.

SAND

Dolomite



DOLOMITE

Dolomite is a chemical sedimentary rock. It contains a fair amount (up to 25%) of other minerals – calcite, gypsum, clay minerals, iron oxides and other admixtures.

Dolomite from the old times has been used as a natural stone for constructing buildings and structures. It was used to build manor houses, bridges, stock-raising buildings.

Dolomite layers that are harder and having more beautiful texture are used to manufacture facing plates to finish buildings and structures.

Dolomite is a raw material with a number of applications. It can be used in construction and elsewhere.



DOLOMITE

Till now three limestone deposits have been geologically prospected in Akmenė district: Karpėnai, Menčiai and Narbučiai. The first two are in use. There is a possibility in Akmenė district to expand production of cement, building lime and limestone powder. Also, it would be necessary to geologically prospect in a northern-east direction the area of a perspective Karpėnai limestone deposit. The adjacent limestone deposits are also perspective.

Limestone



LIMESTONE

Limestone is a sedimentary carbonate rock composed largely (more than 50 %) of the mineral - calcite (CaCO_3) and of various admixtures - dolomite, silt, clay, etc. Limestone is the most important raw material in producing lime, cement and composite binders.

In the territory of Lithuania limestone is mostly found in Akmenė and its adjacent districts. The strata lie at a 1-20 m depth, the thickness of a useful layer amounts to 30 m.

Opoka



OPOKA

Opoka is a grey, hard, irregular-fracture, porous sedimentary rock. In Western Lithuania, in geological sediments of Šilutė district one can find dark grey, low-carbonaceous, hard and porous opoka as well as light grey, marl-containing and porous opoka. In Stoniškiai and Žemaitkiemis opoka deposits, the total area of which is 36.6 ha, almost 39 m of carbonized opoka and siliceous marl can be found. The resources of opoka in these strata make about 34.4 million tonnes. Those excavations are used as an active hydraulic additive when producing cement and other binders, the harder types can be used as a natural building stone.



VILNIAUS GEDIMINO
TECHNIKOS UNIVERSITETAS

Thank You for Your Attention!