order to maintain the quality of products there is used classification and labeling of chemical products specifying the risks of their use, the marking of construction products and equipment (in terms of energy consumption and eco-design of energy-related equipment, as Energy Label, Ecodesign) and their impact on the environment (Eco-label). Implementation of the concept of sustainable development in the building industry should be preceded by legislative procedure, adapting national legislation and national strategies related to construction (eg, energy, environmental protection, sustainable development strategy), as well as a comprehensive examination of the environmental problems in the legislation, planning and management. The implementation of the economic criteria should be based on the develop of economic and ecological account system , efficient use of available economic instruments and market conditions, such as the green procurement, green tax reform, green jobs [4, 5].

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MODELLING OF THE BASIS OF SOIL OF VARIOUS RIGIDITY

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The model of the basis of soil of various rigidity which provides rigid structure is offered and represents a monolith which doesn't give in to shrinkage. It is an important factor for design of highways as the problem of shrinkage of the basis is actual today. For a thorough assessment of soil, we have to go deep into structure of a monolith, into its packing, and also consider boundaries steam channels.

In one of his books the American scientist James D. Watson not without humor and a fair share of sarcasm tells about, how he together with British Frensis G. Shout and Maurice X. F.Uilkinsom opened structure of a gene spiral. These three scientists received the Nobel Prize in 1962 for this discovery. If to trust Watson, he carried out the most part of time in search of entertainments and only sometimes for own pleasure reflected on how to construct gene model of small balls. The task consisted in that, knowing approximate number and sequence of an arrangement of atoms in DNA molecule, to construct its model of balls and cores. The sizes of balls in model corresponded to the extent of atoms in DNA molecule. Their work which has become nowadays classical, – a striking example of how, playing balls, it is possible to get the Nobel Prize.

In a chain of reasoning about the most dense spherical pickings somebody was come, probably, to mind by thought that such pickings are capable to arise not only by careful laying of atoms one to one, but also is casual. For the sake of experience it would be possible to take a box with spheres, to shake it properly and then to investigate packing structure. Such experiment also was carried out. However, thus, the densest packing of spheres with volume filling in 74% never turned out, usually density of packing made about 60%. It is obvious, that crystals get the structure not in a random way, and there is some regularity. Not by gift a paper bag with peas or grain it is always used only for 50 – 60% of the volume.

Fritz Laves investigated the Dutch crystallographer a question of what most friable (least dense) packing of atoms, in general possible in crystals. It after all has to be constructed so that some atoms nevertheless adjoined among them, differently there won't be able to be a firm body. Laves came to a lattice with volume filling to 5,5%. However in the nature, apparently, such crystals don't exist.

After scientists understood a structure of crystals, they undertook determination of their theoretical durability. It in principle is very simple. Between atoms the communication forces which size with a sufficient accuracy is established by physics of a firm body work. From such private forces, naturally very small, there are general total forces. Wish to break off someone a metal crystal and it should overcome these total forces of communication.

Whether it so means, what the theory of forces of communication in crystals is incorrect? Some generations of researchers reflected over this question. Calculations and experiments validated theories. However packing of crystals, alas, isn't so faultless, as in a case with our balls for Ping-Pong. And here too it is found out that though the nature is in general constructed symmetrically, in trifles it allows deviations.

All our crystals contain defects, or as tell crystallographers, dislocations. Theoretically these dislocations reduce the possible durability of crystals more than by 90%. Now we already learned to grow up quite or nearly the faultless crystals, which durability 10 times more values, than at earlier known materials. Unfortunately, such crystals are very insignificant. Once you grow up them larger, again there are defects. In equipment similar faultless high-strength crystals of metals or carbon call threadlike. There is no doubt that in the foreseeable future it will be possible to create methods of production of faultless materials of the big sizes.

Nevertheless we can state the following: time in real crystals symmetry "up to the last atom" isn't maintained, it is impossible to use the theoretical values of durability calculated for ideal crystals. As soon as the problem of creation of faultless materials commercially, our bridges, railway cars, cranes and will be solved [1].

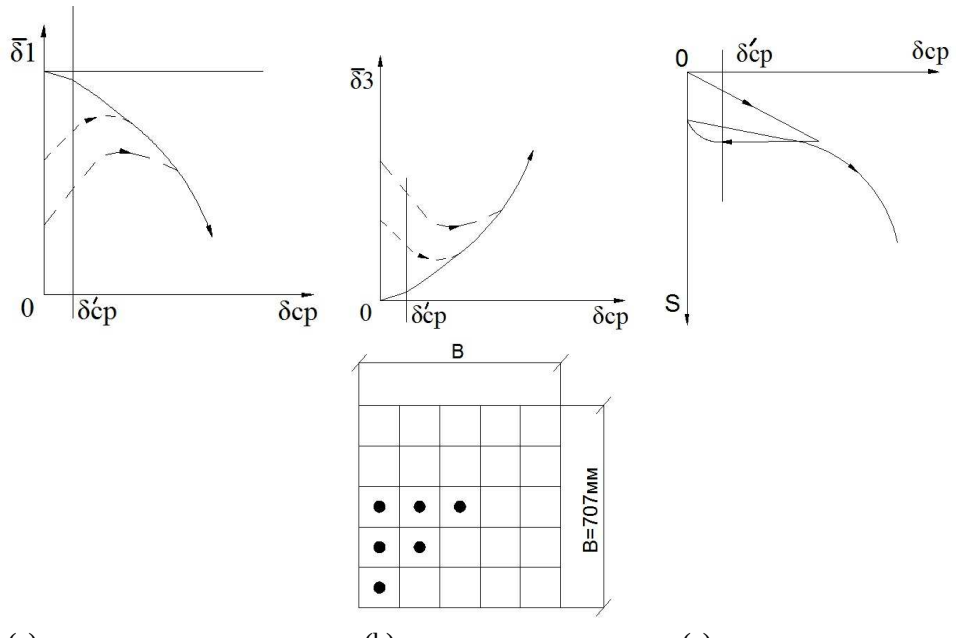
To reproduce static work of the model similar to work of a construction in nature in experiment, it is necessary that materials of models of separate parts of a construction and the basis had the same ratio of rigidity that willows to nature. Rigidity of rocky materials and concrete in calculations can be estimated in sizes of their modules of elasticity of E. Sledovatelno, it is necessary to apply materials to separate parts of model of a construction and its basis, the ratio of which modules of elasticity would be approximately same, as well as in nature. For example, if the module of elasticity of the rock appears twice less, than at concrete, in model of the basis it is necessary to use a material with the elasticity module twice smaller, than at a material of model of a construction. Existence in the basis of layers from materials with various mechanical characteristics is reproduced on model materials of various pliability.

Thickness of model of the basis on each site is appointed proportional to a ratio of modules of elasticity of materials of considered sites of model.

On model the part of the basis of a construction so-called "an active zone" outside which tension and deformations of the basis it is insignificant can be reproduced only are small [2].

On picture 1 (a, b) the continuous line showed trajectories of change of dimensionless ordinates in points 1 and 3. At cyclic loading unloading in a static mode of the loading, carried out within work of basis redistribution of contact tension with a tendency of smoothing of a form эпюры and its approach to more uniform is observed.

The ordinate of distribution diagram in each characteristic point has the main branch of change (the continuous line on rice 1, a, b), defined by behavior of basis at the first loading. At repeated loadings change of ordinate is characterized by a redistribution branch (a dotted line on fig. 1, a, b).



(a) (b) (c)

Fig. 1

Regularities of change intense the deformed condition of the basis at the first and repeated loadings testifies that as theoretical model of the incoherent soil environment it is necessary to accept model of an elastoplastic bodies with hardening. As justification the following features serve:

a) the schedule form a precipitation of the basis is characteristic for deformations of an elastoplastic body with hardening;

b) there is no unambiguous communication between the size of external loading, the contact tension and a basis precipitation to the same average pressure upon the basis σcp there can correspond an uncountable set of values a deposit. (fig. 1, c) and ordinates distribution diagram contact tension (fig. 1, a, b), depending on background of loading.

The solution of a problem of increase of durability the primer concrete of massifs and reliability of antifiltering veils at development of underground space, their stability at various aggressive influences, possibility of management of curing process in the conditions of low positive and negative temperatures, is reached by use of impregnating compositions on the basis of the fine mineral knitting. The analysis of the world market of construction materials showed that receiving fine mineral compositions by a way of air separation the ground mineral components can be previously the most effective solution of objectives.

Theoretically also possibility of increase of physic-mechanical properties of soil and defective underground parts by impregnation by the nanomodified suspensions on the basis of fine knitting with a size of grains from 0,2 to 6 microns is experimentally proved. The colloidal solutions which were formed thus as a result of hydration with a size of particles of 1 – 100 nanometers, have high level of superficial energy and serve as the crystallization centers as on a surface of steam space of an inject material, and in steam space promoting formation of the crystal joint consisting of hydrous silicate of various basicity, hydrous silicate of calcium, Sa (IT) 2, hydro aluminum sulfate and hydro sulfate calcium. Thus, the main volume of products of hydration is presented by gel structure in which dispersive phases are субмикрокри-сталлы calcium hydro silicates [3].

Wells of 1 (fig. 2) drill from two parties of a road bed 2. In the course of drilling the polymeric punched upsetting pipe 3 through which the polymeric structure forming with strengthened soil cylinders 4 is forced under pressure is inserted into a well. Couples of wells are drilled from one point to the right and to the left at an angle, for example 45°, to an axis at distance from each other, for example 4 m. The distance choice between wells is defined by need to provide uniform distribution of forced polymeric structure under all strengthened platform of a cloth. The spatial design consisting of two lattices is as a result created [4].

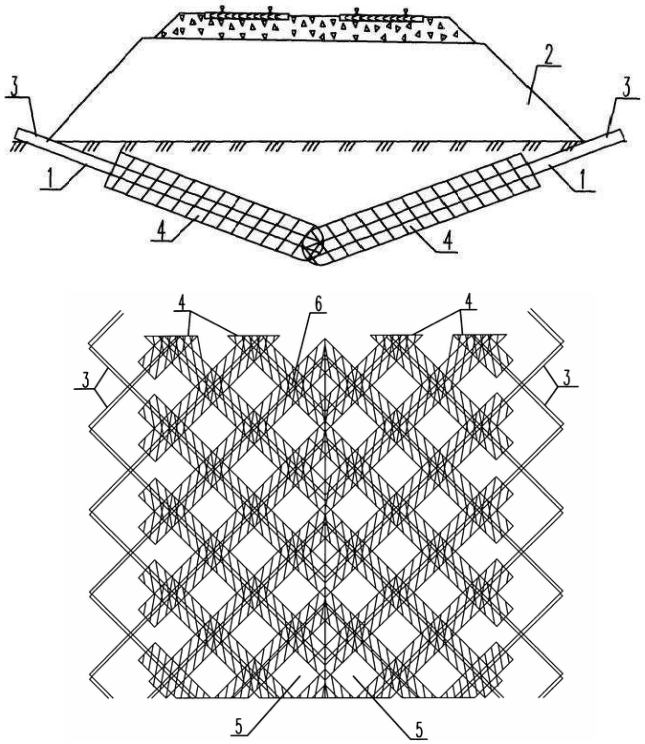


Fig. 2. Limiters of a mortar of soil:
1 – well; 2 – earthly linen, 3 – polymers the punched pipe; 4 – cylinders; 5 – grid; 6 – grid

On these researches we created the option of model which consists of packing of spheres through which time there passes a concrete mix and the monolith (fig. 3) is created.

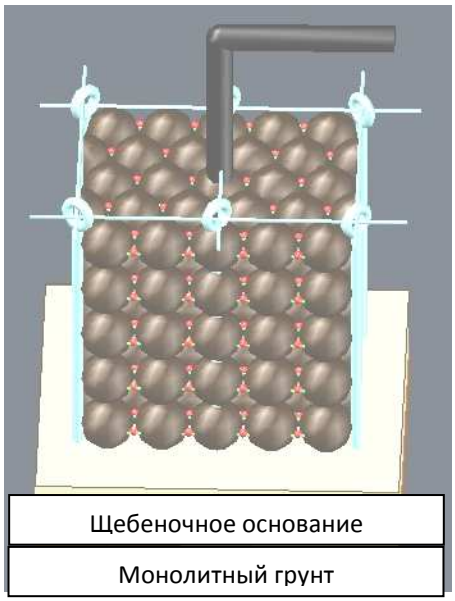


Fig. 3. Model of packing of spheres

We created the road which meets the requirements which we put before ourselves. Namely: to create soil of various rigidity, to create the monolithic basis and the main thing, the road which can be applied in design presently (fig. 4).

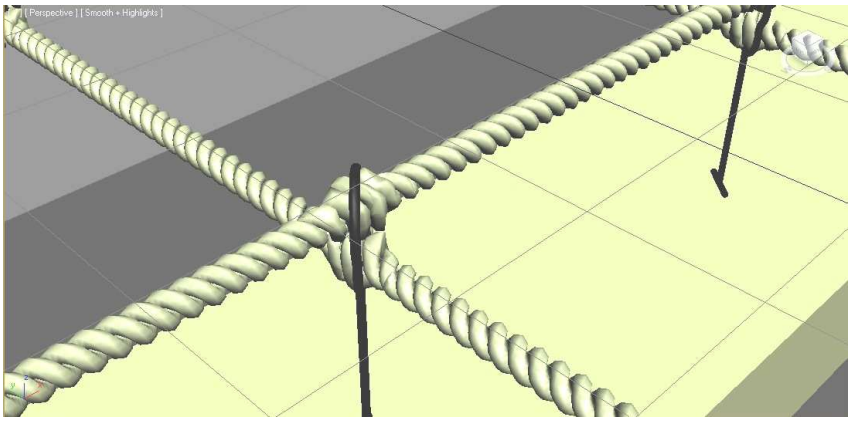


Fig. 4. Highway

Modeling of the bases of soil of various rigidity represents process of creation of the nonshrinking, strong highway which can come instead of existing roads. At the basis we have soil and rubble which provides rigidity of the basis and above we use a mix which represents set of various layers. In our opinion, such scheme of design of the highway is successful and it will be used in practice.

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