frequently associated with tears of gods or beauties. The only stone mentioned in legends as petrified tears more than pearl is *amber*. In order to prove the point, let's take a slant on Baltic legend about sea nymph's empress called Jurata. She lived in water depth but loved to look at sunsets on the sea surface and one day she saw a young fisherman and felt in love with him. Unfortunately, her father did not approve her choice and killed the fisherman. Ever since, Jurata bewails her lover and her tears, turned into magic pieces of amber, are washing ashore by sea waves [8].

On the contrary, next stone is usually associated with fire. *Asbestos*, finely-fibred mineral, is popular with its exceptional characteristic – it cannot be exposed to combustion. Such unusual quality is embodied in legends about magic beasts all over the world, e.g. a salamander rat, which lives in fire. As salamander rat's fur does not burn in fire, asbestos is sometimes called "salamander's fur". In the same way, some of Ural tales confirm that Mistress of the Copper Mountain wears asbestos-woven hulls [7].

Speaking of the Mistress of the Copper Mountain, we could not bypass *malachite*. Pavel Bazhov who was Russian writer and folklorist wrote a series of fairytales about the Mistress. In accordance to his writings, the Mistress lives inside a cliff, where everything is made from malachite. She is proud-spirited and steadfast, sometimes even ruthless, however only few people of good character can avoid her anger and pick up generous award [1].

One more beast which is consistently mentioned in the same breath with salamander and the Mistress of the Copper Mountain is the Great Snake, the guardian of gold. Once a year the Great Snake sloughs off his old skin and when it hardens it becomes a *serpentine*. Apart from this, not only in Ural tales serpentine is associated with snakes, even serpentine's name recalls to snakes as for example in Latin it sounds like "*serpens"* which means, as you can guess, "a snake". And, to some degree, it's not that surprising because serpentine indeed looks like a snake skin. In contrast to, there is a Christian version of serpentine's appearance. Pursuant to this version, when Adam ate a forbidden fruit he choked and spited it out. The leftover bit had turned into a serpentine [1, 5].

To conclude everything that has been said, it is noticeable that people ascribed divine origin to the most of stones. Depending on a country with its national identity and mentality different versions were created. In Europe, Egypt, Russia and in other west countries stones were usually created or given as a present to the mortals by gods. Alternately, in such countries of East as Japan or China legends about stone's appearance from god's guts or body parts were quite widespread. It could be a link between special focus of eastern people at human's inward and such legends.

It must not escape our attention that tales about pearl and amber are tend to be almost the same. Besides that contemporary science does not qualify pearl and amber as minerals, also in all legends they're described as petrified god's or demigod's tears. As legends about these stones are as like as two peas, it is fair to assume that our predecessors had noticed the exceptionality of amber and pearl.

Obviously, in this article not all the stone legends were mentioned, but the research is still in progress, so in the foreseeable future the continuation will be definitely written.

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## UNDERWATER AND ABOVE GROUND PIPELINING

**E.V. Sonina**
Scientific advisor associate professor G.P. Pozdeeva
***National Research Tomsk Polytechnic University, Tomsk, Russia***

Oil and gas sector determines the stability of social and economic development and potential of the world and Russia's national economies. The pipeline transport system a key link in engineering and manufacturing of the oil and gas industry. Development of the pipeline transport system is to efficient and rapid growth of the entire oil and gas sector.

Water body crossing via the pipeline transmission system is of two types which are above-ground and underwater pipelining.

1. Above-ground pipelining

Normally, when narrow width crossing, above-ground pipelining is performed. Depending on the type of pipe laying or crossing, pipelines may be classified into[1]:

- suspended;
- arched;
- girder-type

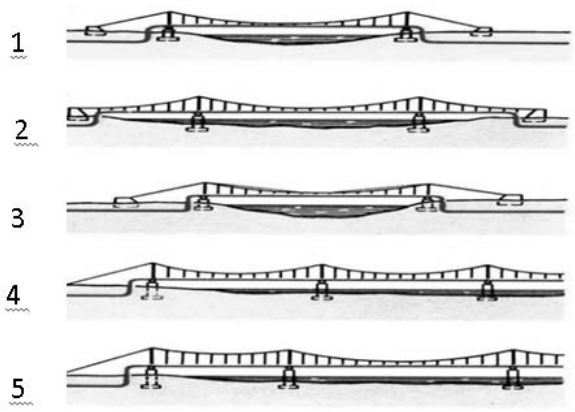


***Fig. 1. Scheme of the flexible suspended pipeline: 1 and 2 - single span and circuit; 3 - doublecircuit; 4 – multiequally sized span; 5 – multi non-equally sized span.***

1.1. Suspended Pipeline

Due to the above-ground pipeline design, the following suspended types are observed: flexible (Fig. 1), slack-line (Fig. 2) and cable-stayed (Fig. 3).

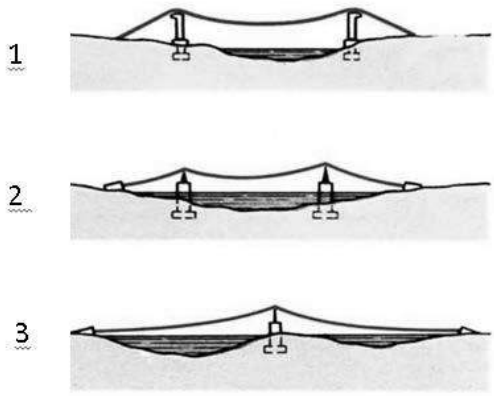


***Fig. 2. Scheme of the suspended slack-line: 1 cable-braced single-span; 2 three-span; 3 two-span with onepile.***

In the flexible and suspended systems pipeline is attached via piping hangers to one or more suspension lines slung over the piles. The disadvantage of flexible systems is their low vertical stiffness. Consequently, when dynamic loadings (e.g. wind) are have to be sustained, the flexible systems can oscillate with increasing amplitude and result in the metal pipe overvoltage [2]. In the cable-stayed systems, the pipeline is held in a vertical position by the suspension cables, and horizontally by rigid girders and braces, providing pipeline geometric shape when oscillatory motion occurs.

1.2 Arched pipeline

Arched pipelines are usually applied when canal crossing with a calm steady flow.

From both sides, steel-concrete supports are constructed and arched crossing is mounted of enlarged units (semi-arch) via various hoisting devices. When mounting arched pipelines over roads or railway lines, rotation construction method on sheer leg is applied for. Normally, arched pipeline crossing is designed from doubled pipelines to create a greater rigidity andstability.

1.3 Girder-typepipeline

Setting the girder crossing pipeline on the supports (girder crossing) is performed in two stages. The first stage: supports setting, which can be reinforced concrete, masonry work, steel, wood, etc. In the second stage, the pipeline is mounted on set supports. As a rule, a mount is carried out by sliding, but also methods with floating cranes and other mounting devices can be applied.

The advantages of above ground pipeline crossing are the opportunity to facilitate technical state control of the metal pipe as well as corrosion protection. The particular pipeline crossing scheme depends on the pipe diameter, easy maintenance and hydrological conditions of watercourse.

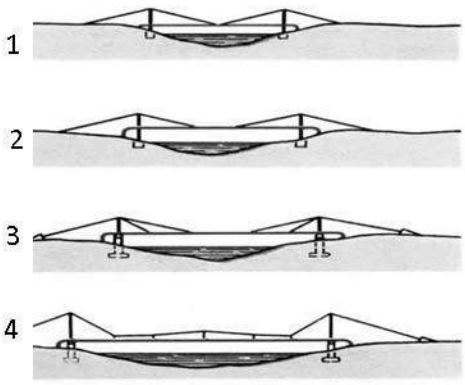


***Fig. 3. Scheme of the cable-stayed suspended pipeline: 1, 2, 3 - with inclined cables; 4 - with cable girder.***

2. Underwater crossing

Underwater line design is based on long-term geological, geographical, geological and topographical surveys, taking into account the production conditions in the previously built crossing areas; hydro-technical utilities, affecting the water course at the intersections and advanced dredging as well as requirements for fish resource protection. Pipelines across rivers and canals should be installed downstream from the bridges, industrial facilities, piers, river stations, as well as spawning sites and areas of mass fish habitat. The minimum distance from the underwater lines axis to above-mentioned facilities and from the underwater gas pipeline axis, is the same as for underground pipeline [3].

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## GROUNDWATER CHEMICAL COMPOSITION OF APTIAN-CENOMANIAN AQUIFER SYSTEM DUE TO SCALE DEPOSITS IN KAYMISOVSKY AREA (WESTERN SIBERIA)

**T.S. Siridonov**
Scientific supervisor, professor E. M. Dutova, Advisor, R.N. Abramova,
***National Research Tomsk Polytechnic University, Tomsk, Russia***

Scaling emerging on oil facilities during field development and production– is a multifaceted and complex process, especially in cases of well watering. Salification leads to decreasing well productivity, downhole pumping equipment, damage resulting in non-scheduled workovers, which, in its turn, furthers low technical and economic indicators in oil production enterprises. The study of the chemical composition dynamics of produced waters is needed to predict scaling in oilfield equipment. Improving production efficiency is directly interrelated with identifying inorganic salt deposits in production wells. Due to the fact that today numerous oil fields in Russia are under intensive flooding, the study of scaling is important [2]. In view of such a practical importance, scaling in Western Siberia has been studied by many researchers. Most works on this subject were published in the first decades of 2000. Tyumen Oil and Gas University research team headed Semenova T. V. made an attempt to trace the change of ion-salt composition of formation waters at the stage of oil field development. Another group of scientists Galeev R. G., Diyashev R.N., Sattarova M. F., Potapov S. S. from different research institutes conducted a study of the mineral composition to identify the causes of scale on equipment. The staff of the Institute of Oil and Gas Problems RAS: Abukova L. A., Ivanova A. E., Isaeva G. W. studied this problem in perspective development of oil fields. They developed automated selection method of investigate mineral scaling in reservoir and downhole conditions. Forecasting intrastratal deposits of sulfate salts during oil extraction was conducted by Arkhangelsk State Technical University staff under the supervision of A. I. Babikova. Also close to the scaling problem faced A team of researchers of Russian State University of Oil and Gas n.a. I. M. Gubkin: Ivanovo V. N., Sabirov A. A., Gerasimov, I. N., Klimenko K. I. and others also tackled the problem of scaling by developing hardware-software complexes to protect downhole equipment.

Waterflooding of the productive zones- is the main method in oil field development. Geochemical rock formation interaction with injected water leads to emerging produced water saturated with inorganic salts [1]. The most common components of scale deposits is calcium carbonate, calcium sulfate and barium sulfate, usually a mixture of several components with minor terrigenous particles or corrosion products. The scale formation involves several stages beginning with saturated solution as unstable clusters. The atomic clusters convert into fine crystal nuclei, forming initial crystallization zone. These crystals gradually grow as a result of the adsorption of ions within damaged areas. Increasing