# Reliable Aluminium

## *A well cannot be developed without metal*

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A technological boom, which our country went through in the early 1960s, was caused by the intense interest in space and avi-ation sphere. At those years the approaches to advanced developments in many high-technology industries were being formed. Among others there was an oil and gas industry with its drilling sector. Some oil and gas fields in the hard-to-reach areas of Siberia and high North were developed. The turbine motor drilling (slide drilling) was pro-actively developed. The lightweight drill pipes– made of aluminium alloys assembled with steel tool joints – were designed by the engineers specifically for such drilling procedures.

The experience of using lightweight drillpipes was successful: in USSR up to 70% annual drilling capacity was achieved bythis method in 1980s. Almost all the main fields were developed with lightweight drillpipes. A separate sphere is long-hole and super-long-hole drilling. For example, the design of aluminium drillpipes was successfully tested while drilling the Kola Superdeep Borehole (bore deep is 12,262 m, the temperature is up to 220 ˚C).

Kamensk-Uralsky Metallurgical Works JSC (OAO KUMZ) is fated to be the majorlightweight drill pipe manufacturer. These products were a special focus.

The unique capacities allowed the production of pipes of sophisticated configuration (with variable cross section along the length). In 1975 four stages of KUMZ pipe extrusionfacilities were launched such as horizontal hydraulic presses, stretching and straightening machines, furnace facilities and machinery. In 1978 thealuminium alloys drill pipes output reached the estimated capacity of 30,000 tons annually.

What's the difference between lightweight drill pipes and steel drill pipes? A long-term experience of their utilization has proven that lightweight drill pipes have a number of unique properties. Among them they include low specific weight, a greater ratio of weight-saving in the drilling mud and low shear and elastic modulus. It shouldn't go unnoticed that there is a trivial loss of strength characteristics at temperatures up to 120-220 ˚C, lower friction coefficient in standard drilling muds andhighspecificstrength. Beside that there is a lower flow friction coefficient, higher damping capacity (ability to absorb and dissipate the elastic oscillation energy), 'easy' drillability, and higher corrosion characteristics (total absence of corrosion damage in the environment saturated with hydrogen sulfide and carbon dioxide).

Lightweight drill pipes allow to reduce resistance force of moving the drill stem (it enables thedeviated wells or horizontal wells with big deviation from vertical line), and also to increase build-up rate while building deviated or horizontal wells.

Specialists know that lightweight drill pipe can be a damper (vibration absorber) of longitudinal vibrations caused by bore bit. The pipes enable geophysical survey through the drill stem, and they can be used as a technological set while running and cementing the casing liners.

Aluminiumlightweight drill pipes of variable cross-section can be made in any configuration including tread thickening in the middle (that protects against wearing while drill stems rotating, promote their centralization in the bore hole, and increase the critical compression rate that causes longitudinal stability loss).

The development of offshore fields is much focused on over the last years in our country. And methods of drilling the long-distance horizontalwells with the lightweight drillpipes are emphasized specifically. There are some projects abroad where the well drilling is performed off-shore spreading up to 17 km. For this drilling, the derrick is placed on rails and transported along the shore. Thus, this method enablesdozens of wells to be drilled in the sea bottom.

It provides the great saving of financial resources and a far cry fromthe platforms and their infrastructure arrangement.

The important condition, as the drillers themselves say, is the high potential of the lightweight drill pipes in well construction. It contributes toless timing forround-trip operations (20 to 25% cut in case of simultaneous multiple energy cost reduction on their realization), in reduction of the drill stem weight by several times, in using derricks of less carrying capacity including mobile unit. Besides, the maximum safety margin of a drill stem can be reduced for more than 20% with simultaneous decrease oftotal hydraulic losses in well minimum for 15 to 25%, as well as the flush pumps of lower power capacity can be used.

It should be noted that the wide using of lightweight drill pipes is constricted due to the stereotype of the supposed high price.

Meanwhile, it makes sense to make a simple example. One ton of lightweight drill pipes is more expensive than one ton of steel pipes for 40 to 50%. But it takes almost as much as twice in linear metres of production out of lightweight drill pipes than insteel tonnage. In addition, the expired lightweight drill pipes arerefunded significantly higher. Presently, the transportation cost of used steel pipes is higher than the cost of scrapped ones. The refund for lightweight drill pipes reaches 15%.

The initiative and direct support of the Aluminium Products Managing Company and the Engineering Services of OAO KUMZallowed «BurilnyeTruby» LLC to implement a program of technical development with the capacity over RUR 100 millionfor two years of their operation. The vast majority of expenses and resources were accounted for by the staged implementation ofNeftegaz investment project. Currently, drill pipe finishing line had been built and assembled and is operatingunder the project. To hold the ultrasonic inspection of drill pipes, the unique equipment with no counterparts in the world is commissioned. Cold-assembly and hot-assembly lines and CNC mills have been installed and are operating now.

The essential trend of the Neftegaz project is to establish the quality system to eliminatefaulty productsdeviations from the customer requirements. All the technical parameters of every product are controlled along the all processing chain. The majority of the machines operate in the automatic mode providingno human factor affectingmost operations. No customer claims can be considered as investment activity outcome. Our customersamong others areSurgutneftegaz, OOO BurovayaKompaniya Eurasia, SGK-Burenie, Oil Transporting Joint-Stock Company Transneft, Bashneft Joint Stock Oil Company, TNK-BP Oil Company, Lukoil, and Integra Group. The number of customers of «BurilnyeTruby» LLC has increased as much as 4 times lately.

It should be noticed that the development of the production and technical facilities has increased our product range. There had been mastered the manufacture of 32 new types of products in 2007-2008.

Apart from the traditional production of the standard drill pipes, some field (conveyer) pipes and tubing were commissioned. The range of drill pipes was complementedbydrill collars and external helically-finned tubes.

During all this time the company has been cooperated with research institutes of the sector, together they developed new products (for example, aluminium casing for high hydrogen sulphidewells). Some sampling pipes, casings for telemetric systems and lots of nonstandard products (such as tool joints of new design) have beenlaunched since the start of this year.

«BurilnyeTruby» LLC, certainly, adjusts its specific market demandin 2009. New orders that had not been made before were placed that moment such as special pipes for well workover operations and pipes for horizontal drilling. Among our customers we have thosethat utilized steel pipes only.

Our cooperation with ENI, the well-known Italian company, started in 2006. Some interesting results were received during the test boring with the drill stem in the Italian Peninsula and in the South America. The second stage is up nextsuch as the production of a second drill stem of unique design.

«BurilnyeTruby» LLC is engaged in negotiations about cooperation with the top oil and gas operators in the world. The time has shown that the using of lightweight drill pipes gives significant advantages to the companies of the sector. And there is no doubt that the production of «BurilnyeTruby» LLC has good market prospects.

**The photo of production at «BurilnyeTruby» LLC**

**In 2007 «BurilnyeTruby» LLC became an individual entity of Kamensk-Uralsky Metallurgical Works JSC (OAO KUMZ), the leading Russian manufacturer of aluminium alloy semi-finished products,at the initiative of Aluminium Products Managing Company to controlthe business of OAO KUMZ.**

**«BurilnyeTruby» LLC was founded on the basis of the KUMZ pipeextrusion facility and is aimed to extend the range of products and services for the oil and gas industry in Russia.**

**The Company managed to get the status of state-of-artglobal leading manufacturer of pipes from specific aluminium alloys for two years of operation. «BurilnyeTruby» LLC has a big client base, constantly enhances its technical potential, and enlargesown product range.**

**All of this allows this company, small in term of current standards, to take exclusive power on the market.**