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Методическое пособие
"ТЕКСТЫ ПРОФЕССИОНАЛЬНОЙ НАПРАВЛЕННОСТИ"

для студентов 3, 4-х курсов
по специальности среднего профессионального образования
21.02.02 БУРЕНИЕ НЕФТЯНЫХ И ГАЗОВЫХ СКВАЖИН

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Аннотация

Методическое пособие «Тексты профессиональной направленности» по специальности среднего профессионального образования 21.02.02 Бурение нефтяных и газовых скважин (далее – Пособие) разработано на основе Федерального государственного образовательного стандарта (далее – ФГОС) по специальности среднего профессионального образования (далее – СПО): 21.02.02 Бурение нефтяных и газовых скважин. Пособие представлено на 27 листах.

Целью методического пособия является формирования знаний, умений и приобретения практического опыта в переводах текстов профессиональной направленности, а также работе с ними.

Задачи:

- развитие интереса у обучающихся к решению задач нестандартного вида;
- развитие активной творческой деятельности студента;
- формирование навыков самостоятельной работы, работа с литературой.

Актуальность разработки. На протяжении курса английского языка студенты учатся решать различные профессиональные задачи в нестандартных ситуациях. Для работы с оборудованием и инструкциями зачастую необходимо знание терминологии на английском языке.

Методическое пособие можно рекомендовать преподавателям СПО как в аудиторной, так и во внеаудиторной работе с обучающимися по специальности среднего профессионального образования 21.02.02 Бурение нефтяных и газовых скважин. В конце представлен список основных терминов, употребляемых в текстах.

Содержание

Введение

Методическое пособие составлено в соответствии с рабочими программами социально-гуманитарной дисциплины «Иностранный язык» по специальности 21.02.02 Бурение нефтяных и газовых скважин, утвержденной в ОГБПОУ «Томский политехнический техникум».

В Пособии даны примеры текстов профессиональной направленности, составлены словари лексических единиц к каждому тексту и даны упражнения для отработки полученных знаний.

В результате изучения Пособия у выпускника должны быть сформированы общие компетенции:

- *ОК 2* организовывать собственную деятельность, выбирать типовые способы выполнения профессиональных задач;
- *ОК 4* осуществлять поиск и использование информации, необходимой для эффективного выполнения профессиональных задач, профессионального и личностного развития;
- *ОК 5* использовать ИКТ в профессиональной деятельности;
- *ОК 8* самостоятельно определять задачи профессионального и личностного развития, заниматься самообразованием, осознанно планировать повышение квалификации;
- *ОК 9* ориентироваться в условиях частой смены технологий в профессиональной деятельности

Также будет приобретен практический опыт перевода и понимания профессиональной терминологии. В связи с этими требованиями к выпускнику Пособие дает понятие и практический опыт работы с текстами профессиональной направленности и с терминологией в соответствии с получаемой профессией.

INTRODUCTION

TEXT 1. OIL AND GAS TODAY

The oil and gas industry employs hundreds of thousands of people worldwide. Many teams have a mixture of nationalities so that English is often the language used, and is often specified for formal communications. Although most of the world has adopted an international measuring system and measures volume in litres, the oil industry often uses the US barrel as a measure even though most oil today is never contained in a barrel. The sector of the oil and gas industry from discovery and drilling to production and refining is known as the upstream sector. Initially, producing countries allowed trading countries (USA, Britain, and Holland) to exploit their oil as a raw material. But they needed to control their own resources commercially and they realized the advantages of processing their crude oil locally to increase the value of the product. They built their own refineries where the crude oil is separated into different forms and converted into different products.

The production of oil and gas has become a major element in international relations and politics. A large part of the industry has developed, transporting oil and gas from the producing countries to consumers and this is sometimes referred to as the midstream sector. The processing of oil into different products is known as the downstream sector. The products include the different fuels required for cars, trucks, and airplanes, fuel for power stations and heating, the basic material or feedstock for plastics, fertilizers, pharmaceutical, and the asphalt that covers our roads. Oil and gas are finite resources and because of the increasing scarcity of oil and gas, concern for the environment, and concerns over security of supply, a huge effort is being made to develop alternative sustainable sources of energy, but the skills of the people working in the oil and gas industry across the world will ensure that oil and gas will be available to us for many years to come.

EXERCISE 1. Answer the questions (write or speak)

1. What measuring system is used in the oil and gas industry?
2. What do “upstream sector”, “midstream sector” and “downstream sector” mean?
3. Is the oil and gas industry environment friendly?

EXERCISE 2. Give English equivalents to the Russian words and word combinations:

Нефтегазовая промышленность; очистительные сооружения для нефти; безопасность поставки нефти и газа; международная измерительная система; сырая нефть; переработка; топливо для электростанций и отопительных систем.

EXERCISE 3. Match the words with the appropriate definition

A supply	1)	a type of substance like air and usually cannot be seen
B stream	2)	to break or divide up into the parts
C to separate	3)	to make pure
D to refine	4)	something flowing or moving forwards continuously
E gas	5)	to provide something that is needed

TEXT 2. OIL GAS AND ENVIRONMENT

The picture many people have of the oil industry is a negative one of disasters reported in the media oil slicks from tankers, birds covered in oil, oil gushing from the ground, or pillars of smoke rising from a fire. The truth is very different. The world's daily consumption of oil is around 90 million barrels, and the overall impact of its production is very low. The industry puts environmental protection high on its list of priorities. From planning the recovery of new resources, through design and construction and operation and eventual decommissioning and disposal of assets, all aspects of the environment are considered in order to minimize the industry's impact. Before licences are granted by governments for exploration or production of reserves on their territory, oil companies must demonstrate how the particular environment will be protected. The companies also have an obligation to consider the impact of their operations on the global environment.

Many desert and arctic areas are home to fragile, unique plant and animal species. Oil companies have their own specialists and work with other local and international experts to study the particular environment and how it should be protected. Soil protection, breeding and nesting sites, and migration routes have to be preserved from the disruption caused by exploration and production. When permanent installations are constructed, they are usually planned to operate for periods of around twenty years. Often large amounts of cooling water are used that may change the environment. More favourable conditions may be created for invasive plants or different species that can overwhelm native species. Waste materials have to be disposed of safely. Another perception of the industry is symbolized by the flaring of gas. There are international agreements to minimize flaring to decrease pollution and conserve resources, but flaring will always be required for emergencies to

dispose of unwanted gas safely.

Companies also have to allow for unplanned events and emergencies. Designers must provide controls and instruments to allow for equipment failures. Plant must be designed to allow for unlikely but possible severe conditions that might only occur every twenty years, for example, extreme wave heights, extreme temperatures, or earthquakes. Technical and management systems have to be in place to ensure that the harmful effects of human error in operating procedures are minimized.

Many installations are close to residential areas, and apart from the safety implications, companies must minimize traffic, noise, and odours and generally develop good neighbourly relations. Most companies are keen to sponsor local events, educational initiatives, and opportunities to listen to local opinion and advice. Major oil companies realize that their long-term future is in more sustainable forms of energy. Far-Sighted companies have the financial motivation, resources, and the expertise to make a major contribution to the global environment.

EXERCISE 4. Answer the questions:

1. What disasters are facing the world of today?
2. What ways are there for environmental protection in the companies?
3. Who is responsible for minimizing harmful effects of human error in operating procedures?

EXERCISE 5. Give English equivalents to the Russian words and word combinations:

Нефтяные пятна; клубы дыма; ежедневное потребление нефти; благоприятные условия; отходы должны быть надежно утилизированы; сжигание газа; чрезвычайная ситуация; вредные воздействия; устойчивые источники энергии.

EXERCISE 6. Translate the following sentences into English:

1. Защита почвы, размножения и мест гнездования и путей миграции должны быть сохранены от разрушения, вызванного разведкой и добычей.
2. Компании обязаны учитывать воздействие их деятельности на окружающую среду.

PART 1. DRILLING PROCESS

TEXT 3. What is a drilling process?

Drilling is a process of well construction by means of rock crushing. A well or a hole is a

cylindrical mining cavity constructed without access of people and having diameter many times less than its length. By level of development oil and gas fields can be classified into green fields and brown fields. Key types of wells in terms of their purpose include: wildcats, exploration wells, production wells, injection wells and observation wells.

Wildcats are drilled in order to discover new commercial deposits of oil and gas.

Exploration wells are drilled in areas with established commercial oil and gas production potential in order to survey the deposit size and structure, obtain required initial data in order to calculate oil and gas reserves, and also design its development.

Production wells are spudded in compliance with deposit development well spacing. They are used to recover oil and gas from subsurface reservoirs.

Injection wells are used to inject water (sometimes air or gas) into producing horizons in order to maintain formation pressure and prolong flowing period of field development. Observation wells are drilled to control development of commercial deposits. Depth of drilled wells may change from 800 to 8000 meters depending upon location of oil-bearing formation. Briefly it can be said that well drilling requires a bit rotating on the well bottom and crashing the rock, and making up of new drill pipes as the well deepens. Drilling is performed with a drilling rig.

Drilling unit is a set of drilling machines, mechanisms and equipment mounted in the drilling location and providing for process operations associated with well construction using drilling tools.

By method of impact on rocks drilling can be divided into mechanical and non-mechanical. In mechanical drilling tools directly impact the rock and crush it, and in non-mechanical drilling rock crushing is performed without direct contact between the rock crushing source and the rock.

By wellbore direction drilling can be divided into vertical, directional and horizontal.

Vertical drilling is a type of drilling, in which the well is drilled vertically in relation to stratification. Directional drilling is a type of drilling, in which the well is deviated in relation to stratification.

Horizontal drilling is a type of drilling, in which deviated well gradually becomes horizontal, for example, when two oil-bearing formations should be connected. Drilling with an angle to vertical line to reach the drilling target is called extended reach drilling. Any well penetrating formation along stratification can be called horizontal; meanwhile vertical wells are drilled obliquely to stratification. Thus the wells, penetrating vertically located formations with vertical wellbores are considered to be horizontal wells.

EXERCISE 7. Give Russian equivalents:

level of development oil and gas fields, green field, brown field, wildcat, exploration well, injection well, observation well, directional drilling, oil-bearing formation, to reach the drilling target, extended reach drilling, stratification.

EXERCISE 8. Scan the text and the English equivalents of the following expressions. Consult a dictionary if necessary.

1) разрушение горных пород

2) цилиндрическая горная выработка

3) сооружать скважину без доступа людей

4) участки с установленным промышленным потенциалом добычи нефти и газа

5) исследования размеров и структуры залежи

6) закачки воды в продуктивные горизонты

7) поддержание пластового давления

8) продление фонтанного периода эксплуатации месторождения

9) контроль разработки промышленных залежей

10) способ воздействия на горные породы

11) бурить скважину вертикально по отношению к напластованию

12) искривлять ствол скважины по отношению к напластованию

13) вскрывать пласт вдоль напластования

EXERCISE 9. Most of these sentences are wrong. Correct them where necessary.

1. Wildcats are drilling units used to drill exploratory wells.
2. Exploratory wells are drilled to control development of commercial deposits.
3. Production wells are spudded to recover oil and gas from subsurface reservoirs.
4. Injection wells are used to inject water or gas into producing horizons in order to maintain formation pressure.
5. By method of impact on rocks drilling can be divided into vertical, directional and horizontal.
6. By wellbore direction drilling can be divided into mechanical and non-mechanical.
7. Extended reach drilling and deviation drilling are similar.
8. Extended reach drilling is a type of drilling with an angle to vertical line and irectional drilling is a type of drilling with an angle to stratification, which is not always horizontal.

9. Horizontal drilling can be also used to connect two oil-bearing formations.
10. Any well penetrating formations along stratification can be called horizontal.

TEXT 4. Straight Hole Drilling

Frequently it is necessary to drill a straighter hole than was originally planned when the job was started with a certain string of drill collars. Also, it may happen that it is desired to put more weight on the bit without increasing the deviation. The best single proven way to do either of these things with the same string of drill collars is to add stabilizers. For deviation control a single stabilizer is sufficient if it is properly located in the drill string.

The proper location is the first bend in the drill string above the bit.

Since the bending point depends on the hole size, drill size and weight on the bit, it may occur at different points. To some extent the placement is also dependable on the formation characteristics.

It has been considered good practice in some cases to space additional stabilizers about one stand apart through a portion or all of the rest of the drill collar string. The additional stabilizers do not help to keep the hole straight. They do help in preventing wall sticking and other problems associated with hole conditions.

With the use of stabilizers, it is important to remember that stabilizers are usually the weakest point in the drill string and, therefore, subject not only to wear but failure. Some of the more modern stabilizers have been designed so that the wings do not create a serious hazard in the hole. For example, some of these are made of drillable material and some may be removed with washover pipe.

By reducing the weight on the bit, the bending characteristics of the drill string are changed and the hole will tend to be straighter. One of the oldest techniques for straightening a hole was to reduce the weight on the bit and speed up the rotary table. In recent years it has been found that this is not always the best procedure because reducing the bit weight sacrifices considerable penetration rate.

The straightening of a hole by reducing bit weight should be done very gradually so that the hole will tend to return to vertical without sharp bends and will therefore be much more safer for future drilling.

***Notes*:**

Bending point – точка перегиба

Penetration rate – скорость проникновения

Space – помещать, размещать

Washover pipe – обурочная труба

EXERCISE 10. Translate the text and make 10 questions to it.

PART 2. DRILLING DESIGN.

TEXT 5. Oil detection

How are subsurface deposits of gas and oil **located**? During the early days of drilling, it was thought that there were large, flowing underground rivers and subsurface **pools** of oil. Early drillers, however, had some success because many subsurface traps are **leaky**. There are small fractures in the caprock, and some of the oil and gas leaks up and seeps onto the surface. The early drillers located their wells on the **seeps**. By the early 1900s, the principles of subsurface gas and oil deposits were becoming better known. Oil companies realized that by **mapping** how the sedimentary rock layers **crop out** on the surface of the ground, the rock layers could be projected into the subsurface, and traps could be located (Fig. 1—3). Geologists were hired to map rock outcrops.

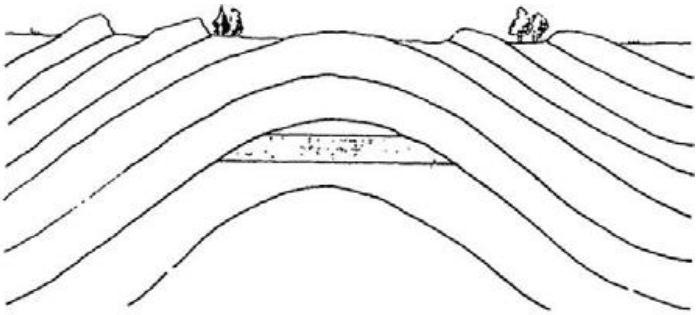

Fig. I–3 *Rock outcrops*

Later, **seismic method** was developed to **detect hidden** traps in the subsurface. Seismic exploration uses a **source** and **detector.**

The source, such as dynamite, is located on or near the surface and gives off an impulse of sound energy into the subsurface. The sound energy **bounces** off sedimentary rock layers and returns to the surface to be recorded by the detector. Sound echoes are used to make an image of the subsurface rock layers.

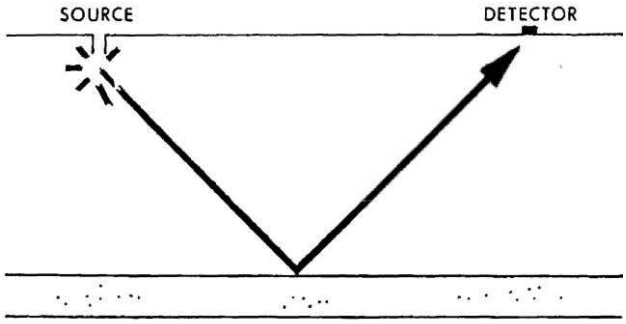

Fig. I–4 The seismic method

EXERCISE 11. Write down words in bold and translate them.

EXERCISE 12. Answer the questions:

1.What was thought during the early days of drilling?

2. Why does some of the oil and gas leak up?

3. How could the rock layers be projected?

4. What is the main principle of seismic method?

5. What are sound echoes used for?

TEXT 6. Drilling a well

The only way to know for sure if a trap contains commercial amounts of gas and oil is to drill a well. A well drilled to find a new gas or oil field is called a **wildcat** well. Most wildcat wells are **dry holes** with no commercial amounts of gas or oil. The well is drilled using a rotary drilling rig (Fig. 1-5). There can be thousands of feet of **drillpipe** with a bit on the end, called the drillstring, **suspended** in the well. By rotating the drillstring from the surface, the bit on the bottom is turned and cuts the hole.

As the well is drilled deeper, more drillpipe is **added**. The power is supplied by diesel engines. A steel **tower** above the well, the derrick, is used to raise and lower equipment. The well can be drilled either almost straight down as a straight hole or out at an angle as a **deviated well**.

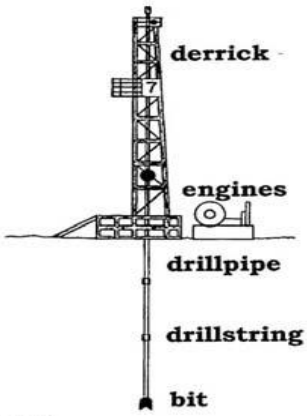

Fig. I–5 Rotary drilling rig

EXERCISE 13. Answer the questions:

1. What is the only way to know about the commercial amounts of oil and gas?
2. What is a drillstring?
3. How is bit rotated?
4. What types of well do you know?
5. What is derrick?

TEXT 7. Completing a well

Depending on the test results, the well can be **plugged** and **abandoned** as a dry hole or completed as a **producer**. Setting pipe is synonymous with completing a well. To set pipe, a long length of large diameter steel pipe (casing) is lowered down the hole. Wet cement is then pumped between the **casing** and the well walls and allowed to set (Fig. 1-9). This stabilizes the hole. In most wells, the casing is done in stages called a casing program during which the well is drilled, cased, drilled deeper, cased again, drilled deeper, and cased again.

In order for the gas or oil to flow into the well, the casing is shot with explosives to form holes called **perforations** (Fig. I—10). A long length of narrow diameter steel pipe (tubing) is then suspended down the center of the well. The produced fluids (water, gas, and oil) are brought up the tubing string to the surface to prevent them from touching and corroding the casing that is harder to repair. The tubing is relatively easy to repair during a **workover**.

In a gas well, gas flows to the surface by itself. There are some oil wells, early in the development of the oilfield, in which the oil has enough pressure to flow up to the surface. Gas wells and flowing oil wells are completed with a series of **fittings** and **valves** called a Christmas tree on the surface to control the flow (Fig. I—11).

Most oil wells, however, do not have enough pressure for the oil to flow to the surface and **artificial lift** must be used. A common artificial lift system is a **sucker-rod pump** (Fig. 1-11). A **downhole pump** on the bottom of the **tubing string** is driven by a **beampumping unit** on the surface. The pump lifts the oil up the tubing to the surface

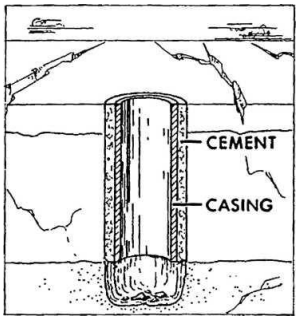

Fig. 1 *Casing a well*

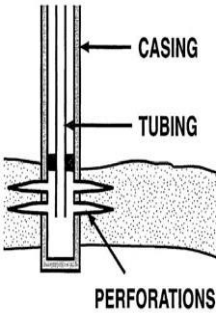

Fig. 2 *Perforations and tubing in a well*

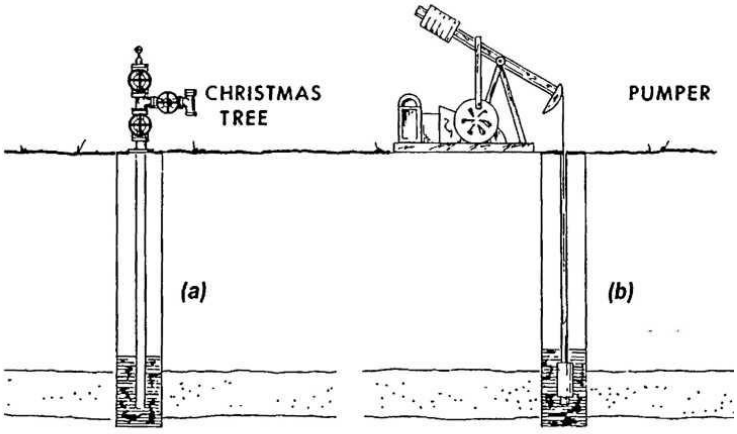

Fig. 1–11 *Gas (a) and oil well (b) completions*

EXERCISE 14. Make the vocabulary list with words in bold (texts 5-6) .

EXERCISE 15. Make up word combinations and translate them.

1)	pore	a.	cap
2)	natural	b.	rivers
3)	gas	c.	trap
4)	salt	d.	arch
5)	underground	e.	outcrops
6)	subsurface	f.	exploration
7)	give off	g.	space
8)	seismic	h.	an image
9)	rock	i.	hole
10)	diesel	j.	water
11)	straight	k.	an impulse
12)	make	l.	engine
13)	mud	m.	cutting

14) well	n. system

PART 3. DRILLING TECHNIQUES

TEXT 8. Cable-Tool versus Rotary Drilling

There have been two drilling techniques available since people first began making holes in the ground: cable-tool drilling and rotary drilling.

Both methods originated a very long time ago. Over 2,000 years ago, for instance, the Chinese drilled wells with primitive yet efficient cable-tool rigs. (They were still using similar rigs as late as the 1940s.)

To quarry rocks for the pyramids, the ancient Egyptians drilled holes using hand-powered rotating bits. They drilled several holes in a line and stuck dry wooden pegs in the holes. They then saturated the pegs with water. The swelling wood split the stone along the line made by the holes.

Cable-Tool Drilling

A cable-tool rig works much like a seesaw. Cable-tool rigs have more parts and, instead of a seesaw, a cable-tool has a powered walking beam mounted in a derrick. At Drake's rig, a 6-horsepower steamboat engine powers the walking beam. The walking beam is a wooden bar that rocks up and down on a central pivot, much like a seesaw.

The derrick provides a space to raise the cable and pull the long drilling tools out of the hole. As the beam rocks up it raises the cable and attaches chisel, or bit. Then, when the walking beam rocks down, heavy weights, sinker bars, above the bit provide weight to ram it into the ground. The bit punches its way into the rock.

Repeated lifting and dropping makes the bit drill (fig. 2). Special equipment plays out the cable as the hole deepens.

Cable-tool drilling works very well in the hard-rock formations such as those in eastern U.S., the Midwest, and California. A few cable-tool rigs are probably drilling wells somewhere in the world even now, although their use peaked in the 1920s and faded thereafter.

In spite of cable-tool drilling's widespread use in the early days; the system has a couple of drawbacks. One is that cable-tool drillers have to stop periodically drilling and pull the bit from the hole. They then have to run a special basket, a bailer, into the hole to retrieve and remove the pieces of rock, or cuttings, the bit makes.

After bailing the cuttings, they then run the bit back to bottom to resume drilling. If the crew fails to bail out the cuttings, the cuttings obstruct the bit's progress.

Bailing cuttings is not a big hindrance, because the cable-tool system allows the crew to do it quickly. Since the cable is wound onto a winch, or windlass, called the "bull wheel", the crew simply

reels cable on and off the bull wheel to raise and lower the bit and bailer.

Reeling cable is a fast operation. A far bigger problem than bailing, and the one that leads to cable-tool drilling's demise, is that the cable-tool technique doesn't work in soft formations like clay or loose sand.

Clay and sand close around the bit and wedge it in the hole. This limitation leads to the increased use of rotary rigs because more wells are being drilled in places like Spindle top where cable-tool bits get stuck.

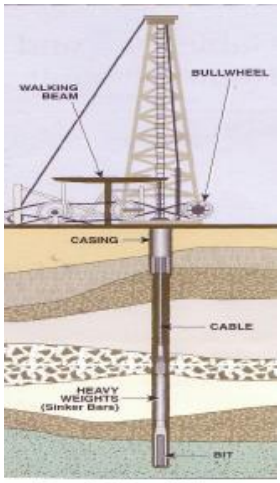

Figure 2. Cable-tool drilling rig

Figure 4. *Cable-tool drilling rig*

The wall cake created by circulating drilling fluid prevents formations from collapsing.

Rotary Drilling

Rotary drilling is quite different from cable-tool drilling. A rotary rig uses a bit that isn't anything like a cable-tool's chisel bit. Instead of a chisel, a rotary bit has rows of teeth or other types of cutting devices that penetrate the formation and then scrape or gouge out pieces of it as the rig system rotates the bit.

Further, a rotary rig doesn't use cable to suspend the bit in the hole. Rotary crew members attach the bit to the end of a long string of hollow pipe. By screwing together several joints of pipe, they put the bit on the bottom of the hole. As the hole deepens, they add joints of pipe.

EXERCISE 16. Give Russian equivalents of the following words and word combinations from the text:

cable-tool drilling, rotary drilling, rotating bits, wooden pegs, to saturate pegs with water, swelling wood, a seesaw, walking beam mounted in a derrick, a pivot, chisel, drawback, a bailer, to retrieve and remove the pieces of rock, bailing the cuttings, to resume drilling, to obstruct the bit's progress, a winch, a windlass, bull wheel, to reel cable on and off the bullwheel, to lead to cable-tool

drilling's demise, to wedge a bit in the hole, the wall cake, to prevent formations from collapsing, to scrape or gouge out pieces of formation, joints of pipe.

EXERCISE 17. Say whether the following statements true or false:

1. A cable-tool has a powered seesaw mounted in a derrick.
2. The derrick provides a space to raise the cable.
3. Cable-tool drilling works very well in the soft formations.
4. The system of cable-tool drilling has a couple of advantages.
5. Cable-tool drillers have to retrieve and remove the pieces of rock, or cuttings.
6. Reeling cable is a slow operation.
7. The wall cake created by circulating drilling Ruid doesn't prevent formations from collapsing.
8. Rotary drilling is quite different from cable-tool drilling.
9. Instead of a cable, a rotary bit has rows of teeth or other types of cutting devices.
10. Rotary crew members attach the bit to the end of a long string of hollow pipe.

Well Drilling Equipment

Rotary drilling technology operations require different in functional assignments machines, mechanisms and equipment. A set of required for well drilling machines, mechanisms and equipment having interrelated operational functions and technical parameters is called a drilling complex.

Drilling rig is the core unit in the drilling complex. Drilling rig is a complex of drilling machines, mechanisms and equipment mounted in the drilling site and by means of drilling tools providing for independent implementation of well construction process operations.

Modem drilling rigs include the following components: drilling equipment (traveling block, mud pumps, draw works, swivel, rotor, power tongs, etc.); drilling structures (derrick, substructure, catwalk and pipe-racks); equipment for heavy work mechanization (mechanisms for automation of pipe tripping operations, pneumatic slips, automatic spinner, auxiliary hoist, control stations); equipment for preparation, treatment and regeneration of drilling mud (preparation block, shale-shakers, desanders and desilters, tanks for chemicals, water and drilling mud) and other equipment.

Rotating Systems

With the bit on bottom, the rig can rotate it in one of three ways. Many rigs use a machine called a "rotary table", a sort of heavy-duty turntable. Others rotate the bit with a top drive, a device

with a powerful built-in electric motor that turns the pipe and bit.

In special cases, a slim downhole motor, usually powered by drilling fluid but in some cases by electricity, rotates the bit. A long metal housing with a diameter a little less than the hole's holds the motor. The bit screws onto the end of it. The latest rotary rigs use a top drive to rotate the pipe and bit.

Many drilling companies still own and use rotary tables, which are simple, rugged, and easy to maintain. Rotary rig owners often use downhole motors where they have to rotate the bit without rotating the entire string of pipe. Such situations occur when the rig is drilling a slant, or directional hole, a hole that is intentionally diverted from vertical to exploit a reservoir.

The driller, the person operating the rig, allows some of the weight of the pipe to press down on the bit. The weight causes the bit's cutters to bite into the formation rock. Then, as the bit rotates, the cutters roll over the rock and scrape or gouge it out.

EXERCISE 18. Express the same in Russian:

to screw onto something, string of pipe, fluid circulation, to be diverted, to press down on the bit, to roll over the rock, to move out of the way, to impede drilling, to bail cuttings, to be misled by the name, soft formation, to stabilize the hole, to be available

PART 4. PUMPS AND PIPELINE COMPONENTS

TEXT 10. OIL PIPELINES

Read the text carefully and answer the following questions:

Pipelines are generally the most economical way to transport large quantities of oil, refined oil products or natural gas over land. Compared to shipping by railroad, they have lower cost per unit and higher capacity. Although pipelines can be built under the sea, that process is economically and technically demanding, so the majority of oil at sea is transported by tanker ships.

Oil pipelines are made from steel or plastic tubes with inner diameter typically from 4 to 48 inches (100 to 1,200 mm). Most pipelines are buried at a typical depth of about 3 to 6 feet (0.91 to 1.8 m). The oil is kept in motion by pump stations along the pipeline, and usually flows at speed of about 1 to 6 metres per second (3.3 to 20 ft/s). Multi-product pipelines are used to transport two or more different products in sequence in the same pipeline. Usually in multiproduct pipelines there is no physical separation between the different products. Some mixing of adjacent products occurs, producing interface. At the receiving facilities this interface is usually absorbed in one of the product based on pre-calculated absorption rates.

EXERCISE 19. Answer the questions.

1. What way is the most economically to transport large quantities of oil or natural gas?

2. What types of pipelines do you know?

3. What materials are oil pipelines made from?

EXERCISE 20. Give English equivalents to the Russian words and word combinations:

Трубопровод; экономичное средство; очищенная нефть; природный газ; многофункциональный трубопровод; использовать; последовательность; распределение; смешивания продуктов; проникновение; оборудование на этапе получения продукта; предварительные расчеты; нормы абсорбции.

TEXT 11. TYPES OF PIPELINES BY TRANSPORT FUNCTION

For natural gas, pipelines are constructed of carbon steel and varying in size from 2 to 60 inches (51 to 1,500 mm) in diameter, depending on the type of pipeline. The gas is pressurized by compressor stations and is odorless unless mixed with a mercaptan odorant where required by a regulating authority.

In general, pipelines can be classified in three categories depending on purpose:

Gathering pipelines - group of smaller interconnected pipelines forming complex networks with the purpose of bringing crude oil or natural gas from several nearby wells to a treatment plant or processing facility. In this group, pipelines are usually short - a couple of hundred meters – and with small diameters. Also sub-sea pipelines for collecting product from deep water production platforms are considered gathering systems.

Transportation pipelines - mainly long pipes with large diameters, moving products (oil, gas, refined products) between cities, countries and even continents. These transportation networks include several compressor stations in gas lines or pump stations for crude and multiproducts pipelines.

Distribution pipelines - composed of several interconnected pipelines with small diameters, used to take the products to the final consumer. Feeder lines to distribute gas to homes and businesses downstream. Pipelines at terminals for distributing products to tanks and storage facilities are included in this group.

EXERCISE 21. Answer the questions.

1. What three groups can be pipelines classified in?

2. What does transportation pipeline network include?

3. Do feeder lines distribute gas to homes and business downstream?

EXERCISE 22. Give English equivalents to the Russian words and word combinations:

Соединенные между собой трубопроводы; комплекс сетей; газовые и нефтяные месторождения; сбор продукта; причины; движение продукта; насосные станции; состоять из нескольких трубопроводов; распределять; перерабатывающие заводы.

VOCABULARY (СЛОВАРЬ)

Aa

abandon – ликвидировать;
abandonment – ликвидация;
accident rate – высокий уровень опасности;
acid – кислота;
add – наращивать;
adjust –регулировать,корректировать;
adopt – принимать;
affect – влиять;
air – воздух;
aircraft – самолёт, воздушное судно, летательный аппарат;
allow – позволять, разрешать;
ancient – древний;
anticline – антиклиналь;
application – метод;
aromatics - ароматический углеводород;
artificial lift – механизированная добыча, насосно-компрессорная добыча;
asphaltics - битумы;
asset – ресурс, достояние;
attach – присоединять.

Bb

barge – баржа;
be able – быть способным, мочь;
be located – находиться, быть расположенным;
beach – морской берег, взморье; отмель;
bedding – напластование; наслоение, слоистость;
behavior – поведение, режим работы;
benchmark – стандарт, эталон;
benzene - бензол;
biotite – биотит (чёрная слюда);
block valve – запорная задвижка;
Block Valve Station – узел задвижек;
bond – связывать, соединять, скреплять;
bond – связь;
boom – бум, резкий подъём деловой активности;
boulder – осадочный валун, диаметром не более 256 мм;
bounce – отскакивать;
brackish water – солоноватая вода;
breakdown – разрушение;
bridge – соединять;

brine water – грунтовая вода;
bubble – пузыриться; подниматься пузырьками;
bubble tray – колпачковая тарелка;
buildup – отложение;
bury - закапывать, зарывать, прокладывать;
bury – погружаться;
butane – бутан.

Cc

carbon dioxide – углекислый газ;
carbon steel – углеродистая сталь.
cargo – груз;
casing - обсадные трубы, обсадная колонна;
casing head gasoline – газовый бензин (получаемый в промысловом сепараторе или абсорбционной установке из нефтяного газа);
caterpillar machines – гусеничная техника;
cause – вызывать;
caustic – едкий;
cementation - цементирование;
chips, cuttings – буровой шлам;

classify – классифицировать;
clean – очищать;
clogging – забивание загрязнение; засорение;
coat – покрывать слоем чего-либо;
cobble –крупная галька (размером 64-256 мм);
compaction – уплотнение;
compare – сравнивать;
complete – заканчивать (скважину бурением)
comply – исполнять;
comprise – содержать, включать в себя;
condense – конденсировать;
consolidated sediments – уплотненные осадочные породы;
consolidation – сообщество;
constraint – ограничение.
constraint - ограничение;
consume – потреблять;
consumer – потребитель;
consumption waste – отходы потребления;
contain – содержать;
content – доля, процент, содержание (чего-л. в чём-л.);
contract – уплотняться, сжиматься;
contractor – подрядчик;
convert – преобразовывать; превращать;
copper – медь;
corrosion – коррозия, ржавчина;
counter part- аналог;
cracking stock – исходное крекинг- сырьё;
crop out – обнажаться, выходить на поверхность;
crude oil – неочищенная нефть;
current – текущий;
customer – клиент;
cycle – цикл; (хронологический) период;
cycloparaffins – циклопарафины.

Dd

decay – разлагаться;
decline curve – кривая падения;
define – устанавливать, определять;
Deliver – доставлять, распределять;
Delivery Station - распределительная станция
depend on – зависеть от;
deplete – истощать; исчерпывать;
depot – склад, хранилище;
depth – глубина;
detect – обнаруживать;
detector – сейсмоприёмник;
determine – определять, устанавливать;
development – развитие, освоение;
deviated well –наклонная скважина;
device — устройство;
disability –нетрудоспособность;
discharge – разгрузка, опорожнение;
displace – вытеснять, заменять, замещать;
distill – очищать;
distinguish – находить отличия; различать, распознавать;
distribution pipeline - распределительный трубопровоммуникации;
dome – купол;
downhole pump – забойный насос;
downstream - переработка нефти и сбыт нефтепродуктов
drilling – бурение;
drillpipe – бурильная колонна;
drinking water – питьевая вода;
drive – запускать; приводить в действие;
dry hole – непродуктивная скважина;
dune –дюна.

Ee

employee – рабочий;
encounter –встречать;
enhanced oil recovery (EOR) –добыча нефти вторичным методом;
ensure – гарантировать;
ensure – обеспечивать;
environment – окружение;
environment – окружающая среда;
equipment – оборудование;
equire – требовать;
estimate – оценивать.
ethane – этан;
evaluate – оценивать;
examine – исследовать; изучать;
exert – оказывать;
exist – существовать;
expose – обнажать;
extraction – извлечение.

Ff

facilities – оборудование;
facility – оборудование;
feeder line – подводящая линия;

feldspar – полевой шпат;
fertilizer – удобрение;
field pipelines – промысловые трубопроводы;
fill – наполнить;
fire cock – пожарный кран;
fire hazard – пожарная опасность;
fire hose – пожарный шланг;
fire safety – пожарная безопасность;
fit – подходить;
fittings – арматура;
flank – бок; край, сторона;
flare – факел сжигания (попутного газа);
flow – течь, поток;
flow mark – знак течения;
fluid - флюид;
foul – вонючий, омерзительный, отталкивающий;
frac job – гидравлический разрыв;
freeze – замерзать, обледеневать;
fresh – свежий;
furnace – печь.

Gg

gain – извлекать пользу, выгоду; улучшаться;
gas storage – газохранилище;
gasoline – бензин;
gathering pipeline - сборный нефтепровод;
giant – огромный;
glacier – ледник;
go-devil - скребок для очистки труб;
gold – золото;
good – товар;
grain – зерно;
granite – гранит;
granule – гранула; мелкая частица (2-4 мм);
greenhouse effect – парниковый эффект.

Hh

helium – гелий;
hidden – скрытый, спрятанный;
high-shrinkage oil – нефть с высокой усадкой;
hinder – затруднять, задерживать;
hold – сохранять, удерживать;
hornblende – роговая обманка, роговик;
hydrocarbon – углеводород;
hydrogen sulfide –сероводород.

Ii

identify – опознавать, распознавать;
ignite – возгораться, воспламеняться;
implement – внедрять, применять;
incident – случай;
include – включать в себя;
industrial facility - промышленный объект;
inject – закачивать;
injection well – нагнетательная скважина;
inlet – вход, подвод;
inspect – осматривать;
insurance – страхование;
interconnect – взаимодействовать;
interconnected – связанный, взаимосвязанный; соединённый;
Intermediate Station – промежуточная станция;
interrupt – прерывать;
investment – инвестирование;
iron – железо;
issue –исход, результат, плод.

Jj

jet – бить струёй.

Ll

launch – спускать, бросать;
layering – наслаивание;
lead – свинец;
leak – утечка;
leaky – имеющий течь; протекающий;
lethal – смертельный; летальный;
light - легкий;
liquid – жидкость;
LNG (Liquified Natural Gas) – сжиженный природный газ;
local – местный;
locate – определять место;
location – место, местонахождение;
logging truck –передвижная каротажная станция;
low-shrinkage oil– нефть с низкой усадкой;
lubricating oil - смазочное масло.

Mm

main pipe (lines) – магистральный трубопровод;
maintenance – текущий ремонт;

malfunctioning equipment – производственное оборудование.
mandatory - обязательно;
manifold pipelines – трубопровод с ответвлениями;
manufacturing plant - производственное предприятие;
mapping – нанесение на карту;
match – спичка;
measurement –снятие мерок, измерение;
meet - удовлетворять, соответствовать;
melt – таять, расплавлять;
meteoric water – подземные воды, образовавшиеся при просачивании
microbiological processes – микробиологические процессы.
mine – разрабатывать рудник; добывать;
mixture - смесь;
molten – расплавленный;
move – передвигать, перемещать;
mud – ил, тина;
mud crack – трещина усыхания.

Nn

naphthenes – нафтены, нафтеновые углеводороды;
natural gas liquids – газовый бензин;
nearby – близкий, соседний;
network – сеть;
nozzle – промывочная насадка.

Oo

occasional – случайный;
occur – встречаться, проявляться;
occur – происходить;
oil depot – нефтехранилище, нефтебаза;
oil field – нефтепромысел;
oil refinery - нефтеперерабатывающий завод;
oil refining - переработка нефти;
oil terminal - перевалочный склад для нефти и нефтепродуктов;
oil- нефть;
operate – работать;
order – порядок; последовательность;
ore – руда;
overlie – перекрывать (залегать выше);
overproduction –перепроизводство;
overthrust belt – надвиговая зона.

Pp

paraffin – парафин;
peak load – максимальная нагрузка;
peat – торф;
pebble –гравий;
percolate – просачиваться;
perforation – перфорация;
personnel – персонал;
petrochemicals – нефтепродукты;
petrol station - бензозаправочная станция;
petroleum – нефть;
pig - скребок для очистки труб;
pig - скребок для очистки труб;
pig-launcher station - площадка запуска диагностиройств;
pile – накапливаться;
pipe rolling – трубопрокатное производство;
pipe- труба;
pipeline – трубопровод;
pipeline inspection gauge - скребок для очис
plug – ставить пробку;
plummet = plummet down – быстро и отвесно падать;
poisonous – ядовитый;
pool – резервуар; бассейн;
pore space – поровое пространство;
precautions – меры предосторожности;
precipitate – осаждаться;
preexisting – существующие ранее;
preserve – сохраняться;
pressurize - поддерживать давление;
prevent – предотвращать;
processing facility - установка по подготовке нефти
producer – эксплуатационная скважина;
production platform - эксплуатационная морская платформа
propane – пропан;
protect – защищать;
protection – защита;
pump – насос;
pump station – насосная станция;
pungent – резкий, едкий;
pure – чистый, беспримесный;
purpose – цель.

Rr

range – колебаться, варьироваться;
rate of reliability – уровень надежности;
reclaiming – восстановление, рекультивация;
reduce – понижать, сокращать, уменьшать;
reef – риф;
refine – очищать;
refinery – переработка;
reflect – свидетельствовать;
regulatory agencies – органы государственного регулирования;
related – связанный;
release – освобождать, ослаблять;
relieve – ослаблять, уменьшать;
remaining – оставшиеся;
remedial – ремонтный;
remove – удалять;
replace – заменять, замещать;
replenish – пополнять, заполнять;
require – требовать;
requirement – требование;
requirements – требования;
reservoir – резервуар;
reservoir drive – пластовый режим;
resistance - сопротивление;
responsibility – ответственность;
restoring the site – восстановление
terexploration – исследование;
ripple marks –рябь;
road tanker – автоцистерна;
rock formation – горная порода;
route – путь, дорога;
routine repair – текущий ремонт;
rupture - прорыв, разрыв.

Ss

safety – безопасность;
Safety Department – отдел техники безопасности;
salvage – нереализованная продукция, отходы производства;
sample – образец, экземпляр;
satellite – спутник;
schedule – расписание;
scraper - скребок для очистки труб;
scraper - скребок для очистки труб;
seal – изолирующий слой;
seawater – морская вода;
seep – выход, проявление;
seepage – поверхностные признаки нефтепроявления;
seismic method –сейсмический метод;
send – посылать, отправлять;
sense – зондировать, измерять;
settling-pit – амбар – отстойник;
sewage – сточные воды
sewage – сточные воды;
shallow – мелкий, мелководный;
shield – щит;
side branch – боковое ответ;
side draw – боковой погон;
silt – мелкозем, частицы почвы 0,05-0,002 мм в диаметре);
silver – серебро;
site - территория объекта;
soil – почва;
solidify – затвердеть;
solution gas – природный газ, растворённый в нефти коллектора;
sonde – 1) зонд 2)каротажный заряд(спускаемый в скважину);
sorting – сортировка, классификация;
sour – высокосернистый;
source – взрывной источник;
source – источник, ключ;
split – разбивать, раскалывать;
split – расщеплять;
staff – сотрудники;
steam – пар;
steel - сталь;
storage – хранение;
storage facilities – нефте или газохранилище;
storage facilities – хранилище;
stream — поток;
stream — поток;
strict – точный;
sub-sea pipeline – подводный трубопровод.
sucker-rod pump – шланговый скважинный насос;
suggest – предлагать.
sulfur - сера;
supplies – сырье (здесь: продукция);
supply – снабжать, подводить;
surround – окружать; обступать;
surveillance - наблюдение;
suspend – подвешивать.

Tt

tank farm - резервуарное хозяйство;
tank terminal – тупиковая нефтебаза.
tank, tankage – резервуар;
tanker – танкер;
technical draft – технический проект;
technical standards – технические нормы;
terminal - конечная станция на трубопроводе;
termination – завершение, окончание;
terrain - территория, район, местность;
theft - воровство;
thick - плотный; густой, мощный (о слое, пласте);
tiny – крошечный;
to set up – устанавливать;
tower – вышка, башня;
transparent - прозрачный;
treatment plant - очистная станция;
tube- труба.

Uu

unauthorized – несанкционированный, неразрешенный;
unfavorable – неблагоприятный;
unit – единица;
unproductive – непродуктивный;
use – использовать.

Vv

valuable - ценный;
valve – клапан; вентиль; задвижка;
vehicles - транспортные средства;
viable – жизнеспособный;
volcanic – вулканический;
water- flood – заводнение.

Ww

wax – воск;
waxy crude oil – парафинистая нефть;
weld – сваривать;
welding – сварка;
well – скважина.
well log – каротажная диаграмма;
wildcat – разведочная скважина;
wireline – талевый канат;
workover – ремонт, ремонтные работы.

Yy

yield – давать; выдавать; производить.

Zz

zinc – цинк.

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