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ШЛЯХИ ПІДВИЩЕННЯ НАДІЙНОСТІ ТА ГЕРМЕТИЧНОСТІ ОБСАДНИХ КОЛОН

ПУТИ ПОВЫШЕНИЯ НАДЕЖНОСТИ И ГЕРМЕТИЧНОСТИ ОБСАДНЫХ КОЛОНН

WAYS TO IMPROVE THE RELIABILITY AND TIGHTNESS OF CASING STRINGS

Анотація. Важливим напрямком підвищення надійності і безпеки будівництва та експлуатації свердловини є удосконалення конструкції і технології виготовлення з'єднань обсадних труб.

Ключові слова: обсадна колона, надійність, герметичність, різьбові з'єднання.

Аннотация. Важным направлением повышения надежности и безопасности строительства и эксплуатации скважины является усовершенствование конструкции и технологии изготовления соединений обсадных труб.

Ключевые слова: обсадная колонна, надежность, герметичность, резьбовые соединения.

Abstract. The important direction of improving the reliability and safety of the construction and operation of the well is to improve the design and technology of the casing joint.

Keywords: casing string, reliability, integrity, screw connections.

Complications and accidents during construction and operation of casing oil or gas wells are caused by the complexity of mining and technical conditions of work. The main causes abnormal function of the column: separation joints and pipes, pipe sections fall into the hole, complications of cementing and casing operation caused between the column and for the column manifestations and emissions. Due to abnormal function of threaded connections is 90% of all accidents casing, 40% due to loss of strength or break pipe thread in the thread and 50% — through leaks in joints.

Damage casing 5–7% of all accidents and their elimination spent 10–12% of emergency repair time, the share of these costs increase with depth drilling. Up to 70% of all complications caused by casing leakage of threaded connections. An important way to increase the reliability and safety of the construction and operation of the well is to improve the design and technology of casing joints. Disability casing due to loss of reliability required strength and tightness of socket joints threaded connections. Even with full compliance of geometrical parameters of thread-

ed connections standards such connections to a wide dispersion force interaction parameters that can not withstand operating pressures on the casing in the borehole.

The trend to hidden under-strength and tightness of threaded joints Casing joints in full compliance with their geometrical parameters of the standard, as the latter does not regulate the requirements screwing with specified torque. The requirement to end couplings coincide with the end of the thread pipe is unreliable criterion of efficiency connection. Therefore it is necessary to look for new technical solutions to improve reliability and ensure the strength and tightness of connections, increase efficiency socket joints compounds casing design and technological methods. The most important task to ensure the reliability casing joints are: the right choice of sealing greases or special sealants, oil-choice solutions and cementing process, create the necessary elastic tension in threaded joints.

High efficiency and performance at the highest technical fastening and operation of wells in difficult geological conditions and obliquely-directed and horizontal wells showed highly airtight fittings node seal metal-metal, but they have some operational weaknesses. Therefore, increasing the strength and tightness of casing from improving connections with integrated hub seal is relevant and promising task. In the world of industrial practice showed highly airtight fittings have been widely used, for example, in Russia formed a separate class of "Premium" pipe connections with metal seals. The design showed highly airtight connections include conical trapezoidal thread profile seal metal-metal and persistent end. High thread type and OTTM common type in the world Buttress (according to the standards of the American Petroleum Institute API 5CT and API 5B) face significantly higher axial and bending loads than triangular thread. However, these structurally thread sealing functions do not perform.

Sealing compounds is indicated with built-compaction. The principle of his work lies in the fact that when screwing thread outer surface of the pipe nipple is radial tension in the inner surface of the clutch and the area of contact occurring strain compression. Sealing the surface can be formed: Internal – cone, cylinder; outside – cone or convex surface (sphere, barrel). In OTTH coupling cone-cone seal with the company Hydril (USA): CTS, CTS-4, RB, FJ, Super FJ, FJ-40, EU, Tripleseal; company Societe Valures (France): VAM, VAM AF, VAM AT-AF, Nev VAM; firm Nippon Steel (Japan): NS-CC and others. Convex shape nipple with sealing Extreme Line, Tenaris Blue, Antares MS, BDS, NK-3SB more. In seals KS Bear, FOX in conjugation are convex and concave surfaces. In the seal of

the company Atlas Bredford (USA) TS-4S, Jj-4S, FL-4S, Jj-3SS are teflon ring. Increase moment screwing reach contact stresses on thrust plane or in the form of reverse cone ends, the main function of which is to limit the screwing and achieve precise axial positioning surfaces and seal carving with desired tension. However, significant axial tension, which are designed connection "Premium" reduce face interaction or revealing butt. However, when inflating stress disorder possible mechanical seals in curved wells. Making connections with metal-to-metal seal is associated with a number of high technological conditions, complicated design, they require high precision cutting and sealing of mutual accommodation, threaded and thrust surfaces. This is necessary for their simultaneous coordinated interaction and achieve the specified tension in conjunction, as tensions in the thread and seal substantially affect each other. Such compounds are sensitive to failure to comply with torque, especially to their excess. It is worth noting that in the use of the oil fields for screwing key casing high work effort, plastic deformations occur groove thrust surfaces and the ends of these compounds that significantly reduces their tensile strength. It is in the field of plastic deformation in the first place is corrosion of metal in the presence of corrosive components in the borehole. In-directed angle and horizontal wells are most effective seal with the convex surface of the nipple. But this interface has less contact area, requires more radial tension and achieves high contact stresses. The rapid onset of plastic deformation, in addition to corrosion, leading to deviations form surfaces, reduce tension, tightness, declining terms of re-screwing.

The authors of [1] proposed a device for sealing socket joints pipe connections established between the ends of the tubes and includes bushing, which is deformed in cold curved sections alternating along its length to form the surface of the second and fourth orders. It provides in connection deformation screwing each curved section and thus the distribution of strain at full length sleeves, bushings increases strength and can provide tightness at higher internal pressures.

Shape sleeve ends and the ends of the pipes is chosen independently flat, conical, convex or concave. The conical shape of the end is different from a plane at an angle, the tangent of which does not exceed the value of the coefficient of friction between the sleeve and the pipe ends. Such performance contact sleeve ends and pipes allow forming most workable connection depending on the given conditions, sizes and materials of its connection details. Find ways to improve designs highly hermetic threaded joints to improve reliability casing is relevant and promising task.

References

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