**Example of Thesis Formatting**

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Improving the selection of hollow sucker rods through the use of a mathematical model of the behavior of the rods in the hole

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ABSTRACT

A new method of calculation of the stresses on the basis of dependence Oding. The method is based on the dependence of Oding with the introduction of the index k terms of characterizing the design features of sucker rods and material of manufacture. The new technique yielded good agreement with the results of the situation in the well. To account for the peculiarities of operation of sucker rods in directional wells developed a mathematical model.

KEYWORDS

Sucker rods, hollow sucker rods, method of calculating the stress, the mathematical model of sucker rods, dependence Oding.

According to statistics for 2015 (Figure 1), more than a third of the entire production fund of oil wells in Russia is equipped with sucker rod pumps (SRP). Additionally, over the past five years, both in Russia and globally, the concept of simultaneous-separate operation has emerged, which involves the operation of multiple productive horizons by a single well. The majority of known simultaneous-separate operation schemes are specifically associated with sucker rod pump installations, which annually increases the share of SRPs. The final coefficients are presented in Table 1.



Figure 1 Well Fund of the Russian Federation for 2015.

Table 1 Coefficient k for Continuous Sucker Rod Pumps [1,2]

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Type Size, mm | Stress Concentration, *Ks* | Scale Effect, *Kds* | Surface Quality, *Kf* | Hardening Method, *Kv* | Inconstancy of Cross-section | Degradation  Coefficient | Final  Coefficient |
| 16 | 0,65 | 1,09 | 0,8 | 1,45 | - | 1,2 | 1,54 |
| 19 | 0,65 | 1,11 | 0,8 | 1,45 | - | 1,2 | 1,56 |

The methods for calculating the equivalent stresses and the mathematical models of the sucker rod string operation used for selecting sucker rods do not fully account for the factors affecting the performance of the sucker rod string (such as the design features of the sucker rods and the strength properties of the material from which they are made), which leads to its failure.

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