# 鄂西地区某油气地质调查井井身结构设计

# 摘要

井身结构设计是钻井工程的基础设计，是钻井工程设计的最重要的组成部分，一口井能否钻探成功，井身结构起决定作用。井身结构设计中包含了一口井从开钻到后期生产整个生命周期内诸多风险控制因素，不但关系到钻井工程的整体效益，而且还直接影响油井的质量和寿命，因而在进行钻井工程设计时首先要科学地进行井身结构设计。本文主要对鄂西地区的一口油气勘查井进行井身结构设计。

本文首先介绍了鄂西地区的地质状况，根据资料预测了钻遇地层，针对钻遇地层的岩性进行分析，该地区岩石可钻性级别普遍不高，由于裂隙、溶洞的存在钻进效率不高。然后对井喷与硫化氢问题、井斜问题、井壁坍塌与卡钻进行了分析：在应对硫化氢与井喷问题时要加强井控意识；井斜问题要重视防斜与纠斜；井壁稳定性问题则要重视泥浆护壁。

理论部分介绍了在设计过程中计算地层压力用到的理论——dc 指数法。在介绍 dc 指数法时介绍了其相应的等效深度法算法。指出了等效深度法受岩性影响的问题。

最后运用上述理论与邻井资料进行地层压力预测并据国家和行业标准进行计算设计同时对压差卡套问题进行了校核。最终确定井身结构采取三开结构：一开Φ444.5mm 钻头钻进至 70m，下Φ339.7mm 套管 69m；二开Φ311.2mm 钻头钻进至 980m，下Φ244.5mm 套管 979m；三开Φ215.9mm 钻头进至 2500m，裸眼完钻。给出了井身结构设计图。

**关键词：**井身结构设计、地层压力、钻井。

# Abstract

The well structure design is the basic design of the drilling engineering and is the most important component of the drilling engineering design. Whether a well can be drilled successfully or not, the well structure plays a decisive role. The design of the wellbore structure contains many risk control factors in the whole life cycle of a well from drilling to post-production. It not only relates to the overall benefit of the drilling project, but also directly affects the quality and life of the well, so when designing the drilling engineering First of all, scientific design of the well structure should be carried out. This paper mainly designs the well structure of an oil and gas exploration well in western Hubei.

This paper first introduces the geological conditions in the western part of Hubei Province. Based on the data, it predicts the formation of the strata and analyzes the lithology of the encountered strata. The rock drillability level in this area is generally not high, and the drilling efficiency is not due to the existence of fissures and caves. high. Then, the problems of blowout and hydrogen sulfide, well deviation, well wall collapse and stuck drilling are analyzed: the well control awareness should be strengthened when dealing with the problem of hydrogen sulfide and blowout; the inclination problem should pay attention to anti-slanting and correction; well wall stability Sexual issues must pay attention to the mud wall.

The theory section introduces the theory used to calculate formation pressure during the design process—the dc index method. In the introduction of the dc index method, the corresponding equivalent depth method algorithm is introduced. The problem that the equivalent depth method is affected by lithology is pointed out.

Finally, using the above theory and adjacent well data to predict formation pressure and calculate and design according to national and industry standards, the pressure difference card sleeve problem is checked. Finally, the well structure was determined to adopt a three-open structure: one open Φ444.5mm drill bit drilled to 70m, the lower Φ339.7mm casing 69m; the second open Φ311.2mm drill bit drilled to 980m, the lower Φ244.5mm casing 979m; three open The Φ215.9mm drill bit is drilled to 2500m and the naked eye is drilled. The design of the well structure is given.