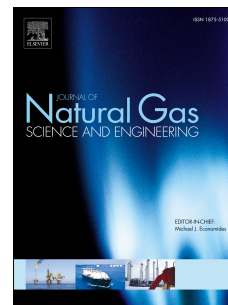


# Accepted Manuscript

A simplified method for predicting the penetration distance of cementing slurry in gas hydrate reservoirs around wellbore

Fang Changliang, Zheng Mingming, Lu Hongzhi, Liu Tianle, Jiang Guosheng, Wu Bisheng



PII: S1875-5100(18)30056-8

DOI: [10.1016/j.jngse.2018.01.042](https://doi.org/10.1016/j.jngse.2018.01.042)

Reference: JNGSE 2449

To appear in: *Journal of Natural Gas Science and Engineering*

Received Date: 18 May 2017

Revised Date: 4 January 2018

Accepted Date: 4 January 2018

Please cite this article as: Changliang, F., Mingming, Z., Hongzhi, L., Tianle, L., Guosheng, J., Bisheng, W., A simplified method for predicting the penetration distance of cementing slurry in gas hydrate reservoirs around wellbore, *Journal of Natural Gas Science & Engineering* (2018), doi: 10.1016/j.jngse.2018.01.042.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# A simplified method for predicting the penetration distance of cementing slurry in gas hydrate reservoirs around wellbore

Fang Changliang<sup>1</sup>, Zheng Mingming<sup>2, 1</sup>, Lu Hongzhi<sup>1</sup>, Liu Tianle<sup>\*1</sup>, Jiang Guosheng<sup>1</sup>, Wu Bisheng<sup>\*3</sup>

1. Faculty of Engineering, China University of Geosciences, Wuhan, Hubei 430074, China

2. State Key Laboratory of Geohazard Prevention and Geoenvironment Protection, Chengdu University of Technology, Chengdu, Sichuan 610059, China

3. CSIRO Energy, Melbourne, Australia

**Abstract:** The permafrost region in the Qinghai-Tibet Plateau of China is abundant in natural gas hydrate (NGH) resources. In this region, there is a great probability of meeting gas hydrate when conducting conventional oil and gas well cementation operations. Because of the relatively developed fractures and not very high pore pressure (usually 3.5-3.6 MPa) in the gas hydrate reservoirs in this area, it is easy for the cementing slurry to penetrate into the gas hydrate reservoirs under the pressure difference during cementing process, undergo hydration and release heat, thus causing hydrate dissociation and cementing quality reduction or even failure. Therefore, it is necessary to first determine the penetration distance of the cementing slurry in the gas hydrate reservoirs to evaluate the effect of hydration of the cementing slurry on the hydrate stability in the reservoirs. In this paper, theoretical and experimental methods for determining the penetration distance value of cementing slurry were established for the first time. The permafrost layer in the Muli area of the Qinghai-Tibet Plateau was selected as the research object and the proposed computational model was verified by using low-density cementing slurry and common cementing process experiments. The results show that the penetration distance calculated by the established computational model is in good agreement with that measured in the experiment, and the computational model can provide technical support for the cementing process design in gas hydrate occurrence area.

**Key words:** gas hydrate, cementing, cement hydration, penetration distance, computational method, simulation experiment

## 1 Introduction

The Qinghai-Tibet Plateau in China is the highest (average altitude: 4,000-5,000m) and largest ( $1.5 \times 10^6 \text{ km}^2$ ) permafrost region at mid-low latitudes in the world and is abundant in natural gas hydrate (NGH) resources<sup>[1-3]</sup>. In November 2008, the Qinghai Coal Geology Bureau of China successfully obtained NGH samples by drilling in the Muli area in the Qinghai-Tibet Plateau (Figure 1), marking the first time NGHs were found in a permafrost region at mid-low latitudes within the land territory of China and the world<sup>[2]</sup>. In recent years, with the increasing activities of oil and gas resource development conducted in permafrost regions, the numbers of related well drilling and completion operations have been growing, and the probability of encountering NGHs during drilling process has increased<sup>[2, 4]</sup>.

Download English Version:

<https://daneshyari.com/en/article/8128251>

Download Persian Version:

<https://daneshyari.com/article/8128251>

[Daneshyari.com](https://daneshyari.com)