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Big data-based piping material analysis framework in offshore structure for contract design

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Abstract. The material analysis of an offshore structure is generally conducted in the contract design phase for the price quotation of a new offshore project. This analysis is conducted manually by an engineer, which is time-consuming and can lead to inaccurate results, because the data size from previous projects is too large, and there are so many materials to consider. In this study, the piping materials in an offshore structure are analyzed for contract design using a big data framework. The big data technologies used include HDFS (Hadoop Distributed File System) for data saving, Hive and HBase for the database to handle the saved data, Spark and Kylin for data processing, and Zeppelin for user interface and visualization. The analyzed results show that the proposed big data framework can reduce the efforts put toward contract design in the estimation of the piping material cost.

Keywords: piping material; big data analysis; offshore structure; contract design

1. Introduction

The material analysis of offshore structure is generally conducted in the contract design phase for the price quotation of a new offshore project. For contract design, engineers analyze previous projects and use this analysis to estimate the construction costs for new projects. This work is very important because the initial cost determines the success of the project. The analysis is conducted manually by the engineer, which is time-consuming and can lead to inaccurate estimation. The engineers collect the related data from the previous projects and use these data to estimate the cost. Unfortunately, there is often not enough time to precisely estimate the cost of a new project. It is very difficult to estimate precise costs in a short amount of time because there is lots of information from the previous projects that must be analyzed. In this study, a big data framework

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