



Research Paper

Blockage of a Slurry Pipeline

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The Ministry of Construction plans to dredge the Tsurumi River and to transport the dredged material by a slurry pipeline. As this pipeline is planned to cross the mouth of the river and the channel, the possible blockage in this submarine pipeline should be investigated before construction. In this paper, the measures taken against a possible blockage of this pipeline are reported. At first flow tests were carried out in a horizontal and submarine model pipeline in order to obtain the characteristics of dredged slurries.

Then, the blockage prevention method by the detection of critical velocity the removal method of alien substances by an expanded pipe and the calculation method for the required pressure to restart the deposits which are formed at the lower part of the vertical section in the pipeline at shutdown are considered.

After these studies the 4,5 km pipeline near the mouth of the river has operated since December 1979.

In a blockage accident of a slurry pipeline, an enormous labor and cost are required to detect its location and to restore it. Especially in the case of buried or submarine pipelines, the blockage problem is fatal to the system. Therefore, experiments on the prevention of a blockage should be carried out before the planning and design of the slurry pipeline.

The Ministry of Construction has planned to dredge the Tsurumi River and to transport the dredged material by a slurry pipeline whose outline is shown in Table 1 [1]. As this pipeline is planned to cross the mouth of the river and the channel shown in Fig. 1, the possible blockage in this submarine pipeline should be investigated before construction.

The causes of a blockage seem to be the following:

1. Decrease of velocity or increase of concentration.
2. Inflow of alien substances or large particles.
3. Shutdown of the pipeline at emergency.

This paper details the methods that were used to ensure that blockage was prevented.