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## Flow-induced Orientation and Concentration Distribution of Fibers in a Concentrated Suspension Flow

[Kazunori YASUDA](#)<sup>1)</sup>

*1) Department of Mechanical Engineering, Graduate School of Engineering, Osaka University*

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**Abstract:** Orientation and concentration distribution of fibers in a slit channel flow were experimentally studied for both dilute and concentrated fiber suspensions. First, the inner diameter of the conduit tube connected to the test channel was determined, because the concentration distribution of fibers in the conduit tube directly affects that in the test channel. As a result, the conduit tube having an inner diameter of 6 mm was selected for fiber of 1 mm long to prevent non-homogeneous concentration distribution in the test channel. Second, the fiber orientation in the test channel was examined. Almost all fibers aligned in the flow direction for the dilute suspension. On the other hand, the preferred direction of large number of fibers also aligned in the flow direction for the concentrated suspension, but the degree of alignment became worse than that for the dilute one. This is because the fibers cannot rotate freely owing to fiber-fiber interaction. However, a large velocity gradient improved the degree of alignment near the channel wall even for the concentrated suspension. Furthermore, it was confirmed that the concentration distribution is nearly uniform in the test channel when the conduit tube larger than 6 mm in inner diameter is used for fiber 1 mm long. From the detailed measurements, however, a local maximum of the concentration appeared beside the channel wall for the dilute suspension because the fiber-wall interaction occurred, while the concentration of fibers gradually and monotonously decreased as one approaches the channel wall for the concentrated suspension.

**Key Words:** [Fiber suspension](#), [Concentrated suspension](#), [Fiber orientation](#),

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