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Proposal of a face gear which generates virtual high mesh frequency by addition of grooves on the tooth flank, and the investigation via vibration simulator and actual samples

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Highlights

- Development of a face gear which generates virtual high mesh frequency by addition of grooves on the tooth flank using effect of frequency.
- Verification of the virtual high mesh frequency using a vibration simulator.
- Confirmation of effect of virtual high mesh frequency using an actual sample.

Abstract:

This report discusses the method of tooth flank modification of a face gear which improves the handle rotational feeling in a fishing reel. A vibration based on a gear pair engagement in fishing reel occurs when a handle of the reel rotates. When this vibration is large, an angler feels uncomfortable, and it is known that the rotational feeling strongly depends on the transmission error of a face gear which is mounted on the reel. In this report, a new method of tooth flank modification was proposed. Based on the new method, it is possible to increase the mesh frequency while keeping the module size and the outer diameter of the face gear unchanged. In this method, several grooves were added along the contact curve on the tooth flank of the face gear. The influence on vibration by these grooves was investigated using the vibration simulator which was introduced in the author's previous reports. Moreover, sample face gears were manufactured and the rotational feeling was evaluated. As a result, it was confirmed that the rotational feeling was improved by applying a proper number of grooves and groove width.

Keywords: Face gear, Tooth flank modification, Transmission error, Tactile sensibility, Fishing reel, Gear vibration

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