EFFECT OF SURFACE TEXTURE ON FRICTION ANISOTROPY UNDER BOUNDARY LUBRICAION

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KEYWORDS
CVT; surface texture; friction anisotropy

ABSTRACT
To further reduce fuel consumption and emission of vehicles, continuously variable transmission (CVT) is commonly used in automobile. CVT consists of a belt clamped between two pulleys, which enables continuous ratio change under load. Apart from seamless ratio change, CVT allows internal combustion engine to operate at much efficient engine rotational speed independently from vehicle speed, therefore reducing fuel consumption and emission [1]. However, efficiency of CVT itself can be improved [2]. Low friction can reduce loss when sliding belt in the radial direction of the pulley, but causes slip in the circumferential direction. In this study, relationship between surface texture and friction anisotropy was investigated to improve tribological properties of pulley surface.

To investigate the relationship of surface texture and friction anisotropy under boundary lubrication, cylinder-on-disk type sliding test was conducted. The sliding test was conducted in four different directions, parallel, thirty degrees, sixty degrees, and perpendicular to the direction of the surface texture.

The experimental results show that the friction anisotropy was generated under boundary lubrication. The results also suggest that different texture patterns, which increase or decrease contact area within sliding surface, have an effect on both generation of friction anisotropy and friction coefficient.

Table 1 Dimension properties of simulation

Normal Load	[N]	20
Stroke	[mm]	10
Speed	[mm/s]	20
Lubricant	[μL]	100
Temparature	[℃]	80
Cycle		500
Lubricating oil		CVTF NS-3

REFERENCES
[1] B. Bonsen *et al.*, “Analysis of slip in a continuously variable transmission” Proceedings of IMECE’03, 2003.
[2] Drogen M. *et al.*, "Determination of Variator Robustness Under Macro Slip Conditions for a Push Belt CVT", SAE Technical Paper, 2004

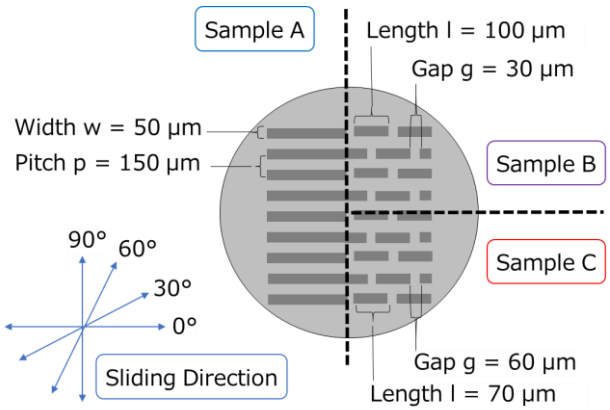

Fig. 1 Texture specimens

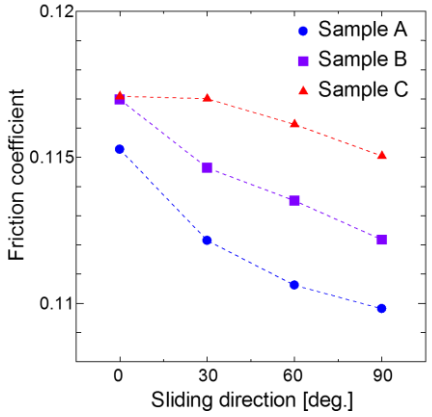

Fig. 3 Friction behavior