# LUBRICATION CHARACTERISTIC OF SURFACE TEXTURING UNDER RECIPROCATING MOTION

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## INTRODUCTION

Surface texturing is known as one of the approaches for the improvement of lubrication characteristic[1]. The lubrication characteristics on the sliding surface may vary depending on the shape, size, and arrangement of surface texturing. There are a few studies on lubrication characteristics of surface texturing during sliding movement of reciprocating machines[2]. However, how much these elements affect the characteristics have not been fully understood. This study focus on the arrangement of surface texturing under reciprocating motion to reduce friction loss. Numerical analysis of the lubrication characteristics is conducted in order to examine the optimum arrangement of surface texturing.

## ANALYSIS CONDITION AND METHOD

Figure 1 shows the analysis model. Figure 2 shows the textured slider. Table 1 shows the dimension of the slider and texturing. Numerical analysis is performed by solving the Reynolds equation using the finite element method. As the boundary conditions, ambient pressure and negative pressure are assumed to be atmospheric pressure.

## RESULT

Figure 3 shows a relationship between reduction ratio of friction loss with ratio of separate length. The friction loss reduces due to the texturing compared with the no texturing. Both of the groove type and the dimple type shown in Fig.2(a) and (b), it is found that the optimum ratio of separate length, *s/L* of texturing exist.

## REFERENCES

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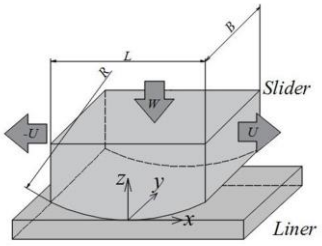
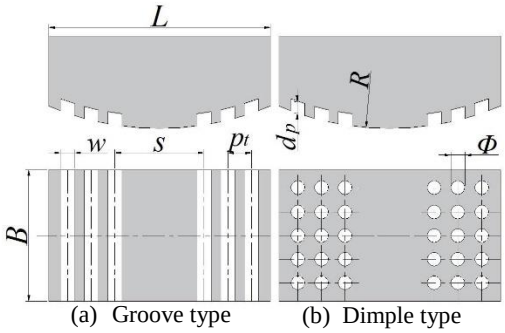



Fig.1 Analysis model




(a) Groove type (b) Dimple type

Fig.2 Textured slider

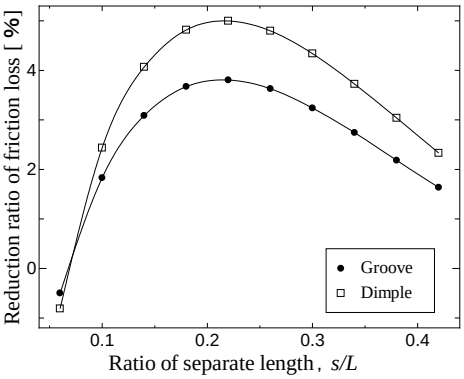



Fig.3 Reduction ratio of friction loss compared with no texturing versus separate length, *s/L*

Table 1 Dimension of Slider and Texturing

| | |
|---|---|
| *L/B* | 1.0 |
| Area density of texturing, *A* | 0.3 |
| Ratio of Pitch, $p_t / L$ | 0.06 |
| Ratio of Depth, $d_p / L$ | 0.004 |
| Ratio of Separate length, *s/L* | 0.06~0.42 |