

Effect of taper angle on processing load in forward extrusion

**Kouhei KONISHI^{*}, Teruo MATSUNO[†], Seiji MAYUMI[†], Yukinori TANIGUCHI[#] and
Shinichi ENOKI[#]**

^{*} Faculty of Advanced Engineering
National Institute of Technology, Nara College
22 Yata, Yamatokoriyama, Nara, 639-1080 Japan
e-mail: kuriiiip@gmail.com

[†] SAKAMURA INDUSTRIES, INC.
6-11-18 Hishie, Higashiosaka, Osaka, 578-0984 Japan

[#] Department of Mechanical Engineering
National Institute of Technology, Nara College
22 Yata, Yamatokoriyama, Nara, 639-1080 Japan
e-mail: enoki@mech.nara-k.ac.jp , taniguchi@mech.nara-k.ac.jp

ABSTRACT

In production site, there is actuality that forward extrusion processing is difficult when taper angle of die is no more than 2°. In the forward extrusion, engineers have decided the taper angle of die by their experiences. Aim of this study is to reveal the reason why the forward extrusion processing is difficult in the case of 2°. To know the reason, we simulated forming process with two-dimensional axisymmetric models under the same conditions. Each of two-dimensional axisymmetric models has different taper angle. Processing conditions are same reduction rate in area and taper angles from 25° to 2°. As a result, the smaller the taper angle, the bigger the processing load. To investigate the cause, we compared with contact pressure distributions in these angles. And then, the smaller the taper angle, the bigger the contact pressure distribution at the upper of taper. When the contact pressure is large, it seems that friction force is large and the processing load become large. From the above, in the case of 2°, processing load is large. Therefore, depending on the machine, it is difficult to process the blank.