

Pengembangan dan analisa hasil lintasan pahat proses roughing pada pemesinan ?Micro-Mold? = roughing tool path development and analysis of micro mold machining / Derris Surya

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Abstrak

[ABSTRAK

Permintaan akan produk-produk mikro yang sedang meningkat pesat dewasa ini menyebabkan proses manufaktur cetakan mikro mendapat perhatian dan penekanan lebih, guna mendapatkan pemahaman yang semakin mendalam untuk mencapai hasil akhir produk mikro yang semakin berkualitas [1-4]. Proses micromilling merupakan proses yang populer dalam memmanufaktur cetakan mikro karena kapabilitas dan fleksibilitas yang dimilikinya terkait proses pelepasan material terhadap benda kerja [1-3,5-7]. Proses manufaktur cetakan mikro dengan material steel ST41 dan alumunium AA 1100 berukuran 3 x 3 x 3 mm yang dilakukan dalam penelitian ini menggunakan proses pemesinan milling 3 axis terhadap kontur sculptured surface dan logo android dengan cutting tool berdiameter 0.1 mm sampai ukuran 2 mm.

Lintasan pahat yang dibuat telah menghasilkan permukaan produk dengan profil yang dikehendaki. Dilakukan pengambilan gambar SEM pada hasil pemesinan cetakan mikro ini, serta dilakukan analisis mengenai dua pola lintasan pahat yang dibuat dengan menggunakan software CAM untuk operasi roughing yang dikerjakan yaitu metode face milling (planar) dan cavity milling (contour) yang hasilnya menunjukkan bahwa metode cavity mill memerlukan machining time yang lebih singkat. Analisis dari perbandingan jumlah CL point yang terdapat pada bagian lintasan pahat yang serupa antara produk makro dan produk mikro juga dilakukan dan didapatkan bahwa densitas CL point pada lintasan pahat produk makro lebih besar dibandingkan yang dimiliki lintasan pahat produk mikro.;

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ABSTRACT

The increasing demand of micro products these days causes the manufacturing process of micro-molds gets more emphasis and attention in order to gain better quality of micro-products [1-4]. The micro milling process is popular as the chosen method to manufacture micro molds due to its capability and flexibility in machining operation [1-3,5-7]. In this research, the manufacturing processes of micro molds of 3 mm x 3 mm x 3 mm from steel ST41 and alumunium AA 1100 were carried out using 3 axis micro milling utilizes various cutting tools from 2 mm diameter to 0.1 mm of diameter. The designed tool path successfully produced the specified profile of the machined surface.

SEM photographs were taken to observe the machined surface and an analysis of two tool path generation methods of face milling area (planar) and cavity mill (contour) using CAM software was conducted and shorter cutting time for the cavity milling method was found as the result. Analysis of CL point density comparison between the micro molds and macro molds roughing tool path in the same region was also done with the comparable applied cutting parameters and the result shows that the macro mold roughing tool path has denser CL point than the other of the micro mold's. The increasing demand of micro products these days causes the manufacturing

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