

ABSTRACT

The removal of brass connectors from non-good top cover battery products at PT XYZ is still performed manually, resulting in low efficiency, high operator effort, and a risk of damaging the brass connectors during the removal process. In addition, the strong bond between the plastic material and the brass connector makes the separation process more difficult. This study aims to design a pneumatic-based brass connector removal device equipped with a heater to improve the efficiency of the removal process while enabling the brass connectors to be reused.

The research method began with problem identification through literature review, interviews, and field observations. The geometry, specifications, and material properties of the top cover battery were used to calculate the push-out force, design the punch die, and perform Finite Element Analysis (FEA). Subsequently, the required air cylinder bore diameter at a working pressure of 6 bar and a heating system with an operating temperature of 100 °C were determined as the basis for the overall device design.

The result of this study is a brass connector removal device that integrates a pneumatic pressing mechanism with a heating system. Based on the design and FEA results, the proposed device is expected to improve removal efficiency, reduce operator workload, minimize brass connector damage, and reduce material waste in the production process.

Keywords: *top cover battery, connector brass, pneumatic, air cylinder, heater, tool design.*

INTISARI

Proses pelepasan *brass connector* pada produk *top cover battery non-good* di PT XYZ masih dilakukan secara manual sehingga kurang efisien, membutuhkan tenaga operator yang besar, serta berisiko menyebabkan kerusakan pada *brass connector*. Selain itu, ikatan yang kuat antara material plastik dan *brass connector* menyebabkan proses pemisahan menjadi sulit. Penelitian ini bertujuan merancang alat pelepas *brass connector* berbasis sistem pneumatik yang dilengkapi *heater* untuk meningkatkan efisiensi proses pelepasan dan memungkinkan *brass connector* digunakan kembali.

Metode penelitian diawali dengan identifikasi masalah, studi literatur, wawancara, dan observasi lapangan. Data geometri, spesifikasi, dan sifat material *top cover battery* digunakan untuk menghitung *push out force*, merancang *punch die*, dan melakukan analisis *Finite Element Analysis* (FEA). Selanjutnya ditentukan diameter *bore air cylinder* pada tekanan kerja 6 bar dan dirancang sistem pemanas dengan temperatur kerja 100 °C sebagai dasar perancangan alat.

Hasil penelitian berupa rancangan alat pelepas *brass connector* yang mengombinasikan sistem pneumatik dan *heater*. Berdasarkan hasil perancangan dan analisis FEA, alat mampu memenuhi kebutuhan gaya pelepasan serta diharapkan meningkatkan efisiensi proses, mengurangi beban kerja operator, meminimalkan kerusakan *brass connector*, dan mengurangi limbah material pada proses produksi.

Kata kunci: *top cover battery*, *connector brass*, pneumatik, *air cylinder*, *heater*, perancangan alat.