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## **Thu-Mo-Po4.01-02 [1]: A uniform pressure actuator with high forming efficiency based on the pulsed magnet manufacturing technique**

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In this paper, a novel Uniform Pressure Actuator (UPA) is designed and analyzed based upon the manufacturing technique of pulsed magnets, which has high forming efficiency as well as high strength. The UPA is a specially designed coil for use in electromagnetic forming (EMF) process, which offers a uniform pressure distribution in flat sheet forming. To improve the strength of the coil, traditional UPAs are usually fabricated by machining copper blocks. This way makes the thick cross-section of the wire and the wide turn spacing, which lead to a decrease in the current density and the magnetic flux density, resulting in a low forming efficiency of traditional UPAs. To improve the forming efficiency, a novel UPA is designed by closely winding the thin copper conductor. And in order to solve the problem of low strength of the thin copper conductor, the manufacturing technique of pulsed magnets is introduced. Considering the flat structure characteristic of the UPA, A new process of winding composite materials in both transverse and longitudinal directions is employed. The theoretical analysis for the forming efficiency is carried out. Both the numerical and experimental techniques are used to calculate and compare the forming efficiency of UPA. After that, destructive experiment is conducted to test the coil strength. The results show that the designed UPA by the manufacturing technique of pulsed magnets has considerable strength with higher forming efficiency compared to the traditional ones.

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