

DESAIN ENGINE CONE DAN KOMPONEN AFTERBURNER UNTUK MINI ELECTRIC JET ENGINE

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ABSTRAK

Electric Ducted Fan (EDF) merupakan sebuah pemodelan jet engine dalam ukuran kecil yang digerakkan oleh motor elektrik berenergi listrik dan berfungsi untuk menghasilkan gaya dorong (thrust). Mini Electric Jet Engine merupakan perpaduan EDF dengan penambahan sistem pembakaran yang menyerupai konsep afterburner engine. Tujuan penelitian ini adalah untuk mendapatkan konfigurasi serta geometri engine cone dan komponen afterburner untuk mini electric jet engine dan untuk mendapatkan nilai pertambahan kecepatan aliran udara pada mini electric jet engine dengan adanya penambahan engine.

Mini Electric Jet Engine ini menerapkan konsep yang menyerupai sistem kerja afterburner pada turbojet engine sesungguhnya. Penelitian ini menggunakan metode numerik dengan software CATIA V5R20 untuk mendapatkan konfigurasi dan geometri mini electric jet engine serta ANSYS untuk nilai pertambahan kecepatannya. Variasi yang digunakan pada pemodelan engine cone afterburner adalah 2 variasi bentuk dan 3 variasi panjang yaitu 192 mm, 242 mm, dan 292 mm pada masing-masing variasi bentuk.

Ukuran diameter inlet mini electric jet engine adalah 70 mm dengan outlet 56 mm. Panjang keseluruhan mini electric jet engine adalah 250 mm. Diameter luar fuel pipe berukuran 3 mm dengan ketebalan pipa 0.5 mm dan memiliki dimensi panjang 55 mm dan bagian melingkar berdiameter 33 mm. Diameter flame holder pada bagian yang menempel dengan motor adalah 28 mm dan 33 mm pada bagian lainnya sepanjang 15 mm dimensi panjang adalah 50 mm dengan ketebalan 0.3 mm dan memiliki. Hasil penelitian menunjukkan bahwa penambahan engine cone afterburner pada Mini Electric Jet Engine dapat menghasilkan pertambahan kecepatan pada bagian outlet lebih dari 7 m/s dengan prosentase tertinggi mendekati 22%.

Kata Kunci: Afterburner, Electric Ducted Fan (EDF), Engine cone, Mini Electric Jet Engine.

ENGINE CONE DESIGN AND AFTERBURNER COMPONENTS FOR MINI ELECTRIC JET ENGINE

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ABSTRACT

Electric Ducted Fan (EDF) is a small-size jet engine model driven by electrically electric motors and serves to produce thrust. Mini Electric Jet Engine is a combination of EDF with the addition of a combustion system that resembles the afterburner engine concept. The purpose of this research is to obtain the configuration, geometry of cone engine and afterburner components for mini electric jet engine and to obtain the value of air flow velocity increase on mini electric jet engine with the addition of engine.

This Mini Electric Jet Engine applies a concept that resembles the afterburner system in the actual turbojet engine. This study used a numerical method with CATIA V5R20 software to obtain the configuration and geometry of the mini electric jet engine and ANSYS for value of its speed increase. Variations is used on modeling of engine cone afterburner were 2 variations of form and 3 variations of length i.e. 192 mm, 242 mm, and 292 mm on each variations of form.

The diameter of the mini electric jet engine inlet is 70 mm with a 56 mm outlet. The overall length of a mini electric jet engine is 250 mm. The outer diameter of the fuel pipe is 3 mm with a pipe thickness of 0.5 mm and has a dimension of 55 mm in length and a circular section with a diameter of 33 mm. The diameter of the flame holder on the part attached to the motor is 28 mm and 33 mm on the other side along the 15 mm long dimension is 50 mm with a thickness of 0.3 mm. The results showed that the addition of engine cone afterburner on the Mini Electric Jet Engine can result in increasing speed at the outlet part more than 7 m / s with the highest percentage approaching 22%.

Keywords: Afterburner, Electric Ducted Fan (EDF), Engine cone, Mini Electric Jet Engine.

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