ABSTRAK

Pada dasarnya screw jack berfungsi untuk mengangkat beban berat ke posisi yang dikehendaki dengan gaya yang kecil dan digerakan tangan. Dalam tugas akhir ini penulis melakukan Analisa modifikasi *screw jack* dari prinsip kerja manual ke prinsip kerja elektrik. Perhitungan daya teoritis, torsi pada poros ulir, torsi yang ditansmisikan pada roda gigi, serta perencanaan roda gigi lurus dan pemilihan material pendukung dilakukan disini. Dari Analisa yang dilakukan didapat hasil sebagai berikut: dimensi screw jack elektrik yang didapat ialah Panjang: 341mm x Lebar: 257.6mm x Tinggi: 280.6mm, Daya teoritis didapat sebesar 5379.3Watt dengan jumlah putaran 1850rpm, Daya aktual didapat sebesar 6200Watt, merek LENZE dengan jumlah putaran 1850rpm, torsi rata-rata yang dibutuhkan screw jack manual sebesar 36.2Nm, torsi yang dibutuhkan screw jack dengan penambahan gearbox sebesar 1.61Nm, roda gigi yang digunakan dalam proses perancangan gearbox ialah roda gigi lurus, dengan spesifikasi sebagai berikut: Diameter poros 1 (D_{S1}): 18mm dan Diameter poros 2 (D_{S2}): 28mm. material yang digunakan pada roda gigi ialah S45C dan material yang digunakan pada poros ialah S35C-D. roda gigi A: modul roda gigi (m): 3, sudut tekan (α_0): 20^0, perbandingan reduksi (i): 5, jumlah gigi 1 (Z_1): 15 dan jumlah gigi 2 (Z_2): 75, Diameter lingkaran jarak bagi 1 (D_{01}): 45mm dan lingkaran jarak bagi 2 (D_{02}): 225mm, diameter kepala 1 (D_{K1}): 51mm dan diameter kepala 2 (D_{K2}): 231mm, diameter kaki 1 (D_{f1}): 37.5mm dan diameter kaki 2 (D_{f2}): 217.5mm, serta roda gigi B: modul roda gigi (m): 3, sudut tekan (α_0): 20^0, perbandingan reduksi (i): 3, jumlah gigi 1 (Z_1): 15 dan jumlah gigi 2 (Z_2): 45, Diameter lingkaran jarak bagi 1 (D_{01}): 45mm dan Diameter lingkaran jarak bagi 2 (D_{02}): 135mm, diameter kepala 1 (D_{K1}): 51mm dan diameter kepala 2 (D_{K2}): 141mm, diameter kaki 1 (D_{f1}): 37.5mm dan diameter kaki 2 (D_{f2}): 127.5mm.

Kata kunci: Screw jack, Daya, Torsi, Roda gigi lurus

ABSTRACT

Basically, the function of screw jack is for lifting dead weight to desired position with a small force and move by hand. In this final project, author perform modification analysis about screw jack from manual working principle to electrically working principle. Theoretical power calculation, the torque on threaded shaft, the torque that gear is transmitted, along straight gear planning and selection of supporting materials is done here. From analysis that the following result is done, electric screw jack dimension is Long: 341mm x Large: 257.6mm x High: 280.6mm. theoretical power is 5379.3 watt, with a number of rounds 1850rpm, actual power is 6200watt, brand LENZE with number of rounds is 1850rpm, the average torque that manual screw jack is required 36.2Nm, the screw jack torque is required with the addition of gearbox: 1.61Nm, the gear is used in the process of designing a gearbox are straight gears with following specification as follow: the first pivot diameter (D_{S1}): 18mm and the second pivot diameter (D_{S2}): 28mm. Material is used on the gear is S45C and materials is used on the pivot is S35C-D, gear A: gear modul *(m)*: 3, press corner (α_0): 20^0, comparison of reduction *(i)*: 5, gear amount 1 (Z_1): 15 and gear amount 2 (Z_2): 75, diameter of circle for 1 spacing (D_{01}): 45mm and diameter of circle for 2 spacing (D_{02}): 225mm, head diameter 1 (D_{K1}): 51mm and head diameter 2 (D_{K2}): 231mm, foot diameter 1 (D_{f1}): 37.5mm and foot diameter 2 (D_{f2}): 217.5mm, then gear B: gear modul *(m)*: 3, press corner (α_0): 20^0, comparison of reduction *(i)*: 3, gear amount 1 (Z_1): 15 and gear amount 2 (Z_2): 45, Diameter circle for 1 spacing (D_{01}): 45mm and Diameter circle for 2 spacing (D_{02}): 135mm, head diameter 1 (D_{K1}): 51mm and head diameter 2 (D_{K2}): 141mm, foot diameter 1 (D_{f1}): 37.5mm and foot diameter 2 (D_{f2}): 127.5mm.

Keywords: Screw jack, Power, Torque, Gear