NATIONAL CONFERENCE ON INNOVATIVE TRENDS IN ENGINEERING & TECHNOLOGY – NITET-18
16-17th March 2018
NOVATEUR PUBLICATIONS
International Journal Of Innovations in Engineering Research And Technology [IJIERT]
ISSN: 2394-3696

ANALYSIS OF MAGNETIC AXIAL COUPLING FOR POWER & TORQUE TRANSMISSION

MR. AMIT PAWAR

MR. SUBHAM DUDYAL

MR. AJAY SARADE

PROF. G.R. DESHPANDE
Student, Mechanical Engineering Department, A.G.P.I.T., Solapur
Asst. Prof., Mechanical Engineering Department, A.G.P.I.T., Solapur

ABSTRACT
Magnetic couplings are of great interest in many industrial applications. They can transmit a torque from a primary driver to a follower without mechanical contact. As the torque could be transmitted across a separation wall, axial field magnetic couplings are well suited for use in isolated systems such as vacuum or high pressure vessels, moreover, they present a maximum transmissible torque (pull-out torque) giving an intrinsic overload protection.
A theoretical analysis of an axial magnetic coupling is presented, leading to new closed-form expressions for the magnetic axial-force and torque. These expressions are obtained by using a two-dimensional (2-D) approximation of the magnetic coupling geometry (mean radius model). The analytical method is based on the solution of Laplace's and Poisson's equations by the separation of variables method. The influence of geometrical parameters such as number of pole pairs and air-gap length is studied. Magnetic field distribution, axial force and torque computed with the proposed 2-D analytical model are compared with those obtained from 3-D finite elements simulations and experimental results.

KEYWORDS: Magnetic coupling, geometrical parameters, Simulation, etc.