COMETa 2012
1st INTERNATIONAL SCIENTIFIC CONFERENCE
28th - 30th November 2012.
Jahorina, B&H, Republic of Srpska
University of East Sarajevo
Faculty of Mechanical Engineering
Conference on Mechanical Engineering Technologies and Applications

STRESS AND STRAIN STATE OF CYCLOID DISC

Mirko Blagojević[1], Zorica Đorđević[2], Vesna Marjanović[3], Nenad Marjanović[4], Blaža Stojanović[5], Rodoljub Vujanac[6]

Abstract: *This paper deals with stress and strain state analysis for cycloid disk, as a vital element at cycloidal speed reducer, for a case when machining tolerances exist. Three cases of the most critical meshing have been analysed: single, double and triple meshing. Values of forces between the rollers of the stationary central gear and cycloid gear were analytically calculated. Stress and strain state analysis were numerically realised by application of FEM. The whole range of models with different cases of load distribution has been made. Obtained results are showed in a form of figures, diagrams and tables. Finally, conclusions were made, based on realised analysis.*

Keywords: cycloidal speed reducer, cycloid disc, stress state, strain state

1. INTRODUCTION

The most important application of the cycloid profile gears (cycloid gears) is their use at cycloidal speed reducers. Due to a range of good characteristics they posses, and firstly due to a big gear ration and low losses, cycloidal speed reducers are very much used within modern industrial machines. Considering the fact that they posses very compact design, they can be readily applied for devices with space limitations. Model of the single-stage cycloidal speed reducer is shown in Figure 1.

The most important element of the cycloidal speed reducer is certainly cycloid gear. As a teeth profile of the cycloid gear, equidistant of the shortened epitrochoid is the most frequently used. Cycloidal gear teeth are meshed with rollers of the stationary central disk. For theoretical case, when machining tolerances are not considered, half

[1] dr Mirko Blagojević, Kragujevac, Fakultet inženjerskih nauka Univerziteta u Kragujevcu, mirkob@kg.ac.rs
[2] dr Zorica Đorđević, Kragujevac, Fakultet inženjerskih nauka Univerziteta u Kragujevcu, zoricadj@kg.ac.rs
[3] dr Vesna Marjanović, Kragujevac, Fakultet inženjerskih nauka Univerziteta u Kragujevcu, vmarjanovic@kg.ac.rs
[4] dr Nenad Marjanović, Kragujevac, Fakultet inženjerskih nauka Univerziteta u Kragujevcu, nesam@kg.ac.rs
[5] mr Blaža Stojanović, Kragujevac, Fakultet inženjerskih nauka Univerziteta u Kragujevcu, blaza@kg.ac.rs
[6] mr Rodoljub Vujanac, Kragujevac, Fakultet inženjerskih nauka Univerziteta u Kragujevcu, vujanac@kg.ac.rs