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PRACA DOKTORSKA

**Wpływ wybranych parametrów konstrukcyjnych
jednego stopnia przekładni zębatej na drugi
w aspekcie jej stanu dynamicznego**

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Gliwice 2013

Summary: **“The influence of selected constructional parameters of first gear stage on the second gear stage in the aspect of the dynamic state of the gear”**

The PhD thesis concerns the problem of influence exerted by selected constructional parameters over interdental dynamic load of given gear stage. The influence is analyzed in the aspect of interaction between adjacent gear stages.

The main purpose of the work is the investigation of reciprocal influences between selected constructional parameters and dynamic relationships in adjacent gear stages of cylinder gear.

The presented topic of the investigation was implemented as dynamic gear model. For the study purposes constructed was an appropriate dynamic two-stage cylinder gear model. After successfully performed verification and validation, the model was applied to simulation investigations. The results of conducted compute simulation were used to perform dynamic analysis taking into consideration the interaction between constructional parameters of the first gear stage and dynamic of the adjacent stage. Furthermore, the results were used to perform conclusions drawn from the analysis. Considered constructional parameters of the gear were: torsional stiffness of the intermediate shaft, transverse contact ratio and distribution of rotating masses in the individual gear stages. Obtained investigation results allowed to broaden the state of the art in the area of multistage gear dynamic.

The selected terminal conclusions are as follows:

- As a result of mutual dynamic interaction between adjacent gear stages, in the case of two-stage gear, disappearance of characteristic for one stage-gear nonlinear phenomenon can be observed.
- Inter-stage energy transmission of vibration first and foremost depends on torsion spring stiffness of the intermediate shaft. The inter-stage vibration energy transmission influences on synergistic interaction between the first and the second gear stage in the aspect of dynamic state of multistage gear.
- High torsion spring stiffness of the intermediate shaft boosts dynamic activity of every particular gear stage in the form of resonance reactions on the natural frequency.

M. Długość.