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[1.] Marián SEMANČÍK, [2.] Slavko PAVLENKO, [3.] Robert GREGA

# ANALYSIS MULTI-OUTPUT TRANSMISSION MECHANISMS

[1-3.] Technical University of Košice, Faculty of Manufacturing Technologies, Department of Technical Devices Design, Sturova 31, Prešov, SLOVAKIA

***Abstract:*** *This article describes output transmission mechanisms. Transmission (transmission mechanism) transmits or distributes power from the prime mover to the driven machine. He changes the frequency of speed, torque and driving forces. Transfer changes rotary motion into rotary motion of other parameters or on straight sliding movement and vice versa.*
***Keywords:*** *multistage transmission mechanism, outputs*

## INTRODUCTION

*Currently it is possible in technical and technological experience to watch a permanent increase in demand for both quality and accuracy of production equipment and technology, but also of industrial and non-industrial areas. This requirement is particularly associated with the search for more effective design solutions different parts of machine technology. This is also the search for suitable alternatives to transmission mechanisms resulting in the possibility of their application.*

*In terms of output, the transmission system can be divided into:*

- *One outputs – group of one-output transmission is characterized by a single output shaft.*
- *Multiple outputs – a group of multi-output transmission is specific in terms of the output shaft. Multi–output transmission may have two or more output shafts. Number of outputs, respectively output shafts $n_{vj}$ is based on the number of jointly engaging sprocket $n_{zi}$ mounted on the inner wheel is defined by: $n_{vj} = n_{zi} - 1$.*

## MULTIPLE OUTPUTS TRANSMISSION SYSTEM

*Multi–output transmission mechanisms can be divided into:*

*1) Transfers to the output of the drive shaft against the drive shaft,*
*2) Transfers retro driven output shaft,*
*3) Transfers with double–sided output.*

*Example multi-output transfer is in the figure 1st and 2nd. This three-output transmission mechanism was designed on KNTZ FVT TU in Košice. The main objective was to contribute to the expansion of assortment of gear mechanisms, resulting in the possibility of their application in machinery manufacturing technology.*

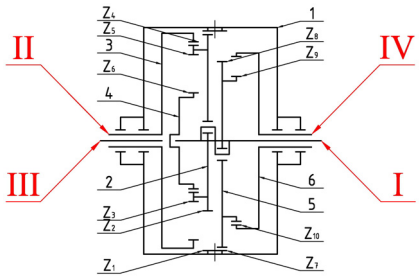


*Figure 1. The principal scheme of a two sided three-output gear mechanism*

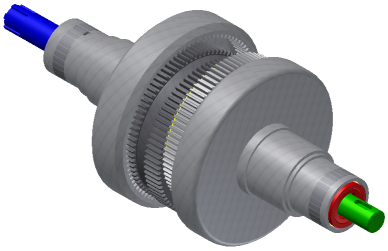

*Figure 2. Model of three-output gear mechanism*

*Multiple outputs gear transmission mechanisms are mechanisms that can be implemented with tooth system:*

- *involute – to conventional modules $m \geq 1$ mm*
- *with small modules with $m < 1$ mm*
- *not-involute (cycloidal) – the size of the module according to the specific design of the transmission mechanism*
- *not-teeth ($m = 0$) – like friction gears*

## PROPOSAL FOR MEASURING MULTI-OUTPUT TRANSMISSION MECHANISMS OF THE STAND

*Based on the known solutions-stage multi-output transmission mechanisms are suitable for two basic solutions:*

1. *Proposed new test equipment (of the stand) for testing the gear mechanism at the output shaft of each load separately and for the two output shafts respectively load of all output shafts. This proposal is the realization of a new measuring device designed so that each output shaft is loaded (braked) separately. Measurement of the transfer will be carried out while individually on each output shaft respectively along with other output shaft or all shafts together. An example of this principle over the circular solution is shown in figure 3rd.*

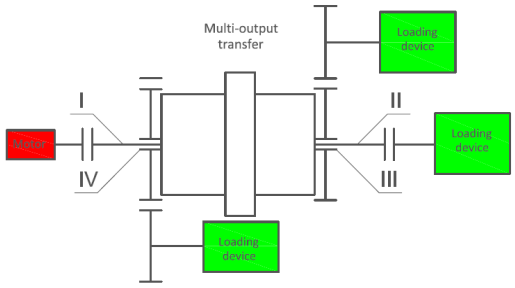


*Figure 3. Schematic measurement of the stand with a separate shaft driven load*

2. *The principle of measuring more stand-circuit transmission mechanisms is based on the principle Nieman at the load of gear (tooth system), the bias caused by cross-shaft driven two mutually related transfers. Such a solution is a measurement of the stand can be considered very useful especially because it gearing at full load power is only needed to cover losses in the respective transfer mechanism. Example Schematic of the stand-circuit over the Nieman principle is shown in figure 4th.*

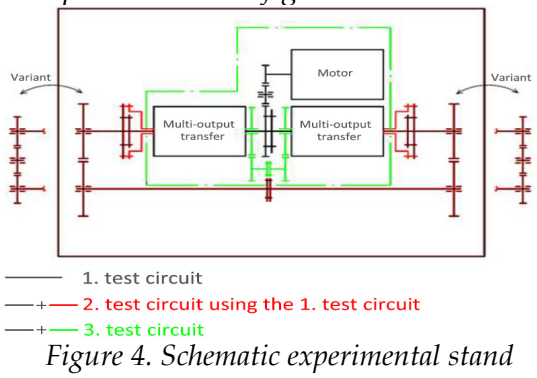


*Figure 4. Schematic experimental stand*

## CONCLUSIONS

*To be considered advantageous alternative no.2, thus measuring stend transmission mechanisms based on the Nieman principle. Functional models are verified under static load under DC rotation shaft. As the most important asset we can say that at full load tooth system is only needed for power losses in the respective transfer mechanism. Additional amenities may be noted that the experimental stand is thus possible to test all three sets of gears connected to each other via the output shaft (I-II, II-III, III-III), either individually or all at once. The principles of testing saves energy needed to carry out tests and also eliminates the need for special arrangements necessary to draw the load.*

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