

CNC Technology and New Calculation Methods Permit Efficient System Independent Manufacturing of Spiral Bevel Gears

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American Gear Manufacturers Association



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ABSTRACT:

A strictly applied CNC technology on machines for cutting or grinding spiral bevel gears allows the machining of different gearing systems on one and the same machine. Based on this, the selection of the most favorable gearing system is possible, based on economical issues, load bearing capacity and noise characteristics.

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1. Introduction

CNC technology offers new opportunities for the manufacture of bevel gears. Whilst traditionally, the purchase of a specific machine at the same time determined the system, CNC technology permits the processing of bevel gears using a wide variety of methods. The ideological dispute between "tapered tooth or parallel depth tooth" and "single indexing or continuous indexing" no longer leads to an irreversible fundamental decision. The systems have instead become penetrable, and with existing CNC machinery it is possible to select this or that system according to factual considerations at a later date.

This essay, by giving a brief overview of the machines and systems available on the market or currently at the development stage, plans to discuss the possibility of processing different types of gear cutting on one and the same machine. Thereafter, the characteristics of gear cutting systems will be contrasted with one another, and finally, the possibilities of gear cutting optimization offered by current calculation and manufacturing technology in connection with CNC measurement technology will be discussed.

2. CNC machine systems

2.1 Soviet Union - registration (figure 1)

The first machine known to us with a cross slide working at the work piece side is the machine, shown in figure 1, according to the russian application for patent SU 724487 A, dated March 30, 1980. On the left figure's side, the cross slide with its ways "3" and "12" describes the circular motion of the tool. The actuation of the cross slide is a mechanical - hydraulic system.

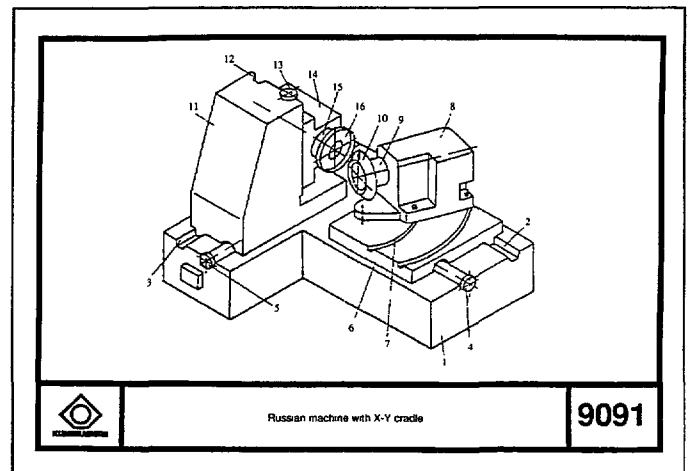


Figure 1: Russian machine with X-Y cradle