FACTORS WHICH DEFINE THE ACCURACY CHARACTERISTICS OF THE FELLOW'S CUTTER TOOTING TECHNOLOGIC SYSTEM

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Abstract: The actual work presents the factors, which influence the accuracy characteristics of the fellow's cutter tooting technologic system. These factors are grouped according to three criteria: the manifestation place of the factor; the manifestation moment of the factor and the influence level of the factor. Dispersions of the dimensional characteristic of the mortised by fellow's cutter toothed rim, are presented.

1. THEORETIC MATTERS

The functional characteristics of the fellow's cutter tooting technological system are grouped as it fallows: technological characteristics, precision characteristics, static and dynamic characteristics and thermal characteristics.

The mentioned characteristics are also determined by the functional characteristics of the technological system's components. Therefore, a great number of factors that influence the execution precision of the toothed wheel appear. These factors can be selected according to two basic criteria:

1. By the manifestation place, the manifestation moment and the carried out influence level (fig. 1);

2. By the constructive-functional characteristics of the tooting machine, the cutting process, the tooting wheel-piece (fig. 2).

Each of the influence factors can be theoretical and practical analyzed. For this purpose, are selectively presented the diagrams from figures 3.

The machine-tool influence upon the execution accuracy of the toothed wheel is studied with the help of the dressing natural (practical) dispersion. According to this, two of its' categories are taken into consideration, fig. 3:

1. The natural dispersion generated by the quality of the tooting technological system (curve 1);

2. The natural dispersion generated by the quality of the machine tool (curve 2).

From the diagram, the next relation can be deduced:

$$\Delta T_p = T_{pSA} - T_{pmu} \ , \tag{1}$$

in which:

- T_{pSA} represents the execution tolerance of the toothed wheel and determined by the quality of the tooting technological system;

- T_{pmu} represents the execution tolerance of the toothed wheel and determined only by the quality of the machine-tool;

- the measure ΔT_p selects the way in which the quality characteristics of the cutter, of the facility and of the wheel-piece influence the execution precision-toothed wheel.
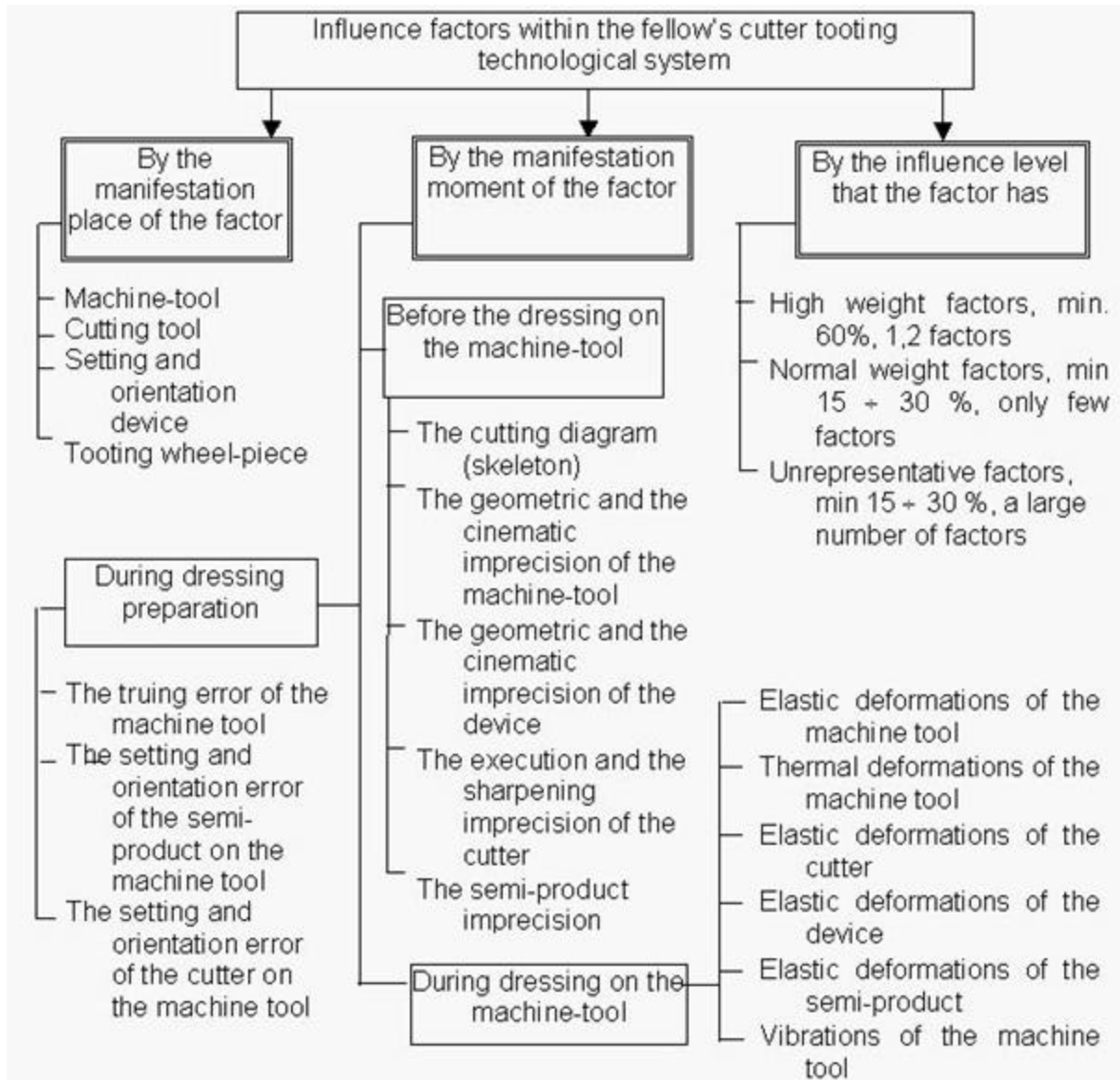

Fig. 1. Classification of the factors that define the accuracy characteristics of the fellow's cutter tooting technologic system

Along with the mentioned factors the influence of the technologic system is also presented. These factors are represented by:

- the cutting regime parameters;
- the cutting forces;
- the installing accuracy of the tooting wheel-piece on the tool-machine;
- the constructive characteristics of the tooting gear wheel defined by the number of the teeth;
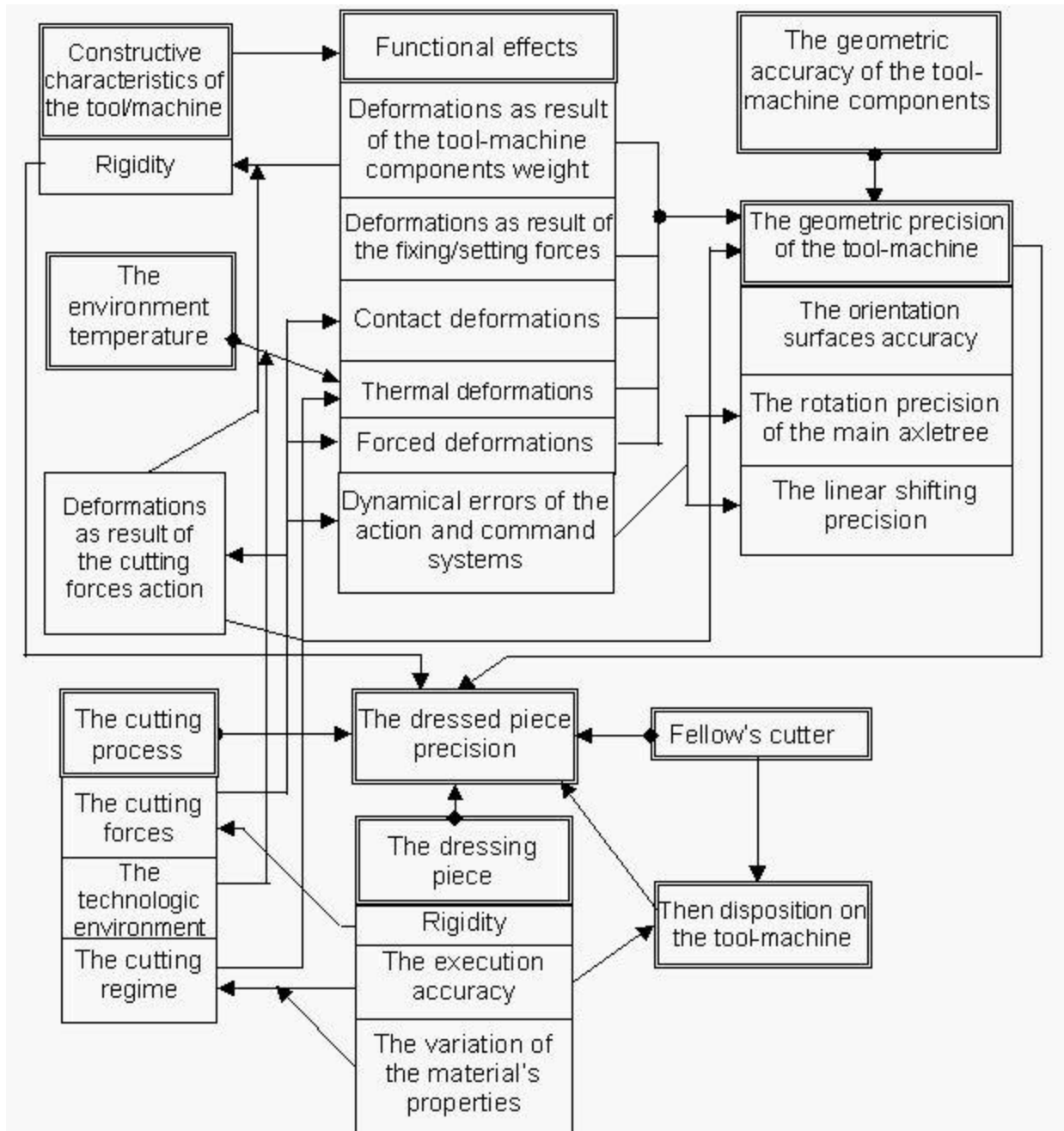- rigidity of the piece during the tooting process, etc.

Fig. 2. Factors that influence the dressing accuracy within the fellow's cutter tooting technologic system

The radial/radian beat AB_r of the disposed on the tool-machine wheel-piece, influence upon the accuracy of the mortised by fellow's cutter tooth construction: a – form error f_f, b – cumulated step discrepancy F_p.

2. CONCLUSIONS

The spreading field values of the dimensional characteristic of the mortised fellow's cutter determines toothed rim by the next factors: the tool-machine, the wheel-piece, cutting tool, the dresses material, the work environment.
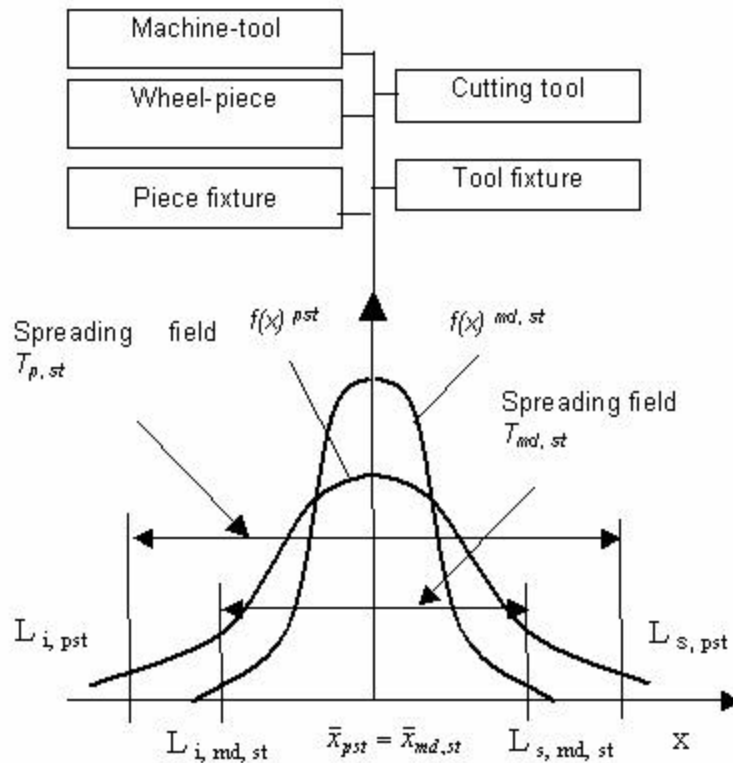
Fig. 3. Dispersions of the dimensional characteristic of the mortised by fellow's cutter toothed rim:
$f(x)^{pst}$ – dressing natural dispersion; $f(x)^{md, st}$ – the natural dispersion of the dressing that corresponds only to the machine-tool influence

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