Computer aided set-up and fixture planning for horizontal machining centres (with regard to prismatic parts)

PhD Thesis

by

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1. **Thesis**

The domain of fixture solutions problem is identified, the task of fixture planning is fully structured and the partial tasks are determined. The partial tasks of fixture are the plane locating, the side locating and the clamping.

2. Thesis

I have ascertained that the complete fixture solutions for prismatic parts are not typical, however it is possible to define the typical solutions for the partial tasks of fixture. I have researched and systematized for prismatic workpieces the typical solution of partial tasks for plane locating, side locating and clamping.

3. Thesis

I have identified and systematized for prismatic workpieces the suitable surfaces for plane locating, side locating and clamping. To take cognisance of suitability of any surface for plane locating, side locating or clamping there are suitability criteria developed.

4. Thesis

I have divided the relationships between surfaces of workpiece into loosely and strictly tolerance-related connections.

The group of loosely tolerance-related connections consists of accuracy related requirements, which can be achieved even in cases when the connected surfaces are machined in two separate clampings.

The group of strictly tolerance-related connections consists of accuracy related requirements, which can be achieved only with difficulty in cases when the connected surfaces are machined in two separate clampings and they need a high accuracy of the fixture and of the locating element of the workpiece, hence these features ought to be machined always in one clamping.

5. Thesis

I have pointed to the necessity of the integrated handling of tasks of the set-up planning and the fixture solution. I have divided the new methodology which is suitable for set-up and fixture planning in an integrated system. There are four strategies devised for the solving of set-up and fixture.

6. Thesis

I have developed two rule based expert systems, one for feature based workpiece modelling and one for solving the set-up and fixture solutions which are implemented in Visual Prolog programming language.