MILLING AND BORING CNC MACHINE-TOOL WITH CONTINUOUS INDEXABLE PROCESSING HEAD

Contracting authority: Management Authority for Scientific Research, Innovation and Technological Transfer, AMCSIT, Bucharest Polytechnic,

Innovation program. Modulus 1. Product-systems development,

Project type: CDI- oriented,

Acronym proposal: MAFCAPINDEX,

Contractor: S.C. Emsil Techtrans S.R.L., Oradea,

Project manager: ing. Mânzat Silviu,

Partners: University of Oradea,
Project head: Ph. Dr. Eng. Rus Alexandru,

Realization time of project: 17.10.2008- 30.09.2010,

Total value of project: 4.836.000 [lei],

Project value, (state budget source): 1.995.000 [lei],

- ## Project description

The project propose the realization of an functional model of continuous indexable processing head and the prototype of an milling and boring CNC machine-tool, with horizontal spindle and T frame.

The innovative character of proposal project consists of in adaptation on a milling and boring CNC machine-tool of a continuous indexable processing head. The processing head, indexable on two axes, offer the possibility of automatic positioning of spindle in a lot of work position, given possibility to process a high variety of surface.

The advantages of new continuous indexable processing head are:

- the possibility to process any point in space, with low energy consumption , approximately 40 KW. Practically is possible to mill very complex surface, (mould, pieces for automobiles and aviation industries, etc.), using 5 CNC axes, 3 linear axes and 2 rotational axes,
- increase the labour productivity on milling and boring machine, reducing the time for spindle orientation in comparison with manual positioning of milling head,
- increase the rigidity of milling head, the carcasse of milling head being indexed with high carrying frontal sprocket wheel coupling,
- high precision positioning of spindle,
- provide repeatable positioning of spindle,

- ## General objectives

The aim of S.C. Emsil Techtrans S.R.L. Oradea is to produce a new milling head, competitive on internal and external market due the technical characteristics and the price,

The general objectives of project:

1. projection and realization of milling and boring machine with continuous indexable processing head prototype,

1.1. projection and realization of an experimental model of continuous indexable processing head,

1.2. projection of milling and boring machine with continuous indexable processing head,

1.3. The built up of milling and boring machine with continuous indexable processing head prototype,

1.4. Attempt of milling and boring machine prototype,

2. Introducing in fabrication of new milling and boring machine,

3. Promote the new milling machine on the machine-tools market,

- **Stages and activities in research project realization**

Stage I. STUDIES AND ANALYZES LOOKING PROCESSING WITH CONTINUOUS INDEXABLE HEAD – 27.01.2009,

StageI.1.(A2.1)- Studies and analyzes looking processing with indexable head,

Stage II. PROJECTION AND REALIZATION OF AN EXPERIMENTAL MODEL OF CONTINUOUS INDEXABLE PROCESSING HEAD,

Stage II.2.(A2.2)- Projection of an experimental model of continuous indexable processing head,

Stage II.2.(SCI) – Technical fezability studies,

Stage II.3.(A2.3)- Realization of an experimental model of continuous indexable processing head,

Stage II.4.(A2.4)- Testing and verification of experimental model of continuous indexable processing head,

Stage II.5.(A2.5) – Conditions of contract, initial conditions,

Stage III. PROJECTION OF MILLING AND BORING MACHINE WITH CONTINUOUS INDEXABLE PROCESSING HEAD – 1.12.2009

Stage III.1(A3.1) – Technical and economical analyses documentation elaboration: technical and economical offer, project theme elaboration, studies looking assimilation opportunity of machine,

Stage III.2(A3.2)- General conception of machine,

Stage III.3(A3.3)- Basic structure execution project elaboration: casting pieces, welding pieces, spindle, ball-screws,

Stage III.4(A3.3)- Basic structure complementary subassembly project elaboration: hydrostatic guiding, spindle compensation, equilibration, optional dispositives and accessories,

Stage III.5(A3.3)- Electrical and hydraulically scheme elaboration,

Stage III.6(A3.3)- NC modulus program elaboration,

Stage III.7.(SCE) – Technical fezability studies,

Stage IV. THE BUILT UP OF MILLING AND BORING MACHINE WITH CONTINUOUS INDEXABLE PROCESSING HEAD PROTOTYPE. ATTEMPT OF MACHINE PROTOTYPE – 30.09.2010

Stage IV.1(A3.3)- Built up of casting and welding pieces and subassembly,

Stage IV.2(A3.3)- Pieces processing, acquisition of import pieces,

Stage IV.3(A3.3)- Make ready and assembly the new components: tools store, cam manipulators, continuous indexable processing head subassembly,

Stage IV.4(A3.3)- General montage of machine,

Stage IV.5(A3.3)- Tests and attempts of milling and boring machine prototype in concordance with conditions of contract,

Stage IV.6(A3.4)- Machine-book elaboration,

Stage IV.7(A2.6)- Functionality presentation and demonstration of continuous indexable processing head,

Stage IV.8(PCI)- Patents elaboration and deposition after CI activities,

Stage V. Account of economical effects due the new milling machine fabrication- 30.09.2009