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# Implementation of Automatic Identification Technology in a Process of Fixture Assembly/Disassembly

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*Radio Frequency Identification (RFID) technology presents automatic identification technology that can be used in product life cycle various phases, especially in the manufacturing phase. The analysis of possible application of RFID technology in machining and inspection operations for fixture manufacturing assembly/disassembly process is presented in this paper. Furthermore, assemble/disassemble fixture manufacturing system structure and conception is presented. An analysis involves hardware and software components that the designed system for assembly/disassembly needs to have. Suggested system verification was done in laboratory conditions. Verification uses ninety-six parts and adequate fixtures. The paper concludes with final remarks, discussing advantages and disadvantages of the developed system.*

**Keywords: fixture, automatic identification, RFID technology**

## 0 INTRODUCTION

Modern manufacturing is characterized by large product ranges, frequent changes of production programmes, constant demands for higher product quality, etc. Two important factors which allow the integration of the mentioned characteristics are scheduling and organisation. Scheduling represents the allocation of scarce sources to tasks in a definite period of time [1]. One of the basic requirements of every production system is production optimization, which is the minimization of production time and costs, on the one hand, and maximization of profit, on the other [2]. The efficiency of the machining process is influenced by numerous parameters, one of which is fixtures. Fixtures are used to reliably locate and clamp the workpiece during a number of operations (machining, welding, inspection, etc.), which are all part of manufacturing. Fixtures significantly influence the output effects of the production process, bearing in mind that costs of fixture manufacture can contribute to the total manufacturing costs [3] by more than 20%. Such percentage ratio confirms the fact that those are expensive and high-quality devices, while their design and manufacture deserve special attention.

Considering the costs and time consumption, the manufacture of novel fixture design solutions can be broken down into two key processes:

- fixture design process,
- fixture assembly/disassembly process.

All other processes needed to manufacture a fixture (e.g. inspection of assembly precision) require less time while incurring lower costs.

The majority of investigations have so far focused on the specific area of development of methodologies for fixture design. So far, many different approaches have been attempted in the research of fixture design. Specifically, it can be discerned between several fields of research in this area. Most of them refer to the development of fixture design systems and the development of methodologies for fixture design optimization. Numerous techniques have been employed to optimize fixture design including artificial neural networks (ANN) [4], finite element analysis (FEA) [5], genetic algorithms (GA) [6], as well as combinations of some methods such as FEA and GA [7], ACA and FEA [8], and GA and ant colony algorithm (ACA) [9]. Those techniques of optimization were generally focused on defining optimal location for certain fixture elements, predominantly the locating and/or clamping

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