

Jasmina Mikovic<sup>1)</sup>  
Sandra Velickovic<sup>1)</sup>  
Srbislav Aleksandrovic<sup>1)</sup>  
Dragan Adamovic<sup>1)</sup>  
Dobrivoje Catic<sup>1)</sup>

1) Faculty of Engineering,  
University of Kragujevac,  
Serbia  
{jasminamikovic89,  
sandravelickovic89}  
@gmail.com,  
{srba, adam, caticd}  
@kg.ac.rs

## APPLICATION OF TAGUCHI METHODS IN TESTING TENSILE STRENGTH OF POLYETHYLENE

**Abstract:** The application of Taguchi methods, that represent a form of statistical analysis of the sensitivity, is subject of this paper. They are used to reduce the number of experimental samples during the experiment. The research was conducted in order to determine which factors and how much they affected the breakage of the specimens made of Hostalen GC 7260, high-density polyethylene. The tensile strength of polyethylene specimens was investigated. The obtained results for three samples per experiment were statistically analyzed by the use of Taguchi methods, more accurately by the use of orthogonal arrays and the S/N ratio.

**Keywords:** Taguchi methods, robust design, quality loss function, S/N ratio, orthogonal arrays, polyethylene, tension test.

## 1. INTRODUCTION

In the modern economy, quality is viewed from the aspect of management, so that the quality management should enable the improvement of the quality of the entire company business [1]. The key to success is to achieve good price-quality ratio, based on the continuous improvement of business productivity.

Quality management represents also a form of the total management function, which should determine and implement the quality policy in general. The model of total quality management (TQM) represents the highest achievement in the field of quality [2].

Taguchi methods are techniques for improving the quality. The main purpose of these methods is to relieve the function of quality control and to form a robust (stable) system.

Polyethylene is a polymer material which is widely used in industrial manufacturing today [3]. Hostalen GC 7260 is a high-density polyethylene which is used for general-purpose items, among other things, for household appliances' parts [4].

## 2. TAGUCHI METHODS

Taguchi methods are statistical methods developed by Genichi Taguchi to improve the quality of products [5].

Taguchi methods include reducing of variation in the process through robust design of experiments. The overall objective of this method is reaching the high-quality products at a low manufacturing price [6].

The robust design is a new concept (Figure 1) which is related to the manufacture of products and high-quality service with no defects [7]. This design has a high tolerance to factors, which can't be controlled.

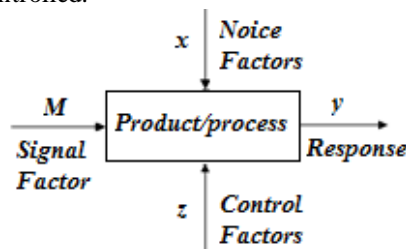


Figure 1 -The concept of robust design













