

# **Monitoring and Analysis of Manufacturing Processes in Automotive Production**

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Jozef Dobránsky, Anton Panda, Dušan Mandulák

**QUALITY MONITORING IN PRODUCTION  
OF THE PARTS IN AUTOMOTIVE INDUSTRY**

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**Jozef DOBRÁNSKY, Anton PANDA, Dušan MANDUĽÁK:**

## **QUALITY MONITORING IN PRODUCTION OF THE PARTS IN AUTOMOTIVE INDUSTRY**

### **Abstract:**

Quality and stability of the production processes are notions associated with the regulation procedures. In simple terms, the stability refers to the fact whether the value prescribed during input can be observed during output. In current competition fight in the market the quality is assessed as the preferred effective force focused on acquisition or retaining of the market shares. The effective tool in increasing of the quality is implementation of statistical methods into the process which allow searching for the causes of the process instability, regulate the efficiency and effectiveness of the corrective actions, and stabilize the development of the process by means of which the work quality and productivity increase. It is obvious that the more statistical methods are known, the higher the possibility of analysis and of successful solving of a potential issue is. Statistical regulation of the SPC processes is the method of the quality control applying the statistical methods. It is applied to monitor and control the process. The regulation consists of two phases: the first one refers to initial adjustment of specifications of the selected process; the second one represents the case of common process utilization in the production. In comparison to other methods of the quality control the advantage of application of the SPC method rests in preference of timely detection and prevention of occurrence of problematic situations prior to correction of already occurred situations. Capability of the production equipment characterizes the possibilities of the equipment and represents the adequate measure for its evaluation in purchase, after repairs and modernization and changes of the production assortment, etc. The information on capability of the production equipment and production process allow assessing of the extent of the variability of processes coming from other sources such as, for instance, influence of material, of operating, of maintenance, etc. Capability of measurement equipment characterizes its adequacy for measuring of particular quality character within the respective range. Its level may significantly influence the

2credibility of information on capability of the process or of the production equipment.

Capability of the process refers to the process uniformity. Its output extent is usually represented by the process variability. Capability of the process is statistical measure of the inherent variability of the process for the respective characteristics. The process capability.

# QUALITY MONITORING IN PRODUCTION OF THE PARTS IN AUTOMOTIVE INDUSTRY

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Edition of Scientific and Technical Literature

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Dušan MANDULÁK, M.Sc., PhD.

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## CONTENTS

<b>INTRODUCTION</b> .....	<b>1</b>
<b>1 METROLOGY</b> .....	<b>3</b>
1.1 BASIC TERMINOLOGY .....	3
1.1.1. <i>Metrology and Quality</i> .....	6
1.1.2. <i>Metrology in General</i> .....	7
1.1.3. <i>Classification of Metrology</i> .....	8
1.1.4. <i>Tasks of Legal Metrology</i> .....	9
1.2 QUANTITIES AND UNITS.....	10
1.2.1. <i>SI Base Units</i> .....	12
1.2.2. <i>SI Derived Units</i> .....	13
1.3 FAILURES AND UNCERTAINTIES OF THE MEASUREMENT .....	16
1.3.1. <i>The Measurement Result</i> .....	16
1.3.2. <i>Measurement Failures</i> .....	16
1.3.3. <i>Random Measurement Failures</i> .....	18
1.3.4. <i>Systematic Failures</i> .....	19
1.3.5. <i>Measurement Uncertainties</i> .....	21
1.4 MEASURING TOOLS, PRINCIPLES, PROCEDURES, METHODS .....	23
1.4.1. <i>The Measurement Results</i> .....	25
1.4.2. <i>Measuring Tools and their Properties</i> .....	28
1.5 CONTROL OF MEASUREMENT PROCESSES .....	33
1.5.1. <i>Responsibility of Management</i> .....	34
1.5.2. <i>Sources</i> .....	34
1.5.3. <i>Methods and Intervals of Collection of Measurement Process Data</i> .	36
1.5.4. <i>Data Analysis for Control of Measurement Processes</i> .....	37
1.5.5. <i>Correction Actions</i> .....	38
<b>2 METHODS OF STATISTICAL REGULATION OF PRODUCTION PROCESSES</b> .....	<b>39</b>
2.1 INTRODUCTION TO THE ISSUE .....	39
2.2 CLASSIFICATION OF THE METHODS .....	41
2.3 7 OLD TOOLS FOR CONTROL AND ASSURANCE OF QUALITY .....	47
2.3.1. <i>Histogram</i> .....	47
2.3.2. <i>Process Development Diagram</i> .....	50
2.3.3. <i>Check Tables</i> .....	52
2.3.4. <i>Pareto Chart</i> .....	54
2.3.5. <i>Diagram of Causes and Effects</i> .....	57

2.3.6.	<i>Scatter Diagram</i> .....	60
2.3.7.	<i>Regulation Diagram</i> .....	61
2.4	7 NEW "MANAGERIAL" TOOLS FOR QUALITY CONTROL AND ASSURANCE .....	65
2.4.1.	<i>Managerial Procedure of Problem Solving</i> .....	66
2.4.2.	<i>Instances of Application and Solution</i> .....	66
<b>3</b>	<b>CAPABILITY OF MEASUREMENT EQUIPMENT</b> .....	<b>74</b>
3.1	MEASUREMENT SYSTEM ANALYSIS – MSA .....	75
3.2	AVERAGE RANGE METHOD .....	77
3.3	DETERMINATION OF MEASUREMENT SYSTEM CAPABILITY – DETERMINATION OF REPEATABILITY AND REPRODUCIBILITY .....	81
3.4	ASSESSMENT OF MEASUREMENT EQUIPMENT CAPABILITY .....	88
<b>4</b>	<b>CAPABILITY OF PRODUCTION EQUIPMENT</b> .....	<b>94</b>
4.1	SELECTION OF CHECK CHARACTERS .....	95
4.2	MARGINAL CONDITIONS.....	95
4.3	DATA COLLECTION .....	97
4.4	CALCULATION OF THE MACHINE CAPABILITY INDICES $C_M$ AND $C_{MK}$ .....	99
4.5	PROCESSES WITH INEVITABLE SYSTEMATICS .....	101
<b>5</b>	<b>CAPABILITY OF PRODUCTION PROCESSES</b> .....	<b>103</b>
5.1	ANALYSIS OF PROCESS CAPABILITY.....	103
5.2	INDICES OF THE PROCESS CAPABILITY .....	105
5.3	VERIFICATION OF THE CAPABILITY OF THE PLASTIC MOULDED PIECE PRODUCTION PROCESS .....	120
<b>6</b>	<b>OTHER TOOL TO IMPROVE PROCESS CONTROL</b> .....	<b>125</b>
6.1	DESIGN OF EXPERIMENTS (DOE) .....	126
6.2	THE SHAININ METHODOLOGY.....	128
6.2.1.	<i>Tools to Generate Clues</i> .....	130
6.2.2.	<i>Factorial Designs</i> .....	137
6.2.3.	<i>The B Versus C Analysis</i> .....	138
6.2.4.	<i>Scatter Plots to Determine Appropriate Tolerances</i> .....	142
6.3	PRECONTROL.....	144
6.3.1.	<i>Comparing Precontrol to Control Charts</i> .....	147
<b>7</b>	<b>ADVANCED PRODUCT QUALITY PLANNING (APQP)</b> .....	<b>150</b>
7.1	PHASE A – PLANNING AND DEFINITION OF THE PROGRAM .....	152
7.2	PHASE B – DESIGN AND DEVELOPMENT OF THE PRODUCT.....	160

7.3	PHASE C – DESIGN AND DEVELOPMENT OF THE PROCESS.....	161
7.4	PHASE D – VALIDATION OF THE PROCESS AND PRODUCT .....	169
7.5	PHASE E – SERIES PRODUCTION .....	169
<b>8</b>	<b>SERIES PRODUCTION PART APPROVAL PROCESS (PPAP) .....</b>	<b>171</b>
8.1	SUBMISSION OF PPAP .....	172
8.2	LEVEL OF SUBMISSION.....	172
8.3	STATUS OF PART SUBMISSION .....	174
8.4	SIGNIFICANT PRODUCTION BATCH.....	174
8.5	REQUIREMENTS OF THE APPROVAL PROCESS .....	175
	<b>REFERENCES .....</b>	<b>185</b>

# Introduction

Quality and stability of the production processes are notions associated with the regulation procedures. In simple terms, the stability refers to the fact whether the value prescribed during input can be observed during output.

In current competition fight in the market the quality is assessed as the preferred effective force focused on acquisition or retaining of the market shares. The effective tool in increasing of the quality is implementation of statistical methods into the process which allow searching for the causes of the process instability, regulate the efficiency and effectiveness of the corrective actions, and stabilize the development of the process by means of which the work quality and productivity increase. It is obvious that the more statistical methods are known, the higher the possibility of analysis and of successful solving of a potential issue is.

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credibility of information on capability of the process or of the production equipment.

Capability of the process refers to the process uniformity. Its output extent is usually represented by the process variability. Capability of the process is statistical measure of the inherent variability of the process for the respective characteristics. The process capability measure has not been agreed on up to present. At times the standard deviation  $\sigma$  or range of quality indicator or their multiple based upon the inherent variability are considered to be the capability measure. Occasionally, it is a combined value of the component induced by the inherent variability and of the component induced by inconsiderable and determinable causes.

Advanced Product Quality planning (APQP) is a framework – a set of procedures and techniques applied in development of the products especially in the sector of industry and production. The APQP framework can be mostly observed in the automotive industry. APQP represents a concept rather similar to the concept of Design for Six Sigma (DFSS) and is derived from the standard of the QS 9000 series. Contrary to the entire system of the Japanese-rooted quality methods, APQP originated in the USA. APQP represents a clearly defined and structuralized procedure (process) of the quality planning leading to assurance of the required quality of the product for a customer. For instance, the process is utilized in a product development system for General Motors, Ford, Chrysler and their suppliers. According to AIAG (The Automotive Industry Action Group) the purpose of APQP is "to produce a product quality plan which will support development of a product or service that will satisfy the customer."

The production part approval process (PPAP) is a method, a manual for adjustment of the part approval processes intended for production. It is applied especially in the automotive industry. The PPAP requirements were developed by the Automotive Industry Action Group (AIAG) as part of the APQP method to encourage the use of the individual processes, of common terminology and of a standard form. The purpose of the PPAP method is also to provide the evidence that during the production process the supplier can produce the product consistently meeting any of these demands. The PPAP method allows minimizing the risks of production failure and supports and improves the APQP method utilization.