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## Surface roughness evaluation method of inner surface of engine bore by RANSAC and least squares method<sup>+</sup>

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Abstract: Analysis methods for plateau surfaces have been defined in the ISO standards, JIS, and 11 previous studies. Sakakibara et al., the authors of the previous study, proposed a method based on 12 the concept of RANSAC. This method achieved high analysis accuracy for plateau surfaces by set-13 ting detailed conditions. However, the process of setting the optimal conditions is performed man-14 ually, which reduces the productivity owing to the manpower and man-hours required. In this 15 study, we propose a new method for automating the setting of the conditions. This method, which 16 does not require human intervention, is expected to contribute to the improvement of productivity 17 at production sites. 18

**Keywords:** material ratio curve; material probability curve; plateau surface; least squares method; 19 RANSAC 20

## 1. Introduction

The inner surface of an automobile engine bore requires high sliding properties be-23 cause the piston slides inside the cylinder. For this reason, the bore surface is finished by 24 plateau honing as shown in Figure 1. The plateau-honed surface has a plateau region and 25 a valley region. Each region has a different requirement specification and is therefore eval-26 uated using a material ratio curve. The slope of the straight line that is fitted to the slope 27 of the part of the material ratio curve corresponding to the plateau and valley regions is 28 the parameter value [1]. Therefore, several analytical methods were proposed because it 29 is important to detect the slope of a straight line with high validity [2-5]. This study pro-30 poses a new linear fitting method based on the concept of RANSAC and least squares 31 method. In addition, because the industrial world demands improved productivity, this 32 study aims to develop a method that does not require human intervention. 33



Citation: Lastname, F.; Lastname, F.; Lastname, F. Title. *Proceedings* **2021**, 68, x. https://doi.org/10.3390/xxxx

## Published: date

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*Proceedings* **2021**, 68, x. https://doi.org/10.3390/xxxxx

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new method to solve this problem.

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**Figure 3**. Detection result of straight line: (a) 0 time; (b) 5 times; (c) 10 times; (d) 50 times; (e) 100 times; and (f) 500 times.

	5. Acknowledgments	
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	Foundation (PMTP-F).	3
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