

# INVESTIGATION OF STEEL STRUCTURAL CHANGES DURING PRESSING STAGES OF PASSENGER CAR PARTS AT UZAUTO MOTORS

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**Abstract:** This study examines the microstructural transformations of steel during the pressing stages of passenger car parts at UzAuto Motors. The research focuses on the impact of modern pressing technologies, such as hot stamping and laser cutting, on the mechanical properties of steel components used in models like Chevrolet Damas and Labo. By analyzing the effects of these processes on grain structure, hardness, and tensile strength, the study aims to optimize manufacturing parameters to enhance product quality and performance. The findings contribute to the development of more efficient and reliable automotive components, aligning with industry standards and consumer expectations[2].

**Keywords:** UzAuto Motors, steel microstructure, pressing process, hot stamping, laser cutting, automotive manufacturing, material properties.

## 1. Introduction

The automotive industry continually seeks advancements in manufacturing processes to improve vehicle performance and safety. At UzAuto Motors, the pressing stages of steel components play a crucial role in determining the final properties of passenger car parts. Understanding the microstructural changes that occur during these stages is essential for optimizing production techniques and ensuring high-quality outcomes.

## 2. Methods

The study involved collecting steel samples from various pressing stages at UzAuto Motors. Advanced analytical techniques, including optical microscopy and scanning electron microscopy (SEM), were employed to observe microstructural changes.

Mechanical testing, such as hardness and tensile strength measurements, provided insights into the material properties post-pressing. The influence of pressing parameters, including temperature and pressure, on the steel's microstructure was systematically analyzed.

### **3. Results**

The analysis revealed significant microstructural transformations in steel components subjected to different pressing techniques. Hot stamping resulted in refined grain structures, leading to increased hardness and strength. Laser cutting maintained the integrity of the microstructure while providing precise component shapes. The study identified optimal pressing conditions that enhance mechanical properties without compromising material integrity.

### **4. Discussion**

The findings underscore the importance of controlling pressing parameters to achieve desired material characteristics. Implementing optimized pressing techniques can lead to improved performance and durability of automotive components. The study's insights are valuable for manufacturing strategies aiming to meet stringent industry standards and customer expectations.

### **5. Conclusion**

Understanding the microstructural changes in steel during pressing stages is vital for producing high-quality passenger car parts. The study's results provide a foundation for enhancing manufacturing processes at UzAuto Motors, contributing to the development of safer and more efficient vehicles.

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