

ESTIMATION OF RELIABILITY OF SYSTEM OF REVERSE STAMPS WITH USE OF COMPOSITE MATERIALS AND ACCURACY OF PUNCHED PARTS

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Purpose. Estimation of reliability of system of reverse stamps with use of composite materials and accuracy of punched parts.

Methodology. The studies were carried out through analyzing the results of production tests.

Findings. The paper presents the results of studies to assess the reliability of adjustable dies for the separation operations in the designs of the assemblies which use AST-T plastic for fastening the working elements (matrices, punches) and guide columns.

It is established that the failure-free operation of the dies depends only on the reliability of the keyed connection of the structural modules, and there are also wear failures due to run-in. The obtained results of production tests allowed to estimate the probability of failures within the limits of the regulated working time of the stamps. At the same time, quantitative characteristics of the error were obtained and factors affecting the accuracy of the stamped parts during punching-cutting in these structures were revealed.

Keywords: Reversible dies, punching, cutting, reliability, accuracy, plastic masses

References

1. Мовшович А.Я. Особенности конструирования и сборки штампов из композиционных материалов для разделительных операций листовой штамповки [Текст] / А. Я. Мовшович, О. П. Семенова, А. Л. Горницкий // Кузнечно-штамповочное производство. – № 6. – 1997. – С. 24 — 27.
2. Мовшович, А. Я. Универсально-перенастраиваемые штампы для поэлементной штамповки [Текст] / А. Я. Мовшович, Н. Д. Жолткевич, В. И. Денисов // Кузнечно-штамповочное производство. – 1977. – № 2. – С. 25 – 29.
3. Мовшович, А. Я. Исследование надежности и долговечности универсально-сборных штампов: дисс. канд. техн. наук. – Краматорск. 1969. – 217 с.
4. Буденный, М.М. Конструктивно-технологические основы создания штампов из композиционных материалов для разделительных операций листовой штамповки [Текст] / М.М. Буденный, А. Я. Горницкий // Вісник Харківського державного політехнічного університету: зб. наук. пр. Харк. держ. пол-техн. ун-ту. – Вип. 63. – X., 1999. – С. 23 – 29.

5. Ахмечет, Л. С. Применение пластических масс в технологической оснастке [Текст] / Л. С. Ахмечет, Л. В. Вайсер, А. Р. Чудновский. –М.: Машгиз, 1962. – 158с. с ил.

6. Агарков В.В. Совершенствование универсально-сборных переналаживаемых штампов путем оптимизации конструктивных параметров компонок в условиях машиностроительного производства: дисс. канд. техн. наук. – Харьков. 2013. – 220 с.

7. Барлоу Р. Математическая теория надежности [Текст] / Р. Барлоу, Ф. Прошан // – М.: Советское радио, 1969. – 488 с.

8. Болотин, В.В. Статистические методы в строительной механике [Текст] / В.В. Болотин. – М. : Стройиздат, 1965. – 279 с.

9. Вагнер И.В. Методы расчета погрешностей элементов и систем / И.В. Вагнер // «Знание». –Киев, 1969. –240с

10. Базовский И. Надежность. Теория и практика / И. Базовский // – М.: Мир, 1965. –373 с.

INFLUENCE OF BANDS TENSION AND FRICTION MODELS FOR LONGITUDINAL STABILITY PROCESS OF ROLLING

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Purpose. Investigation of influence of bands tension and friction models for longitudinal stability process of rolling.

Methodology. The studies were carried out by solving the T. Karman equation with the model of smooth variation of the specific frictional forces.

Findings. It was established in the paper that the tension of the strip affects the longitudinal stability of the process. In this case, the rear tension has a more significant effect on the resultant longitudinal forces compared to the foreleg. With increasing rear tension, this resultant decreases in absolute value, which indicates a decrease in the longitudinal stability of the process.

The solution of the T. Karman equation with the model of smooth variation of the specific frictional forces yields results on the distribution of normal contact stresses, their average value and longitudinal stability of the strip in rolls closer to the experimental data in comparison with the Coulomb friction model. The calculations have shown that the technique used in the work to evaluate the longitudinal stability of the rolling process can be applied in assessing the stability of the process under real conditions of medium- and thin-sheeted rolling with a strip tension.

Keywords: contact stresses, tension, friction, longitudinal stability