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**ДИНАМИЧЕСКАЯ ПОТЕРЯ УСТОЙЧИВОСТИ ТОНКОСТЕННЫХ ТРУБНЫХ ЗАГОТОВОК ПРИ ТОРЦЕВОЙ РАСКАТКЕ**

**Abstract**

В работе представлены результаты исследования процесса торцевой раскатки деталей из тонкостенных трубных заготовок коническим валком. Особенностью процесса является возможная потеря устойчивости формы заготовки, не позволяющая получать детали требуемой геометрии. На основе данных компьютерного моделирования систематизированы причины потери устойчивости трубных заготовок при раскатке, определены кинематические характеристики машины и геометрические параметры заготовки, влияющие на этот процесс.

*Keywords:* торцевая раскатка, трубная заготовка, формоизменение, потеря устойчивости, компьютерное моделирование.

**Introduction**

Отличительной особенностью операций раскатки является локальный характер приложения деформирующего усилия к торцу обрабатываемой заготовки, что позволяет существенно снизить усилие деформирования [1-4]…

**Research methods**

Для достижения поставленной цели использовали современные САПР программы...

**Results and discussion**

В схеме торцевой раскатки (рис. 1) конический раскатной валок, с углом наклона α, имеет скорость поступательного движения вдоль оси заготовки V.

Example of formula design. Hide table borders.

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| а) | б) |
| Рисунок 1 – Технологическое устройство МЭИШ: а) 1 – спиральный индуктор, 2 – подвижный элемент, 3 – матрица для формовки и вырубки, 4 – вкладыш, 5 – заготовка, 6 – полиуретан, 7 – контейнер, 8 – упругий элемент; б) детали, изготовленные при помощи данного технологического устройства |

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Таблица 1 – Оценка погрешности различных способов

|  |  |  |
| --- | --- | --- |
| Способ определения размеров заготовки | $D\_{з}$, мм | $δ\_{D}$, % |
| Аналитические способы | По выведенной формуле | По внут. пов-ти | 111,066 | 5,53 |
| По внеш. пов-ти | 117,432 | 0,83 |
| По сред. пов-ти | 114,258 | 2,34 |
| По равенству площадей | 114,422 | 2,18 |
| По методу Гюльдена-Паппуша | 114,206 | 2,39 |
| Способы с применением САПР | С учетом трения | По внутренней пов-ти | 106,793 | 9,81 |
| По внешней пов-ти | 106,737 | 9,86 |
| По срединной пов-ти | 107,367 | 9,23 |
| Без учета трения | По внутренней пов-ти | 107,157 | 9,44 |
| По внешней пов-ти | 107,406 | 9,19 |
| По срединной пов-ти | 107,350 | 9,25 |

**Conclusion**

При торцевой раскатке внутренних фланцев из тонкостенных трубных заготовок наблюдается явление потери устойчивости заготовки в виде волнистости, которая происходит под действием сжимающих тангенциальных напряжений фланцевой части трубной заготовки.

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**Put an unbroken space sign after the digit, a dash sign. Examples for different types of resources: articles, monographs, patents, the Internet.**

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**DYNAMIC LOSS OF STABILITY OF THIN-WALLED TUBE BLANKS**

**AT AXIAL ROTARY FORGING**

**Abstract**

The paper presents the results of a study of the process of axial rotary forging of parts from thin-walled tube blanks with a conical roll. A feature of the process is the possible loss of stability of the shape of the blanks, which does not allow obtaining parts of the required geometry. On the basis of computer simulation data, the causes of the loss of stability of tube blanks during rotary forging were systematized, the kinematic characteristics of the machine and the geometric parameters of the tube blanks affecting this process were determined.

*Keywords:* rotary forging, tube blank, metal deformation, loss of stability, computer simulation