MODELING OF THE MATERIAL VOLUME AND THE VARIATION OF THE MATERIAL SECTION DISPLACED AT THE COLD TEETHING BY INTERMITTENT BLOW

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Abstract: One of the cold copy teething processes is the intermittent blow process. The principle of this process consists in the whole forming division in a number of partial deformation processes using a pair of gear cutting tools for the profiles. This work presents some aspects concerning the mathematical simulation of the volume and of the section of the material displaced by the forming roll at a blow, important elements in establishing the relationship of the forming force which appear during the cold teething process by intermittent blow (hammering).
The volume of displaced material by the beating roll mainly depends on the axial advance of the blank and on the depth of the profile (section). The material section displaced by the beating roll, according to relations (1, 2) is function of the axial advance of the blank of the roller radius and of the depth of the profile. The area of the surface S_{ABC} results from the following integral:

$$S_{ABC} = \int_{-\frac{S}{2}}^{-(\sqrt{2Rh-h^2})} (\sqrt{R^2 - x^2 - 2s} - s_0^2 - \sqrt{R^2 - x^2})dx \qquad (1)$$

In a similar way, we could determine the evolution of the section S_{BDC}.

$$S_{BDC} = \int_{-(\sqrt{2Rh-h^2})}^{-(s+\sqrt{2Rh-h^2})} \left[\sqrt{R^2 - x^2 - 2s - s_0^2} - (R-h)\right]\mathrm{dx} \qquad (2)$$

The variations of the two sections show the way of evolution of the forming forces. The volume of displaced material by the beating roll mainly depends on the axial advance of the blank and on the depth of the profile (section). The material section displaced by the beating roll, according to relations (1, 2) is function of the axial advance of the blank of the roller radius and of the depth of the profile.

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