Nekoz Olexandr, Shtefan Evgenyi, Shulyak Sergey, Jastreba Sergey
National University of Food Technologies, Ukraine. Kiev

RESEARCH OF OPERATION OF THE OIL PRESS

Principal view of the equipment for extraction oils is shnek the press. On an exit from a press the initial adjusting device on which basically the press overall performance depends is located.

The operation purpose is the analysis of the intense-deformed condition of a working environment in a zone of an initial node of an oil press.

For the analysis of process of a prostamping of a working environment through an initial node of a press deformation in an instant any way restricted to a surface Ω, volume of V disperse material which consists of a disperse phase restricted to a surface $\Omega_1 \in \Omega$ and dispersing environment, the restricted surface $\Omega_2 \in \Omega$is considered. Power loading of a material in a point x is defined by boundary conditions:

1) on boundary Ω_1 preset speeds

$$\vec{v}\Big|_{\Omega_1} = \vec{v}(x)$$

;

2) on boundary Ω_2 set efforts

$$\vec{P}\Big|_{\Omega_2} = \vec{P}(x)$$

;

In each point of area Ω should hold on:

1) the equilibrium equation

$$\sigma_{ik,k} + \rho \overline{F_i} = 0$$

2) the indissolubility equations

$$\ln \rho + div\vec{U} = 0$$

3) a kinetic parity

$$\dot{\varepsilon}_{ik} = \frac{1}{2}(\dot{u}_{ik} + \dot{u}_{ki}),$$

Where $\sigma_{ik}, \dot{\varepsilon}_{ik}$ - tensors of voltages and speed of strains accordingly;

$\vec{U}, \vec{F}$ - Vectors of migrations and efforts accordingly;

ρ - material density

Speeds of strains are represented in адитивному an aspect

$$\dot{\varepsilon}_{ik} = \dot{\varepsilon}^{e}_{ik} + \dot{\varepsilon}^{j}_{ik}$$

Where $\dot{\varepsilon}^{e}_{ik}, \dot{\varepsilon}^{j}_{ik}$ - accordingly, elastic and inelastic compound a tensor of speed of strains.

Elastic component which submits to Guk's law,

$$\dot{\varepsilon}^{e}_{ik} = \frac{1+\nu}{E}\left(\dot{\sigma}_{ik} + \delta_{ik}\frac{\nu}{1+\nu}\dot{\sigma}_{\ell\ell}\right)$$

Where E, ν- the coefficient of elasticity and factor of the Poisson for the disperse environment are defined behind formulas:

$$\mathbf{E} = \mathbf{E}_0(1-\theta)^{5/2};$$

$$\nu = 2\nu_0\frac{(2-3\theta)}{(4-3\theta)}$$

Where E_0 and ν_0 - accordingly, a coefficient of elasticity and factor of the Poisson of a hard phase;

θ - porosity.

The normal associated law of a current is applied to inelastic compound speed of a strain:

$$\varepsilon_{ij} = \mu \frac{\partial \Phi}{\partial \sigma_{ij}};$$

Where μ - a multiplier of type of the Lagrange;

Φ - potential which defines conditions of the beginning of a current of an isotropic disperse material.

The initial is received is completed element model of an adjusting node of a press by which then appropriation of properties of a material and boundary conditions is received the decision of a task in view by means of the program "PLASTIC, - 002" (Fig. 1). The numerical decision is visualised in the form of character of distribution of voltages and working environment migrations in the initial channel of a press.

The designed technique is applied to the decision of a problem of optimisation of operation of an initial node of an olive press.

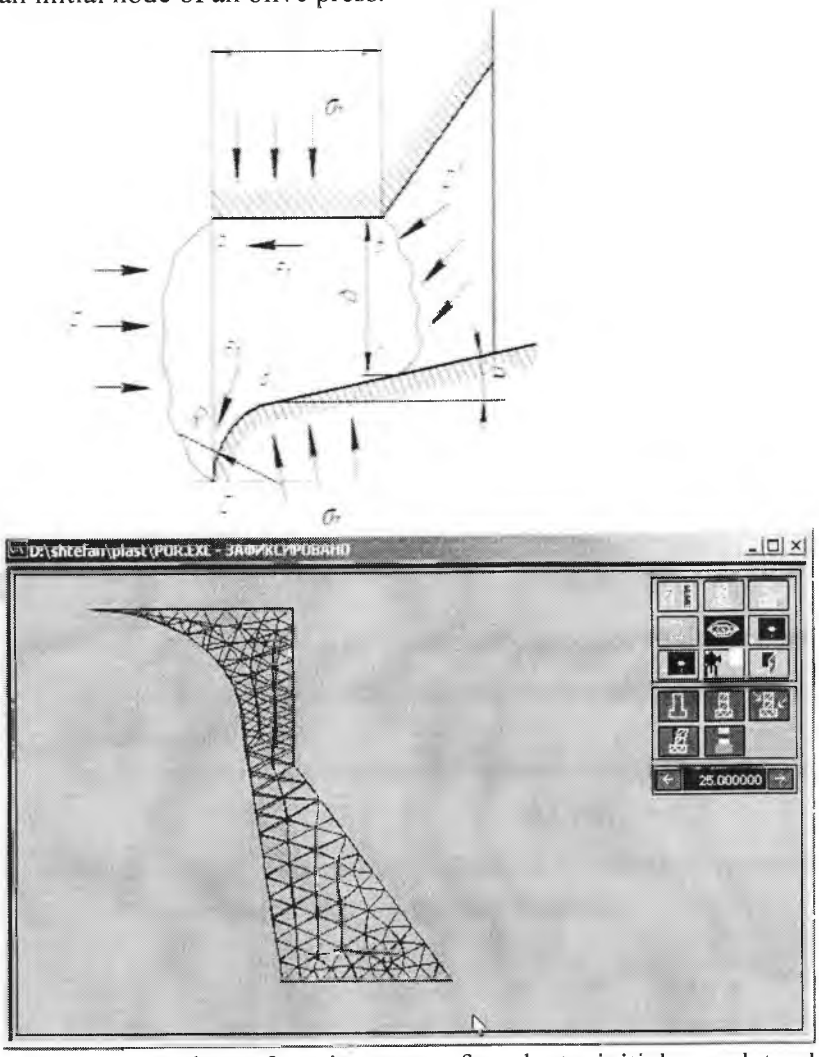

Fig. 1. A chart of protisnennya of product a initial complete-element model of initial knot.