

3. $U_{ijk} = 0; V_{ijk} = 0; W_{ijk} = 0$ (11) // , 1972. - 18.- . 8 -11. 3. . 1973. - 246 . 4. 2.02-83. 05.12.83. -15-74. 01.01.85/ . 6 1985.- 40 . (.) . 5. . -1978.- 10.- . 31-33. // . -1971.- 4. .

624.151

• • •

[1]

$$\gamma_{xy} = \frac{\partial u}{\partial y} + \frac{\partial v}{\partial x}$$

3.

$$\begin{aligned} \frac{\partial \sigma_x}{\partial x} + \frac{\partial \tau_{xy}}{\partial y} + X &= 0; \\ \frac{\partial \tau_{xy}}{\partial x} + \frac{\partial \sigma_y}{\partial y} + Y &= 0. \end{aligned} \quad (3)$$

(1) (2),

(.) .

() :

$$\begin{aligned} \frac{1-\mu_0^2}{\mu_1} E_{x(y)} \frac{\partial^2 u}{\partial x^2} + \frac{E_{x(y)} + E_{y(y)}}{4(1+\mu_0)} \frac{\partial^2 u}{\partial y^2} + \\ + \left[\frac{\mu_0(1+\mu_0)}{\mu_1} E_{y(y)} + \frac{\mu_0(1+\mu_0)}{\mu_1} E_{x(y)} \right] \frac{\partial^2 v}{\partial x \partial y} + \\ \frac{\mu_0(1-\mu_0)}{\mu_1} \frac{\partial E_{x(y)}}{\partial y} \frac{\partial v}{\partial x} + \frac{(1-\mu_0^2)}{\mu_1} \frac{\partial E_{y(y)}}{\partial y} \frac{\partial u}{\partial y} = 0 \\ \frac{E_{x(y)} + E_{y(y)}}{4(1+\mu_0)} \frac{\partial^2 v}{\partial x^2} + \frac{1-\mu_0^2}{\mu_1} E_{y(y)} \frac{\partial^2 v}{\partial y^2} + \\ + \left[\frac{E_{x(y)} + E_{y(y)}}{4(1+\mu_0)} + \frac{\mu_0(1+\mu_0)E_{x(y)}}{\mu_1} \right] \frac{\partial^2 u}{\partial x \partial y} + \\ \frac{\mu(1+\mu_0)}{\mu} \frac{\partial E_{x(y)}}{\partial y} \frac{\partial u}{\partial x} + \frac{(1-\mu_0^2)}{\mu_1} \frac{\partial E_{y(y)}}{\partial y} \frac{\partial v}{\partial y} = 0; \end{aligned} \quad (4)$$

[3]:

$$\begin{aligned} \sigma_x &= \frac{1-\mu_0^2}{\mu_1} E_{x(y)} \varepsilon_x + \frac{\mu_0(1+\mu_0)}{\mu_1} E_{y(y)} \varepsilon_y, \\ \sigma_y &= \frac{\mu_0(1+\mu_0^2)}{\mu_1} E_{x(y)} \varepsilon_x + \frac{1-\mu_0^2}{\mu_1} E_{y(y)} \varepsilon_y, \end{aligned} \quad (1)$$

$$\tau_{xy} = \frac{1}{4(1+\mu_0)} [E_{x(y)} + E_{y(y)}] \gamma_{xy},$$

$$\mu_1 = 1 - \mu_0^2 (2\mu_0 + 3).$$

2.

$$\begin{aligned} \varepsilon_x &= \frac{\partial u}{\partial x}; \\ \varepsilon_y &= \frac{\partial v}{\partial y} \end{aligned} \quad (2)$$

(4)

$\Delta x \Delta y$.

U V. (i, j)

$$\begin{aligned}
 U_{ij} &= A_{11}(U_{i+1,j} + U_{i-1,j}) + A_{12}(U_{ij+1} + U_{ij-1}) + A_{13}(V_{i-1,j-1} - V_{i-1,j+1} - \\
 &\quad V_{i+1,j-1} + V_{i+1,j+1}) + A_{14}(U_{ij+1} + U_{ij-1}) + A_{15}(V_{i+1,j} - V_{i-1,j}); \\
 V_{ij} &= A_{21}(V_{i+1,j} + V_{i-1,j}) + A_{22}(V_{ij+1} + V_{ij-1}) + A_{23}(U_{i+1,j+1} - U_{i-1,j-1} - U_{i+1,j-1} + \\
 &\quad U_{i-1,j+1}) + A_{24}(U_{i+1,j} - U_{i-1,j}) + A_{25}(V_{ij+1} - V_{ij-1}), \quad (5)
 \end{aligned}$$

$$A_{12} = \frac{E_{x(y)} + E_{y(y)}}{(1 + \mu_0) \alpha_1 \Delta y^2};$$

$$A_{13} = \frac{\mu_0 (1 + \mu_0)^2 E_{y(y)} + \mu_1 (E_{x(y)} + E_{y(y)})}{16 \mu_1 (1 + \mu_0) \alpha_1 \Delta x \Delta y};$$

$$A_{14} = \frac{k_1}{16(1 + \mu_0) \alpha_1 \Delta x^2}; \quad A_{15} = \frac{k_1}{16(1 + \mu_0) \alpha_1 \Delta x^2};$$

$$A_{21} = \frac{E_{x(y)} + E_{y(y)}}{4(1 + \mu_0) \alpha_2 \Delta x^2}; \quad A_{11} = \frac{k_1}{16(1 + \mu_0)^2 \alpha_1 \Delta y^2};$$

$$A_{22} = \frac{(1 - \mu_0^2) E_{y(y)}}{4 \mu_1 \alpha_2 \Delta y};$$

$$A_{23} = \frac{E_{x(y)} + E_{y(y)} + \mu_0 (1 + \mu_0) E_{x(y)}}{16(1 + \mu_0) \mu_1 \alpha_2 \Delta x \Delta y};$$

$$A_{24} = \frac{\mu_0 (1 + \mu_0) (E_{y_{i,j+1}} - E_{y_{i,j}})}{4 \mu_1 \alpha_2 \Delta y^2};$$

$$A_{25} = \frac{(1 - \mu_0^2) (E_{y_{i,j+1}} - E_{y_{i,j-1}})}{4 \mu_1 \alpha_2 \Delta y^2};$$

$$\alpha_1 = \frac{2(1 - \mu_0^2) E_{x(y)}}{\mu_1 \Delta x^2} + \frac{E_{x(y)} + E_{y(y)}}{4(1 + \mu_0) \Delta y^2};$$

$$\alpha_2 = \frac{2(1 - \mu_0^2) E_{y(y)}}{\mu_1 \Delta y^2} + \frac{E_{x(y)} + E_{y(y)}}{4(1 + \mu_0) \Delta x^2}; \quad (5)$$

1)

$$\sigma_y = - \gamma d_1, \quad (6)$$

ó

$$V_{i,j} = \frac{P_i \Delta y \mu_1}{1 - \mu_0^2 E_y} + \frac{\mu_0 \mu_1 E_x}{2(1 - \mu_0) E_y \Delta x} (U_{i+1,j} - U_{i-1,j}) + V_{i,j+1};$$

$$U_{ij} = 0; \quad \sigma_y = 0; \quad \tau_{xy} = 0. \quad (7)$$

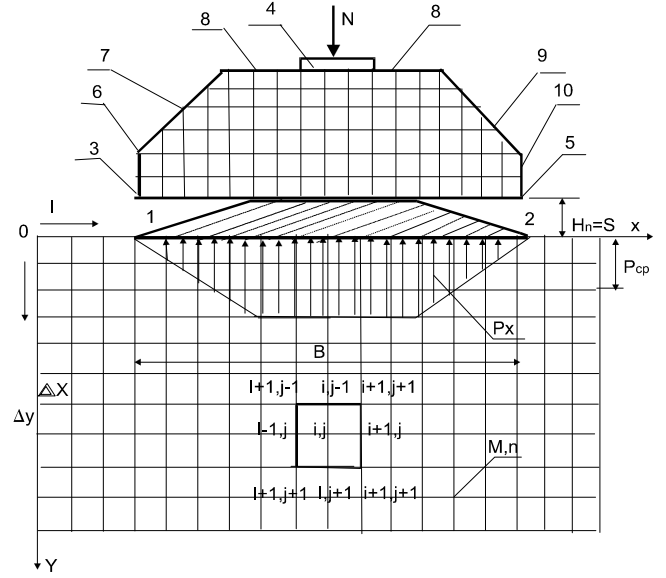
2)

$$U_{i,j} = \frac{\Delta x}{2 \Delta y} (V_{i+1,j} - V_{i-1,j}) + U_{i,j+1};$$

$$V_{i,j} = \frac{\mu_1 E_x \Delta y}{(1 - \mu_0) E_y \Delta x} (U_{i+1,j} - U_{i-1,j}) + V_{i,j+1}. \quad (8)$$

3)

$$0, V_{ij} = 0, \quad \dots, U_{ij} =$$



$$\sigma_y = \frac{\mu_0 (1 + \mu_0)}{2 \mu_1 \Delta x} E_{x(y)} (U_{i+1,j} - U_{i-1,j}) + \frac{(1 + \mu_0^2) E_{y(y)}}{2 \mu_1 \Delta y} (V_{i,j+1} + V_{i,j});$$

$$\tau_{xy} = \frac{E_{x(y)}}{4(1 + \mu_0) \Delta y} (U_{i,j+1} - U_{i,j}) + \frac{E_{y(y)}}{2 \Delta x} (V_{i+1,j} - V_{i-1,j}). \quad (9)$$

$$\sigma_y = \frac{\mu_0 (1 + \mu_0)}{2 \mu_1 \Delta x} E_{x(y)} (U_{i+1,j} - U_{i-1,j}) + \frac{(1 + \mu_0^2) E_{y(y)}}{2 \mu_1 \Delta y} (V_{i,j+1} + V_{i,j-1});$$

$$\tau_{xy} = \frac{E_{x(y)} + E_{y(y)}}{8(1 + \mu_0) \Delta y} \left[(U_{i,j+1} - U_{i,j-1}) + \frac{1}{\Delta x} (V_{i+1,j} - V_{i-1,j}) \right] \quad (10)$$

$$5b, \quad (\quad b \acute{o} \quad)$$

$$\sigma_x = \sigma_y = \tau_{xy} = 0 \quad (11)$$

t,

$$(12) \quad 32. \quad 1. \quad [4]:$$

$$t = 10 \frac{E_0 a^3}{E_1 h^3} = 10 \frac{30}{30 \cdot 10^3} \frac{1,6^3}{0,5^3} = 0,32 < 1, \quad (12)$$

$$E_1 \acute{o} \quad 25, \quad 30 \times 10^3$$

$$; E_0 \acute{o} \quad ; h \acute{o}$$

$$; \acute{o} \quad t = 0,32 < 1,$$

[3]:

$$\sigma_x = \frac{1 - \mu}{1 - 2\mu^2} E \varepsilon_x + \frac{\mu}{1 - 2\mu^2} E \varepsilon_y;$$

$$\sigma_y = \frac{\mu}{1 - 2\mu^2} E \varepsilon_x + \frac{1 - \mu}{1 - 2\mu^2} E \varepsilon_y;$$

$$\tau_{xy} = \frac{E}{2(1+\mu)} \gamma_{xy}; \quad (13)$$

$$\frac{1-\mu}{1-2\mu^2} \frac{\partial^2 u}{\partial x^2} + \frac{\mu}{1-2\mu^2} \frac{\partial^2 v}{\partial x \partial y} + \frac{1}{2(1+\mu)} \left(\frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 v}{\partial x \partial y} \right) = 0;$$

$$\frac{1}{2(1+\mu)} \left(\frac{\partial^2 u}{\partial x \partial y} + \frac{\partial^2 v}{\partial x^2} \right) + \frac{\mu}{1-2\mu^2} \frac{\partial^2 u}{\partial x \partial y} + \frac{1-\mu}{1-2\mu^2} \frac{\partial^2 v}{\partial y^2} = 0. \quad (14)$$

$$U_{ij} = k_{11}(U_{i+1,j} + U_{i-1,j}) + k_{12}(U_{i,j+1} + U_{i,j-1}) + k_{13}(V_{i+1,j+1} - V_{i-1,j+1} - V_{i+1,j-1} + V_{i-1,j-1});$$

$$V_{ij} = k_{21}(V_{i+1,j} + V_{i-1,j}) + k_{22}(V_{i,j+1} + V_{i,j-1}) + k_{23}(U_{i+1,j+1} - U_{i-1,j+1} - U_{i+1,j-1} + U_{i-1,j-1}) \quad (15)$$

$$\Delta x/2 \cdot \Delta y/2 \quad (15)$$

$$\sigma_y = - \dots$$

624.012.45

... ..

[1, 2, 3],

[4].

[1-3]

[4].

ó ;

3, 5 6-10

$\sigma = 0; \sigma_y = 0; \tau_{xy} = 0$

($h_k = S, S \acute{o}$

$max = 1.5$

1. . . .

//

90-94 : ó , . - 1980.-

2. . . .

3. . . . , 1997. - 218 .

4. . . . , 1973. - 246 .

. ó 1984. ó 679 .

267/2.

267/2.

267.