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# CONTACT PROBLEM THE INTERACTION TWO PRESTRESSED STRIPES WITH AN INFINITE STRINGER

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The purpose of the work is to study of the influence of initial (residual) stresses on the distribution and displacement law under the stringer, along the line of contact. Further consideration of the class of contact problems on the contact interaction of elastic stringers with a prestressed strip. To study the influence of the initial (residual) stresses on the distribution law of contact stresses during the reinforcement of elements along the line of direct contact as a result of the action of a concentrated force on an elastic inhomogeneous stringer. In the case of the presence of some elastic potentials of the simplest design, perform numerical calculations and graphing.

**Problem statement and initial resolving equations.** Let an elastic homogeneous strip with initial stresses of thickness $t$ be clamped by the face $y_2 = -t$ and on its other facet $y_2 = 0$ it is reinforced by an inhomogeneous infinite elastic stringer of small thickness $h$. This infinite elastic strip with initial stresses is subjected to the action of vertical and horizontal forces of intensities $p_0(y_1)$ and $q_0(y_1)$.

The carried out research is adhering to the framework of the linearized theory of elasticity with an arbitrary structure of the elastic potential, in general form for the theory of large (finite) and several versions of the theory of small initial deformations. In passing to various versions of the theory of small initial deformations, the introduced are simplifications indicated in [1]. Following [1], to solve the problem posed, solutions are used for compressible and incompressible bodies in the coordinates of the deformed initial state $y_i = \lambda_i x_i$, $(i = 1, 2)$, where $\lambda_i$ – the elongation coefficients that determine the displacements of the initial state in the directions of the coordinate axes. Then the displacements that determine the initial state in the case of uniform initial stresses have the form:

$$u_m^0 = \delta_{im} \cdot (\lambda_i - 1) \cdot x_i = \delta_{im} \cdot (\lambda_i - 1) \cdot \lambda_i^{-1} y_i. \quad (1.1)$$

Where $\lambda_i$ $(i = 1,2)$ – the elongations that characterize the initial deformed state; $x_i$ – lagrangian coordinates; $u_m^0$ – displacements that define the initial state; $\delta_{im}$ – components of the metric strain tensor. The plane strain case considered when $s_0^{11} \neq 0,\ s_0^{22} = 0,\ \lambda_1 \neq \lambda_2 = \lambda_3,\ \lambda_3 = 1,$ where $s_0^{11}, s_0^{22}, \lambda_3$ – known quantities that depend on the initial stress state and the type of elastic potential.

According to Hooke's law, we find the axial stress in the direction of the axis $Oy_1$:

$$\sigma_{y_1 y_1}(y_1) = E_1 \varepsilon_{y_1 y_1}(y_1). \quad (1.2)$$

$$\varepsilon_{y_1 y_1}(y_1) = \frac{du\,(y_1)}{dy_1}. \quad (1.3)$$

Where $u(y_1)$ – horizontal displacements of the points of the elastic stringer.

Using the equilibrium conditions of the elastic stringer, we have:

$$\sigma_{y_1 y_1}(y_1)=\frac{1}{h}\int_{-\infty}^{y_1}[q(t)-q_0(t)]dt,\ (-\infty< y_1<\infty). \tag{1.4}$$

Taking into account (1.1) – (1.4), we find:

$$\frac{du(y_1)}{dy_1}=\frac{1}{E_1 h}\int_{-\infty}^{y_1}[q(t)-q_0(t)]\,dt\,,\ (-\infty< y_1<\infty). \tag{1.5}$$

From the assumption that the stringer bends in the vertical direction like an ordinary beam, we can write:

$$D\frac{d^4 v(y_1)}{dy_1^4}=p(y_1)-p_0(y_1),\ (-\infty< y_1<\infty). \tag{1.6}$$

Where $v(y_1)$ – vertical movement of stringer points; $D$ – the stringer bending stiffness; $p_0(y_1),\ p(y_1)$ – intensity of vertical forces.

On the line of contact of the stringer with the elastic strip, the following conditions take place:

$$u\,(y_1)=u_1(y_1),\ \ v(y_1)=u_2(y_1),\ \ \forall y_1\in(-\infty< y_1<\infty), \tag{1.7}$$

where $u_1(y_1),\ u_2(y_1)$ – displacement of points in an elastic strip with initial stresses. It is necessary to determine the distribution law of normal and tangential contact stresses along the line of connection of the stringer with the strip.

To determine the unknown displacements and stresses along the line of contact of the stringer with the strip, we first solve the auxiliary problem. Let us find the field of elastic displacements and stresses in a pre-stressed infinite strip from the action of a concentrated force applied $P$ to its free face directed at an arbitrary angle $\alpha_0$, using the integral Fourier transform.

Let us write down the boundary conditions of the problem for the upper face of the elastic strip with initial stresses from the applied force at an angle.

$$\begin{gathered}\widetilde{Q}_{11}(y_1,0)=-P\delta(y_1)\cdot\cos\alpha_0;\\ \widetilde{Q}_{22}(y_1,0)=-P\delta\,(y_1)\cdot\sin\alpha_0.\end{gathered} \tag{1.8}$$

$$u_1(y_1-t)=0;\ u_2(y_1-t)=0;\ \ (-\infty< y_1<\infty), \tag{1.9}$$

where $\delta(y_1)$ – Dirac delta function.

As result of solving the problem posed, the influence functions from the action of the normal force at $\alpha_0=\frac{\pi}{2}$ for equal roots $(n_1=n_2)$ have the form:

– for equal roots $(n_1=n_2)$

$$\begin{gathered}h_{11}(y_1)=\frac{1}{\pi}\int_0^\infty H_{11}(\alpha)\cdot\cos\alpha\cdot y_1 d\alpha,\\ h_{12}(y_1)=\frac{1}{\pi}\int_0^\infty H_{12}(\alpha)\cdot\sin\alpha\cdot y_1 d\alpha.\end{gathered} \tag{1.10}$$

– for unequal roots $(n_1\neq n_2)$

$$\begin{aligned} h_{11}(y_1) &= \frac{1}{\pi}\int_0^\infty \widetilde{H}_{11}(\alpha)\cdot\cos\alpha\cdot y_1 d\alpha,\\ h_{12}(y_1) &= \frac{1}{\pi}\int_0^\infty \widetilde{H}_{12}(\alpha)\cdot\sin\alpha\cdot y_1 d\alpha. \end{aligned} \tag{1.11}$$

Where $h_{ij}(\alpha)$, $(i,j=1,2)$ – influence functions that characterize the displacements of the boundary points of the facet $y_2=0$ of an infinite elastic strip with initial stresses from a unit normal force. The nuclei $H_{ij}(\alpha)$, $\widetilde{H}_{ij}(\alpha)$ are of the form [3]:

– for equal roots $(n_1=n_2)$

$$\begin{aligned} &H_{11}(\alpha)=H_1(\alpha,0)=n_0[s_0 sh^2\alpha\varphi_1+s_1 s_0 sh^2\alpha\varphi_1-\\ &-\alpha\varphi_1\xi(\alpha)+(\alpha\varphi_1)^2-\bar{s}_1\xi(\alpha)+\varphi_1]\Delta_1^{-1}(\alpha),\\ &H_{12}(\alpha)=H_2(\alpha,0)=i\frac{m_1 n_0}{\sqrt{n_1}}[s_0 s\xi(\alpha)-s_0(\alpha\varphi_1)-\\ &-\bar{s}_1 s_1\xi(\alpha)+s_1(\alpha\varphi_1)]\Delta_1^{-1}(\alpha); \end{aligned} \tag{1.12}$$

– for unequal roots $(n_1\neq n_2)$

$$\begin{aligned} &\widetilde{H}_{11}(\alpha)=\widetilde{H}_1(\alpha,0)=n_0[-s_1 ch(2\alpha\varphi_1)+s_0\xi_1(\alpha)-s_1 s_0(\alpha\varphi_1)\xi_1(\alpha)+\\ &+s_0(\alpha\varphi_1)^2 sh^2(\alpha\varphi_1)-s_0 ch^2(\alpha\varphi_1)+s_1\xi_1(\alpha)+\alpha\varphi_1\xi_4(\alpha)]\times\Delta_2^{-1}(\alpha),\\ &\widetilde{H}_{12}(\alpha)=\widetilde{H}_2(\alpha,0)=i\frac{n_0 m_1}{\sqrt{n_1}}[s_0 s_1\xi_3(\alpha)-s_0(\alpha\varphi_1)\xi_1(\alpha)+\\ &+s_1(\alpha\varphi_1)\xi(\alpha)-s_1\xi_1(\alpha)]\times\Delta_2^{-1}(\alpha). \end{aligned} \tag{1.13}$$

The functions of influence from the action of a unit tangential force (at the $\alpha_0=0$) for equal roots $(n_1=n_2)$ are as follows:

$$\begin{aligned} h_{21}(y_1) &= \frac{1}{\pi}\int_0^\infty H_{21}(\alpha)\cdot\sin\alpha\cdot y_1 d\alpha,\\ h_{22}(y_1) &= \frac{1}{\pi}\int_0^\infty H_{22}(\alpha)\cdot\cos\alpha\cdot y_1 d\alpha. \end{aligned} \tag{1.14}$$

For the unequal roots $(n_1\neq n_2)$ we can write:

$$\begin{aligned} h_{21}(y_1) &= \frac{1}{\pi}\int_0^\infty \widetilde{H}_{21}(\alpha)\cdot\sin\alpha\cdot y_1 d\alpha,\\ h_{22}(y_1) &= \frac{1}{\pi}\int_0^\infty \widetilde{H}_{22}(\alpha)\cdot\cos\alpha\cdot y_1 d\alpha. \end{aligned} \tag{1.15}$$

The nuclei $H_{ij}(\alpha)$ and $\widetilde{H}_{ij}(\alpha)$, accordingly, have the form [3]:

– for $n_1=n_2$

$$\begin{aligned} &H_{21}(\alpha)=m_0[-(s+1)(s_1\xi(\alpha)-\alpha\varphi_1)+ch^2\alpha\varphi_1-s_1 sh^2\alpha\varphi_1-s]=\\ &=m_0[-(s+1)(s_1 sh\alpha\varphi_1 ch\alpha\varphi_1-\alpha\varphi_1)+ch^2\alpha\varphi_1-s_1 sh^2\alpha\varphi_1-s]\cdot\Delta_1^{-1}(\alpha),\\ &H_{22}(\alpha)=i\frac{m_0 m_1}{\sqrt{n_1}}[s\cdot s_1 ch^2\alpha\varphi_1+(\alpha\varphi_1)^2-\alpha\varphi_1\xi(\alpha)-s_1^2 sh^2(\alpha\varphi_1)-\\ &-s\cdot s_1]\cdot\Delta_1^{-1}(\alpha); \end{aligned} \tag{1.16}$$

– for $n_1\neq n_2$

$$\widetilde{H}_{21}(\alpha)=m_0[-ss_1(\alpha\varphi_1)\xi_2(\alpha)-s\xi_3(\alpha)+s(\alpha\varphi_1)\xi_2(\alpha)+\xi_3(\alpha)]\cdot\Delta_2^{-1}(\alpha),$$
$$\widetilde{H}_{22}(\alpha)=i\frac{m_0m_1}{\sqrt{n_1}}[1-s_1ch(2\alpha\varphi_2)+ss_1\xi_1(\alpha)+s\alpha\varphi_1\xi_4(\alpha)+ \qquad (1.17)$$
$$+ss_1(\alpha\varphi_1)^2sh^2\alpha\varphi_1-ss_1ch^2\alpha\varphi_{21}-s_1^2(\alpha\varphi_1)\xi_4(\alpha)+\xi_3(\alpha)]\cdot\Delta_2^{-1}(\alpha).$$

Here are the roots of the governing equation [1]. The quantities appearing in formulas (1.12), (1.13), (1.15), (1.16), (1.17) are expressed through the known parameters of the initial stress state [3, 4].

**Resolving system of recurrent systems of equations.**

Using the principle of superposition, the displacements of points of an elastic strip with initial stresses in the direction of the axes $0y_1$ and $0y_2$ from the simultaneous action of normal and tangential stresses for compressible and incompressible bodies in the case of elastic potentials of an arbitrary structure are determined by the formulas [3]:

$$\begin{aligned}u_1(y_1)&=\int_{-\infty}^{\infty}h_{11}(|y_1-\tau|)p(\tau)d\tau+\int_{-\infty}^{\infty}h_{12}(|y_1-\tau|)q(\tau)d\tau,\\ u_2(y_1)&=\int_{-\infty}^{\infty}h_{21}(|y_1-\tau|)p(\tau)d\tau+\int_{-\infty}^{\infty}h_{22}(|y_1-\tau|)q(\tau)d\tau.\end{aligned} \qquad (2.1)$$

Following [3, 4], according to the accepted assumptions and notation, the problem can be formulated as a system of equations:

$$\begin{aligned}&\frac{d^2}{dy_1^2}\left[D(y_1)\frac{d^2u_2(y_1)}{dy_1^2}\right]=p(y_1)-p_0(y_1),\\ &E_1(y_1)h\frac{du_1(y_1)}{dy_1}=\int_{-\infty}^{y_1}[q(\tau)-q_0(\tau)]d\tau,\\ &-\infty<y_1<\infty.\end{aligned} \qquad (2.2)$$

Where $D(y_1)=IE_1(y_1)$ – the stringer bending stiffness, $I$ – the inhomogeneity parameter.

Let the stringer material have a weak inhomogeneity varying according to the law:

$$E_1(y_1)=E[(1+\delta f(y_1)],\ \ (-\infty<y_1<\infty). \qquad (2.3)$$

Where $f(y_1)$ – some famous function, $\delta$ – small parameter.

Using the contact conditions (1.6) and representing the unknown contact stresses $p_0(y_1), q_0(y_1)$ as a series in powers of a small parameter, we can write:

$$\begin{aligned}p_0(y_1)&=\sum_{k=0}^{\infty}\delta^k p^{(k)}(y_1),\ -\infty<y_1<\infty.\\ q_0(y_1)&=\sum_{k=0}^{\infty}\delta^k q^{(k)}(y_1),\end{aligned} \qquad (2.4)$$

From (2.2) with the help of (2.3), (2.4), as well as formulas (2.1), we obtain a resolving system of recurrent systems of integro-differential equations:

$$D_0 \frac{d^4 u_2^{(0)}(y_1)}{d(y_1)^4} = p^{(0)}(y_1) - p_0(y_1),$$
$$E_0 h \frac{d^2 u_1^{(0)}(y_1)}{d(y_1)^2} = q^{(0)}(y_1) - q_0(y_1), \tag{2.5}$$
$$-\infty < y_1 < \infty.$$

$$D_0 \frac{d^4 u_2^{(k)}(y_1)}{d(y_1)^4} = p^{(k)}(y_1) - f_1^{(k-1)}(y_1),$$
$$E_0 h \frac{d^2 u_1^{(k)}(y_1)}{d(y_1)^2} = q^{(k)}(y_1) - f_2^{(k-1)}(y_1), \tag{2.6}$$
$$k = 1,\ 2, \ldots.$$

Where

$$u_1(y_1) = \int_{-\infty}^{\infty} h_{21}(y_1 - \tau)\, p^{(k)}(\tau) d\tau + \int_{-\infty}^{\infty} h_{22}(|\, y_1 - \tau\,|) q^{(k)}(\tau)\, d\tau,$$
$$u_2(y_1) = \int_{-\infty}^{\infty} h_{11}(|\, y_1 - \tau\,|) p^{(k)}(\tau) d\tau + \int_{-\infty}^{\infty} h_{12}(y_1 - \tau) q^{(k)}(\tau)\, d\tau, \tag{2.7}$$
$$-\infty < y_1 < \infty, \qquad k = 0,\ 1, \ldots,$$
$$f_1^{(k-1)}(y_1) = D_0 \frac{d^2}{d(y_1)^2}\left[ f(y_1) \frac{d^2 u_2^{(k-1)}(y_1)}{d(y_1)} \right],\ k = 1,\ 2, \ldots,$$
$$f_2^{(k-1)}(y_1) = E_0 h \frac{d}{d(y_1)}\left[ f(y_1) \frac{d u_1^{(k-1)}(y_1)}{d(y_1)} \right],$$
$$D_0 = E_0 I.$$

Here $D_0$ – the zero term of the series expansion.

System (2.5) describes a contact problem for a homogeneous infinite stringer [3], each subsequent system from (2.6) differs from the previous one only by the external load. Consequently, the solution of a contact problem for a prestressed strip reinforced by an inhomogeneous infinite stringer reduced to solving a number of homogeneous contact problems that differ only in similar external loads. The zero approximation of the solution, that is, the solution of system (2.5) using the Fourier transform, was constructed in [3] and takes the form

$$p(y_1) = \frac{\mu}{2\pi} \int_{-\infty}^{\infty} [\alpha^2 H_{21}^*(\alpha) \widetilde{q}_0(\alpha) + H_{22}^*(\alpha) \widetilde{p}_0(\alpha)] \cdot H^{-1}(\alpha) e^{-i\alpha y_1} d\alpha;$$
$$-\infty < y_1 < \infty, \tag{2.8}$$
$$q(y_1) = \frac{\mu}{2\pi} \int_{-\infty}^{\infty} [H_{11}^*(\alpha) \widetilde{q}_0(\alpha) - i H_{12}^*(\alpha) \widetilde{p}_0(\alpha)] \cdot H^{-1}(\alpha) e^{-i\alpha y_1} d\alpha.$$

Here the quantities $H^{-1}(\alpha)$, $H_{ij}^*(\alpha)$, $(i, j = 1, 2)$ expressed in terms of known functions $H_{ij}(\alpha)$ and $\widetilde{H}_{ij}(\alpha)$, $(i, j = 1, 2)$, which are determined according to the formulas for equal and unequal roots of the constitutive equation [1, 3, 4] in the case of a specific structure of elastic potentials. The rest of the approximations of solutions, which are influenced by the inhomogeneity of the stringer material, are constructed in a similar way; $\tilde{p}_0(\alpha)$ and $\tilde{q}_0(\alpha)$ – Fourier transforms of functions of contact voltages along the contact line, $\mu$ – Lamé coefficient.

Thus, the *k*-th approximation has the form:

$$p^{(k)}(y_1) = \frac{1}{2\pi}\int_{-\infty}^{\infty} P^{(k)}(s) e^{-isy_1} ds, \; k = 1,2,....$$
$$q^{(k)}(y_1) = \frac{1}{2\pi}\int_{-\infty}^{\infty} Q^{(k)}(s) e^{-isy_1} ds,$$

Where

$$P^{(k)}(s) = \frac{Ds^2\left\{\bar{f}_1^{(k-1)}(s)[E_0hs^2H_{22}(s)+1] - E_0hs^3\bar{f}_2^{(k-1)}(s)H_{12}(s)\right\}}{L(s)},$$
$$k = 1,\, 2,..., \qquad (2.9)$$
$$Q^{(k)}(s) = \frac{-IE_0\left\{hs\bar{f}_2^{(k-1)}(s)D_0hs^4H_{11}(s)+1] + D_0hs^3\bar{f}_1^{(k-1)}(s)H_{12}(s)\right\}}{L(s)}.$$

are the Fourier transforms of contact stresses. In the (2.9)

$$L(s) = \left[D_0s^4H_{11}(s)-1\right]\left[E_0hs^2H_{22}(s)+1\right] + D_0E_0s^4hH_{12}^2(s),$$
$$\bar{f}_j^{(k-1)}(s) = F\left[f_j^{(k-1)}(y_1)\right], \; j = 1,2, \quad k = 1,2,...$$

Here F – the Fourier transform operator for the indicated function (functional).

**References**

1. Гузь А.Н., Бабич С.Ю., Глухов Ю.П. Змішані задачі для пружної основи з початковими напруженнями. – Saarbrücken: LAP LAMBERT Academic Publishing, 2015. – 468 с.

2. Гузь О.М., Бабич С.Ю., Рудницький В.Б. Контактна взаємодія пружних тіл з початковими напруженнями. – Київ.: Вища шк., 1995. – 305 с.

3. Діхтярук М.М. Визначення функції впливу для пружної смуги з початковими (залишковими) напруженнями // Пр. 4-го Міжнародного симпозіуму з трибофатики (ISTF), 23 – 27 вересня 2002 р. Тернопіль (Україна) / Відп. ред. В.Т.Трощенко. – Тернопіль: Терноп. держ. техн. ун-т ім. Івана Пулюя, 2002. – С. 426 – 431.

4. Dikhtyaruk N.N., Kurinenko O.V., Poplavskaya E.A., Samaruk N.N. Interaction Between a Finite Stringer and Two Identical Prestressed Strips: Contact Problem // Int. Appl. Mech. – 2019. – 55, № 1. – P. 79 – 85.5.