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NEUTRAL ARROW STATUS AND DETERMINATION OF SECTION NUCLEUS

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Annotation

The structural elements used in construction are required to be durable for a long time, without losing their strength, durability and priority under the influence of external forces. The article provides recommendations for methods for determining the neutral axis and the cutting core formed in the sections of parts that resist elongation, compression or bending in technical structures and construction areas.

Keywords: column, beam, neutral axis, force connection, elongated or compressed part, cutting core, tension.

Introduction

Some materials used in the construction of buildings (concrete, brick, wood, cast iron, glass) are materials that do not have the same resistance to elongation and compression. It is not advisable to observe this situation, as incorrect loading will reduce the material's capacity utilization, ie it will not be able to carry the design load that can be carried, and very dangerous situations may arise. In order to avoid such a dangerous situation, it is necessary to determine the neutral axis of the burus.

To determine the position of the neutral axis, we use the following expression, which is used to determine the decentralized stresses.

(1)

This expression can be used to find the intersections formed by the intersection of the coordinate axes of the neutral line.

(2)

From this a_x *va* a_y re calcu $a_y = -\frac{i_x^2}{y_F}$ ıeutra $a_x = -\frac{i_y^2}{x_F}$ ormed.

Divides the neutral white section into compressed and elongated sections. It is found that the compressive stresses at the points on the right and the tensile stresses at the points on the left are affected..

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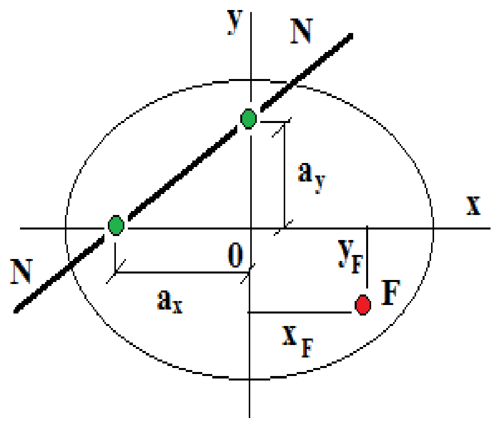

Figure 1. Determine the coordinates of the neutral axis.

(2) Determine the coordinates of the point under the effect of loading from the expression.

$$y_F = -\frac{i_x^2}{a_y} \qquad x_F = -\frac{i_x^2}{a_x}$$

(3) From this (xF) and (yF) are loaded

coordinates of the point. There is the following connection between them. If the coordinates of the loading point are (ax) and (moon), then the zero line intersects the points on the coordinate axes (xF) and (yF).

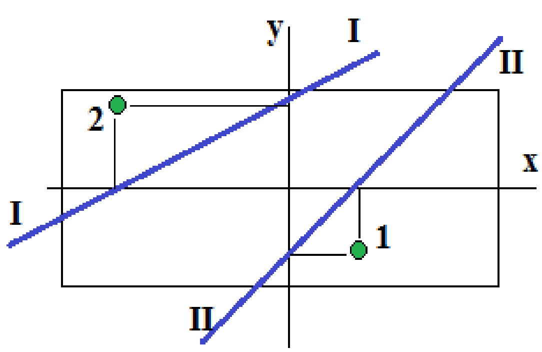

Figure 2. The relationship between the position of the neutral axis and the force**.**

If the force is applied to point 1, the corresponding zero line occupies the position I-I, and if the force is applied to point 2, the zero line occupies the position II-II.

Fragile materials decompose faster when stretched than when compressed. Therefore, when columns made of brittle material are compressed off-center, it is desirable that the same signal stress be generated on the cross-sectional surface. To do this, you need to change the position of the neutral axis in the section. For example, according to formula (3), the distances (X0) and (Y0) can be chosen in such a way that the neutral axis passes through the contour of the intersection, ie from point (D). Then (F) the force approaches the center of the cut and is located at point (2).

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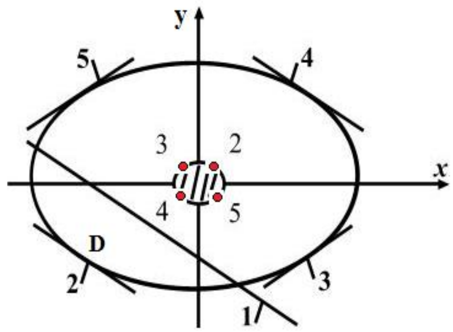

Figure 3. Cut the core detection method.

Similarly, if we place points 3, 4, and 5 around the center of the section, the positions of the lines 3, 4, and 5, that is, the neutral axes, correspond to these points. The neutral axes are placed on the surface of the cut as an attempt. The points of the neutral axes are around the center of the cut the curvilinear boundary formed by the rotation is the cutting core.

Any external force applied to the cutting core creates a uniform signal stress on the cutting surface. For example, for a rectangular section with sides h and b, find the section core. To do this, attempts are made on the sides of the cut.

A section corresponding to I-I attempts
point 1 of the nucleus from the (y) axis to the (x) axis
relative to (4).
The cut corresponding to the III-III attempt
The nucleus is also 3 points from the 0x axis in the 0y axis

$Y = -\frac{h}{6}$ (5) at a distance

For II-II attempts y = 0 va $X = -\frac{b}{6}$ (6) is formed

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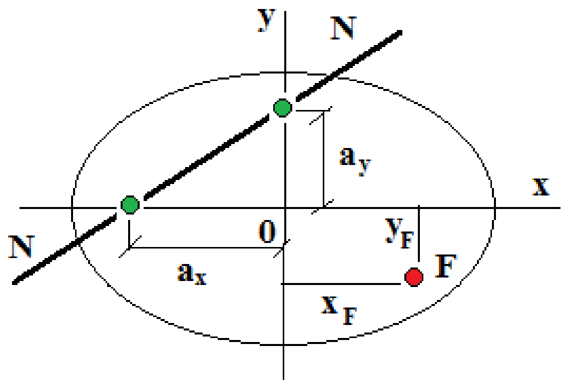

Figure 4. Cut the core determination.

In short, in the construction of buildings and technical structures, it is desirable that the stresses generated by external forces acting on them during the placement of parts do not create complex stresses in the sections of the element, but create the same state of stress. To do this, of course, it is important to know which boundary of the section the zero line of the section crosses. Depending on the position of the hol line, the core of the cut can be determined. In a section where the core of the section is calculated correctly, the value of the voltage generated by the external load is the same. Only then can the long-term safe operation of the device be ensured by making proper use of the load-carrying capacity of the element.

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