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SHAPING OF AXIALLY COMPRESSED BIPOLARLY PRESTRESSED CLOSELY SPACED BUILT-UP MEMBERS

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Abstract
The paper presents a method of shaping and describing the geometry of bipolarly prestressed closely spaced built-up member with symmetrical supports and a bisymmetrical cross-section. The following has been defined as a function dependant on the position along the length of the x section of the closely spaced built-up member with determined geometrical parameters: intial elastic $y_0(x)$ of the closely spaced built-up member chord in the prestressing zone, distance between the chords in the clear $s_i(x)$, moment of inertia $J_i(x)$ relative to main axes and eccentricity $e_i(x)$ of compressive force in a single chord. The length of the extreme section L_1 and the prestressing zone L_2, the maximum distance between chords s_{max} in the clear and the geometric characteristics of a single chord section were assumed. A full and correct description of the geometry of bipolarly prestressed closely spaced built-up members is necessary to start the static and stress analysis. As a result of the introduction of a bipolar displacement prestressing into the closely spaced built-up member, the moment of inertia increases in the middle part with respect to the non-material axis z. It allows predicting the increase of the critical load bearing capacity of the closely spaced built-up member. The load bearing capacity of bipolarly prestressed closely spaced built-up members was estimated using the modified Engesser's formula for two-chord closely spaced built-up member with rigid battens. For selected pair of channel sections, the analytical critical load estimation results were verified using FEM.

Keywords: **Axially compressed member; Bipolarly prestressed member; Bipolarly prestressed closely spaced built-up member; Bisymmetrical cross-section; Closely spaced built-up member; Load-bearing capacity.**