

# THE VARIATION OF THE $Y_S$ BENDING STRESS CORRECTION FACTOR FOR EXTERNAL CYLINDRICAL GEARS

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The bending stress calculus of external cylindrical gears is very important because, many times, this calculus imposes the gear overall dimension. The ISO contact stress calculus method considers two situations of tooth contact in which maximum contact stress could appear. One of these considers the teeth contact in the external point of single tooth contact, in which case the  $Y_S$  bending stress correction factor can be determined only analytically which involves knowing the gear dimensions. This paper presents the analysis of the  $Y_S$  correction factor varying with the gear teeth number, the sum of addendum modification coefficients and of the analyzed gear pinion or wheel addendum modification coefficient.

The  $Y_S$  correction factor is determined with equation (1):

$$Y_S = (1.2 + 0.13L)q_s^{\left(\frac{1}{1.21+2.3/L}\right)} \quad (1)$$

Based on developed software, the influence of the specified geometrical parameters on the  $Y_S$  correction factor was studied, and some output diagrams are presented in fig. 1 and 2.

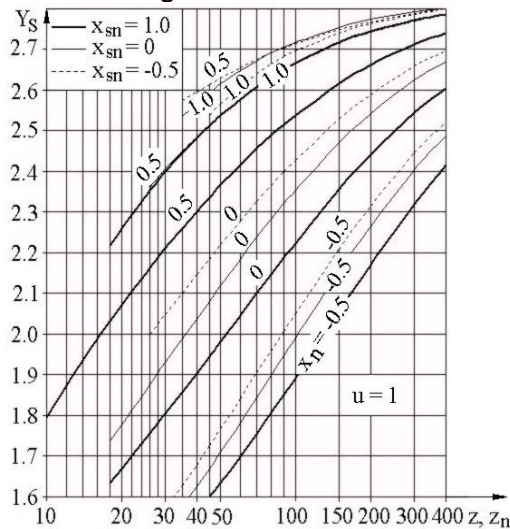


Fig. 1.  $Y_S = f(z(z_n), x_{sn}, x_{n1}, u=1)$

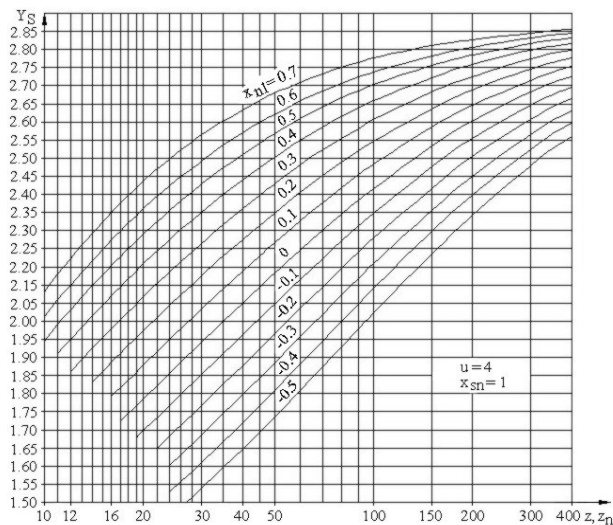


Fig. 2.  $Y_S$  diagram

The  $Y_S$  correction factor increases with the increase of the toothed wheel teeth number ( $z$  – for spur gears,  $z_n$  – for helical gears) and decreases with the  $x_{sn}$  sum of addendum modification coefficients. The increase of the  $x_{n1}$  pinion addendum modification leads to a great increase of the  $Y_S$  factor. The increase of the  $u$  gear ratio leads to the increase of the  $Y_{S1,2}$  factors.

## References

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