(325) New Strand Support Concept in the Withdrawal Unit (Development of the "low-strain" slab caster - II)

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1. Introduction:

In modern high-speed slab casting, the total strain at the solid/liquid interface must be minimized. The amount due to misalignment can be up to 20 % (1) or more (2) of the total strain.

One important part is the straightening area, where misalignment should be minimized since there the sum of strains (bulging strain, straightening strain, misalignment strain, thermal strain) reaches a peak value. Again the resultant strain at the solid/liquid interface must duly respect the critical limits (3). The avoidance of misalignment in the straightening area is subject of the present study.

2. Investigation Procedure:

A mathematical model has been developed for the calculation of strain in the strand shell as function of misalignment (Fig. 1). Thereby the effect of floating rollers - as described in Part I "Continuous" Straightening - has been particularly considered regarding strain due to misalignment.

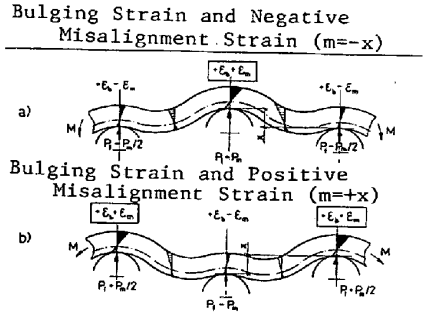

Fig. 1 Bulging and misalignment strain, schematic

3. Results and Discussion:

Fig. 2 shows the example for strain as function of roller pitch (conditions: casting speed 1,5 m/min, ferrostatic pressure 7,5 kg/cm^2, shell thickness 84 mm) with misalignment of the loose side rollers as parameter in the case of (a) conventional strand support, and (b) floating rollers which reduces the misalignment strain considerably.

The concept of floating rollers with fixed gap has the advantage that misalignment due to variations of the roller cavity is cut in half, and in addition alignment control is needed for the cavity only. Consequently, time and costs for maintenance are substantially reduced.

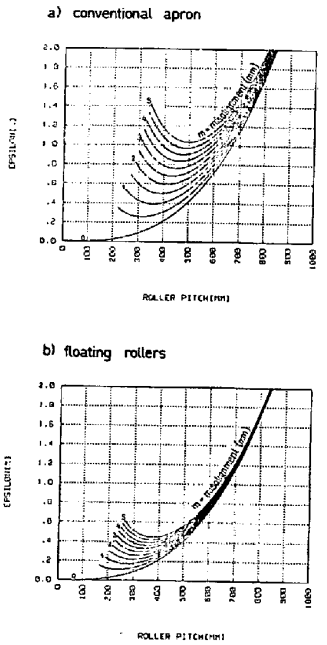

Fig. 2 Strain versus roller pitch as function of misalignment

4. Conclusion:

The concept of floating rollers - as needed for the continuous straightening - is in addition highly suitable to reduce strain and stress (shear and tensile) due to misalignment. It also eases maintenance.

References:

(1) T. Yamaguchi et al.: ILAFA-Congress, Mexico City 1981.

(2) M. Maeda et al.: Tetsu-to-Hagané 67 (1981) 1135-1144.

(3) H. Fastert, M. Wolf: AISI-Engineering Symposium on Slab Casting, Pittsburgh 1981.