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PERFECTION OF TECHNOLOGY OF ROLLING OF STRIPES ON BFHR

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Application of «Coilbox» not on all stripe figures of the hot rolling allows getting stripes with minimum longitudinal polythickness. In the article the analysis of terms of work for «Coilbox» is presented on a broadband figure 1680 and suggestions which can improve the longitudinal type of stripes are considered.

Keywords: stripe, figure, thickness, rolling, temperature, back winding

Existent BFHR (broadband figures for the hot rolling of stripes) with traditional technology have a row of defects, calling appearance of longitudinal polythickness and unevenness of mechanical properties of stripes.

In accordance with theoretical researches [1,2] it is set that the gradient of temperatures on length of intermediate roll renders substantial influence on the augment of thickness of stripe. Thus, than anymore size of gradient, id est than less than temperature of back-end of stripe as compared to the temperature of front end stripe, the anymore augment of thickness on the back-end stripe.

The size of longitudinal polythickness of stripes at the hot or cold rolling is expected with the use of the known expression [3]. Calculations for a stripe a 2,5 x 1250 mm (BFHR 1700) show, that at the gradient of temperatures for intermediate roll before the first cage of clean group, augment of thickness on the back-end stripe, going out from a cage, appeared equal to the zero (front and back ends are rolled without pulls). However, here, on the prepared stripe the augment of thickness on her back-end was made by a 0.06 mm as a result of appearance of gradient of temperatures on length of stripe and absence of back pull at rolling. The presented data testify that for the receipt of uniformity on length of stripe it is necessary to have a negative gradient of temperatures on length of intermediate roll at presence of which constancy of force of rolling is provided on length of stripe and there is indemnification of increasing gradient of temperatures on the cages of figure and it is absence of pull of back-end of stripe.

Application of afterheater on intermediate рольганге is provided the increase of temperature for back-end of rolls on 10-15 °C and decrease of bulge for this area of the prepared stripe on 0.03-0.05 mm. Realization for variant of reconstruction of BFHR 1700 with setting of the second thermal device and IRD in composition the clean group of cages can to provide the substantial decrease of rejections of thickness on length of stripe.

In the conditions of rolling of stripes on BFHR 1680 without «Coilbox» looked the same type longitudinal polythickness of rolling stripes: increase of thickness of stripe on her front area because of rolling without a front pull, increase of stripe thickness on a basic area because of decrease of metal temperature of (temperature cleat) and increase of thickness of stripe on the area of back-end of stripe because of rolling without a back pull.

After setting of IRD in the line of BFHR 1680 OJS the «Metallurgical combine «Zaporozhstal» character of longitudinal shape of stripes changed notedly. On the area II (speed of roll before a cage N 5 (0.85 m/s) takes place increase of stripe thickness, which is possible because of decrease for temperature of intermediate roll on the area «IRD» is a cage N 5. In addition decrease of temperature for outward coils of intermediate roll takes place in the process of their winding and unwinding, id est, than before they get in a coiler, the anymore their cooling. On the area IV, which corresponds to the front end of intermedi-

ate roll, an opposite picture takes place. Increase of thickness for stripe to the middle of her length logically, because it is contingently decrease of temperature for intermediate roll from front to the back-end. The coils of middle III area of coil are located between outward and internal coils, which determine maintenance of warmth, stability of temperature and approximately identical thickness of stripe in points measuring. Area V, since a cage N 5 and in every subsequent cage, roll without a back pull, that causes the increase of middle normal pin tension, forces of rolling, resilient deformations of cage and, consequently, thicknesses of stripe.

At rolling of different stripes with thick 2.0 mm character of change for thickness on length, mainly, remains the same, but the size of rejections changes within the limits of 0.03-0.08 mm. Thus, in the conditions of work of BFHR 1680 roll stripes with longitudinal shape of which has another kind, that ensues from got profilegram. For example, stripes having noticeable (to 0.2 mm) the increase of thickness in direction from front to the back-end stripe; with the approximately identical thickness of stripe on the areas II-IV; stripes with megascopic length of end-capping areas to 40-50 m.

At rolling without «Coilbox» front end of intermediate roll passes distance between cages N 4 and N 5 after 26 s. At the use of «Coilbox» (IRD) intermediate roll (front end), after an exit from a cage N 4 through 15 s acts to IRD, where winding up is carried out in a roll to the exit of back-end from a cage N 4 - 11 s, winding up with an acceleration - 8 s, transmission of roll on winding off - 5 s, serve of front end of roll to the cage N 5 - 14 s. General time after the exit of front end of roll from a cage N 4 to the receipt of him to rollers of cage N 5 makes - 53 s, that almost in two times more than without IRD and results in the additional losses of enthalpy of intermediate roll. Small mass of roll on IRD (to (13 t) assists uneven distribution of temperature on his section, that contingently decrease of temperature on length of initial intermediate roll, long cooling of internal coils of roll at his winding up and unwinding, by the possible delays of roll before unwinding, absence of screening of IRD.

Because of joint influence of the indicated factors the longitudinal shapes of stripes at rolling with the use of «Coilbox» have a various kind and in the conditions of BFHR 1680 at small mass of rolls this device not always performs the basic duty - receipt of eventhickness on length of stripe and decrease of thickness of end-capping areas. However, plant of «Coilbox» in the line of BFHR 1680 played the positive role, providing rolling of long-length slabs (long 9.0-9.4 m by mass of 11-13 t) and promoting, the same, technical and economical indexes of figure work. Nevertheless the problem of increase of longitudinal shape of stripes here is not decided. For the decision of these tasks application of additional technical measures is needed on the figure.

Increase of exactness of longitudinal shape of stripe and providing of rolling of stripes thick in a 2.0-3.0 mm on BFHR 1680 OJC «Metallurgical combine «Zaporozhstal» (without the native reconstruction for figure equipment), it can be attained by realization of technical measures on stabilizing of the thermal state of stripe and increase of temperature of intermediate roll. It can be attained by application of warmth economy device (WED) by long 34 m before IRD and induction neat furnace by length 10 m before a clean group after the transfer of scissors nearer to the declare. WED saves and evens a temperature on length of roll, and furnace allows in the process of rolling from a front end to back change a temperature on 30-50 °C. The self device of winding up - unwinding (IRD) must be screened

own WED. Such technical measures provide a decrease (removal) of low-speed polythickness at rolling, both without acceleration and with the acceleration of stripes.

However the problem of removal of the most substantial bulge on the local area of back-end of roll (stripes) does not decide here. Additional wringing out of this area [1] can be effective at presence of fast-acting hydraulic pressure-bearing devices which on the row of BFHR are absent. Having regard to the necessity of reduction of metal expense at the hot rolling, the decision of this problem can be executed by application of some untraditional methods of affecting to local area of stripe.

Conclusions. The longitudinal shape (polythickness) of thin stripes, rolled on BFHR with use «Coilbox», has substantial deviations from a minimum value, that contingently the long cooling of intermediate roll and uneven distribution of temperature on the section of roll mass to 13 т. The use of «Coilbox» does not provide moving away of back incrassate area of stripe. For the increase of enthalpy of intermediate roll and, together with it, decrease of rejections of thickness on length of stripe setting at intermediate roller bed of warmth economy device and induction warm up furnace is recommended.

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