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THE EXPERIMENTATION PRE-CALIBRATION MILL ROLLS FOR THE INCREASE THE DURABILITY IN EXPLOITATION

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ABSTRACT
This paper presents a critical analysis of the exploitation behaviour of Adamit steel casted laminating cylinders, respectively the experimentation pre-calibration for the increase the durability in exploitation.
It presents some data recorded during the industrial practice at the Middle Profile Rolling Train of the metallurgical company.
The increasing of durability in exploitation values have a direct influence on the company's expenses.
Keywords: hardness, Adamit steel, cylinders, chemical composition

1. INTRODUCTION
The metallurgic industry confronts, currently, the difficulty to maintain competitive, reported to the economic sectors and, the same time, to the necessity to continue and satisfy the increasing demands of steel consumers, concretized in the market economy philosophy, synthesized in the idea that the *primordial purpose of a business is that to produce and sell something which is desired by consumer, in the way that he wishes, when and where he wishes and to the price that he is wishful to pay.*
In the sense of these requests, the current metallurgic industry viewed itself put in the situation to obtain, at more competitive prices, steels with physical – mechanical and technological features as more restrictive, requested by the exigencies of users, following small consumptions and high durability in the exploitation of products obtained from steel.
In this context, the chance of fresh Romanian metallurgy stays in the scientific research, which allow the obtaining, with relative reduced costs, technological perfections on basis of which the steels and steel products become competitive on the market.
An important share in the value of finite products of steel is represented by lamination costs, where the consumer of cylinders has a preponderant role.

2. EXPERIMENTAL DATA
The intensification of lamination processes influences, directly, the durability of lamination cylinders, they being the most important component elements used in this domain [1].
The economical efficiency of lamination production depends, in great measure, of the quality of lamination cylinders, which durability in exploitation is determined by the features of material they are manufactured, the features of material that is laminated, and, not least, the exploitation conditions.
Decreasing durability in exploitation of the lamination cylinders, which work in variable requests conditions due to the deformation process (requests that repeat cyclically, to certain intervals), represent one of the most actual problems met in the lamination sections of metallurgic business, fact for the which the current work wants to answer to more of the problems linked by this aspect, creating a connection bridge between technological factors and exploitation conditions.

Exploitation durability of laminating cylinders is usually calculated by the ratio between the quantity of laminated material (expressed in metric tons) and the minimum thickness of the re-turning removed working crust (expressed in millimetres).
Literature on this topic indicates a close connection between the hardness of the working crust and the recorded durability value.
Exploitation durability is calculated in accordance with the cylinder resistance, one may therefore say that scuffing is low when the working crust is hard, but there is no direct correlation between these two features [1].
The experimentation of cylinders' pre-calibration before the thermal secondary treatment was made on 24 cylinders (12 fittings), designed to obtain the I 80, I 100, I 120, caja 14. profiles [2]. Thus, there have been prepared 4 fittings for the I 80, 6 profile, fittings for the I 100 profile and 2 fittings for I 120 profile.

3. ECONOMIC ANALYSIS OF THE SOLUTION PROPOSED FOR INCREASING THE DURABILITY OF CAST STEEL CYLINDERS ADAMIT

In view of the effecting the technical – economical analysis of lamination cylinders pre-calibration, before the appliance of thermal secondary treatment, in view of increasing their durability, were followed in exploitation the 6 fittings of steel cylinders Adamit (stand of lamination 14) used in the lamination of I 100 profile, and the registered data have been compared to data of the classical cylinders that worked under the same conditions [3,4].
Results obtained are registered in table 1.

Table 1. Durability obtained in exploitation

Max. cylinder sizes	Piece	Finite weight, kg	Gross cast piece, kg	Medium durability obtained $t_{lam}/1mm_{cil}$		Total laminated tones	
				Classic cylinders	Exp. cylinders	Classic cylinders	Exp. cylinders
ϕ450x900	12	1600	4500	62	73,33	48*62=2976	48*73,33=3520
ϕ540x900	12	2150	5500				
TOTAL		22500	60000				

Observation: There have been observed the 12 cylinders in exploitation; the casual expenses have been evidenced by their acquisition and manufacture. Finally, it resulted the expenses with cylinders for production of a laminate tone of 4,5 E/h, and the specific planned consumption is 4,0 kg cil /1 to lam.

The histogram of durability registered in exploitation is presented in fig. 1. The analysis of fig. 1, it results an **increasing of durability with 18,28%.**

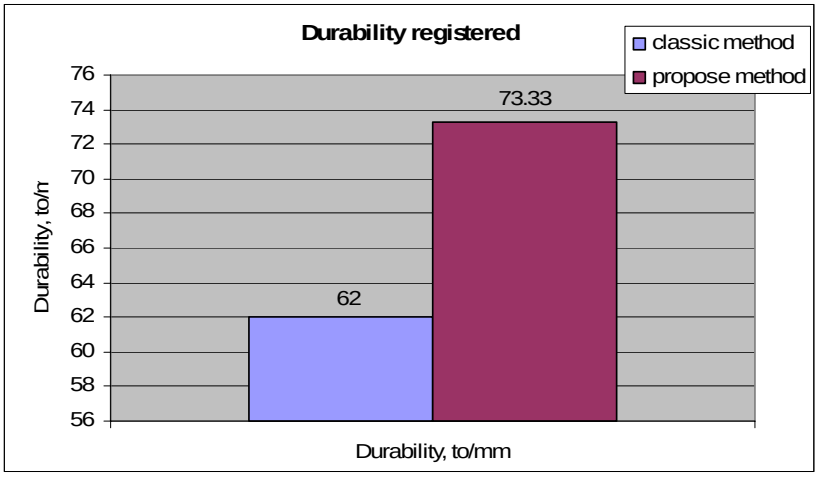

Figure 1. Histogram of durability registered in exploitation

For the determination of economic efficiency it is taken into account the manufacturing cost of cylinders, as well as the durability registered in exploitation. After the routing of piece itinerary (according to technological flows), there are obtained the prices for each operation, taking into account their fixing.

There are made the following procedures:

- specific consumption of cylinders for the medium profiles laminators is 4kg/t laminated steel, respective it is the biggest consumption comparing to the other laminators of enterprise;
- quantity of steel, annually laminated in finite products within the LPM section is around 270.000 tones

4. CONCLUSIONS

For lamination of 270.000 tones of steel, it is consumed averagely, 1080 tones of lamination cylinders, representing a value of 1473,5 E x 1080 tone = 1.591.380 E.

In other words, it is necessary an amount of 1.591.380 E for insuring cylinders consumption, amount sufficiently big to justify the researches concerning the durability of cylinders and, implicit, the decreasing of their consumption, in the conditions of exploitation offered by the technological level of Romanian enterprises.

The increasing of durability is from 62 to 73,33 to/mm, respective an increasing with 18,27%, will be found in the cylinders consumption, with a direct and positive effect upon the expenses of the section.

Usage of pre-calibrated cylinders leads to the increasing of production from 2976 to 3520 laminated.

Thus, decreasing the cylinders' consumption per tone of laminated steel to 3,326 kg, it results a cylinders' consumption of 898 t, for the annual production of laminated tones, respective 1.333.530 E.

Consequently, it is obtained a saving of 257850 E to an annual production of 270.000 laminated tones.

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