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STUDY ON INCREASING TO REMOVE CONTINUOUSLY CAST STEEL FOR THE PRODUCTION OF PIPES

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ABSTRACT:
This article aims to highlight the direct link between removal and hydrogen content in steel and correlations between hydrogen the bubbling parameters of the inert gas (argon).
KEYWORDS:
steel, hydrogen removal, bubbling, argon

1. INTRODUCTION

Materials research, including metallic materials, constant current is due to the requirement for manufacturers to continually improve product performance. Currently there is a reconfiguration of global steel production after 2008 is available with emphasis on high quality metallic materials at the expense amount. If one can say that the world has been a contraction in production of liquid steel, it is equally true that the increased quantity of finished steel, therefore we can say that he worked mostly on growth and hence the net removal reducing the amount of trash [1, 2]. The net removal in the context of this article to understand the amount of blank pipe that could be converted to full-bore, expressed as a percentage of the total weight of a charge [3]. The graphs presented removal will be called yield, the difference was not able to be used is recovered as the trash.

2. RESEARCH RESULTS

Following the results received from the beneficiary (pipe manufac-turing plant), supplier of cakes cast continue, found a decrease in net removal of 92.7% to 78.3%, compared to a required plan (BP) of at least 92.0% leading to the need to conduct a detailed study on factors influencing the removal of metal. Removing the factors which influence the defects that cause scrap and technological flow to eliminate nonconformities, presented in Figure 1.

The analysis of defects were found to have a major share of a small longitudinal cracks, which, together with the defect of flakes are caused by increased hydrogen content in liquid steel continuously cast - Figure 2.

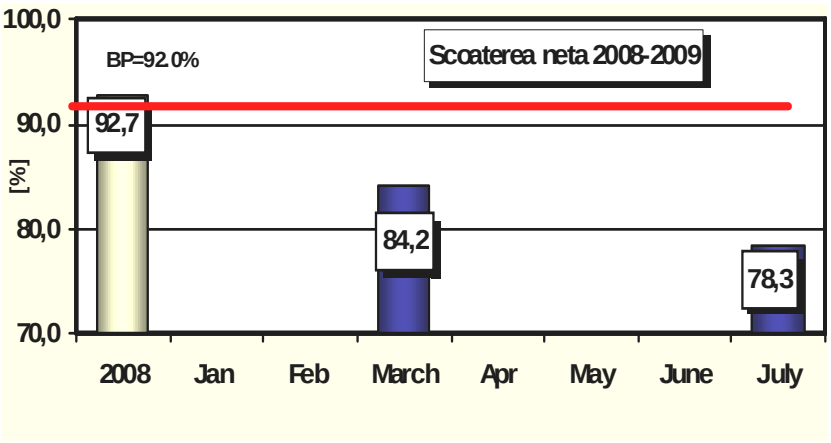


Figure 1. Analysis of removal of steel in 2008 full year and first half of 2009

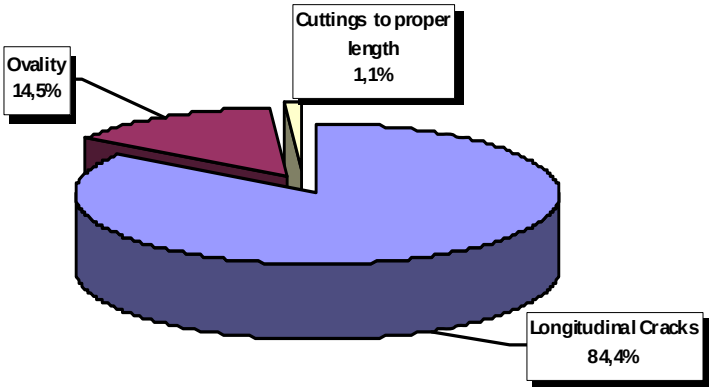
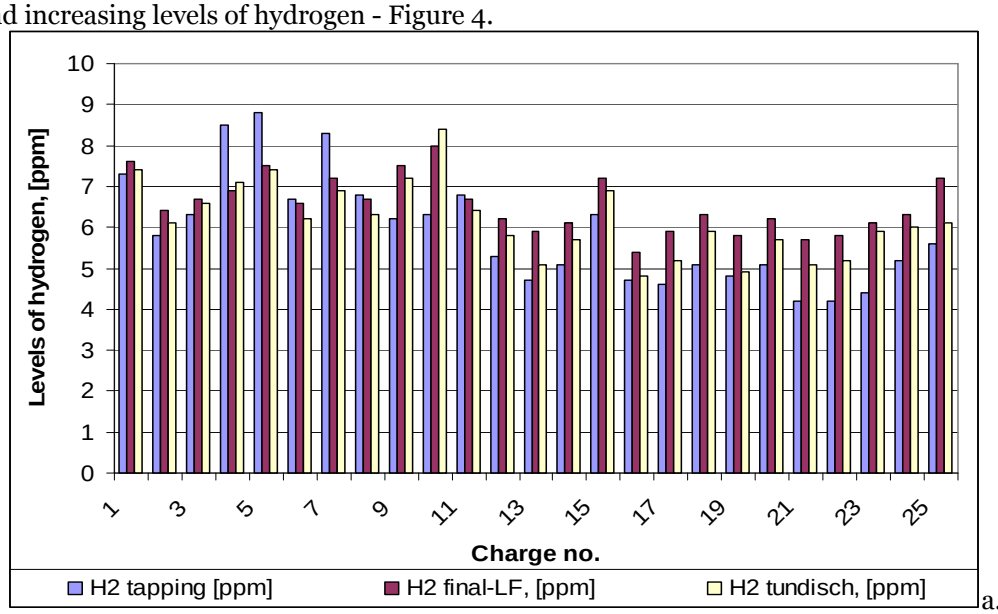


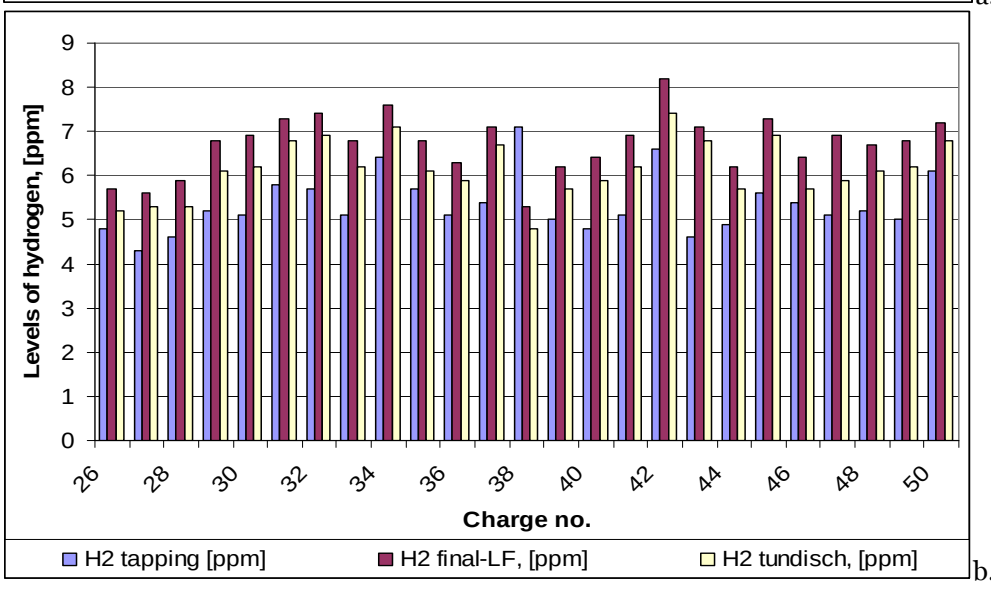
Figure 2.The amount of longitudinal cracks in the total defects

After identifying these problems the study focused on the main sources of hydrogen in steel liquid. For brings it, over the past 3 months was used to measure moisture in materials development and processing, measurement of hydrogen in liquid steel in the evacuation of the furnace, secondary treatment and continuous casting. Thus were examined a number of 100 cast steel mark OLT 35 (DIN 8184/1987), developed a type electric arc furnace EBT and continuously cast on a continuous casting plant, the blank being cast at Φ270mm section.

For a more detailed analysis, I realized the interdependence of continuously cast steel and removal of hydrogen from the dealer, showing a proportional dependence between the increase in waste and increasing levels of hydrogen - Figure 4.



a.



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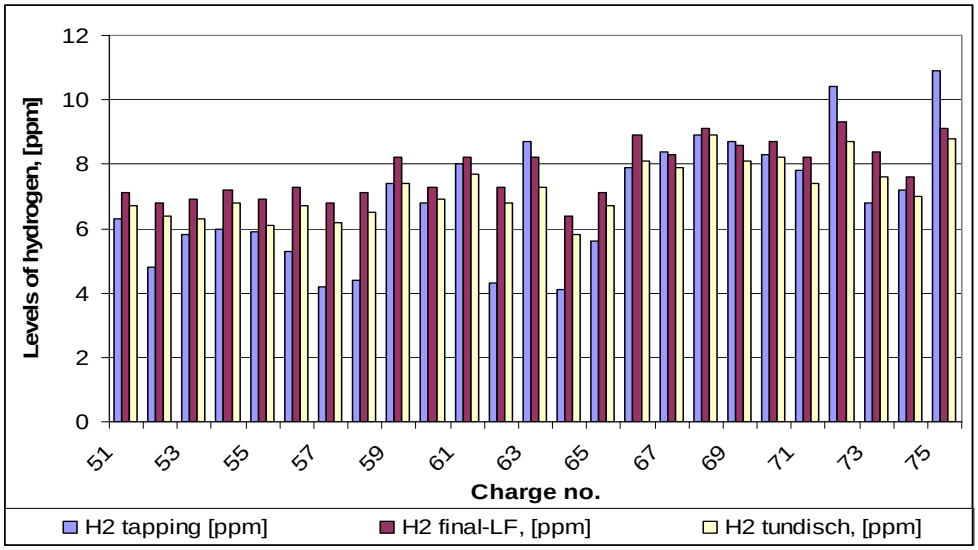

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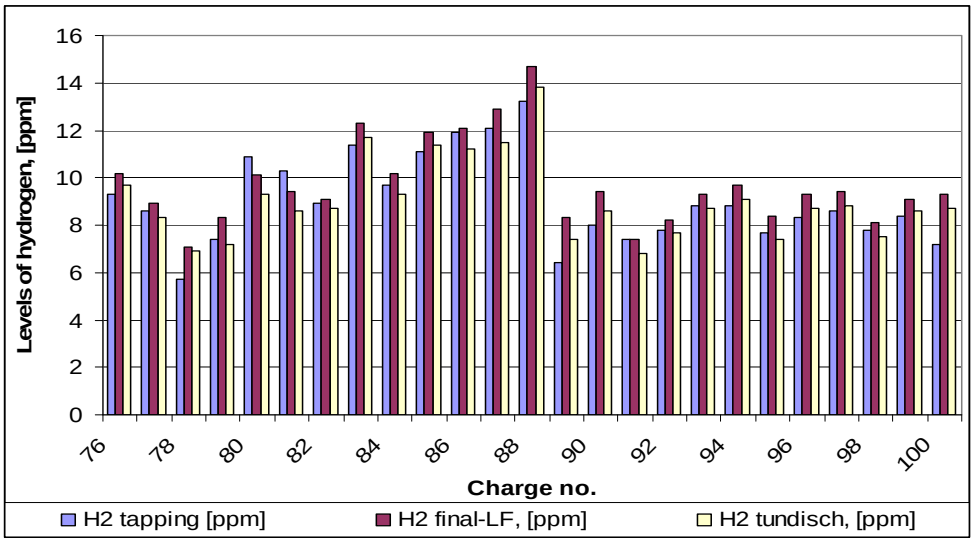

d.

Figure 3. Histogram of change of hydrogen in liquid steel

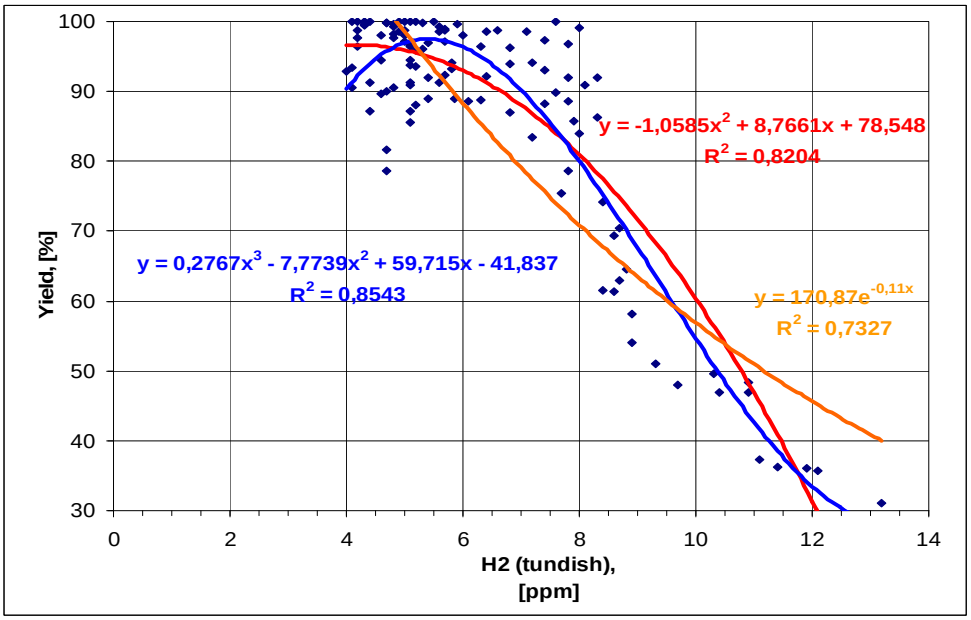

Figure 4. Variation of removing the content of hydrogen in steel

Hydrogen content distributor is very much influenced by the pressure of bubbling used during secondary treatment facility conducted LF In analyzing this figure shows an increase of 5 is the hydrogen content in liquid steel with increasing gas pressure bubbling.

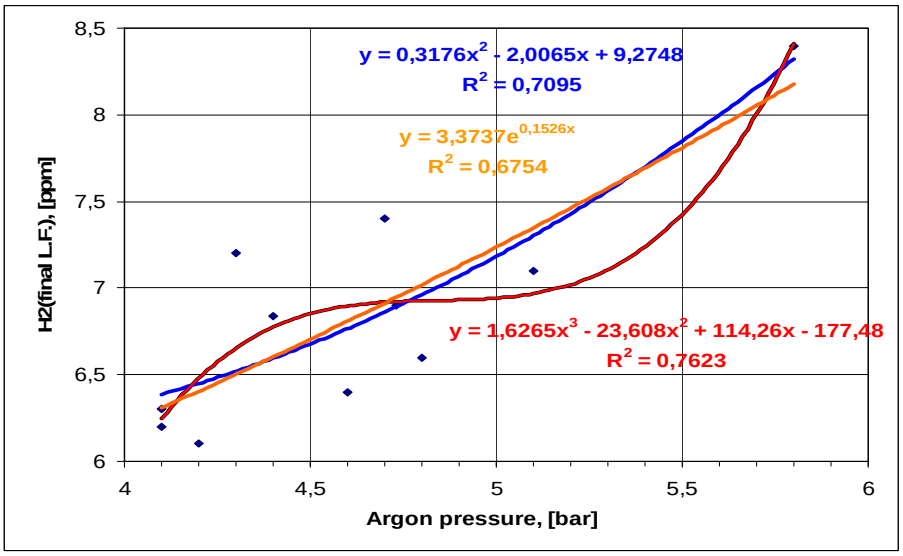

Figure 5. Variation of hydrogen pressure on the amount of argon

Previously presented bubbling pressure influence on hydrogen con-tent and the graph in Figure 6 shows the variation of hydrogen content along with the bubbling flow changes as the analysis of this graph we can see an optimal area between 560 - 600 [l/min] in which the mass removal of hydrogen from steel liquid. In outside this range can see the emergence of the phenomenon of absorption of hydrogen in the atmosphere in the mass of liquid steel.

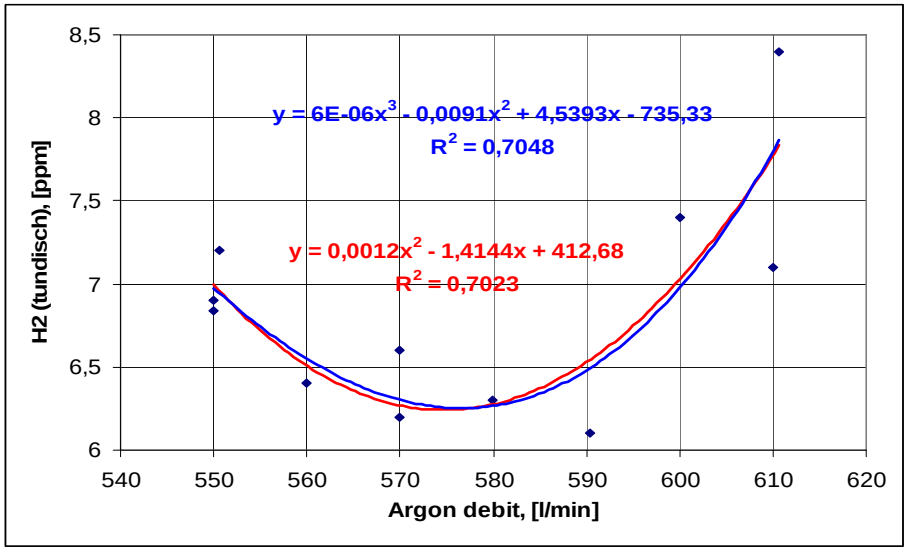

Figure 6. Variation of hydrogen on the amount of argon flow

One of the reasons that causes longitudinal cracks and value is a ratio Mn/S From this point of view was observed removing a pronounced increase with increasing value of the ratio Mn/S - Figure 7. Further, in Figure 8 were analyzed with a removal batches between 80 and 100%, here you can show very clearly that with increasing value ratio Mn/S increases the removal.

In some cases there was an increase in the value of hydrogen tundish during shooting, the stream of steel is protected from the atmosphere through the protection tube pot-dealer, measurements were made of powder layer thickness cover distributor, the interdependence of these values are plotted in Figure 9.

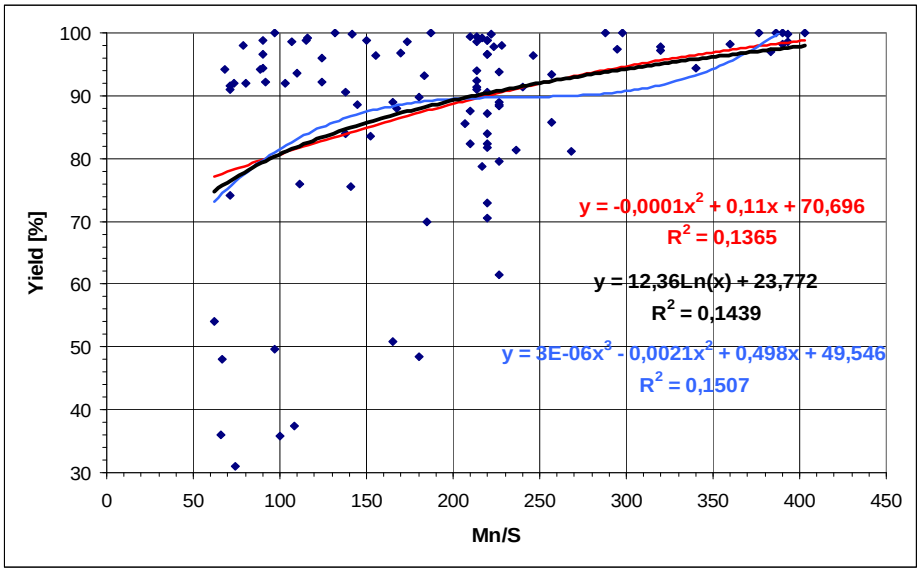

Figure 7. Changes in the light of developments removal ratio Mn/S

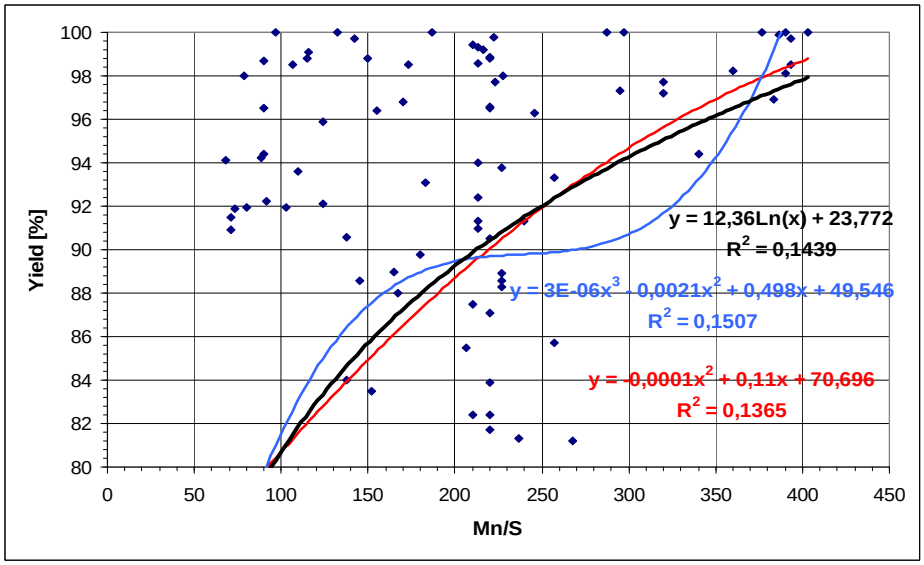

Figure 8. Changes in the light of developments removal ratio Mn/S

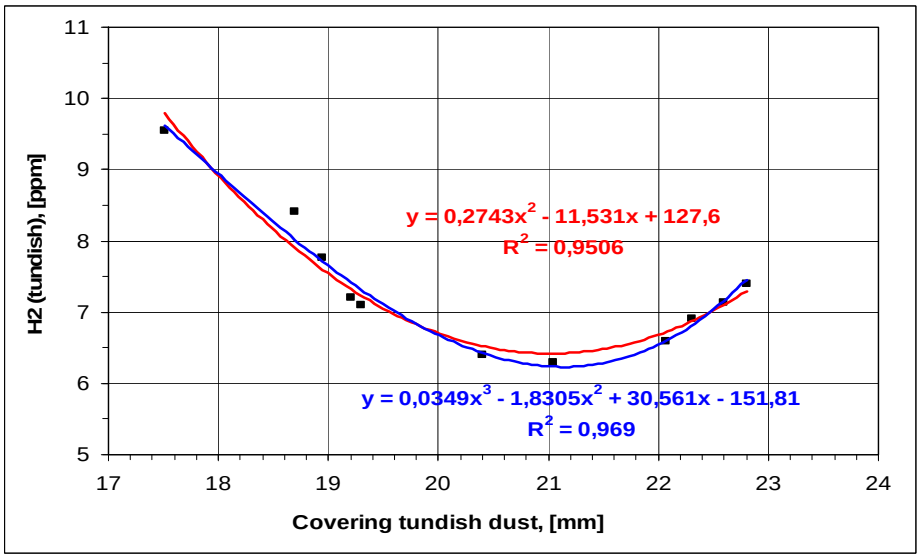

Figure 9. Variation H_2 according to the dust coating thickness

3. CONCLUSIONS AND PROPOSALS

To obtain as high a net removal, after the study is on the following main proposals:

- Throughout the development process, treatment and casting of steel is envisaged to reduce the hydrogen content in liquid steel.
- It is recommended calcination added materials used during development and secondary treatment from the ladle.
- To eliminate a major source of hydrogen (water) prohibits the operation of production equipment in case of minor water leaks.
- An important factor in reducing the humidity of hydrogen is that all materials should not exceed 1%.
- The histogram analysis of Figure 3 may be proposed operation of a facility LF with bubbling pressure and flow as low to avoid detection, metal bath, and thus reduce the absorption of hydrogen in liquid steel.
- An important factor in elimination of hydrogen absorption in the atmosphere is to use the jet protection tube of steel ladle into the distributor, immersing it in steel for a distance of 20-22 cm while forming a coating of steel distributor in thickness from 1.8 to 2.2 cm.

ACKNOWLEDGMENT

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