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Production of Low-Carbon Aluminum-Killed Steel for Hot and Cold Rolled Sheets by Q-BOP–Continuous Casting Process*

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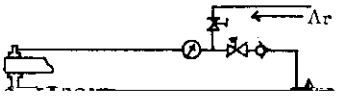
No. 3 continuous caster at Chiba Works has started its operation in April, 1981. This slab caster is one of the two which are connected with the Q-BOP process in the world. Main product of No. 3 continuous caster is low-carbon aluminum-killed steel that was previously made by ingot casting.

bottom-blown converter at the No. 3 Steelmaking Shop and subjected to argon bubbling treatment in the ladle was experimentally cast into the continuous casting mold standing still in a manner similar to the ordinary ingot casting process, in order to see if there are any pinholes and blowholes.

(1) Hydrogen addition in ladle



2.2 Experimental Results

2.2.1 Hydrogen concentration and slab surface quality

Photo 1 shows the occurrence of blowholes in the slab's cross section. While a large number of blowholes occurred at 14 ppm H concentration (Method-d by Japan Society for the Promotion of Science: the dual tube sampling method), the sound slab was obtained at H concentration lower than 10 ppm.

Figure 2 shows the relationship between the number of pinholes on the continuous cast slab surface and the H concentration. The pinholes were detected by

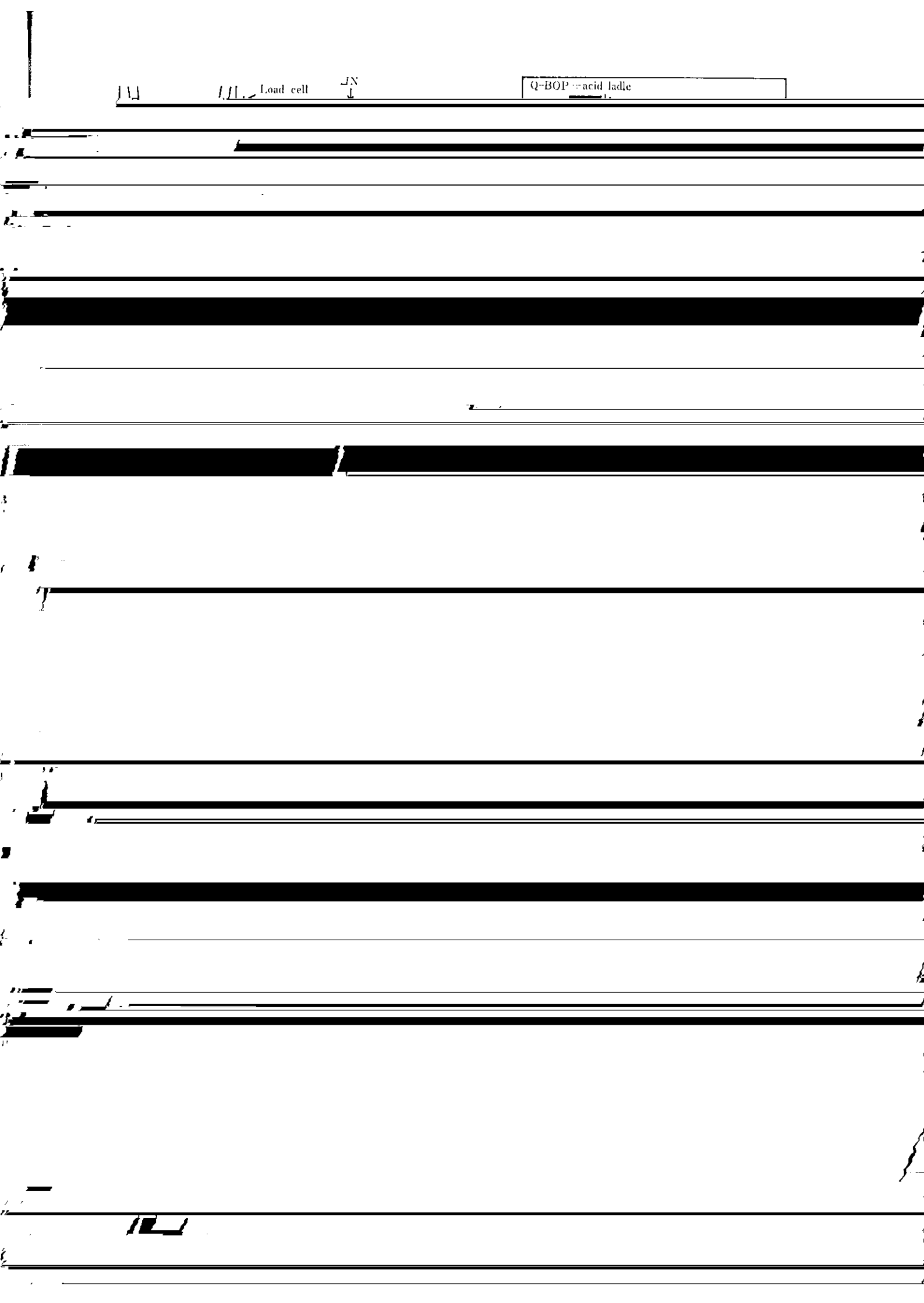
complying with the no-conditioning criteria was found to be 11 ppm in LD-H_2 addition process. However, in Q-BOP-Ar–stirring ingot casting process, the number of pinholes was greater than that in LD-H_2

ν: Kinematic viscosity coefficient of molten steel

C_{Li} as defined by eqs. **(1)** and **(2)** were determined for

Table 1 Chemical composition of low-C low-Al killed steel and low-C Al-killed steel at No. 3 continuous caster connected with Q-BOP

(wt %)


Load cell
N
Q-BOP acid ladle