

Development of the latest small-size flaskless horizontal molding machine

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In recent years, environmental protection against to global warming and deterioration of environment has been paid attention to. Authors have been developing molding machine not only increasing productivity but also achieving environmentally-friendly production, safety and improving working environment.

In that development, the key technology is “Aeration sand filling”. In the conventional sand filling, the falling sand particles have directional property. It always caused problems such as uneven sand density even on the same pattern and insufficient sand filling into small bore pockets. These problems are solved by aeration sand filling technology. The compressed air with low pressure is introduced into the sand tank to fluidize the molding sand, and guide the sand into the molding flask. As the compressed air with low pressure is used, the air consumption is reduced, and the noise caused by compressed air is decreased. Aeration sand filling carries many other advantages. One of them is low noise and low vibration. Dimensional deviation of casting has been improved, thus finishing cost could have been reduced. Sand filling performance in the complex shape has been improved by the aeration sand filling. Therefore, defects of mold has been greatly reduced.

This technology was applied to tight-flask molding machine at first. Next, authors developed the small-size flaskless horizontal molding machine with latest technology for the advanced of the small jobbing foundry.

Keywords: Green sand mold, Aeration sand filling, Flaskless molding, Energy saving

1. Introduction

In the recent domestic foundry industry, the obsolescence of technologies and the aging of the facilities have progressed gradually. Therefore, the expectations for the molding machine with the latest technology have increased especially from the small-scale foundry plants. On the other hand, in overseas plants mainly in China and Southeast Asia, has been changing from the semi-automatic molding machine with hand work to full automatic.

To answer such demand, authors developed small-size molding machine (type FDNX). This user-friendly molding machine achieved the stable operation for quality casting with the aeration sand filling technology [1-3] as the core technology and the latest control system.

2. The principle of aeration sand filling technology

Figure.1 shows a concept of aeration sand filling mechanism.

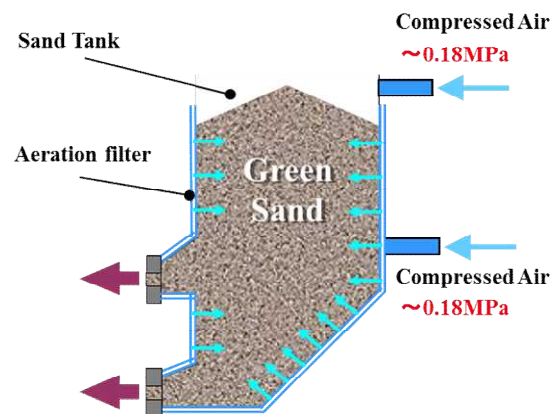


Fig.1 Aeration sand filling mechanism

The conventional blow type molding machine had required high pressure compressed air of more than 0.3MPa for the sand filling process.

In contrast, the newly developed molding machine adopted the aeration sand filling technology as the core technology. Uniform sand filling is realized with saving energy because aeration air in low pressure under 0.18MPa is led in through a special filter in the sand tank.

3. Test result

3.1 Mold strength

The mold strength distribution of the mold were compared by the conventional blow type molding machine and upgraded molding machine in a Japanese foundry plant. The results are shown in Figure 2. Compared to the conventional blow type molding machine, new aeration type molding machine has

improved the mold strength, furthermore, achieved uniform sand filling with the aeration filling.

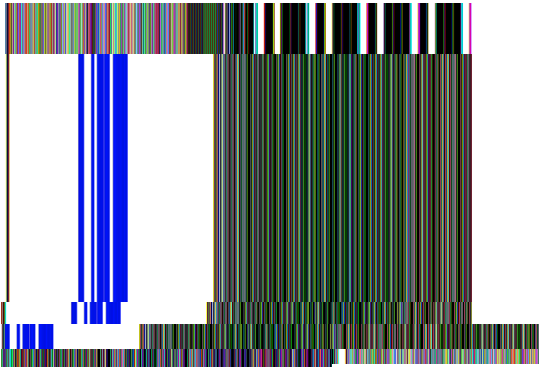


Fig.2 Mold strength distribution comparison

3.2 Casting dimensional accuracy comparison test results

Dimensional accuracy was also compared by the molding machine before and after updating as with the intensity distribution. The result is shown in Figure 3.

The developed molding machine achieved the improvement of the casting quality in terms of dimensional accuracy even in small plant.

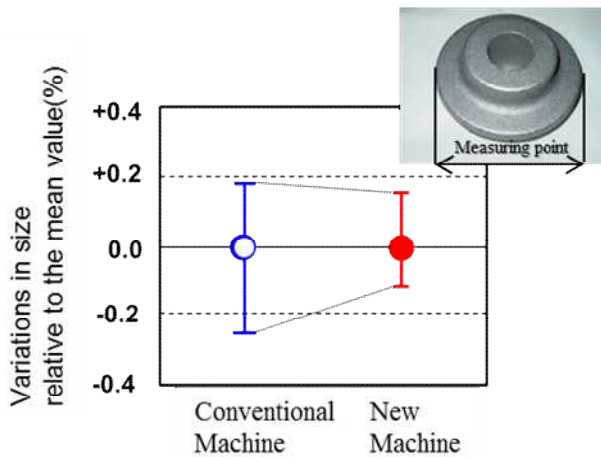


Fig.3 Casting accuracy comparison result

4. Conclusion

The improvement of casting quality is important task for the domestic small-scale foundry in the global competition. In addition, it also contributes to improve Japanese foundry technology.

Authors developed small-size flaskless molding machine. It has achieved uniform sand filling and the improvement of the casting quality in terms of dimensional accuracy with the aeration filling.

Semi-automatic molding machine with hand

work is still widely used in emerging countries. On the other hand, the countries developing such as an automobile industry need to stably mass-produce high precision casting. New developed small-size flaskless molding machine meets such demand.

References

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