

Influence of the mulling condition to exert on the greensand nature

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The greensand adds water and regulates a compactability (CB). The adjustment of the CB is difficult and the greensand nature has a big looseness. From a fluctuation factor to have an influence on the greensand nature, I chose quantity of addition and addition time of the water. The mulling test which changed examined quantity of addition and addition time of the water. As a result, I knew that is important to tempering of greensand which the water adding performed a gross quantity early in mulling.

1. Introduction

The greensand process can mass-produce a cast. The process which can produce a high-quality cast. Quality stabilization of greensand is desired to produce a high-quality cast. Installation and automation are advancing the greensand process. A water controller is equipmentized as a representative of automation. Compactability (CB) adjustment is performed by a water controller and we're working on stabilization of the greensand nature. At the same time, an adjustment and management of greensand composition are being performed. But, looseness is big for the greensand nature and it's the real state of affairs to have trouble with stabilization of the greensand nature. The fluctuation factor which has an influence on the greensand nature is a-f.

- a) Casting condition (pouring temperature, sand/metal weight ratio (S/M ratio), etc.)
- b) Mulling condition (mulling time, addition amount, etc.)
- c) Condition of mulling facility (Simpson type, agitator type, etc.)
- d) Composition of return sand (Distribution of sand grains, Clay, Moisture, etc.)
- e) Facility condition to treatment return sand (Cooling of sand by water, Temperature of return sand, etc.)
- f) Others (Tempering of greensand, Pre-mulling, etc.)

This report is here for investigating the size of the looseness of the greensand nature.

2. Experiment method

This experiment was made about "f" and a mulling condition of "b". A testing condition of "b" is indicated in the next.

2.1 Combination of sand

The material of greensand is composed a system sand 100%.

2.2 Test procedure of the mulling condition "b"

Mulling condition "b" changed addition time of the water and the addition amount and investigated the influence which gives it to the greensand. Mulling of greensand added water using a mulling machine and mulling for 4 minutes. Addition timing of the water and the addition amount were changed, and we investigated properties of greensand. The quantity of water was set to 2 standards of the 110cc and the 120cc. Later, the test procedure discuss an example of 120cc.

Mulling condition A did the whole quantity addition of water with a systemsand and mulled for 4 minutes, and we investigated properties of greensand. Mulling condition B added 1/2 water of 120cc with a systemsand and mulled for 2 minutes. After, added 1/2 water of 120cc and mulled for 2 minutes, and we investigated properties of greensand. Mulling condition C added 1/2 water of 120cc with a systemsand and mulled for 2 minutes. After, added 1/3 water of 120cc and mulled for 1 minutes, and added 1/5 water of 120cc and mulled for 1 minutes, and we investigated properties of greensand.

2.3 Test procedure of the mulling condition "f"

We could preliminary mulling a systemsand and tempered greensand for 180 minutes per 60 minutes per 30 minutes after that. After, we could main mulling a systemsand and investigated properties of greensand. Preliminary mulling added 3/12 water of 120cc, and mulled for 3 minutes. We put mulling sand in wellclosed container and preserved it. This is the tempering of sand. Time of the tempering of sand was set to 180 minutes per 60 minutes per 30 minutes, and we mulled for the main mulling.

The tempering of sand per 30 minutes is Mulling condition D. The tempering of sand per 60 minutes is Mulling condition E. The tempering of sand per 180 minutes is Mulling condition F.

Preliminary mulling added 5/12 water of 120cc, and mulled for 3 minutes. We put mulling sand in well closed container and preserved it. Time of the tempering of sand was set to 180 minutes per 60 minutes per 30 minutes, and we mulled for the main mulling.

The tempering of sand per 30 minutes is Mulling condition G. The tempering of sand per 60 minutes is Mulling condition H. The tempering of sand per 180 minutes is Mulling condition I.

3. Experimental result

The test result is indicated on fig 1. The compression strength falls compared the B, C then the A which did the whole quantity addition of water. The permeability is also the similar tendency.

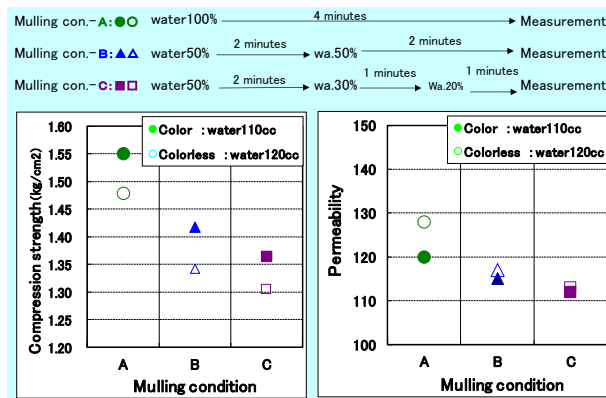


Fig. 1 Relation between compression strength and permeability in mulling condition A, B, C

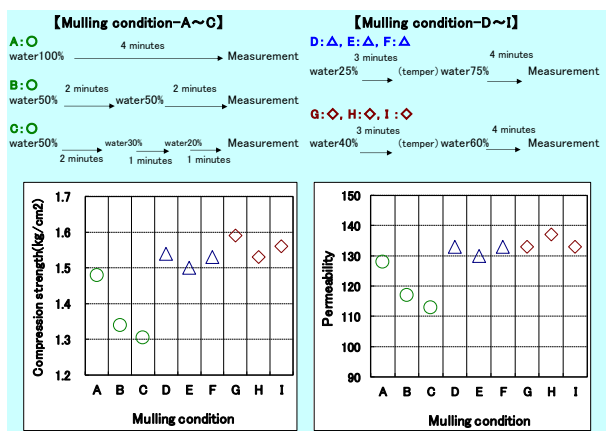


Fig. 2 Relation between compression strength and permeability in each mulling condition

The test result is indicated on fig 2. There are no big changes for compression strength of the D,E,F,G,H,I which went on the temper.

The permeability is also the similar tendency.

4. Summary

This report was investigated about the mulling condition that I can think it influenced looseness of the greensand nature. When dividing and adding water in mulling, the compression strength and permeability indicate the decline tendency. When doing this mulling after you could pre-mulling and we'll stay to keep for 180 minutes per 60 minutes per 30 minutes, the compression strength doesn't fall, and the looseness is also small.

Therefore that the mulling of a greensand is addition method of water and a temper is important.

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