다양한 온도 환경에서의 RC-LFS 기반 수경성 복합 재료의 수화발열 특성

Hydration Heat Property of RC-LFS based Hydraulic Composite according to Various Ambient Temperature

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Abstract

Ambient temperature has a direct impact on the hydraulic process. Though many experiments have been processed in order to investigate the hydration properties under the various ambient temperature of OPC, there are not reported about aluminate-based composite. This presentation is composed of contents on the experimental investigation of the hydration heat of pulverized rapid cooling ladle furnace slag based composite. Based on the experimental outcomes, gypsum can decrease the hydration heat dramatically and lower ambient temperature has a negative effect on accelerated the hydraulic process.

키 워 드 : 수화특성, 속경성 환원슬래그, 주변온도
Keywords : hydration property, RC-LFS, ambient temperature

1. Introduction

1.1 Experimental purpose and background

Sustainability goes widely into every section of our society. As cement industry and construction, new binder material with better sustainability is highly necessary. A recent study shows a suitable alternative which is the pulverized rapid cooling ladle furnace slag (RC-LFS)[1.2]. While the ambient temperature hasn't been involved as a variable parameter. In order the widely use of this material, the impact of ambient temperature is necessary. Since that, this presentation content a serious experiment to test the ambient temperature effects.

2. Experimental program

2.1 Experimental plan and method

The hydration temperature of an RC-LFS based composite is relatively very high, and increasing dramatically. So, a indirect method is involved in this experiment. The fresh mix will be cast into a plastic mold and sealed and then weight. After that, all the samples will emerge into 1500 ml water, the water temperature is just as equal as the ambient temperature. Other detail as shown in Table 1. The monitor will be involved to test the changing of water temperature. By the equation (1), the hydration heat can be calculated.

$$E = 4200 \times m \times \triangle T \quad \text{---------- (1)}$$

E: energy (J)

m: sample weight (kg)R

△T: Temperature difference (K)

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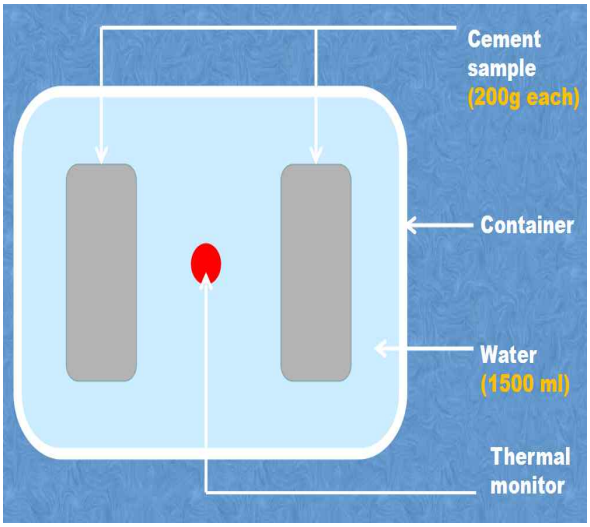
Table 1. Experimental Plan and method

ID	Mix ingredient	Ambient temperature (℃)	Retarder dosage (w%)	test method
R100-0-0.2	RC-LFS 100%	0	0.2	
R100-0-0.4			0.4	
R100-10-0.2		10	0.2	
R100-10-0.4			0.4	
R100-20-0.2		20	0.2	
R100-20-0.4			0.4	
R75H25-0-0.2	RC-LFS 75% +Hemihydrated gypsum 25%	0	0.2	
R75H25-0-0.4			0.4	
R75H25-10-0.2		10	0.2	
R75H25-10-0.4			0.4	
R75H25-20-0.2		20	0.2	
R75H25-20-0.4			0.4	
R70D30-0-0.2	RC-LFS 70% +Dihydrate gypsum	0	0.2	
R70D30-0-0.4			0.4	
R70D30-10-0.2		10	0.2	
R70D30-10-0.4			0.4	
R70D30-20-0.2		20	0.2	
R70D30-20-0.4			0.4	

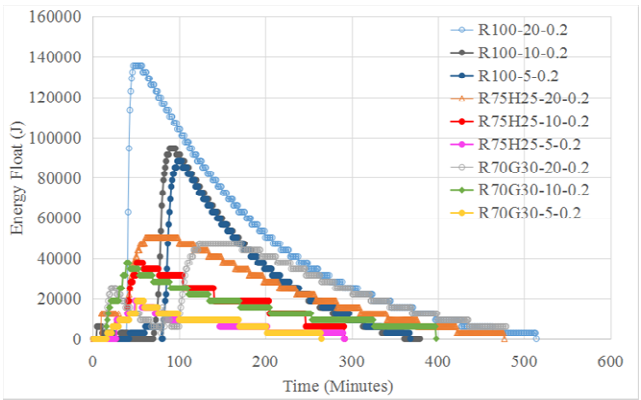


Figure 1. Hydration heat (0.2% retarder)

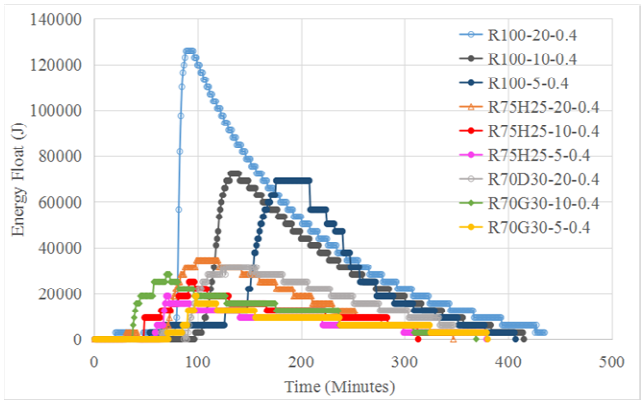


Figure 2. Hydration heat (0.4% retarder)

3. Result, discussion and conclusion

The result as shown in Figure1 and Figure2. First of all, gypsum can decrease the pick energy value dramatically. Secondly, ambient temperature has a higher impact on the hydraulic process than the retarder. Another characteristic can be seen from the result is that the hydraulic processed dramatically.

감사의 글

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참 고 문 헌

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