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# 1 Multi-response optimization of post-fire performance of Strain 2 Hardening Cementitious Composite

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## 6 Abstract

7 This paper presents results of an experimental program conducted to optimize  
8 the post-fire performance of Strain Hardening Cementitious Composites (SHCC)  
9 using Taguchi approach with utility concept. The experiments were first undertaken  
10 by determining nine SHCC mixes using a standard L9 ( $3^4$ ) orthogonal array of four  
11 parameters and each parameter with three levels. The four parameters of SHCC mixes  
12 included fly-ash/binder ratio, sand/binder ratio, water/binder ratio and fiber  
13 proportions. The responses of SHCC to be optimized were tensile strain capacity,  
14 compressive strength and post-fire compressive strength after subjected to 200 °C,  
15 400 °C, 600 °C and 800 °C of isothermal heating. Together with Taguchi method,  
16 utility concept was introduced to simplify the multi-response problem into  
17 mono-response question together with Taguchi method. The role of different  
18 parameters on the composite responses of SHCC was examined. Furthermore, an  
19 optimal SHCC mix to maximize multi-responses was determined based on statistical

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