Flexural Behavior of Corroded Steel Fiber Reinforced Concrete Beams with Variable Fiber Contents

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Abstract

1. Introduction

$\mu A/cm^2$

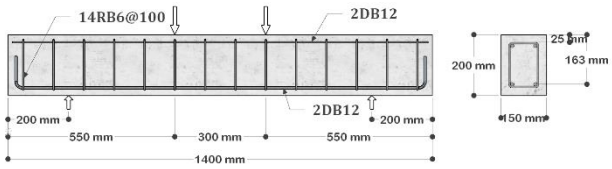

Fig. 1

2.3 Materials

2. Methodology

2.1 Experimental parameters

Table 1

**Note: Specimen's name is denoted as the immersion date to achieve the corrosion for 19 days and the fiber volume fraction in the SFRC beam.*

2.2 Experimental details

Table 2

Table 3



Fig. 2

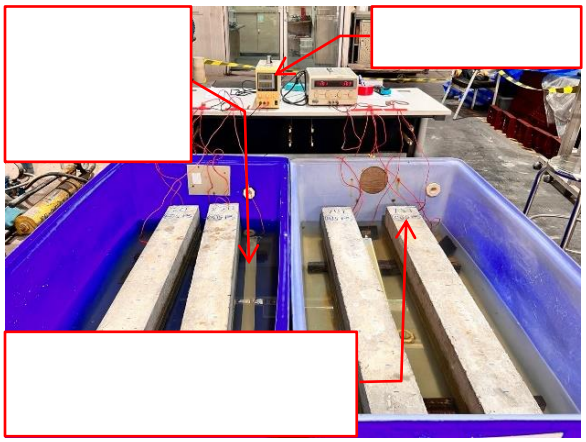

Fig. 3

2.4 Fabrication procedure



Fig. 4

2.5 Experimental setup

2.5.1 Corrosion acceleration process

$$\Delta_m = \frac{MIt}{zF} \qquad (\ )$$

M

I

t

z

F

$$I = \frac{i_{applied}}{A} \qquad (\ )$$

I $\mu A/cm^2$
$i_{applied}$ μA
A cm^2

2.5.2 Crack measurement



Fig. 5

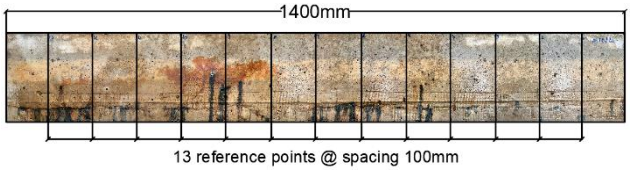

Fig. 6

2.5.3 Four-point loading test setup

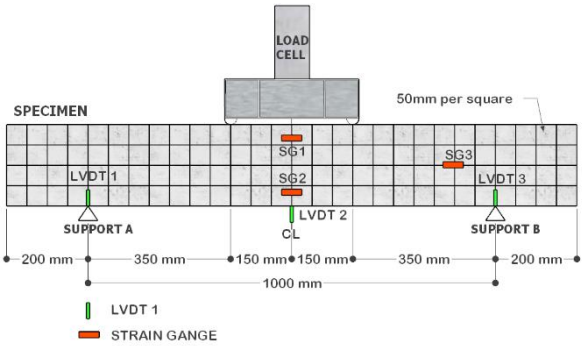

Fig. 7

3. Results and discussion

3.1 Crack propagation

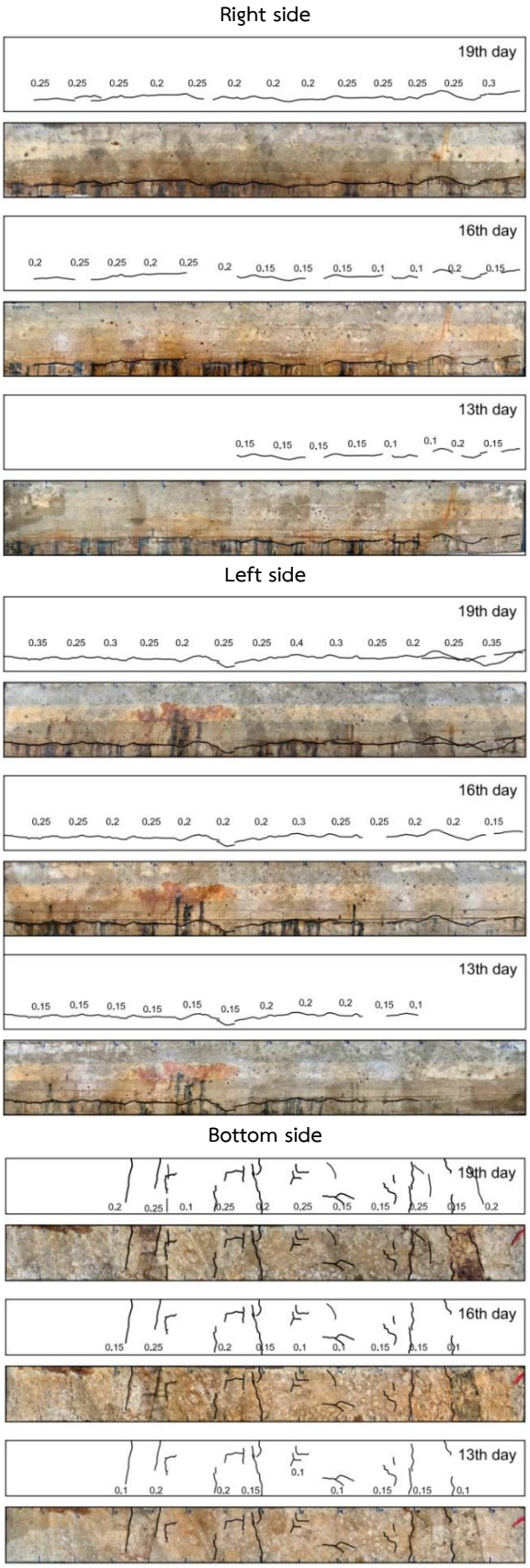
Right side
19th day
0.25 0.25 0.25 0.2 0.25 0.2 0.2 0.2 0.25 0.25 0.25 0.25 0.3
16th day
0.2 0.25 0.25 0.2 0.25 0.2 0.15 0.15 0.15 0.1 0.1 0.2 0.15
13th day
0.15 0.15 0.15 0.15 0.1 0.1 0.2 0.15
Left side
19th day
0.35 0.25 0.3 0.25 0.2 0.25 0.25 0.4 0.3 0.25 0.2 0.25 0.35
16th day
0.25 0.25 0.2 0.25 0.2 0.2 0.2 0.3 0.25 0.25 0.2 0.2 0.15
13th day
0.15 0.15 0.15 0.15 0.15 0.15 0.2 0.2 0.2 0.15 0.1
Bottom side
19th day
0.2 0.25 0.1 0.25 0.2 0.25 0.15 0.15 0.25 0.15 0.2
16th day
0.15 0.25 0.2 0.15 0.1 0.1 0.15 0.15 0.1
13th day
0.1 0.2 0.2 0.15 0.1 0.1 0.15 0.15 0.1

Fig. 8

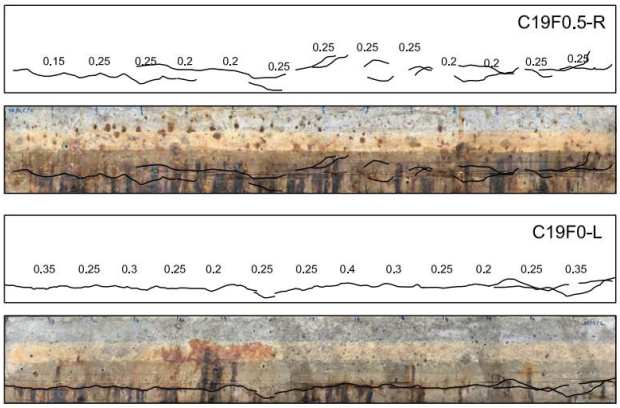

Fig. 9

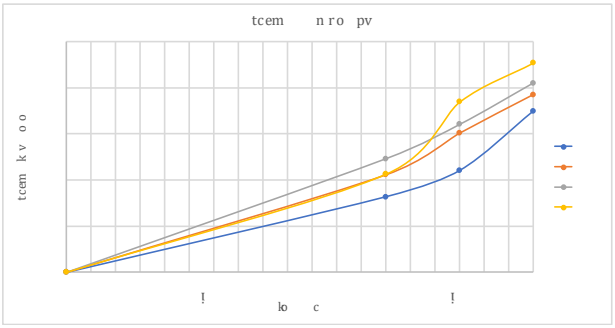

Fig. 10

3.2 Flexural test result of the beams

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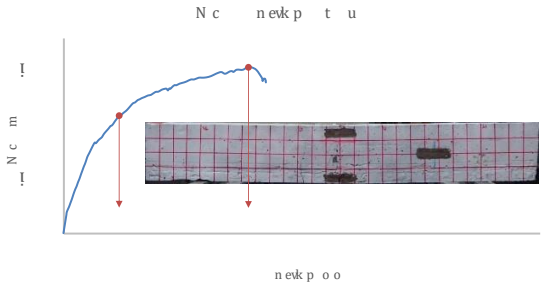

Fig. 11

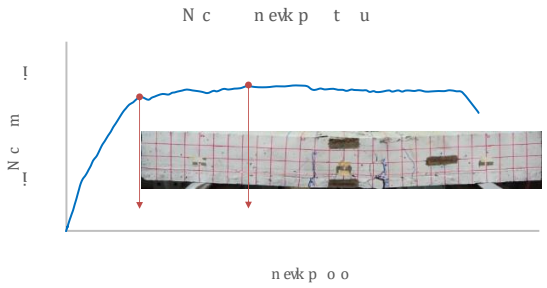

Fig. 12

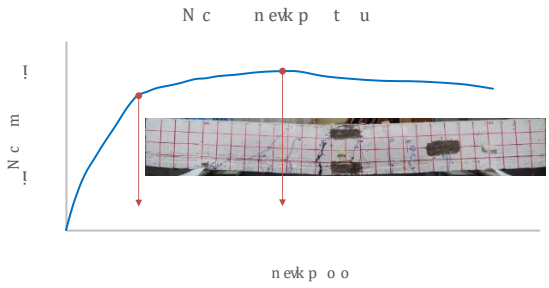

Fig. 13

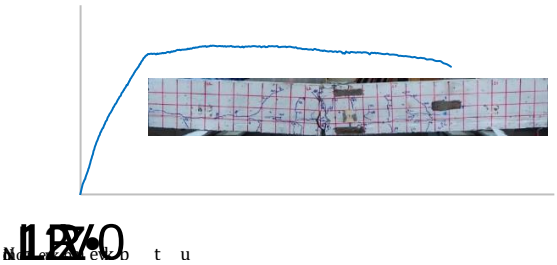

Fig. 14

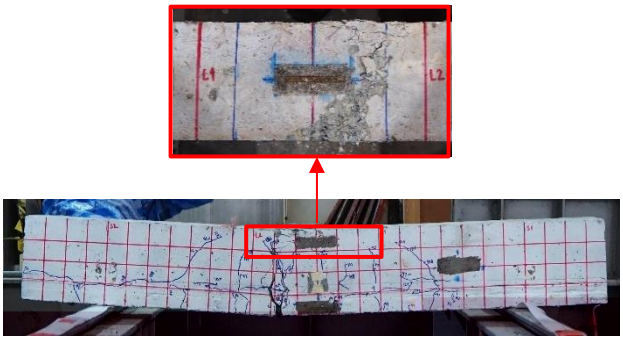

Fig. 15

3.3 Flexural performance and crack relation

Table 4

4. Conclusions

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