

An Analysis on the Correlation between Crack Condition and Safety Grades in Masonry Buildings

*

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Abstract

In Seoul, structural deterioration is severe in the private masonry buildings which have been built since 1906s. But most of these structures remain without any repair works. As a result, the rate of deterioration is getting faster and these dangerous structures may cause hazardous circumstances to the adjacent structures and neighborhood. The purpose of this study is to investigate the actual conditions of wall cracks among the defect types which occur in private masonry buildings and to analyze the correlation between safety grades and wall cracks for offering the fundamental data. Using these data we can establish basic criteria for safety grades of structures and improve the quality of masonry buildings. The result of this study indicate that there are high correlations between safety grades and the width of crack but much less so with the length. Furthermore, with regard to crack patterns, vertical cracks much more negatively effected the safety grades.

1960
가

Keywords : Masonry, Crack Patterns, Deterioration, Safty grades

1)

2)

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? 2005 9 30

2006 1



1. ?

1.1 , 가 ,

가 k

1.2

1.2.1

1970

, 1990

2000

.(1)

가

가

가

?

, 100 , 2003

20

10

.(2)

. 20

가

C,

가

D, E

20

가

1

, 가
가

2000 , 2001

가

2002

가

가

가

가

가

?

.(3)

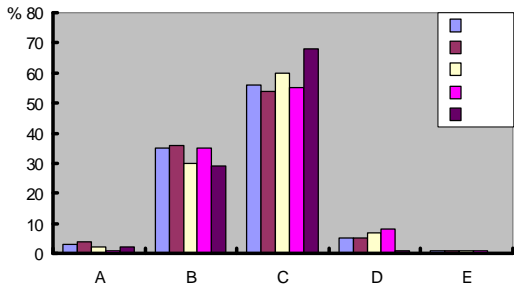


Fig. 1

가 , 가 , Fig. 1
가 4

2002

6,053 , 가 ,
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”
가 A, B, C, D, E

Fig. 2

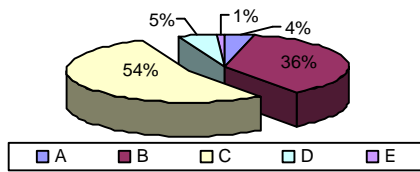
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Fig. 2

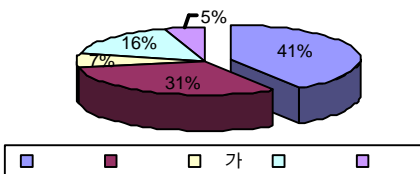
A, B , C, D, E

, C

20



(a)



(b)

1.2.2

1.2.3

2003

2003 9 2004 4 2

(Cross Tabs)
SPSS (Statistical Package for the
Social Sciences) Sub

(4)
 χ^2 (chi-square)
 ()
 가
 , (6) (7)

Table 1

0.3mm
 ,
 0.2mm
 , 0.2 ~ 1.0mm
 () ,
 20mm
 . (7)

2.

2.1

Fig. 3

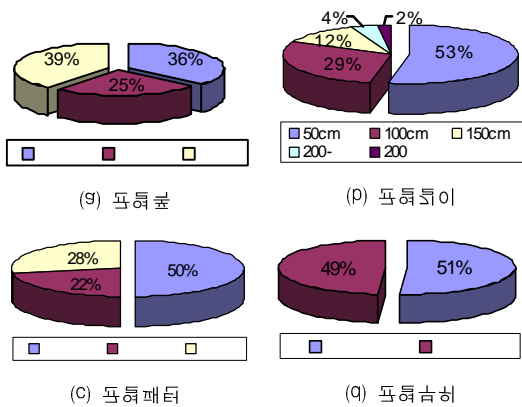


Fig. 3

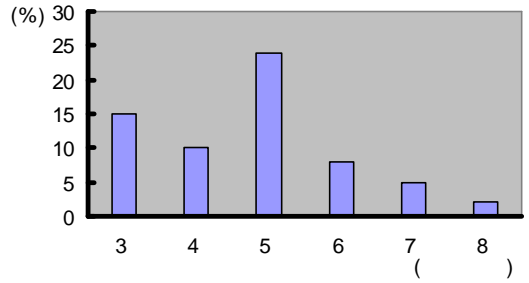


Fig. 4

가
 1
 가
 , 1mm
 가
 2/3
 가

Fig. 4

1 ~ 3mm
 가 가
 20mm
 2%

| | 1 | 2 | 3 | 4 |
|------|-------|-----------|---------|-------|
| (mm) | 0.2 | 0.2 ~ 0.5 | 0.5 ~ 1 | 1 ~ 3 |
| | 5 | 6 | 7 | 8 |
| (mm) | 3 ~ 5 | 5 ~ 10 | 10 ~ 20 | 20 |

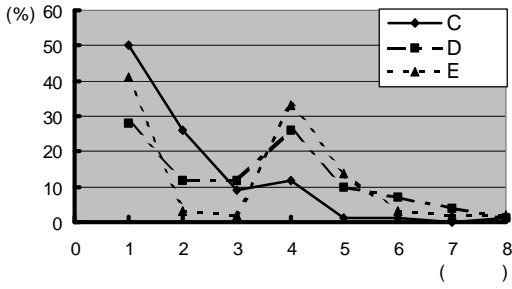


Fig. 5

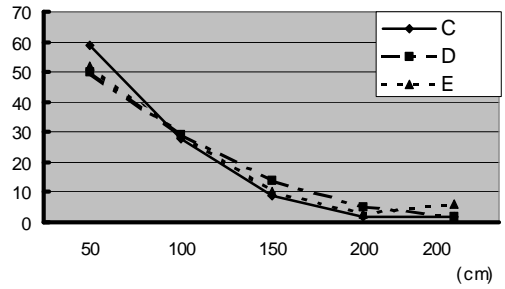


Fig. 6

가
 ,
 ,
 ,
 가
 가

(33%)가 , (3%,
 2%) (C : 26%, 9%, D : 12%,
 12%)
 D C E
 , (28%)가 E
 (41%) , 5 ~ 20mm

2.2

2.2.1

X , Y
 Fig. 5가
 C (86%)
 (1mm)
 , 3mm

C (0.2mm) , D
 (0.2 ~ 1mm) , E 1 ~ 3mm
 , 1.0 ~
 5.0mm 가
 가 , D, E

2.2.2

D, E
 47%(D) , 55%(E) 가
 C
 가
 E 가
 가
 4 (1.0 ~ 3.0mm)

Fig. 6

D (14%) 150cm C,
 E (9%, 10%) ,
 가
 가

2.2.3

Fig. 7

(C : 42%, D : 51%, E : 61%)가 가 , D, E
 C
 (36%)
 20%
 C
 (36%), D (27%), E (15%) 10%
 C, D , E
 가
 가 , 가
 가
 가
 가
 가
 가

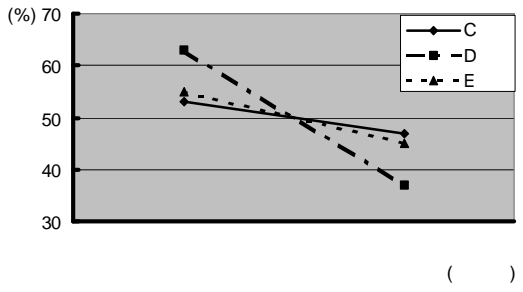


Fig. 8

2.2.4

Fig.

D (63%) (37%)
 , C, E
 C 67 cm, D 69cm,
 E 66cm
 C
 67cm, D 76cm, E 78cm C D, E
 가 , D E

2.3

Table 2

| C | () | 1 | 1 | 1 | 1 | 1 |
|---|------|------|------|------|------|------|
| | (cm) | 72 | 71 | 51 | 84 | 44 |
| | (mm) | 7.0 | 2.0 | 3.0 | 7.5 | 3.0 |
| D | () | 2 | 1 | 1 | 2 | 0 |
| | (cm) | 87 | 73 | 63 | 73 | 42 |
| | (mm) | 16.0 | 7.5 | 12.0 | 12.5 | 11.0 |
| E | () | 2 | 1 | 1 | 3 | 1 |
| | (cm) | 80 | 80 | 45 | 74 | 37 |
| | (mm) | 10.6 | 12.0 | 11.0 | 17.0 | 12.0 |

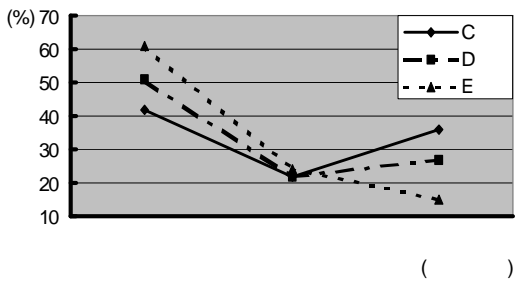
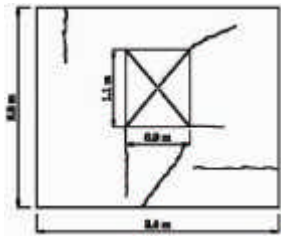
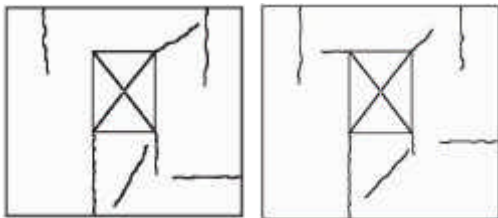


Fig. 7



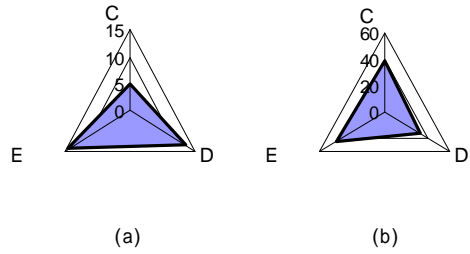
(a) C



(b) D

(c) E

Fig. 9



년 10 프회분파 음브 54히 유뒴위 비프

가 1.3mm, 62cm가

Fig. 9

가

E

C D, E

, D

가

(2cm 가)

가

3.

3.1

가

SPSS

Fig. 10

Table 2

1.1m, 0.9m 가 2.8m, 3.4m

cm, mm

C

3

3

, 0.5mm, 63cm, D

5

3

, 1.22mm, 68cm

C

가가

. E

4

4

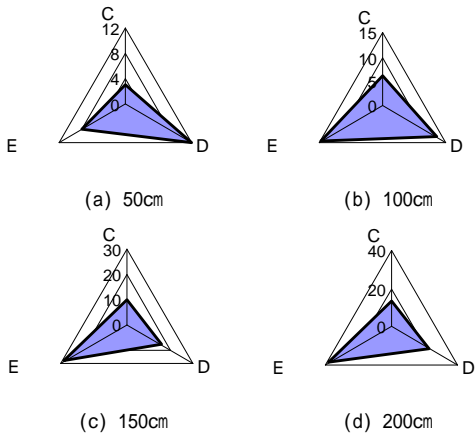


Fig. 11

χ^2 (chi-square)

(significance, p)

0.05

(C D E

)

: 5.4 p=0.01, D : 13.3 p=0.005, E (C
: 14.4 p= 0.0001),

가

D, E

가

D, E

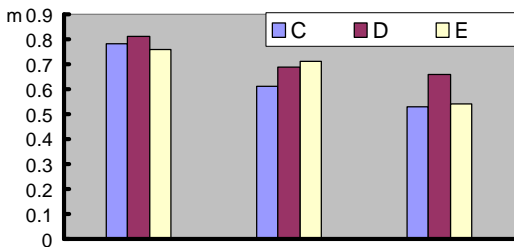


Fig. 12

Fig. 11
D, E 가 가
, C 가 가
C 가 가
, C 가
가 150cm D, E 가
150cm 가

Fig. 12가

가 (81cm, 66cm)
E (71cm)
가

Fig. 13

가

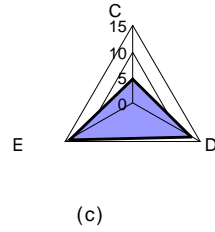
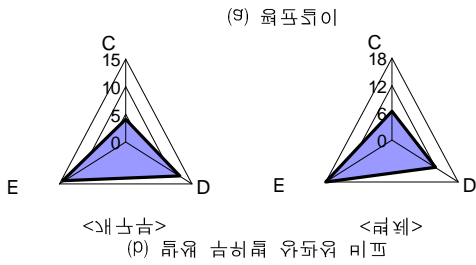
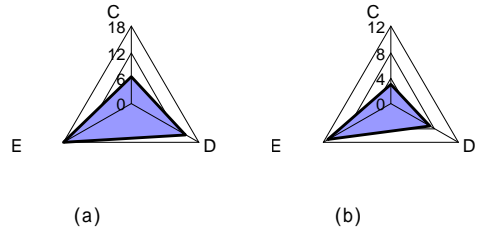
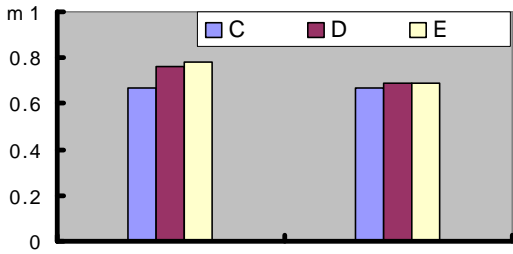


Fig. 13

Fig. 14

D, E χ^2 (chi-square)

3.3

Fig. 14 χ^2 D, C, E

가

C, D, E

1)

가

가

가

2)

가

가

가

가

가

가

3)

C

D, E

D, E

C

D, E

D, E

E

D

4)

C

, D

C

가

가

. E

가가

D

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