

2003

Characteristic Analysis of Fire Modeling Codes



4가 Zone Model (Five Induced Vulnerability Evaluation (FIVE), CFAST, COMPBRN IIIe MAGIC) CFAST MAGIC, COMPBRN FIVE

Abstract

This paper documents and compares key features of four zone models: CFAST, COMPBRN IIIe, MAGIC and the Fire Induced Vulnerability Evaluation (FIVE) methodology. CFAST and MAGIC handle multi-compartment, multi-fire problems, using many equations; COMPBRN and FIVE handle single compartment, single fire source problems, using simpler equation.

1.

Power Research Institute(EPRI)

가
가 Electric
NSAC-178L[1]

10

3.6 가

EPRI

PSA

(Probabilistic Safety Assessment)

PSA

EPRI Fire PRA Implementation

Guide[2]

가

/

가

(?)

가

(Computational Fluid Dynamics Model: CFD)

Zone Model 가

Zone Model

Zone Model

PSA(Probabilistic Safety Assessment)

가(Fire Hazard Assessment: FHA)

가

PSA

FIVE

[3]

COMPBRN

[4]

FIVE COMPBRN

PSA

PSA

가

Zone Model

2.

가 ,

가

1970

가

(Fire Model)

(Evacuation Model),

Zone model Field Model

2.1 Zone Model

가

가

(Fire Source)

(Flame)

(Fire Plume)

(Ceiling Jet)

(Hot Gas Layer)

가

(Lower Layer)

(Control Volume)

(Zone)

Zone Model

Zone model

가

Zone model

가

가

/

Zone model

2.2 Field Model

Zone Model

Field Model

CFD

Field Model

가

가

가

Field Model

3.

가

FIVE

, CFAST[5],

COMPBRN e MAGIC[6]

3.1 CFAST (Consolidated Fire Growth and Smoke Transport)

CFAST National Institute of Standards and Technology (NIST)

NIST FAST CCFM

CFAST

CFAST

가

가

3.2 COMPBRN e

COMPBRN e

PSA

UCLA

가

가

3.3 FIVE

FIVE

(Semi-Quantitative)

가

가

가

가

가

3.4 MAGIC

MAGIC

EDF Research and Development Division

1985

. MAGIC CFAST 가
 , 가 가 EDF 2
 MAGIC Version [7].

4. Zone Model

3 4가 Zone Model
 , 가

4.1

1 .
 가 .
 1 'M' 1 가 , 'Y'
 가 . , ,
 가 .
 CFAST MAGIC 가 ,
 Zone Model
 . CFAST MAGIC
 가 , 가
 PSA
 가

1

Parameter	CAFST	COMPBRN	FIVE	MAGIC
Number of rooms	15	1	1	24
Number of floor levels	M	1	1	M
Number of wall vent	M	1	1	M
Number of floor/ceiling vents	M	0	0	M
Mechanical ventilation	Y	Y	Y	Y
Boundary materials	Y	Y	Y	Y
Number of fires	M	1	1	M
Number of layers per room	2	2	1	2

CFAST MAGIC

가

가

4.2

가

가 가

가

가

가

2

CFAST MAGIC

'W',

'F'

'C'

가 가

가

(Stack Effect)

(Wind Effect)

가

가

2

Parameter	CAFST	COMPBRN	FIVE	MAGIC
Natural ventilation	C,F,W	W	W	C,F,W
Vent mixing	Y	Y	N	Y
Mechanical ventilation	Y	Y	Y	Y
Stack effect	Y	N	N	Y
Wind effect	Y	N	N	N

4.3

가

(,)
 Fuel Loss Rate (g/m³) Heat Release Rate(kW)
 4 Zone Model 가
 CAFST Fuel Loss Rate Heat Release Rate 가
 가 4 Zone Model 가

4.4

가 Zone Model
 1
 FIVE 가
 ,
 .

5.

가 가 , 가
 ,
 MAGIC 가 가 CFAST 가
 ,
 가 FAST가
 CFAST 가

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