

가 GIS

Dynamic Analysis of Gas Interrupt Switchgear with Motor Driven Spring Operator, Considering the Gas Flow)

*# 1, 2, 3, 4
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1,2,3,4 LS ()

Key words : Gas Insulated Switchgear, Circuit Breaker, Electric Contact, Motor Driven Spring Operator, Oil Dash-Pot

1.

가 , GIS(Gas Insulated Switchgear) , simulation 가 가 GIS part 가가 , crank, lever, cam GIS 가 . DashPot) , SF6

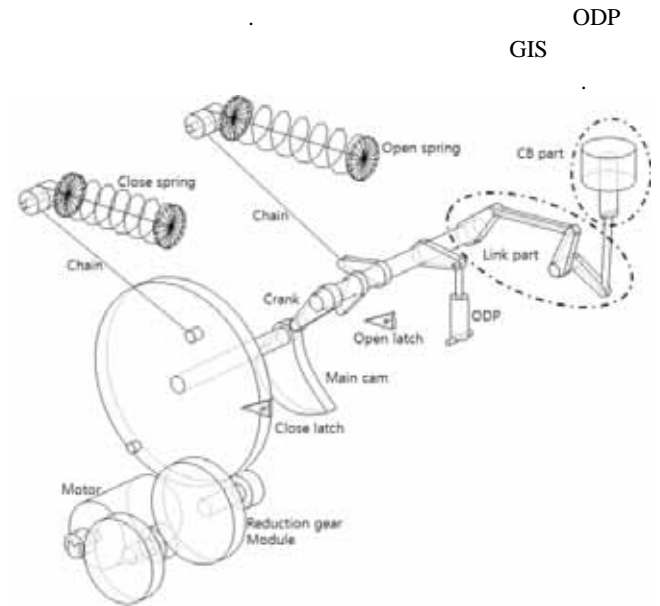


Fig. 1 Motor driven spring operator

2. GIS

GIS , Link , 3 가 , SF6 Link . Link 가 , 2 가 가 , 3 가 가 . Link 가 . Link 가 Link 가 CB SF6 가

GIS 3D CAD FunctionBay RecurDyn . Fig.1

motion ODP CB puffer 가 가 3. CB ODP 가 CB puffer 가 SF6 가 puffer chamber

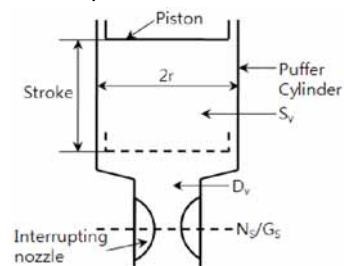


Fig. 2 Puffer cylinder

Westinghouse Puffer, Fig.2

Puffer (1) 가

$$P = \left(\frac{\rho}{\rho_o}\right)^\gamma P_o \quad (1)$$

$$\rho = M / vol \quad (1)$$

$$\frac{d\rho}{dt} = \frac{1}{vol} \left[\frac{dM}{dt} - \rho \frac{d(vol)}{dt} \right] \quad (2)$$

M, vol dead volume

$$vol = \pi r^2 S_i (1 - f) + D_v = \pi r^2 S_i (1 + \delta - f) \quad (3)$$

$$\delta = D_v / S_v, f = L / St \quad (3)$$

$$\frac{d}{dt}(vol) = -\pi r^2 v \quad (4)$$

v Puffer 가, Puffer 가 가

$$\frac{dM}{dt} = \frac{-\rho N_s V_s}{2} \quad (5)$$

(3), (4) (5) (2)

$$\frac{d\rho}{\rho} = \frac{-df}{1 + \delta - f} \left[\frac{N_s V_s}{2\pi r^2 v} - 1 \right] \quad (6)$$

(6) $t=0 \quad \rho = \rho_o$

$$\frac{\rho}{\rho_o} = \exp \left[\left(1 - \frac{N_s V_s}{2\pi r^2 v} \right) \ln \frac{1 + \delta}{1 + \delta - f} \right] \quad (7)$$

(7) (1) Puffer

$$F_p = P * A_p \quad (8)$$

(8) Puffer A_p Puffer

Puffer RecurDyn

ODP CFX

data table

RecurDyn ODP

data table

ODP

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4.

Link Link

Fig.3

ODP

Fig.4 Puffer Puffer

가 Puffer

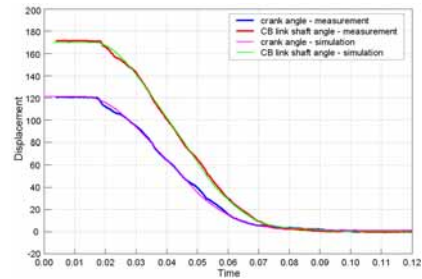


Fig. 3 Stroke graph with simulation and experiment

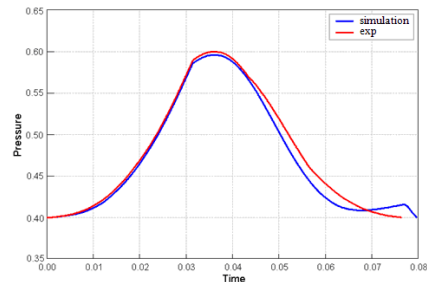


Fig. 4 Pressure graph with simulation and experiment

5.

GIS

Link

Puffer

GIS

1. Flurschein, C. H., 1975, "Power Circuit Breaker Theory and Design", Short Run Press Ltd.
2. FunctionBay, Inc 2005, "RecurDyn™ / Solver Theoretical Manual".
3. , , , , 2000, "Puffer 가 ,"

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