

Development of NGRDS (Nuclear Generic Reliability Data System)

150

[1]

(NGRDS; Nuclear Generic Reliability Data System)

Abstract

Credibility and applicability of the previous generic equipment reliability database [1] was significantly improved by providing additional information on dependency among original data sources and developing a new data classification code system suitable for a data management program, NGRDS (Nuclear Generic Reliability Data System). This program even facilitates extraction of generic equipment reliability data.

1.

(risk analysis)

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가가 가

가 (probabilistic safety assessment; PSA)

가

high-technology

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PSA

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PSA

[2].

가

(prior information)가

, 3,4

3,4

PSA[3,4]

PSA

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[1]. 2400

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NGRDS (Nuclear Generic Reliability Data System),

2.

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PSA

[1]

2.1

prior

prior

[5]가

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2400

2260

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1 2 , 3 , 2 7

1 2 , 3,4

(2) (3)

'VMGLE'가 'VMG' 1 V
, M , G gate 'motor operated gate valve'
'LE' 2 L
leakage E external leakage

'general' 3,4

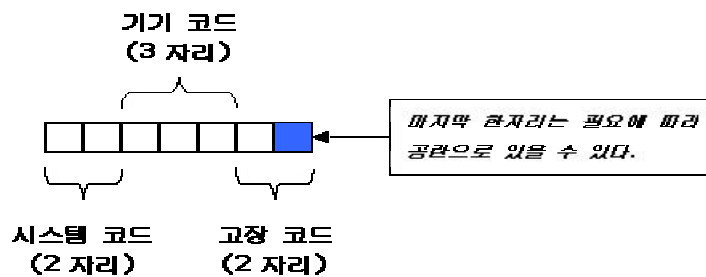
3. (NGRDS)

3,4

[6]. , PSA

가 가

PSA



1.

(1 st)	(2 nd digit)	(3 rd digit)
A/air cond.	_/, C/air cooling unit, H/rm. chiller or air cond. unit, L/cooling coil	_/
B/	_/, C/charger, U/ups	_/
	T/	_/, L/lead, N/Ni-Cd
E/	_/, C/converter, F/fuse, H/house load, I/inverter, N/terminal board, S/sequencer, W/switch	_/
	B/circuit breaker	_/, D/DC, H/high(>4kV), L/low(<4kV), V/vacuum
	P/power supply	_/, D/, H/, L/
	R/relay	_/, C/coil, T/time delay
	T/contact, X/transformer	_/, H/, L/
F/ventilation	_/, B/fan or blower	_/
G/	_/, M/motor	_/, D/DC
	D/diesel, G/gas (turbine), T/turbine	_/
H/가	_/, H/electric, B/boiler, F/furnace, T/heat tracing, X/heat exchanger	_/
I/instrument	_/, A/analyzer, D/transducer	_/
	C/instrument channel, S/sensor, T/transmitter, W/instrument switch	_/, C/core flux, D/pr. diff., F/flow, L/level, M/limit, P/pressure, Q/torque, R/radiation, T/temp., V/speed
J/control module	_/, A/annunciator, B/bistable, D/interlock, P/PLC, T/trip logic	_/
	C/controller	_/, T/temp.
K/electronic parts	_/, A/amplifier, B/solid state device, C/conductor, D/diode, I/isolator	_/
	R/rectifier	_/, S/SCR
L/line	_/, G/grid, W/instrument wire	_/
	B/power bus, C/coupler	_/, H/high(>4kV), L/low(<4kV)
M/mechanical part	_/, A/agitator, D/dryer, E/extruder, F/centrifuge, H/Keowee hydro unit, M/mixer or blender, Q/control rod & driver, S/traveling screen	_/
	C/compressor	_/, C/centrifugal, R/reciprocal
N/engine	_/, C/lube oil cooler, D/diesel, K/gasket, L/clutches, T/turbine	_/
	M/motor	_/, D/DC
P/pump	_/, D/diesel-driven, T/turbine	_/, C/centrifugal, R/reciprocal
	M/motor-driven	_/, C/, R/, S/screw
R/piping	_/, A/instrument air pipe, D/rupture disk or diaphragm, H/hose, L/instrument lead pipe, N/nozzle, O/orifice or ventury,	_/
	F/fitting	_/, E/elbow, J/expansion joint, W/welds
	P/pipe or penetration	_/, H/high (dia.>3in.), L/low (dia.<3in.)
	S/strainer or filter or louver	_/, A/air, F/fixed, L/liquid, M/motor-driven
T/tank	_/, S/sump	_/
	K/tank or accumulator	_/, R/vessel, T/tower
V/valve	_/	_/, A/angle, B/ball, C/check (S/stop, W/swing, O/other check), D/damper, E/needle, F/butterfly, G/gate, L/globe, N/nozzle, P/pilot, R/safety or relief, U/plug,
	E/explosive op., H/hydraulic op., I/piston op., S/solenoid op.	_/
	A/air operated	_/, /B, C/, D/, F/, G/, L/, P/
	M/motor operated	_/, C/, F/, G/, L/, S/
	P/pilot operated	_/, R/
	X/manual	_/, G/, F/, D/
Z/	_/, C/conveyor, E/elevator, R/crane	_/

)'_ ' general .

2.

(1 st digit)	(2 nd digit)
D/degraded	C/shift calibration
F/general failure	C/fail to close, D/fails to de-energize, E/fails to energize, F/fail to operate on demand, I/fail to insert, J/fail to withdraw, O/fail to open, P/plugged, R/fail to run, S/fail to start, T/short circuit, X/open circuit, Y/fail to operate
H/human-related failure	
I/timing-related failure	D/delayed operation, P/premature operation
J/inadvertent or spurious actuation	
L/leakage-related failure	C/fails catastrophically (rupture, excess leakage), E/external leakage, I/internal leakage, R/reverse leakage
M/unavailable due to T&M	
O/output-related failure	B/out-of-bound, F/output fluctuation or hunting, H/high output or overheated, L/low output, N/no output
R/conditional failure	C/fail to re-close, O/fail to re-open
T/position transfer-related failure	C/transfer closed, F/fail to transfer to failed position, O/transfer open
Z/all mode	

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PSA

NGRDS (Nuclear Generic Reliability Data System) MS Visual Basic V6.0
 Windows 98, 32MB RAM MS Internet Explorer 5.0

2 NGRDS , NGRDS

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"Direct Search" , PSA

"Semantic Search" . Direct search ,

, 가 . 3(a) "Semantic Search"

3(b) "Direct Search"

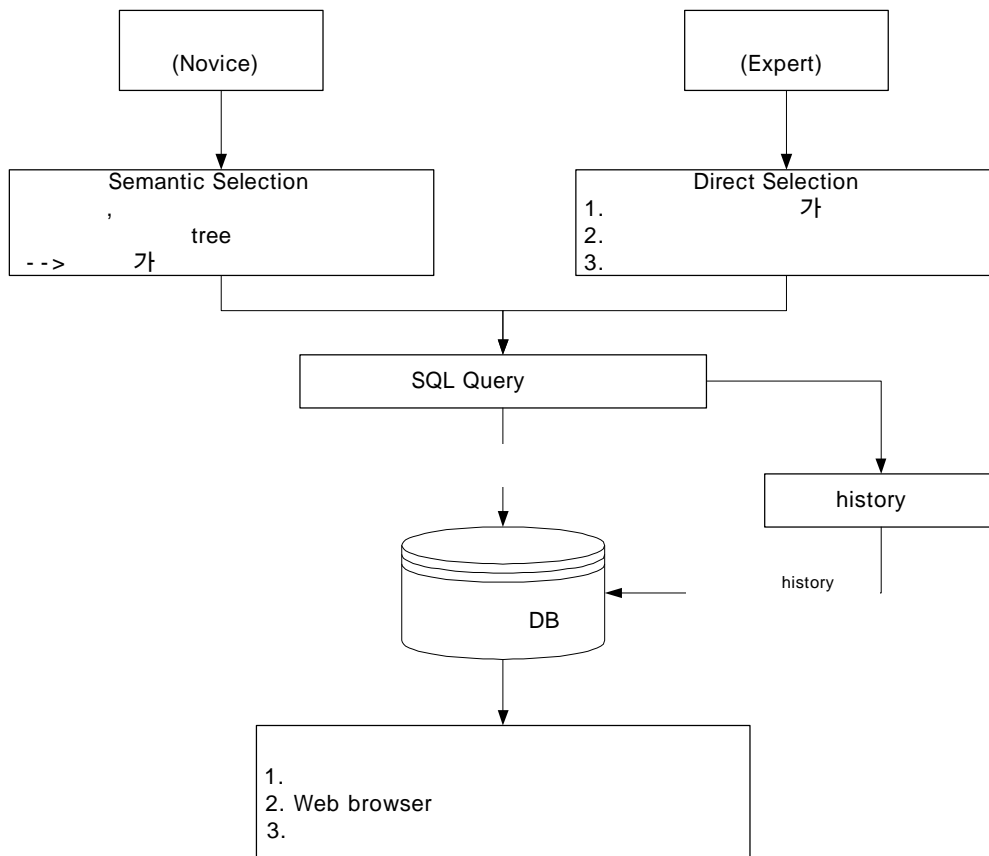
가 2260

embedded MS Access worksheet (

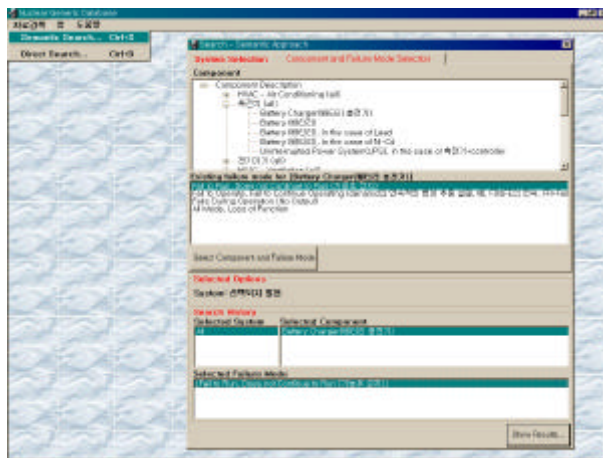
4(a)), HTML (4(b)) 가 .

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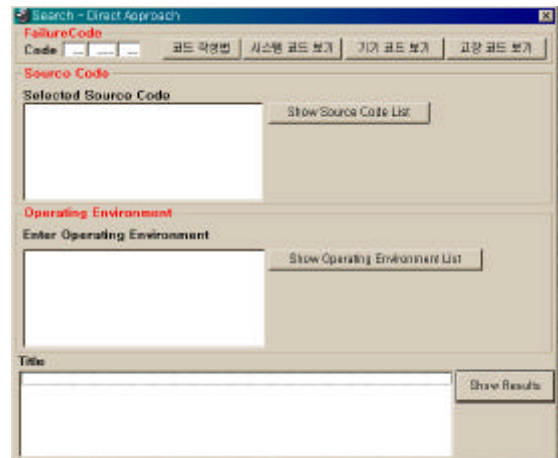
가 MS Access 97



2. NGRDS

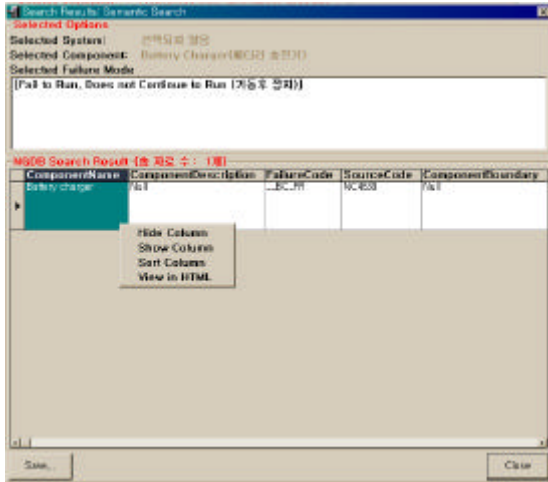


(a) "Semantic Search"

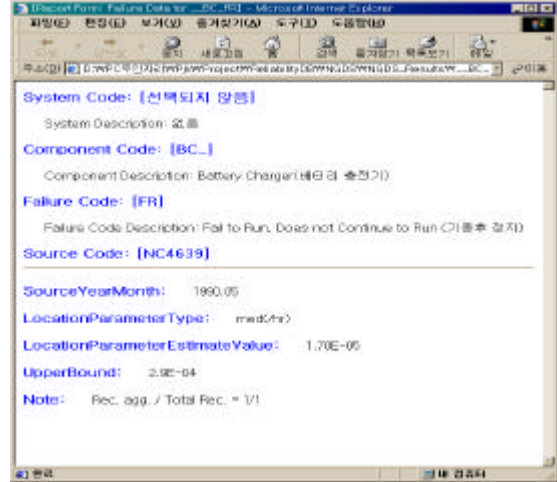


(b) "Direct Search"

3. NGRDS



(a) Embedded MS Access



(b) HTML

4. NGRDS

4.

Web

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NGRDS

Web

[1] , KAERI/TR-997/98, , 1998.

[2] U.S. NRC, "PRA Procedures Guide," NUREG/CR-2300, 1982.

[3] Y.G. Jo, et. al., Final Level 1 PRA Update for Yonggwang Nuclear Units 3 and 4, KAERI, Vol.1 & 2,

1993.

[4] KEPCO, Ulchin Units 3,4 Final Probabilistic Safety Assessment Report, Vol.1&2 (Internal Event Analysis), prepared by KAERI, 1997.

[5] , " , " , 20 , 3 , pp.43-59, 1995.

[6] 3 , 1 DB , KAERI/GP-142/99, 1999.