

Reliability Data Collection & Analysis for Korea Standard Nuclear Power Plants

150

PSA

RIR&A PSR DB framework / DB

/

4 56

, 60% 가

62%

38%

4

가 11 가

Abstract

We have been developed component reliability database for Korea standard nuclear power plants which has their own characteristics. The purpose of the reliability DB is to supply domestic reliability data for PSA, RIR&A, PSR etc instead of generic data. We structured the reliability DB framework and guideline for standardized Data collecting and analysis. Based on them, we collected and analyzed the component failure data from TR and daily operation reports and made a data collection rule for the component operating data such as the number of demand and operating hour. Some failure rates of failure modes of YGN 4 are compared with the generic data. 60% of the 56 failure rates don't show a large difference from the generic data. And 62% have lower failure rates and 38% have higher failure rates than generic data. There are 11 failure modes of which failure rates are zero. It is resulted from short plant operating year.

1.

가 (PSA, Probabilistic Safety Analysis) , 가
 3&4 1&2 DB
 PSA / 1 /
 1 PSA 2,3,4
 PSA (Generic DB)

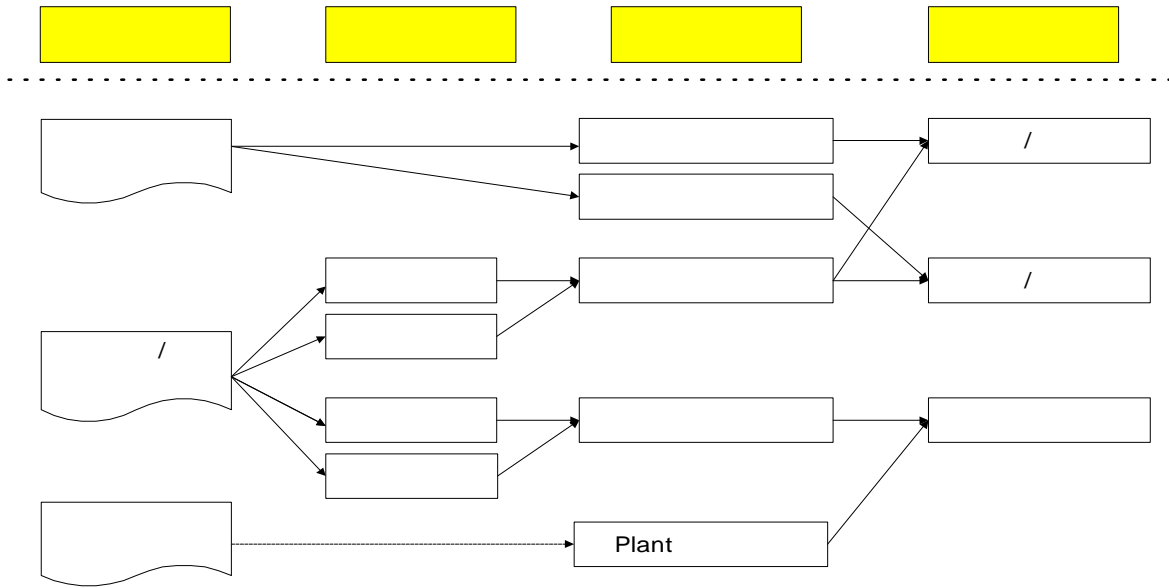
PSA DB
 RIR&A (Risk Informed Regulation & Application)

DB S/W DB Framework DB
 / /
 / DB 가
 [1][2][3].

DB /
 / [4].
 2 .
 , 3 .
 4 . 5
 6 .

2.

1 DB



1. DB

DB 가 , / 가
 . 1 / 가
 .
 1.

/	
• : /	• : (, ,)
• :	• :
• TR (Trouble Report):	• : /
• :	
• Tagging :	

1) /

(PUMAS/N-II) . TR / 가 TR
 (PUMAS/N-II TR)
 . raw data 가 TR

, tagging

LCO

가

2)

DB

가

가

가

3.

3

가

가

가

가

1)

•

가

가 2

가

(Train)

가

가

가

4

2

2.

()

	/		()	
441 (LPSI)	Pump/ 01PA 01PB	48 (3) 68 (2)	0.833	
441 (HPSI)	Pump/ 02PA 02PB	48 (3) 68 (2)	0.833	
442 (CSS)	Pump/ 01PA 01PB	41 (3) 68 (2)	0.833	
	Additonal Pump/ 02PA 02PB	43 (3) 68 (2)	0.833	
451 (CVCS)	Pump/ 01P 02P 03P	18 (3) 04 (3)	0.667	(18)

2)

DG

1

가

3

4

1

3

가

가

3.

	/			
451 (CVCS)	Pump 01/02/03P	2 , 1 (18)	2 , 1	0.667
461 (CCWS)	Pump 01/02/03PA 01/02/03PB	1 , 2 (18)	1 , 1 , 1	0.333
462 (ESW)	Pump 01/02PA, 02/02PB	3 , 3 (18)	1 , 1	0.5
541 (MFWS)	Pump 01/02P 04/05P			1
551 (CWS)	Pump 01P-06P		5 . 6	0.8
561 (TBOCW)	Pump 01/02/03P	2 , 1 (18)	2 , 1	0.667
562 (TBCCW)	Pump 01/02P	3 , 3 (18)	1 , 1	0.5
596 (IA)	Compressor 01/02C	3 , 3 (18)	1 , 1	0.5
626 (ECW)	Pump 01/02PA 02/02PB	1 , 1 (18)	1 , 1	0.5
	Chiller 01/02CA 01/02CB	1 , 1 (18)	1 , 1	0.5

4.

1

DB

/

1)

- = /
- = /

() 가 () 가 ,

가
가

가

() 가 ,

가 (Catastrophic), (Degraded), (Incipient) 가

- (Catastrophic) : 가
- (Degraded) : 가
- (Incipient) : 가

2)

• = /

가

TR tagging

LCO

/

가

T/S

가

PUMAS/N-II TR

• :

• :

가

가

5.

/

DB

3,4

PSA

23

1998

30

4

3

3,4

20

2000

4

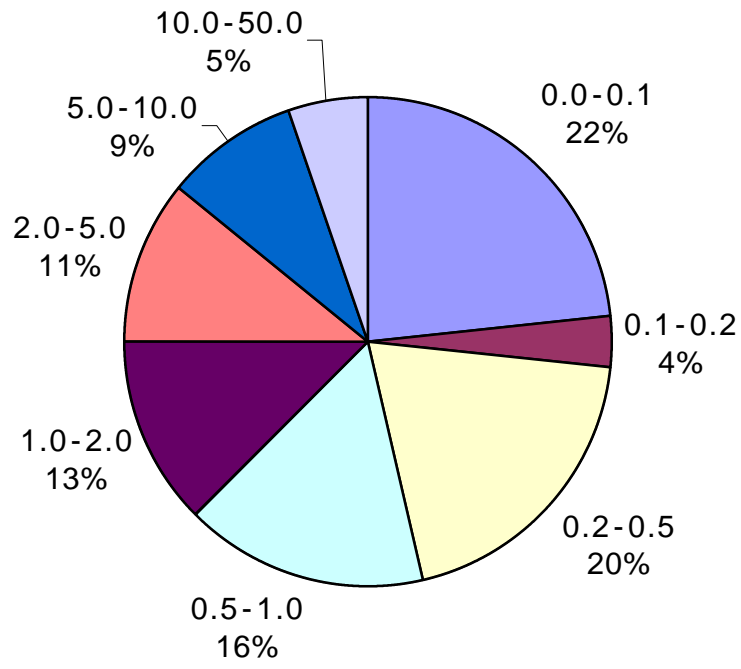
DB

4

4. 4

ACU	47	40	Air Dryer Package	2	8
Battery Charger	10	13	Bus	127	55
Check Valve	274	18	Chiller	4	56
Circuit Breaker	3528	54	Compressor	2	25
Controller	88	13	Deluge Valve	25	8
Detector	31	25	Element	354	16
Exciter	1	6	Fan	30	40
Filter	35	119	Heat Exchanger	25	25
Heater	12	15	Inverter	7	20
Manual Valve	1447	103	Power Operated Valve	378	344
Pressure Regulating Valve	12	9	Pump	89	770
Refrigerator	1	10	Relief Valve	128	11
Screen	8	130	Sprinkler	31	2
Strainer	56	38	Switch	759	94
Tank	40	24	Transformer	44	59
Transmitter	381	94			

가 Chiller, , Exciter Screen,
 Filter 가 .
 .
 2 4
 . 4 DB 150 56
 .
 56 60% 0.2 5.0
 . (62%가
 38%). 22% 4
 4 가
 4
 10.0 가 5%



2. 4

6.

PSA
RIR&A PSR
DB DB DB framework
DB 가
framework /
/ .
.
Chiller .
, ,
3
가 .
4 56 , 60%

가 . 4

가 11 가

50 .

5,6 PSA

5,6 PSA Risk-Informed In-Service Test 가 .

PSA RIA
가 .

KEPRI 4 , , ,

1. , “ ”, '99 , , 1999
2. KAERI-ISA-RDB-20000705-01, , , 2000
3. (1999). “ ”. '99 ., 1999
4. (1999). “ ”. '99 , 1999