

A Plan to Optimize the Management of Weld ID SSN Numbering System for Nuclear Power Plants in Korea

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1. Introduction

According to the nuclear law in Korea, KHNP conducts in-service inspection for nuclear power plants[1]. Moreover, KHNP makes Long Term Plan (LTP) classified by nuclear power plant and inspects welding areas which are the inspected area during the in-service inspection. Summary Sheet Number(SSN) in the current LTP is an ID which means a weldment in a nuclear power plant. However, the SSN ID, which is unique on in a nuclear power plant, is not unique one if the weldments of entire nuclear power plant in Korea are treated in one system. Therefore, it is hard to manage the data during life time using the existing SSN ID system. It is also hard to configure the characteristics of weldment in mind because IDs implying Alloy600 and overlay weld do not exist in the existing SSN ID System.

An optimized SSN numbering system managing weldments for the life time is introduced in this paper. Moreover, it is explained how to manage the SSN numbering system in the computer program system, too.

2. A plan to optimize the management of weld ID SSN numbering system

KHNP CRI has been developing an integrated management system for the in-service inspection of nuclear power plants in order to make DB related to the history of defect data produced during the past ISI periods in nuclear power plants and to analyze the trends of defects on welds easily connecting with ISO drawings. The unique ID such as a residence registration number is needed in order to utilize DB for the information of each weld. The integrated system has been being developed possibly to manage each weld during life time designating an unique ID as SSN .

2.1 Existing SSN numbering system

SSNs have been designated arbitrarily by an cooperating company to perform the in-service inspection during a establishing LTP service[2].

HANUL NUCLEAR PLANT, UNIT 1									
SUMMARY OF NONDESTRUCTIVE EXAMINATIONS									
CLASS 1, COMPONENTS									
PAGE: 38									
REACTOR COOLANT SYSTEM	CLASS 1	COMPONENTS	EXAM	DATE	RESULTS	REMARKS	NO. OF	REMARKS	REMARKS
ITEM NO.	CLASS	EXAMINATION AREA	EXAM METHOD	DATE	RESULTS	REMARKS	NO. OF	REMARKS	REMARKS
22-8C-B-1104 (SEE FIG. A-9)									
85-130	W-1	SAFE-END TO PIPE	RT	100-1/0	101200	X - - -	4	NO UT EXAM, SAFE-END SIDE DUE TO DIFFERENT CAL. BLOCK EQUIPPED.	
			UT	300-0/0		X - - -	4	NO UT EXAM, SAFE-END SIDE DUE TO DIFFERENT CAL. BLOCK EQUIPPED AND UT EXAM. LIMITED SAFE-END SIDE	
			UT	500-12/0		X - - -	4	DUE TO ADJACENT PIPE-WELD WELD.	
			UT	500-0/0		X - - -	4	BASIC CALIBRATION BLOCK **	
			UT	500-0/0		X - - -	4	22-8C-B-1,438-1303	
			UT	500-0/0		X - - -	4	22-8C-B-2,456-0902	
			UT	500-0/0		X - - -	4		
22-10,20, F-G									
20	W-1	SUPPORT COMPONENT	RT	100-1/0	101200	X - - -	4	UT EXAM, LIMITED ON WELD DUE TO WELD CONFIGURATION.	
			UT	300-0/0		X - - -	4	BASIC CALIBRATION BLOCK **	
			UT	500-0/0		X - - -	4	22-10,20-2,456-0902	
			UT	500-0/0		X - - -	4		

Fig. 1 Results for the pre-service inspection of Hanul Unit 1 (1987, Example)

The number is composed of 6-digit in the SSN numbering system of the LTP. For example, the numbers of No. 1 weld and No. 2 weld of RCS system are follows[3]:

- No. 1 weld: 130000
- No. 2 weld: 130010

The existing SSN ID numbering system is illustrated in Fig. 2.

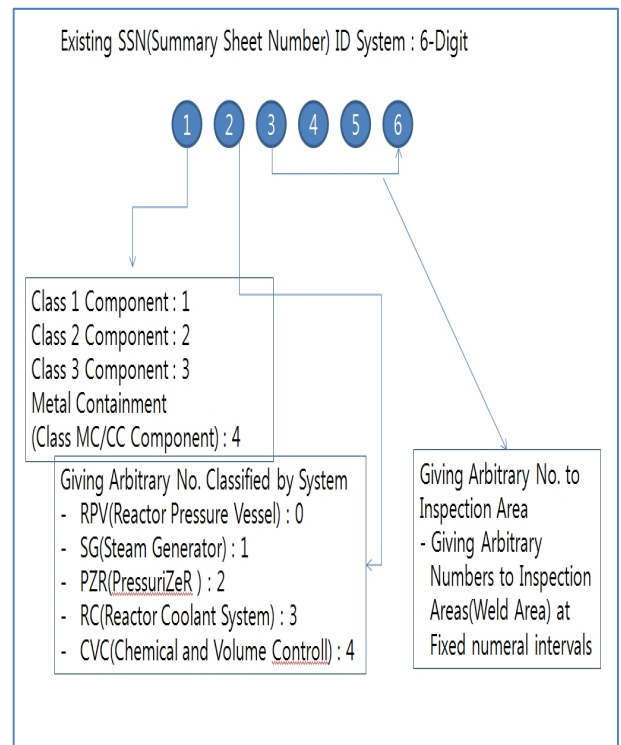


Fig. 2 Existing SSN ID numbering system

The existing SSN ID numbering system has been used for managing welds classified by each unit. The inspection result is indicated as a blank if the weld is not inspection target. There are no contents in the system describing the Alloy600, thermal stratification/thermal fatigue, small bore and high energy pipings. Therefore, it is very hard to manage the welds. In addition, a certain ID is unique one in a plant, but the ID is overlapped with the ID of other plant. Therefore, it is very difficult to distinguish which plant has the weld with the ID. Because, the integrity of weld is related to the leakage of radioactive material, the weld is very an important part to be controlled by Nuclear Law. Therefore, KHNP must hand in the inspection result of the weld when the Regulatory Body requests. However, it is not easy to find the inspection history of a specific weld area due to the lack of the unique weld ID system and management system. In this paper, it is introduced that a new ID system and a computerized management system to optimize the management of inspection history of every weld in nuclear power plants in Korea.

2.2 New SSN numbering system

The number is composed of 9-digit in new SSN numbering system. The 9-digit is made by adding 3-digit to the 6-digit of the existing numbering system in LTP for statistics and reference.

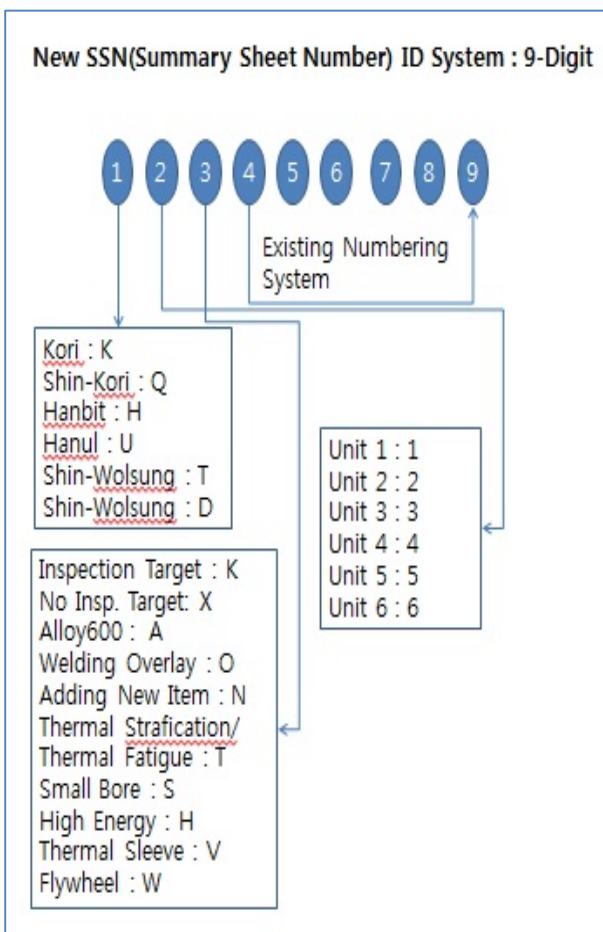


Fig. 3 New SSN ID numbering system

For example, the numbers of No. 1 weld, which is an inspection target, and No. 2 weld, which is not an inspection target, of RCS system are follows:

- No. 1 weld: Q2K130000
- No. 2 weld: Q2X130010

KHNP CRI has been developing an integrated management system for the in-service inspection of nuclear power plants. In order to do that, CRI has been collecting the latest LTPs and inspection drawings. The collected SSN IDs in LTPs will be transformed to new IDs according to the new numbering system and new IDs will be input to the integrated ISI DB in order to refer the data and to use efficiently for statistics.

3. Conclusions

The problem, which the weld is not harmoniously managed, would be solved provided adapting the new SSN ID introduced in this paper. A weld is managed during its life time from creation to extinction. The inquiry of inspection history of a concerned weld and the reference of statistics would be performed easily and rightly because the concerned weld can be accessed from anywhere connected to KHNP network such as KHNP headquarter, plants and CRI. As the results, it is expected that the efficiency of in-service inspection and the reliability of inspection results for welds for nuclear power plants would be improved.

REFERENCES

- [1] ASNT, "Nondestructive Testing Handbook" 3rd ed. : Vol.5, Electromagnetic Testing, Columbus, OH : American Society for Nondestructive Testing, 2004
- [2] FINAL REPORT FOR 1987 PRESERVICE EXAMINATION OF CLASS1, CLASS2, CLASS3 COMPONENTS OF THE ULJIN NUCLEAR PLANT, UNIT 1
- [3] Pre-Service Inspection/In-service Inspection Data Sheet, ANSCO, SAEAN, KPS, UMI, 2014.