

Development of 3D Programs for Efficient Radiation Dose to Data Management

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1. Introduction

In these days, the dismantling of nuclear power plants in Korea is a hot issue because of the new government launching the rule out the nuclear power plants. At present, there are eight nuclear power plants that will be obsolete. (Excluding Gori Unit 1, construction standards of the 1980s) All of these are expected to be dismantled by 2030. According to this, the development of technologies for dismantling is urgent in addition to data management is too. Because it is very important part in dismantling.

The basis of decommissioning nuclear power plants is residual radiation measurement. This part is very important because residual radiation measurements must be completed to prove that the waste is harmless to humans. For this reason, we have developed a 3D program that simplifies the management of residual radiation data. This 3D program is a very simple and convenient to manage residual radiation measurement data.

In this paper, we discuss the usefulness of the 3D program that can efficiently manage the data of scan survey among the decommissioning of nuclear power plants.

2. Main title

2.1 Background

This study was carried out in 2016 to study the residual radiation and activity effect for the rescission of the site regulation by the TRIGA Mark II & III. Residual radiation measured value was measured by two ways. One is direct method such as scan survey (LB-124, Radeye G-10), and the other is indirect method (Smear method). The data were collected and applied to all programs.

2.2 Development of 3D program modeling

The modeling structure of the 3D program is shown in the following.

Table 1. 3D program modeling structure

No	Session
1	Selection of survey building
2	Grid segmentation and perform scan survey
3	Building investigation and drawing
4	Development to 3D program
5	Apply dose value to 3D program
6	Check the result and make use of program

For scanning, spaces were divided by the grid of 1x1(m) (Fig. 1) and the total number of the measurement data in the research was 7,502 pieces. Based on the scan survey, the building was actually completed the drawing of the building as shown in Fig. 2. The completion period to the drawing was about two months. Based on this, we completed the 3D program.



Fig. 1. Grid segmentation for scan survey.

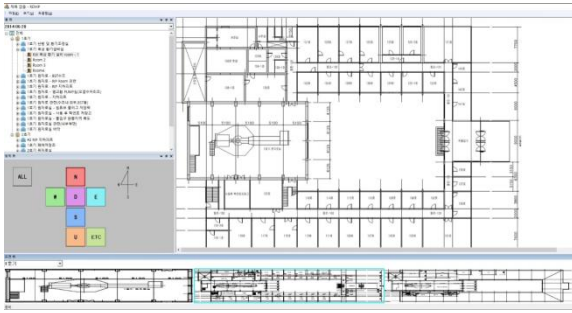


Fig. 2. Create drawing for 3D programs.

2.3 Application and effects of 3D program

Based on the drawing of TRIGA Mark II & III simulated in 3D, we applied dose information that we surveyed to each grid segmentation area. Dose information was entered for each building, room and grid segmentation. An example of grid segmentation areas is shown to Fig. 3. After entering all the results, we were able to see all of the dose results in the 3D program by clicking the section that we want to see. When you click the section, the input results are displayed as shown in Fig. 4.

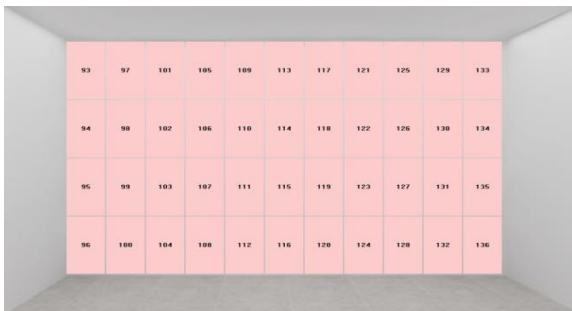


Fig. 3. Classification by 3D program grid segmentation.

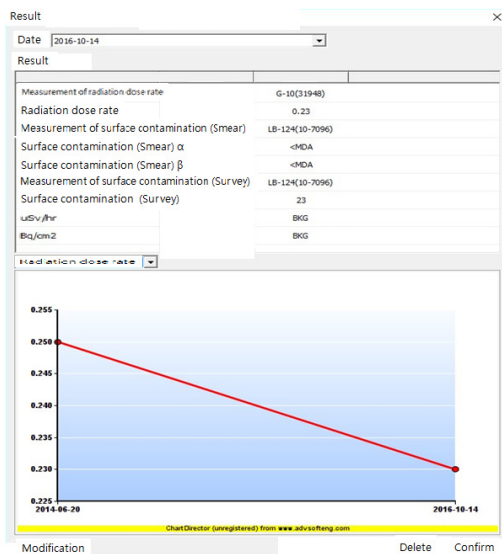


Fig. 4. Radiation dose view in grid segmentation units.

Completed design of TRIGA Mark II & III is as follows in Fig. 5. This is also the first screen displayed in the program. It is possible to search all dose information of all grid segmentation area in the building.



Fig. 5. Classification by 3D program grid segmentation.

3. Conclusion

Gori nuclear power plant unit 1 was stopped and waiting for its demolition. The dismantling of nuclear power plants involves a lot of work including many construction methods, decontamination and waste disposal and it is necessary to systematically manage the output from these processes. It is essential to collect and manage information of areas that we want to decommission such as dose information and history of the facility. This program will be very effective in managing large amounts of information and can easily see implicit information. Therefore, this 3D program development in this aspect will be very useful for dismantling nuclear power plants in the future.

REFERENCES

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