

A Study on the System and Method for Drawing 3-Dimensional Cable Object with the cable tracking Navigation

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1. Introduction

I would like to describes the management system and method of the cable installed in the nuclear power plant, and how to build the database of the system.

More specifically, it will be operated to the maintenance and management function, and the life management system of the cable, describing the creation method of three-dimensional cable object formed by the information of trace route through navigation and how to build the system database automatically.

2. Methods and Results

Developing the computerized data for 3D cable is divided into three steps. The first step is the modification procedure for the different parts by comparing the existing drawing of 3D cable with the review of the lists for safe-related cable and the drawing of 2D cable of management objects. The second step is to modifying the different parts by comparing the existing drawing of 3D cable with the review of the lists of the list for the cable tray and the drawing of 2D cable. The last one is to create the three-dimensional structure and the objects such as cable tray and cable based on the three-dimensional CAD objects by using the automatic navigation according to the cable information. The following Fig 2.1 shows the management system of 3D cable with the navigation.

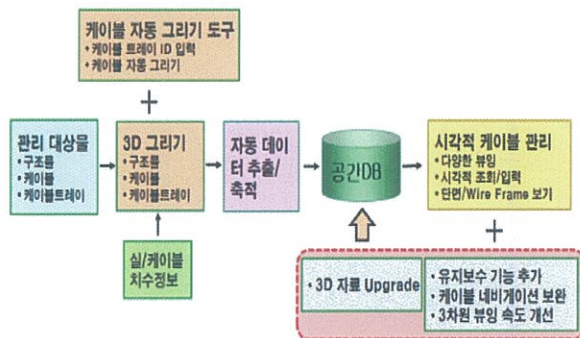


Fig 2.1 Schematic of development system using data for 3D computerized upgrade

2.1 When searching for numbers of cable in cable trays, main equipment and equipment etc., the function to display a separate cable color

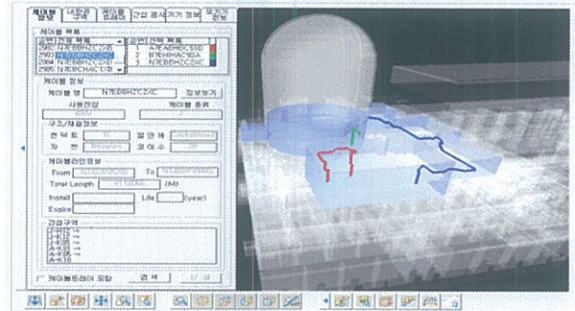


Fig 2.2 Searching for numbers of cables

- 2.2 The function to display how far from the start point and end point by clicking the point of the cable
- 2.3 The function to identify an environmental area where the point of the cable is
- 2.4 The function to display the coordinate of the navigation on a point of the cable
- 2.5 The function to display how far from the start of the cable when cable navigation
- 2.6 The function to display the information involving environmental area at the navigation point

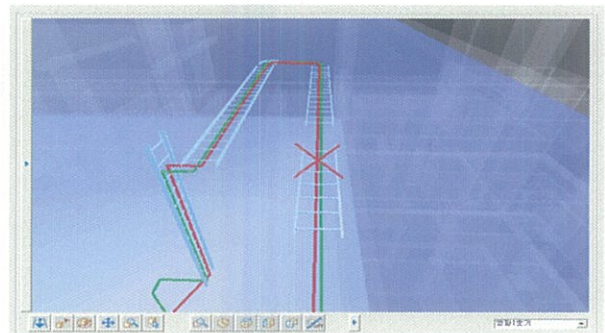


Fig 2.3 Display the information when cable navigation

2.7 The improvement on speed and performance of Cable Management System (CMS)

To the improvement of the speed to search a cable, this system provides the part to load the list from the database and to display the list through a query sentence, and makes a change the direction of the viewpoint along the path of the cable by improving the way to see with existing top view when using the navigation along the path of the cable.



Using this method, user can clearly identify the cable route. Also, when visualizing the search result of the cable, it improves user convenience by turning the function displaying only a portion of the existing cable trays into being able to display all.

- (1) The improvement on performance of the cable route navigation.
 - ① Under navigation, change in position and height of the camera
 - ② Visualization of cable tray on the route when searching the cable
- (2) The improvement on viewing speed
 - ① The improvement on the searching speed of the cable
 - ② The improvement on the visualization speed of the cable
 - ③ The improvement on the searching speed of the cable tray
 - ④ The improvement on the visualization speed of the cable tray

- ③ Maintenance information related to the existing equipment
- (2) Developing the function of the maintenance history management of the cable
 - ① Developing the function of the registration of the maintenance history for the cable
 - ② Developing the function of the search of the maintenance history for the cable
- (3) Developing the function of the maintenance history management of the cable tray
 - ① Developing the function of the registration of the maintenance history for the cable tray
 - ② Developing the function of the search of the maintenance history for the cable tray
- (4) Developing the function of the maintenance history management of the equipment
 - ① Developing the function of the registration of the maintenance history for the equipment
 - ② Developing the function of the search of the maintenance history for the equipment

No	contents	Existing performance (Avg.)	Current Performance (Avg.)	Improvement (%)
1	The improvement on the searching speed of the cable	12sec	12sec	30%
2	The improvement on the visualization speed of the cable	12sec	12sec	15%
3	The improvement on the searching speed of the cable tray	12sec	12sec	30%
4	The improvement on the visualization speed of the cable tray	12sec	12sec	15%

Table 2.1 The Development of maintenance history information management

The management of Cable, cable tray, and equipment etc. through CMS was only available to the cable, but it will be applied to all of the maintenance of the management objects. Therefore, for the main objects of management such as the cable, cable tray, and equipment, this will improve the utilization of the CMS by adding the function to manage the maintenance information

CMS is upgraded by establishing the database structure which can accumulate the maintenance information, adding the function that inputs the information, and developing the function that checks the accumulated maintenance information. However, the function for the input and search will be only provided because it is beyond the scope of the services to input the maintenance information.

- (1) DB schema design
 - ① Maintenance information related to the existing cable
 - ② Maintenance information related to the existing cable tray

2.9 Upgrade Data for the structure

- (1) Upgrade data for the slave
 - ① Identifying the data for the existing slave
 - ② Designing the missing drawing and establishing the data
- (2) Upgrade data for the wall/structure
 - ① Identifying the data for the existing the wall/structure
 - ② Designing the missing drawing of the wall/structure and establishing the data

3. Conclusions

3D cable tracking system with navigation makes it possible to easily search the objects which users want to retrieve and to measure the visual, spatial and structural distance by connecting the existing cable management system with 3D cable tracking system with navigation. With this consideration, we hope to create a more advanced cable management system in the future.

REFERENCES

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