Paris Session 2022





A Study For Digital Twins for Substation Control Circuits

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Group Discussion Meeting

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Question and our contribution

Question PS3.2

• What examples and return of experience can be provided on <u>digital substations</u> and digital twins? Which <u>emerging digital technologies</u> will improve substations for the grid of the future?

<u>Answer</u>

✓ The Examples and return of experience regarding digital twins

 We developed on digital twins used to work on connecting/disconnecting control cables.

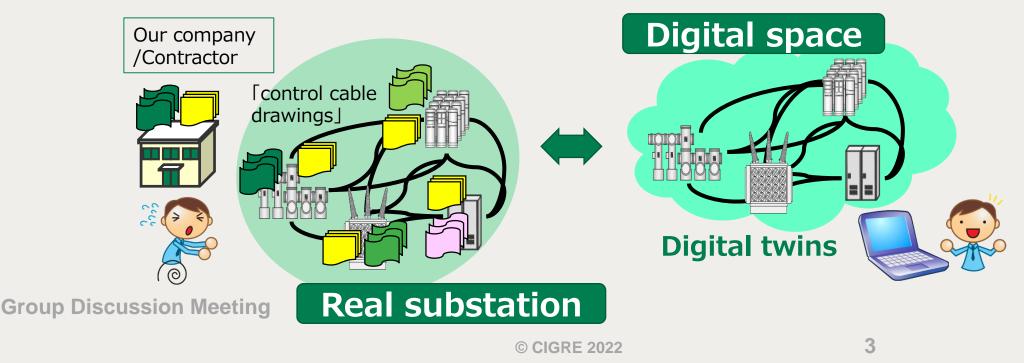
✓ The emerging digital technologies

- Digital twins of control circuit.

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Utilizing the digital twins in substations

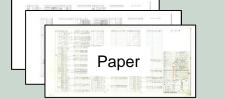
- Digital twins are aggregates information on objects that exist in the real substation, and reproduces and manages them in digital space.
- As a situation management for control circuits in substations, the prototype tool was created to link the real substation with the digital space and its practicality was verified. We created a prototype tool for digital twinning, which links the real substation with the digital space, and verified its practicality.



Concept of improving work efficiency through system utilization

Changes due to systemization

Before starting construction



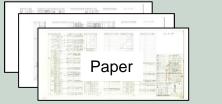
Cable connection status is recorded on paper called "control cable connection table".

Under construction

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Create a cable connection/disconnection checklist using the control cable connection table, and work by using it.

After completing construction



Update to the latest connection status.



Digital twins of control cables

Semi-automated creation



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Impact on Operations

- Many tables can be checked on a PC
- Quick confirmation of connection points
- Prevention of HE(human error) due to misreading
- Reduction of time required to prepare forms
- Prevention of HE due to copying errors
- Paperless(No need to print drawings)

- No work to update drawings
- Prevention of HE due to omission of correction



Automatic update

Conclusion

- In control cable connection work in electrical construction, checking disconnection and connection points and revising connection tables have become a burden for contractors and utilities.
- In order to carry out improving level of work with a limited number of personnel, it is necessary to improve work efficiency using DX technology.
- We developed a prototype tool for a "control cable connection table" to link the real substation and the digital space as a status management tool for control circuits in substations and verified its practicality.

Thank you

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