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GROUP REF. : B3
PREF. SUBJECT :2
QUESTION N° : 3

PS2.3: With the retirement of experienced utility engineers around the world, there is a significant knowledge drain on utilities and the industry. What processes or development programs can help companies transfer knowledge to the new work force. Are there any examples that you would like to share?

Actions for internalization of maintenance skills and knowledge to transfer them to the next generations

Introduction

- Recently, both utilities and manufacturers have seen a decrease in the number of engineers familiar with aging equipment due to retirement and other reasons. In addition, the number of highly aged equipment is increasing due to the longer service life of equipment. Nevertheless, the opportunities for young engineers to deal with equipment are decreasing due to the increasing performance of equipment and the introduction of IoT.
- Because of these issues, utilities face the following challenges :
  - How to keep up the quality of maintenance on aging equipment?
  - How to pass on the skills and knowledge to younger engineers?
- In this paper, we introduce our actions for internalization of maintenance skills and knowledge to address these challendges for the reliabile electricity supply.

Our actions for internalization of maintenance skills

-Action 1. Create maintenance work manuals

- We have been creating manuals for maintenance work on equipment (especially on aging equipment) that has been carried out by the technicians of manufacturers or maintenance companies.
- The manuals are designed to be easy to read with diagrams and photographs so that they can be easily understood by inexperienced engineers.
- It also covers all the necessary replacement parts, tools, jigs and work precautions in detail. This enables users to retain the know-how required for equipment maintenance.
- The use of manuals facilitates the transfer of technical skills and knowledge to younger engineers.

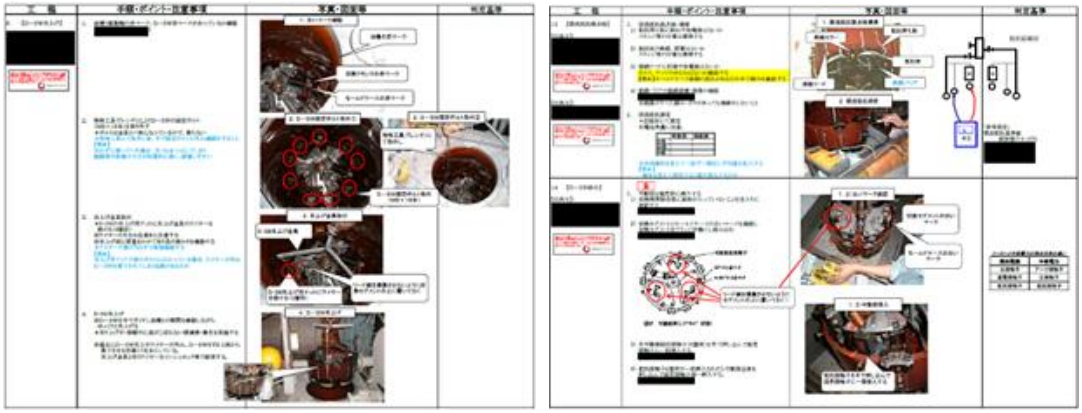

Fig.1 Example of maintenance work manuals

-Action 2: Create education and training facilities with a collection of decommissioned equipment

- Decommissioned equipment is collected and used as education and training facilities in vacant spaces in substations and elsewhere.
- These facilities are disconnected from the power lines and allow practical skills training at any time, safely and practically.
- They help young engineers to understand the inner workings of older equipment.

Training equipment: CB, LS, LR, etc.
Training menu:
• Overhaul of the operating mechanism
• Operating characteristics test
• Electrical characteristics test (current-carrying capacity, insulation resistance, etc.)
• Parts replacement, etc.

Fig.2 Education and training facilities

-Action 3: In-house maintenance skills competition, technical certification system

- In-house maintenance skills competitions are held using the education and training facilities described in Action 2.
- In addition, an internal technical certification system has been set up and engineers are given tasks according to their level.
- In this way, we are trying to improve the skills of young engineers and promote their motivation.

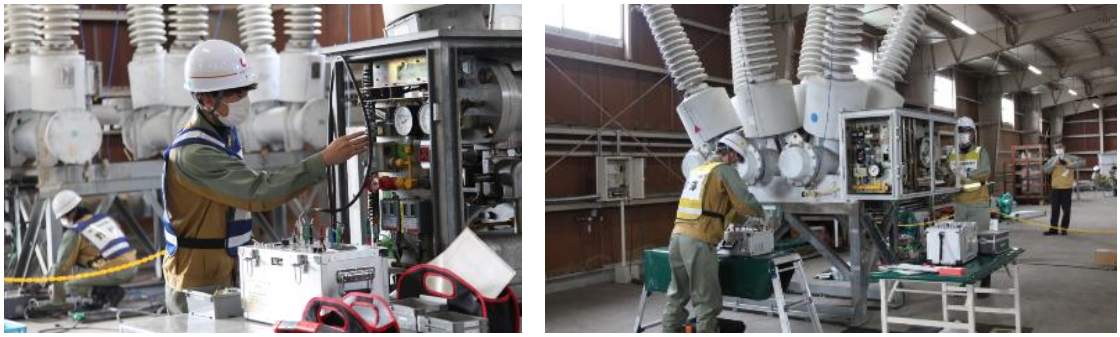

Fig.3 In-house maintenance skills competition

Conclusion

- As mentioned above, we are taking various actions to bring equipment maintenance skills and knowledge in-house.
- Through these actions, we are keeping up the quality of maintenance for older equipment and passing on the skills to younger engineers.
- These actions are not limited to simply passing on skills to younger engineers, but will further improve our maintenance skills and are expected to make a significant contribution to improving the reliability of the electricity supply.