A Study on the Data Relevance and function Enhancement of Oil & Gas Testing Diagnosis System of Electrical Equipment

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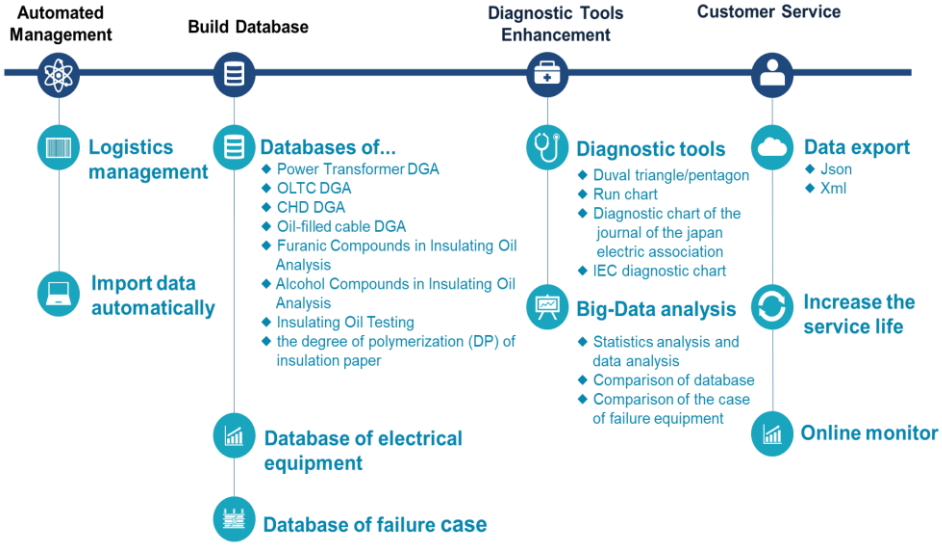
Over the years, the Oil & Coal Testing Section of TPRI has developed three generations of “Dissolved Gas in Oil Analysis Database System”, which plays a big role in insulating oil testing of the electrical equipment of Taipower. The performance of the fourth generation system, titled ”Oil & Gas Testing Diagnosis System of Electrical Equipment (O&G Diagnosis System), is the main focus of this article, and has been enhanced in the following aspects: 1. the management of automated testing, 2. the completeness of database, 3. the variety of diagnostic tools, and 4. the function of customer service,



.Fig.1 Oil & Gas Testing Diagnosis System of Electrical Equipment

To improve the efficiency and reliability of the test, we have introduced several automatic management methods, including the use of barcode to establish the logistics management of sample and automatic test data import. Starting with receiving the sample of the client, the barcode generated form the O&G Diagnosis System will be used for subsequent processes of testing records, data input, diagnosis, report output, and delivering the completion report to the client. The O&G Diagnosis System of the logistics management chain interfaces with the profit center system of TPRI, the instrumentation system of the laboratory, and the commissioned test information, client information, test data and spectrum graphs will be automatically imported and presented on the software screens, instead of manual input and paper reviewing. As the statistical result shows, the output time of report is reduced by 0.6

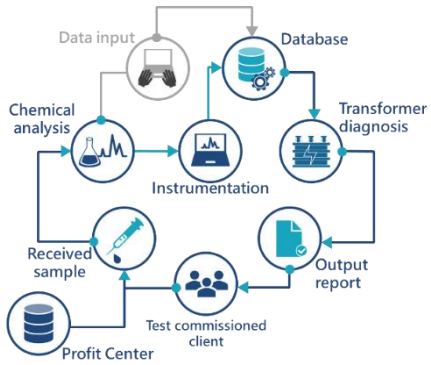


Fig.2 Automated Management in Laboratory

days on average, and the manpower in need of data input, error rates, and paper printing has been reduced accordingly.

O&G Diagnosis System also enhances the integrity of the database and the efficiency of comprehensive diagnosis. In addition to the already recorded transformer data, the current system also incorporates the data of transformer accessories equipment, including On-Load Tap-Changer (OLTC), Cable head (CHD) among others, and combines relevant specifications, operating conditions, and oil strain processing to build up a database of insulating oil and insulating paper tests. In the future, the testing results of Gas Insulated Switchgear (GIS) will be included in the database system. The enhanced O&G Diagnosis System can not only improve the ability of identifying the location of equipment failure, but also be used for assessing the type and stage of oil and paper aging. A comprehensive database system, combined with existing international diagnostic methods and big data analysis tools, may help Taipower develop it's own insulating oil diagnostic method for more precise and in-depth data interpretation.

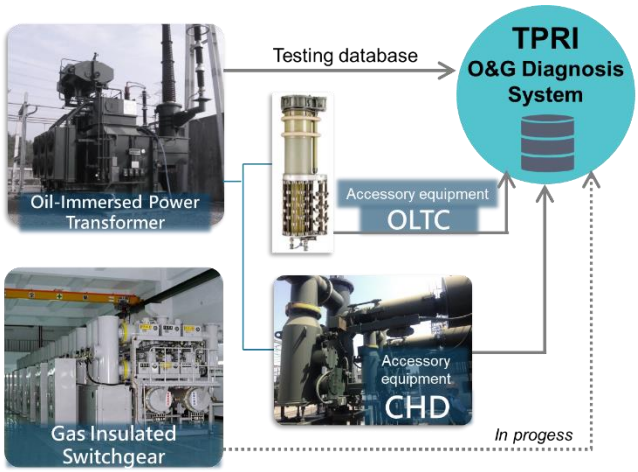


Fig.3 Database Covered by O&G Diagnosis System

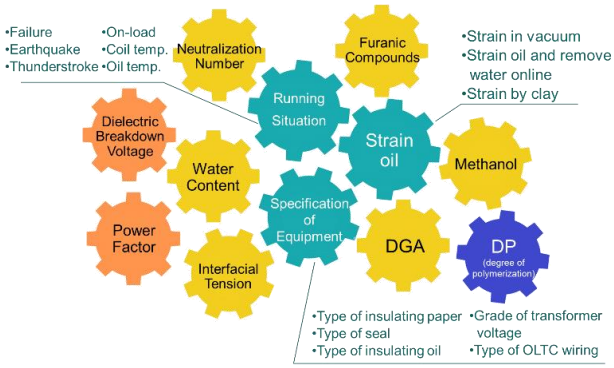


Fig.4 Data Type covered by database

The fourth generation O&G Diagnosis System not only improves the testing and diagnostic ability of laboratory, but also enhances the follow-up service with clients. Testing data can export by json or xml format automatically and interface with the clients' database by FTP platform. For the electrical equipment diagnosed as Fault or Aged, we provide 9 kinds of online gas monitor service or online water removal service to track the condition of equipment by using the follow-up test results. Through the improvement of the testing processing in laboratory, the enhancement of diagnosis capability, and assistance in solving problem of on-site equipment, this research is expected to make effective diagnosis of fault prediction, and strengthen the ability of detecting and responding to accidents, and achieve the purpose of strengthening the power grid.

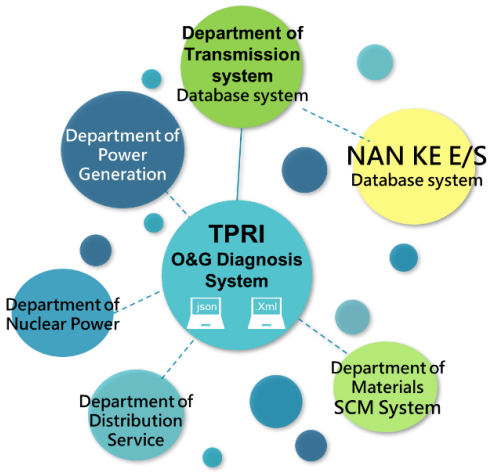


Fig.5 The Interface of data and information with Different Database (As the solid line shows, the interface has been already done and as the dotted line shows, the organ which the O&G Diagnosis System could provide service as soon as the user demands.)