XFEL DATABASE USER INTERFACE

P.D. Gall, V. Gubarev, D. Reschke, A. Sulimov, J.H. Thie, S. Yasar

DESY, Notkestrasse 85, 22607 Hamburg, Germany

Abstract

The XFEL database plays an important role for an effective part of the quality control system for the whole cavity production and preparation process for the European XFEL on a very detailed level. Database has the Graphical User Interface based on the web-technologies, and it can be accessed via low level Oracle SQL.

INTRODUCTION

Beginning from TTF a relational database for cavities was developed at DESY using the ORACLE Relational Database Management System (RDBMS) [1].

The database is dynamically accessible from everywhere via a graphical WEB interface based on ORACLE. At the moment we use the version Oracle Developer 10g Forms and Reports. The graphical tools are developed in Java.

The database is created to store data for more than 840 cavities coming from the serial production and about 100 modules. Therefore the main aim of the database is to store data about cavity production, cavity preparation, cavity measurement steps, assembling cavities in module, and module test results.

We have developed tools to analyse the data stored in the database for different groups of experts, which have access via WEB. Through the link http://xfel.desy.de/cavity_database you can enter the start page for the XFEL database Graphical User Interface (GUI, Fig. 1):
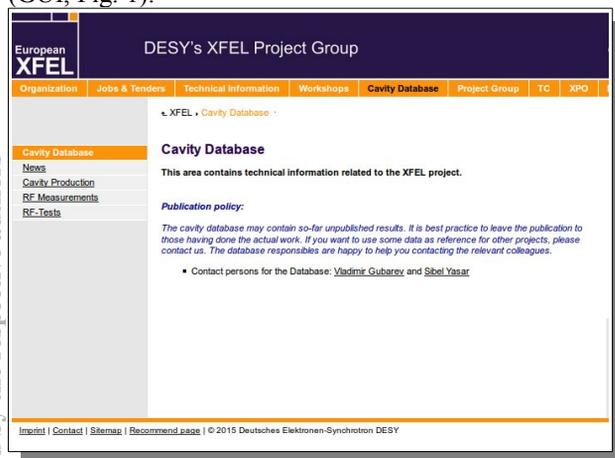

Figure 1: The XFEL database start page.

DATA PROTECTION

According to demands of production firms the grant system for the data access was designed. It is based on the group access for the different kind of information. People from the one group can have individual permissions.

Using this protection system we have divided all customers into different groups:

- RI group has permission to view production results from RI only and open information
- ZANON group has permission to view production results from ZANON only and open information
- DESY group has permission to view all results from all companies
- Not authorised people have access to the open information only

To get authorised access to the database one have to contact the responsible persons listed in the XFEL database GUI pages.

GRAPHICAL USER INTERFACE

The XFEL database GUI was developed to meet the requirements of experts involved. According to the people needs the GUI applications can logically be divided into groups:

- Cavity production control
- Cavity transportation control
- Geometry calculations for string assembly
- RF Test results in vertical cryostat
- Module Test results

Cavity Production Control

In general there exist 3 levels of the cavity production:

- Acceptance Level 1 (AL1):
  - Half cells mechanical properties
  - Half cells frequency properties
  - Dumb-bells mechanical properties
  - Dumb-bells frequency properties
  - End groups mechanical properties
  - End groups frequency properties
  - 3D-Shape measurement
  - Cavity structure
  - Cavity mechanical properties
  - Cavity frequency properties
- Acceptance Level 2 (AL2):
  - Cavity transfer measurements
  - Cavity eccentricity measurements
  - Cavity preparation steps (like BCP, EP, HPR...)
  - Cavity mechanical properties in tank
  - Cavity frequency properties in tank
- Acceptance Level 3 (AL3):
  - Further preparation steps
  - Cavity frequency check before transportation to DESY

During fabrication process the groups of experts at DESY are tracing the quality of production on every acceptance level via the data sent by firms. Due to wishes of these experts a set of applications was developed to present summarised results with highlighted status including possibility to access the original document directly or obtain statistical data.

Cavity Transportation Control

The quality of transportation is defined by the frequency properties of cavity(s) at the beginning and end of the transport chain. A special tool was developed to compare the frequencies from the different measurements per cavity (see Figure 2).
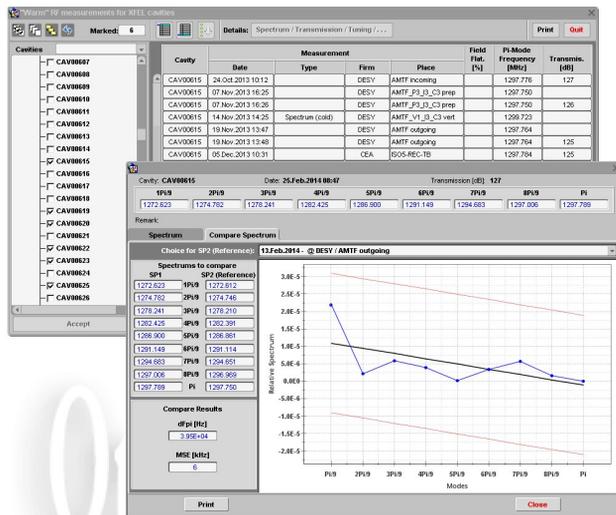

Figure 2: Spectrum comparison.

Data for String Assembly

For string assembly the people at CEA need recalculated coordinates of cavities according to the last eccentricity measurements and corresponding 3D transfer measurements. In the GUI this function is realized and these calculations are done automatically. Afterwords the file of the special format can be obtained to use in the internal CEA system for module assembly.

Cavity RF Test Results in the Vertical Cryostat

Special application from the XFEL database GUI shows the full information about test results in the vertical cryostat in the table and graphical format (see Figure 3).
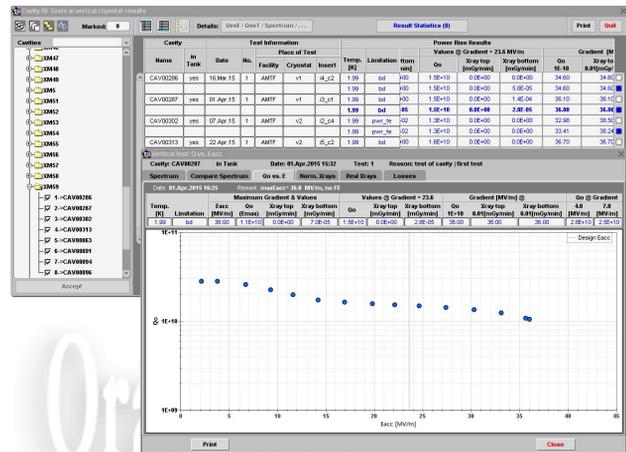

Figure 3: RF Test results in the vertical cryostat.

Module Test Results

As for the cavity RF Test there is a special application to present Module Test results (Fig. 4):
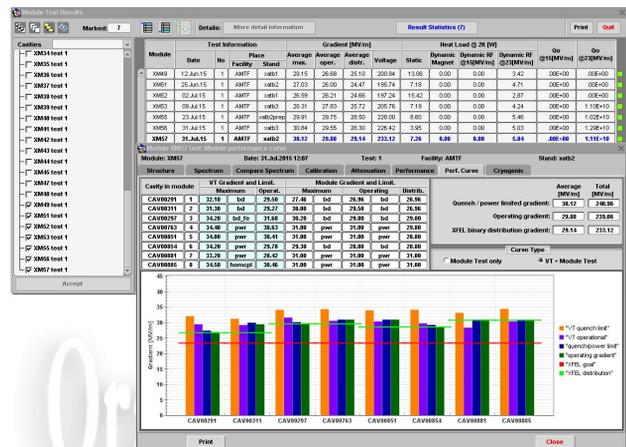

Figure 4: Module test results.

DATABASE ACCESS ON THE LOW LEVEL

Some groups of people are working with the XFEL database on the low level – Oracle SQL:

AMTF people need data about module structure and results from the RF spectra measurements done at firms to provide RF Tests in vertical cryostat and Module Tests.

Magnet measurement team needs data about module structure to trace quadrupole history.

Cavity analysis team needs the full access for the database for statistical analysing the cavity serial production process [2].

To support wishes of these people the new oracle account was created with read-only data access.

SUMMARY

Up to now there is only positive feedback from the users of the developed applications. Therefore the XFEL database GUI is permanently growing due to the personal wishes of the people, which are involved in this business.

REFERENCES

[1] P.D. Gall, V. Gubarev, S. Yasar, A. Sulimov, J.Iversen., "A Database for the European XFEL" SRF 2013

[2] N. Walker, et al., „Update and status of vertical test results of the XFEL series cavities", SRF 201, MOPB086