FAT AREA

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The Factory Acceptance Test (FAT) is a major project milestone in an electrical installation project where the manufacturer of the equipment demonstrates that the system design and manufacturing meets the contract or Purchase Order terms and conditions.
OSKAR-EL possess a specifically equipped area within our own production premises for simultaneous FAT testing of more than 100 assemblies at the same time.
A system for access control of authorized personnel and video monitoring of the FAT is operational.
The testing is performed in accordance with a procedure for FAT testing developed by Oskar-El and approved by our clients.
OSKAR-EL has a procedure for standard FAT testing, however in cases when additional testing is required by Clients or due to project terms or conditions, a new procedure capturing any additional testing could be implemented.
The FAT includes testing of the entire system – hardware and software. The hardware portion (PLC, control panels, power cabinets, communication equipment, etc.) is fully configured in order to simulate conditions closer to the actual operating conditions.
All possible working modes are simulated in order to monitor the behavior of the entire hardware system and SCADA in accordance with the preapproved FAT procedures.
The working station is equipped with a 32 inches display on which can be seen all the documents necessary for the testing, procedures, electrical diagrams, requirements, technical characteristics of the equipment used, etc.
OSKAR-EL has developed and implemented a PLC panel with mathematical models simulating the working environment of the external devices and/or actuators in order to achieve maximum operational functionality of the PLC. This simulation process achieves an increase in the results of the testing and minimization of the startup time of the system in real-time conditions.

The mathematical model for simulation of a specific process during FAT consists of PLC 192 DI, 128 DO, 32 AI, 32 AO. In cases of large-scale projects and when more I/O are required the model could be expanded.

The mathematical model for the performance of each mechanism/device is developed based on the characteristics of the mechanism/devices. This allows for maximum similarity to the actual devices in a system (valve, pump, motor, hydraulics, I&C, etc.). The performance of each device is simulated in different modes including failures. This way the alarm and working signals in the SCADA are tested. Then the entire system is tested. This is achieved in the following manner:

- The process engineer sets up the working algorithm of the system.
- All I/O of the controller are checked.
- All existing devices are set up in the model.
- The working algorithm is programmed.
- The entire algorithm is tested with the model (normal and emergency conditions).
Example of a test results

<table>
<thead>
<tr>
<th>Device</th>
<th>Specification</th>
<th>Test Status</th>
<th>Result</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>Specification1</td>
<td>Passed</td>
<td>Passed</td>
<td>2023-01-01</td>
</tr>
<tr>
<td>D2</td>
<td>Specification2</td>
<td>Failed</td>
<td>Failed</td>
<td>2023-01-02</td>
</tr>
<tr>
<td>D3</td>
<td>Specification3</td>
<td>Passed</td>
<td>Passed</td>
<td>2023-01-03</td>
</tr>
</tbody>
</table>

Notes:
- Passed: Test met all requirements.
- Failed: Test did not meet requirements.
• The FAT testing is typically witnessed by representatives of the Contractor, Client or Designer of the system. However, in cases when the participation of the authorized testing representatives of the Contractor, Client or Designer is impossible, OSKAR-EL provides the means for remote witnessing of the testing via video monitoring. Remote witnessing is achieved with a portable high resolution camera, which is positioned in front of the panel to be tested. The Client has the possibility to rotate and zoom the camera in order to observe detailed information about the testing. Remote access to the SCADA Operator Working station and Engineering Working Station is also provided. Consequently, the Client can attain an idea about the testing as it is performed in real time.