

primtech – OSR – BIM Model from 3D-Laser Scans or Photos

Through high loads on grids nowadays with unforeseeable grid and weather phenomenon, more unanticipated events occur in substations that need to be solved quickly. Equally, long offline times due to faults or extensions/retrofits are no longer sustainable. In order to react quickly and reliably to events as well as plan for extensions or retrofits, it is becoming ever more important exact documentation of existing substations in the form of a digital twin of the substation.

With the help of this twin, planning and simulating can be fast and reliable. The digital twin can be connected with various data sources like Scada-Systems or Asset-Management-Systems and must behave intelligently - switches in the twin must be able to switch, wires must be able to swing. primtech allows the creation of an intelligent substation model - of a digital twin - that fulfils these requirements. In order to fully benefit from the digitization of the digital twin, existing substations need to be digitally captured - with the help of the new primtech tool - Optical Symbol Recognition (OSR).

OSR Tool

The primtech tool - Optical Symbol Recognition (OSR) - allows, with the help of artificial intelligence in a mostly automatic process, the creation of primtech substation model out of point cloud scans or photos of a substation.



The created primtech models are intelligent 3D models and comply with the Building Information Modeling (BIM) Philosophy - so called primtech BIM 3D Models. primtech creates the models according to the detected points and the specific signature within the point clouds and then builds

up assemblies - step by step - to a complete BIM model.

Starting Point: Substation Scan

The 3D scan of a substation or photos taken from drones serve as the basis for the OSR tool. These 3D scans (e.g. Lidar scans) or photos are converted and optimized in an Autodesk ReCap project. These ReCap point cloud projects are then simply linked to a primtech project and become available to the OSR tool.



For the pre-processing of the laser scan or photo data, Autodesk ReCap or Autodesk ReCap Pro respectively is needed.

OSR Execution

The OSR tool is integrated in primtech and can be executed as soon as the point cloud is linked to a substation. The creation of a primtech model from the point cloud takes place in steps at the assembly level - which are created from recognized equipment, steel constructions and foundation heads. After defining the conducting wires and their connection points, the primtech tool examines all possible positions - signatures - in the point cloud and compares these to the relevant assemblies in the integrated primtech library. These are then inserted or new assemblies are created respectively.

The Auto-Search and Auto-Apply features support the user in the fast implementation of the symbol recognition. Through the preview, the user can individually decide - based on a scoring list - which assemblies he prefers and select it. The wires are automatically attached to

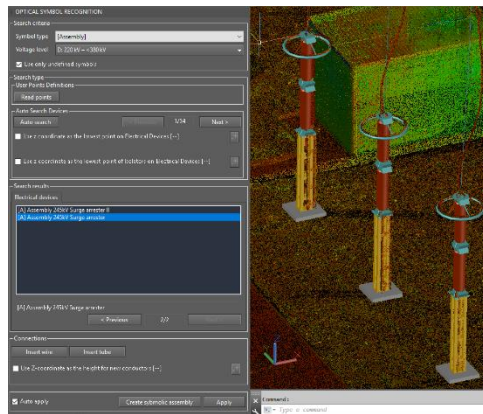
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the respective electrical connection points on the equipment upon the insertion of the assemblies.



Generating a BIM 3D Model

After the OSR tool examines all signatures in the point cloud and all signatures are mapped to an assembly in the model, a logical and intelligent primtech BIM model has been created. The model has the familiar primtech project structure in the project databank and contains all created symbols. The BIM model can now be utilized in further calculations and checks. The model can also be used as a full-fledged template for extension or retrofit - to create parts lists and plans as well as to carry out calculations.

Learning Phase and Library Extension

primtech contains a large library of equipment that go back to the 1990s. During the OSR process, it can also call upon legacy equipment. With very old substations, in which the respective equipment or standards are no longer available, the Teaching Assistant in the OSR tool can be of help. It allows, in this case, the quick creation of a concept assembly which can later be fitted exactly in the assembly environment of the point cloud.

The such created assembly is then immediately available to the OSR system and can be utilized in further substations.

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