WESEE – 3D SIMULATION AND VISUALIZATION TOOL

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When performing visual testing, according to Swedish qualified procedures, rigid demands are placed on the control of camera distance and viewing angles in relation to the inspection object. In the preparation before the inspection, it is mandatory to verify that correct camera angles and distances can be achieved. An instruction on how this shall be accomplished and how the inspection must be performed shall be described in data sheets prepared for each and every specific object to be inspected. The personnel to perform the inspection must also be trained on the task according to the requirements in the procedure and the data sheet. Pre-inspection verification of camera positions has historically been very time consuming, being done manually from existing two-dimensional (2-D) drawing material. Realistic training conditions for the personnel have also been a challenge to accomplish.

WesDyne TRC has developed a tool, WeSee, which both simulates and visualizes manipulator and camera movements in a three-dimensional (3-D) environment based on CAD models of the object and area to be inspected. This paper describes the WeSee tool as applied on the WesDyne TRC Standalone Visual Inspection Platform – SVIP.

Before the inspection, WeSee is able to simulate the manipulator and camera movements as well as present a simulated picture as seen by the inspection camera. Additionally, camera angles and distances can easily be manipulated and verified. As a result, this 3-D-simulation and visualization can serve as basis for the mandatory data sheet for the inspection. WeSee uses the same type of human control interfaces to control the simulation as the actual inspection equipment employs (joystick, etc.). Thereby, the personnel can, in a very realistic way, train on performing the inspection task according to the data sheets with full visual feedback fully corresponding to the actual inspection situation.

During inspection, WeSee visualizes the manipulator and camera movements in real-time based on positioning feedback from the control system. In this way, a clear view of the movements of the camera and manipulator is presented and a check that permissible angles and distances are maintained can be performed. By also comparing the simulated camera picture with the picture from the actual inspection camera, it is possible to verify that the correct area is inspected. The software can log the inspection and potential defect area positions and the data can be saved for future rendering and presentation of the areas of interest.

WeSee can also serve as a complement to surveillance cameras by giving an optional virtual surveillance view of manipulator movements in the area, thus making it easier to prevent interference with adjacent objects. Finally, after completion of the inspection, the tool can present a detailed view of the actual area that has been inspected in order to assess and document coverage and areas of interest.