

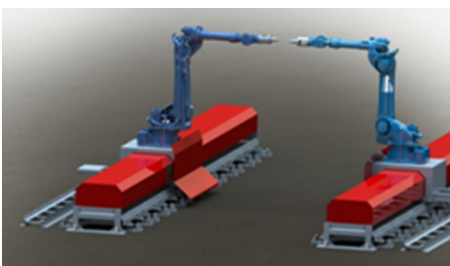
복합재 구조물의 건전성 확보를 위한 다관절 초음파시스템 개발

Development of Multi-Joint Robotic Ultrasonic Inspection System for Integrity of Composite Structure

특징

- ✓ 다양한 복합재료를 간단한 티칭으로 검사가능 (평판과 곡물 그리고 더블곡물에 대해 검사가능)
- ✓ 두 개의 초음파센서를 사용하여 물줄기 사이로 초음파를 전달 (하나의 센서는 발진, 하나의 센서는 수신을 한다.)
- ✓ 물줄기 속에 와류나 기포가 최소화 될 수 있게 제작 (펌프, 스쿼터, 컨트롤러, 호스의 길이 등 최적화 제작)
- ✓ 복합재 속의 벌어진 부위나 기공의 결함을 검출 (검출되는 초음파의 강도를 이미지로 처리하여 검출)
- ✓ 다 관절로봇 두 대를 동기화 시켜 공간좌표로 제어
- ✓ 평판 기준으로 500mm/s 이상의 속도로 검사가능
- ✓ 검사 전 프로그램을 통해 시뮬레이션 가능
- ✓ 운용 프로그램과 평가 프로그램으로 나눠 검사와 평가
- ✓ 검사결과를 3차원적으로 확인 가능하다.
- ✓ 제품의 3D 모델링을 STL파일로 변환하여 스캔가능

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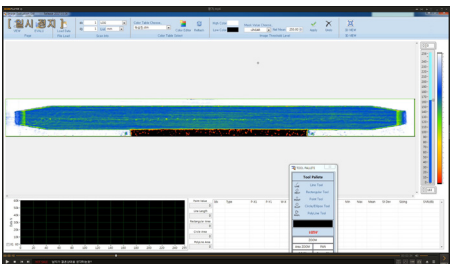
시스템 3D-모델링 System 3d Modeling



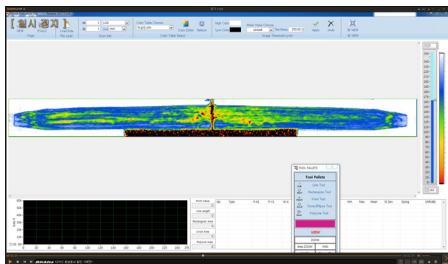
시운전 모습 Test drive appearance



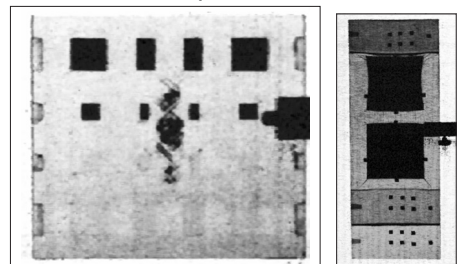
스쿼터 테스트 Squatter test



결과 화면 (양품) Results screen (pass)



결과 화면 (불량) Results screen (Failed)



결과 화면 (기공) Results screen (pore)

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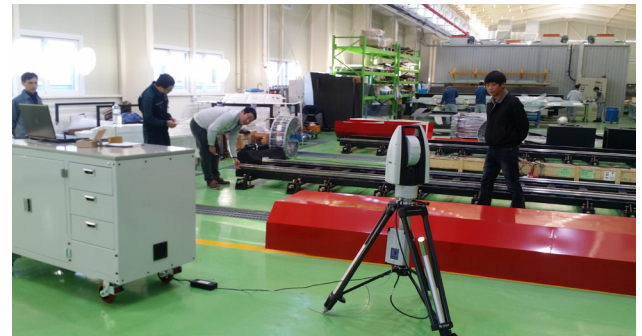


SPECIAL FEATURE

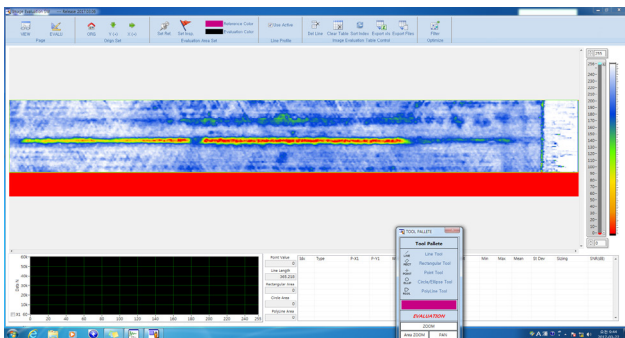
- ✓ Various shapes can be inspected by teaching (Plane, curved, double curved inspection)
- ✓ True-Transmission UT is performed using a squirter
(One generates ultrasonic waves and the other receives ultrasonic waves.)
- ✓ The jetted water is stable and removes air bubbles.
- ✓ Detect defects such as delamination or pores inside the carbon fiber composite
(Ultrasound is imaged using C-Scan.)
- ✓ Two synchronized articulated robot arms are used.
- ✓ Scanning speed of 500mm / s
- ✓ Inspection and evaluation divided into operation program and evaluation program
- ✓ The inspection result is expressed as a 3D image.
- ✓ 3D modeling of products can be converted into STL files and scanned



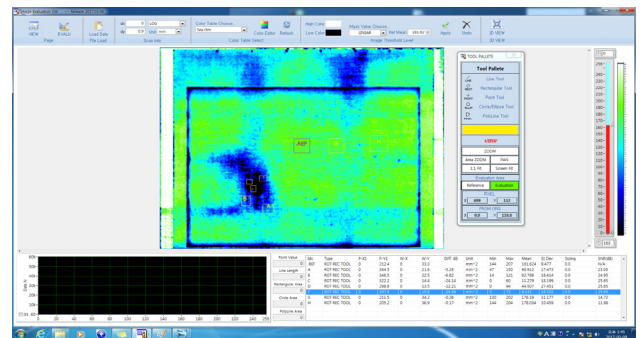
System site installation



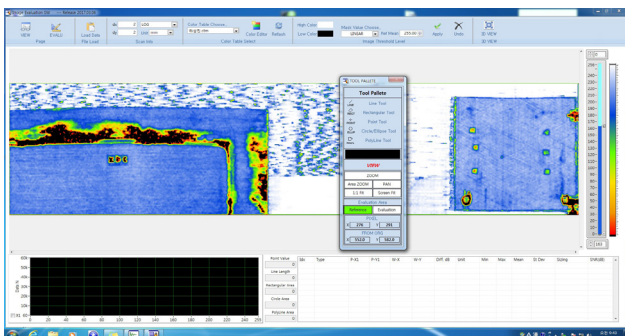
3D laser measurement



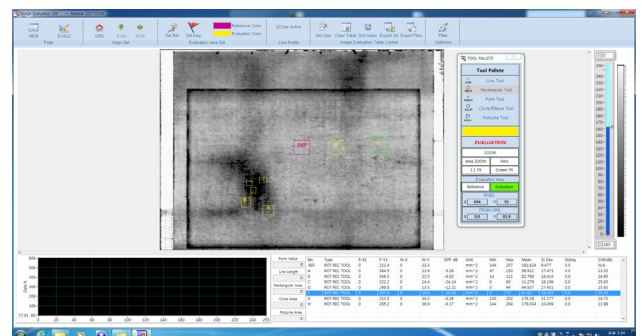
Results analysis screen



Results analysis screen



Results analysis screen



Results analysis screen