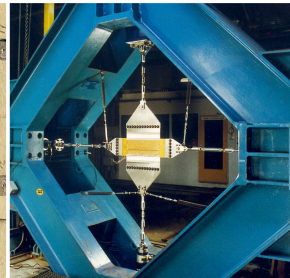
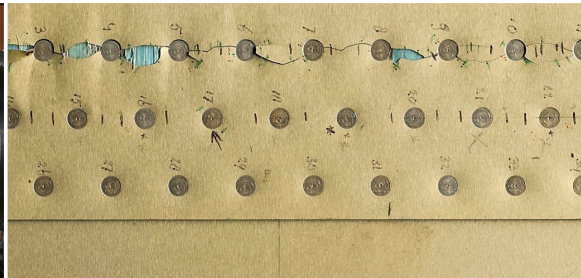
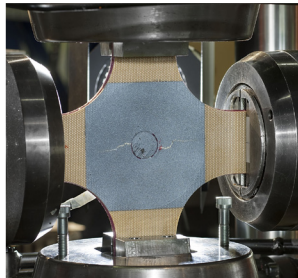
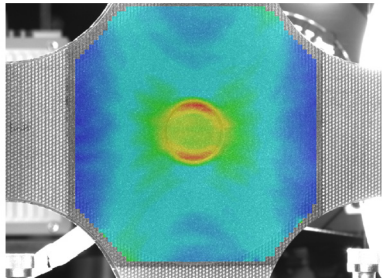



# Biaxial Testing

both in tension and compression either static or dynamic

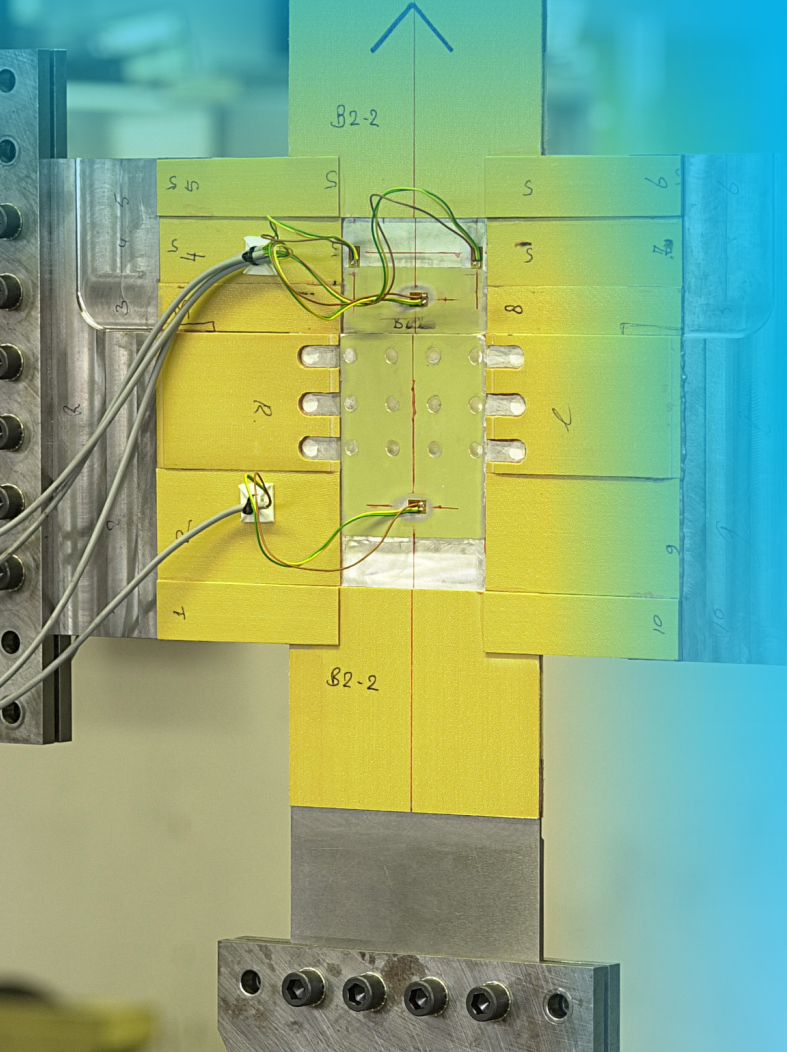


 Aerospace Vehicles Division  
Structures Testing & Evaluation

 [testing@nlr.nl](mailto:testing@nlr.nl)

 +31 88 511 42 86

“BIAXIAL TESTING ENABLES THE FULL EXPLOITATION OF THE BENEFITS OF ADVANCED MATERIALS AND JOINTS”



The understanding of the behavior of composite laminates and structural joints under multi-axial loading is of great practical significance, since bi-axial loading regimes are the norm in real engineering structures.

From previous biaxial experiments it was found that significantly higher biaxial failure loads are obtained as compared to uni-axial load cases.

# "LESS CONSERVATIVE FAILURE CRITERIA CAN BE OBTAINED"

## Biaxial testing at NLR

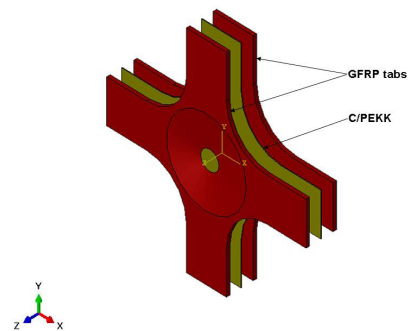
NLR has gained years of hands-on experience in biaxial testing. Starting in the '80 of previous century with successful fatigue tests on fuselage lap joints to study Multiple Site Damage and most recently with a static test program to establish a realistic failure criterion for a carbon composite lay-up.

NLR owns two biaxial test set ups:

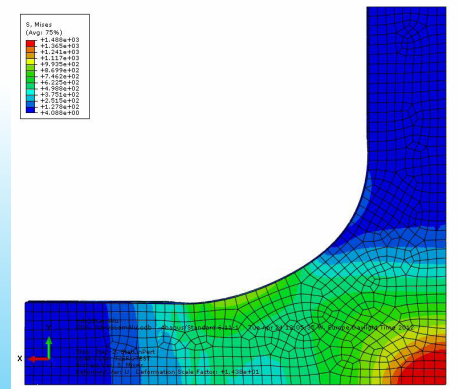
- The first set up has a capacity of 100kN and 200kN in two mutually perpendicular directions. The set-up only allows tension-tension tests, both static and dynamic.
- The second set-up allows tension-tension, tension-compression and compression-compression tests. All these tests can be executed statically or dynamically. The maximum load capacities are 500kN in vertical and 200kN in horizontal direction.

From its experience in biaxial testing NLR can assist in the design of successful test specimen geometries, ranging from local thickness reduction to tailoring of anisotropic specimen stiffness.

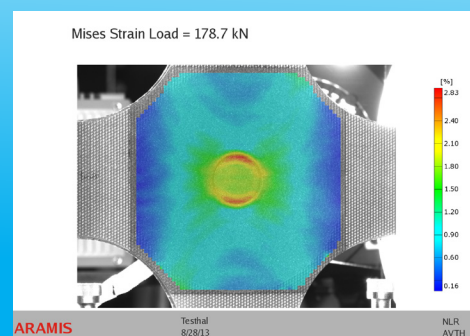
Apart from mechanical tests, NLR has a broad range of measurement techniques at its disposal for measurement of strains, displacements and loads.



*Ply Design*



*FEM analysis*



*Digital Image Correlation*

## Features

A wide variety of NLR's specialized laboratories and workshops ensure extensive possibilities for:

- test specimen design
- test specimen manufacturing in metal and composite
- Finite Element Analysis
- strain, displacement and load measurements using a broad range of measurement techniques
- NDI techniques
- failure analysis