Efficient computation of a least square ellipsoid for the hydraulic cup test (Bulge) with NURBS

The hydraulic cup test (Bulge test) is a very important experiment for advanced parameter identification for the constitutive modelling of sheet metal materials. The most complex challenge is the accurate determination of curvature in the pole of the hydraulic cup. Currently no efficient and accurate method exists for calculation of the specimen pole radii.

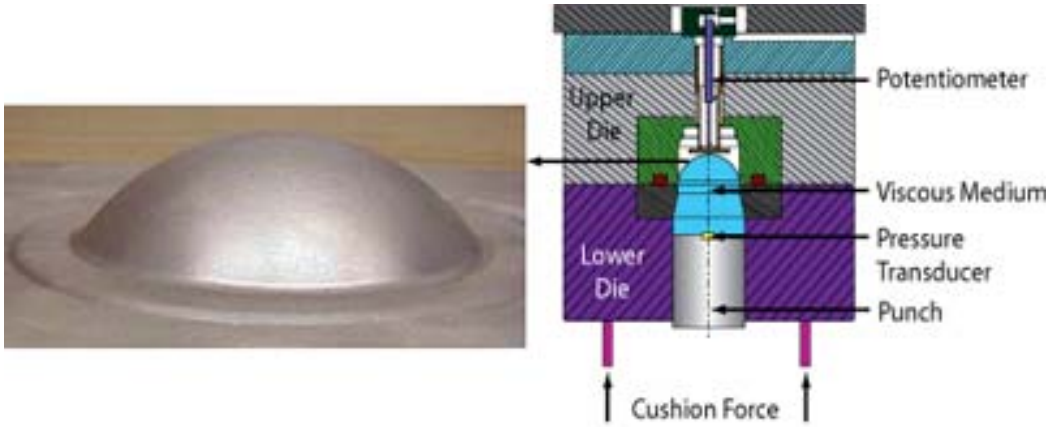

Figure: Bulge test

The application of NURBS in combination with the least square method seems to be a promising approach to approximate the optical measured data.

The tasks of this project are

- getting basic knowledge of NURBS theory and experimental set up of the BULGE test
- application of NURBS in a least square approach for the Bulge data
- validation and verification with real measured data and numerical reference data
- implementation in a suitable software package

It is planned to visit the BMW laboratory in Dingolfing, where the Bulge test equipment is available.

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