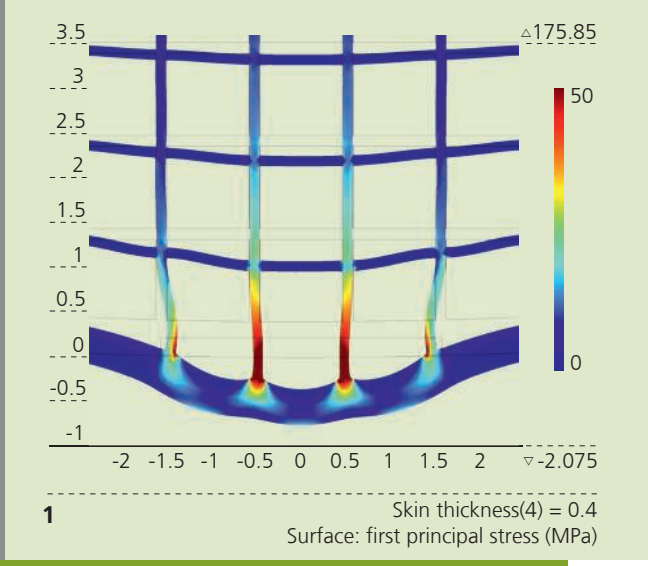

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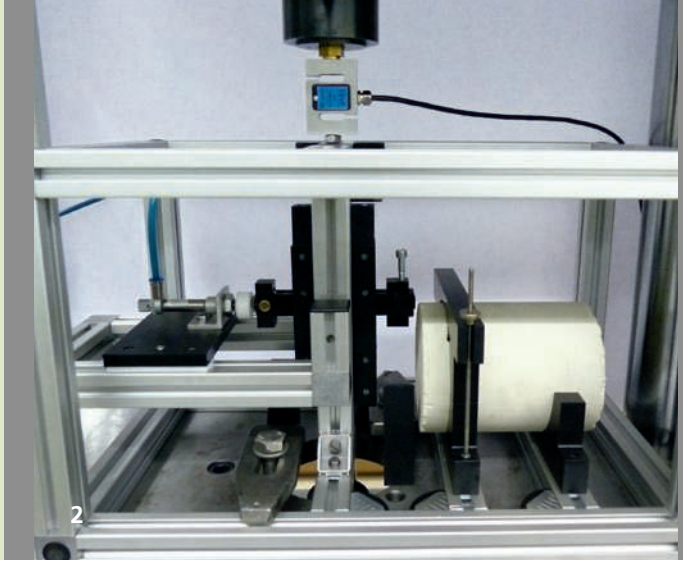
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COMPONENT-SPECIFIC TEST METHODS

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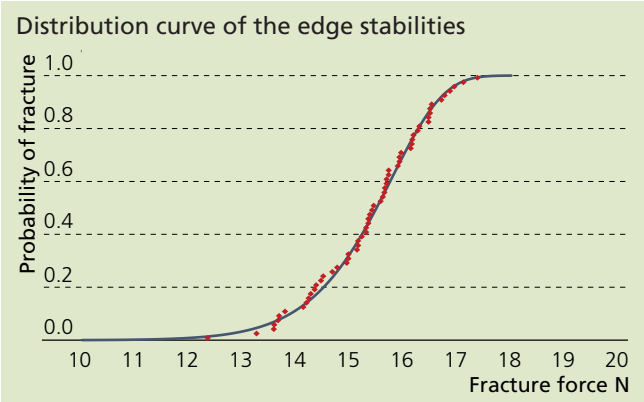
Overview

The increasing importance of ceramics as structural and functional materials requires component-specific test methods for determining the mechanical load capacity under realistic use conditions. These conditions are characterized by special geometrical as well as temporal loading scenarios and require solutions departing from the established and standardized universal procedures. For this purpose, the Laboratory for Quality and Reliability at Fraunhofer IKTS regularly develops component-specific test methods and systems. A current example is a test stand developed for UMICORE AG & CO. KG for determining edge stability in ceramic honeycombs.

Test stand for determining edge stability

In the processing of ceramics with honeycomb structures, failures that can be traced back to instabilities in the edge regions occur. Often a certain minimum edge stability is a prerequisite for further processing. The aim of the work was hence to develop a method that was suitable for simple and reproducible measurement of edge stability as well as for receiving inspections of random samples. Based on extensive preliminary examinations of samples from production as well as from inspection of the manufacturing facilities, a test system enabling simulation of the loads arising in the production process and measurement of edge stability for different ceramic honeycomb geometries was developed and validated.

For the measurement, a plunger is pressed flatly with an adjustable force against a defined edge region, the honeycomb is loaded normally until fracture of the edge occurs, and the forces occurring in the process are recorded and evaluated electronically. In this way, it is possible to determine and check the type-specific limit values for edge stability.



Services offered

- Development of component-specific test methods
- Design and construction of component-specific test systems
- FEM simulations for the development of test systems
- Process evaluation with inspection of manufacturing facilities

1 *FEM simulation of the stress state in edge regions of a ceramic honeycomb.*

2 *Test stand for measurement of edge stability in ceramic honeycombs.*

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