

Claims

1. Method for detecting cracks in an aircraft component (1) or in a gas turbine component (1), characterised in that the method comprises at least the following steps:
 - a) determination of geometric data of the component (1) using an optical measurement method, wherein the geometric data is determined by means of an interferometric method.
 - b) evaluation of the geometric data by an electronic evaluation means (14), cracks (2) and/or other damage being automatically detected and/or classified, and the position of the cracks (2) and/or of other damage being stored.
2. Method according to claim 1, characterised in that the determined geometric data is automatically compared with preferably mathematically predefined and stored features and/or set contours and/or tolerances and/or damage patterns.
3. Method according to claim 1 or claim 2, characterised in that the determined geometric data is also used for a measurement of the component (1).
4. Method according to any one of the preceding claims, characterised in that the aircraft component (1) or gas turbine component (1) is a combustion chamber component of an aircraft engine.
5. Method according to any one of the preceding claims, characterised in that the geometric data is determined by means of white light interferometry.
6. Method according to any one of the preceding claims, characterised in that the evaluated geometric data is used to establish the need for, and/or extent of, repairs of the component (1).
7. Method according to claim 6, characterised in that the evaluated geometric data is used for a subsequent, preferably automated repair and/or machining operation of the component (1).

8. Device for detecting cracks in an aircraft component (1) or gas turbine component (1), characterised in that the device has an optical measurement device (20) and an electronic evaluation means (14), and is configured to implement the method according to any one of claims 1 to 7,
wherein the device comprises a manipulation device (21), by which the measurement device (20) and the component (1) can be moved relative to one another, and
wherein the optical measurement device (20) comprises a distance sensor which allows an automatic online-adaptive and/or offline-adaptive path correction of the manipulation device (21) by a control device (10).
9. Device according to claim 8, characterised in that the manipulation device (21) comprises a robotic arm (15) and/or a rotary table (16).
10. Device according to any one of claims 8 and 9, characterised in that it comprises an automated high-bay store (13) for storing the component (1) and preferably also a workpiece carrier (9).
11. Device according to any one of claims 8 to 10, characterised in that it comprises a deflection mirror and/or an endoscope for the measurement device (20).
12. Device according to any one of claims 8 to 11, characterised in that the evaluation means (14) is configured to automatically evaluate the geometric information using predefined features and/or set contours and/or tolerances and/or damage patterns and/or learned rules and/or prior knowledge about the geometric information to be expected, and configured to use the evaluated geometric information for the detection and/or classification of damage.

Claims

1. Method for detecting cracks in an aircraft component (1) or in a gas turbine component (1), wherein the method is carried out using an optical measurement device (20) comprising a distance sensor and a white light interferometer having a beam splitter (4), wherein the method comprises at least the following steps:

- a) location of the optical measurement device at a defined distance from a surface of the component using the distance sensor;
- b) determination of geometric data of the component (1) using the white light interferometer;
- c) evaluation of the geometric data by an electronic evaluation means (14), cracks (2) and/or other damage being automatically detected and/or classified, and the position of the cracks (2) and/or of other damage being stored.

2. Method according to claim 1, characterised in that the determined geometric data is automatically compared with preferably mathematically predefined and stored features and/or set contours and/or tolerances and/or damage patterns.

3. Method according to claim 1 or claim 2, characterised in that the determined geometric data is also used for a measurement of the component (1).

4. Method according to any one of the preceding claims, characterised in that the aircraft component (1) or gas turbine component (1) is a combustion chamber component of an aircraft engine.

5. Method according to any one of the preceding claims, characterised in that the evaluated geometric data is used to establish the need for, and/or extent of, repairs of the component (1).

6. Method according to claim 5, characterised in that the evaluated geometric data is used for a subsequent, preferably automated repair and/or machining operation of the component (1).

7. Apparatus for detecting cracks in an aircraft component (1) or gas turbine component (1), wherein the apparatus comprises:

an optical measurement device (20) comprising:

a distance sensor arranged to detect a defined distance from a surface of the component to the optical measurement device; and

a white light interferometer having a beam splitter (4); and

an electronic evaluation means (14); wherein

the optical measurement device is configured to determine geometric data of the component (1) using the white light interferometer when at the defined distance from the surface of the component; and

the electronic evaluation means is configured to evaluate the geometric data, and automatically to detect and/or classify cracks (2) and/or other damage, and for the position of the cracks (2) and/or of other damage to be stored.

8. Apparatus according to claim 7, further comprising a manipulation device (21), by which the optical measurement device (20) and the component (1) can be moved relative to one another, and

wherein the distance sensor allows an automatic online-adaptive and/or offline-adaptive path correction of the manipulation device (21) by a control device (10).

9. Apparatus according to claim 8, wherein the manipulation device (21) comprises a robotic arm (15) and/or a rotary table (16).

10. Apparatus according to any one of claims 8 and 9, further comprising an automated high-bay store (13) for storing the component (1) and preferably also a workpiece carrier (9).

11. Apparatus according to any one of claims 7 to 10, further comprising a deflection mirror and/or an endoscope for the optical measurement device (20).

12. Apparatus according to any one of claims 7 to 11, wherein the evaluation means (14) is configured to automatically evaluate the geometric information using predefined features and/or set contours and/or tolerances and/or damage patterns and/or learned rules and/or prior knowledge about the geometric information to be expected, and configured to use the evaluated geometric information for the detection and/or classification of damage.