Claims

1. Method for repairing an aircraft and/or gas turbine component (31), characterised in that the method comprises the automated steps of:
   a) checking the component (31) for cracks using an optical measurement method based on white light interferometry, wherein gathered geometric and/or damage data are stored in a component-specific manner,
   b) generating an adaptive processing strategy on the basis of the gathered geometric and/or damage data in a data processing unit (1),
   c) machining the component (31),
   d) gathering the altered geometric data of the component (31),
   e) carrying out repair welding, characterised in that the repair welding is performed by a robot unit using a laser powder build-up welding method,
   f) checking the component (31) for cracks using an optical measurement method, wherein
   a database which is linked to the data processing unit contains predefined cases of damage and shapes which in process step b) are compared with the damage which is currently present in each case, and
   wherein, while checking the component (31) for cracks, current is individually regulated in each individual pixel.

2. Repair method according to claim 1, characterised in that milling paths and/or a milling strategy are automatically generated in step b) by the data processing unit (1).

3. Repair method according to any of the preceding claims, characterised in that the component (31) is automatically adjusted before step a) and/or f).

~~4. Repair method according to any of the preceding claims, characterised in that, while checking for cracks, current is individually regulated in each individual pixel.~~

5~~4~~. Repair method according to any of the preceding claims, characterised in that, in order to gather the geometric and/or damage data within the context of checking for cracks, the detected individual images are put together by transformation and registration processes to form a full image of the component (31).

~~6~~5. Repair method according to claim ~~5~~4, characterised in that, in order to analyse the total point cloud of the component (31), it is broken up into portions which are individually checked for damage, and structural features and damage being determined, and differentiated on the basis of model parameters.

~~7~~6. Repair method according to any one of claims 4 and 5 ~~and 6~~, characterised in that damage detected in portions which reaches to the edge of the portion is marked and is taken into account for analysing the adjacent portion.

~~8~~7. Repair method according to any of the preceding claims, characterised in that a data processing unit (1) automatically defines a repair strategy using the geometric and/or damage data gathered in step a) and predefined technological parameters, and produces a global repair program for the component (31).

~~9~~8. Repair method according to any of the preceding claims, characterised in that the automated repair welding is automatically scheduled by the data processing unit (1) on the basis of the altered geometric data of the component (31).

~~10~~9. Repair method according to any of the preceding claims, characterised in that the altered geometric data are gathered by automatically scanning the component (31).

~~11~~10. Repair method according to any of the preceding claims, characterised in that the method steps a) to f) are carried out multiple times in succession on the same component (31).

~~12~~11. Repair method according to any of the preceding claims, characterised in that the component (31) is a gas turbine component made of a superalloy.

~~13~~12. Device for repairing an aircraft or gas turbine component (31), characterised in that the device comprises at least one rotary table for receiving the component (31) and/or a workpiece carrier (32) and is set up to carry out the method according to any of claims 1 to ~~12~~11, the device being configured to perform an optical measurement method based on white light interferometry for checking the component (31) for cracks, and further configured to regulate individual current in each individual pixel

for checking the component (31) for cracks, wherein a robot unit is provided which is set up to perform a repair welding using a laser powder build-up welding method, wherein a database which is linked to a data processing unit contains predefined cases of damage and shapes which can be compared with the damage which is currently present in each case.

~~14~~13. Device according to claim ~~13~~12, characterised in that the device comprises an automated storage rack (21), one or more rotary tables and one or more robot units (52, 62, 72, 82).

Claims

1. Method for repairing an aircraft and/or gas turbine component (31), characterised in that the method comprises the automated steps of:
   a) checking the component (31) for cracks using an optical measurement method based on white light interferometry, wherein gathered geometric and/or damage data are stored in a component-specific manner,
   b) generating an adaptive processing strategy on the basis of the gathered geometric and/or damage data in a data processing unit (1),
   c) machining the component (31),
   d) gathering the altered geometric data of the component (31),
   e) carrying out repair welding, characterised in that the repair welding is performed by a robot unit using a laser powder build-up welding method,
   f) checking the component (31) for cracks using an optical measurement method, wherein
   a database which is linked to the data processing unit contains predefined cases of damage and shapes which in process step b) are compared with the damage which is currently present in each case, and
   wherein, while checking the component (31) for cracks, current is individually regulated in each individual pixel.

2. Repair method according to claim 1, characterised in that milling paths and/or a milling strategy are automatically generated in step b) by the data processing unit (1).

3. Repair method according to any of the preceding claims, characterised in that the component (31) is automatically adjusted before step a) and/or f).

4. Repair method according to any of the preceding claims, characterised in that, in order to gather the geometric and/or damage data within the context of checking for cracks, the detected individual images are put together by transformation and registration processes to form a full image of the component (31).

5. Repair method according to claim 4, characterised in that, in order to analyse the total point cloud of the component (31), it is broken up into portions which are

individually checked for damage, and structural features and damage being determined, and differentiated on the basis of model parameters.

6. Repair method according to any one of claims 4 and 5, characterised in that damage detected in portions which reaches to the edge of the portion is marked and is taken into account for analysing the adjacent portion.

7. Repair method according to any of the preceding claims, characterised in that a data processing unit (1) automatically defines a repair strategy using the geometric and/or damage data gathered in step a) and predefined technological parameters, and produces a global repair program for the component (31).

8. Repair method according to any of the preceding claims, characterised in that the automated repair welding is automatically scheduled by the data processing unit (1) on the basis of the altered geometric data of the component (31).

9. Repair method according to any of the preceding claims, characterised in that the altered geometric data are gathered by automatically scanning the component (31).

10. Repair method according to any of the preceding claims, characterised in that the method steps a) to f) are carried out multiple times in succession on the same component (31).

11. Repair method according to any of the preceding claims, characterised in that the component (31) is a gas turbine component made of a superalloy.

12. Device for repairing an aircraft or gas turbine component (31), characterised in that the device comprises at least one rotary table for receiving the component (31) and/or a workpiece carrier (32) and is set up to carry out the method according to any of claims 1 to 11, the device being configured to perform an optical measurement method based on white light interferometry for checking the component (31) for cracks, and further configured to regulate individual current in each individual pixel for checking the component (31) for cracks, wherein a robot unit is provided which is set up to perform a repair welding using a laser powder build-up welding method, wherein a database which is linked to a data processing unit contains predefined

cases of damage and shapes which can be compared with the damage which is currently present in each case.

13. Device according to claim 12, characterised in that the device comprises an automated storage rack (21), one or more rotary tables and one or more robot units (52, 62, 72, 82).