CLAIMS

1 A method for de-bonding a workpiece (8) from an adhesive fastening element, the adhesive fastening element comprising:

a first member (4) ; and

a second member (6) adjacent the first member and movable relative to the first member along a longitudinal axis of the adhesive fastening element; wherein a bond is formed by an adhesive (10) between the workpiece and the first and second members of the adhesive fastening element;

the method characterised in that it comprises:

moving the first and second members relative to one another such that the second member moves away from the workpiece (8) so as to break the bond between the second member and the workpiece; and
moving the first and second members relative to one another such that the second member moves towards the workpiece and applies a force to the workpiece so as to break the bond between the first member and the workpiece, and to de-bond the workpiece from the adhesive fastening element.

2 A method as claimed in claim 1, wherein the first and/or second members are threaded such that moving the first (4) and second members (6) relative to one another comprises rotating the first and/or second members.

3 A method as claimed in claim 2, wherein the first and second members are threadably coupled to one another such that moving the first and second members relative to one another comprises rotating the first and second members relative to one another.

4 A method as claimed in claim 1, wherein moving the first and second members relative to one another comprises translating the first and second members relative to one another.

5 A method as claimed in claim 4, wherein the translation of the first and second members is hydraulically or pneumatically actuated.

6 A method as claimed in any preceding claim, wherein the second member is moved toward and away from the workpiece.

7 A method as claimed in any preceding claim, further comprising, prior to de-bonding, checking the integrity of the bond by applying a predetermined force between the second member and the workpiece.

8. A method as claimed in claim 7, wherein the predetermined force is greater than the minimum required holding force and less than the fully cured failure strength of the bond.

9 A method as claimed in any preceding claim, wherein the second member is disposed inside the first member.

10 A method as claimed in claim 9, wherein the second member is set back from the first member so as to define a recess which receives a portion of the workpiece; and wherein, after breaking the bond between the first member and the workpiece, the second member is advanced to remove residual adhesive from an inner surface of the recess.

11 A method as claimed in any preceding claim, wherein the adhesive fastening element comprises a plurality of first elements and/or a plurality of second elements.

The invention claimed is:

1. A method for de-bonding a workpiece from an adhesive fastening element, the adhesive fastening element comprising:

a first member; and

a second member adjacent the first member and movable relative to the first member along a longitudinal axis of the adhesive fastening element; wherein a bond is formed by an adhesive between the workpiece and the first and second members of the adhesive fastening element;

the method comprising:

moving the first and second members relative to one another such that the second member moves away from the workpiece so as to break the bond between the second member and the workpiece; and moving the first and second members relative to one another such that the second member moves towards the workpiece and applies a force to the workpiece so as to break the bond between the first member and the workpiece, and to de-bond the workpiece from the adhesive fastening element.

2. A method as claimed in claim 1, wherein the first and/or second members are threaded such that moving the first and second members relative to one another comprises rotating the first and/or second members.

3. A method as claimed in claim 2, wherein the first and second members are threadably coupled to one another such that moving the first and second members relative to one another comprises rotating the first and second members relative to one another.

4. A method as claimed in claim 1, wherein moving the first and second members relative to one another comprises translating the first and second members relative to one another.

5. A method as claimed in claim 4, wherein the translation of the first and second members is hydraulically or pneumatically actuated.

6. A method as claimed in claim 1, wherein the second member is moved toward and away from the workpiece.

7. A method as claimed in claim 1, further comprising, prior to de-bonding, checking the integrity of the bond by applying a predetermined force between the second member and the workpiece.

8. A method as claimed in claim 7, wherein the predetermined force is greater than the minimum required holding force and less than the fully cured failure strength of the bond.

9. A method as claimed in claim 1, wherein the second member is disposed inside the first member.

10. A method as claimed in claim 9, wherein the second member is set back from the first member so as to define a recess which receives a portion of the workpiece; and wherein, after breaking the bond between the first member and the workpiece, the second member is advanced to remove residual adhesive from an inner surface of the recess.

11. A method as claimed in claim 1, wherein the adhesive fastening element comprises a plurality of first elements and/or a plurality of second elements.

12. A method for de-bonding a workpiece from an adhesive fastening element, the adhesive fastening element comprising:

a first member; and

a second member adjacent the first member and movable relative to the first member along a longitudinal axis of the adhesive fastening element; wherein a bond is formed by an adhesive between the workpiece and the first and second members of the adhesive fastening element;

the method comprising:

moving the first and second members relative to one another such that the second member moves away from the workpiece so as to break the bond between the second member and the workpiece; and hydraulically or pneumatically moving the first and second members relative to one another such that the second member moves towards the workpiece and applies a force to the workpiece so as to break the bond between the first member and the workpiece, and to de-bond the workpiece from the adhesive fastening element and prior to de-bonding, checking the integrity of the bond by applying a predetermined force between the second member and the workpiece.

13. A method as claimed in claim 12, wherein the predetermined force is greater than the minimum required holding force and less than the fully cured failure strength of the bond.

14. A method as claimed in claim 12, wherein the second member is set back from the first member so as to define a recess which receives a portion of the workpiece; and wherein, after breaking the bond between the first member and the workpiece, the second member is advanced to remove residual adhesive from an inner surface of the recess.