CLAIMS

1. A blasting system comprising: a blast projection module, an image acquisition module, and a blasting control module,

wherein the blast projection module includes at least one blasting gun configured to perform blasting operation on a work surface, and is configured to be removably mounted to a movable platform, wherein the movable platform is configured to dispose the blast projection module at a specified position in relation to the work surface;

wherein the blast projection module further includes a guide frame and a blasting gun holder, wherein the at least one blasting gun is fixedly mounted to the blasting gun holder and the blasting gun holder is configured to be movably mounted to the guide frame to move along a rail provided by the guide frame;

wherein the guide frame includes a XY table to which the blasting gun holder is movably mounted, and the blasting gun holder is configured to move along a vertical rail and/or a horizontal rail provided by the XY table.

the image acquisition module is configured to acquire an image of the work surface; and

the blasting control module, which is communicably coupled to the blast projection module and the image acquisition module, is configured to remotely control the at least one blasting gun to perform blasting operation on the work surface based on the image acquired by the image acquisition module.

2. The system according to claim 1, further comprising:

an adaptor configured to be used to mount the blast projection module to the movable platform.

3. The system according to claim 1 or claim 2, wherein the blasting control module is further configured to control movement of the movable platform to dispose the blast projection module at the specified position.

4. The system according to any one of claims 1 to 3, wherein the blast projection module further includes an isolating sheet disposed between the guide frame and the work surface to prevent grit from rebounding back to the guide frame.

5. The system according to any preceding claim, wherein the blast projection module further includes an enclosure which is configured to form at least partially enclosed space for the blasting system to prevent or reduce grit and dust, which are generated during the blasting process, from scattering into the ambient environment.

6. The system according to claim 5, wherein the enclosure includes at least two parts removably coupled to each other.

7. The system according to claim 5 or claim 6, wherein the blast projection module further includes a grit collection passage coupled to the enclosure to collect grit and dust generated during the blasting process.

8. The system according to any one of claims 5 to claim 7, further comprising a positioning device configured to detect position of the blast projection module, and the blasting control module is further configured to control movement of the movable platform based on the detected position of the blast projection module.

9. The system according to claim 8, wherein the positioning device includes at least one sensor, and/or at least one laser pointer disposed on the enclosure.

10. The system according to any one of claims 5 to 9, wherein the image acquisition module includes a digital camera which is disposed on an internal surface of the enclosure.

11. The system according to any preceding claim, wherein the blasting control module is further configured to

receive the image of the work surface, which is acquired by the image acquisition module;

use a colour thresholding method to distinguish rusted area from clean area in the image of the work surface;

ascertain a movement path for the at least one blasting gun based on a working mode selected for the blast projection module according to the distinguished rusted area; and control movement of the at least one blasting gun based on the ascertained movement path.

12. The system according to claim 11, wherein the blasting control module is further configured to if a spot repair working mode is selected,

split the image of the work surface into a plurality of cells;

label each cell with a predetermined value according to rust condition therein; and

ascertain a movement path for the at least blasting gun by Travelling Salesman Problem (TSP) path planning.

13. The system according to claim 11, wherein the blasting control module is further configured to if a full blasting working mode is selected,

identify an area to be blasted by scanning the image of the work surface;

calculate dimensions of the identified area; and

ascertain a movement path for the at least one blasting gun by a zigzag path planning.

14. The system according to any preceding claim, wherein the blasting control system is further configured to conduct a calibration test to determine a movement speed and a projection width of the blasting gun before putting the blasting system in use.

15. A blasting method, comprising:

moving a movable platform to which a blast projection module is mounted, to dispose the blast projection module at a specified position in relation to a work surface;

acquiring, by an image acquisition module, an image of the work surface; and

remotely controlling, by a blasting control module, movement of the at least one blasting gun to perform the blasting process based on the image acquired by the image acquisition module，and movement of a blasting gun holder, to which the at least one blasting gun is fixedly mounted, along a rail provided by a guide frame；wherein the guide frame includes a XY table,

the step of controlling movement of the blasting gun holder further comprises: controlling, by the blasting control module, movement of the blasting gun holder along a vertical rail and/or a horizontal rail provided by the XY table.

16. The method according to claim 15, further comprising: mounting the blast projection module to the movable platform.

17. The method according to claim 15 or claim 16, wherein the step of moving the movable platform comprises:

controlling, by the blasting control module, movement of the movable platform to dispose the movable platform at the specified position.

18. The method according to any one of claim 15 to claim 17, wherein the blast projection module further includes an enclosure and a grit collection passage coupled to the enclosure,

wherein the method further comprises: collecting grit and dust, which are generated during the blasting process, using a grit collection passage which is coupled to the enclosure.

19. The method according to any one of claim 15 to claim 18, further comprising: detecting a position of the blast projection module using a positioning device, and controlling the movement of the movable platform based on the detected position of the blast projection module.

20. The method according to any one of claim 15 to claim 19, wherein the step of remotely controlling movement of the at least one blasting gun further comprises:

receiving, by the blasting control module, an image of the work surface to be processed, which is acquired by the image acquisition module;

using, by the blasting control module, a colour thresholding method to distinguish rusted area from clean area in the image of the work surface;

ascertaining, by the blasting control module, a movement path for the at least one blasting gun based on a working mode selected for the blast projection module according to the distinguished rusted area; and

controlling, by the blasting control module, movement of the at least one blasting gun based on the ascertained movement path.

21. The method according to claim 20,

wherein if a spot repair working mode is selected, the step of ascertaining a movement path for the at least one blasting gun comprises:

splitting, by the blasting control module, the image of the work surface into a plurality of cells;

labelling, by the blasting control module, each cell with a predetermined value according to rust condition therein; and

ascertaining, by the blasting control module, a movement path for the at least blasting gun by Travelling Salesman Problem (TSP) path planning.

22. The method according to claim 20, wherein if a full blasting working mode is selected, the step of ascertaining a movement path for the at least one blasting gun based on the selected working mode comprises:

identifying, by the blasting control module, an area to be blasted by scanning the image of the work surface;

calculating, by the blasting control module, dimensions of the identified area; and

ascertaining, by the blasting control module, a movement path for the at least one blasting gun by a zigzag path planning.

23. The method according to any one of claim 15 to claim 22, further comprising:

determining, by the blasting control module, projection width and movement speed of the at least one blasting gun by a calibration test.