DESCRIPTION

TITLE OF INVENTION: FLANGE FASTENING MANAGING METHOD, FASTENING MANAGING SYSTEM, FASTENING MANAGING PROGRAM, AND FASTENING MANAGING DEVICE

TECHNICAL FIELD

[0001]

The present invention relates to fastening managing technology of a flange for coupling piping, a valve, a pump, etc.

BACKGROUND ART

[0002]

A flange joint is used for coupling of piping and connection of a pump, etc. to the piping. A gasket is interposed between flanges of the flange joint, and the flanges are fastened by bolts and nuts arranged at a plurality of points. For this fastening, a manual tool such as a torque wrench is used, but instead an electrically-powered screw fastening tool may be used.

[0003]

It has been known in relation to this screw fastening tool that an electrically-powered motor is used as a rotary drive source, that a current pulse is intermittently applied to the motor, that a current value is controlled in accordance with a detected torque, and that the current pulse is stopped when the detected torque reaches a target torque (e.g. Patent Literature 1).

CITATION LIST

PATENT LITERATURE

[0004]

Patent Literature 1: JP2002-1676A

SUMMARY

[0004a] According to an aspect, the present disclosure refers to a flange fastening managing method in which a computer as well as a fastening tool are used, the fastening tool fastening flanges with a gasket by a plurality of bolts and nuts, the gasket being sandwiched between the flanges, the method comprising the steps

of: acquiring fastening condition information associated with the flanges; acquiring gasket part number information and fastening condition number information from a flange tag attached to the flanges, the gasket part number information and the fastening condition number information conforming to the flanges; collating the gasket part number information acquired from the flange tag with gasket part number information of a gasket to be used, to determine whether the gasket fits the flanges; selecting a fastening condition number based on the fastening condition number information acquired from the flange tag when the gasket selected fits the flanges, selecting a fastening condition associated with the fastening condition number from the fastening condition information, setting the fastening condition in the fastening tool, and applying a fastening torque from the fastening tool to the bolts or the nuts under the fastening condition; acquiring, from the fastening tool, the fastening torque applied from the fastening tool to the bolts or the nuts, to evaluate whether fastening of the flanges conforms to the fastening condition; and stopping a drive of the fastening tool when the fastening of the flanges does not conform to the fastening condition.

[0004b] According to another aspect, the present disclosure refers to a flange fastening managing system comprising: a fastening tool that fastens a plurality of bolts and nuts attached to flanges, a gasket being sandwiched between the flanges; a controller that controls a fastening action of the fastening tool; and a server that is connected to the controller by wire or wireless, wherein the controller acquires, from the server, fastening condition information associated with the flanges, the controller acquires, from a flange tag attached to the flanges, flange information containing gasket part number information and fastening condition number information, the gasket part number information and the fastening condition number information conforming to the flanges and acquires gasket part number information from the gasket or from a gasket tag attached to a gasket case, the controller collates

the gasket part number information acquired from the flange tag with the gasket part number information acquired from the gasket or the gasket tag, to determine whether the gasket fits the flanges, the controller selects a fastening condition number based on the fastening condition number information acquired from the flange tag when the gasket fits the flanges, selects a fastening condition associated with the fastening condition number from the fastening condition information, and sets the selected fastening condition in the fastening tool, the controller acquires, from the fastening tool, a fastening torque applied from the fastening tool to the nuts, to evaluate whether fastening of the flanges conforms to the fastening condition, the controller provides, to the server, fastening result information containing at least the fastening condition and a result of the evaluation in association with the flanges, and the controller stops a drive of the fastening tool when the fastening of the flanges does not conform to the fastening condition.

[0004c] According to another aspect, the present disclosure refers to a flange fastening managing program for making a computer implement functions, the computer being used for control of a fastening tool that fastens flanges with a gasket by a plurality of bolts and nuts, the gasket being sandwiched between the flanges, the functions being: acquiring fastening condition information associated with the flanges; acquiring, from a flange tag attached to the flanges, flange information containing gasket part number information and fastening condition number information, the gasket part number information and the fastening condition number information conforming to the flanges; acquiring gasket part number information from a gasket or a gasket tag; collating the gasket part number information acquired from the flange tag with the gasket part number information acquired from the gasket or the gasket tag, to determine whether the gasket fits the flanges; selecting a fastening condition number based on the fastening condition number information acquired from the flange tag when the gasket fits the

flanges, selecting a fastening condition associated with the fastening condition number from the fastening condition information, and setting the selected fastening condition in the fastening tool; acquiring, from the fastening tool, a fastening torque applied from the fastening tool to the nuts, to evaluate whether fastening of the flanges conforms to the fastening condition; presenting fastening result information containing at least the fastening condition and a result of the evaluation in association with the flanges; and stopping a drive of the fastening tool when the fastening of the flanges does not conform to the fastening condition.

[0004d] According to another aspect, the present disclosure refers to a flange fastening managing device to be used with a fastening tool that fastens flanges with a gasket by a plurality of bolts and nuts, the gasket being sandwiched between the flanges, the device comprising: an information acquiring unit that acquires fastening condition information associated with the flanges, that acquires, from a flange tag attached to the flanges, flange information containing gasket part number information and fastening condition number information, the gasket part number information and the fastening condition number information conforming to the flanges, that acquires gasket part number information from a gasket or from a gasket tag attached to a gasket case, and that acquires, from the fastening tool, a fastening torque applied from the fastening tool to the nuts; a processing unit that collates the gasket part number information acquired from the flange tag with the gasket part number information acquired from the gasket or the gasket tag, to determine whether the gasket fits the flanges, that, when the gasket fits the flanges, selects a fastening condition number based on the fastening condition number information acquired from the flange tag, that selects a fastening condition associated with the fastening condition number from the fastening condition information , and that sets the fastening condition in the fastening tool, to evaluate whether fastening of the flanges conforms to the

fastening condition; and an information presenting unit that presents fastening result information containing at least the fastening condition and a result of the evaluation in association with the flanges, wherein the processing unit stops a drive of the fastening tool when the fastening of the flanges does not conform to the fastening condition.

TECHNICAL PROBLEM

[0005]

Use of such a fastening tool enables uniform and even fastening in spite of different workers, advantageously increasing the work efficiency.

[0006]

CLAIMS

1. A flange fastening managing method in which a computer as well as a fastening tool are used, the fastening tool fastening flanges with a gasket by a plurality of bolts and nuts, the gasket being sandwiched between the flanges, the method comprising the steps of:

acquiring fastening condition information associated with the flanges;

acquiring gasket part number information and fastening condition number information from a flange tag attached to the flanges, the gasket part number information and the fastening condition number information conforming to the flanges;

collating the gasket part number information acquired from the flange tag with gasket part number information of a gasket to be used, to determine whether the gasket fits the flanges;

selecting a fastening condition number based on the fastening condition number information acquired from the flange tag when the gasket selected fits the flanges, selecting a fastening condition associated with the fastening condition number from the fastening condition information, setting the fastening condition in the fastening tool, and applying a fastening torque from the fastening tool to the bolts or the nuts under the fastening condition;

acquiring, from the fastening tool, the fastening torque applied from the fastening tool to the bolts or the nuts, to evaluate whether fastening of the flanges conforms to the fastening condition; and

stopping a drive of the fastening tool when the fastening of the flanges does not conform to the fastening condition.

2. The flange fastening managing method of claim 1,

further comprising the steps of:

presenting fastening result information containing at least the fastening condition and a result of the evaluation in association with the flanges.

3. A flange fastening managing method in which a computer as well as a fastening tool are used, the fastening tool fastening flanges with a gasket by a plurality of bolts and nuts, the gasket being sandwiched between the flanges, the method comprising the steps of:

acquiring fastening condition information associated with the flanges;

acquiring, from a flange tag attached to the flanges, flange information containing gasket part number information and fastening condition number information, the gasket part number information and the fastening condition number information conforming to the flanges;

acquiring gasket part number information from a gasket or from a gasket tag attached to a gasket case;

collating the gasket part number information acquired from the flange tag with the gasket part number information acquired from the gasket or the gasket tag, to determine whether the gasket fits the flanges;

selecting a fastening condition number based on the fastening condition number information acquired from the flange tag when the gasket fits the flanges, selecting a fastening condition associated with the fastening condition number from the fastening condition information, and setting the fastening condition in the fastening tool;

acquiring, from the fastening tool, a fastening torque applied from the fastening tool to the nuts, to evaluate whether fastening of the flanges conforms to the fastening

condition;

presenting fastening result information containing at least the fastening condition and a result of the evaluation in association with the flanges; and

stopping a drive of the fastening tool when the fastening of the flanges does not conform to the fastening condition.

4. The flange fastening managing method of claim 1 or 3, further comprising the step of:

outputting presentation information indicative of whether the gasket fits the flanges.

5. The flange fastening managing method of claim 1, 3 or 4, wherein

the evaluation whether the fastening of the flanges conforms to the fastening condition makes during fastening of the flanges.

6. The flange fastening managing method of any one of claims 3 to 5, further comprising the steps of:

acquiring worker information from a worker tag; and

presenting the flange information, the fastening condition, and the result of the evaluation in association with the worker information.

7. The flange fastening managing method of any one of claims 3 to 6, wherein

the fastening condition number information is information indicative of a fastening procedure.

8. The flange fastening managing method of any one of claims 3 to 7, wherein

the fastening condition information contains the flange information.

9. The flange fastening managing method of any one of claims 3 to 8, further comprising the steps of:

forming a gasket from a gasket material; and

attaching the gasket tag to the gasket case for the gasket.

10. A flange fastening managing system comprising:

a fastening tool that fastens a plurality of bolts and nuts attached to flanges, a gasket being sandwiched between the flanges;

a controller that controls a fastening action of the fastening tool; and

a server that is connected to the controller by wire or wireless, wherein

the controller acquires, from the server, fastening condition information associated with the flanges,

the controller acquires, from a flange tag attached to the flanges, flange information containing gasket part number information and fastening condition number information, the gasket part number information and the fastening condition number information conforming to the flanges and acquires gasket part number information from the gasket or from a gasket tag attached to a gasket case,

the controller collates the gasket part number information acquired from the flange tag with the gasket part number information acquired from the gasket or the gasket tag, to determine whether the gasket fits the flanges,

the controller selects a fastening condition number based on the fastening condition number information acquired from the flange tag when the gasket fits the flanges, selects a

fastening condition associated with the fastening condition number from the fastening condition information, and sets the selected fastening condition in the fastening tool,

the controller acquires, from the fastening tool, a fastening torque applied from the fastening tool to the nuts, to evaluate whether fastening of the flanges conforms to the fastening condition,

the controller provides, to the server, fastening result information containing at least the fastening condition and a result of the evaluation in association with the flanges, and

the controller stops a drive of the fastening tool when the fastening of the flanges does not conform to the fastening condition.

11. A flange fastening managing program for making a computer implement functions, the computer being used for control of a fastening tool that fastens flanges with a gasket by a plurality of bolts and nuts, the gasket being sandwiched between the flanges, the functions being:

acquiring fastening condition information associated with the flanges;

acquiring, from a flange tag attached to the flanges, flange information containing gasket part number information and fastening condition number information, the gasket part number information and the fastening condition number information conforming to the flanges;

acquiring gasket part number information from a gasket or a gasket tag;

collating the gasket part number information acquired from the flange tag with the gasket part number information acquired from the gasket or the gasket tag, to determine whether the gasket fits the flanges;

selecting a fastening condition number based on the fastening condition number information acquired from the flange tag when the gasket fits the flanges, selecting a fastening condition associated with the fastening condition number from the fastening condition information, and setting the selected fastening condition in the fastening tool;

acquiring, from the fastening tool, a fastening torque applied from the fastening tool to the nuts, to evaluate whether fastening of the flanges conforms to the fastening condition;

presenting fastening result information containing at least the fastening condition and a result of the evaluation in association with the flanges; and

stopping a drive of the fastening tool when the fastening of the flanges does not conform to the fastening condition.

12. A flange fastening managing device to be used with a fastening tool that fastens flanges with a gasket by a plurality of bolts and nuts, the gasket being sandwiched between the flanges, the device comprising:

an information acquiring unit that acquires fastening condition information associated with the flanges, that acquires, from a flange tag attached to the flanges, flange information containing gasket part number information and fastening condition number information, the gasket part number information and the fastening condition number information conforming to the flanges, that acquires gasket part number information from a gasket or from a gasket tag attached to a gasket case, and that acquires, from the fastening tool, a fastening torque applied from the fastening tool to the nuts;

a processing unit that collates the gasket part number information acquired from the flange tag with the gasket part

number information acquired from the gasket or the gasket tag, to determine whether the gasket fits the flanges, that, when the gasket fits the flanges, selects a fastening condition number based on the fastening condition number information acquired from the flange tag, that selects a fastening condition associated with the fastening condition number from the fastening condition information , and that sets the fastening condition in the fastening tool, to evaluate whether fastening of the flanges conforms to the fastening condition; and

an information presenting unit that presents fastening result information containing at least the fastening condition and a result of the evaluation in association with the flanges, wherein

the processing unit stops a drive of the fastening tool when the fastening of the flanges does not conform to the fastening condition.