

DESCRIPTION

TITLE OF THE INVENTION: PIPEWORK WORKABILITY EVALUATION AND TESTING DEVICE

TECHNICAL FIELD

[0001] The present invention relates to a pipework workability evaluation and testing device. More specifically, the present invention relates to a device for evaluating and testing pipework workability, which can be suitably used in evaluating and testing, for example, tightening workability of a gasket and the like at a joint part of pipes which are used in a petrochemical plant, a factory and the like.

BACKGROUND ART

[0002] Plural pipes have been sometimes complexly arranged in a worksite of a petrochemical plant, a factory and the like. When a piping joint is tightened in the above worksite, tightening is sometimes obstructed by other pipe, or it becomes difficult for a worker to carry out tightening of the piping joint. In addition, there is a possibility that leakage of ingredients included in a pipe occurs from a portion of a piping joint due to lack of a tightening force.

[0003] In the above worksite, workability can be somewhat improved by using a design drawing of the worksite or the like. However, it is not easy to appropriately evaluate whether or not workability of a worker is sufficiently ensured only by using the design drawing. When working is not actually carried out in a worksite which is closely simulated to an actual work site, it cannot be appropriately evaluated whether or not workability is appropriately ensured.

[0004] As a device for evaluating and testing damage such as cracks generated in a wall of a hole for cooling with water, which is formed in a metal mold under a condition similar to actual operating, conventionally there has been proposed an evaluation and testing device composed of a test body in which a stress-concentrated portion is formed in a hole for cooling with water, a unit for supplying cooling water of which temperature is controlled to the hole for cooling with water, and a heating unit for heating the test body from outside (see, for example, Patent Literature 1).

[0005] However, so far as the applicant has investigated, there has not yet been found out a prior art document which discloses a device for evaluating and testing a pipework workability and the like, which can be used when tightening workability of a gasket and the like is evaluated and tested at a joint part of pipes.

PRIOR ART LITERATURES

PATENT LITERATURES

[0006] Patent Literature 1: Japanese Patent Unexamined Publication No. 2007-298467

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0007] The present invention has been made in view of the above-mentioned prior art. An object of the present invention is to provide a device for evaluating and testing pipework workability, which enables to evaluate and test tightening workability of a gasket and the like at a joint part of pipes which are used in a petrochemical plant, a factory and the like under a condition similar to an actual piping work site.

MEANS FOR SOLVING THE PROBLEMS

[0008] The present invention relates to a device for evaluating and testing pipework workability for use in evaluating and testing pipework workability, characterized in that the device has a pipe for evaluation, and a pipe for obstruction capable of moving toward a vertical direction, which is provided in the direction perpendicular to the pipe for evaluation in the vicinity of the pipe for evaluation. Since the device for evaluating and testing pipework workability of the present invention has the above-mentioned constitution, tightening workability of a gasket and the like can be evaluated and tested at a joint part of pipes under a condition similar to an actual piping work site.

[0009] In the device for evaluating and testing pipework workability of the present invention, when the pipe for evaluation includes a joint part of pipes, there can be evaluated or tested, for example, whether or not performance of tightening of a joint will be difficult for a worker due to the pipe for obstruction at the time of tightening of the joint, or whether or not there is a possibility to generate leakage of contents in a pipe from the joint part of pipes due to lack of a tightening force at the joint part.

[0010] In the device for evaluating and testing pipework workability of the present invention, when a parallel pipe for obstruction is provided so as to be parallel to the pipe for evaluation, tightening workability of a gasket and the like can be evaluated and tested at a joint part of pipes under a condition more similar to an actual piping work site.

[0011] In the device for evaluating and testing pipework workability of the present invention, when a passageway is provided in the vicinity of the place for evaluating the pipe for evaluation, tightening workability of a gasket and the like

can be evaluated and tested at a joint part of pipes under a condition still more similar to an actual piping work site.

[0012] In the device for evaluating and testing pipework workability of the present invention, when a rail for moving is provided so as to be parallel to the pipe for evaluation, and a passageway is placed on the rail for moving, tightening workability of a gasket and the like can be evaluated and tested at a joint part of pipes under a condition even more similar to an actual piping work site.

[0013] In the device for evaluating and testing pipework workability of the present invention, when the pipe for evaluation and the pipe for obstruction are provided on a suspension stand, the suspension stand is connected with one end of a rotating shaft through a connecting member, and a handle for rotating the rotating shaft is provided at the other end of the rotating shaft, since the suspension stand can be inclined by rotating the handle, the pipe for evaluation and the pipe for obstruction can be easily parallelized so as to be different in height from the ground from each other. Therefore, tightening workability of a gasket and the like can be evaluated and tested at a joint part of pipes under a condition even more similar to an actual piping work site.

EFFECTS OF THE PRESENT INVENTION

[0014] When the device for evaluating and testing pipework workability of the present invention is used, there can be exhibited excellent effects such that tightening workability of a gasket and the like can be evaluated and tested at a joint part of pipes under a condition similar to an actual piping work site.

BRIEF DESCRIPTION OF DRAWINGS

[0015] Fig. 1 is a schematic front view showing one embodiment of the device for evaluating and testing pipework workability of the present invention.

Fig. 2 is a schematic plan view showing one embodiment of the device for evaluating and testing pipework workability of the present invention.

Fig. 3 is a schematic front view showing another embodiment of the device for evaluating and testing pipework workability of the present invention.

MODE FOR CARRYING OUT THE INVENTION

[0016] As described above, the device for evaluating and testing pipework workability of the present invention is a device for use in evaluating and testing pipework workability, characterized in that the device includes a pipe for evaluation, and a pipe for obstruction capable of moving toward a vertical direction, which is provided in the direction perpendicular to the pipe for evaluation in the vicinity of the pipe for evaluation.

[0017] Incidentally, in this description, the term “pipework workability” incorporates both meanings of whether or not pipework can be efficiently performed, and whether or not pipework can be accurately performed.

[0018] The device for evaluating and testing pipework workability of the present invention will be described hereinbelow with reference to the accompanying drawings. However, the present invention should not be construed as being limited only to the embodiments described in those drawings.

[0019] Fig. 1 is a schematic front view showing one embodiment of the device for evaluating and testing pipework workability of the present invention. Fig. 2 is a schematic plan view showing one embodiment of the device for evaluating and testing pipework workability of the present invention.

[0020] As shown in Fig. 2, the device for evaluating and testing pipework

workability has a pipe 1 for evaluation, and pipes 2a, 2b for obstruction capable of moving toward a vertical direction, which are provided in the direction perpendicular to the pipe for evaluation in the vicinity of the pipe 1 for evaluation. The pipe 1 for evaluation means a pipe which is actually used in pipework at a work site or a pipe which is the same kind as the pipe. Also, the pipes 2a, 2b for obstruction mean pipes which are actually used in pipework at a work site or pipes which are the same kind as the pipes.

[0021] Fig. 1 and Fig. 2 show an embodiment of the device for evaluating and testing pipework workability, in which two pipes 2a, 2b for obstruction are provided. It is appropriate that the number of the pipes 2a, 2b for obstruction is adjusted in accordance with an actual work site. Therefore, the number of the pipes 2a, 2b for obstruction is not always necessarily controlled to 2. The number of the pipes 2a, 2b for obstruction can be a number of pipes which obstruct pipework when the pipework is performed at an actual work site, for example, one to five. The pipes 2a, 2b for obstruction are provided in the direction perpendicular to the pipe 1 for evaluation in the vicinity of the pipe 1 for evaluation. The above term "in the vicinity of the pipe 1 for evaluation" means that there is a distance between a pipe which obstructs pipework at an actual work site and a pipe which is actually used for pipework. The positional relationship such as a distance between the pipe 1 for evaluation and the pipes 2a, 2b for obstruction, and each diameter of the pipe 1 for evaluation and the pipes 2a, 2b for obstruction can be arbitrary, and preferably adjusted in accordance with a pipe which is actually used at a work site, a pipe which causes obstruction, and the like.

[0022] The pipes 2a, 2b for obstruction are attached to units 3a, 3b for moving up and down, respectively. The units 3a, 3b for moving up and down are arranged

in a vertical direction so that the pipe 2a, 2b for obstruction can be moved toward a vertical direction. Each length of the units 3a, 3b for moving up and down is arbitrary. It is preferred that each length of the units 3a, 3b is appropriately determined in consideration of a position where the pipes 2a, 2b for obstruction are actually arranged in a work site. The pipes 2a, 2b for obstruction can be equipped with, for example, fitting portions (not shown in the figure) at both end portions of the pipes 2a, 2b for obstruction, and the pipes 2a, 2b for obstruction can be provided at the units 3a, 3b for moving up and down through the fitting portions. The positions where the pipes 2a, 2b for obstruction are fitted to the units 3a, 3b for moving up and down are arbitrary. It is preferred that the above positions are appropriately adjusted in accordance with an actual work site. Each upper end of the units 3a, 3b for moving up and down can be opened, or can be equipped with a stopper for preventing the pipes 2a, 2b for obstruction from releasing. In addition, it is preferred that the lower ends of the units 3a, 3b for moving up and down are moveably provided on guide rails 4a, 4b which are provided so as to be parallel to the pipe 1 for evaluation as shown in Fig. 2 by providing, for example, a wheel or a caster (not shown in the figure) at the units 3a, 3b so that the units 3a, 3b are moveable in a direction parallel to the pipe 1 for evaluation, in order to adjust each distance between the pipe 1 for evaluation and the pipes 2a, 2b for obstruction.

[0023] It is preferred that the pipe 1 for evaluation is the same as a pipe which is actually used at a work site from the viewpoint of accurate evaluation and testing of tightening workability of a gasket and the like at a joint part of pipes which are actually used. When the targeting property for evaluating and testing pipework workability is tightening workability of a gasket and the like at a joint part of pipes, the pipe 1 for evaluation can be equipped with, for example, a joint part 5 or

the like. When a gasket is used as the joint part 5 of the pipe 1 for evaluation, it can be evaluated or tested, for example, whether or not the gasket can be easily fitted to the joint part 5, or whether or not work can be performed so that an appropriate tightening force is applied to the gasket at the joint part 5.

Incidentally, when an appropriate tightening force is not applied to the gasket, leakage of contents of the pipe 1 for evaluation is to be generated at the joint part 5 of the pipe 1 for evaluation. Whether or not generation of leakage of the contents of the pipe 1 for evaluation can be confirmed, for example, by closing the pipe 1 for evaluation, increasing an internal pressure of the pipe 1, and confirming whether or not leakage of the contents of the pipe 1 for evaluation is generated at the joint part 5 of the pipe 1 for evaluation, or by confirming whether or not lowering of an internal pressure of the pipe 1 for evaluation is generated by means of a pressure gauge.

[0024] In addition, the device for evaluating and testing pipework workability of the present invention can be equipped with a parallel pipe 6 for obstruction in a direction parallel to the pipe 1 for evaluation. When the device for evaluating and testing pipework workability of the present invention is equipped with the parallel pipe 6 for obstruction in a direction parallel to the pipe 1 for evaluation, as described above, tightening workability of a gasket and the like can be evaluated and tested at the joint part 5 of a pipe under a condition more similar to an actual piping work site. In the embodiment of the device for evaluating and testing pipework workability shown in Fig. 2, the number of the parallel pipe 6 for obstruction is four. However, it is appropriate that the number of the parallel pipe 6 for obstruction is adjusted in accordance with an actual work site.

Therefore, the number is not always necessarily four, and can be, for example, one to five. In addition, a positional relationship such as a distance between the pipe

1 for evaluation and the parallel pipe 6 for obstruction, and a diameter of the parallel pipe 6 for obstruction can be arbitrary, and preferably adjusted in accordance with an actual work site. Therefore, it is preferred that the parallel pipe 6 for obstruction is moveably provided at an arbitrary position of the device for evaluating and testing pipework workability by using, for example, a rail for moving (not shown in the figure) so that the parallel pipe 6 for obstruction can be positioned at an arbitrary position corresponding to an actual work site.

[0025] In the device for evaluating and testing pipework workability of the present invention, a passageway 7 can be provided in the vicinity of the pipe 1 for evaluation in order to simulate an actual work site. When the passageway 7 is provided as mentioned above, tightening workability of a gasket and the like can be evaluated and tested at a joint part 5 of the pipe 1 for evaluation under a condition still more similar to an actual piping work site. The passageway 7 can be also utilized as a working scaffold at a piping work site. The passageway 7 can be moveably provided on a rail 8 for moving, which is provided in a direction parallel to the pipe 1 for evaluation. In order to make the passageway 7 moveable on the rail 8 for moving, for example, a wheel or a caster (not shown in the figure) can be provided at a lower portion of the passageway 7. When the rail 8 for moving is provided in a direction parallel to the pipe 1 for evaluation, and the passageway 7 is provided on the rail 8 for moving as mentioned above, the passageway 7 can be placed on the site corresponding to an actual piping work position. Therefore, tightening workability of a gasket and the like can be more appropriately evaluated and tested at a joint part of pipes.

[0026] In the device for evaluating and testing pipework workability of the present invention, a scaffold 9 can be provided as occasion demands. The scaffold 9 can be utilized as a stepping stool which is used when a worker moves to

a working place. The scaffold 9 can be moveable or fixed. Alternatively, the height of the scaffold 9 can be easily controlled.

[0027] Furthermore, in the device for evaluating and testing pipework workability of the present invention, a side pole 10 can be provided as occasion demands. When a suspension stand 11 is provided on the side pole 10, and the suspension stand 11 is equipped with a crane (not shown in the figure), the pipe 1 for evaluation, the pipes 2a, 2b for obstruction, the parallel pipe 6 for obstruction and the like can be easily transported or arranged.

[0028] Fig. 3 is a schematic front view of another embodiment of the device for evaluating and testing pipework workability of the present invention. In the device for evaluating and testing pipework workability of the present invention shown in Fig. 3, a pipe for evaluation (not shown in the figure) and pipes 2a, 2b for obstruction are provided on a suspension stand 11. The suspension stand 11 is connected with one end of a rotating shaft 12 through a connecting member 14. The rotating shaft 12 is rotatably fitted to the side pole 10. A handle 13 for rotating the rotating shaft 12 is provided at the other end of the rotating shaft 12.

[0029] In the device for evaluating and testing pipework workability shown in Fig. 3, since the suspension stand 11 can be properly inclined to a desired angle by rotating the handle 13, the pipe for evaluation and the pipes 2a, 2b for obstruction can be easily parallelized so as to be different in height from the ground from each other. Therefore, tightening workability of a gasket and the like can be evaluated and tested at a joint part of pipes under a condition even more similar to an actual piping work site.

[0030] When the device for evaluating and testing pipework workability of the present invention is equipped with, for example, the joint part 5, there can be evaluated or tested, for example, whether or not tightening of a joint will be

difficult for a worker due to the pipe 2a, 2b for obstruction at the time of tightening of the joint, or whether or not there is a possibility to generate leakage of contents in the pipe 1 for evaluation from the joint part 5 of the pipe 1 for evaluation due to lack of a tightening force at the joint part 5.

[0031] Accordingly, when the device for evaluating and testing pipework workability of the present invention is used, and a height and a position of each of the pipes 2a, 2b for obstruction, a distance between the pipe 1 for evaluation and each of the pipes 2a, 2b for obstruction and the like are appropriately controlled, a circumstance where tightening of a gasket and the like at the joint part 5 of a pipe can be reproduced in accordance with an actual piping work site. Therefore, tightening workability of a gasket and the like at a joint part of pipes which are used in a petrochemical plant, a factory and the like can be appropriately evaluated and tested without relying on a design drawing of the work site and the like.

EXPLANATION OF REFERENTIAL NUMBERS

[0032] 1: Pipe for evaluation

2a: Pipe for obstruction

2b: Pipe for obstruction

3a: Unit for moving up and down

3b: Unit for moving up and down

4a: Guide rail

4b: Guide rail

5: Joint part

6: Parallel pipe for obstruction

7: Passageway

8: Rail for moving

9: Scaffold

10: Side pole

11: Suspension stand

12: Rotating shaft

13: Handle

14: Connecting member

CLAIMS

1. A device for evaluating and testing pipework workability for use in evaluating and testing pipework workability, characterized in that the device comprises a pipe for evaluation, and a pipe for obstruction capable of moving toward a vertical direction, which is provided in the direction perpendicular to the pipe for evaluation in the vicinity of the pipe for evaluation.
2. The device for evaluating and testing pipework workability for use in evaluating and testing pipework workability according to claim 1, wherein the pipe for evaluation comprises a joint part of pipes.
3. The device for evaluating and testing pipework workability for use in evaluating and testing pipework workability according to claim 1, wherein the device comprises a parallel pipe for obstruction parallel to the pipe for evaluation.
4. The device for evaluating and testing pipework workability for use in evaluating and testing pipework workability according to claim 1, wherein the device comprises a passageway in the vicinity of the place for evaluating the pipe for evaluation.
5. The device for evaluating and testing pipework workability for use in evaluating and testing pipework workability according to claim 4, wherein the device comprises a rail for moving positioned to be parallel to the pipe for evaluation, and a passageway is positioned on the rail for moving.

6. The device for evaluating and testing pipework workability for use in evaluating and testing pipework workability according to claim 1, wherein the pipe for evaluation and the pipe for obstruction are provided on a suspension stand, the suspension stand is connected with one end of a rotating shaft through a connecting member, and a handle for rotating the rotating shaft is provided at the other end of the rotating shaft.