METHOD, SYSTEM, PROGRAM, DEVICE, DATABASE, AND RECORDING MEDIUM FOR FORM MANAGEMENT

BACKGROUND OF THE INVENTION

1. TECHNICAL FIELD

[0001] The technology of the present disclosure relates to a form management technology used for maintenance management of regular repair work and the like of, for example, a heat exchange system included in an oil refining plant.

2. DESCRIPTION OF THE RELATED ART

[0002] Regular repair work or preparation work necessary for the regular repair work in oil refining plant equipment including a heat exchange system is ordered from an owner company that operates the plant to a partner company. Since such regular repair work is executed by stopping the operation of the plant, it is necessary to speed up the processing, and management for safety/security including construction progress, inspection after the regular repair, and the like is required.

[0003] Regarding progress management of maintenance inspection and the like, the following technique is known. A list creation unit that has received a list creation request selects maintenance inspection items in a confirmation information database, creates a check list, and delivers the check list to a terminal device. Confirmation items such as maintenance inspection and measurement items performed according to this check list are taken into a server device through the terminal device, stored in the confirmation information database, and delivered to the terminal device according to a request (e.g., Patent Literature 1).

[0004] Regarding progress management of construction work, the following technique is known. In building work, a memory unit accumulates a construction plan including a plurality of processes, progress information of the construction plan, and an input plan of resources including persons or heavy equipment, and a record information acquisition unit acquires a progress ratio of each process and a resource input record. A production rate investigation unit compares a record production rate converted from the resource input record with a plan production rate converted from the resource input plan to determine a future production rate of the construction work, and a workload calculation unit calculates a remaining object amount and a workload on the basis of the future production rate (e.g., Patent Literature 2).

[0005] Regarding progress management of building work, the following technique is known. A construction plan support system, an inspection schedule database that accumulates data on inspection schedules, and an inspection schedule/result database that accumulates inspection

progress data obtained by integrating the inspection schedules and records are provided. In the progress management, a progress confirmation system that transmits construction progress data obtained by converting an inspection progress status into a physical quantity of construction progress to the construction plan support system is combined, and section-classified processes and the previous construction progress data are integrated, to display a process chart with a chart progress line indicating the construction progress (e.g., Patent Literature 3).

CITATION LIST

PATENT LITERATURE

[0006] Patent Literature 1: JP 2004-227307 A

Patent Literature 2: JP 2013-45308 A

Patent Literature 3: JP 2010-282496 A

SUMMARY OF THE INVENTION

[0007] In the regular repair work and the like of the heat exchange system included in the oil refining plant, an orderer is the owner company that operates the plant, and an order receiver is the partner company that undertakes construction processing and management thereof. The heat exchange system as a target of the regular repair work includes a plurality of heat exchangers having different specifications and the like, and a large number of related machinery. Since the regular repair work is performed by stopping the heat exchange system, a construction period for minimizing the stop period is required. In addition, elements such as system specifications and regular repair cost are also added as matters to be considered.

[0008] For the orderer of the regular repair work, management of progress, inspection according to the progress, and the like are main processing matters. On the other hand, the order receiver is required to grasp the concept of the orderer and the entire image of the system as the regular repair target, establish a regular repair plan, execute the construction processing, and receive the inspection of the orderer as required, to complete the regular repair work.

[0009] The processing of the orderer and the order receiver in such regular repair work has been previously executed on the basis of preparation of documents. There is a problem in that it is necessary to prepare documents according to the scale of the system and the amount of machinery included therein, and a workload of manually preparing a large number of documents is enormous.

[0010] The regular repair work includes a plurality of processes such as construction progress, reporting, inspection permission, and confirmation. For example, when the regular repair work of one piece of machinery is completed, the inspection permission is given from the orderer who

has received a report on the completion. If the inspection result does not reach an acceptance range, for example, does not meet a standard, the process cannot proceed to a next process. This management is excellent from the viewpoint of safety, but there is also a problem in that the construction progress is entrusted to an inspector of the orderer. Information sharing between the orderer and the order receiver is essential. Insufficient information sharing causes a problem in that a temporal loss between the processes is induced in terms of basic points such as search for a position of inspection machinery.

[0011] Since sheets generated by spreadsheet software are usually used for information input, it has been difficult to link the sheets together. That is, suppose that information is input to one sheet, and another necessary sheet is then retrieved. In this case, for example, if processes and construction quality management information are described in different sheets, it is troublesome to retrieve these sheets and search for related information between the processes. In order to create and link the sheets together, it is necessary to manually perform a large number of processes, resulting in a problem in that this work could cause human errors, and a worker has an enormous workload.

[0012] There is another problem in that construction work is delayed if a constructor or a manager takes time to confirm construction progress in addition to status information such as construction progress.

[0013] With regard to such problems, the configurations disclosed in Patent Literature 1 to Patent Literature 3 cannot solve the problems presented in the present disclosure.

[0014] The inventors of the technology of the present disclosure have found that, regarding form management necessary for regular repair work of a heat exchange system and the like, the load of all management such as progress management in the regular repair work can be reduced by database creation of information necessary for the regular repair work, automatic creation of sheet information, and information sharing, thereby achieving improvement in reliability as well as time reduction of the regular repair.

[0015] Therefore, in view of the above problems and findings, an object of the technology of the present disclosure is to make it easy for an orderer, an order receiver, and a person in charge of construction work to grasp information by creating a database of information necessary for regular repair work, dividing an information table by each management function, and spreading input information.

[0016] In order to achieve the above object, according to one aspect of a form management method of the present disclosure, a form management method is a form management method using a computer and including: generating a task information table for storing two or more pieces of task information, and storing the task information in the task information table;

generating two or more task management tables each specified by a management function; generating an execution task selection table to which selection information for selecting task information to be executed from the task information is input; and selecting any one, or two or more of the task management tables based on the selection information acquired from the execution task selection table, and storing the task information specified by the selection information.

[0017] The form management method may further include presenting any one, or two or more of the task information table, the task management tables, the execution task selection table, and transition information on the task management tables, on an information terminal.

[0018] The form management method may further include, based on information input to the specific task management table, selecting any one, or two or more of the other task management tables, and reflecting input information.

[0019] The form management method may further include acquiring input information from any one, or two or more of the plurality of task management tables, and presenting all of the input information on the specific task management table.

[0020] In order to achieve the above object, according to one aspect of a form management system of the present disclosure, a form management system includes: a memory unit configured to store information; a processing unit configured to generate a task information table for storing two or more pieces of task information, two or more task management tables each specified by a management function, and an execution task selection table to which selection information for selecting task information to be executed from the task information is input, select any one, or two or more of the task management tables based on the selection information acquired from the execution task selection table, and cause the memory unit to store the task information specified by the selection information; and an information terminal including an information presentation unit configured to present any one, or two or more of the task information table, the task management tables, the execution task selection table, and transition information on the task management tables.

[0021] In order to achieve the above object, according to one aspect of a program of the present disclosure, a program is for causing a computer to execute: a function to generate a task information table for storing two or more pieces of task information, and store the task information in the task information table; a function to generate two or more task management tables each specified by a management function; a function to generate an execution task selection table to which selection information for selecting task information to be executed from the task information is input; and a function to select any one, or two or more of the task management tables based on the selection information acquired from the execution task selection

table, and store the task information specified by the selection information.

[0022] The program may further cause the computer to execute a function to present any one, or two or more of the task information table, the task management tables, the execution task selection table, and transition information on the task management tables, on an information terminal.

[0023] The program may further cause the computer to execute, based on information input to the specific task management table, a function to select any one, or two or more of the other task management tables, and reflect input information.

[0024] The program may further cause the computer to execute a function to acquire input information from any one, or two or more of the plurality of task management tables, and present all of the input information on the specific task management table.

[0025] In order to achieve the above object, according to one aspect of a form management device of the present disclosure, a form management device includes: a memory unit configured to store information; a processing unit configured to generate a task information table for storing two or more pieces of task information, two or more task management tables each specified by a management function, and an execution task selection table to which selection information for selecting task information to be executed from the task information is input, select any one, or two or more of the task management tables based on the selection information acquired from the execution task selection table, and cause the memory unit to store the task information specified by the selection information; and an information presentation unit configured to present any one, or two or more of the task information table, the task management tables, the execution task selection table, and transition information on the task management tables, the memory unit, the processing unit, and the information presentation unit being installed in a housing.

[0026] In order to achieve the above object, according to one aspect of a database of the present disclosure, a database is used for form management and includes: a task information table for storing two or more pieces of task information; two or more task management tables each specified by a management function; and an execution task selection table to which selection information for selecting task information to be executed from the task information is input, wherein the task information specified by the selection information is stored in any one, or two or more of the task management tables selected based on the selection information.

[0027] In order to achieve the above object, according to one aspect of a recording medium of the present disclosure, a recording medium stores any one, or two or more of the task information table and the task management tables included in the form management method, the task information table and the task management tables included in the form management system, and the program.

[0028] According to the present disclosure, any one of the following effects can be obtained.

[0029] (1) The task information table storing the two or more pieces of task information is generated, the two or more task management tables specified by the management function are generated, and the task information is stored in the task information table. As a result, the task information can be automatically classified into the two or more task management tables specified by the management function, and the two or more task management tables storing the task information can be automatically generated.

[0030] (2) The selection information for selecting the task information to be executed from the task information existing in the task information table is input to the execution task selection table. As a result, any one, or two or more of the task management tables can be selected on the basis of the selection information, and the task information specified by the selection information can be automatically stored in the task management table(s).

[0031] (3) With respect to the two or more pieces of task information, it is possible to perform editing including selection of the task management table and change of the task information by generating the two or more task management tables and selecting the task information, and the edited contents can be reflected in the task management tables.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] FIG. 1 is a diagram illustrating a configuration example of a form management system according to a first embodiment;

FIG. 2 is a diagram illustrating an example of a table generation function;

FIG. 3 is a drawing illustrating a configuration example of a task information table;

FIG. 4 is a drawing illustrating a configuration example of an execution task selection table;

FIG. 5 is a drawing illustrating a configuration example of a task management table F1;

FIG. 6 is a drawing illustrating a configuration example of a task management table F2;

FIG. 7 is a drawing illustrating a configuration example of a task management table F3;

FIG. 8 is a drawing illustrating a configuration example of a task management table F4;

FIG. 9 is a flowchart illustrating a processing example of form management;

FIG. 10 is a diagram illustrating a linkage state among the task management tables;

FIG. 11 is a flowchart illustrating an example of form management processing;

FIG. 12 is a diagram illustrating a configuration example of a form management system according to a second embodiment; and

FIG. 13 is a flowchart illustrating an example of form management processing.

DETAILED DESCRIPTION

[0033] FIRST EMBODIMENT

FIG. 1 illustrates a configuration example of a form management system according to a first embodiment. A configuration illustrated in FIG. 1 is an example, and the technology of the present disclosure is not limited to such a configuration.

A form management system 2 has a function to create forms used for management of processes such as construction work before inspection, inspection processing, and recovery processing after the inspection, progress, recording of inspection results, and the like, a function to notify a manager, and an information sharing function in regular repair work and the like of, for example, a heat exchange system installed in an oil refining plant. The above form management processing is executed by a computer. In the form management system 2, for example, as illustrated in FIG. 1, a management server 4 and an information terminal 6 communicate with each other using a network 8, to exchange input information and notification information such as management information necessary for the form management processing.

[0034] <Management Server 4>

The management server 4 is an example of a form management device of the present disclosure, and is a device that performs creation processing of forms for each management function by using task information such as regular repair work and inspection of machinery. The management server 4 is a computer including a processor, a memory, an input/output unit (I/O), a communication unit, and the like. The management server 4 includes, for example, a processing unit 10, a memory unit 12, an information input unit 14, and an information presentation unit 16.

The processor is a functional unit that executes computation processing of various programs such as an OS and a form management program stored in the memory, and constitutes the processing unit 10.

The memory includes a memory element such as a ROM and a RAM, and is an example of a recording medium of the present disclosure. The memory constitutes a work area for performing the computation processing of, for example, the OS and the form management program, and also constitutes the memory unit 12 that stores a table, a database, and the like generated by the form management processing.

The input/output unit (I/O) is an interface to which the information input unit 14 and the information presentation unit 16 are connected, and that takes input information into the management server 4 and outputs information from the management server 4 under the control of the processor.

The communication unit performs communication with the information terminal 6 and

communication with an information source (not illustrated) under the control of the processor. This communication may be either wireless or wired communication.

[0035] The processing unit 10 includes a table generation function unit 20 that performs the creation processing of forms by, for example, the computation processing of the form management program. The table generation function unit 20 generates, for example, a task information table 24, an execution task selection table 26 to which selection information for selecting task information is input, and two or more task management tables 28 specified by management functions.

The memory unit 12 stores, for example, a task information database (DB) 22 that stores the task information, and the task information table 24, the execution task selection table 26, and the task management tables 28 generated by the table generation function unit 20.

[0036] The information input unit 14 is an example of a unit that inputs the selection information, other setting information, and authentication information such as an ID number of a manager to the management server 4, and includes an operation unit such as a keyboard and a touch panel.

The information presentation unit 16 is a unit that displays the task information table 24 and the execution task selection table 26, and displays notification information of the generated task management tables 28 and the like in generating forms. The information presentation unit 16 is configured by an information presentation device such as an LCD.

[0037] <Information Terminal 6>

The information terminal 6 performs data communication with the management server 4, receives and displays the notification information of the generated task management tables 28 and the like, and transmits information such as an execution status and results of a task such as regular repair work and inspection of plant equipment, to the management server 4. For example, a manager on the plant owner side performing at least the inspection processing, and a manager on the partner company side performing the regular repair work are involved in the regular repair work and the inspection work. The managers individually use information terminals 6-1, 6-2,..., 6-N. Examples of the information terminals 6-1, 6-2,..., 6-N include a mobile phone, a mobile PC, and other dedicated terminal devices used for the inspection work.

[0038] <Network 8>

The network 8 is an example of a unit that allows for data communication between the management server 4 and the information terminals 6-1, 6-2,..., 6-N of the managers, for example, in a wired or wireless manner. For example, a public line may be used as the network 8, or a private line restricted to be accessible only in the plant may be used as the network 8.

[0039] <Table Generation Function Unit 20>

FIG. 2 illustrates an example of the table generation function.

For example, as illustrated in FIG. 2, the table generation function unit 20 generates the task information table 24 set for each of management functions T1, T2, T3,..., Tn using the task information read from the task information DB 22, and generates task management tables F1, F2, F3,..., Fn using the selection information set in the execution task selection table 26 with respect to the task information table 24.

[0040] The task information DB 22 stores the task information indicating a large number of work processes performed in the regular repair work and the inspection processing, and their contents. For example, machinery information, management function information, and the like corresponding to the task information are also stored in the task information DB 22 in association therewith. As a result, in the form creation processing, the table generation function unit 20 can read the task information related to, for example, the input or set machinery information and management function information, and store the information in the task information table 24.

[0041] <Task Information Table 24>

The task information table 24 is an example of a data table that collects and stores the task information to be executed on machinery as a target of the regular repair work and the inspection processing, to automatically generate the task management tables 28. For example, as illustrated in FIG. 3, the task information table 24 is provided with a management function section 30 and is divided into the management functions T1, T2, T3, T4,..., Tn to be executed in the regular repair work and the inspection processing. The task information corresponding to each function is stored in the task information table 24. The management functions to be set include, for example, an inspection progress management function (T1), a process management function (T2), a daily report management function (T3), a construction quality management function (T4),..., another management function (Tn), and the like.

In the task information table 24, for example, a number section 31, reflection sections 32, 34, and 36, task information sections 33, 35, 37, and 39, a classification section 38, a manager setting section 40, and the like are set. The task information table 24 is configured to arrange, for example, task processes in a vertical direction and related task information in a horizontal direction in a matrix.

[0042] The number section 31 shows a process order and stores coordinate information in the vertical direction indicating a storage position of the task information with respect to the task information table 24.

The reflection sections 32, 34, and 36 are examples of setting information as to whether or not to link the respective pieces of task information together in the task management tables

(F1 to Fn) 28 individually generated for the management functions T1, T2, T3, T4,..., and Tn. That is, for example, when the manager inputs information to any or some of the generated task management tables (F1 to Fn) 28, a condition as to whether or not to reflect the same information as the input information, a part of the input information, or information generated on the basis of the input information, in the other task management tables (F1 to Fn) 28 is set in the reflection sections 32, 34, and 36. The input information includes, for example, a construction or inspection date, result information, progress information, and the like.

[0043] The task information sections 33, 35, 37, and 39 are areas in which work information on the regular repair work and the inspection is set, and store the task information read from the task information DB 22. The task information sections 33, 35, 37, and 39 store, for example, the task information (B12, B13, C11, O11, P11, A21 to A26, B21, B22-1, B22-2,..., Pn1) and the like for each of the management functions T1 to Tn. In the task information table 24, for example, the same or highly related processing contents are set for the task information set to the same process. Therefore, in the task information sections 33, 35, 37, and 39, there is a case where no task information is stored in a part of the management functions T1 to Tn in a predetermined process. In the management functions T2 to Tn, for example, number “1” stores the task information A21, A31, A41, and An1. On the other hand, in the management function T1, no related task is performed nor exists on the basis of management contents. Thus, the task information section 33 is blank, and for example, a symbol “×” is set as the display indicating prohibition in the reflection section 32 such that other task information results are not reflected therein. Specifically, it is assumed that, for example, “inspection progress management” is set as the management function T1, and the task information including no inspection is set to the processes of numbers “1” to “7”. In this case, in the “inspection progress management”, the task information not related to the process, result, and the like of the inspection is set not to be read from the task information DB 22. That is, the task information table 24 stores the task information based on the management functions T1 to Tn, the processes, and the like.

The classification section 38 is an example of an area in which classification information of the task information is stored, and includes information indicating the stages of the regular repair work and the inspection. The classification section 38 stores information indicating the type of the construction work such as “incidental work”, “overhaul inspection”, “cleaning”, and “repair” in addition to broad classification such as “pre-work” and" inspection". These pieces of classification information are associated with the individual pieces of task information in the task information DB 22, for example.

[0044] Although the case where the classification section 38 is set within a range of the management function T4 has been described, the present disclosure is not limited to this case.

The classification section 38 may be provided in any range of each of the management functions T1 to Tn, or an independent setting item may be set.

[0045] The manager setting section 40 is an example of an area for setting the manager of the construction work, the inspection, and the like in the task information set for each of the management functions T1 to Tn. The manager setting section 40 sets, for example, which one of X company as the plant owner and Y company as the partner company is in charge of management. In addition, for example, a plurality of persons in charge x1, x2, x3, y1, and y2 can be set for each manager. For example, a symbol "○" is set in the manager setting section 40, as the display indicating instruction information indicating which manager and person in charge can perform management for each of the processes set in the number section 31.

[0046] <Execution Task Selection Table 26>

FIG. 4 illustrates a configuration example of the execution task selection table 26. A configuration illustrated in FIG. 4 is an example, and the technology of the present disclosure is not limited to such a configuration.

The execution task selection table 26 is an example of a table for setting the selection information for selecting the task information to be executed with respect to the task information table 24. For example, as illustrated in FIG. 4, the execution task selection table 26 can set the selection information for each device of machinery, plant equipment, and the like as the target of the regular repair work and the inspection, and includes a number section 41 and a selection section 42.

[0047] The number section 41 is an example of position information indicating selection positions of the task information sections 33, 35, 37, and 39 of the task information table 24, and stores information identical or linked with that of the number section 31 of the task information table 24.

The selection section 42 is an example of a selection input section that selects the task information sections 33, 35, 37, and 39 of the task information table 24.

[0048] The table generation function unit 20 extracts the task information of the task information table 24 on the basis of the selected and input information of the number section 41. The table generation function unit 20 generates a plurality of task management tables (F1) 28-11, 28-12,..., 28-1N, task management tables (F2) 28-21, 28-22,..., 28-2N, task management tables (F3) 28-31, 28-32,..., 28-3N,..., and task management tables (Fn) 28-n1, 28-n2,..., 28-nN corresponding to the management functions (T1, T2, T3,..., Tn), for example, for respective pieces of machinery. As the generated task management tables (F1 to Fn), the corresponding tables are generated on the basis of, for example, the management functions set in advance based on plant management information and the like, or information set by the manager. The

management functions are set for each piece of plant equipment or each piece of machinery to be inspected, for example. That is, the management functions may be selected differently between machinery such as a heat exchanger and a pressure tank on which the regular repair work and the inspection need to be strictly performed, and other equipment that can be simply managed.

[0049] <Task Management Table F1>

FIG. 5 illustrates a configuration example of the task management table F1.

The task management table F1 is, for example, an inspection progress management table, and includes a plurality of pieces of data 28-11, 28-12,..., 28-1N for respective pieces of machinery or plant equipment. The task management table F1 includes, for example, a classification section 50, a number section 51, a device name section 52, a reflection section 53, a construction information section 54, a management information input section 55, a completion monitoring section 56, and an authority section 57.

[0050] The classification section 50 is an example of an area in which the classification information of the task information is stored, and includes the information indicating the stages of the regular repair work and the inspection. The classification section 50 stores the information of the classification section 38 of the task information table 24.

The number section 51 stores a management number. In the task management table F1, for example, a plurality of pieces of information of devices having similar functions are registered.

The device name section 52 stores a device name of machinery as a target of the inspection progress management. The device name section 52 stores, for example, a device name input to the execution task selection table 26.

The reflection section 53 stores setting instruction information as to whether or not to link input information with the other task management tables F2, F3, and F4 generated for the same device name. For example, by setting a symbol "○" in F2 to F4, the reflection section 53 links a determination result, date information, and the like of the inspection progress management with the other task management tables F2 to F4.

The construction information section 54 is an area where the manager or the like can input data such as text information and photographs using the information input unit 14 of the management server 4 or an input function of each information terminal 6. The construction information section 54 may store, for example, transmission information specific to the machinery in addition to specific work contents, an inspection procedure, cautions, and the like in the regular repair work.

[0051] The management information input section 55 is an area in which information such as a progress status of the set task information, whether or not the task has been completed, and a

date thereof is stored. In the management information input section 55, for example, for each task information, a portion in which information from the other task management tables F2 to F4 is reflected is “blank”, and a check box or the like may be set in a portion to which information is directly input.

The completion monitoring section 56 is an area in which a check result by the manager is input as to whether the processing of all or a predetermined number of pieces of task information set in the task management table F1 has been completed.

In the authority section 57, authority information of a person in charge is set who can determine the task completion and input the check results to the management information input section 55 and the completion monitoring section 56. In the form management processing, in a case where the person in charge does not have necessary authority to, for example, input information to the task management table F1, the input information may be invalidated or the information input may be prohibited.

[0052] <Task Management Table F2>

FIG. 6 illustrates a configuration example of the task management table F2.

The task management table F2 is, for example, a process chart of the regular repair work and the inspection processing, and includes a plurality of pieces of data 28-21, 28-22,..., 28-2N for respective pieces of machinery or plant equipment. The task management table F2 includes, for example, a date section 60, a device name section 61, a classification section 62, a task information section 63, and a process management section 64.

[0053] The date section 60 sets calendar information for performing the regular repair work and the inspection, and includes, for example, a date entry frame.

The device name section 61 is an area in which a device name of a monitoring target is set, and stores the device name input to the execution task selection table 26.

The classification section 62 is an example of an area in which the classification information of the task information is stored, and includes the information indicating the stages of the regular repair work and the inspection. For example, the information of the classification section 38 set in the management function T4 of the task information table 24 may be reflected in the classification section 62.

[0054] The task information section 63 is an area in which process information of the regular repair work and the inspection is stored. The task information section 63 stores the task information set in the task information section 35 of the task information table 24. In the task information section 63, for example, adjustment processing may be performed so as to arrange the task information that can be simultaneously executed in the vertical direction on the basis of the processing contents while maintaining the set order.

The process management section 64 displays the process for each day or half day in the calendar information regarding a processing schedule set for the task information arranged in the task information section 63. Although the case where the process management section 64 displays the task information within a frame indicating the number of days has been described, the process management section 64 is not limited to such a display state. In the task management table F2, for example, the task information of the task information section 63 may be distinguished by color or pattern, and may be displayed by adding the same color or pattern to the frame of the process management section 64 corresponding to each task information.

[0055] In addition, the task information section 63 and the process management section 64 of the task management table F2 include an information input area 65 along the processes and the calendar information. In the information input area 65, a process start date, a completion date, a progress status, and the like can be input as record information of the work processes.

[0056] For example, the table generation function unit 20 extracts the task information of the task information table 24 on the basis of the selected and input information of the number section 41, reads information on the number of days required for each task, and the like from a database (not illustrated) or input information by the manager, and sets schedule information of a work period, a start date, and a completion date according to the processes arranged in the task information section 63.

[0057] <Task Management Table F3>

FIG. 7 illustrates a configuration example of the task management table F3.

The task management table F3 is, for example, a daily report that gives daily process information of the regular repair work and the inspection processing, and stores a work result thereof to manage a work status, and includes a plurality of pieces of data 28-31, 28-32,..., 28-3N for respective pieces of machinery or plant equipment. The task management table F3 includes, for example, a header section 70, a device name section 71, a task information section 72, and a management information section 73.

[0058] The header section 70 is an area in which header information of the daily report is stored, and includes, for example, information on the manager or a person in charge of inputting information to the daily report, date information, description of information displayed in the daily report, and the like.

The device name section 71 is an area in which the device name of the monitoring target is set, and stores the device name input to the execution task selection table 26.

The task information section 72 is an area in which the process information of the regular repair work and the inspection, and the task classification information are stored. The task information section 72 stores the task information and the like set in the task information

section 37 of the task information table 24.

The management information section 73 is an area in which the progress status of the task information is stored. Information such as a construction result and an inspection result as schedule information, a completion date, building permission information from the plant owner, and the like are stored in the management information section 73 by the manager or the person in charge. In the schedule information, symbols representing different states are assigned to, for example, “new” indicating the start of the process, “continuation” indicating the process in progress, and “completion” indicating the completion of the process.

[0059] <Task Management Table F4>

FIG. 8 illustrates a configuration example of the task management table F4.

The task management table F4 is, for example, a construction quality management table that stores monitoring results of the regular repair work and the inspection processing, and includes a plurality of pieces of data 28-41, 28-42,..., 28-4N for respective pieces of machinery or plant equipment. The task management table F4 includes, for example, a classification section 80, a task information section 81, a confirmation content section 82, an inspection content section 83, a start information section 84, a monitoring result section 85, and an authority section 86.

[0060] The classification section 80 is an example of an area in which the classification information of the task information is stored, and includes the information indicating the stages of the regular repair work and the inspection. The information of the classification section 38 of the task information table 24 is stored in the classification section 80.

The task information section 81 is an area in which the process information of the regular repair work and the inspection is stored. The task information section 81 stores the task information set in the task information section 39 of the task information table 24.

The confirmation content section 82 is an information transmission area in which processing contents, cautions, and the like in the regular repair work and the inspection can be input. The confirmation content section 82 stores, for example, text information such as instruction contents given to a person in charge of work from the manager, and matters pointed out in past regular repair work and inspection.

[0061] The inspection content section 83 stores instruction information specifying execution means in the inspection processing. The instruction information includes, for example, “visual” that is an instruction for the person in charge to directly view the target or check an image captured by a camera of the information terminal 6, and “document” that is an instruction for confirmation by a report or the like. In addition, the information of the inspection content section 83 includes, for example, instruction information to the information terminal 6 that has

read the task management table F4. A camera application may be automatically activated when the information is “visual”.

The start information section 84 is an area in which start dates and the like of the regular repair work and the inspection are stored. The start information section 84 may store checked date information, and may record a company name or the like of the person in charge or the manager.

The monitoring result section 85 is an area that stores check results of the regular repair work and the inspection. For example, the information may be directly input by the manager to the monitoring result section 85, or the information input to the other task management tables may be reflected in the monitoring result section 85.

In the authority section 86, authority information of the person in charge is set who can determine task completion and input the check results to the monitoring result section 85. In the form management processing, in a case where the person in charge does not have necessary authority to, for example, input information to the task management table F4, the input information may be invalidated or the information input may be prohibited.

[0062] <About Form Management Processing>

FIG. 9 illustrates a processing example of the form management. The processing illustrated in FIG. 9 is an example of a form management method and program of the present disclosure, and the technology of the present disclosure is not limited to such processing contents and a processing procedure.

For example, as illustrated in FIG. 9, the form management processing includes read processing of the task information (S1), generation processing of the task information table (S2), read processing of the execution task selection table (S3), input processing of the machinery information (S4), selection and input processing of the execution task (S5), generation processing of the task management tables (S6), storage processing of the task information in the task management tables (S7), and notification and display processing of the task management tables (S8).

[0063] The management server 4 starts the table generation function unit 20 by executing the form management program in response to setting information or an input instruction from the manager. For example, when accessing the task information DB 22, the table generation function unit 20 reads the task information of the regular repair work and the inspection associated with a machinery name as a set monitoring target, type information thereof, plant information, and the like (S1), and generates the task information table 24 using the task information, the machinery information, and setting conditions such as the type and number of the management functions T1 to Tn (S2).

[0064] For example, when reading the unfilled execution task selection table 26 stored in the memory unit 12 (S3), the table generation function unit 20 inputs the machinery information such as the device name as the monitoring target (S4). When the manager or the like inputs the selection information of the execution task to the execution task selection table 26 (S5), the table generation function unit 20 generates the task management tables (F1 to Fn) individually for the set management functions (T1 to Tn) (S6). The setting of the management functions (T1 to Tn) is selected according to, for example, the setting information input by the manager or the type of the plant equipment. That is, as the management functions (T1 to Tn), any one, or two or more of the inspection progress management, the process management, the daily report, and the construction quality management, or still another management function may be set, in addition to the case where all of the inspection progress management, the process management, the daily report, and the construction quality management are set as described above.

[0065] The table generation function unit 20 stores the task information read from the task information table 24 based on the selection information of the execution task selection table 26, in the task management tables (F1 to Fn) (S7) individually for the set management functions (T1 to Tn), and gives or displays the task management tables to the information terminal 6 of the manager or the person in charge (S8).

[0066] Note that the task information table 24 is not limited to a case of being newly generated for each regular repair work and inspection, and may be generated in advance and stored in the memory unit 12, or may be used by reading past data acquired from the memory unit 12, an external database, and the like, or data generated in another plant equipment.

[0067] <About Information Sharing among Task Management Tables F1 to F4>

FIG. 10 illustrates a linkage state among the task management tables. The relationship and the linkage state illustrated in FIG. 10 are examples.

In the form management system 2, for example, the instruction information for linking the input information is set for each piece of stored task information in the task management tables F1 to F4 generated using the common task information table 24. Such instruction information includes the reflection sections 32, 34, and 36 stored in the task information table 24. For example, the manager who uses the task management tables F1 to F4 is set on the basis of the management functions T1 to T4, and information such as an inspection result is input to the task management tables F1 to F4 by the set manager. Specifically, the task management table F1 used for the inspection progress management function is used by the plant owner, and the task management table F2 used for the process management and the task management table F3 used for the daily report are used by the manager of the partner company. The task management table F4 used for the construction quality management is used by the plant owner

and the partner company.

[0068] With such user setting, for example, as illustrated in FIG. 10, the task management table F1 reflects “inspection permission information” that is the input information of the plant owner, in the task management table F2 functioning as the process chart, the task management table F3 functioning as the daily report, and the task management table F4 functioning as the construction quality management table, so that the information is shared with the partner company. For example, the task management table F4 reflects “construction information” that is the input information of the manager of the partner company, in the task management tables F1, F2, and F3, so that the progress status of the construction work and the monitoring result of the quality are shared with the plant owner. In addition, when date-and-time information including the progress status of the process or the like is input, the task management table F2 reflects the date-and-time information in the task management table F3. The task management table F3 is the daily report presenting, for example, the process schedule, and the construction or inspection result. Thus, the information input to the other task management tables F1, F2, and F4 is only reflected in the task management table F3.

[0069] <Example of Information Sharing Processing>

FIG. 11 illustrates an example of the form management processing related to the information sharing. Processing contents and a processing procedure illustrated in FIG. 11 are examples. The form management processing is an example of the form management method and program of the present disclosure.

[0070] For example, as illustrated in FIG. 11, the form management processing includes authentication processing (S11), acquisition processing of the machinery information (S12), read processing of the task management tables (S13), determination processing of the information input (S14), determination processing of the reflection setting (S15), input processing to the other task management tables (S16), and notification and display processing of the task management tables (S17).

[0071] The management server 4 performs the authentication processing on the information terminal 6 that accesses the form management system 2 (S11), and may acquire information indicating which of the plant owner side and the partner company side the manager belongs to, name information of the person in charge, the set authority information, and the like. When acquiring the machinery information as the monitoring target (S12) and reading the task management tables (F1 to Fn) generated for the machinery (S13), the management server 4 determines whether the information has been input to the task management tables F1 to Fn (S14). When the management server 4 specifies the task management tables F1 to Fn to which the information such as the inspection result and a construction completion notice is input (YES

at S14), the management server 4 determines whether the reflection setting is made for the task information corresponding to the input information (S15). When determining that the reflection setting is made for the task information (YES at S15), the management server 4 inputs the same information as or processed information from the input information to the other task management tables based on the setting condition of the reflection destination (S16), and gives and displays the task management tables to the set information terminal 6 (S17). When determining that the reflection setting is not made for the task information (No at S15), the management server 4 gives and displays only the task management table to which the information is input to the information terminal 6 of the manager.

[0072] <Effects of First Embodiment>

With such a configuration, the following effects can be obtained.

[0073] (1) The task information table 24 storing the two or more pieces of task information is generated, the two or more task management tables 28 (F1 to Fn) specified by the management functions (T1 to Tn) are generated, and the task information is stored in the task information table. As a result, the task information can be automatically classified into the two or more task management tables specified by the management functions, and the two or more task management tables storing the task information can be automatically generated.

(2) Since the task information table 24 is automatically generated using the machinery information and the task information associated with the management functions (T1 to Tn), and the task management tables 28 (F1 to Fn) in which the task information is selected for each management function are automatically generated by the selection operation by the manager, the load of the form creation processing can be reduced.

[0074] (3) Necessary task information is stored for each management function, and the task management tables 28 (F1 to Fn) are automatically generated using this information. This makes it possible to avoid human errors such as lacking in construction processes and inspection contents, and improve the reliability of the regular repair work and the inspection.

[0075] (4) Since necessary task information can be set in the execution task selection table 26 only by the selection operation by the manager, adjustment processing such as increase or decrease of the task information can be easily and quickly performed during the generation of the task management tables 28 (F1 to Fn).

(5) With respect to the two or more pieces of task information, it is possible to perform editing including selection of the task management table and change of the task information by generating the two or more task management tables and selecting the task information, and the edited contents can be reflected in the task management tables 28 (F1 to Fn).

[0076] SECOND EMBODIMENT

FIG. 12 illustrates a configuration example of a form management system according to a second embodiment. A configuration illustrated in FIG. 12 is an example, and the technology of the present disclosure is not limited to such a configuration.

For example, as illustrated in FIG. 12, the form management system 2 includes a manager database (DB) 90 in the memory unit 12, and an authentication processing unit 92 in the processing unit 10, and has an adjustment function such as addition, deletion, and change of the task information with respect to the task information DB 22 and the task information table 24 according to authority set for the manager. Adjustment processing of the task information also includes change of setting information of the reflection sections 32, 34, and 36 in the task information table 24 and setting information of the task classification information and the like.

[0077] The manager DB 90 is an example of a database in which information for specifying the manager or the person in charge who accesses at least the management server 4 directly or using the information terminal 6, and authority information are registered. In the manager DB 90, for example, a company name of the manager, a name of the person in charge, a department to which the manager or the person in charge belongs, and rank information are registered, and authority information given to each manager or person in charge is registered. The authority information is, for example, the information stored in the authority sections 57 and 86 of the task management tables F1 and F4, and restricts an executable task and an access range to data in the management server 4. In the form management system 2, for example, authority to permit the task information adjustment processing is given to a person in charge who has a high rank or large responsibility, such as a work supervisor, a head of the assigned department, or a person having a higher rank. The task information is information directly related to the regular repair work, the inspection processes, the inspection items, and the like. Therefore, in the form management system 2, the authority to adjust the task information is given only to a limited number of persons in charge who are given authority with high responsibility.

[0078] The authentication processing unit 92 is an example of a functional unit that specifies a person who accesses the task information adjustment function and determines whether the person has the authority. In the authentication processing, for example, ID information including a name, a company name, fingerprint information, and the like may be taken, and two-dimensional code information, a one-time password, and the like given only to an authorized person may be read.

[0079] <Form Management Processing>

FIG. 13 illustrates an example of form management processing according to the second embodiment. Processing contents and a processing procedure illustrated in FIG. 13 are examples. The form management processing is an example of the form management method

and program of the present disclosure.

For example, as illustrated in FIG. 13, the form management processing includes manager authentication processing (S31), correction processing of the task information table or setting processing of an input mode to the task information DB (S32), confirmation processing of the authority (S33), input processing of the task information (S34), setting processing of the reflection information (S35), update processing (S36), and presentation processing of warning information (S37).

[0080] The management server 4 collects information necessary for authentication including the name from the manager or the person in charge who accesses the management server 4 using the information input unit 14 or the information terminal 6, and performs the authentication processing including identity verification and the presence or absence of the registered authority information by using this information (S31). For example, when the manager who has passed the authentication corrects the task information table 24 or sets the input mode of the task information to the task information DB 22 (S32), the management server 4 refers to the authentication result of the manager to confirm the authority to adjust the task information (S33). When the manager is authorized (YES at S33), the task information associated with the machinery information as the monitoring target is input (S34), and the management server 4 sets the reflection information of the task management tables 28 (F1 to Fn) (S35), and stores the update information of the task information table 24 and the task information DB 22 (S36).

[0081] When the manager is not authorized or does not have the authority to adjust the task information (NO at S33), the management server 4 presents the warning information on the information presentation unit 16 or a screen of the information terminal 6 used by the person who has performed access (S37).

[0082] <Effects of Second Embodiment>

With such a configuration, any one of the following effects can be obtained.

[0083] (1) Effects similar to those of the first embodiment can be obtained.

(2) The task information can be adjusted with respect to the task information DB 22 and the task information table 24, and it is possible to cope with conditions specific to the plant equipment, the inspection of each plant owner, and the like.

(3) By setting the authority of the manager high for the adjustment of the task information and precisely managing the adjustment processing, it is possible to improve the reliability and safety of the regular repair work and the inspection.

[0084] OTHER EMBODIMENTS

Other modifications of the embodiments described above will be listed below.

[0085] (1) In the above embodiments, the case where the execution task selection table 26 and

the task information table 24 are configured independently has been described. However, the present disclosure is not limited to this case. The execution task selection table 26 may be formed integrally with the task information table 24, for example. When the execution task selection table 26 is formed integrally with the task information table 24 as described above, for example, the number section 41 may be omitted in the execution task selection table 26.

Furthermore, in the execution task selection table 26, for example, the selection section 42 of the task information may be displayed at a position adjacent to each of the management functions (T1 to Tn) of the task information table 24.

[0086] (2) In the above embodiments, the case where the execution task selection table 26 and the task management tables 28 are generated for each device name has been described. However, the present disclosure is not limited to this case. The execution task selection table 26 and the task management tables 28 may be generated, for example, for each piece of plant equipment including a plurality of pieces of machinery or each facility including a plurality of pieces of plant equipment. For example, for the same or highly related machinery in the plant equipment, or even for different types of machinery including the same or similar task information in the regular repair work and the inspection, the form management system 2 is only required to generate the plurality of task management tables 28 including the task information of the same contents.

[0087] (3) In the above embodiments, the case where the selection information is input to the execution task selection table 26 for each piece of machinery in the form management processing has been described. However, the present disclosure is not limited to this case. For example, the management server 4 may cause the memory unit 12 to store the selection information of the past execution task selection table 26 or other selection information set in the same or highly related machinery together with the machinery information, read the stored selection information at the timing of the next regular repair work and inspection, and read the task information from the task information table 24 and generate the task management tables 28.

[0088] (4) For example, the table generation function unit 20 may read the execution task selection information acquired from the past execution task selection table 26 stored in the memory unit 12, or from the outside, and perform comparison processing with the selection information of the execution task selection table 26 generated by the selection of the manager. That is, for example, the table generation function unit 20 compares the task information with the task information set in the past or another plant for the same or highly related machinery, and performs warning processing including display of a comparison result screen in a case where the selection information of the newly generated execution task selection table 26 is insufficient or more pieces of selection information are set in the newly generated execution task selection table

26. As a result, in the form management processing, it is possible to prevent unnecessary construction work or inspection from being performed due to lack of the task information necessary for the regular repair work and the inspection, or setting of excessive task information.

[0089] As described above, the most preferred embodiments and the like of the technology of the present disclosure have been described. The technology of the present disclosure is not limited to the above description. Various modifications and changes can be made by those skilled in the art based on the gist described in the claims or disclosed in DETAILED DESCRIPTION. It goes without saying that such modifications and changes are included in the scope of the technology of the present disclosure.

What is claimed is:

1. A form management method using a computer, the form management method comprising:

generating a task information table for storing two or more pieces of task information, and storing the task information in the task information table;

generating two or more task management tables each specified by a management function;

generating an execution task selection table to which selection information for selecting task information to be executed from the task information is input; and

selecting any one, or two or more of the task management tables based on the selection information acquired from the execution task selection table, and storing the task information selected by the selection information in the task management table(s).

2. The form management method according to claim 1, further comprising presenting any one, or two or more of the task information table, the task management tables, the execution task selection table, and transition information on the task management tables, on an information terminal.

3. The form management method according to claim 1 or 2, further comprising, based on information input to the specific task management table, selecting any one, or two or more of the other task management tables, and reflecting input information.

4. The form management method according to any one of claims 1 to 3, further comprising acquiring input information from any one, or two or more of the plurality of task management tables, and presenting all of the input information on the specific task management table.

5. A form management system comprising:

a memory unit configured to store information;

a processing unit configured to generate a task information table for storing two or more pieces of task information, two or more task management tables each specified by a management function, and an execution task selection table to which selection information for selecting task information to be executed from the task information is input, select any one, or two or more of the task management tables based on the selection information acquired from the execution task

selection table, and cause the memory unit to store the task information specified by the selection information; and

an information terminal including an information presentation unit configured to present any one, or two or more of the task information table, the task management tables, the execution task selection table, and transition information on the task management tables.

6. A program for causing a computer to execute:

a function to generate a task information table for storing two or more pieces of task information, and store the task information in the task information table;

a function to generate two or more task management tables each specified by a management function;

a function to generate an execution task selection table to which selection information for selecting task information to be executed from the task information is input; and

a function to select any one, or two or more of the task management tables based on the selection information acquired from the execution task selection table, and store the task information specified by the selection information.

7. The program according to claim 6, for further causing the computer to execute a function to present any one, or two or more of the task information table, the task management tables, the execution task selection table, and transition information on the task management tables, on an information terminal.

8. The program according to claim 6 or 7, for further causing the computer to execute, based on information input to the specific task management table, a function to select any one, or two or more of the other task management tables, and reflect input information.

9. The program according to any one of claims 6 to 8, for further causing the computer to execute a function to acquire input information from any one, or two or more of the plurality of task management tables, and present all of the input information on the specific task management table.

10. A form management device comprising:

a memory unit configured to store information;

a processing unit configured to generate a task information table for storing two or more pieces of task information, two or more task management tables each specified by a management

function, and an execution task selection table to which selection information for selecting task information to be executed from the task information is input, select any one, or two or more of the task management tables based on the selection information acquired from the execution task selection table, and cause the memory unit to store the task information specified by the selection information; and

an information presentation unit configured to present any one, or two or more of the task information table, the task management tables, the execution task selection table, and transition information on the task management tables,

the memory unit, the processing unit, and the information presentation unit being installed in a housing.

11. A database used for form management, the database comprising:

a task information table for storing two or more pieces of task information;

two or more task management tables each specified by a management function; and

an execution task selection table to which selection information for selecting task information to be executed from the task information is input,

wherein the task information specified by the selection information is stored in any one, or two or more of the task management tables selected based on the selection information.

12. A recording medium storing any one, or two or more of the task information table and the task management tables included in the form management method according to any one of claims 1 to 4, the task information table and the task management tables included in the form management system according to claim 5, and the program according to any one of claims 6 to 9.