Title: SLAUGHTERHOUSE MANAGEMENT SYSTEM AND METHOD, RFID TAG

Abstract: A slaughterhouse management system is provided. The slaughterhouse management system includes: a PDA which reads production history information recorded in an ear tag attached to an object entered into a mooring site or records slaughter information in an RFID tag; an informing unit which informs a slaughter schedule; an RFID tag issuing unit which issues RFID tags to divided pieces of the slaughtered object; and a slaughterhouse management apparatus which, when the production history information recorded in the ear tag is received through the PDA, generates the slaughter schedule, informs the slaughter schedule through the informing unit, and controls the RFID tag issuing unit to record the production history information and issue the RFID tags to the divided pieces.
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SLAUGHTERHOUSE MANAGEMENT SYSTEM AND METHOD, RFID TAG

[Technical Field]

The present invention relates to a production history management system using an RFID tag, and more particularly, to a slaughterhouse management system and method of managing production history information on meat which is entered into, slaughtered in, and exited from a slaughterhouse.

[Background Art]

Recently, a production history tracing system has been developed for safe distribution of meat such as pork and beef. In the production history tracing system, an RFID solution has been employed so as to manage object information.

However, RFID tags that are attached to livestock objects in farms are removed or lost during slaughter processes. Therefore, there is a problem in that data of the objects are continuously managed.

In order to improve reliability of the production history tracing system, there is a need for a technique of maintaining continuity of the production history information in the slaughter processes.

In order to improve reliability of divided pieces exited from the slaughterhouse, there is a need for a technique of additionally managing slaughter information such as mooring information, dividing information, examining information, and pre-cooling information of the divided pieces of the slaughtered object.

[Disclosure]

[Technical Problem]

The present invention provides a slaughterhouse management system and method of generating a slaughter schedule of an object entered into a slaughterhouse, recording production history information of divided pieces of the object slaughtered according to the slaughter schedule in RFID tags, and automatically issuing the RFID tags so as to maintain continuity of the
production history information of the object during slaughter processes and an RFID tag.

The present invention provides a slaughterhouse management system and method of recording slaughter information such as mooring information, dividing information, examining information, and pre-cooling information in RFID tags attached to divided pieces and an RFID tag.

[Technical Solution]

According to an aspect of the present invention, there is provided a slaughterhouse management system comprising: a PDA which reads production history information recorded in an ear tag attached to an object entered into a mooring site or records slaughter information in an RFID tag; an informing unit which informs a slaughter schedule; an RFID tag issuing unit which issues RFID tags to divided pieces of the slaughtered object; and a slaughterhouse management apparatus which, when the production history information recorded in the ear tag is received through the PDA, generates the slaughter schedule, informs the slaughter schedule through the informing unit, and controls the RFID tag issuing unit to record the production history information and issue the RFID tags to the divided pieces.

[Advantageous Effects]

According to the present invention, it is possible to maintain continuity of production history information during slaughter processes by generating a slaughter schedule of an object entered into a slaughterhouse, recording production history information of divided pieces of the object slaughtered according to the slaughter schedule in RFID tags, and automatically issuing the RFID tags.

In addition, according to the present invention, it is possible to improve reliability of divided pieces exited from the slaughterhouse by recording slaughter information such as mooring information, dividing information, examining information, and pre-cooling information in RFID tags attached to the divided pieces.

[Description of Drawings]
FIG. 1 is a view showing a slaughter process according to an embodiment of the present invention.

FIG. 2 is a view showing a configuration of a slaughterhouse management system according to an embodiment.

FIG. 3 is a flowchart showing process of a slaughter management method according to the present invention.

FIG. 4 is a view showing a structure of an RFID tag according to an embodiment of the present invention.

[Best Mode]

A slaughterhouse management system according to the present invention includes: a PDA (personal data assistant) which reads production history information recorded in an ear tag attached to an object entered into a mooring site or records slaughter information in an RFID tag; an informing unit which informs a slaughter schedule; an RFID tag issuing unit which issues RFID tags to divided pieces of the slaughtered object; and a slaughterhouse management apparatus which, when the production history information recorded in the ear tag is received through the PDA, generates the slaughter schedule, informs the slaughter schedule through the informing unit, and controls the RFID tag issuing unit to record the production history information and issue the RFID tags to the divided pieces.

[Mode for Invention]

In general, a slaughterhouse includes a mooring site where livestock objects transferred to the slaughterhouse are moored, a slaughter site where the moored objects are slaughtered according to the slaughter schedule, an examining site where hot pieces, that is, the divided pieces just after the slaughtering of the object or cold pieces, that is, the pre-cooled divided pieces are examined, and a pre-cooling room where the examined divided pieces are cooled and stored or pre-cooled.

Now, slaughter processes of the slaughterhouse will be descried in brief with reference to FIG. 1.

A veterinarian checks an ear tag of a livestock object and inputs
object identification information and production history information of the object in a slaughterhouse management apparatus. After that, the object is transferred to the mooring site (A).

According to the input of the object identification information and the production history information, the slaughterhouse management apparatus generates a slaughter schedule of the objects moored in the mooring site and informs the slaughter schedule through a touch-screen-PC-type informing unit. According to the informed slaughter schedule, slaughtering of the objects moored in the mooring site is performed (B and C).

The slaughter processes include an electric killing process, a blood releasing process, a rinsing process, a dividing process. During the slaughter processes, the ear tag of the object may be lost. The slaughterhouse management apparatus allows an RFID tag issuing unit installed in the slaughterhouse to issue RFID tags to the divided pieces of the slaughtered object. The issued RFID tags are attached to the corresponding divided pieces by a slaughterer.

In case of shipping of the divided pieces as the hot pieces, the divided pieces are directly subject to an examining process and a class determining process. In case of shipping of the divided pieces as the cold pieces, the divided pieces are pre-cooled, and after that, the pre-cooled divided pieces are subject to the examining process and the class determining process (D and E). The examining information, the class determining information, and the pre-cooling information are recorded in the RFID tags. The RFID tags have a function of heat-resistance and water-proof and a structure capable of being engaged with dermis (skin layer) and an adipose layer of the divided piece without influence of quality.

Now, a configuration of a slaughterhouse management system according to an embodiment of the present invention will be described with reference to FIG. 2.

The slaughterhouse management system includes a slaughterhouse management apparatus 100, a database 102, an informing unit 104, a PDA 106, a
RFID tag issuing unit 108, and a gage unit 110.

When a veterinarian or the like checks the ear tag, the RFID tag attached to the object transferred to the mooring site is read through the PDA 106. When the production history information recorded in the RFID tag is received through the PDA 106 in a wireless manner, the slaughterhouse management apparatus 100 allocates the object information storage region for the object to the database 102 and stores the production history information and the mooring-site entering time information. In the object information storage region, production history information, mooring-site entering time information, slaughtering order information, divided-piece examining information, divided-piece pre-cooling information, and the like are stored.

When the object information is stored, the slaughterhouse management apparatus 100 generates the slaughter schedule for the object moored in the mooring site and records the slaughtering order information of the object in the object information. The slaughterhouse management apparatus 100 uses the informing unit 104 to inform the starting of slaughter of any one of the moored objects according to the slaughter schedule.

When informing the starting of slaughter according to the slaughter schedule, the slaughterhouse management apparatus 100 controls the RFID tag issuing unit 108 to issue the RFID tags to the divided pieces of the slaughtered object. Under the control of the slaughterhouse management apparatus 100, the RFID tag issuing unit 108 issues the RFID tags to the divided pieces of the slaughtered object. The RFID tags are attached to the corresponding divided pieces. In the RFID tag, production history information, mooring-site entering time information, slaughtering time information, examining information, pre-cooling information of the corresponding object are recorded.

When divided-piece examining information including examining information of an hot piece which is a divided piece immediately obtained through slaughtering of the object or examining information of a cold piece which is a pre-cooled divided piece is provided through the PDA 106 carried
by an examiner located at the examining site, the slaughterhouse management apparatus 100 registers the divided-piece examining information in the database 102. The PDA 106 records the divided-piece examining information in the RFID tag attached to the divided piece.

<28>
When RFID tag reading information in the RFID tag attached to the divided piece is received from the gage unit 110 provided to the pre-cooling room, the slaughterhouse management apparatus 100 register the RFID tag reading information in the divided-piece pre-cooling information.

<29>
The PDA 106 may be provided to a veterinarian who checks the object transferred to the mooring site, so that the PDA reads the RFID tag attached to the object transferred to the mooring site or transmits the read information to the slaughterhouse management apparatus 100. In addition, the PDA 106 may be provided to an examiner who examines the divided piece transferred to the examining site, so that the PDA receives the examining information and transmits the examining information to the slaughterhouse management apparatus 100 and, at the same time, records the examining information in the RFID tag attached to the divided piece.

<30>
The RFID tag issuing unit 108 issues the RFID tags to the divided pieces of the slaughtered object under the control of the slaughterhouse management apparatus 100.

<31>
The gage unit 110 is provided to entrance and exits of the pre-cooling room to read the RFID tags attached to the divided pieces and detect the entering and exiting of the divided pieces. In addition, the gage unit 110 records the information associated with the entering and exiting in the RFID tags and transmits the information to the slaughterhouse management apparatus 100.

<32>
The informing unit 104 is constructed with a touch-screen PC. The informing unit 104 informs various types of information received from the slaughterhouse management apparatus 100. Particularly, the informing unit 104 informs the slaughter schedule and the information of the to-be-slaughtered object. In addition, the informing unit 104 receives from the
slaughterhouse management apparatus 100 information associated with user's search requests and informs the information.

In the database 102, production history information, mooring-site entering time information, slaughtering time information, divided-piece examining information, and divided-piece pre-cooling information of the object transferred to the mooring site are stored.

Now, operations of the slaughterhouse management system according to the embodiment of the present invention will be described with reference to FIG. 3.

When an object arrives at the slaughterhouse, a veterinarian or the like reads object identification information and production history information from the ear-tag-type RFID tag attached to the object through the PDA 106 and provides the information together with mooring information such as mooring site entering time information to the slaughterhouse management apparatus 100. The slaughterhouse management apparatus 100 allocates object information storage region for the object to the database 102 and stores the object identification information, the production history information, and the mooring information in the object information storage region.

As described above, every time that object information of a new object is registered, the slaughterhouse management apparatus 100 generates a slaughter schedule for the un-slaughtered object (Step 306).

The slaughterhouse management apparatus 100 provides the slaughter schedule and the information of the to-be-slaughtered object to the informing unit 104 according to a slaughter time or a request of the informing unit 104. When the slaughter schedule and the information of the to-be-slaughtered object are received, the informing unit 104 informs the slaughter schedule and the information (Steps 308 to 312). In accordance with the informing, the slaughtering and dividing of the object are performed.

After the informing of the slaughter, the slaughterhouse management apparatus 100 controls the RFID tag issuing unit 108 to issue the RFID tags of the divided pieces of the object. The slaughterhouse management apparatus
100 provides the object information to the RFID tag issuing unit 108 to record the object information in the issued RFID tags (Step 314). Under the control of the slaughterhouse management apparatus 100, the RFID tag issuing unit 108 issues the RFID tags of the divided pieces in which the object information is recorded (Step 316). The RFID tags are attached to the divided pieces of the slaughtered object.

As described above, the divided pieces attached with the RFID tags are selectively stored and pre-cooled in a pre-cooling room. When the divided piece is entered/exited to/from the pre-cooling room, the gage unit 110 provided to the entrance and exit of the pre-cooling room reads the information recorded in the RFID tag attached to the corresponding divided piece (Step 318). When the RFID tag is read, the gage unit 110 records pre-cooling information such as pre-cooling room entering time and pre-cooling room leaving time in the RFID tag and provides the pre-cooling information to the slaughterhouse management apparatus 100 so as to register the pre-cooling information of the corresponding divided piece (Steps 318 to 324).

The divided piece just after the slaughter or the pre-cooled divided piece is transferred to the examining site, an examiner of the examining site inputs examining information and class determining information of the divided piece through the PDA 106. The PDA 106 records the examining information and the class determining information in the RFID tag of the corresponding divided piece and provides the examining information and the class determining information to the slaughterhouse management apparatus 100 (Steps 326 to 330). The slaughterhouse management apparatus 100 registers the examining information in the database 102 and issues a slaughter certificate (Steps 332 and 334).

Now, a structure of the RFID tag according to the present invention will be described with reference to FIG. 4. The RFID tag has a shape of a pushpin tack with a plate 402 and a protrusion 400. The protrusion 400 is provided with a hook which penetrates dermis (skin layer) and is hooked with an adipose layer. The protrusion 40 is made of a harmless material such as
stainless steel. The plate 402 is made of a water-proof heat-resistant material such as ceramic and polyethylene so that the plate can be protected from flame throwing and from blood releasing. Circuits of the RFID tag are embedded to the plate 402.

[Industrial Applicability]

<42> According to the present invention, it is possible to maintain continuity of production history information during slaughter processes by generating a slaughter schedule of an object entered into a slaughterhouse, recording production history information of divided pieces of the object slaughtered according to the slaughter schedule in RFID tags, and automatically issuing the RFID tags.

<43> In addition, according to the present invention, it is possible to improve reliability of divided pieces exited from the slaughterhouse by recording slaughter information such as mooring information, dividing information, examining information, and pre-cooling information in RFID tags attached to the divided pieces.
[CLAIMS]

[Claim 1]

A slaughterhouse management method comprising:

reading object information recorded in an ear tag attached to an object which is entered into a mooring site and generating a slaughter schedule according to the object information; and

when the object transferred to the slaughterhouse is slaughtered and divided according to the slaughter schedule, issuing to the divided pieces RFID tags in which the object information of the object is recorded.

[Claim 2]

The slaughterhouse management method of claim 1, further comprising recording slaughter information of the divided pieces in the RFID tags.

[Claim 3]

The slaughterhouse management method of claim 2, wherein the slaughter information is one or more of mooring information, examining information, and pre-cooling information.

[Claim 4]

A slaughterhouse management system comprising:

a PDA which reads production history information recorded in an ear tag attached to an object entered into a mooring site or records slaughter information in an RFID tag!

an informing unit which informs a slaughter schedule!

an RFID tag issuing unit which issues RFID tags to divided pieces of the slaughtered object; and

a slaughterhouse management apparatus which, when the production history information recorded in the ear tag is received through the PDA, generates the slaughter schedule, informs the slaughter schedule through the informing unit, and controls the RFID tag issuing unit to record the production history information and issue the RFID tags to the divided pieces.

[Claim 5]

The slaughterhouse management system of claim 4, wherein the PDA
receives input of the examining information of the divided piece and provides and records the examining information to the RFID tag and/or to the slaughterhouse management apparatus for recording.

[Claim 6]
<56>
The slaughterhouse management system of claim 4, which is provided at entrance and exit of a pre-cooling room to provide and record the entering and exiting information of the RFID tag as pre-cooling information to the RFID tag and/or the slaughterhouse management apparatus.

[Claim 7]
<57>
The slaughterhouse management system of claim 4, wherein the slaughter information is one or more of mooring information, examining information, and pre-cooling information.

[Claim 8]
<58>
An RFID tag comprising:
<59>
a plate which is made of a ceramic or polyethylene, wherein circuits of the RFID tag are embedded thereto; and
<60>
a pin which fixes the plate.
[DRAWINGS]
[Figure 1]

1. ENTERED
2. MOORING (A)
3. TRANSFER TO SLAUGHTERHOUSE (B)
4. ELECTRIC KILLING, BLOOD RELEASING, RINSEING, DIVIDING (C)
5. COOLING, PRE-COOLING (D)
6. EXAMINING AND CLASS DETERMINING (E)
7. EXITED