

IMPROVEMENT FOR ~~LEAKTIGHT AND THERMALLY A SEALED AND THERMAL~~
INSULATING TANK INTEGRATED INTO A ~~CARRIER-BEARING~~ STRUCTURE

This invention concerns an improvement for a sealed and thermal insulating tank for integration into a bearing structure.

5 According to documents FR-2 527 544-A, FR-1 376 525-A, FR-1 379 651-A, FR-2 724 623-A and FR-2 798 902-A, there is a known embodiment of a sealed and insulating tank integrated into a bearing structure, in particular on a vessel, with two successive sealing barriers: a primary barrier in contact with the product contained in the tank and a secondary barrier between the primary sealing barrier and the bearing structure. Between these 2 sealing
10 barriers on the one hand, and between the secondary sealing barriers on the other, there is at least one thermal insulating barrier. The primary sealing barrier, according to the documents, is made of metal or of a composite material which can include a metal core. The thermal insulating barriers are built as modules, or panels, arranged in juxtaposition, having a general polygonal shape, with thickness determined according to the desired insulating capability.
15 These modules have a cover and a base, designated indifferently as "panel". The term primary thermal insulating barrier refers to the barrier on which the primary sealing barrier stands and, the term secondary thermal insulating barrier to the one on which the secondary sealing barrier stands.

20 In use, deterioration of the primary sealing barrier, made of metal ferrules, was observed, caused more especially by sloshing, especially at the tops of the tanks or in the embanked area above them in particular. In addition, the primary thermal insulating barrier can suffer from degradation of the rigid panel forming the support for this primary thermal insulating barrier.

25 However, deterioration of the secondary sealing barrier and/or the secondary thermal insulating barrier has sometimes been reported.

 Accordingly, one of the purposes of this invention is to supply an improvement for such sealed and thermal insulating tanks incorporated into a bearing structure such as the hull of a vessel, to avoid or at least limit damage to the tank as reported above.

CLAIMS

1. A sealed and thermal insulating tank integrated into a bearing structure (1), the bearing structure consisting of a double wall, the tank comprising:
 - 5 a thermal insulating barrier made integral with the bearing structure (1),
 - a secondary sealing barrier (5) located within the thermal insulating barrier, and
 - a primary sealing barrier (10) which stands on the thermal insulating barrier,
 - the thermal insulating barrier consists of modules arranged in juxtaposition, wherein a module is more or less a rectangular parallelepiped in shape and comprises a first
 - 10 plywood panel (3), on top of which there is a first thermal insulating coat (4), on top of which there is the secondary sealing barrier (5), on which is arranged a second thermal insulation coat (6), itself supporting a second plywood panel, on which stands the primary sealing barrier (10) consisting of ferrules or metal plates, characterized in that it includes a damping device consisting of a layer of damping
 - 15 material arranged between two walls, wherein the damping device is located between the secondary sealing barrier (5) and the second thermal insulating coat (6).
2. The tank according to claim 1, wherein the damping material is a material based on woven fibers.
3. The tank according to claim 1, wherein the damping material is a felt.
- 20 4. The tank according to any of claims 1 to 3, wherein the layer of damping material (11) is between 2 and 15 mm thick.
5. The tank according to any of claims 1 to 4, wherein the secondary sealing barrier (5) and the primary sealing barrier (10) are comprised of waffled metal plates.
6. The tank according to any of claims 1 to 5, wherein the thermal insulating
- 25 barrier comprises a secondary thermal insulating barrier, on top of which there is the secondary sealing barrier (5) and a primary thermal insulating barrier arranged on the secondary sealing barrier (5), the primary sealing barrier (10) consisting of ferrules or metal plates standing on the primary thermal insulating barrier, each of the thermal insulating barriers consisting of modules arranged in juxtaposition, wherein a
- 30 secondary thermal insulating barrier module (2b) is a rectangular parallelepiped in shape and comprises a first plywood panel (3), on top of which there is a first thermal insulating coat (4), wherein a primary thermal insulating barrier module (2a) is a rectangular parallelepiped in shape and comprises a second thermal insulation coat (6), itself supporting a second plywood panel.

7. The tank according to claim 6, wherein the secondary thermal insulating barrier module (2b) and the primary thermal insulating barrier module (2a) are in the form of offset rectangles.

8. The tank according to the any of claims 1 to 7, characterized by the fact that
5 a depression deflecting means is arranged between the first (8,8') and the second wall (9,9') of the damping device and passes through the damping material coat (11,11').

9. The tank according to any of claims 1 to 8, characterized by the fact that the
10 junctions between the first walls (8,8') of the damping device are offset with respect to those of the second walls (9,9') of the damping device.

10. The tank according to one of claims 1 to 9, characterized by the fact that the two walls (8,8' and 9,9') of the damping device have a thickness included between 9 and 21 mm.

11. The tank according to one of claims 1 to 10, characterized by the fact
15 that the two walls (8,8' and 9,9') of the damping device are of fir plywood or of a composite material.

12. The tank according to any of claims 1 to 11 characterized by the fact
20 that the first panel (3) is attached to the wall of the bearing structure with an interposed cord of mastic (14) having an elasticity modulus of at most 500MPa at a temperature of -25°C and approximately 150MPa at a temperature of 25°C.

CLAIMS

1. Improvement for a sealed and thermal insulating tank integrated into a bearing structure (1) consisting of a double wall which tank is of a type comprising
5 two sealing barriers, primary (10) and secondary (5), and at least one thermal insulating barrier made integral with the bearing structure in which a secondary sealing barrier (5) is located and on which a primary sealing barrier (10) stands, characterized in that it includes a damping device consisting of a layer of damping material arranged between two walls.

10 2. An improvement according to claim 1 characterized by the fact that the thermal insulating barrier consists of a module much in the shape of a rectangular parallelepiped including a first panel, which could be made of plywood for instance, on top of which is a first thermal insulating coat, on top of which there is a sealing barrier itself attached to the secondary insulating panel, on which is arranged a
15 second thermal insulation coat supporting a second panel of plywood, and on which, in a known manner, stands the primary sealing barrier consisting of ferrules or metal plates, which damping device is located underneath the primary sealing barrier (10) and consists of a second plate comprising the two walls between the which the layer of damping material is arranged

20 3. An improvement according to claim 1, characterized in that the thermal insulating barrier consists of a module, more or less a rectangular parallelepiped in shape, comprising a first plywood panel, on top of which there is a first thermal insulating coat, on top of which is placed a second thermal insulating coat, itself supporting a second panel, for instance of plywood, on which stands in a known
25 manner, the primary sealing barrier consisting of ferrules or metal plates while the damping device is located under the secondary sealing barrier (5).

4. An improvement according to claim 1, characterized in that the thermal insulating barrier consists of a module, more or less a rectangular parallelepiped in shape, comprising a first plywood panel, on top of which there is a first thermal
30 insulating coat, on top of which is placed a second thermal insulating coat, itself supporting a second plywood panel, on which stands in a known manner, the primary sealing barrier consisting of ferrules or metal plates while the damping device is located between a secondary sealing barrier (5) and a second thermal insulating coat

(6).

5. An improvement according to claim 1, characterized in that the thermal insulating barrier consists of a module, more or less a rectangular parallelepiped in shape, comprising a first plywood panel, on top of which there is a first thermal insulating coat, on top of which is placed a second thermal insulating coat, itself supporting a second plywood panel, on which stands in a known manner, the primary sealing barrier consisting of ferrules or metal plates while the damping device is located between a first panel (3) and a first thermal insulating coat (4).

6. An improvement according to the any of claims 1 to 5, characterized by the fact that between the first (8,8') and the second wall (9,9') and passing through the damping material coat (11,11') a depression deflecting means is arranged.

7. 7. An improvement according to claim 6, characterized by the fact that the depression deflecting means is inserted into the holes (12a) and (12b) arranged respectively in the walls (8,8') and (9,9'), forming a Tee while the free ends of the vertical bar of the Tee face one another and an H shaped bar (13) is arranged in the space thus formed.

8. An improvement according to claim 7, characterized by the fact that the depression deflecting means is inserted into the holes (12a) and (12b) arranged respectively in the first wall (8,8') and in the second thermal insulation coat (6), forming a Tee while the free ends of the vertical bar of the Tee face one another and an H shaped bar (13) is arranged in the space thus formed.

9. An improvement according to any of claims 1 to 8, characterized by the fact that the junctions between the first walls (8,8') are offset with respect to those of the second walls (9,9').

10. An improvement according to claim 9, characterized in that the junction between the first walls (8,8') is identical to that found between the strips of an English parquet floor.

11. An improvement according to any of claims 1 to 10, characterized in that second wall (9,9') has an elasticity modulus at least ten per cent less than that of current materials.

12. An improvement according to one of claims 1 to 11, characterized by the fact that the two walls (8,8') and (9,9') have a thickness included between 9 and 21 mm.

13. An improvement according to one of claims 1 to 12, characterized by the fact that the two walls (8,8') and (9,9') are of fir plywood or of a composite material.

14. An improvement according to any of claims 1 to 13 characterized by the fact that the first panel (3) is attached to the wall of the bearing structure with an interposed cord of mastic (14) having an elasticity modulus of at most 500MPa at a temperature of -25°C and approximately 150MPa at a temperature of 25°C.