CLAIMS

1. An acquisition device (20) comprising a wall and a transducer (23, 323), in which device the transducer is constituted by a body (24, 324) and a plurality of electrodes (25, 325, 425, 525) fastened to said body and spaced apart from one another;

· the transducer is such that an electrical impedance (R) determined from said plurality of electrodes is variable as a function of deformation to which the transducer is subjected; and

· when looking in a direction perpendicular to a surface (36) of the wall, at least two electrodes (25) of said plurality of electrodes are spaced apart from each other;

wherein

the transducer is incorporated under the surface (36) of the wall;

the electrodes are flexible; and

the transducer is configured so that, if a force is applied to the acquisition device in a direction perpendicular to the surface of the wall, the transducer deforms mainly in a plane that is substantially parallel to the surface of the wall, and an impedance measured between said at least two electrodes (25) of said plurality of electrodes varies.

2. An acquisition device according to claim 1, further comprising a transfer layer (34, 46, 116) adhering to a face of the transducer (23, 323) and separating the transducer from the surface of the wall, and wherein the transfer layer (34, 46, 116) and the wall are made of the same material, in particular asphalt.

3. An acquisition device according to claim 2, wherein the transfer layer (34, 46, 116) and the wall are formed integrally.

4. An acquisition device according to any one of claims 1 to 3, further comprising a bonding layer (22, 26), constituted by a flexible plastic film, configured to be interposed between the body (24) of the transducer and a surface neighboring the body of the transducer, the bonding layer adhering to the body of the transducer.

5. An acquisition device according to any one of claims 1 to 3, wherein the body (24) of the transducer is clamped between two bonding layers (22,26), each constituted by a flexible plastic film, and being configured to be interposed between the body (24) of the transducer and a surface neighboring the body of the transducer.

6. An acquisition device according to any one of claims 1 to 5, wherein the body of the transducer (24) comprises a piezoresistive polymer or a mixture of a plurality of piezoresistive polymers, or a mixture of at least one polymer with conductive micro- and nano-particles or a mixture of asphalt or of bitumen with micro- and nano-particles.

7. An acquisition device according to any one of claims 1 to 5, wherein the body (24) of the transducer comprises a percolating array of micro- and/or nano-particles, said micro- and/or nano-particles comprising one or more particles from the following list:

a) carbon nanotubes, in particular in a random or an organized array;

b) self-assembled micro- or nano-particles; and

c) sheets of graphene, graphite, or optionally-reduced graphene oxide.

8. A tape (21, 121) comprising a plurality of acquisition devices according to any one of claims 1 to 7, fastened on a strip, in particular a strip made of a flexible polymer.

9. A sensor (10) including at least one acquisition device (20, 120) according to any one of claims 1 to 7, and an impedance-determination system (12) connected to electrodes (25, 325, 425, 525) of at least one transducer of said at least one acquisition device, and suitable for determining an impedance and/or an impedance variation of said at least one transducer.

10. A sensor (10) according to claim 9, comprising a set of transducers arranged in an array, in particular so as to form a matrix, and further comprising means for identifying which transducers are activated or stressed at a given instant.

11. A display suitable for displaying variable information and including at least one acquisition device according to any one of claims 1 to 7.

12. A force-measuring method comprising the following steps:

a) providing a transducer (23) constituted by a body (24) and by a plurality of flexible electrodes (25, 325, 425, 525) fastened to said body and spaced apart from one another, the transducer being such that an electrical impedance(R) determined from said plurality of electrodes is variable as a function of deformation to which the transducer is subjected;

b) applying a force to said transducer in a direction such that, when seen looking along said direction, at least two electrodes of said plurality of electrodes are spaced apart from each other;

c) measuring the variation of the impedance under the effect of the applied force; and

d) determining the applied force as a function of said impedance variation.

13. A method of fabricating an acquisition device comprising a wall and a transducer, the method comprising the following steps:

a) positioning a plurality of flexible electrodes (25, 325, 425, 525) in contact with a body (24), the body and said electrodes being such that an electrical impedance (R) determined from said plurality of electrodes is variable as a function of deformation to which the body associated with said plurality of electrodes is subjected;

· the body and said plurality of electrodes thus form a transducer (23); and

b) forming the wall;

wherein steps a) and b) are performed in such a manner that the transducer (23) is incorporated under a surface (36) of the wall, and that, when seen looking along a direction perpendicular to said surface, at least two of said electrodes (25, 325, 425, 525) are spaced apart from each other.

14. A method of laying a roadway, the method comprising the following steps:

A) preparing a support surface (113); and

B) on said support surface, depositing at least one asphalt layer (116) while incorporating therein at least one transducer (320), in such a manner that the roadway includes an acquisition device formed by a method according to claim 13.

15. A method of laying a roadway according to claim 14, wherein step B comprises several steps:

i) a bottom bituminous mix layer (32) is deposited;

ii) a bottom bonding layer (22) is deposited on the top surface of the bottom bituminous mix layer (32) so that the bottom bonding layer (22) adheres to the bottom bituminous mix layer (32);

iii) the pair of electrodes (25) is put into place on the bottom bonding layer (22), being spaced apart in the horizontal direction (X);

iv) the body (24) is formed by depositing a piezoresistive layer 24 of piezoresistive material on the bottom bonding layer (22) and on the electrodes (25);

v) a top bonding layer (26) is deposited on the piezoresistive layer (24) so that the top bonding layer (26) adheres to the piezoresistive layer (24); and

vi) a top bituminous mix layer (34) is then deposited on the top bonding layer (26).