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PROCEDURE FOR MONITORING THE STABILITY OF ECOLOGICAL LANDFILLS

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ABSTRACT

NOVELTY - The invention relates to a process for monitoring the stability of ecological dumps, both in mining areas and in urban areas. According to the invention, the process enables measurement of spatio-temporal displacements in various points of a dump (1), by determining angular and vertical displacements of a spatial tensometric transducer (2) which slides on a rod (3) embedded at its lower extremity in the dump base layer (4), the information related to the displacements about the three axes being transmitted to a microcontroller system (21) which processes them by means of an instrumentation amplifier which is supplied from a storage battery system (23) or a current regulating system (24) connected to a photovoltaic panel (25).

KEYWORDS

Process for monitoring,
Machine control
Microcontroller system,
Tensometric transducer
Mining areas

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INTRODUCTION

The invention refers to a process for monitoring the stability of existing ecological depositories in mining, dump and landfill areas, as well as in urban areas, such as decanting ponds and landfills.

RESULTS

The process of monitoring the stability of the waste dumps, according to the invention, is built from a tensometric space displacement transducer (2) that slides on a rod (3). The angular displacement αx results from the tensometric half-deck (5) applied to both sides of the elastic element (6), rigidly encased at one end in the reazem (7), at the other end being required by the gravitational component of the mass (8), which by its construction senses angular displacements only after the Ox axis. The angular displacement αy results from the tensometric half-deck (9) applied to both sides of the elastic element (11), rigidly encased at one end in the reazem (12), at the other end being required by the gravitational component of the mass (13), which by its construction senses angular displacements only after the Oy axis. The linear displacement dz results from the tensometric half-deck (14) applied to both sides of the elastic element (15), rigidly attached to the element (16), the neutral position of which is established at the position of the transducer on the depoonia, by a palpator disc (17) necessary to detect +/-z movements, its final fixation being ensured by the screw (18). The processing of information on the spatial-temporal movements of the depoonia is carried out with a microcontroller system (21), by means of an instrumentation amplifier (22), its supply is made from the battery system (23) or by means of the current regulator system (24), connected to the photovoltaic panel (25). The synchronization of information, on the angular movements of the deponia, between each space tensotic transducer located on the depony is carried out by means of an antenna (27) connected to the electronic sensor system, which retrieves the information from the transceiver (28).

The space tensometric transducer for monitoring the movement of the depony is located in the premises (20), the information on movements after the three axes is transmitted to a microcontroler system (21), which is amplified apriori by the instrumentation amplifier for tensometric stamps (22). The numerical tensometric monitoring system shall be supplied from the battery system (23) or via the current regulator system (24) connected to the photovoltaic panel (25) of the electronic sensor system which is placed on rubber spacers (26) of vibration damping that could be transmitted to the photovoltaic panel.

The synchronization of information, on the angular movements of the deponia, between each space tensotic transducer located on the depony is carried out by means of an antenna (27) connected to the electronic sensor system, which retrieves the information from the transceiver (28). Tensometric semi-decks that detect angular displacement on the +/- x and +/-z axis respectively bind to the instrumentation amplifier by means of shielded conductors (29), and the tensometric half-deck detects movement on the +/- y axis are connected to the instrumentation amplifier by means of shielded conductors (30).

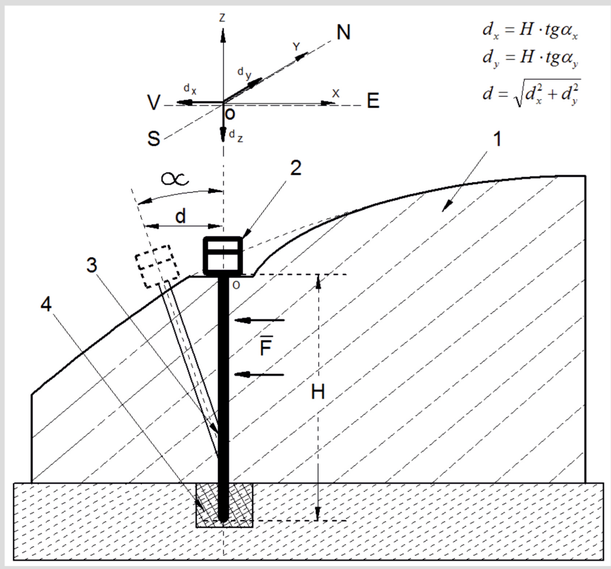

Figure 1.

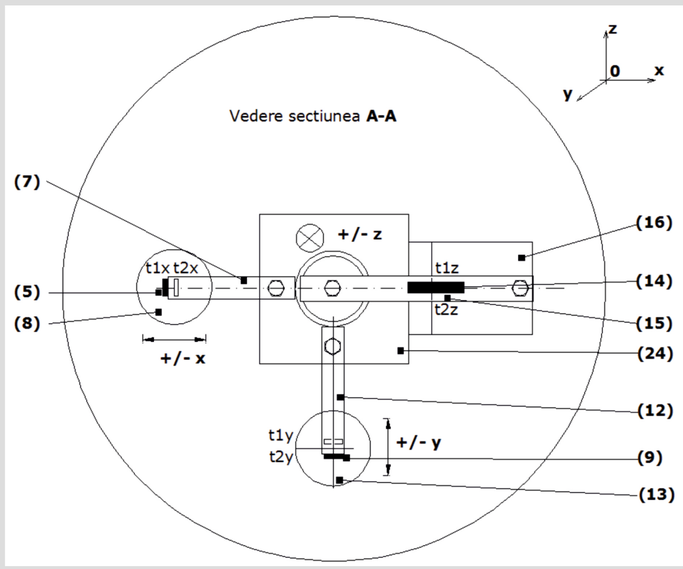

Figure 2.

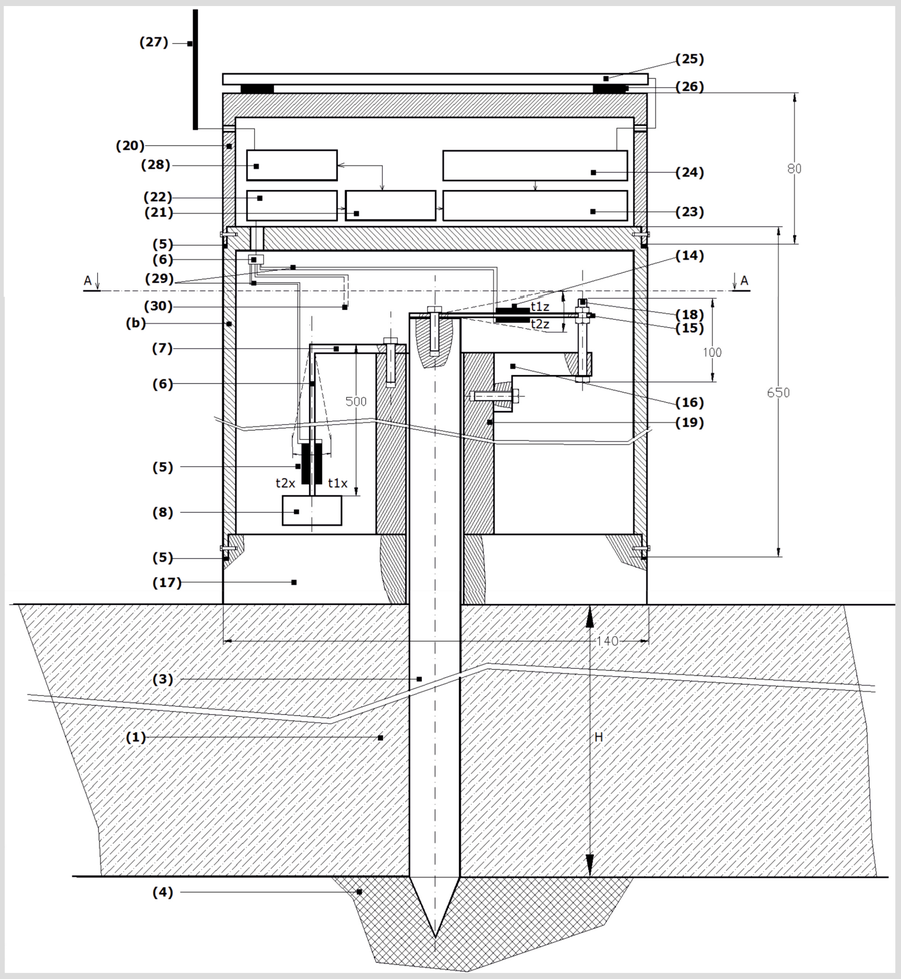

Figure 3.