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Research Article

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Preliminary Study of the Alterations of the Natural Geomagnetic Field Caused by Construction Materials

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Abstract

The architect's perspective on environmental quality and health within a sustainable context is broadened by considering radiation as an element to be accounted for in architectural design. In this regard, alongside hydrotropic comfort and air quality, the electromagnetic quality of space can be considered in relation to human health.

This study experiments on the influence of the geomagnetic field in relation to various construction materials, using data collected with a geomagnetometer. It is observed that construction materials, due to their magnetic properties, have the ability to modify, to a greater or lesser extent, the natural geomagnetic field upon which life develops.

It is concluded that considering the relationship between the magnitude of the geomagnetic field and construction materials may become part of the criteria for choosing materials for healthy and sustainable architecture.

Keywords: Geopathic Stress, Construction Materials, Environmental Quality, Dowsing, Electromagnetic Properties.

Introduction

Biological rhythms, physical wellbeing, and mental states depend on the interaction between our electrical system and the brainwaves in relation to the weak electromagnetic fields generated by the telluric and cosmic radiation of the Earth. Certain geographical locations, known as geopathic stress zones, can have a negative effect on health [1].

Geopathic stress is linked to various types of natural radiation, some of which emanate from the ground. Some effects are related to natural groundwater currents, which, when crossing anisotropic terrain, occasionally drag ions or metallic particles, inducing electromagnetic fields [2]. Another effect is related to piezoelectric discharges in certain geological areas containing quartz sand, tourmaline, topaz, etc.; there are also other effects related to the phenomenon of "longitudinal scalar waves" and the natural radioactivity of the ground [3, 4].

Natural Radiation, Effects on Health, and Detection Methods

In the 1970s, it was stated that the type of material used could amplify or condense radiation, turning spaces into pathogenic zones [5]. Geopathic zones emit a subtle type of energy that can be quantified using the Light Interference Technique (LIT). The identification of geopathic zones caused by the presence of groundwater can be confirmed using the resistivity method and seismic refraction method [6]. The influence of geopathic zones on the human organism can be detected using Gas Discharge Visualization (GDV) [2]. It has been shown that geopathic zones have a distinct influence on the normal functioning of the human body, particularly in changes in blood pressure and heart rate [7].

This study continues research on construction materials in relation to location, studying magnetic differences (in nT) as a complement to the electrical variable (in V/m) in previous studies [5]. The objective of this work is to study the alteration of the natural geomagnetic field in the presence of construction materials.

Methodology

Measurement Protocol

The parameter to be studied is the Geomagnetic Disturbance

$$\text{Deg } G = \frac{\Delta B(Bmáx - Bmín)}{\Delta S} \quad (nT/m)$$

The measurement instrument used is a Geomagnetometer BPT 2010. The PC software "Geogram BPT 5020" provides precise information on the maximum and minimum points of the magnetic field intensity and the disturbance degree G.

The measurement follows the protocol of the instrument:

- A rectangular area is defined for measurement, oriented N-S.
- A geometrically calibrated mat (100x100 mm grid) is placed, with maximum dimensions of 1600x3000 mm, oriented N-S using a compass.
- Vertical isodynamics of the chosen area are measured using the geomagnetometer. The lines of the mat are traced at a height of 5 cm from the surface, at a constant speed, taking data every second. The tracing is always from East to West (maximum length 3000 mm) moving from South to North (maximum length 1600 mm).

Five measurements are performed consecutively in this order

1. On the ground without material.
2. On the ground, cork agglomerate is placed, and measurements are taken on both.
3. On the ground, OSB panel is placed, and measurements are taken on both.
4. On the ground, polyurethane panel is placed, and measurements are taken on both.
5. On the ground, minionda sheet is placed, and measurements are taken on both.

The measurement is done in intensity mode, obtaining the magnetic flux density (B) in nanoTeslas (nT).

Selection of Location and Materials

The measurements were carried out on the sports area of ETSAM (School of Architecture of Madrid). Measurements were made at various locations, on natural ground and on reinforced concrete slab. Material selection was based on previous studies [8], [9] to observe other aspects and interrelate concepts in the near future.

Table 1: Materials Used and Their Characteristics.

MATERIAL	THICKNESS (mm)	ρ (kg/m³)	λd (W/m.°K)
Agglomerated Black Cork Panel	60	140	0.39
OSB Panel	16	650	0.14
Minionda Sheet Panel	1	1140	58
Polyurethane Panel	80	40	0.029

Table 2: Summary of the group of measurements made, grouped according to the characteristics of the initial terrain.

Measurements	Natural Ground (CN)	Concrete Slab (S)	OSB	Cork	Polyurethane	Minionda Sheet
M 1	CN	-	-	-	-	-
M 2	CN	-	-	-	-	-
M 3	S	x	x	x	x	x
M 4	S	x	-	x	x	x
M 5	CN	x	x	x	x	x
M 6	CN	x	x	x	x	x
M 7	CN	x	x	x	-	-
M 8	CN	x	x	x	-	-

Results and Discussion

The measurement on the natural ground zone M6 was selected to show the data collection process.

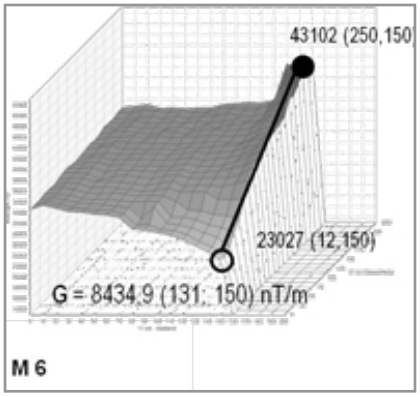

Figure 1: Magnetic field mapping in zone M6. Disturbance gradient: 23027nT.

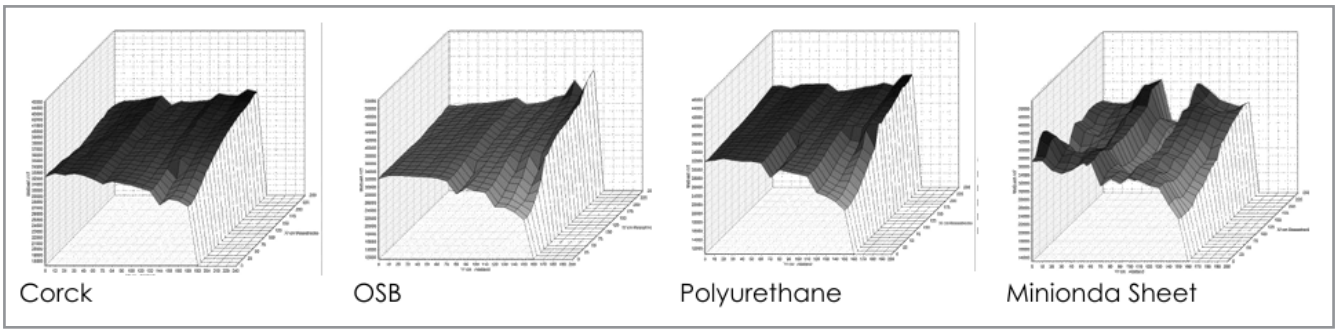

Figure 2: Magnetic field mapping in zone M6 over each of the materials.

The table below summarises the numerical values of the intensities and gradients measured on the natural ground and on each of the materials.

Table 3: Summary of the geomagnetic field intensity values for M6 and the materials overlaid.

MATERIAL	Max. Intensity (nT) (x,y, cm)	Min. Intensity (nT) (x,y, cm)	Disturbance Degree (nT/m) (x,y, cm)
M 6	43102 (250,150)	23027 (012,150)	8434.9 (131,150)
Cork	35196 (240,140)	27222 (012,150)	3494.0 (126,145)
OSB	42457 (250,150)	21562 (000,150)	8358.0 (125,150)
Polyurethane	36460 (250,150)	20720 (000,150)	6296.0 (125,150)
Minionda Sheet	41990 (037,000)	23097 (025,150)	12555.2 (031,075)

The materials that most effectively reduce the disturbance degree of the original ground are listed in this order: agglomerated black cork, polyurethane, OSB, and minionda sheet.

Finally, all the measurements made are compiled in a table, sorting the materials from highest to lowest capacity to reduce the geomagnetic disturbance degree.

Table 4: Summary of the disturbance reduction ranges obtained from the measurements comparing different materials. Materials are ordered from highest to lowest capacity to reduce the geomagnetic field disturbance.

Concrete Slab	Concrete Slab	Concrete Slab	Natural Ground	Natural Ground	Natural Ground
G	M 3	M 4	M 5	M 6	M 7
++	Cork	Polyurethane	OSB	Cork	Cork
+	OSB	OSB	Cork	Polyurethane	OSB
-	Polyurethane	Cork	Polyurethane	OSB	Polyurethane
--	Minionda	Minionda	Minionda	Minionda	-

Conclusions

The conclusions of this preliminary study indicate that these four construction materials have the ability to modify the path and intensity of the natural geomagnetic field (B). Among the construction materials chosen for experimentation (OSB, black agglomerated cork, polyurethane, and minionda sheet), it was found that black agglomerated cork and OSB are the most effective at reducing the disturbance (G) of the geomagnetic field in a given location compared to the other materials. In some cases, cork performs better, and in others, OSB does. This could be due to the variable orientation of the OSB panel chips.

This study marks the beginning of further research aimed at conducting measurements with different construction systems to observe how they behave in relation to the natural geomagnetic field. It would be interesting to start characterizing the electromagnetic properties of materials for which no information exists, and other construction materials, in order to better understand their behavior concerning the natural geomagnetic field.

The use of certain materials in geopathic zones may moderate the disturbance degree of the geomagnetic field. It is concluded that depending on the location, some materials may be more suitable than others. This is very interesting from an environmental quality and health perspective, as it could help create more sustainability and harmony in the environment.

Notes at the End

- Piezoelectricity is the ability of certain crystals and ceramic materials to generate electrical and magnetic signals in response to applied mechanical stress.
- Longitudinal scalar waves, in Maxwell's field theory, are generally overlooked and reduced to zero, despite numerous experiments that suggest their existence and interaction with the human body or other vehicles through resonance, with changes observed in the electromagnetic field of the human body or the vehicle in question. Longitudinal scalar waves are a diffuse mixture of frequencies and wavelengths that could technically resemble the noise produced by an antenna.

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