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SESSION 5

SESSION 6

SESSION 7

SESSION 8

QUALITATIVE ANALYSIS INTO QUAKOID ROLE IN CYCLIC DISTURBANCES AND THEIR IMPACT ON PREVENTIVE MAINTENANCE OF STRUCTURES

SALMAN MOHAMMAD AL-KASIMI *

ABSTRACT

This article reviews the analysis of Quakoid, an earth- layer shell of extreme strength and density, and its contribution to hollow-earth new model. It corrects its estimated edge-depths from 41 and 46 to 11 and 34 Km beneath earth surface. It reveals the hidden role of Quakoid in cyclic disturbances to structures, a natural result of oceans hydraulic forces due to earth daily rotation in the gravitational field of sun, moon, planets and other celestial objects. The paper then shows how disturbances affect structures through expansion displacements and settlement forces, whose magnitudes are governed by: strength of geological structures beneath site, superficial layer characteristics, earth topology at site area, site distance from seas, and structure properties such as dimensions, geometry, weight and strength. The article then discribes preventive measures for structure design and site choice improving life-time of structures and maintenance cost thereafter. Site measures suggest homogenuity in every aspect throughout area of site to be constructed. Design measures suggest circular column-distribution and slab-areas with flexible jointing both vertically and horizontally.

INTRODUCTORY REVIEW TO THE QUAKOID EARTH SHELL:

A statistical research was conducted (a1) looking for "Earthquake Bouncing" on 8082 earthquakes covering any recorded magnitude within six-month period during 1990. The earth layer to which all epicenters belong was named "Quakoid", and was found to extend averagly from depths of about 41 to 46 Kilometers beneath the surface. This finding was based on the calculations of the average accumulative epicenter-depths of analized data settling to perturbe between the indicated limits.

This shell was found to averagly contained the epicenters of the 8082 earthquakes considered, and was thought to be stronger than any other earth layer either above or beneath it, as it was the one critical to earthquaking. Excessive increase or decrase of the pressure inside the Quakoid was claimed to crack it at its exterior or interior respectively, resulting in earthquaking.

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* Associate Professor at The Electrical and Computer Engineering Department of Umm-Ul-Qura University, P.O.Box 6112, Makka, Kingdom of Saudi Arabia.

The data was analized searching for "Earthquake bouncing" within the Quakoid media. The analysis of seismic-waves propagation-speeds was found to reach an averaged maximum of 33.37 Kilometers per second, and it was suggested that this media must be indeed of a very dense nature. This extremely **dense** Quakoid **was** hinted to indicate the **existance** of some other esrth-laver of **extremely** light nature to balance **back** the total earth known **mass.**

For any two successive earthquakes with decending magnitudes having locations $(\alpha_i, 0;)$ and (α_j, β_j) converted to Radians, the angle at earth center was calculated in degrees as given by:

$$\theta_{ij} = cos^{-1}[cos\alpha_i * cos\alpha_j * cos(\beta_i - \beta_j) + sin\alpha_i * sin\alpha_j] * 180.0/\pi.$$

The central angle statistics was found to have a major **peak** around 90 Degrees as **shown** in Fig.1.

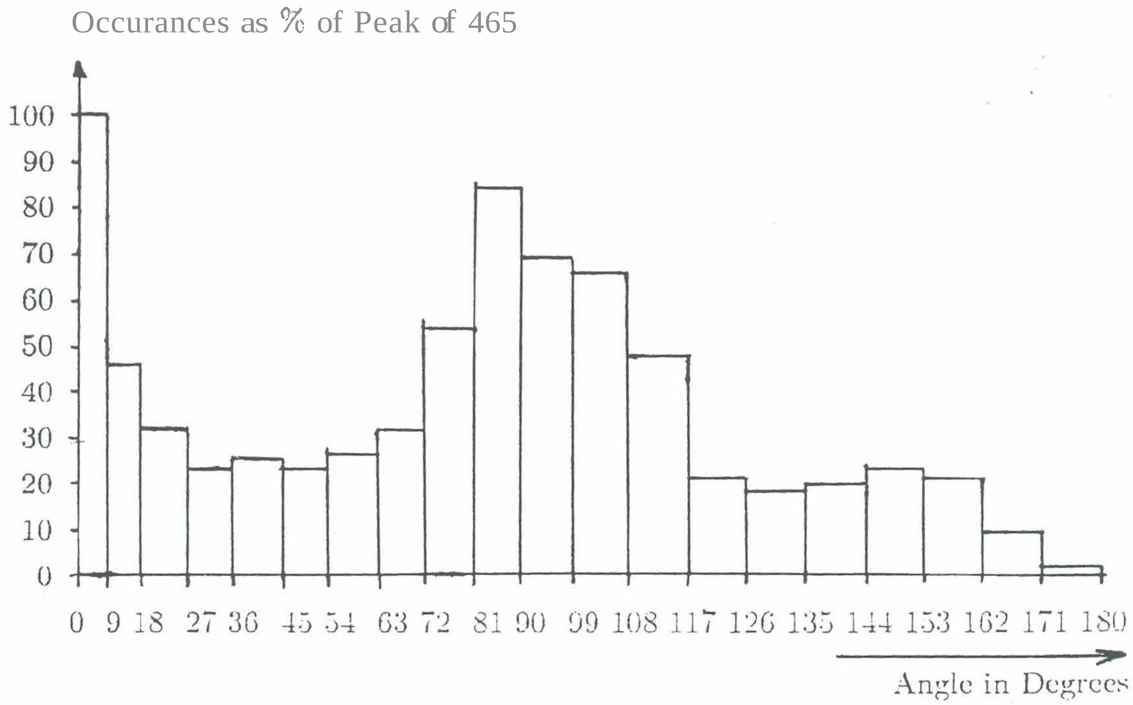

Fig.1: Central-Angle Histogram For **Six-Month** Record

This peak was explained, using a theoretical model, by proposing that the Quakoid thickness vanishes at some regions.

REVIEWING HOLLW-EARTH NEW-MODEL:

Another statistical research was conducted **(a2)** looking for "Topology Effect on Heavy-Earthquaking" on 179 earthquakes covering recorded magnitudes of 8 or higher on the Rechter scale within a century ending December 31. 1990. Each data point was assigned, using a world Atlas (c1). a corresponding topological entry. This entry was the height of land-end at epicenter-location as measured from sea level. The height statistics was found to have one major peak at coasts and two minor peaks at high-mountains and deep-seas as shown in Fig.2.

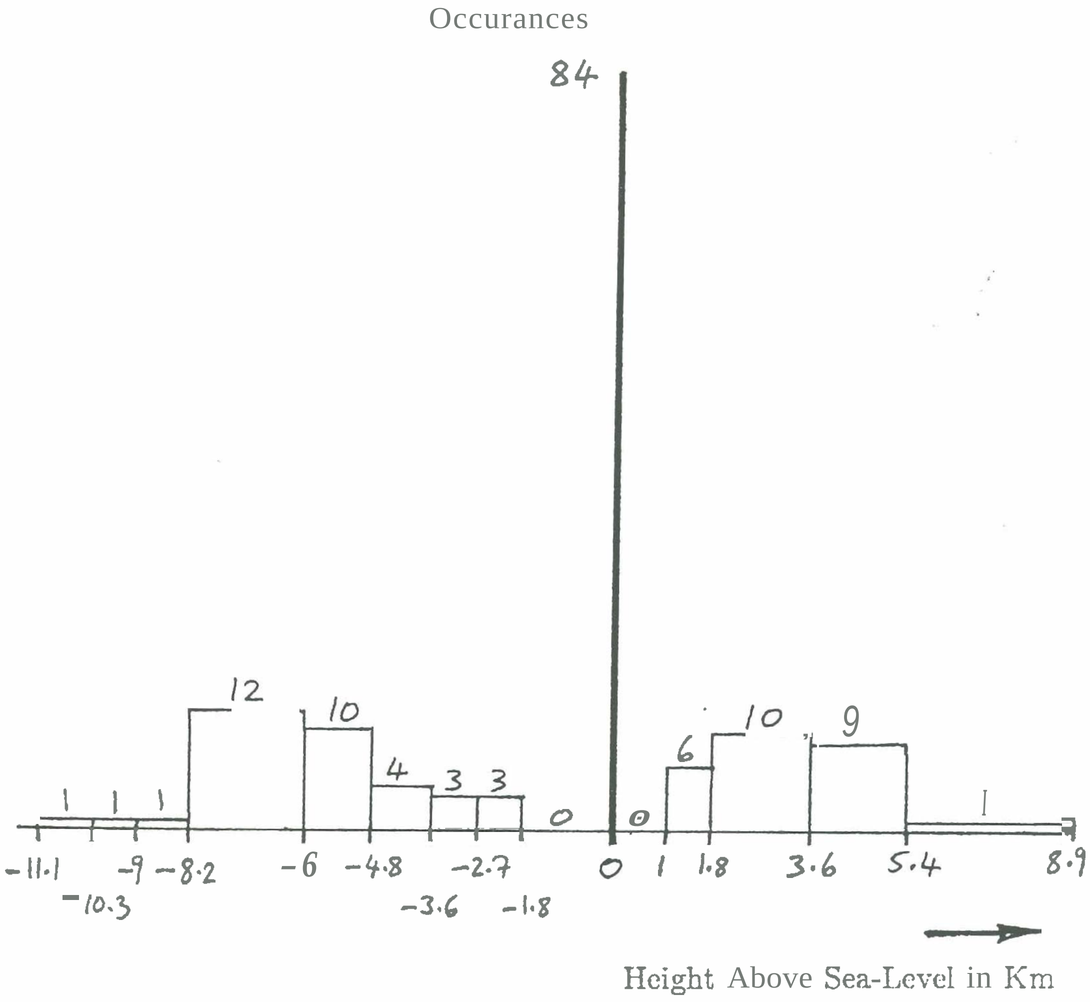

Fig.2: Topology Histogram For A Century Record

The three **peaks** were justified, using the Quakoid vanishing at some regions, by claiming a hollow- earth new model as shown in Fig.3.

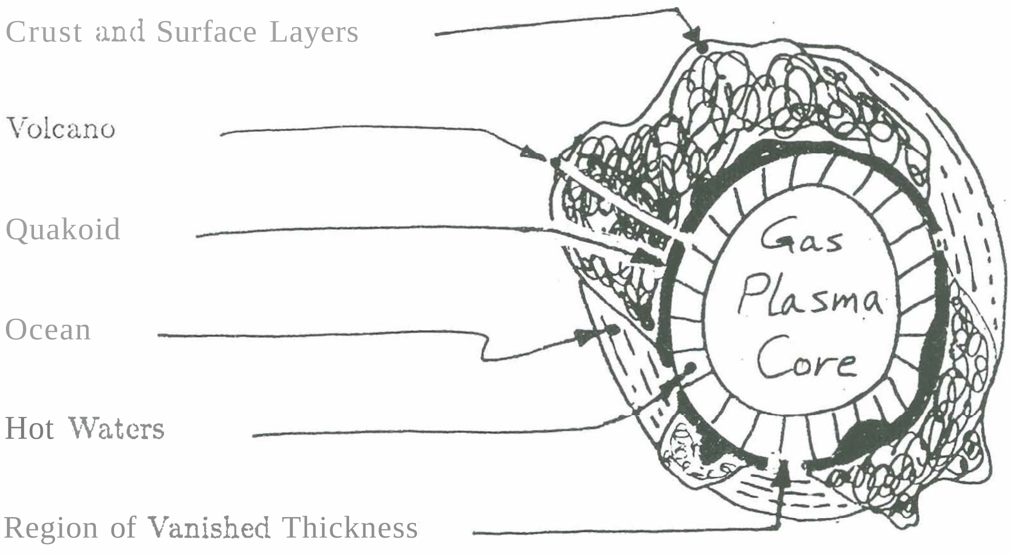

Fig.3: Suggested Hollow-Earth New-Model Showing Its Layers

This new model. is suggested to replace the stuffed earth old model shown (c1) in Fig.4, which was claimed to be violating the basic gravity and rotational physics laws stating (c2) that at earth center gravity vanishes and that rotation leaves higher densities at higher radii with lower densities nearer to center.

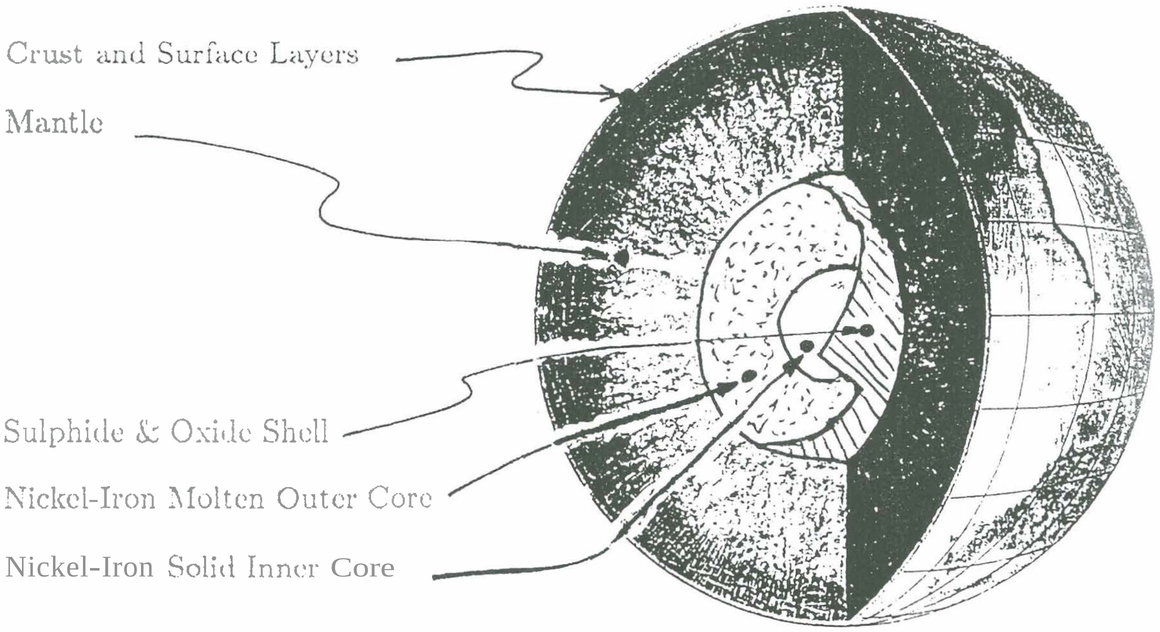

Fig.4: Traditional **Stuffed-Earth Old-Model** Showing Its **Layers**

The hollow-earth new-model, consistant with the above-mentioned physics laws, was further consolidated by explaining through it many of the un-explained phenomina and mysteries. This includes:

1: sea surface-currents being travelling eastwards.
2: presence of so-many Chilian islands,
3: tail-like shape of south Chile,
4: deep trenches local to the Chilian coast.
5: presence of mountains in the west of the two American continents.
6: huge stresses at the Saint Andrias fault,
7: rise of Vancouver Island,
8: permenant nature of volcanic locations,
9: global warming raising the rate of earthquaking and other disasters,
10: sudden climatic changes,
11: animal response prior to earthquakes,
12: Bermuda mystery,
13: birth of tornados always starting in seas,
14: Toulouse of France rising and dropping 40 Cm daily (b1), and:
15: most continents are rising one Centimeter a year (b1).

The hollow earth model was suggested to give a major role for rain-falls and oceanic water-waves in all violent phenomina including earthquakes, volcanos, storms, tornados, hurrocanes, heavey seas and other meteorological absets and disasters. The oceanic waves were claimed to drive earth to rotation around its axis. This dynamics is thought to be disturbed by rain-falls, particularly over oceans. These rain-falls suddenly and locally release massive and energetic high cloud-waters accumulated over extended areas and periods of time. This local disturbance was claimed to be globally settled through violent phenomina.

The hollow-earth new-model was claimed to give early global warning to earthquakes and other disasters via monitoring, anywhere, the disturbances in the daily patterns of Geo-magnetic. Geo-electric, Geo-thermal, gravity or displacement fields. S o evidence of this was proven so far except for an isolated news of some Greek scientist that managed once to expect accurately one local earthquake through local measurements of changes in geo-magnetic *field.*

CORRECTION OF ESTIMATED QUAKOID EDGE DEPTHS:

The Quakoid concept reviewed above seemed attractive and had a lot of implications, not least its influence on structures. Yet, it needed more verification to support it. If correct, a marked evidence should appear on depth-histogram of earthquake-epicenters. For that, a history was analized for recorded data (c3) of earthquakes with any recorded magnitude that occured world-wide during five complete years ending in December 31, 1990. This included 85233 earthquakes. The depth-histogram was, thus, obtained as shown in Fig.5.

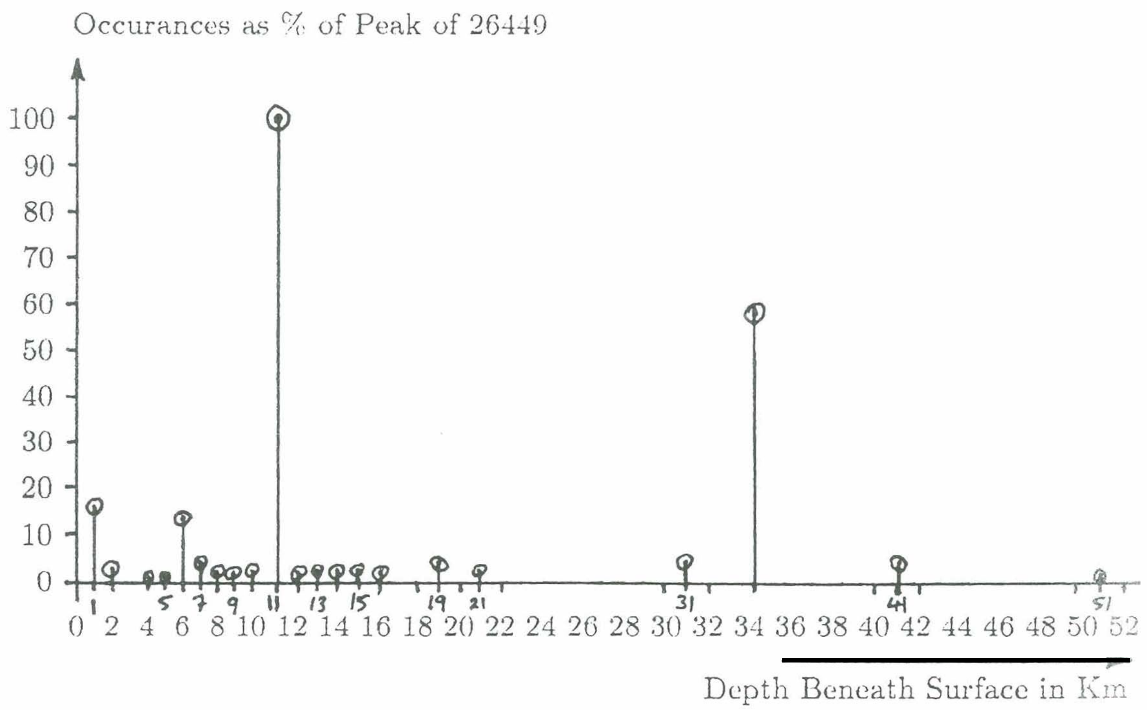

Fig.5: Depth Histogram For Five-Year Record

Here, depths below 51 Km were ignored as they have occurances less than 350 (1.3 % of peak 26449 occurances at 11 Km depth).

The Quakoid-edges are indeed visualized remarkedly, but the Quakoid itself is rather extending from depths of 11 to 34 Kilometers beneath the surface. This makes it 23 Kilometers thick. The two edge-depths account for almost half the total number of earthquakes during the five-year period, with the shallow-edge depth (11 Km) having almost doubled occurances of those of deep-edge depth (34 Km). It is easier, now, to believe that excessive disturbing increase or decrease of the pressure inside the Quakoid might be the cause for it cracking into earthquakes epicentered at its exterior (shallow-edge) or interior (deep-edge) respectively. In fact, it can be mentioned that the pressure inside the Quakoid is disturbed above normal more often than below normal. This is because of the histogram indicating higher occurances (26449 vs. 14880) at shallow-edge depth (11 Km) than at deep-edge depth (34 Km).

The correction of Quakoid edge-depths makes it easier to believe that it vanishes at some regions particularly at deep oceanic trenches. On the other hand, the correction of the extremely-dense-Quakoid thickness (from 5 to 23 Km) makes it easier to believe in the existance of some other earth-layer of extremely light nature, such as gas, to balance back the total earth known mass. If there, the gas layer must be indeed in the earth core, where weak gravity field allows such existnnce. The various layers of water in Fig.3, arc maintained in position by the balance between the gravity centripetal force on one side and the centrifugal forces of pressure and rotation on the other side.

QUAKOID ROLE IN CYCLIC STRUCTURAL DISTURBANCE:

The daily tidal oceanic-waves (resulting from earth rotation in the presence of the gravity field of sun, moon, planets and other celestial objects) cause cyclic variations in the water head pressing the earth-core gas at regions below ocean-bed where the Quakoid thickness vanishes. This hydraulic pressure on the earth-core gas, perturbing daily, tends to change the size of the Quakoid similar to size change of an inflated football undergoing pressure disturbance. If the disturbance increases its pressure, it will grow in size; and vise versa.

This sets the Quakoid, and hence surfaces beneath structures, on a daily so called "breathing" action noticeable anywhere on earth. This action is easier to notice on land rather than sea. The size of breathing of each spot on earth surface is function of so many factors. Some of these factors are:

1: local thickness of Quakoid, where a thick Quakoid segment breathes at less magnitude than thin one,

3: types. weights and characteristics of local geological layers burrying the Quakoid beneath the surface, where strong layers resist breathing,

3: interface characteristics among layers, as slippery interfaces assist breathing,

4: ellevation above sea level?which is indicative to the ammount of loading weight on the Quakoid, where loaded Quakoid segment resist breathing,

5: distance from seas or oceans, where nearby spots breathes at higher magnitudes than far ones due to lack of support at sea end,

6: superficial layer characteristics, where sandy spot assists breathing and rocky one resists that,

7: ground water and other lubricant levels, where low levels resist breathing, and:

8: properties of structures installed on the spot such as: dimensions, geometry, weight and strength, where spots at which strong small heavy structures are installed breathes less than spots with otherwise structures.

The breathing disturbances affect structures through forces acting on their column-footings, radially from earth center. Although the span of a structure constitutes a very small angle at earth center, yet the ammount of breathing forces are so huge that the resultant component could not be ignored if structure life-time is considered.

These forces can be analized into two types of components: vertical and horizontal. The vertical components are partially responsible for structure settlements, whereas the horizontal ones cause displacements. Each is considered separately.

STRUCTURAL DISPLACEMENT DUE TO QUAKOID BREATH:

Fig.6 shows a row of $2N+1$ column-footings interfacing a structure to the earth surface.

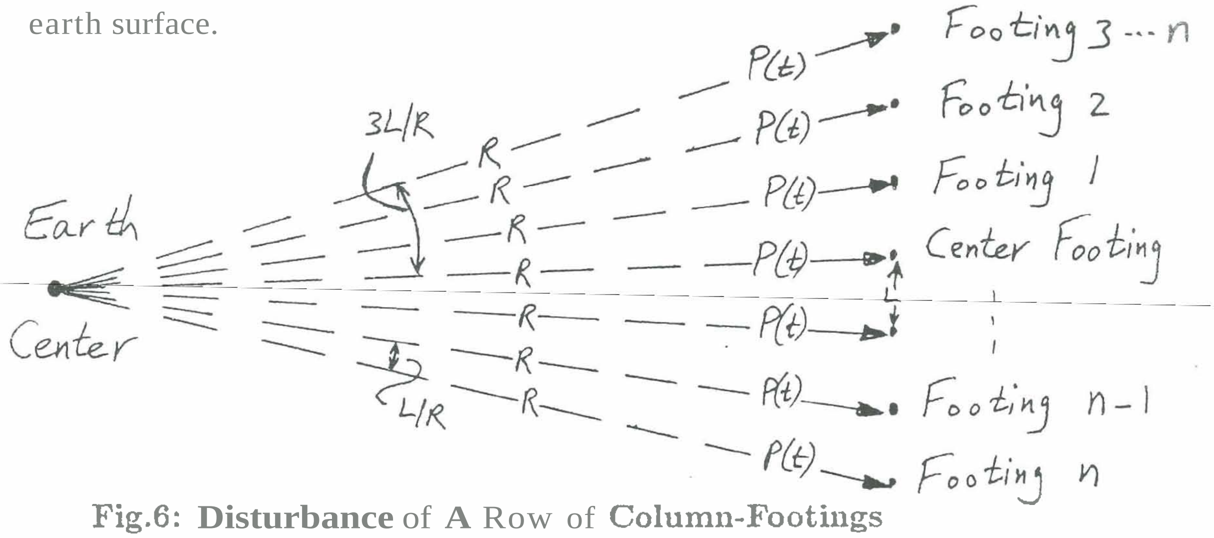

Fig.6: Disturbance of **A** Row of **Column-Footings**

Assuming that:

1: the earth radius is R,

2: the span length between two footings is L, and:

3: the disturbing force, p, due to Quakoid breathing is given by: $p(t) = Psin(2\pi ft)$, where:

4: P is the peak value of p,

5: f is one cycle per day, and:

6: t is the time; then the horizontal force, h_k, on footing-k from center is given as:

$$h_k = kLp(t)/R. \tag{1}$$

This shows that the horizontal breathing force is zero at center, and that it is linearly increasing off-center. This force tends to move the column-footing proportionately sidewise, and hence proportionately shortening the effective column length. This results in cyclicly re-distributing axial loads on columns, and hence cyclicly relieving those off-center proportionately from their initial axial loading.

STRUCTURAL SETTLEMENT eue TO QUAKOID BREATH:

The vertical force, v_k, on footing-k from center is given as:

$$v_k = p(t)[1 - k^2L^2/(2R^2)].$$

To the contrary of h_k; this means that the whole structure is influenced vertically by $p(t)$ with infinitesimal parabolically proportionate decrease off-center. It is here, where the superfacial layer at structure site exert influence. If homogeneous, then all footings are almost moving equally with ignored infinitesimal differences. Otherwise, soil yields differently under each footing. This is the major reason for settlements in structures. A minor reason is the differential distribution of v_k.

Althogh the infinitesimal differences in v_k are smaller in magnitude than h_k; yet the settlement forces, assuming homogeneous site area, results from combined doubled effect of this force plus the relief force mentioned earlier due to displacement. Despite that, still, the differential impact of displacement breathing on column-footing is far higher than settlement breathing in homogeneous site areas.

PREVENTIVE MEASURES FOR SITE CHOICE:

The influence of Quakoid breath on structures has now been established. To neutralize this effect, preventive measures must be considered. These measures influence the way structures are designed and sites are chosen. If followed, lifetimes of structure and maintenance costs thereafter are substantially optimized.

The site measures suggest homogenuity in every aspect throughout area of site to be constructed. Its never a good practice to have a structure partially built on a mountain foot and partially on a sandy land. The breathing response of both is remarkably different, and hence settlements and displacements are not compatable throughout structure footings. If not taken into consideration in better design strategies, this might lead to structural collapse.

One way to test homogenuity, is to bore few excavation holes for few meters and test decompositions and characteristics of soil samples at every depth. If results are within reasonable variations, then site superficial layer looks homogeneous. Deeper layers can be tested using ultra-sonic techniques.

If site was proven in-homogeneous, then some measurements must be taken for: differential settlements of virgin soil, displacement magnitudes, bearing capacities ...etc. These measurements are then considered while designing structure particulars.

PREVENTIVE MEASURES FOR STRUCTURAL DESIGN:

The major breath of structures on homogeneous sites has been established to be through the displacement forces. These forces can be seen from Eq.1 to be proportional to distance off-center. Hence, the cyclic force profile follows the contor of column-footings. If homogeneous profile is required for avoiding stress concentrations, then the contor must be circular.

Design measures, hence, suggest circular column-distribution and circular-segment slab-areas centered at site-center. To compensate for the sidewise cyclic swing of the coloumn-footings, flexible jointing between columns and beams should be adopted. The flexibility of the horizontal-level jointing must be increased with distance from center as the sidewise swing does, but it could be reduced with height of floor since the swing dies down with height.

The vertical differential cyclic swing of coloumn-footings can be compensated by flexible jointing columns and beams in the vertical direction. The flexibility here, contrary to the horizontal-level one, must be increased with distance towards center as the differential vertical swing does. This, again, can be reduced with height of floor since the swing dies down with height.

Extra design precautions are needed when site is in-homogeneous. These include stiffer strength requirements, suitablly-flexible column-support at column-footing. structural-segmentation ...etc.

CONCLUSION:

This paper had reviewed the analysis of Quakoid, an earth- layer shell of extreme strength and density, and its contribution to hollow-earth new-model. It then corrected estimated edge-depths of Quakoid, that were found in a previous research from six-month record of 8082 earthquakes. That estimation was found by monitoring the calculations of the average accumulative epicenter-depths of analized data that settled to perturbe between 41 and 46 Kilometers. The correction, on the other hand, researched in five-year record of 85233 earthquakes, was found by plotting the histogram of the number of earthquakes occuring at each Kilometer of epicenter depth beneath earth surface. Two sharp pulses accounting for about half the earthquakes-total were indicating that the Quakoid edge-depths are present at 11 and 34 Kilometers below earth surface. The use of the perturbations of the average accumulative epicenter-depths for estimating the Quakoid edge-depths was mis-leading.

Re-armed by the findings, hollow earth model was used to reveal the hidden role of the Quakoid in cyclic disturbances to structures. These disturbances were a natural result of oceans hydraulic forces due to earth daily rotation in the presence of the gravitational field of sun, moon, planets and other celestial objects.

The paper then highlighted how daily cyclic disturbances affected structures, through displacements and settlement forces. It mentioned several factors governing the magnitudes of these displacements and forces. These are: local thickness of Quakoid; types, weights and characteristics of local geological layers burrying Quakoid beneath earth surface; interface characteristics between layers; ellevation above sea level; distance from seas or oceans; superficial layer characteristics; ground water and other lubricants level; and properties of structures installed on site such as dimensions, geometry. weight and strength.

The article then discribed preventive measures for structure design and site choice affecting greatly the life-time of structures and maintenance cost thereafter. The site measures suggested homogenuity of site in every aspect throughout area to be constructed. They also suggested boring the site, analizing soil compositions and behaviour and using these informations in structure design. This was added to design measures which suggested circular column-distribution and slab-areas centered at site-center, flexible jointing both in vertical and horizontal directions, vertical flexibilities decreasing off-center contrary to horizontal ones, and flexibility decreasing with structure height.

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