

“Wave - Particle Duality” and Soil Liquefaction in Geotechnical Engineering

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Abstract : In the disaster situation of multi-earthquake, with the phenomenon of vibrating phenomenon and the occurrence of cracks in the surface soil , the collapse of the buildings on the ground are caused. The author tries to explain the phenomenon of earthquake disaster in this geotechnical engineering by using the wave-particle duality theory of sunlight. And proposed the sun in the physics of the already high frequency of the weak light superimposed into the low frequency of the low light wave volatility, once again superimposed, superimposed as a lower frequency of linear light, the energy from low to high. Sunlight from weak light into a strong sunlight, that is, the sun near the observation may be weak light or black sunspots is composed of black holes. By long distance, the convergence of light becomes into a dazzling luminous body. Light from the numerous light quantum and an energy line form a half-space infinite volatility curve , and the role of light plays under the linear form of particles. When the night is manifested of 1 black approaching unconnected light quantum. The author plays the earth as the sun, compared to the deep pressure of low-viscosity clay soil pore ,water performance is complex. Similar to the surface of the sun's spectrum, saturated silty sand is showed volatility, Ground surface high-energy clay showed particle properties. Particle performance is shear strength.

1.Introduction

In recent years of our country ,more frequent earthquakes lead to the earthquake disaster with the phenomenon of high-rise buildings collapse. Roads and other hard soil staggered cracks. The hard mesons transfer most of the energy in the process. However, the soft daughter meson consumes energy and delivers less energy.. The hard delevering meson is like delevering the energy of the quantum collision, but the soft sub-meson shows the volatility of light consuming of a lot of energy. The less energy is more prominent for the volatility to consume energy. However, The stronger the energy is more prominent to the quantum of light, that is, the more powerful the more difficult to dissipate the energy. And the lower the energy the more easily dissipated for the performance of high-energy material particles. And low power shows object volatility. As the time as earthquake liquefaction,, the water transfers energy best and the energy dissappers best. So it shows the performance of volatility like water ripples. The surface of area soil is small, and the collision surface is just a local range. The transmission of energy is not easy, which shows the performance of the particle.. The energy line of lighet is like the performance of capillary water in the soil, which can lead to high frequency fluctuations. Soil particles are the most important factor for making the curve waveform. Capillary water and soil particles are made into a half-space infinite body, with the



performance of the volatility of movement. Just like buddha beads. Saturated soil as the buddha beads material in medium frequency fluctuations in the energy line, and the capillary water is made into a low energy concentration of the moderate energy line. Sand is a common material on the surface of the land with mostly non-capillary water and usually more than the performance to the energy of particles,. When an earthquake occurs, the phenomenon of flow sand leads to the surface of the water outflow. The lower part of the saturated sandy soil occurred shaking, there is a water outflow that the surface of the convergence of energy is very strong. If the upper part are the high-rise buildings, the soil generally does not have water outflow, and more energy gathered to high-rise buildings. The higher the convergence of the greater more energy, so in the earthquake-prone areas, the underlying buildings are bullded.

2.The Principle of Energy Convergence In Physics

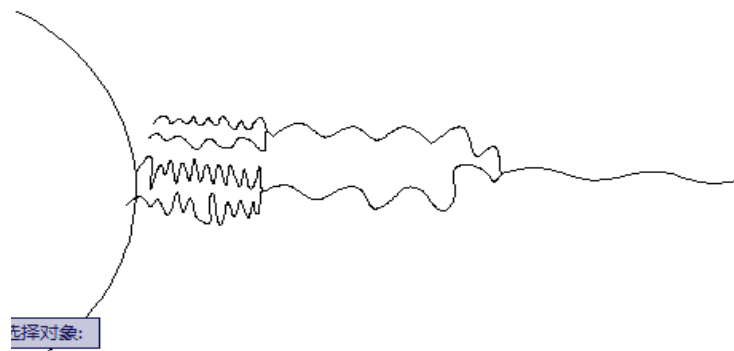


Figure 1. Principle of spectral convergence of sunlight

The energy of the sun in the process of dissipation shows the total convergence, near away from the sun the light energy is weak, with rapid dissipation as the performance for high frequency fluctuations. In the distance of the middle of the sun when the energy occurred convergence. Long distant from the sun it occurs convergence. The emergence of low-frequency pop is similar to the linear state. Its energy is quite large in a dazzling state. To the distance near the sun it is for the volatility, the long distance from the sun, it is the main performance of the particle.

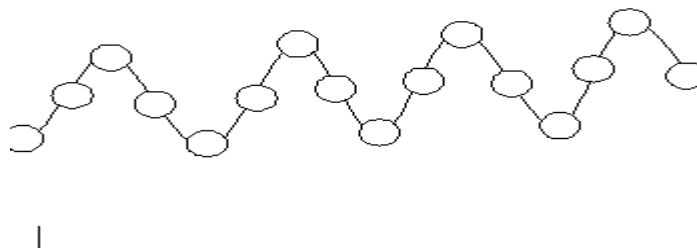


Figure 2 The curve of energy line and light quantum

Light quantum is the existence of Ethernet tiny transparent particles, and the movement is connected by the energy line with the composition of the law of volatility. When the energy is very difficult to dissipate when the performance of a linear collision process appears.

Similar to the flashlight poke, strong external force is put on the wave of light, strong energy first performs the particle, after the dissipation and then performs the volatility. This is the experimental nature of Wave - particle duality.

3. Wave-Particle Duality in Geotechnical Engineering

In geotechnical engineering, the center of the earth is equivalent to the body of the sun, and the soil particles are equivalent to the light quantum of the space, and the void water is equivalent to the energy line in the sun light.

In the event of earthquakes, that is, when the crust is moving, the distribution of more frequent and weak energy, or else the volcano will not erupt to the surface and turn to the crustal surface accumulation of volcanic lava. In the role of groundwater, the energy continues to converge to the surface.. Sand liquefaction occurs under the action of shaking vibrating sand. The author publishes papers on the foundation soil liquefaction damping research. If the liquefaction does not occur, the destructive power between the soil transfers to the surface of the building, and further passes to the high-level part so that the violent shaking occurs.

This study presents several assumptions:

(1) the soil in the crustal energy dissipation process changes from the weak capillary water into sufficient groundwater, and then it expresses as a strong particle collision mechanism, that is, the shear strength of soil. That is, the convergence principle of energy, it convergences from low energy to high energy quantum..

(2) in the process of energy convergence, the soil particles may be broken.

(3)The thickness of the capillary water channel determines the level of energy convergence, like the pool coming together into the same river.

(4) in the surface of the soil, mostly capillary water is existed just like no volatility, fully understood as the particle. that is the linear collision state.

(5) light is formed of the light quantum and energy lines, the particle collision is changing from volatility into a straight line.

(6) the soil is the composition of soil particles and capillary water. There is no capillary water when the energy is completely transferred to the soil particles, that is, the structural principle of the soil..

In the ether space, the energy of each light quantum is $E = MC^2$, and the kinetic energy is low so the vibration frequency is high. At last, the performance is fluctuating; when the kinetic energy is high, the vibration frequency is low, and the particle is linear.

In the soil, the distance of the soil particles from the center of gravity is larger, the the potential energy G is greater. so G is positive. $E = \frac{1}{2} Mv^2 + G$, soil particles moves to the center of the earth, which are consolidated. The closer to the center of the earth, the soil reflects the complete consolidation of the state. Farther away from the ground and more close to the surface, the soil showed more loose state. Under the groundwater level, the water is now fluctuating, hanging up in the capillary water, volatility weakens, to no capillary water, which performs the linear relationship between particle collision. In other words, the energy in the transmission process is always volatile, but in longer distance, the volatilefrom performs liner state. The weaker the amplitude of the beat, the the frequency is lower.

Particles are only relatively speaking, volatility is permanent. Einstein's black box theory is realized in the local space, if the light in a broader space will bend, there is a slight trend of bending, in a limited local range, the light is always along the straight line. Soil particles are consolidated.

In the soil analogy analysis, more close to the ground, the capillary water performs more complex chaotic. Under the groundwater level, the water body in the sand or silty sand shows regularity. By the Darcy law $V = K i$, the hydraulic gradient performs laminar flow state, that is, the law state. The greater the hydraulic gradient, the more turbulent state, that is, irregular. Of course, there are two reasons that the flow of water is not easy. One for the confining pressure of the water channel compacted closes water channel, two is that channels for the water is too thick, there is no enough water to fill the channel. When the confining pressure is too large, that is, in the deeper soil, the soil crowding degree, the soil energy is easy into water kinetic energy, which is easy to laminar flow trend. In the surface, the soil pore channel is large, the kinetic energy of the soil is completely transformed into the shear strength of the soil particles. At this time, the water in the soil can not fill the pore channel, so the kinetic energy of the water in the pore is not big. From the effective stress principle, $p = u + a$, p is the total energy, u is the excess pore water pressure, and a is the effective

stress.. At the surface, the water body $u = 0$. $a = p$. The performance of the collision of soil particles is friction, that is, the shear strength of soil. At this time the performance of soil is particles.

In the volatility curve, the waterline only provides the energy transferration, the degree of damage depends on the size of the natural energy of the soil particles. If the surface the energy of the earth ,maybe it is huge enough to shake a building.. In the process of energy transmission, the energy of the soil particles is getting bigger and bigger, and finally the fragmentation of the soil particles and the collapse of the building are caused. In the light I-line or water flow connection, the energy from one end of the half-space infinite body to the other end of the infinite distance, the performance of energy more and more concentrates, and the performance of light is linear propagation, far away. That is, the collision process of light quantum.

4.The Relationship Between the Liquefied Liquefaction and the Two Particles

In the sand, when the buoyancy generated by the void water is equal to the gravity of the soil particles, the soil particles are in the suspended state. There is no friction among the soil particles, and it can be seen as a liquid fluid state, but it is just a lot bigger than water molecules. It can flow, which is sand liquefaction. When the sand has liquefaction, the water body shows volatility, and the energy transfers out, the occurrence of liquefaction is entirely due to the volatility of water molecules . The reason for the occurrence of vibration liquefaction is the vibration of the earthquake. Water molecules are full of fluctuations, and no cohesion is among the soil particles. Soil particles among the existence of water is reflected the volatility. No pore water performs the particles.

Particle directly lead to earthquake damage, volatility is mainly used to dissipate energy, so in the application, the use of particle volatility is to reduce the earthquake damage. The Particle particles are as weak as possible. In the earthquake-prone areas, in the treatment of the foundation, to the groundwater level, the clay will be filled into sand, saturated sand in the vibration state is prone to sand liquefaction, In the middle of the ground we build a layer of saturated sand, we take the use of vibration liquefaction to reduce damage. At the surface, for effective rolling, the soil compaction becomes smaller. The use of rolling soil particles make the pore become smaller, the soil particles dense, compaction. Increase the effective stress, and increase the friction, control the movement of soil particles. In this case, the liquefaction will dissipate the main energy, the energy delivered to the surface is minimal, the surface seismic capacity is strong, because the surface is hard soil. The surface soil particles are compact, reducing the collision motion of the particles, so it is not exercise, which is the equivalent of no energy transmission.. The energy is enclosed in the sand liquefaction zone. For example, as if in the iron drum in the agitation of water, water constantly moves, which has the constant consumption of energy, but the iron has always no movement. This is like a liquefied soil layer is set to hard soil layer of protective layer role. Liquefied office access to the fine sand for the useless soil, the cost is very low. we can use waste and greatly improve the use of fine sand, turning waste into treasure.

5.Iron Bucket Effect

Put an iron bucket at the ground, the bucket fills with water, with the utensils or hand kept stirring the water inside the bucket, but the barrel does not move, everything outside the barrel seems to have nothing happened. Water is the damper of the earthquake, and now the water for the dampers is taken place of saturated fine sand, which can occur liquefaction.. Iron bucket is buckled under the surface, the barrel is filled with liquefied saturated fine sand.. We can study how much the effect of iron drum on the shock absorption, How does the effect of saturated fine sand liquefaction on the effect of reducing vibration. Analysis of shock absorption from two perspectives: (1) dissipation of vibration energy, take the use of volatility to reduce the seismic energy, that is, the method of dredging; (2) with the resistance method of shock absorption, the iron is very good line of very dense soil, there is a certain degree of stiffness, with less prone to deformation. The volatility of the earthquake and the particle are completely separated from the outside world. Use the volatility and then hinder the particle transferring energy. The dissipated energy is separated by an isolator. That is, the energy is completely consumed by volatility, and the energy is not allowed to pass through the iron drum, and the seismic energy is shielded with a hard and dense barrier. The inverted buckets can be analogous to

the support piles of the foundation pit, and the support pile behind the backfill is similar to the outer wall of the drum.

As Figure below:

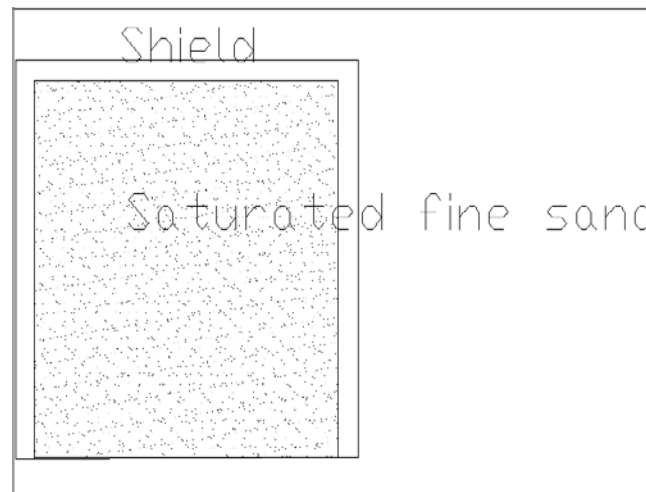
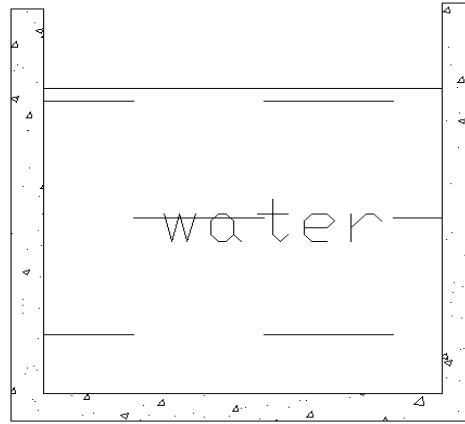


Figure 3

Figure 4

6. Conclusions

In the role of seismic load, the soil may occur liquefaction damping effect, and it may also not meet the conditions of soil liquefaction, and the energy transfers further to the upper high-level structure. In the process of energy transferration, seven conclusions are summarized as follows:

1) In the process of soil energy transferration, the soil particles are equivalent to the light quantum, the water is equivalent to the light line, and the light quantum wears into a curve which can be volatile material;

2) Volatility is eternal, only the strength of the fluctuations is high or low, the particle is weak volatility, the particle is relatively speaking. That is, the linear propagation of light is relatively speaking;

3) In the light transmission process, the energy from the low energy level to high energy level, from weak to high energy, it is mainly because of the superposition of energy concentration;

4) Water is a volatility, the water is the earthquake dampers, with cheap saturated powder sand as a damper, so that fine sand liquefaction is used to consume energy to reduce shock;

5) Iron bucket effect reflects the fine liquefied sand can be used to reduce shock, shield can be effectively isolated earthquake from our buildings;

6) The inverted buckets can be analogous to the support piles of the foundation pit, and the support pile behind the backfill is similar to the outer wall of the drum.

7.References

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