INTERNATIONAL JOURNAL OF SCIENTIFIC PROGRESS AND RESEARCH (IJSPR) ISSN: 2349-4689

Detection of Underground Water using Sound Waves (A SURVEY)

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Abstract: Underground water detection is a social problem; we know underground water is how essential nowadays there is no sufficient technology to detect underground water.PMR and hydro physics one of the best technology to detect underground water. But passing electricity to the earth is not safe also we did not get better performance level. Instead of passing electricity we can pass sound waves the performance level become high comparatively cost becomes low and the implementation gives faster result.

Keywords: E9, PMR, Performance, detection.

I. INTRODUCTION

Detection of water which is hiding below the earth is very important. Now a day scarcity of water is a major problem we are facing, if we use the underground water some sort of problem will be solved. To dig the bore well first we should know that whether the water will be present or not. For many purpose also detection of underground water is very important. But the technology grows rapidly in all fields. But in the field of detection of underground water, we didn't get the sufficient technology. Some technologies are available like using coconut, using rods. But it is not sufficient and efficient. Now trendy we using E9 method involve searching for water located below the earth surface in paretic layer or aquifers, in order to pump it. This is done with the utmost care and precision using appropriate techniques in order to dig or drill well in the best possible places their by avoid costly, discouraging failures. Around 1250 BC, Onwards are using this technology. Given the growing and vital importance of water and soil

Resources around the world, as well as their scarcity, we need to do everything possible to improve the finding management and preservation of these essential and fragile resources. Ground water is usually good quality water. As it is often buried at significant depths, It is highly advisable to locate it. As precisely as possible and asses its quantity and quality before undertaking costly drilling work and thus avoid costly failures. E9 method involves so many processes and so many different methods like by using rods and coconut. We think thus coconut and rods processes are simply superstitious. We didn't believe that processes. So we go for the modern method that is Hydro geophysics and PMR.

II. E9 [1]

E9 method involves searching for water located below the earth surface in paretic layer or aquifers, in order to pump it. This is done with the utmost care and precision using appropriate techniques in order to dig or drill well in the best possible places their by avoid costly, discouraging failures. It involves two methods; those are hydro geophysics and PMR.

A. HYDROGEOPHYSICS

The geographical method is the main method of investigation and detection of underground aquifer. It mainly depends on the geological contest.

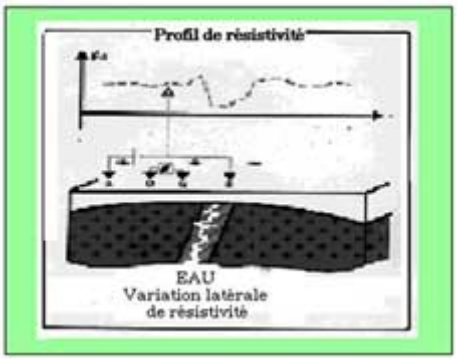

Fig 2.1 Traditional geographical method

From the Fig 2.1 we strive to study the physical properties and its electrical properties. The aquifers are most often trapped between rock layers. All rocks conduct a certain amount of electricity but their conductivity and resistivity vary according to their type. These methods are thus based on the capacity of the soil (or) rock to conduct electricity and the measurement of their conductivity or resistivity.

These are two main types of methods which are sometimes used successfully

It consists in sending direct current into a geological structure on a given site (50-400volts). Using two electrodes (A and B) as shown in the above Fig 2.1.

B. PMR (Proton magnetic resonance)[2]

This is a direct water detection methods, it consists of sending electric currents into the ground. It requires

sophisticated equipments including proton magnetic fields. But these two methods are not sufficient and also not efficient. Though it has advantages, there are disadvantages also. The disadvantages are –Dowsers can never guarantee the presence of water nor its depth, quality or quantity. Moreover, it can be distorted by various factors and it is indispensable most of the time operations based solely and dowsers finding do not bear fruit or the findings are two imprecise. The operation is difficult to assess since situation are rarely comparable moreover, the use of this equipment presents drawbacks: it only allows detections down to a certain depths and indication may be disported by the presence of electromagnetic signals or electric lines the main problems of this methods is, it is too costly to implement. To overcome from these disadvantages we have planned to pass the sound waves. Now days we are not getting the suitable technique to detect the underground water. This is the major problem that we are facing.

Sound is produced when something vibrates. The vibrating body causes the medium (water, aired) around it to vibrate. Vibrations in air are called travelling longitudinal waves which we can hear. Sound waves consists of areas of high and low pressure called compressions and rarefactions.

Travelling wave

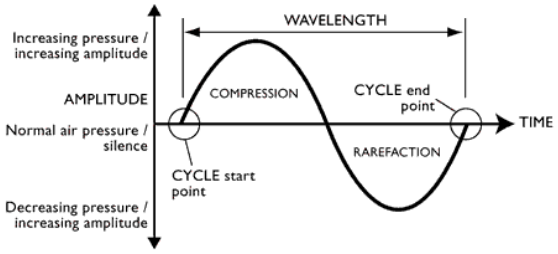

Fig 2.2 a simple sound wave transmission

The shaded portion represents the varying pressure here. We know that sped travels at 343 meter per second. At STP we can produce the sound in many ways. When sound occurs in that time sound waves are produced automatically. Generating a sound wave is not a big problem compare to electric and magnetic waves. We can produce the sound waves very easily and sound travels in different pressure and different medium. Nowadays we are using sound waves in many purposes, then why we these sound waves in the purpose of detection of water can't. There are so many types in sound waves like Transverse waves, longitudinal waves, Acoustic waves, seismic waves etc. Out of these waves can also use longitudinal waves and acoustic waves or seismic waves for this purpose. Yes

These waves have the capacity to travel in below the earth. The mechanical wave had a great property like.

*It is very energetic.

*When frequency increases sound will also increases.

*They can be transfer over long distance without loss of energy.

In the time of transmission period if we use electric waves. Some amount of energy and heat will loss sit can be reduced by using sound waves. We also use these sound waves in many applications like detection of flowing water in the metals and SONARS, metal cutting purpose etc. Like this nowadays sound waves plays a major role in many fields. [3] The important things of sound waves is that it travels faster in solid medium when compare to liquid medium and gaseous medium because in solid medium the atoms are tightly packed. For example imagine one molecule hitting the next molecule and then that molecule hitting the next and so forth the distance between molecules in solids are very small that solids are more dense as compared to liquids and gases because they are so close then they can collide very quickly shorter than in gases, but longer than in solids. Liquids are denser than solids, so sound waves travels second fast in liquids. As we mentioned in the above following sound waves travels faster in solid medium so taking sonar technology as an example. Since sonar technology completely depends upon the sound Propagation and these we use ultrasonic waves in liquid medium to detect the object under water likes rocks, submarine, icebergs and to find the depth of water bodies so here by we came to known that sound travels faster in solid medium compare to liquid medium, So, why can't we use to ultrasonic waves to detect the underground water ultrasonic waves can be produce by using these two method piezoelectric effect and magneto astrictive effect.

Electric waves verses sound waves

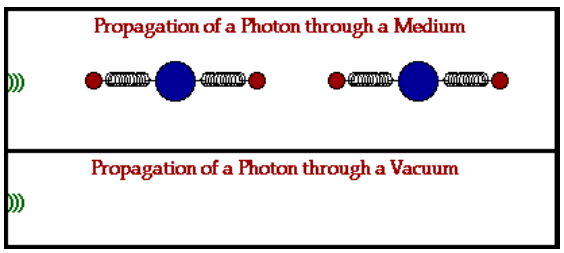

Fig 2.3 Propagation of electric waves

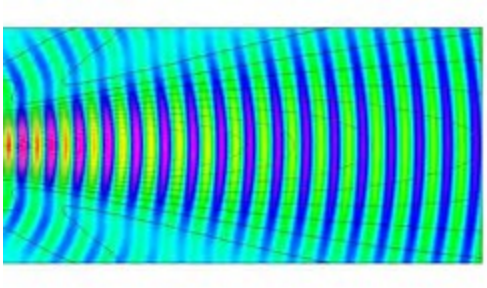

Fig 2.4 propagation of sound waves

When electric waves are passed into the underground for detecting water, if the waves touches the rocks inside, then the energy will be loosed, so these will be no confirmation that electric waves will reach destination or not but in case or sound waves when it is passed into the underground for detecting water, if the waves touches the rocks then only the effected rays remains there itself but the other rays reaches the destination to detect the water and hear energy of the sound waves remain constant.

Small idea for detection of underground water

Fig 2.5 sound level detector

Sound waves transmit in different pressure level in each medium. Firstly, we pass the sound waves in the solid medium, then it travels in constant pressure level then when it reaches the water level, pressure changes according to the water level so, at that time will came to know that water is present and the pressure is checked to use pressure level meter.

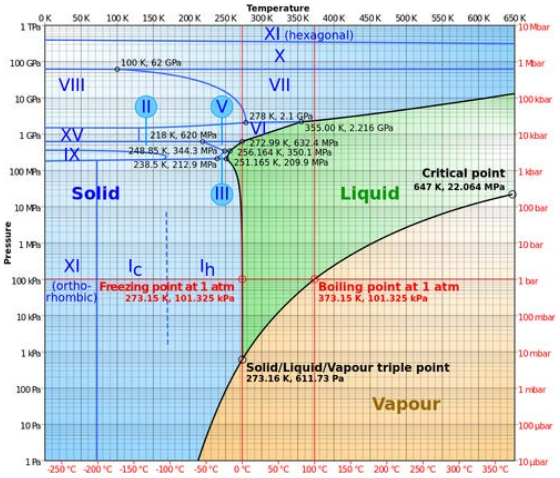

Fig 2.5 solid medium versus liquid medium in pressure

CONCLUSIONS

As we discusses in the above session, our main idea is to implement the sound waves instead of electricity to detect the underground water level. Since sound waves travels faster in solid medium, we thought of using these sound waves in this water detection process

REFERENCES

[1] www.wikiwater.fr
[2]www.wikiwater.fr
[3] www.physlink.com