WWJMRD 2017; 4(2): 86-88
www.wwjmrd.com
International Journal
Peer Reviewed Journal
Refereed Journal
Indexed Journal
UGC Approved Journal
Impact Factor MJIF: 4.25
E-ISSN: 2454-6615

Dzhumaev Zokir Fatulayevich
Bukhara Technological Institute of Engineering Bukhara Republic of Uzbekistan

Fatulayev Sardorbek Zokirovich
Bukhara Technological Institute of Engineering Bukhara Republic of Uzbekistan

Fatulaeva Gulchekhra Zokirovna
Bukhara Technological Institute of Engineering Bukhara Republic of Uzbekistan

Correspondence:
Dzhumaev Zokir Fatulayevich
Bukhara Technological Institute of Engineering Bukhara Republic of Uzbekistan

Experimental Speed Determination Methods Distribution of wave in the Half-Space

Dzhumaev Zokir Fatulayevich, Fatulayev Sardorbek Zokirovich, Fatulaeva Gulchekhra Zokirovna

Abstract
When an explosion occurs in the rock there is an explosive wave that moves very fast - almost at the speed of sound. This wave reaches the surface of the rock. When reflected from this surface a blast wave transforms from a wave compressing the rock into a rarefaction wave causing tension cracking and rock failure.

Keywords: pieces of rock soil medium waves blast wave.

Introduction

In this case small pieces of rock appear which come off the surface and jump upwards at a considerable speed. This is just the appearance of a splash caused by the reflection of a blast wave. When considering the various phenomena of an explosion in a rock the question often arises of what is the effect of the initial impact of explosive gases and what the effect of their subsequent expansion is. But with the processes under consideration one can still note the initial formation of cracks and the jumping of the fragments during the splitting. These phenomena can be attributed to the initial action of the blast wave. Then begins the gradually increasing displacement of large rock masses - the mechanical work of expanding explosive gases is manifested. Bukhara region was the construction of a protective structure (Fig. 1) L = 2m (V = 8m^3) from reinforced concrete. Sensors 1 was installed on the base of the structure and sensors 4 5 6 on the surface of the ground environment. Schematic of directed blast waves is shown in Fig. 1. The vibrations of the ground during the explosion are non-stationary; therefore the displacement of the particle varies with time. The energy of seismic waves is characterized by the speed of oscillation. The dependence of the velocity on the weight of the charge and on the distance to the source of the explosion was determined by formula

$$\vartheta = k_v \left(\frac{3\sqrt{c}}{r}\right)^{\frac{3}{2}}$$

Where ϑ speed m / sec; c - charge weight kg; r - distance from the outbreak m K_v - coefficient varies depending on the conditions. In the given conditions K_v =70 5. the result of the calculations of the experiment is shown in Table 1. The registration of oscillations was carried out by two components X and Y. There are two categories of seismic waves: volumetric and surface.

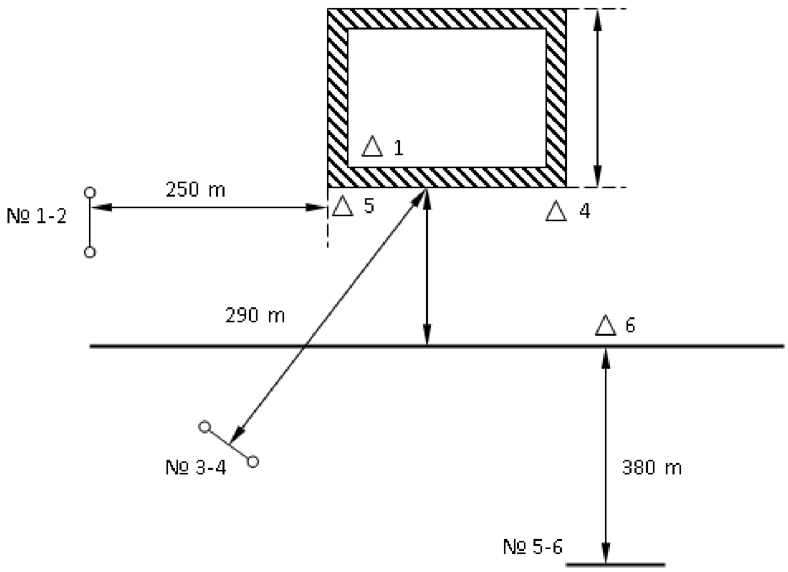

Fig.1: Location of experimental explosions and sensors in the area of protective structures (dimensions in m.)

Volumetric waves can be of two types: longitudinal and transverse. Surface waves have a larger number of types. The main ones are the Rayleigh wave and the Love wave. The propagation velocity of the longitudinal wave is given below (km / s)

Ground (steppe zone)............................ 2.6 - 3.0
Limestones of sandstone........................... 2.2-2.5
Ground (water-free ground)..................... 0.6 ÷ 0.8 Loose soils.. 0 1 ÷ 0 2

This data was obtained with the help of SV-5 equipment. The propagation velocity of longitudinal waves was compared by the results of [1]. The results of calculations differ up to 30%. It is explained that in the Bukhara region the land is high salted and water-dried. When these circumstances are taken into account the following can be established. If we know the scales of the charge the densities of the people and K_v then it can be determined by means of empirical stress formulas. Usually the calculation of radial stresses in the rock is of practical interest only in those areas where the blast wave is capable of producing particular disruptions. In this case it is necessary to take into account the energy losses to these disruptions which leads to a decrease in the calculated value of the charge mass with increasing distance traveled by the blast wave. If we express the density of a rock in kilograms per cubic meter then we can apply the formula of AN to calculate radial stresses in rock formations. A.N. Hanukaev

$$\sigma_R = F_\sigma \gamma \left(0{,}77\,\frac{q}{R^3} - 0{,}4\,\frac{q^{\frac{2}{3}}}{R^2} + 0{,}11\,\frac{q^{\frac{1}{3}}}{R} \right).$$

Below are the values of the density of some rocks which are further used in calculations

Breed	Diabase	Granite	Marble	Limestone Tuf
γ_1 кг/м^3	3300	2650	2790	2350 2120

The time t of the action of the wave is almost independent of the distance. In hard rocks one can take approximately

$$t \approx \frac{\sqrt[3]{\alpha}}{2000}$$

Maximum mixing speed

$$V_R = \frac{\sigma_R}{150}.$$

In this formula the coefficient $\frac{1}{150}$ depends on the units in which V_R and σ. In the above formula is expressed as indicated above in kilograms per square centimeter and speed - in meters per second.The displacement of the rock during the passage of the blast wave has a significant value in the action of the explosion in the ground. This displacement is approximately equal to $U_R \approx \frac{1}{2} V_R t$.

On the basis of the above formulas

$$U_R = \frac{F_\sigma \gamma}{3000}\left(\frac{1}{130}\frac{q}{R^3} - \frac{1}{250}\frac{q^{\frac{2}{3}}}{R^2} + \frac{1}{860}\frac{q^{\frac{1}{3}}}{R} \right).$$

Mixing is more convenient to express in millimeters. Then

$$U_R = \frac{F_\sigma \gamma}{3000}\left(7{,}7\frac{q}{R^3} - 4\frac{q^{\frac{2}{3}}}{R^2} + 1{,}2\frac{q^{\frac{1}{3}}}{R} \right).$$

Thus with the explosion of 1 kg of TNT on the surface of the rock (F_σ = 0 2) mixing at a distance of 1 m will be approximately 1 mm.

If the charge is L then for the calculation of the listed quantities σ_R t V_R S_R you can apply the same formulas but they need to introduce an equivalent charge calculated in the same way as was done above in calculating the parameters of an air shock wave. The equivalent charge

$2\frac{R}{L}q$ under the condition R <L. The stresses and bias in the explosion considered here refer to solid (rock) rocks. Relatively close to them are the stresses and displacements in the soft water saturated soils. Quite differently soft soils (clay loam) which are not completely saturated with water (Bukhara region of the Kyzyl-Kum step) i.e. containing some air or other gases (eg methane).

Таблица 1. Результаты наблюдения скорость распространения волн**.**

№ Experience	C kg	Mixing			
		X		У	
		t sec.	A m.	t sec.	A m.
1	1	0 031	0 0119	0 020	0 0075
2	1	0 030	0 056	0 015	0 026
3	10	0 031	0 212	0 020	0 075
4	10	0 030	0 201	0 015	0 061
5	25	0 031	0 106	0 020	0 082
6	25	0 030	0 32	0 015	0 076

On the basis of the obtained results it is revealed that when blast waves propagate in such soft soils air bubbles are compressed and the gas contained in them is heated under compression. As a result the heat from the gas is very quickly transferred to the surrounding water and soil particles. Thus a significant part of the energy of the blast wave is lost and the blast wave rapidly weakens.

References

1. Nonlinear electromagnetic waves. Moscow: Mir 1983. - 312 p.
2. Strike explosion and destruction. Translation from English. - M.: Mir 1981. 238 p.
3. Dynamics of impact. Sat. Translations. - Moscow: Mir 1985. - 296 p.