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Study of the Success of Explosion on Overburden (OB) Displacement Activities in Efforts to Achieve Production Targets at Pit 7 at PT. Alamjaya Bara Pratama East Kalimantan Province

Kajian Keberhasilan Peledakan pada Kegiatan Pembongkaran Overburden (OB) dalam Upaya Pencapaian Target Produksi di Pit 7 Pada PT. Alamjaya Bara Pratama Provinsi Kalimantan Timur

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Abstract

The purpose of this research is, to determine the success of blasting in an effort to achieve the production target, to know the types of explosives, to know the use of abrasive materials used in blasting activities, to know the production achieved and the fragmentation produced in blasting activities. The blasting process at PT. ABP is said to be successful. The blasting target was not achieved due to the drill unit which experienced a lot of breakdowns, and weather factors that prevented the blasting target in April. PF 0.19 Kg/M3, ANFO used 220,350 Kg, Dinamit 2,353.50 Kg. The weight of the blast hole filling with an average depth of 6 and 8 meters with a column length of 3-4 meters, the amount of explosives used is 10-25 Kg/Meter, so the total is 30-100 kg/hole if the blast hole is in dry. With the number of production targets desired by the company in April is 1,880,220 Bcm and the actual blasting production field in April is 1,154,050 Bcm, the resulting fragmentation is 37-42 cm.

[*Tujuan penelitian ini adalah untuk mengetahui keberhasilan peledakan dalam upaya pencapaian target produksi, Mengetahui jenis-jenis bahan peledak, Mengetahui Penggunaan bahan peledak yang dipergunakan dalam kegiatan Peledakan, Mengetahui produksi yang dicapai dan fragmentasi yang dihasilkan dalam kegiatan peledakan. Proses peledakan pada PT. ABP dikatakan berhasil. Tidak tercapainya target peledakan dikarenakan unit drill yang banyak mengalami breakdown, dan faktor cuaca yang membuat tidak tercapainya target peledakan di* *bulan April. PF 0,19 Kg/M3, ANFO yang dipergunakan 220.350 Kg, Dinamit 2.353,50 Kg. Bobot isian lubang ledak dengan kedalaman rata-rata 6 dan 8 Meter dengan panjang kolom isian 3-4 Meter. Jumlah bahan peledak yang dipergunakan adalah 10 – 25 Kg/Meter. Total keseluruhan adalah 30 - 100 Kg/Lubang jika lubang ledak dalam kondisi kering. Dengan Jumlah target produksi yang diinginkan oleh perusahaan di bulan April adalah 1.880.220 Bcm dan actual di lapangan produksi peledakan di bulan April adalah 1.154.050 Bcm, Fragmentasi yang dihasilkan 37-42 Cm.*]

Keywords: explosion on overburden; displacement activities; efforts to achieve production targets; PT. Alamjaya Bara Pratama

I. Introduction

The large number of production targets to be achieved must also be supported by mechanical tools needed during activities, so that mining companies can optimally meet consumer demand for using coal products by optimizing coal production capacity from the amount of reserves mined and consumer needs. It is considered necessary to prepare mining activities and other mining supporting facilities. Mining is all types of activities, technology and business starting from prospecting, exploration, evaluation, mining, processing, transportation to marketing. The mining stage itself consists of several relatively hard overburden dismantling process activities that need to use ripping and blasting (blasting), but when we use the ripping method it is not very effective so blasting is needed. Exploding is used to crush/break rocks that cannot be crushed/broken by mechanical means.

Blasting that is carried out in several sections, especially for Overburden (OB), blasting techniques generally contain practical knowledge of blasting practices in mining of minerals which in their implementation without leaving the principles of efficiency and effectiveness. In order for these expectations to be fulfilled, every individual involved in blasting must consider the aspects of safety (safety), production targets and the environment. Thus, if a blasting team has members who already have the same commitment, expectations about efficiency and effectiveness will come true.

II. Research methodology

Primary data taken in the field are data on the number of explosives in blasting activities, the types of explosives used, the production targets achieved, calculating the time for extracting the blasting material, the resulting fragmentation and documentation of the explosives used at the research location.

Secondary data is data that is already available and archived in the company, secondary data that the authors compile in the completion of this report are location, topography, mining areas, geological data, explosives specifications and rainfall.

III. Basic Theory

a. Explosives

Coal blasting activities in mining activities are an activity that aims to destroy/break hard material that cannot be destroyed by mechanical means. The results of blasting the hard material are then transferred to the disposal area using mechanical devices. The intended explosive material is a chemical explosive material which is defined as a single chemical compound or mixture in the form of solid, liquid, or a mixture thereof which when given an initial heat, impact, friction or explosion action will experience a very fast exothermic chemical reaction and the result of the reaction is partially or they are entirely gaseous with heat and very high pressure which are chemically more stable.

Explosives are classified based on their energy source into mechanical, chemical, and nuclear explosives. Because the use of chemical explosives is wider compared to other energy sources, a more intensive classification of chemical explosives is permitted. The considerations for its use include the relatively cheap price, easier technical handling, more variation in the delay time and compared to nuclear, the danger is lower. Explosives are classified based on their energy source into mechanical, chemical and nuclear. Because the use of explosives from chemical sources is wider than from other energy sources, a more intensive classification of chemical explosives is introduced. The considerations for its use include the relatively cheap price, easier technical handling, more variation in the delay time and compared to nuclear, the danger level is lower. Therefore, this module will only expose chemical explosives.

Permissible explosives in the above classification need to be corrected because currently most of these explosives are strong explosives. Permissible explosives are used specifically to reform coal mined underground coal and the type is a blasting agent which is classified as a strong explosive.

The classification of explosives is:

1. Strong explosives for example TNT, dynamite, and gelatin.
2. Blasting agents for example ANFO, slurries, emulsions, hybrid ANFO, and slurry mixtures.
3. Special explosives for example seismic, trimming, permissible, shaped charges, binary, LOX, and liquid.
4. Explosive substitutes for example compressed air/gas, expansion agents, mechanical methods, waterjets, and jet piercing.

The physical properties of an explosive are a tangible appearance of the properties of an explosive when facing changes in environmental conditions, namely, among others:

1. Density is a number that represents the ratio of weight to volume.

2. Sensitivity is a property that indicates the ease of initiation of an explosive or the minimum size of the booster required.
3. Resistance to water (water resistance).
4. Chemical stability.
5. Gas characteristics (fumes characteristic).

a. Types of Explosives

1. Ammonium nitrate (AN)

Ammonium nitrate (NH_4NO_3) is a basic material that acts as an oxide supply for explosives. White like salt with a melting point of about 169.6 C. Ammonium nitrate is a very strong support for the combustion process, but it is not itself a combustible substance nor a substance that acts as a fuel so that under ordinary conditions it cannot be burned. As an oxygen supplier, if a flammable substance is mixed with Ammonium nitrate (AN), it will strengthen the intensity of the combustion process compared to if the flammable substance was burned in normal air conditions. Normal air or the atmosphere contains only 21% oxygen, while Ammonium nitrate (AN) reaches 60%. Another material similar to ammonium nitrate (AN) and often used by small mines is potassium nitrate (KNO_3).

Ammonium nitrate is not classified as an explosive. However, if it is mixed or covered by only a few percent of combustible substances, for example fuel oil (diesel, etc.), coal dust, or sawdust, it will have explosive properties with low sensitivity. Although there are many types of ammonium nitrate (AN) that can be used as a blasting agent, for example urea fertilizer, an excellent ammonium nitrate (AN) is in the form of granules with high porosity, so it can form an ANFO type composition.

ANFO

ANFO stands for ammonium nitrate (AN) as an oxidizing agent and fuel oil (FO) as fuel. Any carbon-based fuel, whether in powder or liquid form, can be used as a mixer with all its advantages and disadvantages. In the 1950's America was still using coal powder as fuel and now it has been replaced with fuel oil, especially diesel.

When using coal powder as fuel, preparation is required in order to obtain coal powder of uniform size. Some of the disadvantages of using coal powder as fuel are:

- Preparation makes ANFO explosives expensive;
- The homogeneity level of the mixture between coal powder and ammonium nitrate (AN) is difficult to achieve;
- Less sensitivity, and;
- Coal dust hazardous to inhalation when mixing.

Using fuels other than diesel or diesel oil, for example kerosene or gasoline can also be done, but several drawbacks must be considered, namely:

- Will increase the degree of sensitivity, but do not provide a significant increase in strength;
- Has a low burning point, so it will pose a very dangerous risk when mixing with Ammonium Nitrate (AN) or during filling operations into the blast hole. If you are going to use fuel oil as Fuel Oil (FO) at ANFO, it must have a fuel point greater than 61° C.

The use of diesel as a fuel is more profitable than the type of fuel oil (FO) for several reasons, namely:

- The price is relatively cheap;
- Mixing with Ammonium nitrate (AN) is easier to achieve a degree of homogeneity;
- Because diesel has a relatively higher viscosity than other liquid Fuel Oil (FO), it does not absorb into the AN granules but only covers the surface of the Ammonium nitrate (AN) granules;
- Because the viscosity also makes ANFO increase in density.

To ensure that the mixture of Ammonium nitrate (AN) and Fuel Oil (FO) is completely homogeneous, you can add a coloring agent, usually ocher.

b. Blasting Equipment

Blasting equipment is used materials that aid blasting, namely:

1. Detonator
2. Axis blasting

Detonator is an initial trigger device which initiates in the form of an explosion (small explosion) as a form of action which gives a shock effect to detonator or primary sensitive explosives.

There are two types of explosive charge in a detonator, each of which has different functions, namely:

1. The primary charge is in the form of a strong explosive that is sensitive (sensitive), its function is to receive the effects of heat very quickly and explode, causing a shock wave.
2. Base charge (also called secondary charge) is a strong explosive material with high VoD, its function is to receive a shock wave and explode with a large force depending on the weight of the base charge.

The detonator's strength is determined by the amount of its base filling. Types of detonators:

1. The plain detonator (plain detonator).

2. Electric detonator (electric detonator).
3. Nonel detonator (nonel detonator).
4. Electronic detonator (electronic detonator).

What is meant by the blasting axis here is the axis of fire and the axis of explosion. The fire axis is the axis connected to the normal detonator for blasting using a normal detonator. It can be said that the fire wick is the counterpart of an ordinary detonator, because a normal detonator cannot be used without a wick. The function of the fire axis is to spread the fire at a constant speed in an ordinary detonator. Meanwhile, the axis of the explosion is the axis where at its core there is an explosive material. The function of the explosion axis is to assemble a blasting system without using a detonator in the hole. The explosive axis is insensitive to friction, collision, stray currents, and static electricity.

c. Blasting equipment

Blasting equipment is a blasting auxiliary device that can later be used repeatedly. Blasting equipment can be classified into:

1. Equipment that is directly related to blasting is;
   a) Explosive Trigger Tool
      - On electric blasting (Blasting Machine)
      - On nonel blasting (shot gun/short fire)
   b) Tools of electric explosions
      - Blasting Ohmmeter (BOM)
      - Electric current leakage meter
      - Blasting multi meter
      - Blasting machine strength gauge
      - Lightning tracker (lightning detector)
   c) Other blasting aids:
      - Main power cable (lead wire) or main nonel axis (lead in line).
      - Cramper (clamp the connection of the fire axis with an ordinary detonator).
      - The meter (50 ml) and bamboo sticks (± 7 m) were scaled.
      - Stick (a tool used to compaction explosives in the hole (Steaming).
      - Hoe (To cover the hole with a hard material)
      - Shelter (Tool to protect from Flying Rock at the time of blasting)
      - Liner (Protection of explosives from water, so as not to be mixed with explosives.

2. Blasting support equipment includes:
   a) Main supporting tools, related to safety and security aspects of work, as well as the environment, such as transportation and safety equipment.

b) Additional support devices focused on blasting research that are not always used in routine blasting, for example detonation speed gauges, vibration meters and noise meters.

d. Workplace Analysis

The work field is very influential, because if the work field is bad it will make it difficult for the equipment and explosives to be operated optimally. The workplace must not only meet the requirements for the achievement of production targets but also must be safe for the placement of explosives and the mobility of workers around them, considering that explosives are very dangerous for workers. There are several factors that must be taken into account and blasting includes the area, the volume of the blasting results, the supply of fresh air and work safety.

e. Explosion hole diameter

The choice of the diameter of the blast hole is influenced by the amount of the planned production rate. The larger the hole diameter, the higher the production rate with the same drilling equipment and rock conditions. The factors that limit the diameter of the blast holes are:

1. The size of the blasting fragmentation
2. The contents of the main explosives must be reduced or smaller than the technical calculation due to earth vibration or economic considerations
3. The need for selective rock excavation.
4. The following is the formula for the area of a circle:
5. The Formula for Area of a Circle = πr ^ 2

In solid rock conditions, the size of rock fragmentation tends to increase if the ratio of the depth of the blast hole to the diameter is less than 60 cm. Therefore, try to make the comparison more than 60 Cm or

$\frac{L}{d} \geq 60$. For example, a 4 inch hole diameter is used, then:

- $\frac{L}{4} \geq 60 \rightarrow L \geq (60 \times 4) = 240$ Inch or 6 m.
- So, the depth of the blast holes should be made above 6 m.

f. Drilling Pattern

Drilling pattern is a form of drill hole layout within a certain distance, on the surface of the work front to be blown up, the shape of the drilling pattern is influenced by the rock layer structure, and the planned level height. There are four drilling patterns that are made regularly, namely:

1. Square drill pattern, namely the burden distance and the same space.

2. Rectangular drill pattern, where the spacing in one line is bigger than the burden.
3. A zigzag drilling pattern (staggered square drill pattern), where the drill holes are made a zigzag derived from a square pattern.
4. The staggered Rectangular Drill Pattern, where the drill holes are zigzagged, originating from a rectangular pattern.

g. Blasting Pattern

The blasting pattern is a sequence of blasting times between drill holes in one row and boreholes in the next row or between boreholes with one another. This blasting pattern is determined based on the time sequence of the explosion and the direction of rock collapse, the blasting pattern is classified as follows:

1. Box cut, which is a blasting pattern in which the direction of the rock collapse is forward and forms a box.
2. Corner cut, namely this blasting pattern is applied to blasting locations that have three free faces, the direction of throwing the results of the blasting using this blasting pattern is towards the corner (corner)
3. V cut, which is a blasting pattern in which the direction of the rock collapse is forward and forms the letter V.

Based on the time sequence of blasting, the blasting patterns are classified as follows:

1. Simultaneous blasting pattern, which is a pattern that applies simultaneous blasting to all blast holes.
2. Sequential blasting pattern, namely a pattern that applies blasting with the time delay between one line to another.

h. Level height

The cascade height is closely related to other blasting geometry parameters and is determined in advance or sometimes determined later after other parameters and aspects are known. The maximum level height is usually influenced by the capability of the drill tool and the size of the bowl (bucket) and the reach height of the loading tool. Generally, in quarry and open pit blasting with large hole diameters, the level height ranges from 10-15 m. Another consideration that must be considered is the stability of the ladder not to collapse, either because of the weak bearing capacity or due to blasting vibrations. In short, it can be concluded that a short cascade requires a small hole diameter, while a large hole diameter can be applied to a higher level. The relationship between the variation in the diameter of the blast hole and the height of the level, which results in the lowest and top limits for each blast hole diameter.

i. Powder Factor (PF)

Powder factor (PF) indicates the amount of explosive material (kg) used to obtain one unit volume or weight of blasting fragmentation, so the unit is usually kg/m³ or kg/ton. The use of Powder factor (PF) tends to lead to the economic value of a blasting process because it is related to the price of the explosives used and the acquisition of blasting fragmentation that will be sold.

j. Blasting Geometry

Blasting Geometry consists of calculations of burden, drill hole depth, sub-drilling, steaming and spacing. To get the optimum fragmentation of the blasting results by using a minimum of explosives, a large area of free space is needed and the free face has the optimum distance from the firing hole. Guidelines for calculating blasting geometry using (Ash, 1967).

k. Loading Density

Loading Density is the amount of stuffing for explosives per meter of length of the column. With dry blast hole conditions. The fill density is used to calculate the amount of explosive required per detonation.

In the calculation of Blasting Geometry, two equations are used, namely the equation according to RL Ash and ICI Explosive, which aims to find out the results of the blasting, which is expected at the end of the evaluation to know the advantages and disadvantages of the two equations so that it can be concluded which is more efficient, effective, economical, and environmentally friendly. The following are the equations of the two formulas according to R.L. Ash and I.C.I Explosive:

Table 1. Usage Formulas According to Ash and I.C.I Explosive

No	Component	R.L.Ash	I.C.I Explosive
1.	Burden	$B = \frac{Kb \ x \ De}{39{,}30}$	B = 25d – 40d
2.	Spacing	Ks = Ks x B = 1,1-2 x b	S = 1B – 1,5B
3.	Explosion Hole Depth	H = Kh x B = 1,5-4 x B	H = 60d - 140d
4.	Subdrilling	J = Kj x B = 0,2-0,3 x B	J = 8d - 12d
5.	Steamming	T = Ktx B = 0,75 -1 x B	T = 20d – 30d
6.	Loading Density	$0{,}508 \ x \ De^2 \ x \ SG$	$0{,}00000785 \ x \ De \ x \ \rho$
7.	Total HANDAK usage	Q = Pc x De x N	$W_{handak} = n \ x \ Pc \ x \ \rho^d$
8.	Blasting Volume	V = B x S x L	$SF = \frac{Vs}{Vl} \ x \ 100\%$ Vs = B x S x H Maka : $V_L = \frac{B \ x \ S \ x \ H}{SF}$

9.	Powder Factor	PF = E/W	PF = $\frac{Whandak}{B \, x \, S \, x \, H}$

l. Fragmentation

Fragmentation is a general term for the size of each lump of rock blasted. The size of the fragmentation depends on the next process. For certain purposes, a large fragmentation size or boulder is required, for example, as a barrier to the edge of a mine road. However, in most cases a small fragmentation size is desirable because subsequent handling will be easier. The size of the largest fragmentation is usually limited by the dimensions of the excavator or shovel that will load it into the truck and by the size of the crusher opening gap.

There are two principles that must be adhered to control rock fragmentation, namely:

1. The energy generated by the explosives must be at a strategic location in the rock mass.
2. The timing of the energy release between the firing holes must also be regulated.

In order to obtain the maximum energy distribution within the rock mass to form satisfactory fragmentation, the explosive charge must be adequate and included in a carefully calculated blasting pattern. Some general provisions regarding the relationship of fragmentation to blast holes:

- The size of the blast hole is large and will produce chunks of fragmentation, therefore it must be reduced by using a stronger explosive.
- It should be noted that adding an explosive will result in a long throw.
- On rocks with high fracture intensity and small amount of explosives combined with short spacing will result in small fragmentation.

Deviations from the above general provisions regarding fragmentation size may occur due to specific differences in the quality of the rock and explosives. Therefore, once again, drilling and blasting experiments must be carried out to obtain optimum results. The rock splitting that results in rock fragmentation during blasting begins before the rock period undergoes movement. The fragmentation resulting from blasting occurs as a result of the following:

1. A tensile shock wave resulting from the reflection of a compressive shock wave on the free face. The duration of the first effect depends on the time interval between initiation (delay) and reflection on the free face.
2. The tensile stress generated in the rock mass around the firing hole by the pressure of the blasting gases. The second effect generally lasts longer than the first effect. The duration of the second effect depends on supporting the gas in the firing hole.

3. Collisions between rock fragments that were thrown off and between rock fragments on the walls. The third effect lasts the longest than the previous two effects, but the effect is the smallest. The rock fragmentation resulting from blasting is strongly influenced by the rock factor and the explosives used.

To estimate the rock fragmentation resulting from blasting, the formula proposed by Kuznetsov (1973) can be used.

$$X = A(V/Q)^{0.8} \times Q^{0.167} \times (E/115)^{-0.63}$$

Information:

X = Average size of rock fragmentation, meters
A = Rock factor
V = volume of rock exposed, m3
Q = weight of explosives per blast hole, kg
E = Relative/Weight Strength

IV. Discussions

a. Blasting Plan

The work plan targets for April 2017 are as follows:

- Blasting Production Target : 1.886.220 Bcm/Bulan
- Powder FaCtor : 0,19 Kg/M^3
- Loading Density : 30-100 Kg

Actual Blasting Geometry in April according to R.L Ash :
Volume = B x S x (H-J) x N

Info:

B : Burden
S : *Spacing*
H : The depth of the blast hole
N : Number of Explosive Holes

Volume Blasting Equation:
Volume : B x S x (H-J) x N

b. Large Drill Production

Burden (B) : 7.5 Meter
Spasi (S) : 9 Meter
Depth (H) : 8.5 Meter

Subdrill (J) : 0.50 Meter
Level High (L) : 8 Meter
Fill Column (PC) : 4 Meter
Blasting Index (BI) : 0.5 x (RMD + JPS + JPO + SGI + H)
: 0.5 x (20 + 50 + 30 + (-30) + 7)
: 38.5
Rock Factor : BI x 0.12
: 38.5 x 0.12
: 4.62

Fragmentation: X $= 4.62 \times [\frac{540}{100}]^{0,8} \times 100^{0,17} \times (\frac{100}{115})^{-0,63}$
= 4.62 x 3.85 x 2,18 x 1,092
= 42.3 cm = 42 Cm

c. *Production Using Small Drill*

Burden (B) : 5.5 Meter
Spasi (S) : 6.5 Meter
Depth (H) : 6 Meter
Subdrill (J) : 0.50 Meter
Level Height (L) : 5.50 Meter
Fill Column (PC) : 3 Meter
Blasting Index (BI) : 0.5 x (RMD + JPS + JPO + SGI + H)
: 0.5 x (20 + 50 + 30 + (-30) + 7)
: 38.5
Rock Factor : BI x 0.12
: 38.5 x 0.12
: 4.62

Fragmentasi: X $= 4.62 \times [\frac{178.75}{30}]^{0,8} \times 30^{0,17} \times (\frac{100}{115})^{-0,63}$
= 4.62 x 4.16 x 1.78 x 1.092
= 373 cm = 37 cm

Total Overall OB raised:
OB production = Large Drill Production + Small Drill Production
= 1.103.729.6 + 131.749
= 1.154.050 BCM

d. *Use of Explosives*

Use of ANFO : 220.350 Kg/Month
Usage of Dynamite : 2.353.50 Kg/Month
Use of In-Hole Delays : 2.906 pcs/Month
Using Surface Delays : 2.914 pcs/Month

Powder Factor : 220.350 Kg /1.154.050 Bcm
: 0.19 Kg/M^3

The explosives used by the Company are types of solid chemical explosives such as ANFO and Dinamit. In the process, ANFO is given a dye or it is called OKER so that it is easy to know whether AN has been mixed well with diesel fuel. By using a percentage of the use of AN 94.5% and FO 4.5% to get Zero Balance Oxygen.

PT. Alamjaya Bara Pratama in carrying out Blasting activities assisted by 2 Subcontractors, namely PT Putra Perkasa Abadi and PT. Multi Nitrotama Kimia. Every day blasting activities were carried out with a different number of drill holes, the total number of blast holes produced in April was 2,906 blast holes and the use of ANFO was 220,350 kg. With the use of the above, the unloaded rock is 1,154,050 Bcm with a Powder factor of 19 Kg/M ^ 3.

The weight of the blast hole filling is 6M and 8M on average with a 3M - 4M column length, the average amount of explosives used is 25 Kg/Meter for large boreholes and 10Kg/M for small boreholes, so the overall total is 30 - 100 Kg/Hole if the blast hole is dry and 90 kg/hole is wet. The resulting fragmentation is 37 - 42 cm. The amount of explosives used in PT. ABP is included in the effective category because the amount of explosives used is compared to the amount of rock uncovered as expected.

e. Fragmentation

The blasting fragmentation is one of the clues to determine the success of a blasting other than powder factor (PF). Because when in a blasting, the Powder factor is achieved but does not produce the desired Fragmentation size. The results of the blasting which can be said to be the fragmentation of the blasted rock are quite irregular with the fragmentation results desired by the company, but also have no problems in the process.

f. Actual Parameters of Overburden Extraction Processing Time (OB)

From the results of research in the field it is said that the blasting process is said to be successful if several of these factors are successfully carried out, in the measurement using a stopwatch as many as 3 samples of data collection by taking different working times carried out in the field obtained the following times:

$$Q = I \times SF \times DT$$

Information:

Q = Production
I = Bucket Capacity ($9M^3$)
SF = Swell Faktor (0,85)

DT = *Digging Time*

Table 2. Digging Time Calculation Table

Sample 1 :	**Sample 2 :**	**Sample 3 :**
Q = 9 x 0.85 x 107	Q = 9 x 0.85 x 152	Q = 9 x 0.85 x 125
Q = 818,5 BCM/Hour	Q = 1.162.8 BCM/Hour	Q = 956,2 BCM/Hour

From the above calculations, within 180 minutes of the excavation process, the type of excavator Komatsu PC 2000 with a bucket capacity of 9M3 with the number of excavations in 60 minutes, with the results of the calculation of the above calculation activities with the company's target is 850 Bcm/hour and the average total material which is raised is 979.2 Bcm/Hour.

g. *Factors Affecting Target Not Achievement*

There are many factors that affect the achievement of blasting production targets by companies, these factors are:

1. Unit Drill
   Drilling Machines that are Breakdown or are experiencing damage also affect the production target to be achieved. Value of Equipment Availability (Indonesianto, 2009). There are several definitions that indicate the state of the equipment and the effectiveness of its operation, including mechanical readiness, physical readiness, willingness to use, willingness to be effective.

Table 3. Unit Drill Usage Table

No	**Unit Name**	**MA**	**PA**	**UA**	**EU**
1	SANDVICK D245S	54%	55%	52%	44%
2	JUNJIN 1300	50%	50%	39%	34%

a) Mechanical Availability
   The total percentage of the Sandvick drill unit is 54% and the Junjin 1300 drill unit is 50%, this figure shows the actual condition of the tool that is ready to use, the time needed for routine repair and maintenance of the Sandvick drill unit is 46% and the Junjin 1300 drill unit is 50% from the time allotted. The tool is in good condition.
b) Physical Availability
   The total percentage of the Sandvick drill unit is 55% and the Junjin 1300 drill unit is 50%, it can be said that the physical tool is in good condition, even though there is time lost due to tool maintenance for the Sandvick drill unit is 45% and the Junjin 1300 drill unit is 50% of the scheduled time for work. This means that more tools are used for operations.

c) Us of Availability
The total percentage of the Sandvick drill unit is 52% and the Junjin 1300 drill unit is 39%. This figure shows the percentage of time taken by the tool to operate when the tool can be used. So the tool can not be used has the percentage of the sandvick drill unit is 48% and the junjin 1300 drill unit is 61% of the time when the tool is mechanically stated to be used when it is not damaged.

d) Effective utilization
The total percentage of the sandvick drill unit is 44% and the junjin 1300 drill unit is 34% indicating a few percent of all available working time which can be used for productive work. So the tool is not used the Sandvick drill unit is 56% and the Junjin 1300 drill unit is 66% of the time available

2. Uneven Workplace Front
The uneven location also affects the failure to reach the production target because you have to make extra moves from the left and right sides of the unit and make the unit move slowly.

3. Weather
Weather conditions have a major influence on rock drilling and blasting activities, this is related to the effective working time schedule, of course in the process of filling explosives.

4. Groundwater
Groundwater conditions greatly affect the blasting process, the presence of water causes explosives to decrease in number due to the use of liners. Groundwater affects the speed of the explosives and will reduce the energy produced, as a result the resulting fragmentation is low. Because ANFO has poor resistance to water.

h. Blasting Success Parameters

Blasting activity is said to be technically successful, is the desired target is achieved or in accordance with company expectations, the use of explosives in question is the powder factor in Kg/M3, as well as the resulting fragmentation according to what the company wants.

The results of field research with the above discussion of blasting activities were said to be successful because in accordance with the technical parameters achieved, the company has a production target of blasting activities in April of 1,886,220 Bcm and the results of reports from the company in accordance with the above discussion that the production of overburden produced in April is 1,154. 050 BCM, the target was not achieved not because of blasting activities but because the user of the drill tool was not optimal because the drill was damaged, then the use of explosives used in April was 220,350 kg/month, with the formula used in the search for powder factor: 220,350 Kg/1,154,050 BCM = 0.19 Kg/M3. The fragmentation produced during the blasting process was carried out in April with the company's target of 50 cm, and the resulting fragmentation was 37 cm - 42 cm, with the above parameters that the blasting process in the research location was said to be technically successful because it was in accordance with the company's wishes.

V. Conclusion

Overburden (OB) Production Target in April is 2,174,671.47 Bcm and Coal Production in April is 250,000 tons. From the data collected in the field it was found that the production target was reached, namely 2,277,317.35 Bcm and the achievement of coal production was 234,561.43 tons. In blasting activities carried out at PT. Alamjaya Bara Pratama (PT.ABP). The resulting fragmentation during the blasting activity at PIT 7 was 37 - 42 Cm. In the process of digging time, PT. Alamjaya Bara Pratama (PT.ABP) with actual results in the field by taking 3 times the sample with the same digging tool, with an average time of extracting the material 9 seconds with one digging, which was raised is 979.2 Bcm/hour. Powder Factor produced from data and observations in the field that the resulting Powder Factor is 0.19 Kg/M3 with the average use of 7.532 Kg of explosives. With the targets and desires of the company in accordance with the above discussion, the blasting process is said to be successful because it has answered all company needs.

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