

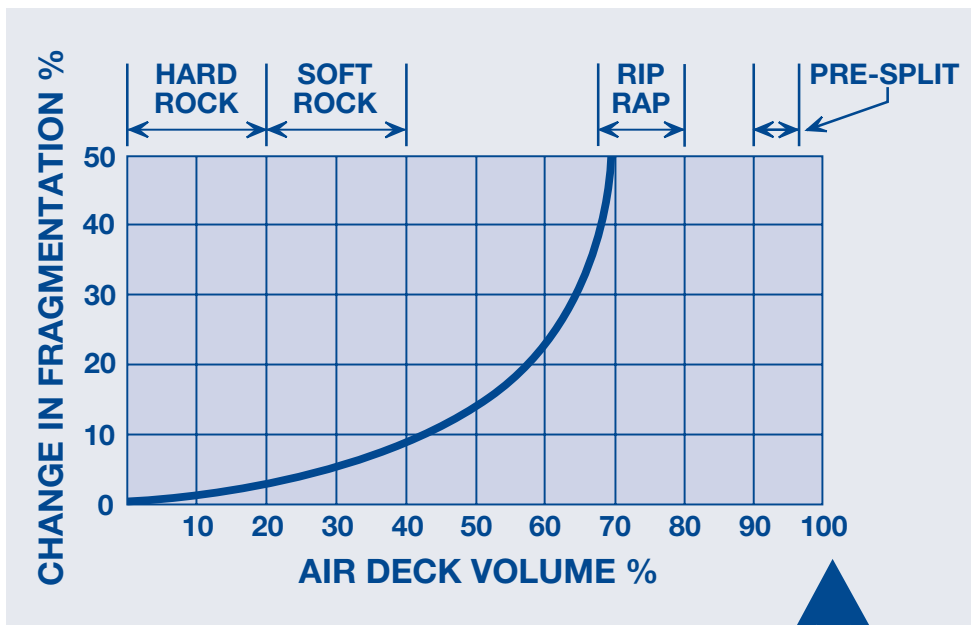
# WHAT SIZE AIR/WATER DECK?

The standard answer is that it depends on the conditions prevailing at the site and will most certainly vary from site to site.

The following graph is indicative of results which can be achieved with increasing air decks.

***Put in simple terms, it is the amount of explosives that can be removed from a blasthole and substituted with air or air/water or water.***

As you can see from the graph as much as 30-40% of the explosive can be replaced by an air deck before a significant deterioration in fragmentation is experienced. Further along the graph shows the zones where rip rap production and pre-splitting occurs.



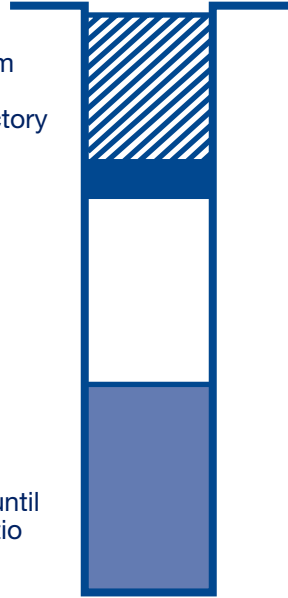
# SOFT GROUND / DRY HOLES

**Stemming** 5m generally sufficient for 270/311mm blastholes. If greater reduce existing stemming progressively until satisfactory surface fragmentation.

**Gasbag**

**Air Deck**

**ANFO** Commence with a 15% explosive reduction and reduce progressively until optimum fragmentation/explosive ratio achieved.



## Benefits

- Up to 40% reduction in explosives
  - Better containment of explosive gases
  - Less stemming ejection
  - Better surface fragmentation
  - Up to 75% vibration reduction
  - Less airblast
  - Increase in charging efficiency
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# BANDED GROUND / DRY HOLES

**Stemming** Reduce progressively until satisfactory surface fragmentation achieved.

**Gasbag**

**Air Deck**

Over the softer strata. If cap rock is present minimise stemming height to increase surface breakage without increasing stemming ejection.

**ANFO**

In harder strata. Reduce until suitable fragmentation achieved.

**Gasbag**

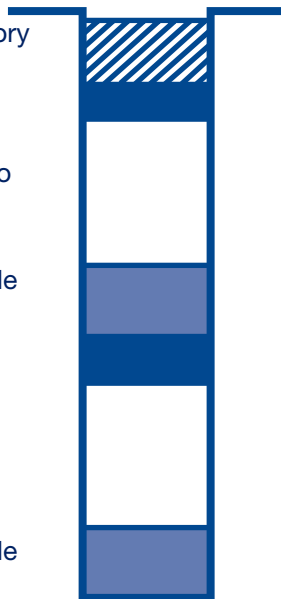
Locates explosive in harder strata.

**Air Deck**

Over softer strata.

**ANFO**

In harder strata. Reduce until suitable fragmentation achieved.



## Benefits

- Reduction in explosive costs
- Locating explosive in hard strata lessens energy lost through weak strata



# HARD GROUND/DRY HOLES

## (i) Shallow Blastholes – less than 30 metres

**Stemming** Reduce progressively until satisfactory surface fragmentation.

**Gasbag**

**Air Deck**

**ANFO** Commence with a 10% explosive reduction. Reduce progressively until optimum fragmentation / explosive ratio achieved.

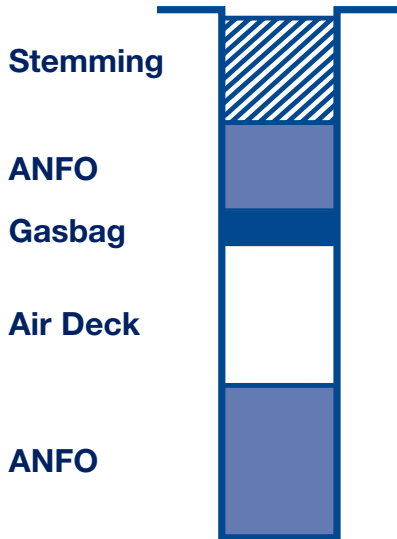


## Benefits

- Up to 20% explosive reduction
  - Less stemming ejection
  - Less backbreak
  - Better surface fragmentation
  - Reduced ground vibration
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# HARD GROUND/DRY HOLES

## (ii) Deep Blastholes – greater than 30 metres



### Mid Column Air Deck

Commence with 10% explosive reduction but maintain current stemming heights. Reduce in 5% increments until satisfactory results achieved.

Minimise stemming heights for maximum surface breakage.

### Benefits

- Up to 20% explosive reduction
- Better heave
- Consistent levels of fragmentation
- Less stemming ejection
- Optimum surface breakage

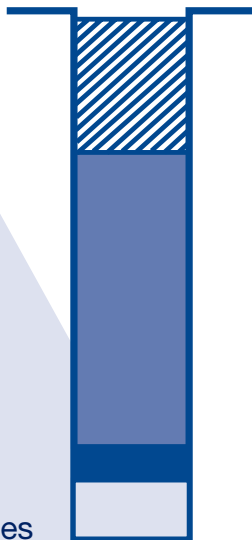


# WET HOLES/NUISANCE WATER

Stemming

ANFO

Gasbag  
Water – up to 3m in  
270 /311mm blastholes



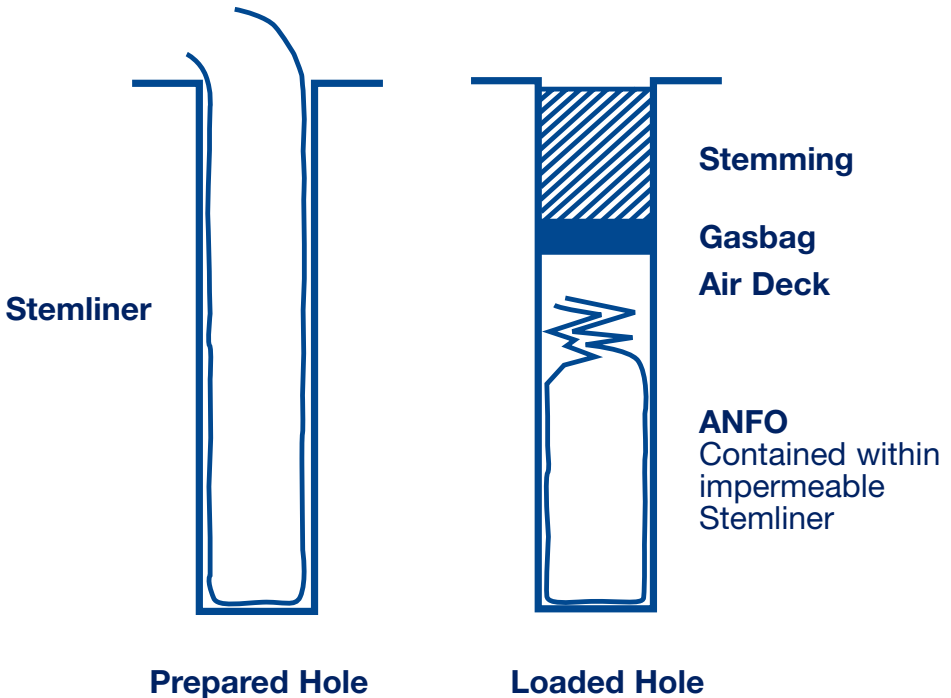
## Benefits

- Replaces emulsion with ANFO
- Reduces total explosive usage

# WET HOLES/STATIC WATER (Dewaterable)

## Procedure:

- *Dewater Blasthole*
- *Place Stemliner down blasthole*
- *Use ANFO*



## Benefits

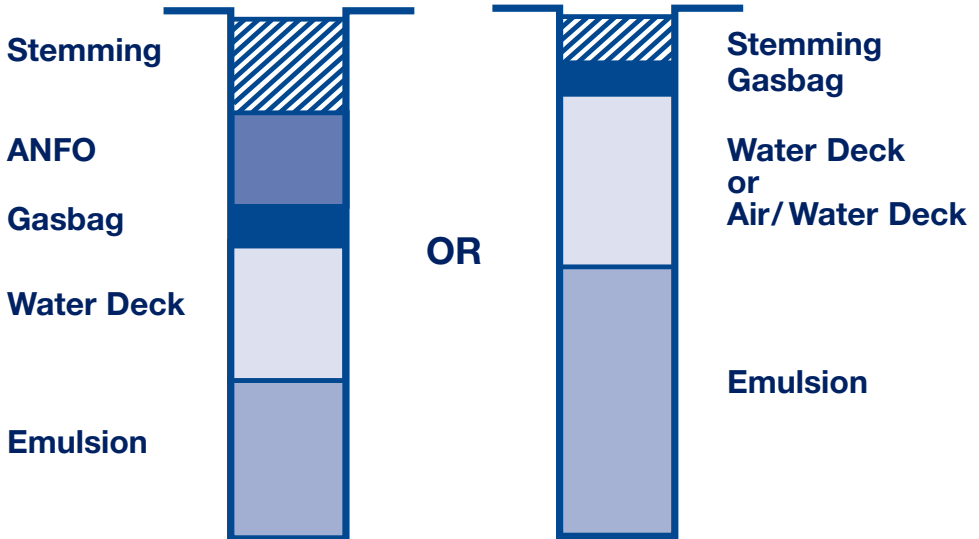
- Replaces expensive waterproof explosives with ANFO
- Incorporates a top air deck to optimise stemming height and achieve better surface fragmentation



# WET HOLES/DYNAMIC WATER

(Non dewaterable)

(i) Up to 10 metres of Water Column



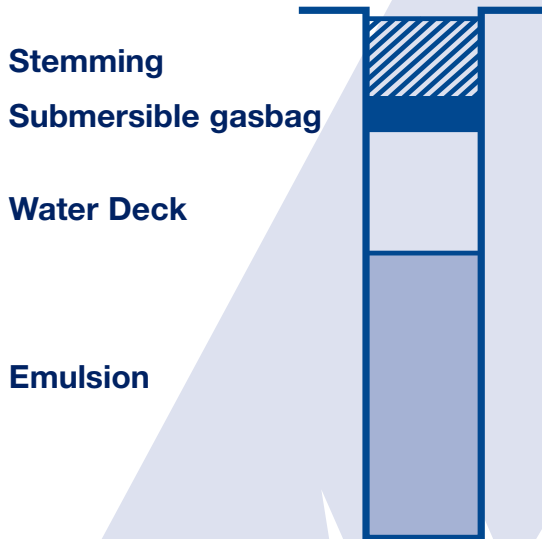
## Benefits

- Reduces total emulsion usage
  - Less stemming ejection with top air/water deck
  - Gasbag prevents contamination of explosive column by stemming material
  - Total charge : water/air deck ratio of 60 : 40 is possible in softer ground
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# WET HOLES/DYNAMIC WATER

(Non dewaterable)

(ii) Over 10 metres of Water Column



## Benefits

- Reduces total emulsion usage
- Less stemming ejection
- Less back break



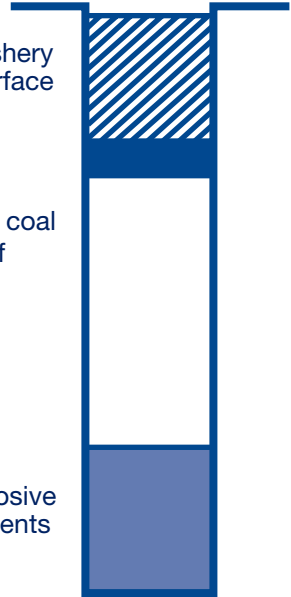
# COAL BLASTING

**Stemming** Preferably 10/20mm nut coal or washery rejects. Reduce until satisfactory surface expression.

**Chemical Gasbag** (Prestrung – dry holes. Submersible attachment – wet holes ). Used in preference to aerosol gasbag where coal contamination from metal residual of aerosol can is not tolerated.

**Air deck**

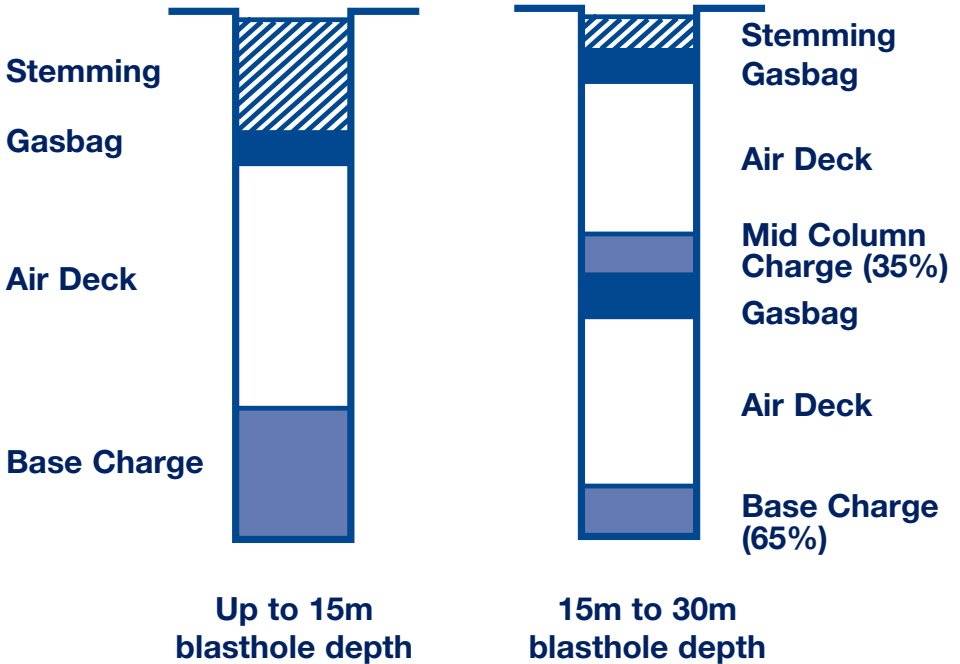
**Explosive** (ANFO – dry holes, waterproof explosive – wet holes). Reduce in 10% increments until satisfactory fragmentation.



## Benefits

- At least 20% explosive reduction
  - Less stemming ejection
  - Less fines generation
  - Decreased surface “lump” coal
  - Minimal contamination of product coal especially when coal is unwashed
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# RIP RAP (ARMOUR STONE)



Creating a large air space above the base charge allows useful work to be done throughout the length of the hole.

Burden can be up to double the spacing.

Fire as many holes as possible on same delay.

## Benefits

- Maintains ratio of large to small stone
- Produces clean stable faces with no toes or overhangs



# PRE-SPLITTING

## RULES OF THUMB

- Hole spacing is generally half the normal production spacing between holes.
- *The pre-split line is generally located at a distance of half the normal burden spacing from the design last row of production blastholes.*
- Charge weights should range between 3% to 10% of the total charge in a normal production hole.
- *60% of the total charge should be at the base.*
- Holes should be stemmed for best results and for noise reduction. Generally minimal stemming heights of around 1 metre have produced the required pre-split results.

