



User Guide



Instructions
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FAQ's
Safety & First Aid
Drilling Patterns



Instructions

PLAN YOUR DRILL PATTERN

Determine your Drill Pattern & hole spacing based on:

- › project objectives (full / partial demo, pre-crack, dimension)
- › desired size, shape of cracked material
- › if expansion space or an open face is available
- › any need to direct cracking or protect an adjoining structure
- › equipment available
- › material type, hardness

1. DRILL HOLES

	Reinforced Concrete	Hard Rock	Soft Rock	Concrete	Boulders
Diameter	1.5"	1.5"	1.5"	1.5"	1.5"
Spacing	10-12"	10-12"	12"	12"	10"
Depth	90%	105%	105%	75%	75%

2. MIX DEXPAN

Organize personnel & equipment to ensure mixture is poured into holes within 5 - 10 minutes of mixing.

In a flat bottom bucket:

- › add 1.5 litres of cold water (not lukewarm or warm)
- › slowly add one bag of Dexpan
- › mix well, using hand drill and mixing paddle
- › rinse the bucket between batches

3. FILL HOLES

Fill the row of holes nearest your open face (where there is room to expand) first. Pour first row, left to right. Return to the start of the next row, pour left to right. Gradually pour Dexpan mixture into the holes to avoid air bubbles. Leave ½ to 1 inch of space from the top (not necessary to fill to the very top).

Timing

Depending upon the material and temperature conditions, small cracks can begin to appear as early as 18 hours, but waiting for 36 to 48 hours will result in more extensive and wider cracks.

When the temperature drops after filling the holes or in cooler weather, the reaction is slower.

Allow 1 to 3 days for a Dexpan to full react resulting in larger cracks and more extensive fracturing.



Keys to Success

CORRECT PRODUCT

Select the correct Dexpan product based on the core temperature of the concrete/rock (NOT air temperature).

Dexpan 1: 25° to 40 °C Dexpan 2: 10° to 25 °C Dexpan 3: -5° to 10 °C

WARNING: Using the wrong product may result in:

- › blowouts (product reacts too fast and is ejected out of the hole resulting in safety risk and wasted product)
- › cracking to fail or take significantly longer

EXPANSION SPACE

To be effective, the material requires space to expand and break apart. Breaking a flat rock bed, a boulder submersed in earth or concrete enclosed on all sides does not allow for room for the material to expand and fracture.

Possible strategies to create expansion room or an open face:

- › trenching drill to remove material around the case
- › drill a series of holes into the rock or concrete that you do not fill, but leave empty to provide expansion space
- › drill some holes at a 45 degree angle to direct pressure upwards

DRILL HOLE PATTERN & SPACING

A well-designed hole Drill Pattern will:

- › achieve breaking objectives
- › minimize labour & reduce consumption of Dexpan
- › direct and control breaking
- › shorten time for breaking to occur
- › protect areas from cracking or expansive pressure

Match the angle and depth of adjoining holes.

You want the pressure generated by each hole to work together with the adjoining hole.

Some projects may require unfilled relief holes to:

- › compensate for a lack of expansion space
- › direct fractures
- › protect an adjoining area or structure
- › reduce time required for cracks to form
- › reduce consumption of Dexpan

MIXING

Organize personnel & equipment to ensure mixture is poured into holes within 5 - 10 minutes of mixing.

Add water to bucket first, then Dexpan. Mix one bag of Dexpan at a time. Scrape bottom and sides.

Mix well, preferably with an electric hand drill with a mixing paddle to achieve a lump-free slurry.

Use only open pails or containers for mixing.

Rinse the bucket between batches. Don't incorporate any unused mixture into the next batch.

FILLING HOLES

Clear any water and excessive dust from holes.

Pouring early in the morning is ideal. Material is coolest and can gradual warm with heat of the day.

Always start pouring row of holes closest to open face - where there is room for expansion first.

Gradually pour mixture to minimize air bubbles.

Pour first row, left to right. Return to the start of next row, pour left to right

Do NOT fill holes in a snake pattern (first row left to right, second row right to left)

You do NOT need to fill holes to the top. Fill to within ½ to 1" of the top of the hole

Use protective plastic sleeves if rock has extensive fractures, is porous or if there is noticeable ground water

Protect filled holes from rain and snow with a tarp

IMPORTANT

When mixing & filling holes always use personal protective equipment (safety goggles, dust mask, gloves)

Dexpan Demolition Grout

Non-explosive Controlled Demolition Agent

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FAQ's

Which type of Dexpan should I use?

Select the type of Dexpan (Type 1, 2 or 3) based on the core temperature of the material to be cracked (not the air temperature).

Dexpan 1	25° to 40 °C	77° to 104 °F
Dexpan 2	10° to 25 °C	50° to 77 °F
Dexpan 3	-5° to 10 °C	23° to 50 °F

How much Dexpan do I need?

Calculate total linear feet of Dexpan you will consume:

$$\# \text{ of holes} \times \text{depth of holes in feet} = \text{total linear feet}$$

Based on 1.5" diameter holes

11 pound Bag	will fill up to 8.6 linear feet of holes
44 pound Box	will fill up to 36 linear feet of holes

What are the common mistakes people make?

1. Not reading the User Guide, instructions, FAQ's fully.
2. Using wrong Dexpan type given material temperature.
3. Not taking into account Dexpan requires expansion room for the concrete or rock to crack, break apart.
4. Wrong diameter holes or too far apart.
5. Material too shallow
6. Impatience. Give Dexpan full 24-48 hours to achieve fuller expansion and wider cracking.

Will Dexpan work for all shallow applications?

No. For Dexpan to be effective, we strongly recommend materials be a MINIMUM of 7" in depth.

How long does it take to work?

Factors affecting the timing for cracks to appear include:

- › material temperature and hardness
- › reinforcing present
- › number/spacing/depth/diameter of drilled holes
- › temperature fluctuations after filling holes

Small cracks can begin to appear as early as 18 hours, but waiting for 24 to 48 hours will result in more extensive and wider cracks.

When the temperature drops after filling the holes or in cool conditions, allow 2 to 4 days for full expansion and cracking. Expansion / cracking can occur for up to 5 days.

What are the considerations for drilling holes?

Spacing and depth should be adjusted based on:

- › project objectives (demo, dimension, pre-crack)
- › material type, density, presence of reinforcing
- › desired size of broken material
- › desired cracking time

Hole Diameter, Depth & Spacing

For best results, we highly recommend 1.5" diameter holes. Do not exceed 2" or go less than 1" in diameter.

	Reinforced Concrete	Hard Rock	Soft Rock	Concrete	Boulders
Diameter	1.5"	1.5"	1.5"	1.5"	1.5"
Spacing	10-12"	10-12"	12"	12"	10"
Depth	90%	105%	105%	75%	75%

Depending upon the material, project objectives and hole diameter, it is sometimes possible to space holes 18" apart.

More holes spaced closer together results in:

- › faster break times
- › smaller more manageable pieces
- › adds labour cost (drilling & filling more holes)
- › may increase quantity of Dexpan used

Why is planning your drill pattern so important?

A well-designed hole-drilling pattern will:

- › get the job done right, the first time
- › improve effectiveness of Dexpan
- › direct and control breaking
- › reduce quantity of Dexpan required
- › reduce time spent drilling/filling holes
- › pre-crack difficult materials making demolition and removal easier
- › protect any sensitive surrounding structures

Why is it important to ensure sufficient empty space around the rock or concrete to be cracked?

For Dexpan to be effective, the material needs an open face or room to expand and break apart.

Breaking rock or concrete enclosed on all sides does not allow room for expansive pressure created by Dexpan to crack and break the material.

Our project does not have an open face and is enclosed on all sides, what can we do?

There are a number of alternatives to create the necessary expansion space:

- › dig around or remove soil enclosing rock or boulders to be cracked
- › drill a series of empty relief holes
- › employ holes drilled at 45° angle (to direct expansion upwards) in the centre of the material
- › create expansion space or an open face by pre-cracking the first row or two on one side by employing alternating filled & empty relief holes

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FAQ

What is the purpose of drilling relief holes?

Drilling holes, but not filling with Dexpan can:

- › create expansion room for material to break apart when the case is enclosed or confined
- › direct and control cracking
- › reduce amount of Dexpan required
- › shorten time for breaking to occur
- › control breaking to protect part of a structure
- › create corners (examples: wall openings, quarrying stone)

How will drilling a different diameter hole affect spacing?

Depending on the density of the material and/or reinforcing present:

2" Diameter Holes

You may be able to space holes 16" to 18" apart

1 – 1 ¼ " Diameter Holes (smaller than we recommend)

To be effective, holes need to be drilled closer together (6 - 10" apart).

When is the best time to pour Dexpan?

The best time to pour Dexpan is when the material temperature is coolest and material can gradually warm as the day progresses.

An effective strategy is to drill holes the day before so you can pour first thing early the next morning.

Pouring the Dexpan in the morning, when material is coolest, is HIGHLY recommended, especially in summer or when working in extremely hot temperatures.

Any advice when using Dexpan in the summer?

Expansive demolition grouts are sensitive to temperature. Using Dexpan in hot weather requires additional precautions to avoid blow outs.

- › Always select the correct type of Dexpan for your material temperature and expected weather conditions (Type 1 for material at/above 25 °C)
- › Ensure all personal protective equipment in use
- › Store Dexpan in cool shaded conditions prior to use
- › Use cold or ice water to mix slurry
- › Start with an empty bucket (do not add 2nd bag to any left-over mixture)
- › Do not pour mixture into hot holes
- › Do not look or stand over filled holes
- › Cover filled holes with a cloth tarp to shield from sun

What can cause expansive demolition grouts to blowout?

1. Using wrong version of Dexpan.
2. Pouring grout mixture into warm or hot holes.
3. Hole diameter is too large.
4. Hole depth is too shallow. Drill holes to a minimum depth of 5 times the hole diameter.
5. Distance between holes is too large.
6. No open face or expansion room for material to expand, crack and break apart.
7. Mixing more than 1 bag of expansive grout at a time resulting in #9 below.
8. Mixing expansive grout by hand vs. using electric hand drill with mixing paddle attachment resulting in #9 below.
9. Too much time passing between beginning to mix and pouring into holes. Pour Dexpan mixture into holes within 5-10 minutes.
10. Adding expansive grout and water to leftover mixture remaining from previously mixed batch
11. Too much dust in holes.
12. Not measuring water.
13. Water temperature is too high. In warm conditions crucial to use cold or ice water.
14. Grout sitting in sunlight or warm conditions before being mixed with water.
15. Filled holes exposed to hot direct sunshine.
16. Filling holes incorrectly. Always fill row of holes closest to your open face first, pouring left to right; next row, back to the start, pour left to right.

Any tips for freezing cold conditions?

1. Ensure correct type of Dexpan is used (Type 3) and stored at 10 - 15 Celsius until ready to use.
2. Drill 1.5" diameter holes at 1 foot spacing (filled with Dexpan). To speed up and assist cracking, drill 1/2 to 3/4" diameter relief/expansion holes in between the filled holes (leave them empty).
3. Ensure water temperature is lukewarm (approximately 10 degrees Celsius), Caution: Cooler water will delay the cracking and DO NOT overheat the water as this could lead to BLOW OUTS.
4. Fill holes in morning so any natural temperature rise during the day supports the reaction vs pouring in afternoon when the temperature might drop overnight and work against the reaction in the crucial first 8 hours.
5. After you fill the holes, cover to help seal in the heat.
6. PATIENCE. In extreme cold conditions, it might take 3 to 5 days for full cracking. If the Dexpan is still clay-like and firm to the touch, it is still working.

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Safety & First Aid

WARNING

Due to the highly alkaline nature of the product:

- › risk of serious eye damage
- › may cause skin irritation if left on skin
- › inhalation of dust may irritate respiratory system or lungs

IMPORTANT

When mixing and pouring Dexpan ALWAYS:

- › use personal protective equipment:
 - safety goggles rubber gloves
 - dust-proof mask proper clothing
- › Select correct Dexpan product type given material core temperature
- › Ensure adequate ventilation in confined spaces
- › Mix promptly ensuring mixture is poured into holes within 5 - 10 minutes of combining powder & water
- › Start with an empty bucket (do not add 2nd bag to any left-over mixture)
- › Cover filled holes with a tarp

NEVER

- › look or stand over filled holes
- › pour mixture into hot holes
- › use warm water for mixing
- › leave excess product sitting in bucket
- › use glass or enclosed containers to mix/pour Dexpan (could lead to a blow-out with glass or metal fragments)

SUMMER PRECAUTIONS

All brands of expansive demolition grouts are sensitive to hot weather. If the chemical reaction goes too quickly a steam driven blowout may occur where the expansive grout, under pressure within the confined holes, is ejected with sudden force.

Avoiding blowouts is of utmost priority to ensure safety of personnel, projects are completed successfully (uneventfully, on-time & on-budget) and legal liability for any injuries or property damage is avoided.

Using Dexpan in hot weather increases the chances of blow outs.

- › Select the correct type of Dexpan for your material temperature and expected weather conditions
- › Ensure all personal protective equipment in use
- › Store Dexpan in cool shaded conditions prior to use
- › Use cold or ice water to mix slurry
- › Start with an empty bucket (do not add 2nd bag to any left-over mixture)
- › Do not pour mixture into hot holes
- › Do not look or stand over filled holes
- › Cover filled holes with a cloth tarp to shield from sun

FIRST AID

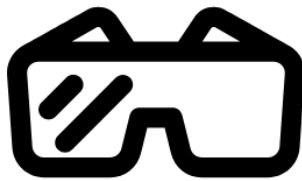
If accidental contact occurs on skin, wash off powder immediately. If accidental contact with eyes occurs:

- › promptly wash eyes with plenty of water while lifting eye lids
- › continue to rinse for at least 15 minutes
- › seek medical attention if redness or irritation develops

PERSONAL PROTECTIVE EQUIPMENT



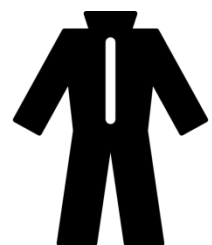
Dust-Proof Mask



Protective Glasses



Rubber Gloves



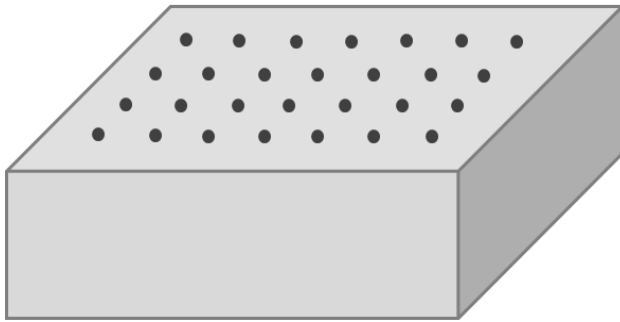
Protective Clothing



Drilling Patterns

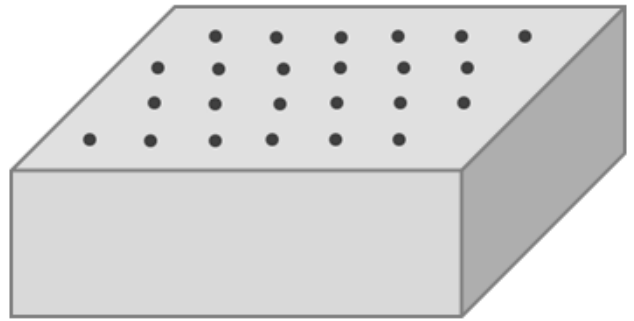
REINFORCED CONCRETE

Full Demolition
Grid pattern to avoid rebar



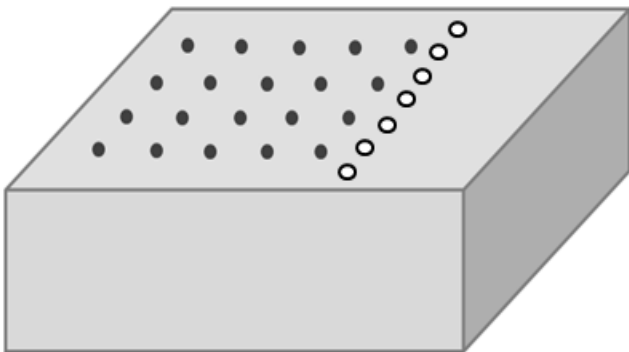
DEMOLITION

Offset, staggered holes



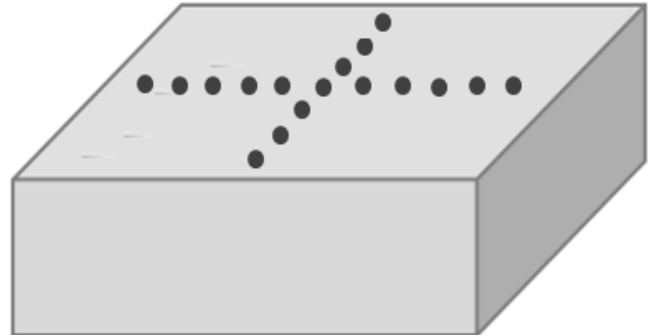
CONTROLLED DEMOLITION

Keep on area intact
Use Relief Holes (unfilled) to create boundary



DIMENSION

Achieve desired shape, size
Reduces consumption of Dexpan



1' WIDE CONCRETE RETAINING WALL

Pattern: Holes offset from the midline

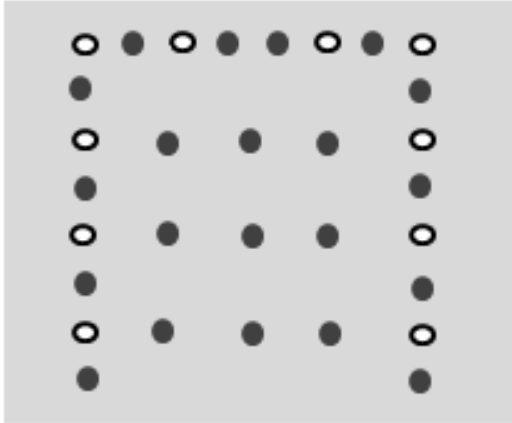




Drilling Patterns

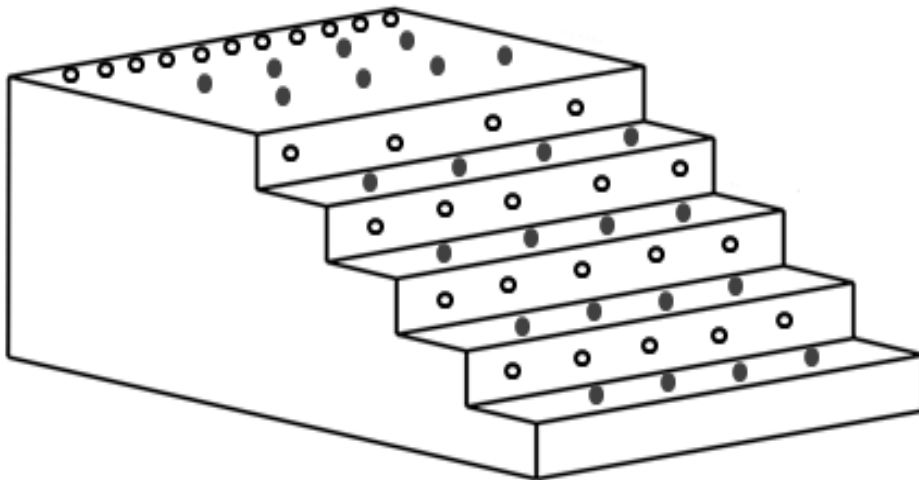
CREATE AN OPENING IN A VERTICAL WALL

Use Relief Holes (unfilled) to create expansion room
Holes drilled at downward angle to ease filling



CONCRETE STEPS DEMOLITION

In application below, need to protect the building foundation where the stair platform meets the house
Unfilled Perimeter Holes stop cracking and protect structure
Relief Holes aid the demolition



● Dexpan filled holes

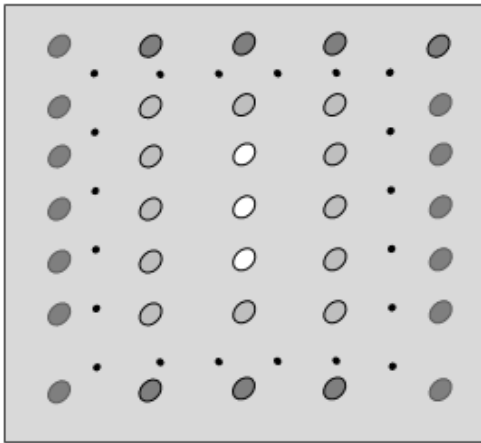
○ Relief Holes (empty, unfilled)



Drilling Patterns

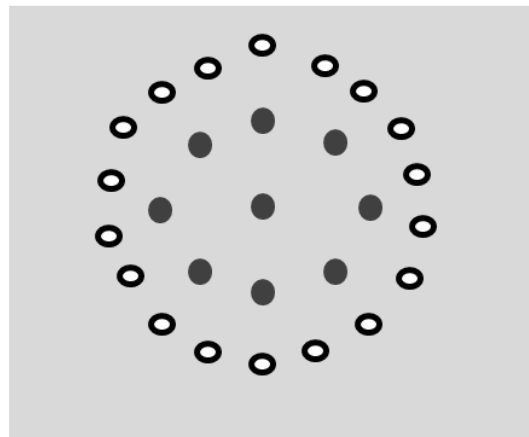
PIER OR CONCRETE COLUMN

Reinforced concrete structure
Use of unfilled relief holes
Deliberate filling of holes in sequence



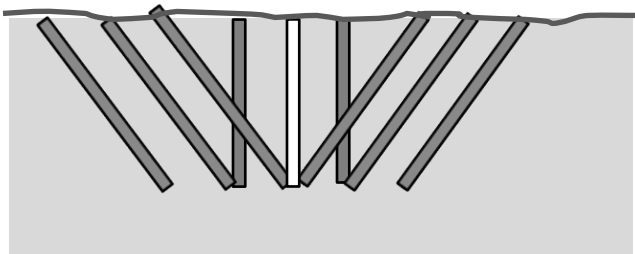
TUNNELING

Need to create expansion space
Use of unfilled relief holes
Holes filled in sequence



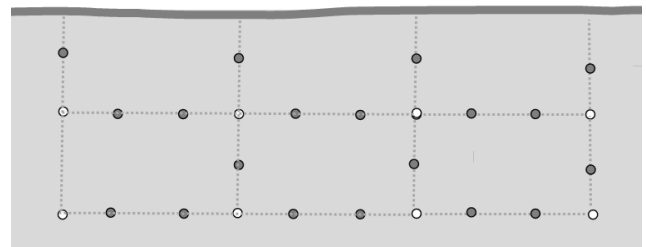
TRENCHING

In rock or concrete
Use of unfilled relief holes
Deliberate filling of holes in sequence



QUARRYING ROCK

To create blocks in pre-determined shapes, sizes
Avoids blasting, damage to material
Use of unfilled relief holes to achieve corners



● Dexpan filled holes

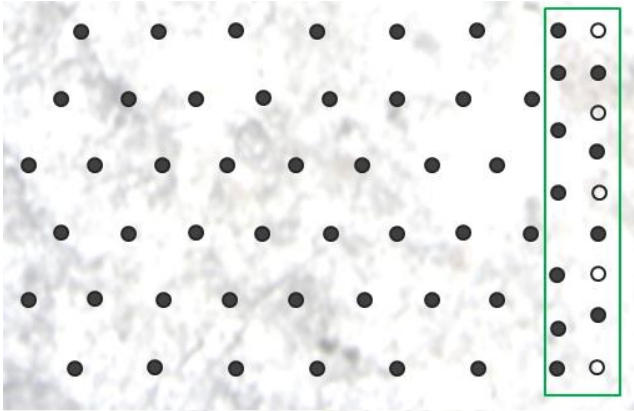
○ Relief Holes (empty, unfilled)



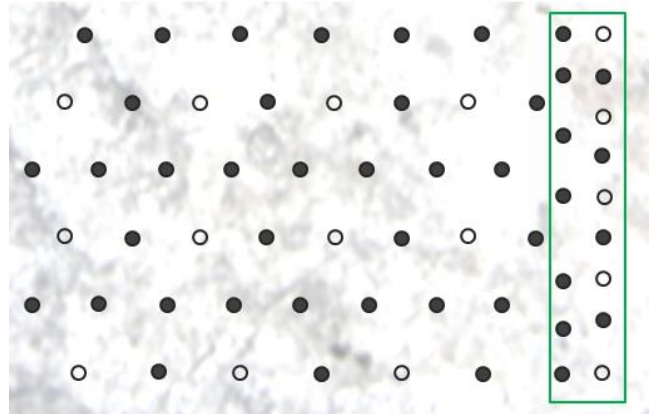
Drilling Patterns

EXCAVATING ROCK

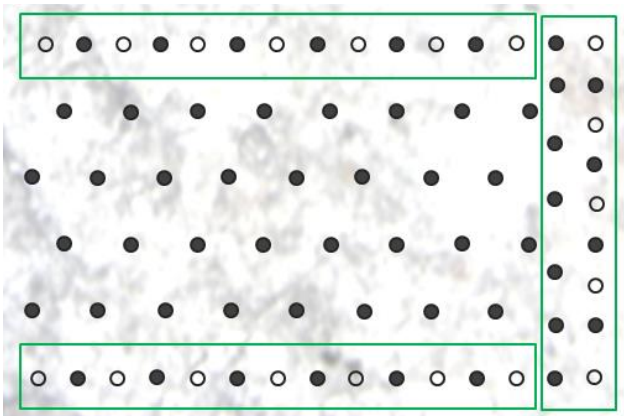
Pre-cracking an area to create expansion space



Using un-filled holes to reduce Dexpan Usage



Using a pre-cracked cut line to create an outer boundary, outline the area to be removed and create expansion space.

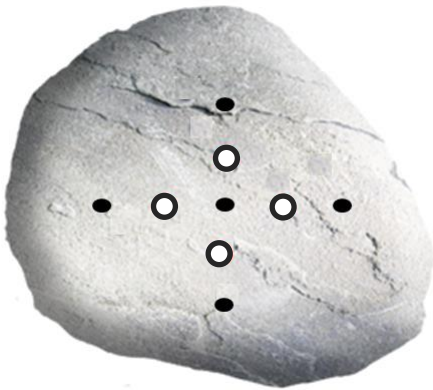


● Dexpan filled holes

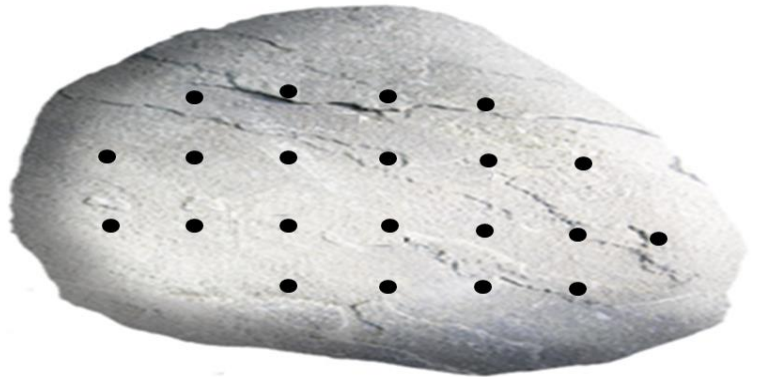
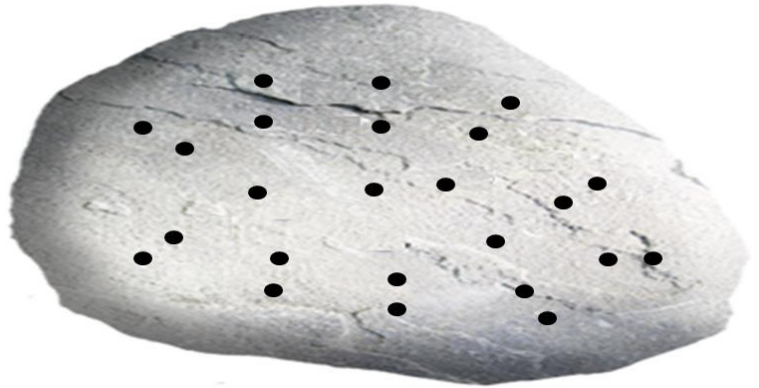
○ Relief Holes (empty, unfilled)

Drilling Patterns

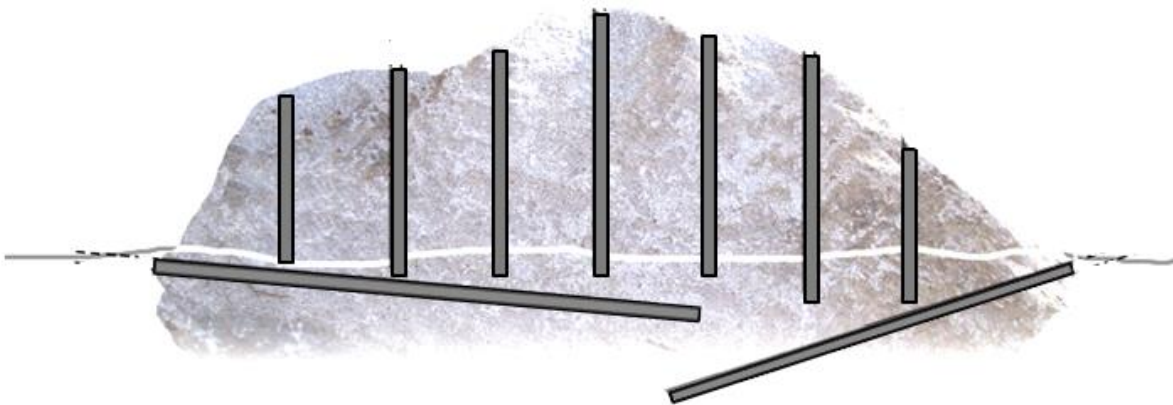
SMALL BOULDERS



LARGER BOULDERS



ROCK HUMP





Help & Advice

Support and Advice

We want you to be comfortable and confident using Dexpan.

Contact us by phone or email, if you have questions or need advice with your project.

- Answers to Your Questions
- Project Support & Advice
- Drilling Patterns
- Quotes & Estimates
- Retail & Distributor Inquiries

Please note, we can help you most effectively if you can email or text us:

- › pictures
- › dimensions
- › temperature of material
- › project objectives, considerations and/or challenges
- › tools & equipment on hand

Contact Us

We are here to help.
Monday to Friday, 8:30 to 5:00 pm (Pacific)

(604) 340 – 7106
patton@dexpan-canada.com