

THE EFFECTIVE OPERATING METHOD

XCENTRIC RIPPER



NOTES

This manual gives the operating method and the excavating procedure of the Xcentric Ripper, in order to realize the highest productivity and performance with exerting its highest capability.

Please refer to the operation & maintenance manual for the general information such as product specification, daily maintenance and etc.



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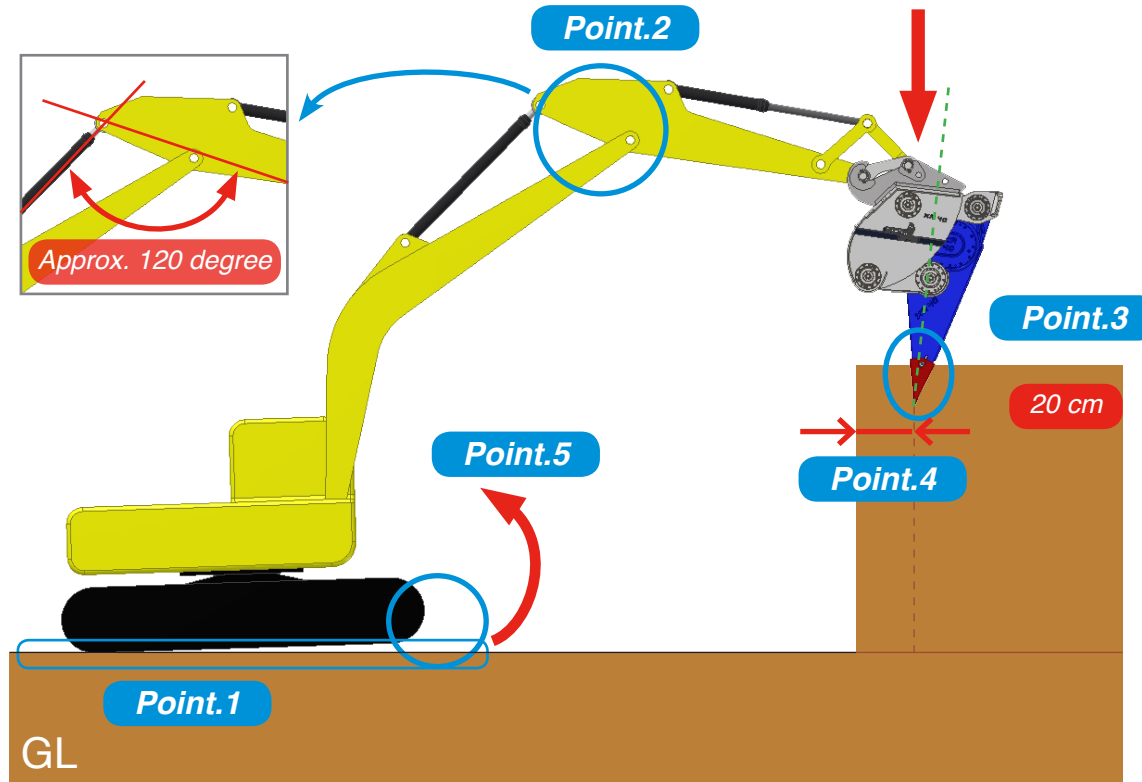
3. Effective Breaking

- 1) Basic Procedure
- 2) Effective Breaking
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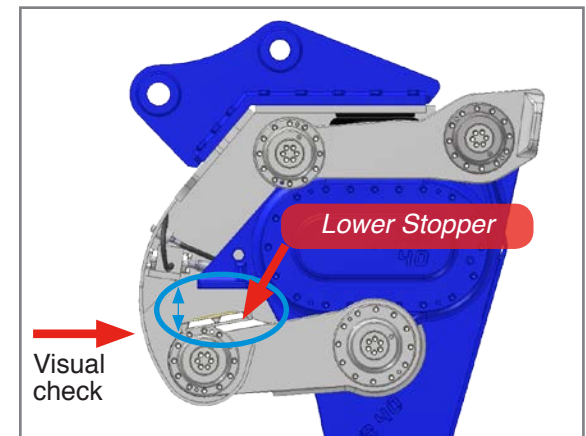
1. Basic Procedure

1.1. Bench Excavation

1) Position to Start (* The position of Ground level excavation is same as Bench excavation)



(ref.) Lower Stopper Check



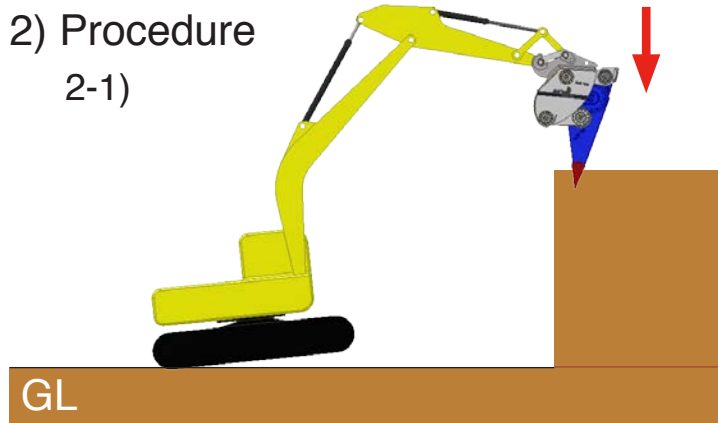
- (Point.1) Make the ground level flat.
 - (Point.2) Set the excavator in order to position boom and arm with proper angle.
 - (Point.3) Set the ripper arm vertically to the ground or just a little inside vertical.
 - (Point.4) Set the tooth onto the material approx. 20cm deep from the edge.
 - (Point.5) Set the tooth firmly onto the material by rising the front of crawler (around 30cm).
At the same time, make sure the gap between pivot arm and lower stopper is around 6-8cm.
- * Lower stopper visual check to be done when operation starts at ground level.

1. Basic Procedure

1.1. Bench Excavation

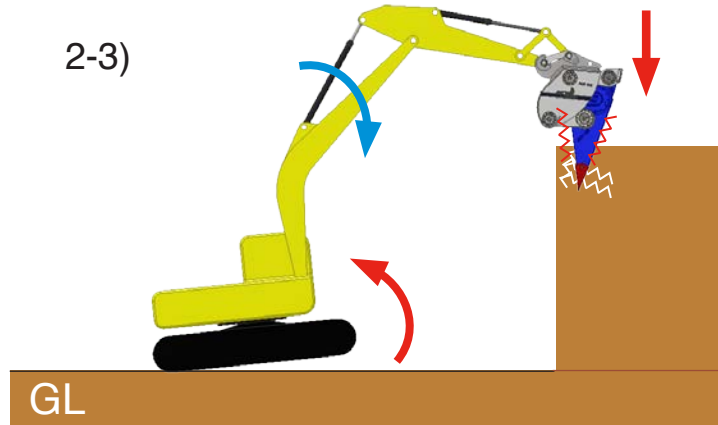
2) Procedure

2-1)



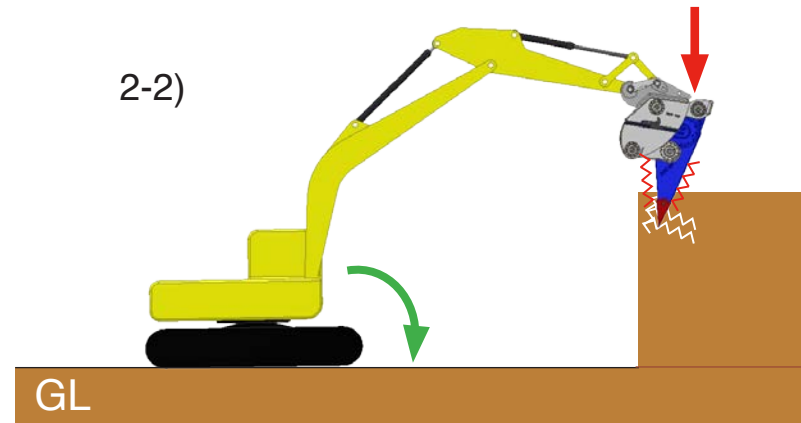
Start breaking by pushing “attachment pedal” down.

2-3)



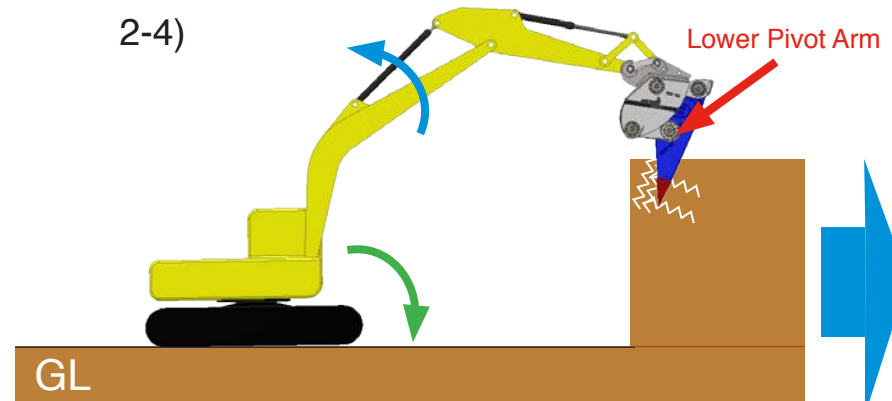
Before the front of crawler reaches to GL, keep boom down so that breaking material continues.

2-2)



By breaking material, the front of crawler comes down.

2-4)



Before the lower pivot arm hits the face of bench, stop breaking and down the crawler onto GL by rising the boom up.

Point

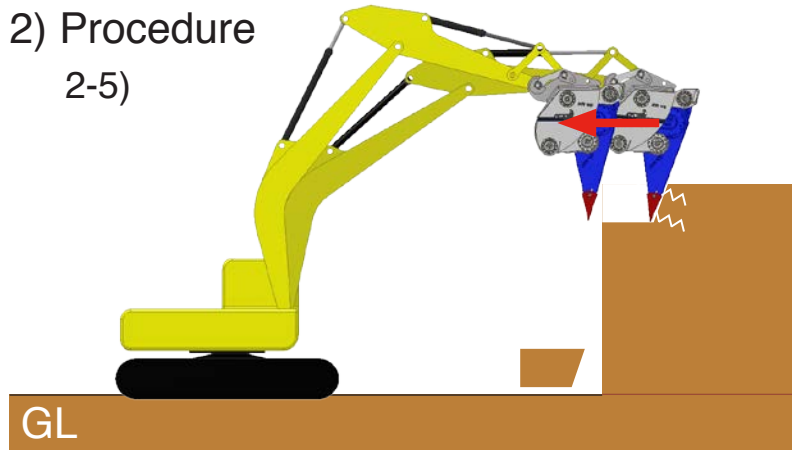
1. Keep the weight of excavation on XR, so that idle blow can be avoided.
2. Keep breaking material straight down as possible.

1. Basic Procedure

1.1. Bench Excavation

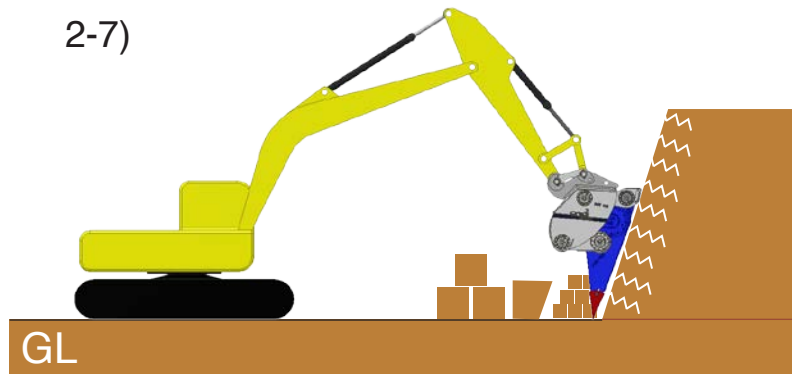
2) Procedure

2-5)



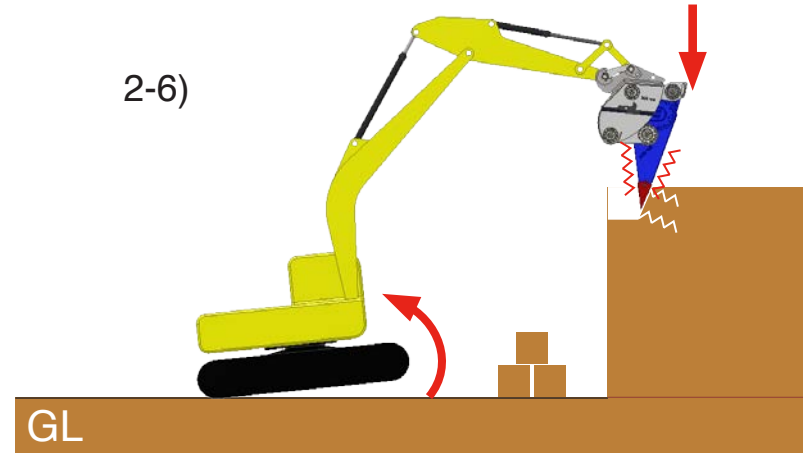
Break the fractured material by ripping back from the bench.

2-7)



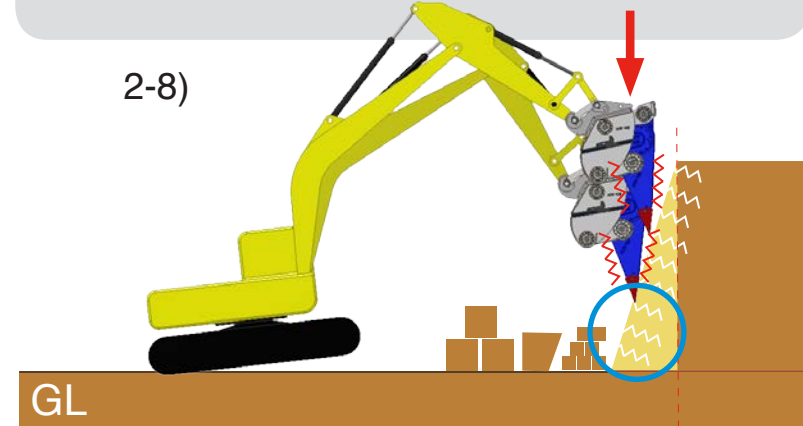
Keep the operation until the target level.

2-6)



Rise the front of crawler again and keep breaking.

2-8)



To keep the wall as vertical as possible (yellow part). Especially the root of the wall should not remain unbroken.

Point

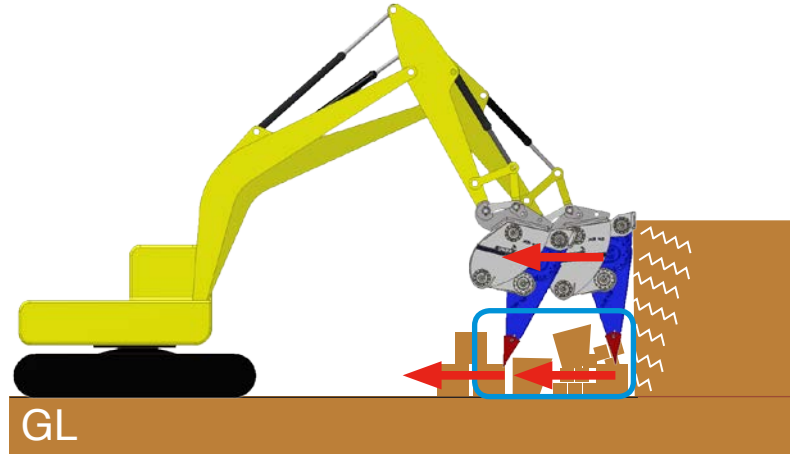
Keep the wall with vertical face after one round cycle (pic. 2-1 to 2-7), so that it gets easier to break material next cycle.

1. Basic Procedure

1.1. Bench Excavation

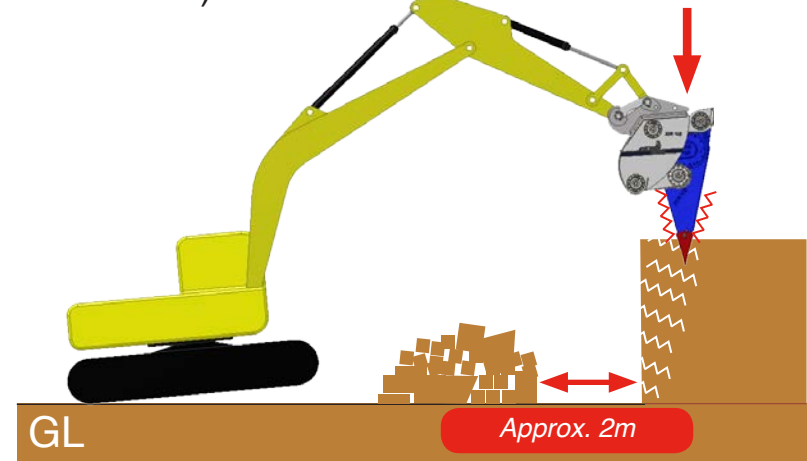
2) Procedure

2-9)



Rip the broken rocks back from the bench so that the next target is visible.

2-10)



Before restart breaking, keep a blank space, approx. 2m, between the bench and the extracted material.

REPEAT 2-1) to 2-10)

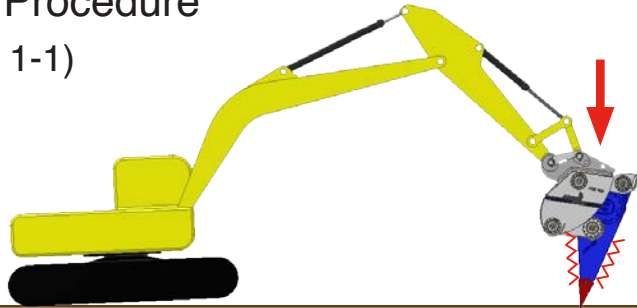
1. Basic Procedure

1.2. Ground Level Excavation



1) Procedure

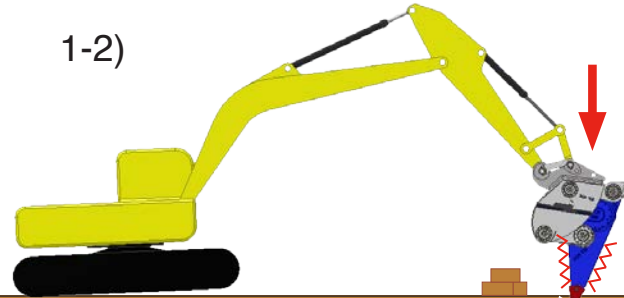
1-1)



GL

Start breaking by pushing “attachment pedal” down.

1-2)

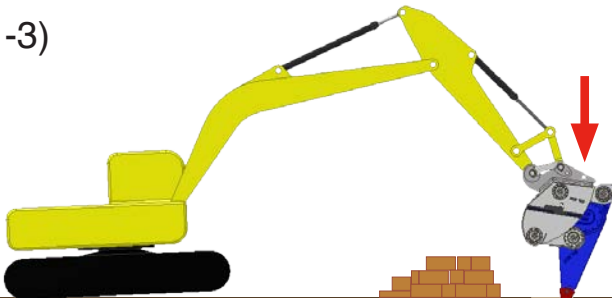


GL

Target Level

Stop excavating before digging too deep and take the rocks out. (In case of soft rock and easy to dig in, it is possible to continue to excavate).

1-3)

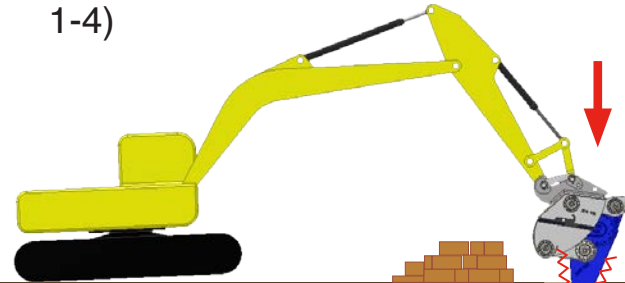


GL

Target Level

Expand the breaking area gradually.

1-4)



GL

Target Level

When breaking area expanded, keep digging into the target digging level.

Point

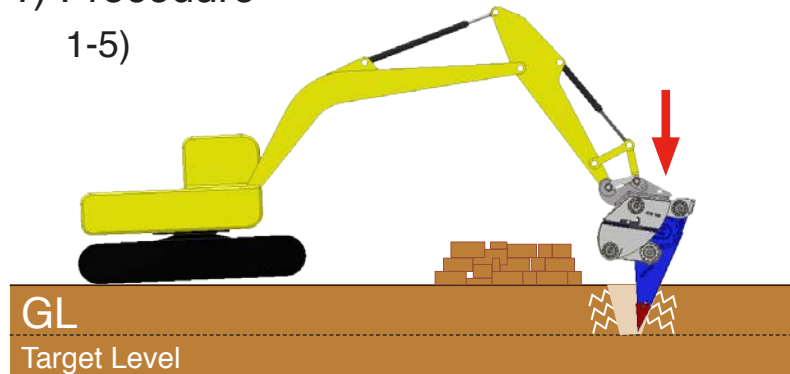
1. The starting excavator position is the same as bench excavation.
2. No Free faces in breaking area, so repeat “Short dig & rip rocks out” until reaching target level.

1. Basic Procedure

1.2. Ground Level Excavation

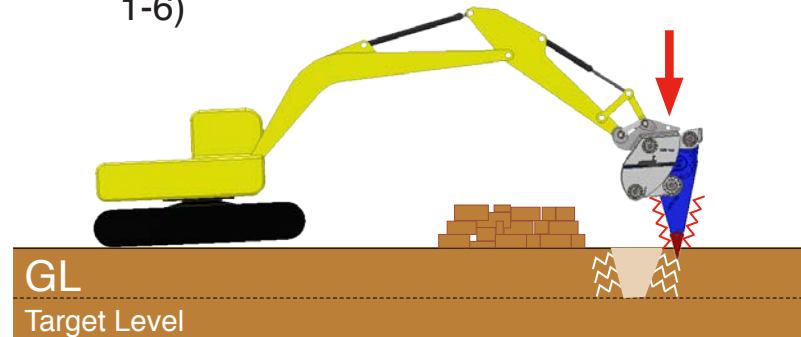
1) Procedure

1-5)



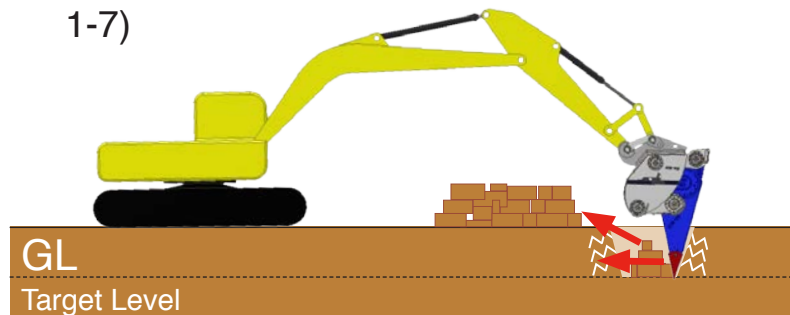
Dig until the target level.

1-6)



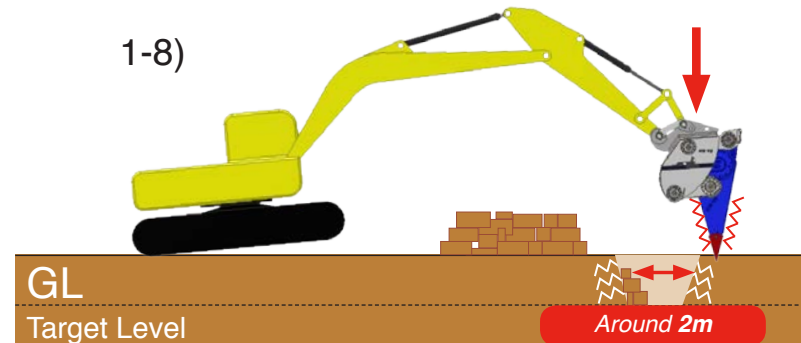
Breaking procedure is the same as in bench excavation.

1-7)



Take the broken rocks to the direction of excavator and make the target rock visible.

1-8)



Make sure the blank space (approx. 2m) is available in front of the target and restart the excavation.

REPEAT 1-6) to 1-8)

Point

1. Once the blank space is made, it is possible to break as same as bench excavation
2. Broken rocks fill in the area easily, therefore it is necessary to rip out the rock frequently

2. Precautions during operation

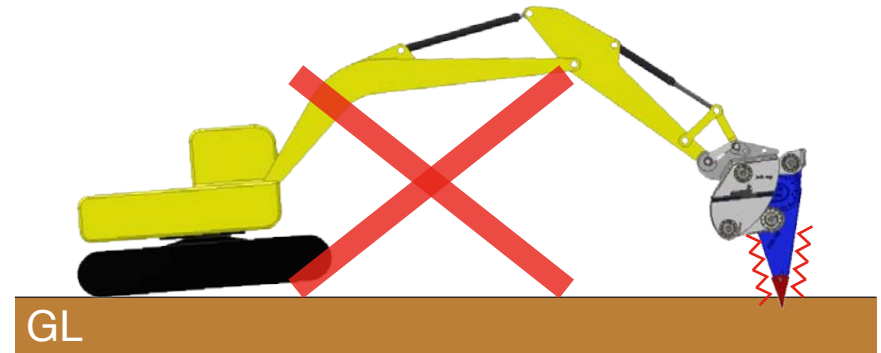
1) Position of the ripper

1-1) Foothold



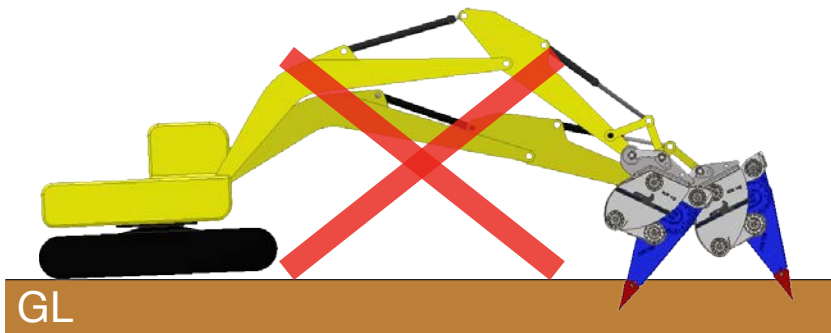
Never operate on the unstable ground.

1-2) Working Equipment



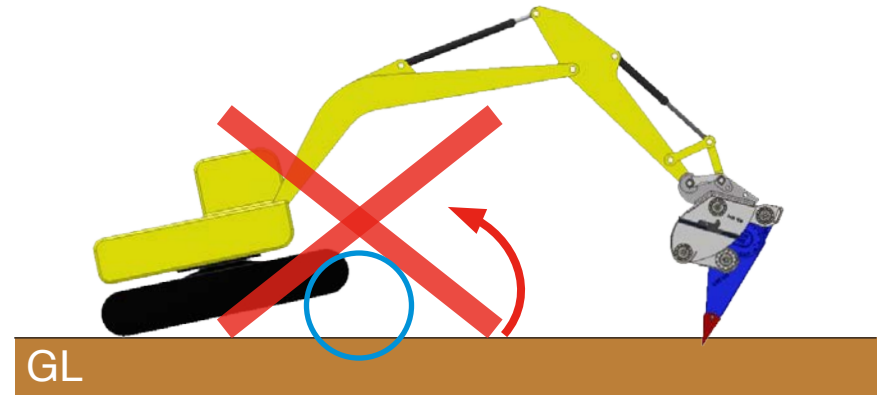
Never operate with fully retracted/extended cylinders.

1-3) Angle of Ripper Arm



Insert ripper arm with proper angle.

1-4) Rising the Crawler

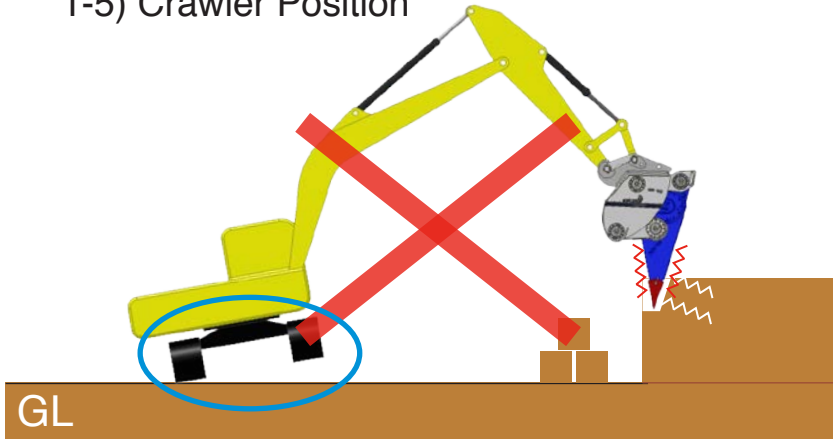


Do not rise the crawler more than the proper height (proper height: approx. 30cm).

2. Precautions during operation

1) Position of the ripper

1-5) Crawler Position

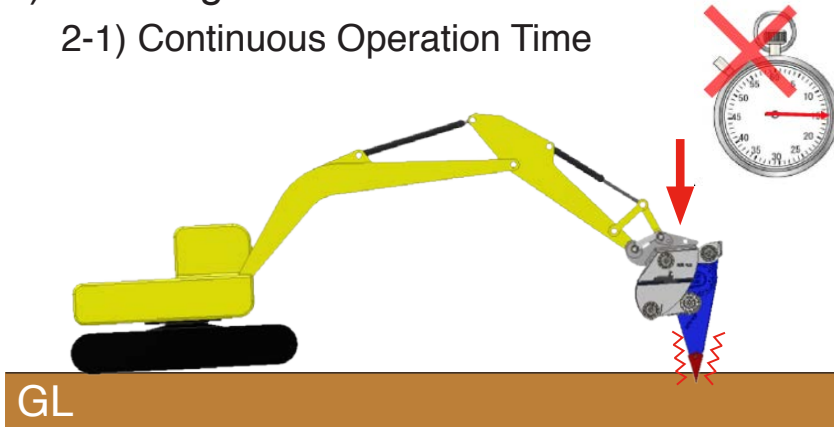


Do not operate on the crawler with side angle.

2. Precautions during operation

2) Breaking

2-1) Continuous Operation Time

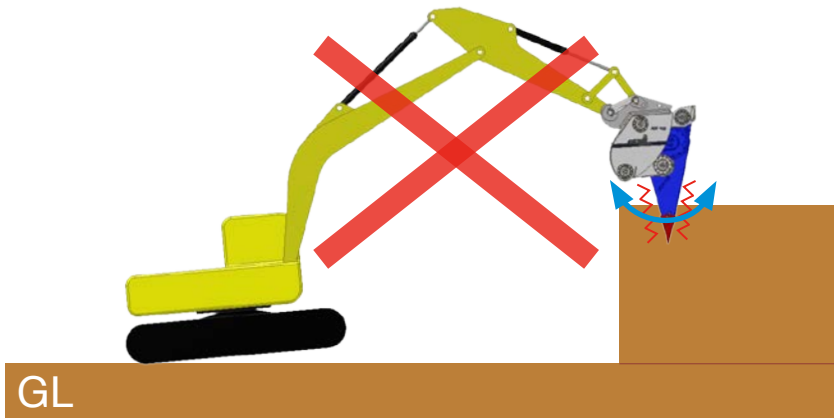


Change the breaking point if no breakings occurs during 15 seconds.

In case of continuous unbreakable operation over 15 seconds, Ripper tooth and tooth holder are to be heated and decreased in hardness and it causes tooth breakage, abnormal wear and tooth holder breakage. Change the breaking point some time after the unbreakable operation.

** In case breaking is possible, it is possible to continue breaking over 15 seconds.*

2-2) Bucket Operation during breaking



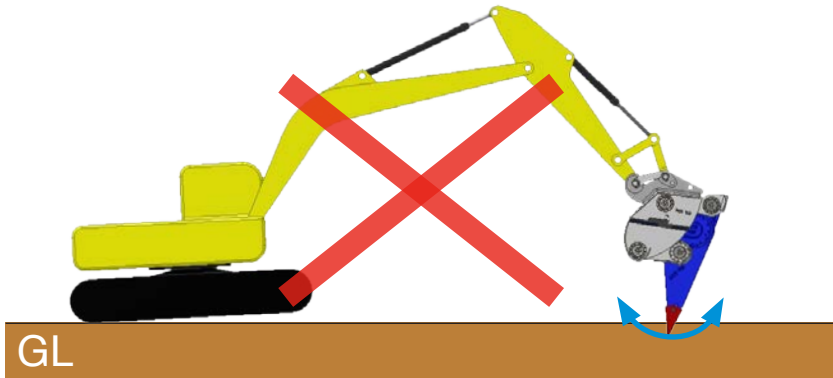
While the ripper arm is in the materials on breaking, DO NOT take "Bucket operation".

While the ripper arm is in the materials and not enough blank space available around the ripper arm, DO NOT take "bucket operation". This levering may result in breakage at the tip of the tooth and/or tooth holder.

2. Precautions during operation

2) Breaking

2-3) Ripper arm stuck



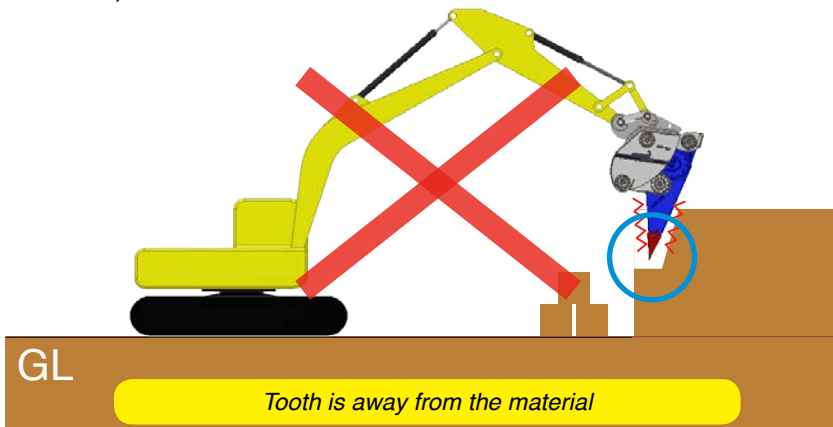
GL

DO NOT lever the ripper in order to pull out the ripper arm.

In case the ripper arm is stuck into materials, DO NOT take “bucket operation” to release the ripper arm. This levering may result in breakage at the tip of the tooth and/or tooth holder.

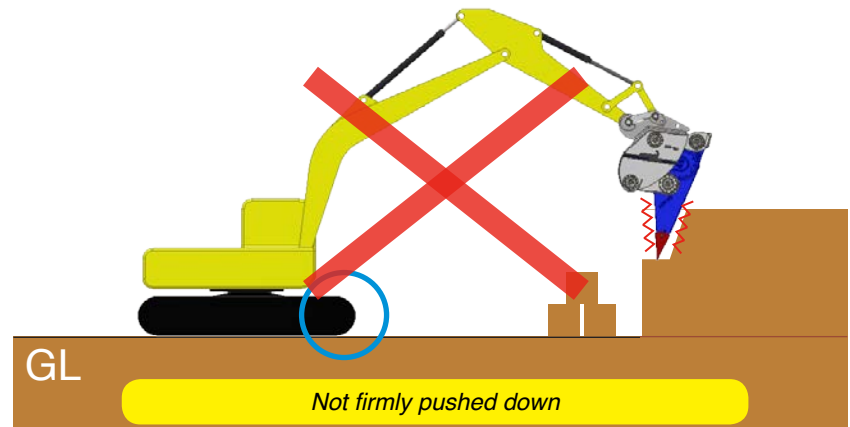
In order to pull out the ripper arm, always lift the ripper vertically without levering. And if the ripper arm does not come out from the material, ADD “very little vibration” by the ripper operation and try to lift it up vertically.

2-4) Idle Blow



GL

Tooth is away from the material



GL

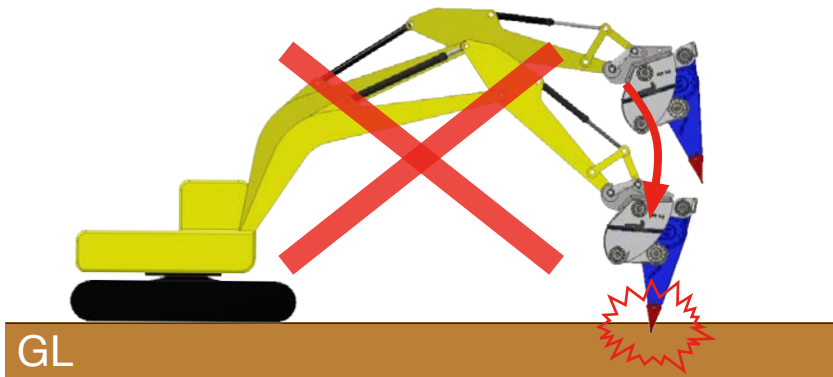
Not firmly pushed down

DO NOT give vibration if the ripper tooth is not set onto material firmly enough. (The pressure accumulator located between ripper arm and housing is to be compressed when it gets ready for breaking.) Idle blow makes too much vibration on excavator and harsh noise.

2. Precautions during operation

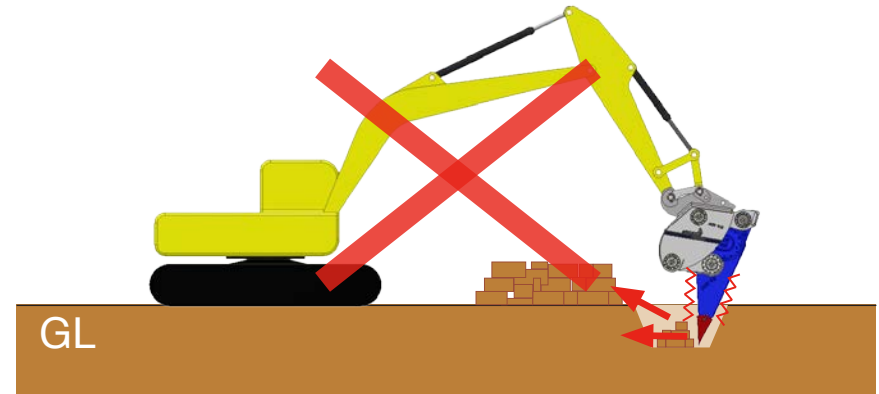
2) Breaking

2-5) Breaking by striking with ripper



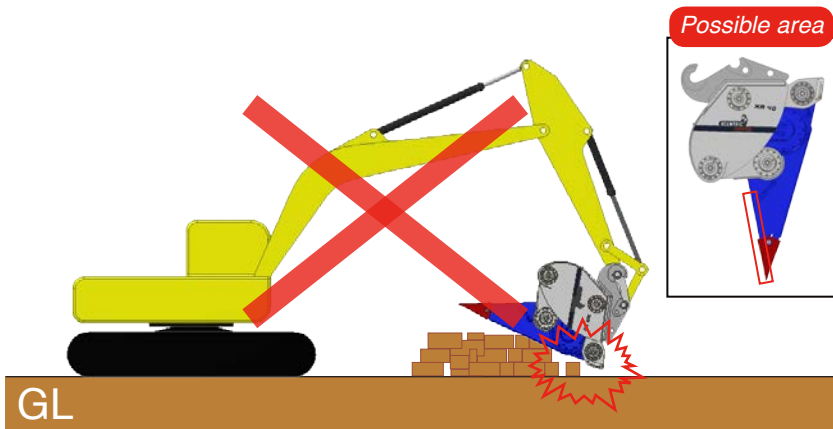
DO NOT try to break materials by striking with ripper.

2-6) Vibration during ripping



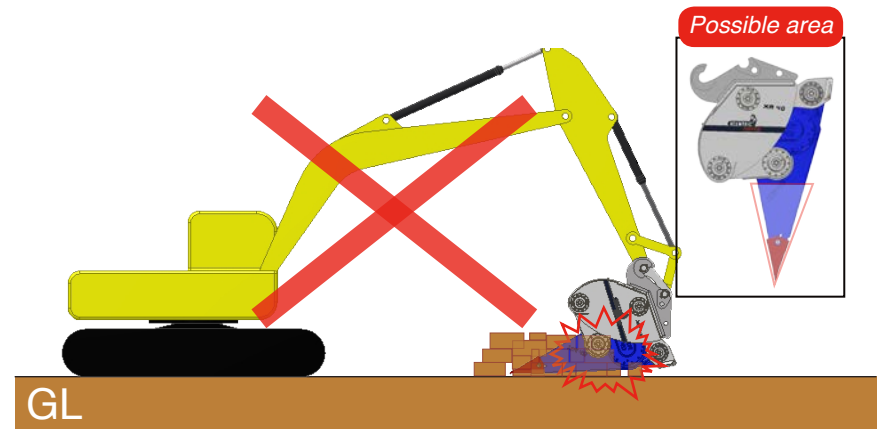
NEVER give vibration during ripping.

2-7) Moving materials by prohibited area



DO NOT use the upper part of ripper arm to move the materials.

2-8) Sweeping materials by prohibited area

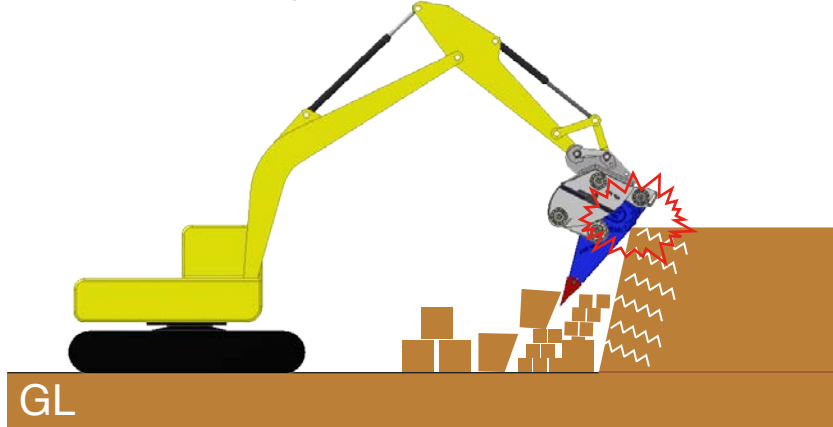


DO NOT sweep materials by the upper part of ripper.

2. Precautions during operation

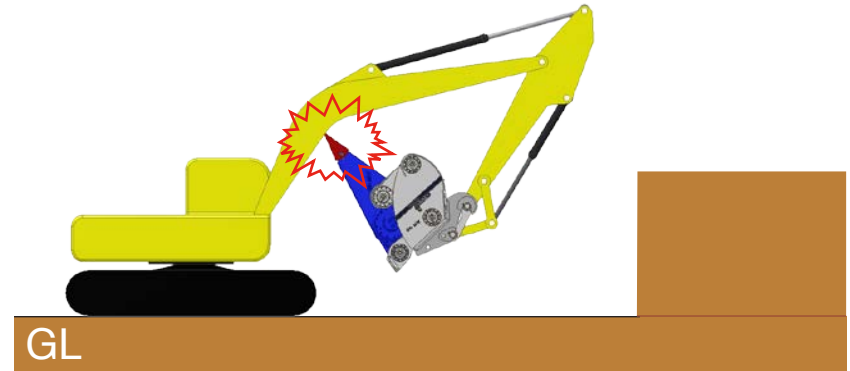
2) Breaking

2-9) Interfering with upper pivot arm



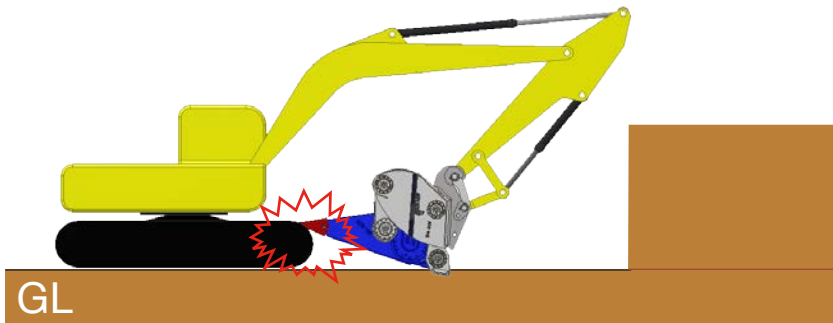
Be careful of the interference with pivot arm and materials.

2-10) Interfering with working equipment



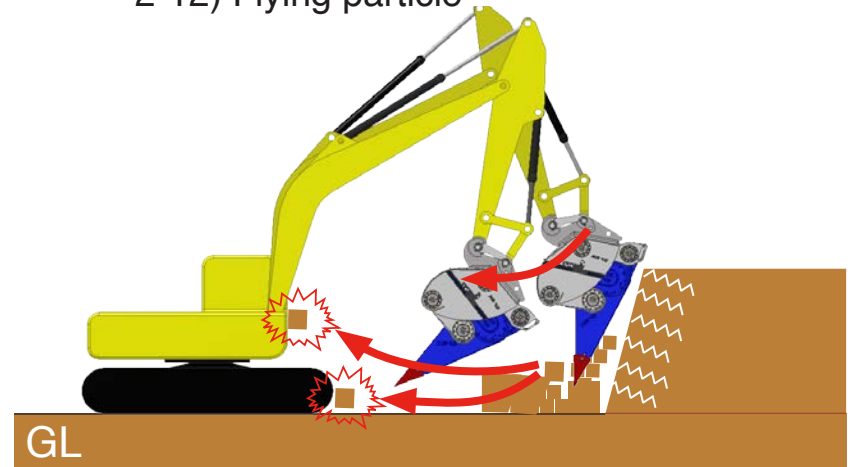
Be careful of the interference with working equipment and ripper tooth.

2-11) Interfering with crawler



Be careful of the interference with crawler and ripper tooth.

2-12) Flying particle

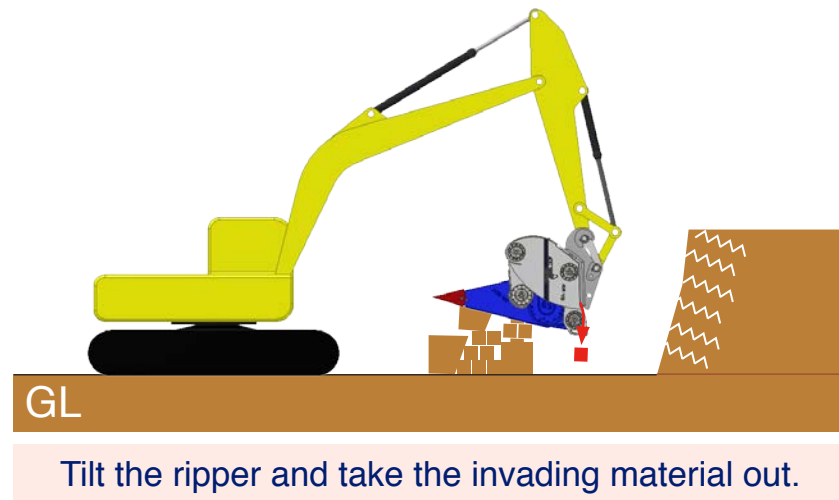
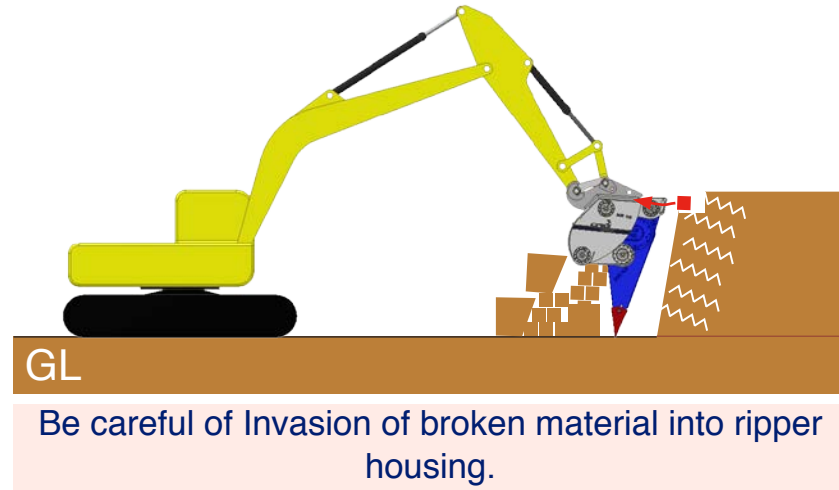


Be careful of flying particles during ripping.

2. Precautions during operation

2) Breaking

2-13) Invasion of broken material into ripper housing



When the broken materials come into the ripper housing, be sure to take the materials out from the ripper housing and restart operation.

*The ripper operation with the invading broken materials in the ripper housing may cause the **breakage of the pressure accumulator and/or hydraulic motor.***

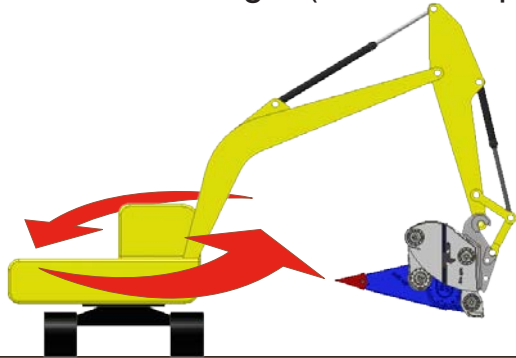
Place of Invasion



2. Precautions during operation

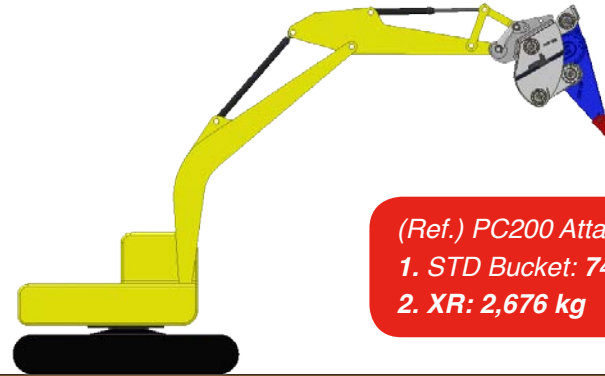
3) Others

3-1) Attachment Weight (Xcentric Ripper > Bucket)



GL

Always slew slowly and NEVER slew quickly.

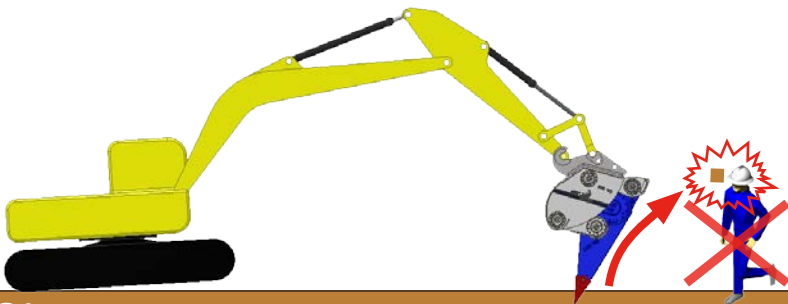


GL

(Ref.) PC200 Attachment Weight
1. STD Bucket: 740 kg
2. XR: 2,676 kg

DO NOT unreasonably lift Xcentric Ripper too high.

3-2) Safety Zone



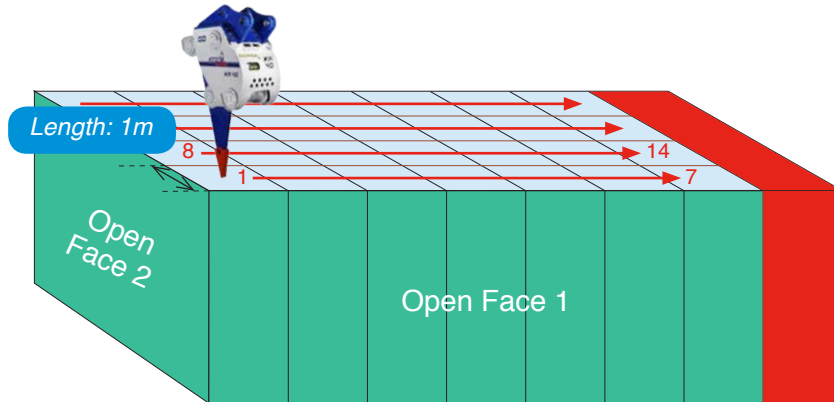
GL

While excavator is active, machine operator make sure nobody is inside of the safety zone (around 20m)

3. Effective Breaking

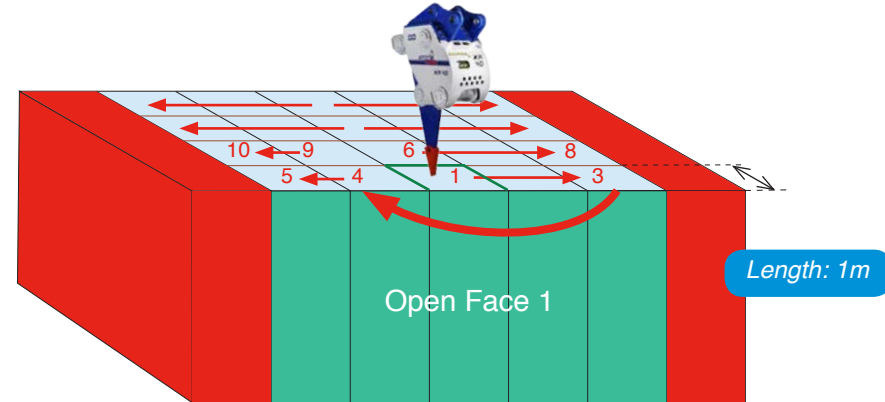
1) Basic Procedure (The area to be broken is highlighted in blue)

1-1) In case of breaking from the edge



1. Start breaking from the edge
2. Break materials in order of 1 to 7
3. Keep the width of breaking block per around 1m
4. After breaking one line (1 to 7), start breaking next line (8 to 14)
5. Repeat above Step 1 to 4

1-2) In case of breaking from the center



1. Break Block 1 and make the edge on the bench
2. Break in order of 2 to 3, 4 to 5 (Break block which has more than two free faces)
3. Keep the length of single block 1m each
4. After breaking one line (1 to 5), start breaking next line (8 to 10)
5. Repeat above step 1 to 4

Point

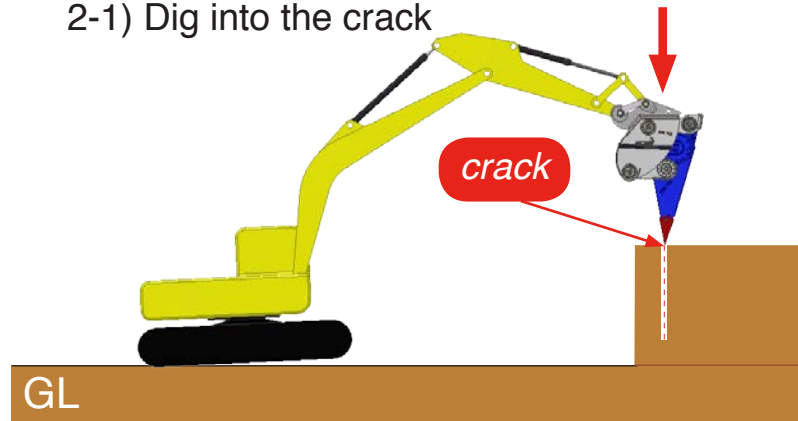
1. It is important to keep always two open edges on the object in order to increase the productivity.
2. It is necessary to keep the breaking length max. 1m but more breaking cycle with less breaking length required to achieve high productivity depending on the hardness of breaking object. (Harder material, more process to reach the same target breaking length).

(Eg.) Hard Rock excavation: Repeat breaking in line with single breaking length of 20cm
(5 lines breaking → Broken length: 1m)

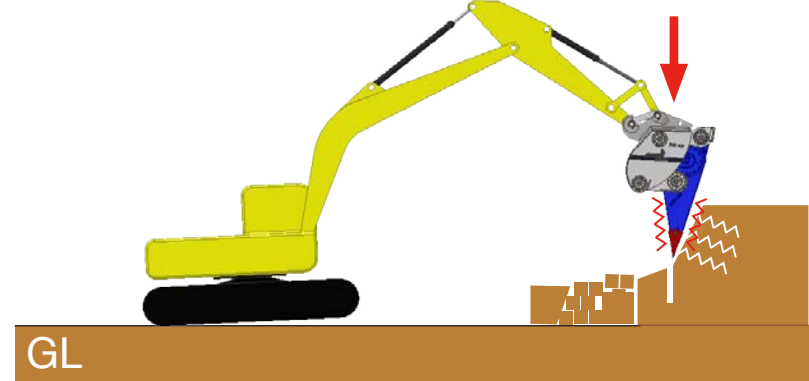
3. Effective Breaking

2) Effective Breaking

2-1) Dig into the crack

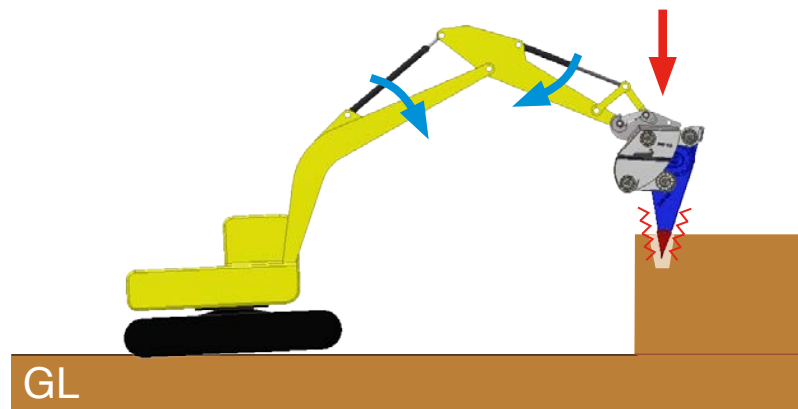


Insert the tooth into the crack, if crack is visible on the rock.



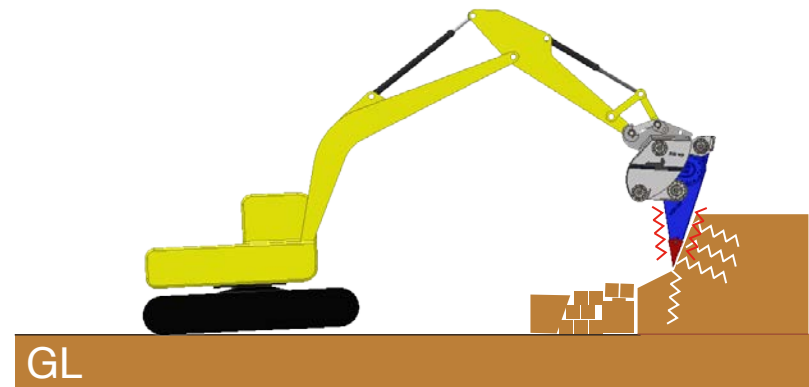
Vibration penetrates into whole rock through the crack and it leads more effective breaking.

2-2) Adjustment of digging point



If the breaking does not go well, make very little "Arm pull" and/or "Boom down" operation. (do not lever)

* Maximum working period is 15 seconds

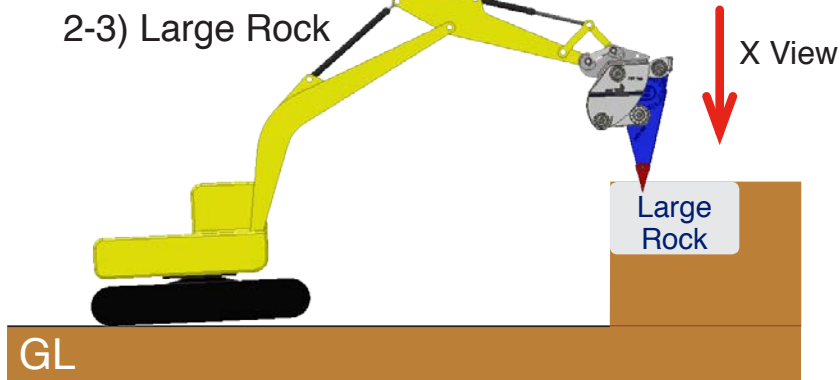


"Arm pull" operation slightly changes the breaking point and may lead to the effective breaking. (if not, take the ripper arm out and change into another position)

3. Effective Breaking

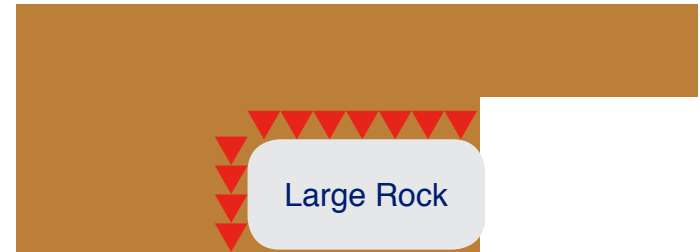
2) Effective Breaking

2-3) Large Rock



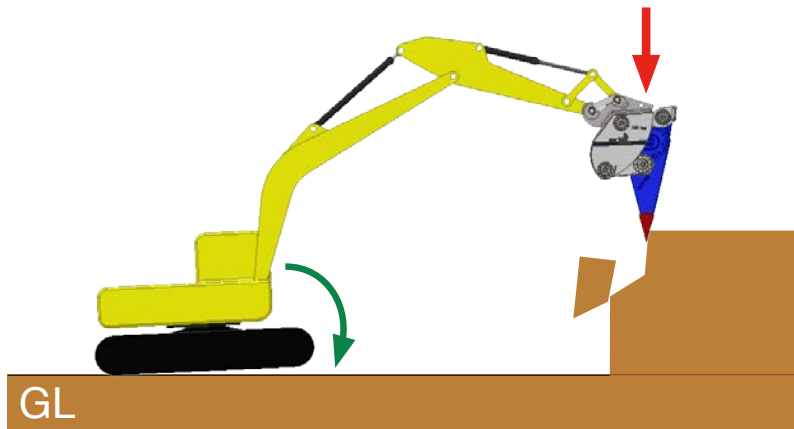
When large rock comes up, excavate softer area around the large rock and drop the rock off.
(No direct breaking onto the large rock)

X View

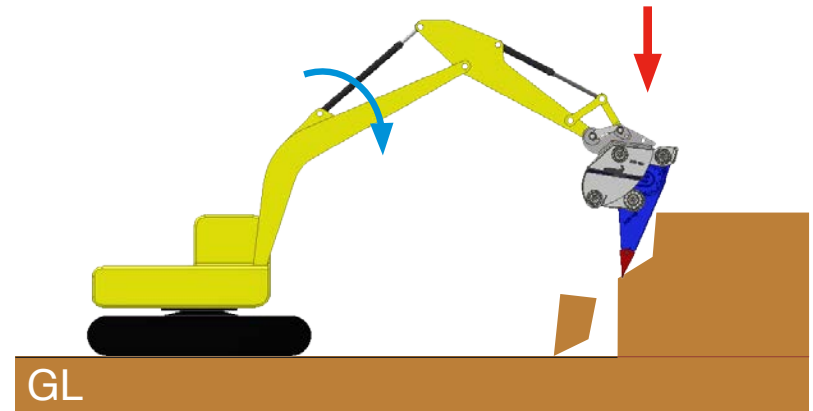


▼ breaking points

2-4) Adjustment just after rock broken



Just after the rocks are falling down, the front of the crawler is going back to the ground as no support under the ripper tooth.

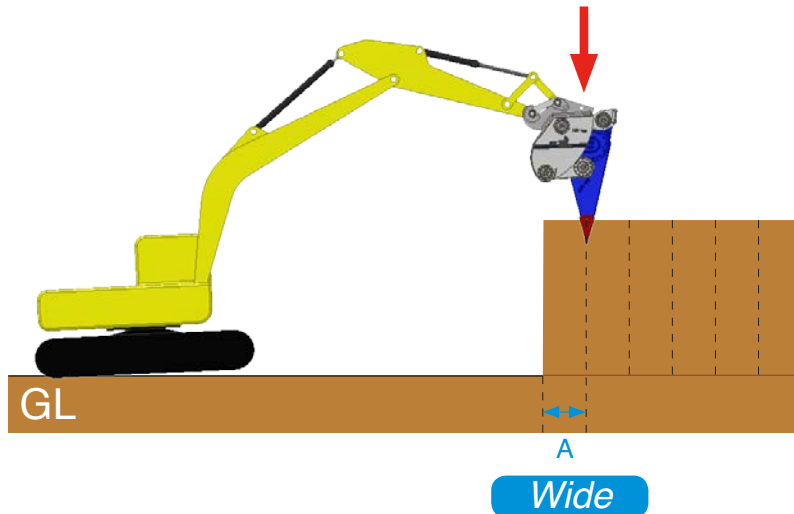


Immediately stop "vibration" and operate "boom down" and avoid idle blow.

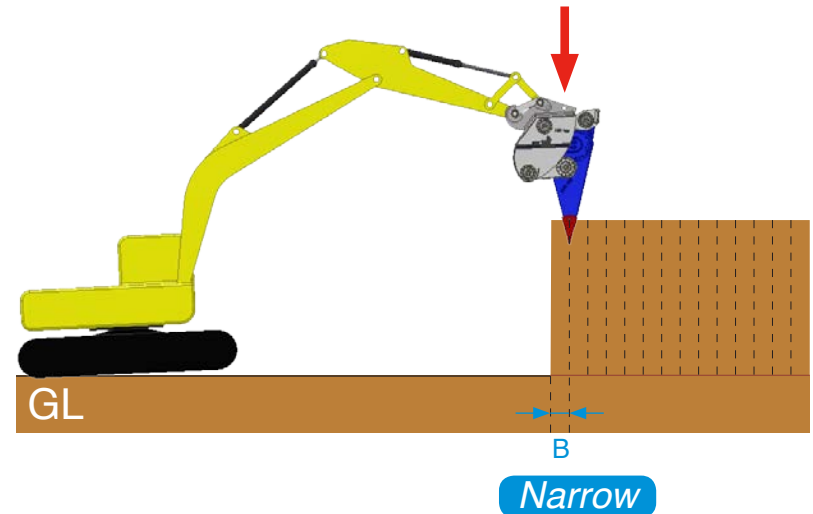
3. Effective Breaking

3) Breaking by the rock hardness

3-1) Soft rock



3-2) Hard rock



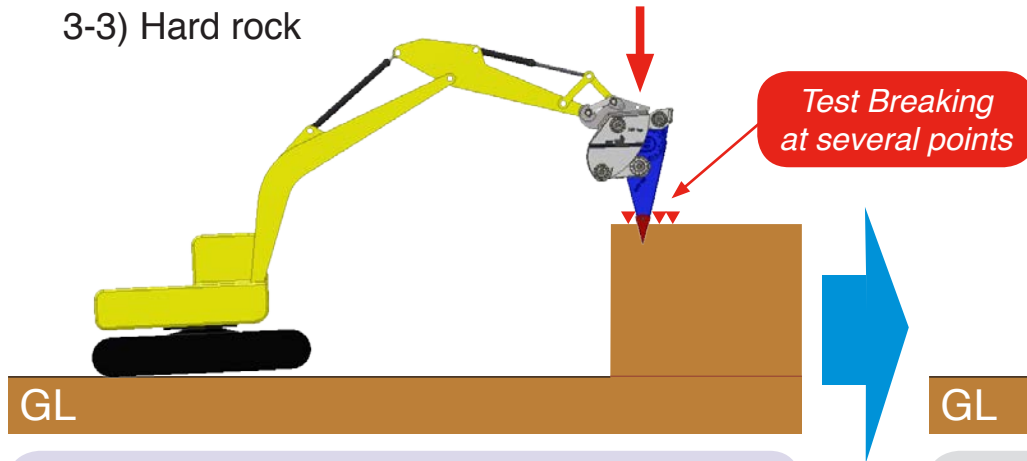
Point

1. The width of breaking is different depending on the hardness of rock (Soft Rock > Hard Rock).
 2. For both soft and hard rock, it is necessary to start Width 20cm, and if it is easy to break, extend the width like 20cm → 30cm → 40cm → find the most appropriate width of breaking.
- * Even if it is possible to make wide excavation, breaking in narrow width makes more productivity.
(Balance between breaking speed and production volume)

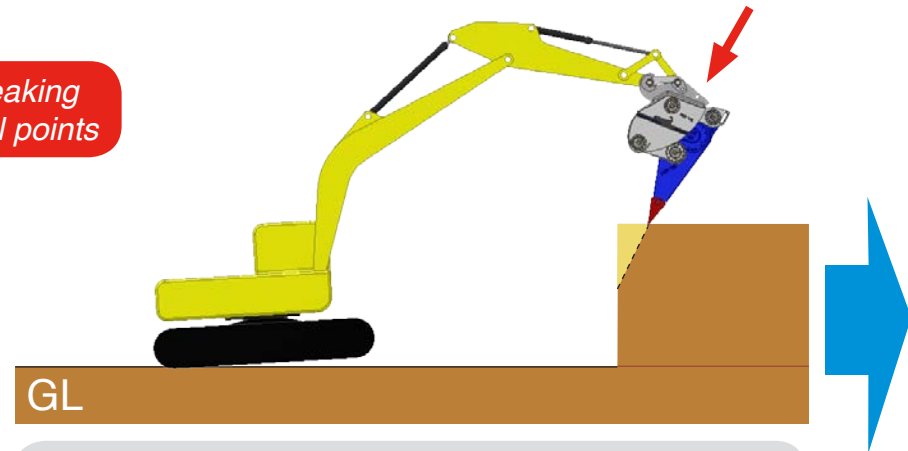
3. Effective Breaking

3) Breaking by the rock hardness

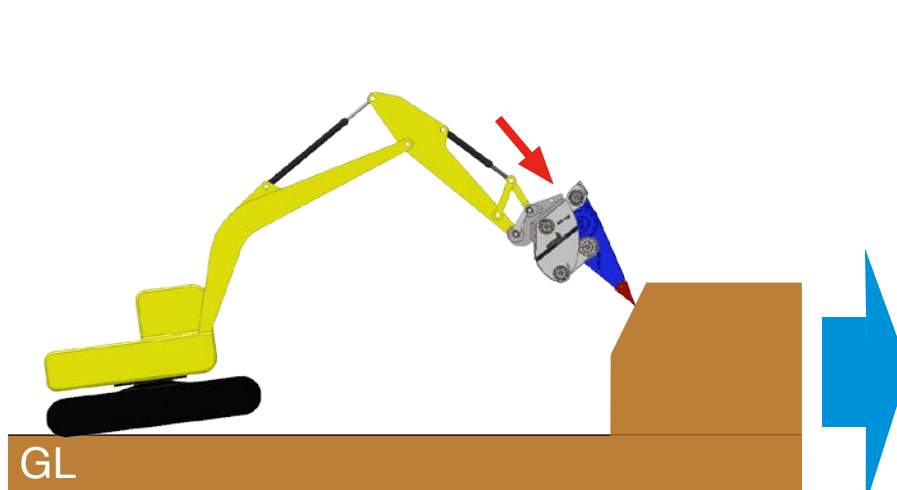
3-3) Hard rock



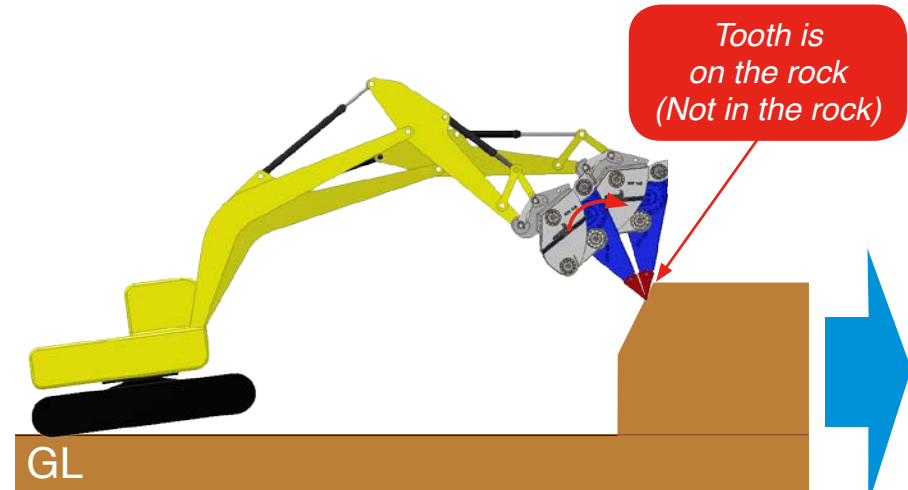
Impossible to insert the tooth due to very hard rock (after trial several positions).



Insert the tooth with slant position (above picture).



Inset the tooth vertically against the face of object, if slant position, the tooth may slip down.

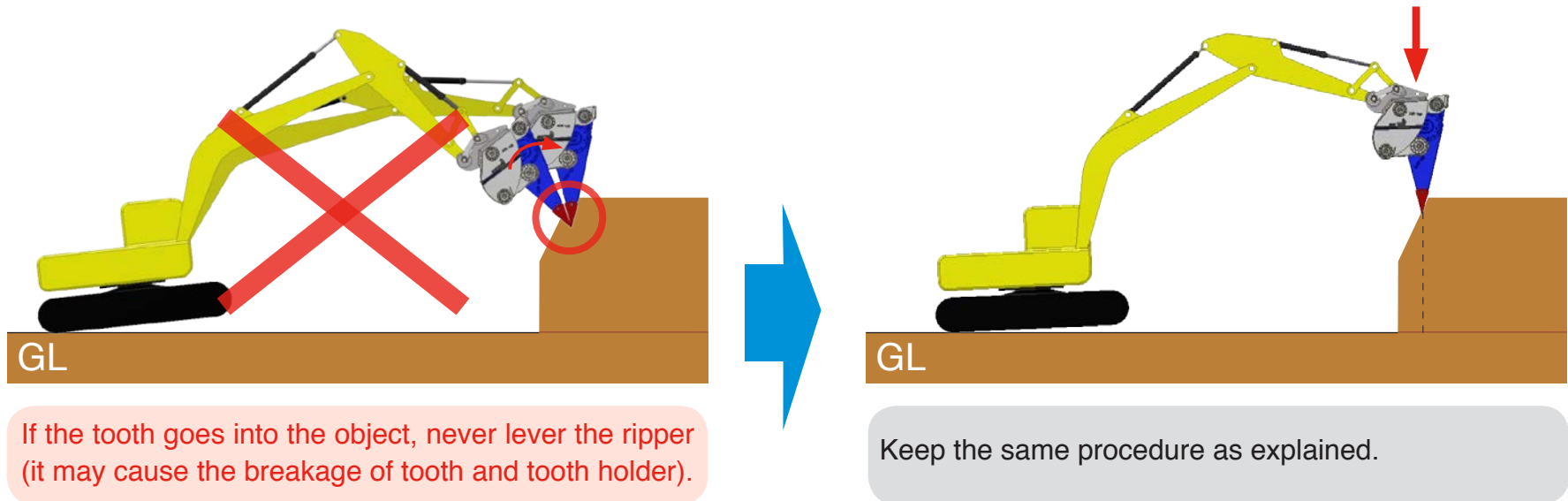


Once creating small hole on the object, rise the tooth on the object with continuous vibration.

3. Effective Breaking

3) Breaking by the rock hardness

3-3) Hard rock



Point

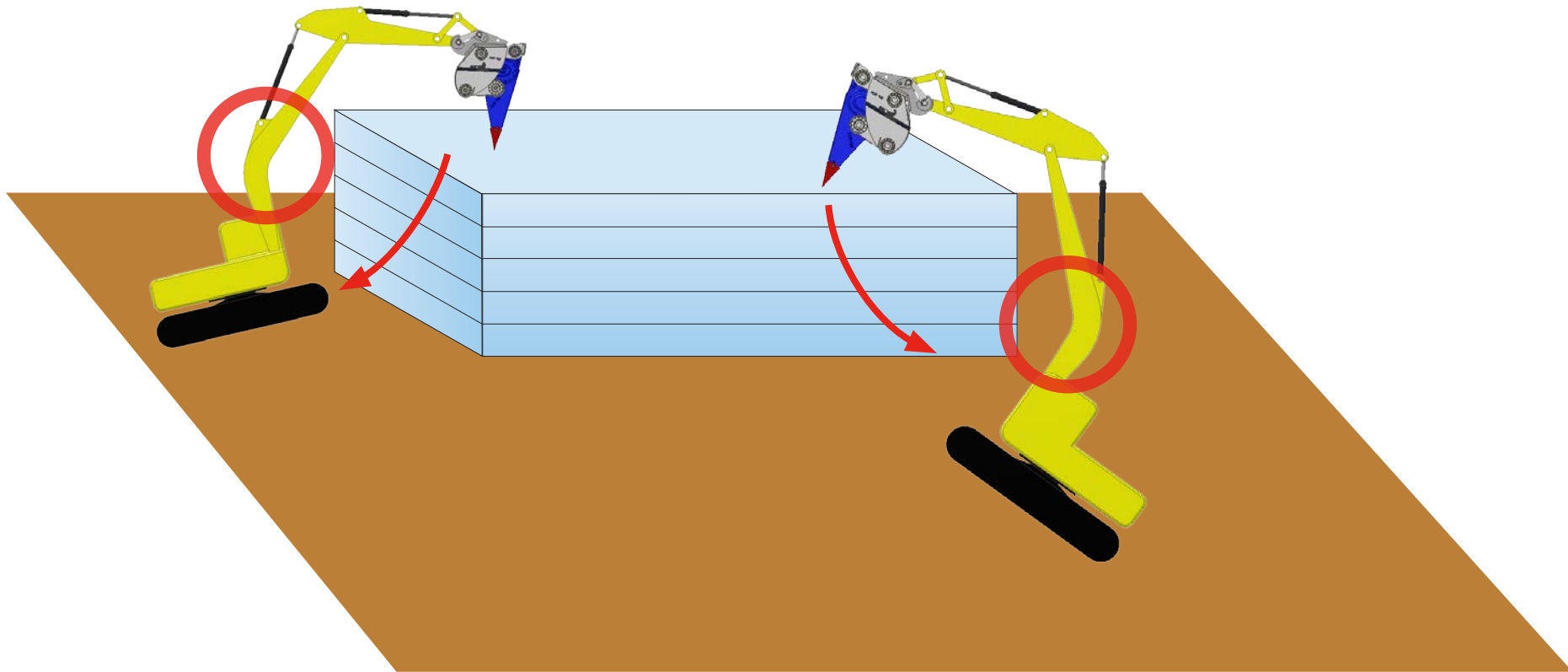
If the rock is too hard and few layers or cracks, it is necessary to try below 4 points. Otherwise, please recommend bigger size of the Xcentric Ripper or hydraulic breaker, etc.

1. Find the cracks and insert the tooth into the crack
2. Break several points
3. Break as like peeling the material
4. Change the angle of ripper arm and break the material

* The Xcentric Ripper is basically designed for breaking layered and/or fractured rocks and concrete and it is not recommended to use for very hard rock without cracks or very hard concrete.

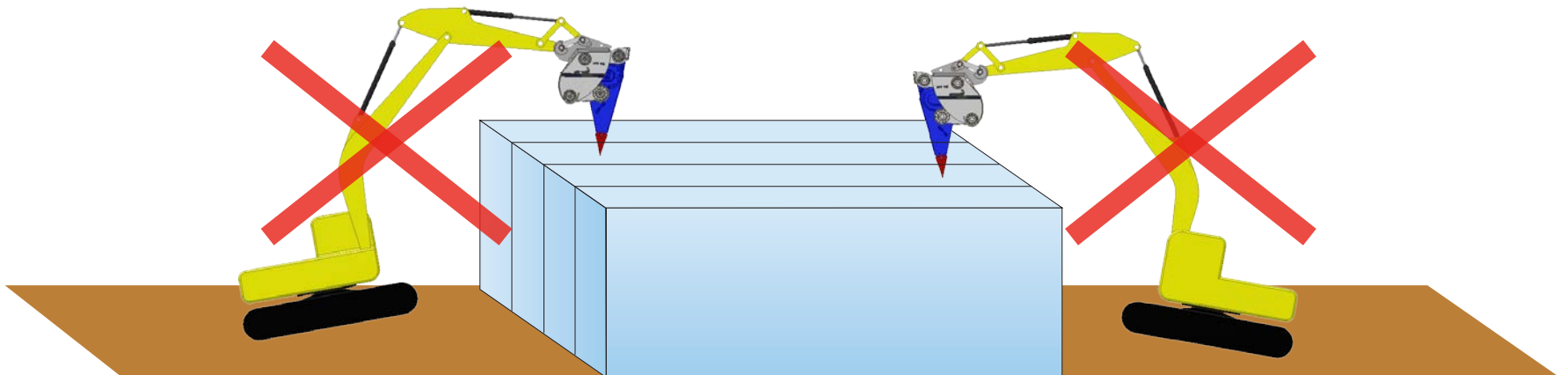
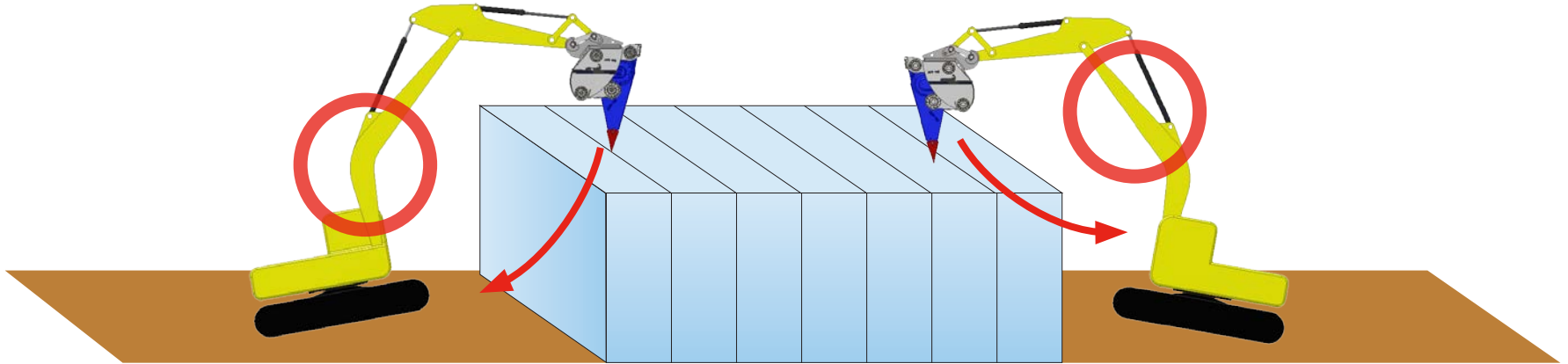
3. Effective Breaking

4) Breaking by the direction of Layer and Cracks



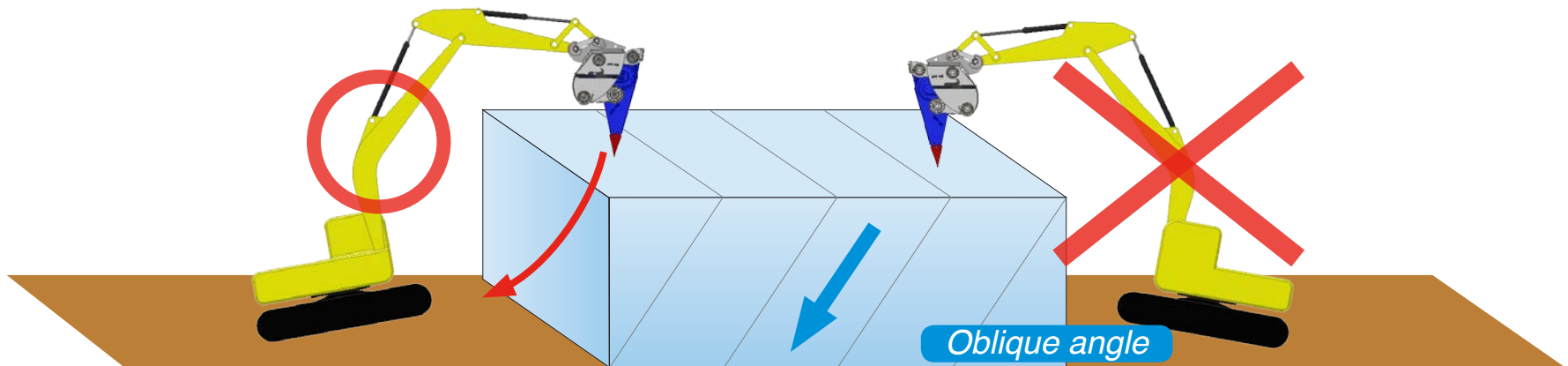
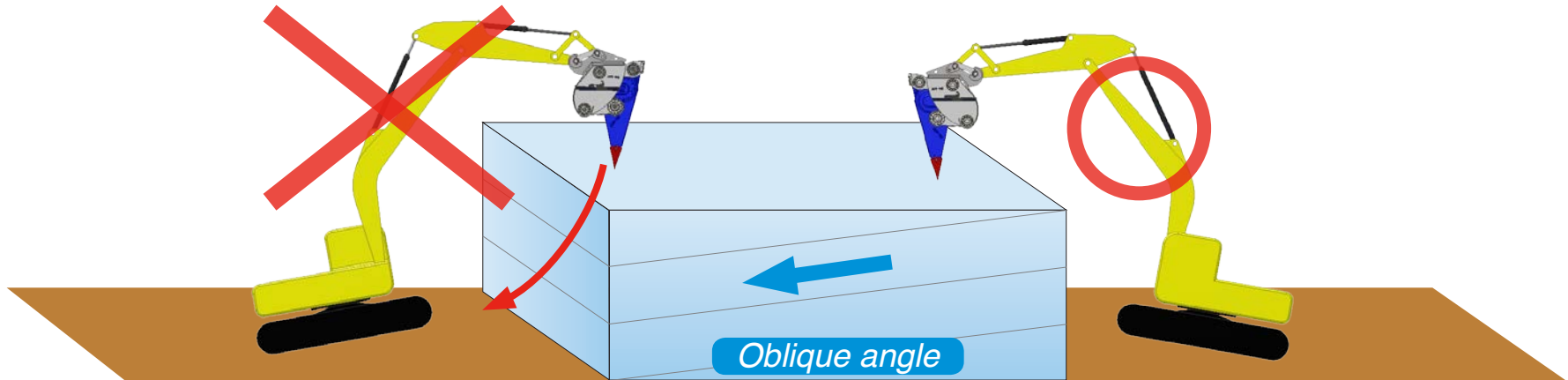
3. Effective Breaking

4) Breaking by the direction of Layer and Cracks



3. Effective Breaking

4) Breaking by the direction of Layer and Cracks



Point

Check the following points and study the most productive procedure to break the material before operation. (1. Direction of layer and width, 2. Allowable area to set the excavator)



**Please contact below
when you have any questions about this material**

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Thank You