

Dimensional & Irregular Materials for Horizontal Application/Flatwork

By Jon Hirsch – Krugel Cobbles, Inc.

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Content

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- Ordering the Stone
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Before going to the Job Site

- Set up expectations with your client.
 - The wrong expectations can lead to conflict and most likely a bid dent in your pocketbook.
 - Natural Stone is variable in texture, color and appearance.
 - Know the properties of the stone you are selling and make sure that you clearly communicate the information to your client.
 - Take advantage of the information, seminars, brochures and websites of your local stone dealers.
 - The more you put into learning your products, the more comfortable and confident you will be in selling them to your clients.

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Before going to the Job Site

- Have a portfolio on hand to show material pictures.
 - Show pictures of your own projects, making sure that they are high quality and good enough to show a client.
 - Use stone suppliers' brochures.
 - It is better not to show your own work, than to give a client poor quality pictures or worse, illustrating poor quality work.

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Before going to the Job Site



- Preparing samples & mock-ups
 - Mock-ups should look good but should also be representative of what the project will actually look like.
 - If only the best stones are used, then the mock-up is unrealistic and the client will expect this unobtainable standard for the project.
 - Mock-up should be large so that they illustrate the range of color or texture (if any) of whatever material is proposed.
 - Always set up a mock-up and samples and obtain approval prior to placing the order so that adjustments can be made if needed.



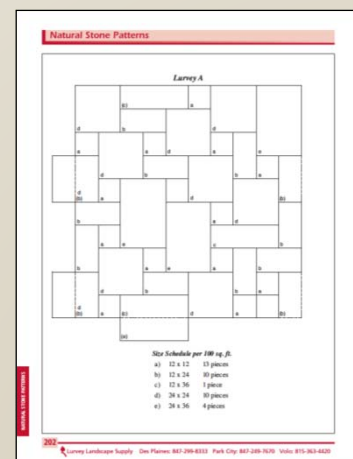
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Ordering the Material



- Understand how the material is fabricated
 - Many stones including Bluestone are nominal in size, so if it says 24" x 24", it is actually only 23.5" x 23.5" because it is fabricated assuming a mortar joint.
 - Take into consideration that for a large dryset application, either the joints will be wide and unsightly or you will run short.
 - Know the proper mix of sizes. Many fabricators and material yards will provide pattern layout sheets.



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Ordering the Material



- Understand how the material is fabricated
 - Know the material lead times from the suppliers prior to committing to an install date with the client. Custom materials have a much longer lead time.
- Waste: Order at least 5% more material than required
 - Includes saw cut & allows to cull through the material to eliminate less than desirable pieces.
 - Figure more percentage of waste for more curved designs.



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Ordering the Material



- Purchase Orders to Supplier
 - Facilitates comparison between quoted price & invoice.
 - Helps with job costing.
 - Helps the vendor keep the orders straight, particularly if there are several going at one time.
- Freight: How will the material be shipped to the job site?
 - Be aware of road weight limits.
 - Be aware of what size truck can access the job site.
 - Cost & time comparison between loads with own truck vs suppliers freight



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Installing the Stone

- Necessary Tools:

- Shovels
- Rakes
- Broom
- Compactor
- Hose
- Carpenter's pencils
- Soapstone
- Tape measure
- 2' & 4' Levels
- Square finishing trowel
- String lines
- 2' Carpenter's square
- 2 Pound sledge hammer
- Rubber mallet
- 4" Hand grinder
- Gas driven cut off saw
- 2" Masonry chisels
- Oxygen Acetylene torch
- Blower

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Installing the Stone

- Mock-up installation

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- Mock-up installation



MORTAR JOINTS BETWEEN BLUESTONE TO BE CHARCOAL GREY.

MORTAR JOINTS BETWEEN BLUESTONE TO BE CHARCOAL GREY.

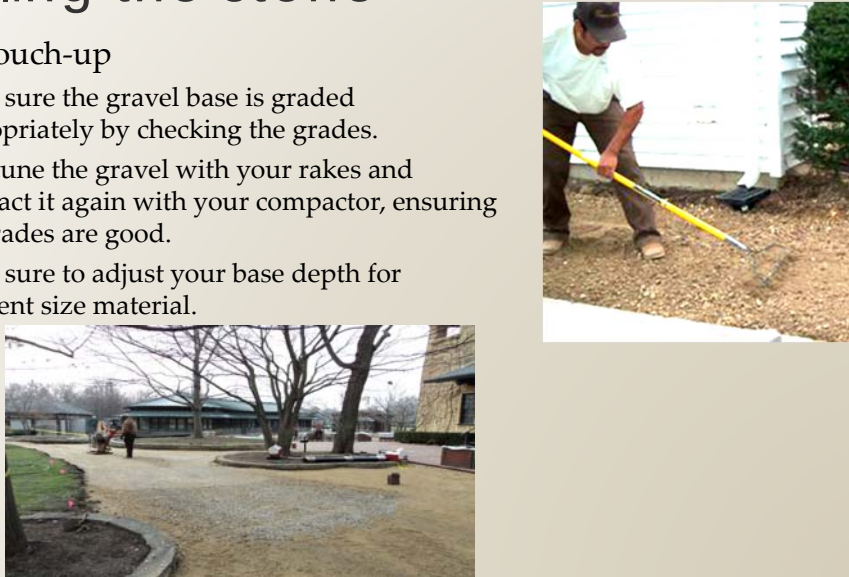
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- Base Touch-up
 - Make sure the gravel base is graded appropriately by checking the grades.
 - Fine-tune the gravel with your rakes and compact it again with your compactor, ensuring the grades are good.
 - Make sure to adjust your base depth for different size material.



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Installing the Stone

- Pattern Selection & Starting Point
 - Random ashlar, running bond, stacked bond
 - Best place to start and how will it fit in the space
 - Center and check the layout to avoid small cuts along the edge and to avoid pattern being noticeably out of balance – easier with ashlar
 - Axis lines and alignment points off the house
- Ensure pattern stays square
 - Check multiple points on the house to determine if it is square.
 - Set up string lines to ensure pattern stays square and true.
 - Use a PaverSQUARE to make sure corners are square and true.

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Installing the Stone

- Leveling Course
 - Material selection:
 - First choice is #2 torpedo sand – ease of use
 - Limestone screenings have a tendency to hold water and can have an affect on the pH of the soil.
 - Application:
 - Apply the sand over the compacted gravel at a thickness of about 1".
 - Do NOT try to make up for gaps in your gravel with a lot of sand.
 - If there is over 1.5" of sand, there will be an unlevelness of your stone over time.
 - Grade out the sand as evenly as possible.

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- Trim the stones to make them square
 - **Bluestone and other dimensional stones are not completely square.**
 - For a 'hand tight' dimensional stone project or for 1/8" joints, the stone has to be trimmed to ensure all sides are square.
 - Use the 2' carpenter's square to check each stone, then use the carpenter's pencil to mark it and then the gas driven cut off saw to trim the stone.
 - Be aware of the 'no dust' municipal regulations
 - Attach hose to allow wet-cutting.
 - Be aware that there will be a slurry mix to clean up, but a large fine will be avoided.




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- Stone Layout
 - Layout the selected pattern in a small area with trimmed and square stones.
 - Start by leveling the first closest to the starting place.
 - NO more than a 7.75" height of a step and NO less than 5" down from the last riser. Keep the bottom riser height consistent with the others.
 - Set the stones by lifting them up one by one, installing or removing torpedo sand as necessitated by the characteristics of the stone.
 - Use the square finishing trowel to spread and grade the sand.
 - Make sure each stone is still square and then finish the leveling.
 - Use the 2' and 4' level to ensure that the stones are pitching in the right direction.



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- Saw cutting
 - Layout a flexible piece of 1" diameter PVC pipe and a carpenter's pencil to mark the nice curves before cutting.
 - Review to avoid small pieces. Change the small pieces out before cutting and remark the larger pieces.
 - Etch a line with the 4" hand grinder in the stone in order to ensure staying true to the pencil marking.
 - Use the gas driven saw to cut the stones through the etched line.






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Installing the Stone

- Saw cutting



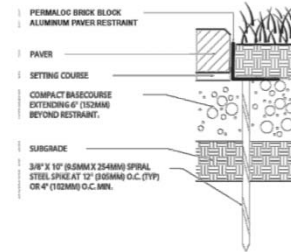
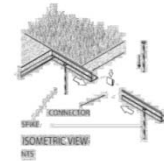
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- Types of Edge Restraint Systems
 - Black Aluminum – low profile helps keep stone in place

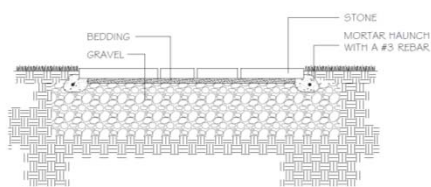


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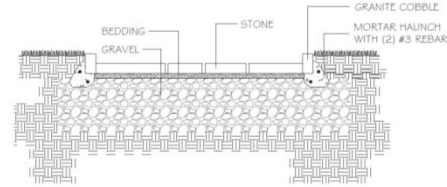
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Installing the Stone

- Types of Edge Restraint Systems
 - Mortar Haunch reinforced with #3 rebar – *Frequently used but it can have a differential movement of the stones on the perimeter to the stones in the field.*



MORTAR HAUNCH



MORTAR HAUNCH (CURBING)

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- Types of Edge Restraint Systems
 - 3/16" x 4" Steel Edge – expensive to purchase and install, floats out of ground

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- Types of Edge Restraint Systems
 - Curbing
 - Vertical stone or brick
 - Great look
 - Effective edge as long as the right material is used
 - Costly

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Installing the Stone

- Sand sweeping
 - Construction
 - Do NOT use a compactor. Use a rubber mallet and then sweep the sand into the joints.
 - Types of sand
 - Polymeric Sand
 - Lots of brands such as Alliance & TechniSeal.
 - Keeps project looking attractive for years to come.
 - Helps to preclude joint sand loss, infestations and weed growth. *DO NOT promise that the client will have NO maintenance or will never have weeds.*
 - Understanding the installation process is crucial to avoid staining and hazing.
 - Standard Torpedo Sand
 - Needs maintenance over time to remove weed & moss growth in the joints.
 - Silica sand, Mason sand or Play sand – DO NOT USE
 - Too fine and water will cause the sand to float out of the joints and form sand remnants on stone. They are easy to sweep into the joints, but won't last.

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Installing the Stone

• Pro Tips for a High Quality Installation

- NEVER use Bluestone under 1" thick. 1.5" thickness or greater is preferable.
- Check the color blending of the stones. Avoid clumping of color in one area.
- DO NOT use too many small pieces.
- Be picky. If a certain piece does NOT look as nice as the others, cull it out.

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- **Pro Tips for a High Quality Installation**
 - In thermal Bluestone, eliminate pieces with small iron spots in the stone, as overtime they tend to work their way to the surface and 'bloom' out over the stone.
 - In clefted material, watch for cupping in the middle of the stone where 'bird baths' will be present in the future.
 - Use 2" masonry chisel and acetylene torch to chisel and flame off knobs, bumps and other trippers where two stones meet each other.
 - Use your acetylene torch to flame off all chisel marks left on the stone from the quarry (make sure you wet the stone before flaming and use only a light touch).



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- **Pro Tips for a High Quality Installation**
 - Use multiple string lines to ensure the pattern does NOT 'walk' off the square.
 - Never lay what we call '**4 corners.**'
 - Never lay what we call '**twins**' – 2 stones of the same size that are laid next to one another (not applicable to running bond or stacked bond, of course).
 - Break the joints and do NOT have more than 3 stones running continuously with the **same running joint.**





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Installing the Stone

- Maintain a minimum of 6" spacing between joint intersection.
- NEVER use less than a 12" dimension of stone in the field.



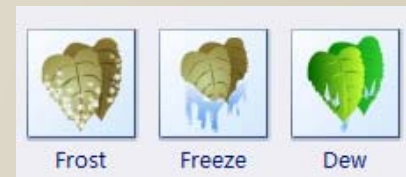
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Weather Conditions



- Be aware of how the weather can affect your finished dimensional stone product.
 - Torpedo sand freezes and clumps when it is cold and it will not be workable.
 - If it is raining and the sand is wet, leveling the stone becomes difficult.
 - Make sure the installation of the polymeric sand is done under dry conditions.



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Clean up & Maintenance



- Clean up the site after finishing your dimensional stone project.
- Wet cutting will leave a slurry mix that needs to be cleaned up.
 - Trimming of the stones will leave a lot of waste which you can use for future riser pieces for Bluestone stoops.
- Power-washing:
 - Power-washing of Bluestone by an unexperienced operator could cause stripping of the stone.
 - Some clefted material does NOT respond well to power-washing, as it shales the material.
 - Power-washing also blows out the polymeric sand and it needs to be re-done.
- Frequently a garden hose and some Simple Green degreasing soap are the best items to use to clean stained or aged dimensional stone.



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Dimensional Stone Flatwork

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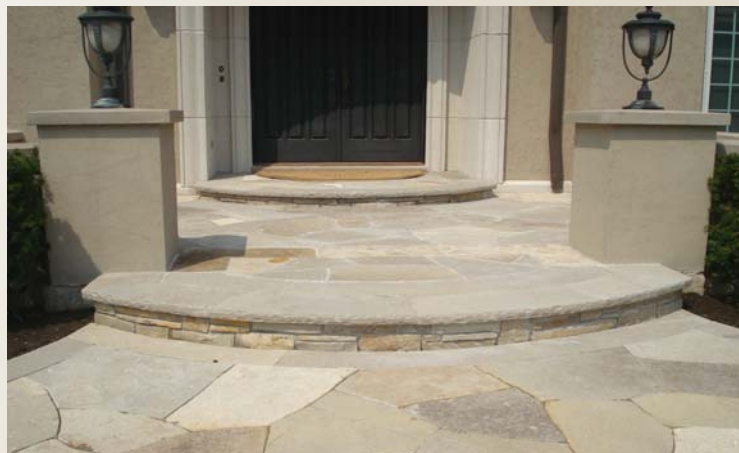
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Irregular Flagstone Flatwork Installations

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Content

- Materials
- Ordering the Stone
- Installing the Stone
 - Necessary Tools
 - Installation
- Tight Joint Installation
- Loose Joint Installation

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Types of Stone

Fossil Creek

Fon Du Lac

Bluestone

Chilton

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Ordering the Stone

- Typically comes standing up in pallets but some come laying on the pallets
- Comes by the ton
 - Remember to order more stone than the recommended amount by the supplier. Particularly for a tight joint installation.
- Make sure to confirm the sizes the material will come in.



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Installing the Stone

• Necessary Tools:

- Shovels
- Rakes
- Broom
- Hose
- Carpenter's Pencils
- Tape Measure
- String Lines
- 2 Pound Sledge Hammer
- Rubber Mallet
- Gas Driven Cut off Saw
- 4" Hand Grinder
- 2" Masonry Chisels
- Oxygen Acetylene Torch
- Blower

• Wet-Cutting

- Most towns require wet-cutting. This is difficult with flagstone due to the amount of cutting required. Plan your site accordingly.



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Installing the Stone

- **Tight Joint Installation**
 - Grade & compact gravel as necessary.
 - Use string lines to maintain proper pitch.
 - Select your pieces off of the pallet & roughly layout the shapes in the space.
 - Make sure to select your stones appropriately.
 - Consistently breaking the bond of the joints.
 - Have a nice mix of sizes and color
 - Place stones as close as possible before trimming
 - Mark using carpenter's pencil for more square patterns or a 1" PVC pipe for more organic shapes.
 - Use the gas driven saw to cut the stones.
 - Set the stones in place, adding or removing sand as necessary and hammering them into place with a rubber mallet.
 - Mark and cut the edges or leave it irregular for a more natural look.
 - Install edge restraint system.
 - Use a 2" chisel & 2 lb sledge hammer to chisel joints, eliminate any toe grabber and make the cut edges appear more organic.
 - Use Acetylene torch to lightly flame the chisel and saw cut edges to smooth out.
 - Sweep with polymeric or other joint sand.






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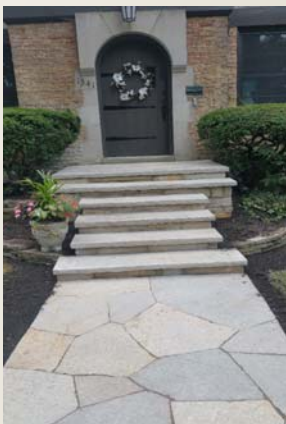
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Installing the Stone

- **Tight Joint Installation**

Preferred



Undesirable



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Installing the Stone

- Tight Joint Installation

Preferred

Undesirable

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Installing the Stone

- Tight Joint Installation

Preferred

Undesirable

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Installing the Stone

- **Loose Joint Installation**
 - Sub-base either:
 - Layout your flagstone on the soil and then mark exactly where you will excavate & install in the exact stepper location.
 - Dig out the pathway entirely and install gravel throughout, then lay your flagstones out and channel out the gravel.
 - Keep joints consistent width by measuring between each stone & adjusting as necessary.
 - Just because the joints are open and you do not have to trim the stones it does NOT mean that you shouldn't plan to.
 - Use your hand grinder, gas driven saw, flexible PVC and markers to trim & chisel into more attractive pieces and fit together better.
 - Make sure that you are still breaking your bonds with the stones.
 - Your stones should appear completely random in size & shape, but should fit together nicely with consistent width joints.
 - Use torch to flame the surface or edges if you have chisel marks or saw marks on the stone.
 - Edge restraint:
 - If you are using large enough pieces, you typically won't need an edge restraint system, but if you have issues with the movement of smaller stones, you can always use a small mortar haunch to bond them in place.
 - Fill the joints with a decorative gravel (Bluestone chip, pea gravel, etc.) or soil.





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Installing the Stone

- **Loose Joint Installation**

Preferred



Undesirable





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Installing the Stone

- Loose Joint Installation

Preferred



Undesirable



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Developing the Pattern & Layout

- The Do's













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Developing the Pattern & Layout

- The Don't's









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Final Thoughts

- Just because it looks simple or natural does NOT mean it is.
- There is an artistic and creative eye necessary for this type of work.
- Typically it is better to cut stones on a wood pallet rather than in place, as it helps avoid overcutting your joints into the adjacent stones.
- It is very labor intensive.
- These types of installations are the most expensive of stone flatwork.
- This installation requires more coordination with the designer & client. There are NO 'do-overs' without buying additional material.



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