

Sandbagging Techniques



**US Army Corps
of Engineers**

Kansas City District Participation

Sandbag demonstrations and training classes are put on by flood engineers each year at the request of local communities.



A Steadfast Flood Fighting Tool

Sandbags are used to:

- Prevent overtopping of levees
- Direct a river's flow
- Construct ring dikes around boils
- Weight down saturated levee back slopes
- Anchor plastic sheeting and straw bales
- Build buttresses on back slopes and toes of levees



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Sandbag Construction

Treated burlap sacks are preferred by Seattle District.

- 14 inches wide, 24 inches long.
- Fill two-thirds full (untied).
- Use tied bags (filled slightly fuller) to hold plastic sheeting or straw bales in place.



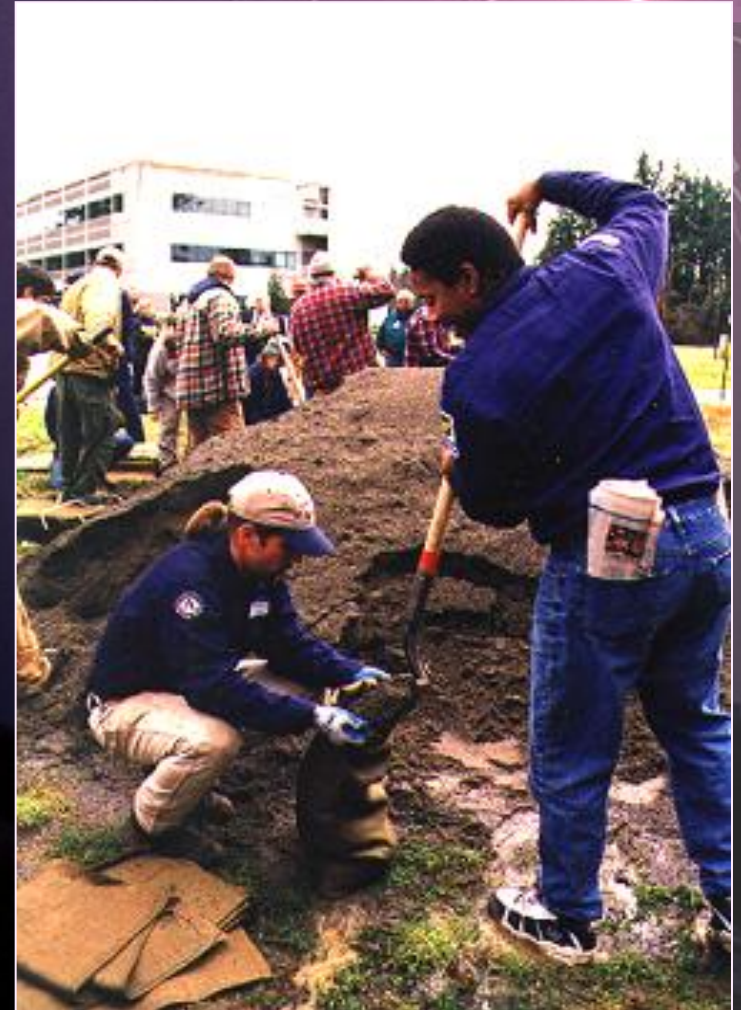
Fill Materials

- Sand is by far the best material for filling and shaping bags.
- Silt, clay or gravels may be used if necessary.
- Alternatives:
 - Straw bales
 - Concrete Jersey Barriers
 - Ecology Blocks



Correct Filling Procedures

- A two- or three-person operation.
- Use proper lifting techniques.
- Form a 1-1/2 inch collar and empty a No.2 shovel of material into bag.
- Use gloves to protect hands and fill bag two-thirds full.
- Haste makes waste.



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Correct Filling Procedures (Cont.)

- **Consider vehicle transportation and access to the flood site when bags are filled at a distant location.**
- **Specialized filling equipment is commercially available for large scale operations.**



Proper Placement

- Remove debris from area.
- Place bags lengthwise and parallel to direction of flow with the open end facing upstream.
- Fill low spots first and start at the downstream end and 1 foot landward from river.



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Proper Placement (cont.)

- Fold the open end of the bag under the filled portion.
- Place succeeding bags tightly against and partially overlapping the previous one.
- Offset adjacent rows by one-half bag length.
- Compact and shape by walking on each bag.



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Single Stack Placement

- Use single stacked placement where there is no streamflow velocity or danger from floating debris.
- Generally not recommended to be above three courses or layers.
- Can be used as a barricade to protect structures.



Pyramid Placement Method

- Use to increase the height of sandbag protection.
- Place equal number of rows on the bottom as there are vertical rows.
- When the water is 1 foot below the top of the levee and predicted to rise 3 more feet, construct a 2-1/2 foot sandbag structure.



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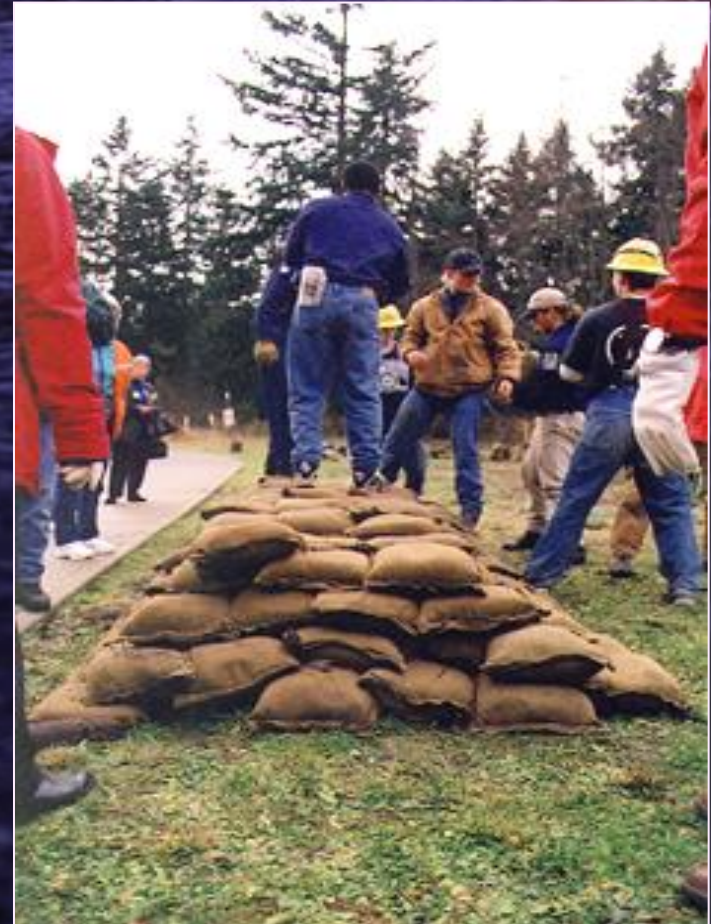
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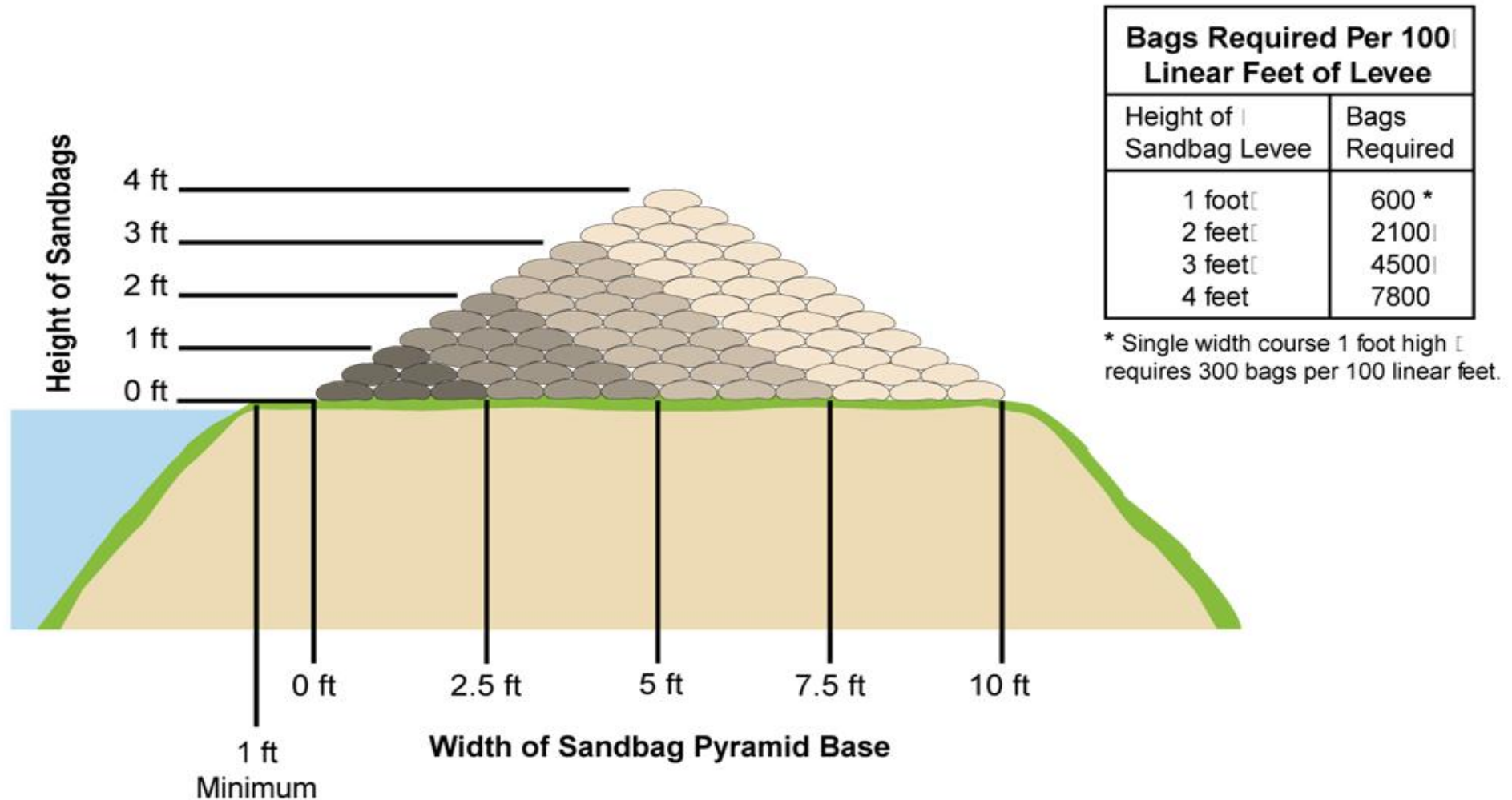
Pyramid Placement Method (Cont.)

Use this rule of thumb in determining dimensions of the pyramid:

- 1 bag in length equals about 1 foot
- 3 bags in width equal about 2-1/2 feet
- 3 bags in height equal about 1 foot



Typical Pyramid Sandbag Placement



Ringling Sand Boil Method

- Water seepage through the levee foundation or embankment can create a sand boil.
- Build ring dikes around a boil only when soil is being transported.
- There should be a minimum 2- to 3- foot radius from the center of the boil to the inside edge of the ring dike.



Ringling Sand Boil Method (cont.)

- Do not stop the flow as this will cause the boil to pop up somewhere else.
- Build an overflow section to allow clear water to exit ring dike.
- Continue raising ring dike until water runs clean.



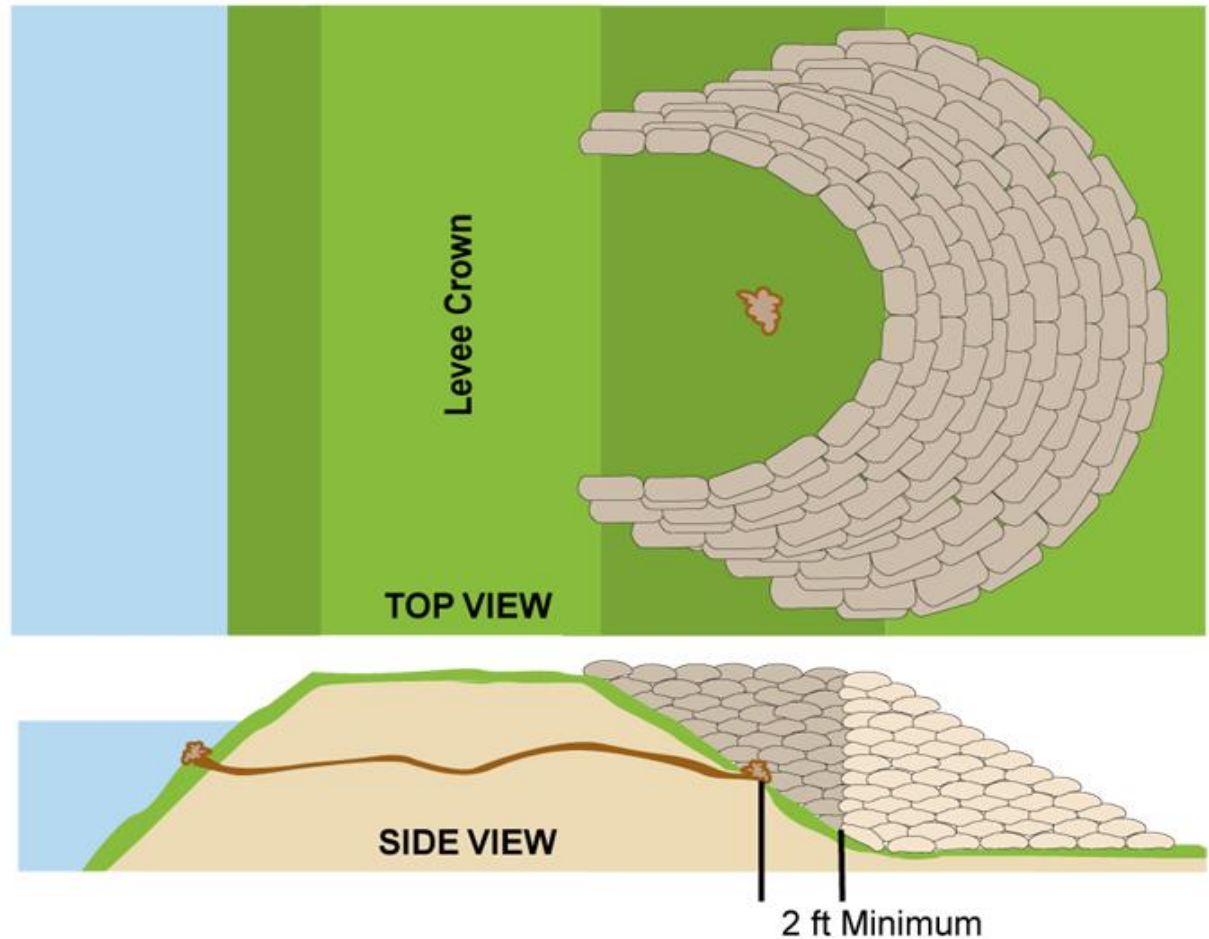
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Ringing Sand Boils

- Minimum 2 ft radius from center of boil to edge of ring dike.
- Tie into levee if boil is near toe of levee.
- Build half-moon shaped ring dike if boil is on levee slope.



Safety Tips

Tip #1: Use proper lifting techniques.

Tip #2: Use work gloves and avoid contact with eyes and mouth.

Tip #3: Wear adequate layered clothing and wear boots



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Tip #5: Wear with reflective material for night work.



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U.S. Army Corps of Engineer Policy

- The Corps stocks sandbags to supplement state & local supplies
- Coordinate requests for sandbags with State Emergency Management Office.
- Locals are responsible for removal and cleanup.
- Corps flood engineers can provide technical assistance during sandbag operations



**Make sure you
study the Corps'
latest brochure on
proper procedures
and tips on sandbag
techniques.**



For More Information

For more information on sandbag training see
the Corps Sandbag Techniques brochure online at:

www.nwk.usace.army.mil/flood2007



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