

# Sandbagging Techniques

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**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.



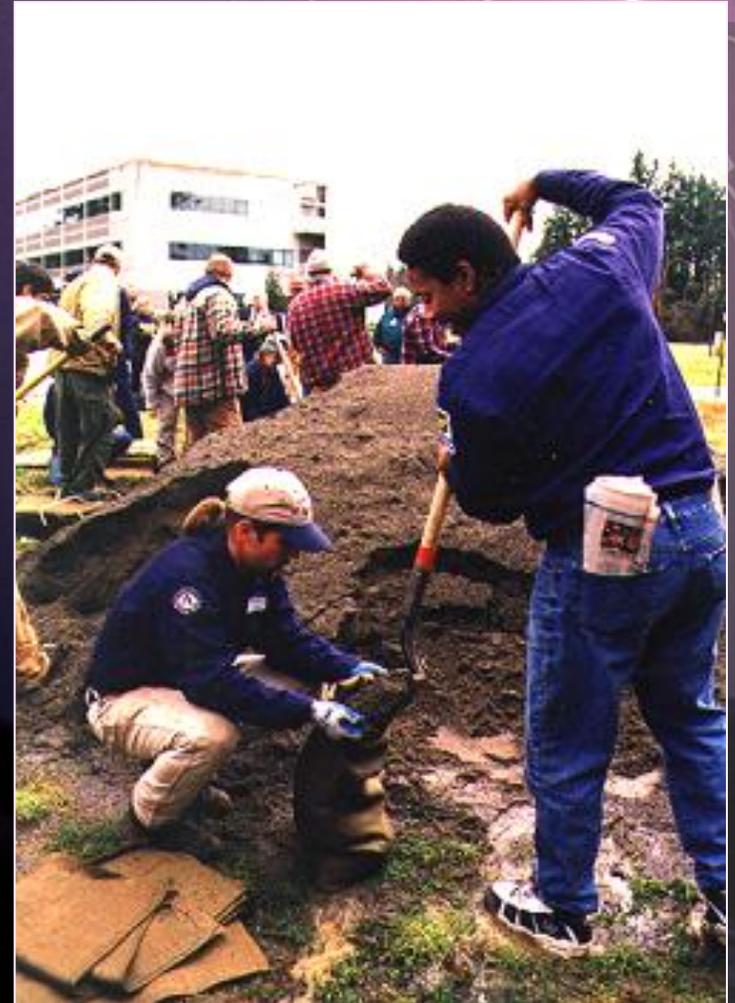
# Fill Materials

- 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.)

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- **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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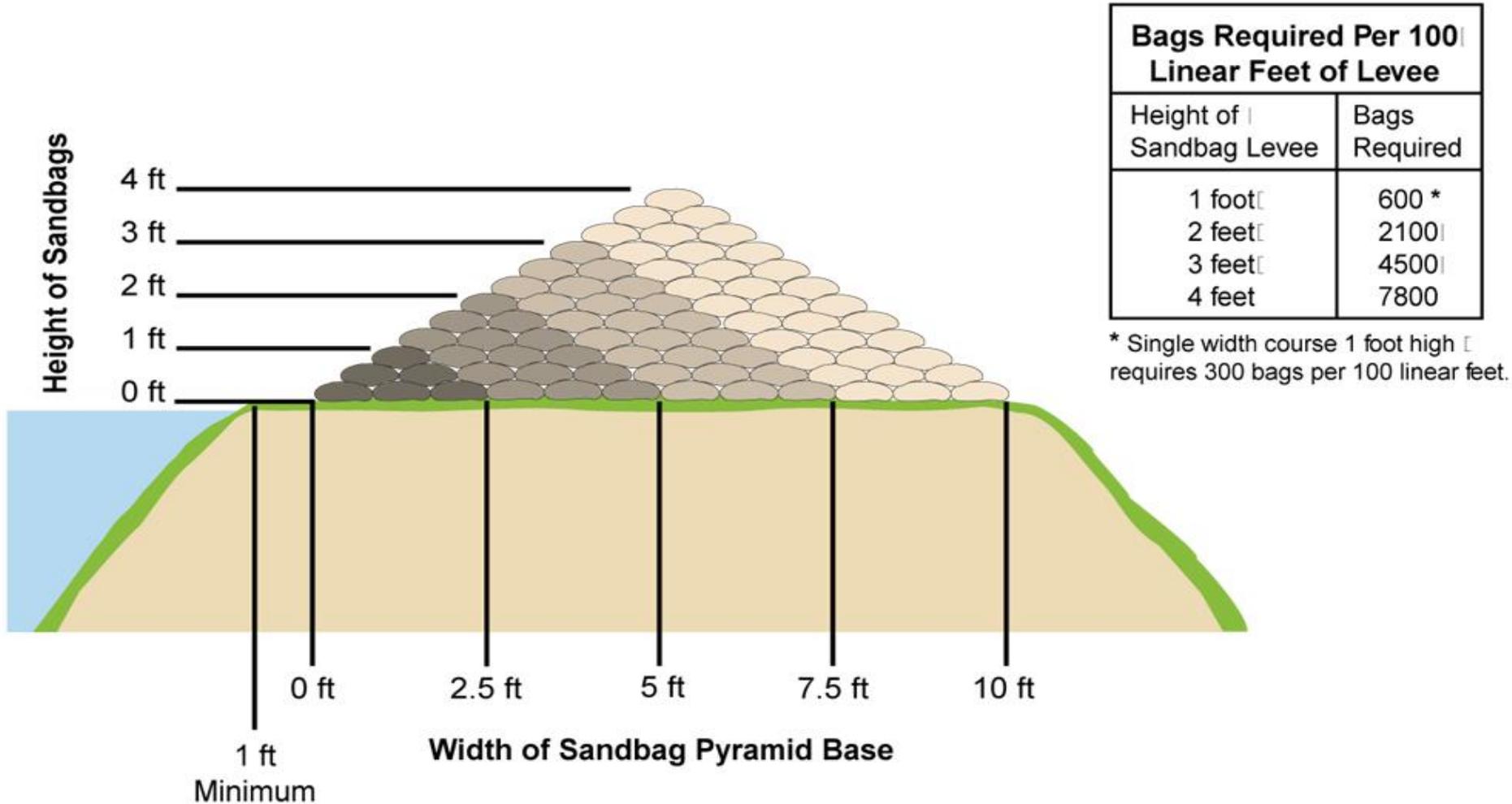
# Pyramid Placement Method (Cont.)

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



# Ringing 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.



# Ringling Sand Boil Method (cont.)

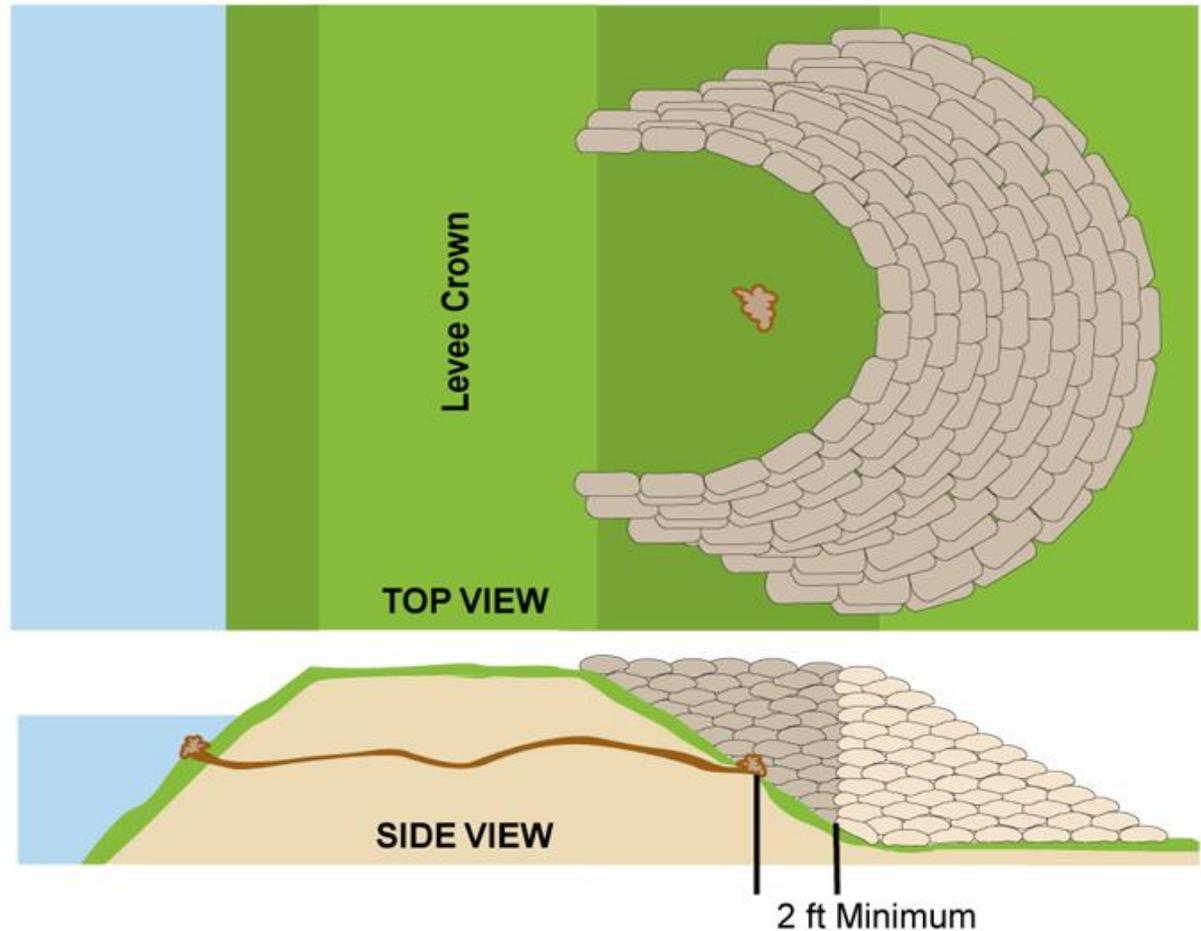
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# Ringling Sand Boils

- 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

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**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

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

[www.nwk.usace.army.mil/flood2007](http://www.nwk.usace.army.mil/flood2007)



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