1.4 How to Sandbag…

If you come upon a flowing current where water is above your ankles, stop, turn around and go the other way - six inches of swiftly moving water can sweep you off your feet.

Never underestimate the swiftness of the water - flooded rivers and streams are unpredictable. Even though the surface water may be smooth, the water may be moving very fast. If you must walk in water, wherever possible, walk where the water is not moving. Use a stick to check the firmness of the ground in front of you. Always wear a lifejacket when working near the waters edge.

Never attempt to drive or walk in flood water. A mere six inches of fast-moving water can knock over an adult. Two feet of rushing water can carry away most vehicles, including SUVs and pick-up trucks.

Sandbagging
To minimize flood water damage, sandbagging is one of the most versatile flood fighting tools. It is a simple, effective way to prevent or reduce flood water damage. Homeowners who are preparing homemade sandbags need to be aware of the proper steps to take:

- Two people should be part of the sandbagging process. It will take about one hour to fill and place 100 sandbags, giving you a 1-x-20-foot wall.
- Make sure you have enough sand, burlap or plastic bags, shovels and time to properly prepare.
- Contact your local municipality for information on obtaining sandbags.

Fill materials:
Sand is by far the easiest material for filling and shaping sandbags and becomes heavier when saturated from rain or moisture.

- In emergencies, other materials such as silt, clay, gravel or a mixture of these may be used, but none work as well as sand.
- When vehicle access is cut off to the flood site, and you have no other choice, use the back side of the levee or an adjacent field to find whatever material is available to fill sandbags.

Proper filling procedure:
- Always use gloves and avoid touching your eyes and mouth.
- Filling sandbags is normally a two- to three-person task.
- One member while crouching with feet apart and arms extended places the bottom of the empty bag on the ground.
- The opening of the bag is folded outward about 1 to 1.5 inches to form a collar and held open to allow the second team member to only fill with material approximately one-half or two-thirds full, and then fold them over and tie them at the top. This allows the bags to conform to each other and make the wall watertight.
- Don't hurry, haste can result in undue spillage and additional work.
- The third team member stockpiles or stacks the open sacks.

Proper placement:

- Remove any debris from the areas where bags are to be placed.
- Place the bags lengthwise and parallel to the direction of flow if water is moving swiftly.
- If water is slow moving or from a body of water place bag with the sealed end towards the water.
- Fill the low spots first before placing bags the full length of the area to be raised.
- Start at approximately one foot landward from the river or levee's edge.
- For moving water, fold the open end of the bag under the filled portion. The folded end of bag should face upstream.
- Place succeeding bags with the bottom of the bag tightly and partially overlapping the previous bag.
- Offset adjacent rows or layers by one-half bag length to avoid continuous joints.

See the following diagrams for quick reference on estimating quantities needed and site design to ensure safety in large operations.

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Lesson - Sandbags

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Summary

- Safety (working in/around flooded areas)
- Sandbags (general, correct filling, different kinds of sandbags)
- Logistics (materials, personnel, area, quantities per hour)
- Correct usage of sandbags

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Safety

gloves

life vest/PFD

rubber boots

waders

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Sandbag types

- Different sizes

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Sandbag types

- Different materials

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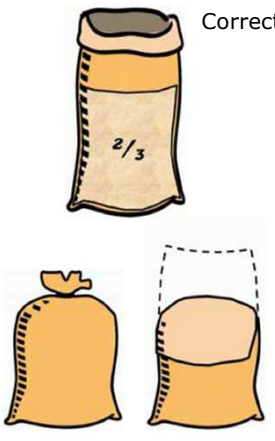
Filling sandbags



Correct filling (max. 20 kg or 2/3)

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Filling methods

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Logistics

Packing-Example with 50 sandbags on each pallet

5. Layer

4. Layer

3. Layer

2. Layer

1. Layer

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Logistics

Transport

by truck

by hand

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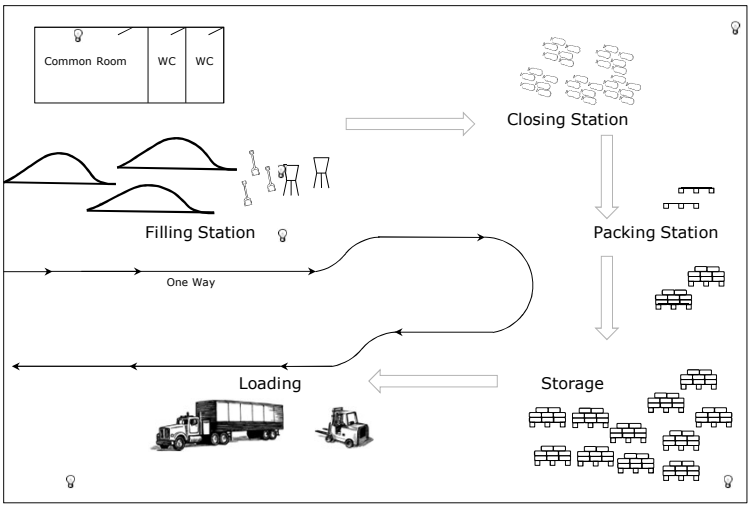
Example of a Sandbag Filling Area



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Logistics

Filling area

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Logistics

- Purchasing the material
- Demand of time, personnel and material

The calculations apply only to a sandbags with the dimensions of 70cm x 30 cm with a 2/3 filling.
The determined number of sandbags applies, when the sandbags are laid with the Bottom facing water.
A transverse laying increases the sandbags requirement by the factor of 1,56.

	Protection height	Number of Sandbags at a Length of 10 meters	50 meters	100 meters
1 Line	10 cm	21	107	214
2 Lines	20 cm	64	321	643
3 Lines	30 cm	129	643	1286
4 Lines	40 cm	214	1071	2143
5 Lines	50 cm	321	1607	3214
6 Lines	60 cm	450	2250	4500
7 Lines	70 cm	600	3000	6000
8 Lines	80 cm	771	3857	7714
9 Lines	90 cm	964	4821	9643
10 Lines	100 cm	1179	5893	11786

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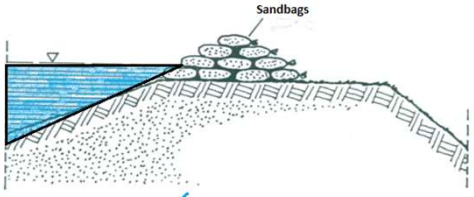
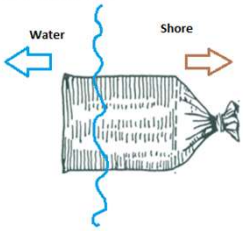
How to use a sandbag

- How to build a sandbag wall





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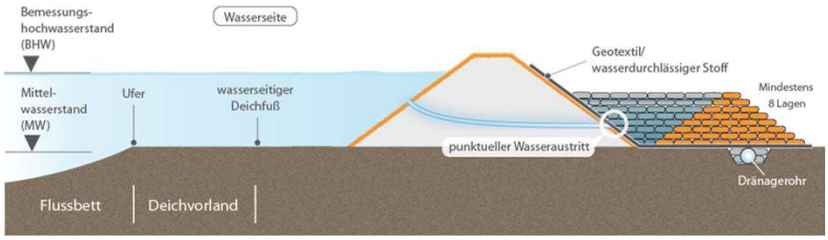
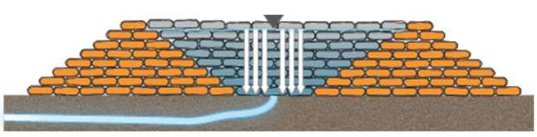
How to use a sandbag





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Forecast / Alternates