

<http://www.gov.mb.ca/emo/home/prepare/sandbag.html>

## Safety Tips for Leaders and Volunteer Workers

- Individuals with a medical condition that would make it dangerous for him/her to participate should avoid taking part.
- Register all persons involved and deliver the registration sheet to the community Emergency Coordinator.
- Wear protective gear such as steel toed boots, hat, safety glasses, gloves, sunscreen, etc.
- Ensure there are sufficient potable water and bathroom facilities. Take regular water breaks.
- Be attentive of large equipment moving in the area.
- Be aware of floodwater dangers:
  - Contamination
  - Varying water flow and strong undercurrents
  - Floating debris
- Adhere to proper sandbag handling technique:
  - Do not bend more than 20 degrees in any direction while handling sandbags.
  - Keep heavy weights below shoulder height, above knees and close to the body. Limit reaching with arms when passing the sandbags.
  - Pivot feet and do not twist through the back while handling sandbags.
  - Do not throw sandbags.



## Filling Sandbags

- Fill sandbag to half its capacity (no more than 40 lbs) with sand, clay or silt.
- Fold or tie the flap.
- Do not drag the bags (this could cause lower back injury and bag to weaken).
- When forming a line to pass sandbags, face each other and stand no more than one to two feet apart. If there are not enough people to form a continuous line, use a wheelbarrow to move sandbags.

No matter how well you build a dike, extreme water pressure may cause water to seep through the dike or bubble up through the ground. It is advisable to have pumps with sufficient fuel and oil readily available to last the duration of the flood event and an escape plan.

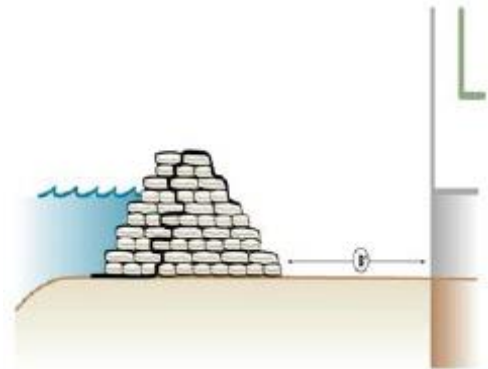
## Sandbag Dike Removal

- Sandbags should be removed with the same precautions as they were laid.
- Sand from sandbags should not be used for children's sand boxes or play areas, but could be used for landscaping purposes.

## **Building a Sandbag Dike**

### ❖ **Location:**

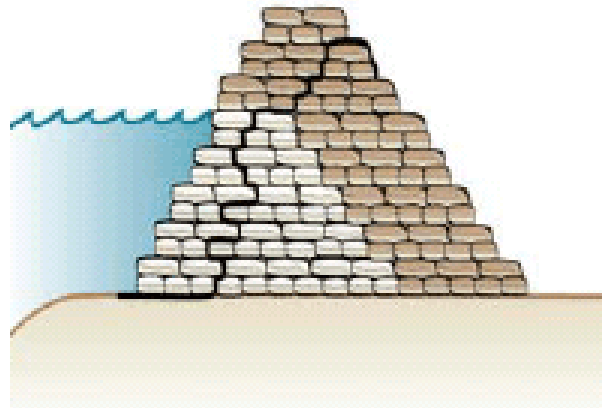
- Base area of dike should be clear of snow and ice.
- To avoid flood water moving under a dike, do not build a dike on porous land or on a septic field.
- The dike should be at least eight feet from building foundation. This prevents foundation damage and allows room for people and equipment to move. As well, this space allows more dike base width to be constructed should additional dike height be required.
- To create a more secure dike, when possible, create a trench in the soil that is one sandbag deep by two sandbags wide.



### ❖ **Construction:**

#### ○ **Polyethylene sheets**

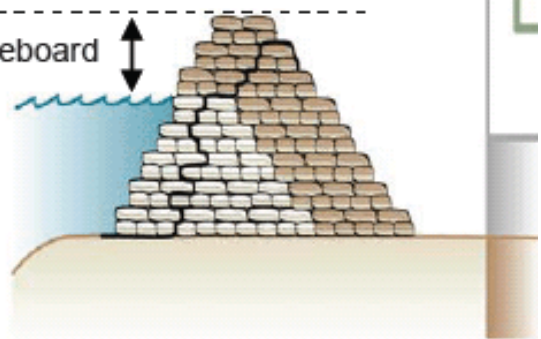
- Proper use and placement of polyethylene sheets is important to reduce the rate of water seeping through the dike. **Use six mil polyethylene** in three metre wide rolls on the river side of the dike. Have the polyethylene sheet protrude over the ground on the river side of the dike. Be careful not to puncture the polyethylene sheet. (The polyethylene sheet will be weaved between the courses of sandbags.)
- Weave the polyethylene sheet between the courses of sandbags as to have at least two layers of sandbags protecting the polyethylene sheet from debris punctures. Maximum depth of the polyethylene sheet should be 3 sandbags or a quarter (1/4) of the cross section of the dike, whichever is less.
- If more height of polyethylene sheet is required, make polyethylene sheets overlap at least two feet.



- **Height:** Sandbag dikes require at least two feet of freeboard. Freeboard is the area of the dike between the highest floodwater level and the top of the dike:
  - **predicted floodwater rise above ground level + two feet of freeboard = required dike height**

For example, if floodwater is predicted to rise four feet above ground level, the required dike height is at least six feet. (4' + 2' of freeboard = 6' high dike)

At least two feet of freeboard

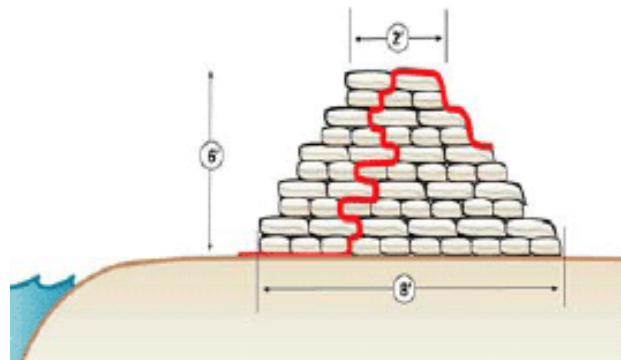


Sandbag dikes will compact when they get wet, which can reduce the available freeboard. The amount of compaction due to wetting increases with the size of the dike. Add at least five per cent to the required height of the dike to account for compaction. For example, add 3 - 4 inches for a six foot dike to account for compaction due to wetting.

- **Width:** The base of a sandbag dike is two feet wider than it's required height:
  - **height + two feet = width at base**

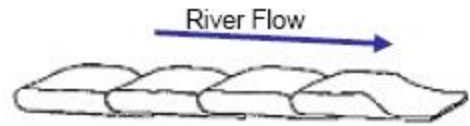
For example, a dike with a required height of six feet would have to be eight feet at its base. (6' + 2' = 8' wide at base)

- Sandbag dikes must be at least two feet wide across the top of dike.
- Due to the high pressure water can exert, consult your local authority for additional advice for dikes higher than six feet.

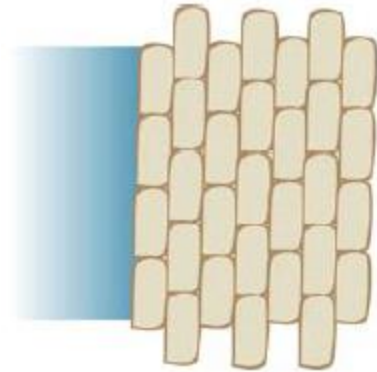


○ **First course/bottom layer:**

- Lay first course/bottom layer of bags parallel to river/water with the closed side of bag against river flow direction.
- The filled portion of the second bag sits over the empty portion of the previously placed bag. This is known as lapping.

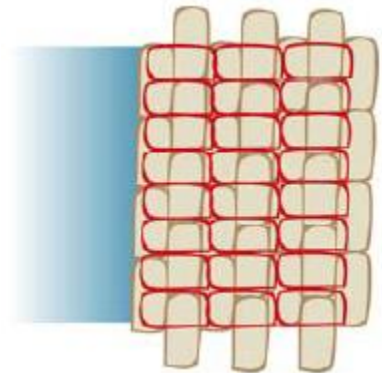


- Drop the bags into place and tamp bags with feet to lodge them into place.
- Offset the bags from the previous row in the same course to form a brick pattern.

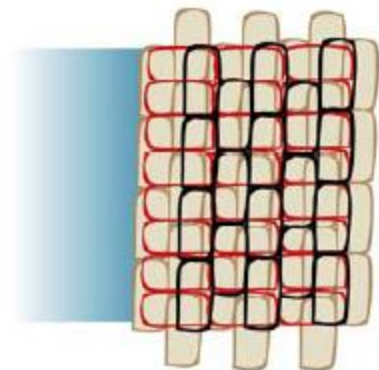


○ **Second and remaining courses:**

- Rotate bags 90 degrees when laying second course of sandbags. Keep seal side of bag towards water/river. Ensure sandbags are well packed against each other and firmly in place.



- Change direction of bag from parallel to perpendicular to the river for each course of bags.
- Every second course of sandbags should be set back a quarter (1/4) of a sandbag width, both on the river side and the land side of the dike, producing a step-like appearance.



**Number of Sandbags**: Rough Estimate using the: Base = Ht. + 2ft. dimensions

Height of dike	Number of Sandbags Required for the following Lengths of dike													
	(Lengths in Feet)													
	50	100	150	200	250	300	350	400	450	500	550	600	650	700
<b>0.0</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>0.5</b>	210	430	640	850	1070	1280	1500	1710	1920	2140	2350	2560	2780	2990
<b>1.0</b>	470	950	1420	1900	2370	2850	3320	3800	4270	4750	5220	5700	6170	6650
<b>1.5</b>	780	1570	2350	3130	3920	4700	5480	6270	7050	7830	8620	9400	10190	10970
<b>2.0</b>	1100	2300	3400	4600	5700	6800	8000	9100	10300	11400	12500	13700	14800	16000
<b>2.5</b>	1500	3100	4600	6200	7700	9300	10800	12300	13900	15400	17000	18500	20100	21600
<b>3.0</b>	2000	4000	6000	8000	10000	12000	14000	16000	17900	19900	21900	23900	25900	27900
<b>3.5</b>	2500	5000	7500	10000	12500	15000	17500	19900	22400	24900	27400	29900	32400	34900
<b>4.0</b>	3000	6100	9100	12200	15200	18200	21300	24300	27400	30400	33400	36500	39500	42500
<b>4.5</b>	3600	7300	10900	14500	18200	21800	25400	29100	32700	36300	40000	43600	47200	50900
<b>5.0</b>	4300	8500	12800	17100	21400	25600	29900	34200	38500	42700	47000	51300	55600	59800
<b>5.5</b>	5000	9900	14900	19800	24800	29800	34700	39700	44700	49600	54600	59500	64500	69500
<b>6.0</b>	5700	11400	17100	22800	28500	34200	39900	45600	51300	57000	62700	68400	74100	79800