

# Storm the Castle Counterweight Instructions

Updated 11/17/21

For teams, or Event Supervisors, in need of counterweights for Storm the Castle may want to use the following instructions to build their own set. The materials used should be available from “big box” hardware stores (i.e., Lowes, Menards, Home Depot), smaller neighborhood stores (i.e., Ace, Tru-Value, Do It Best), or online. There is the option to build either a 2-inch diameter, or 3-inch diameter, model. Either will work for the event, though the 3-inch diameter model will have extra room to add additional weight. Teams, or Event Supervisors, may find this flexibility useful if they plan on competing in or being an Event Supervisor for Storm the Castle over a number of years.

Each counterweight is estimated to cost about \$8/counterweight to build.

## **Materials Needed to Build Two (2) Counterweights**

- One (1) 7 to 8-inch (17.78 – 20.32 cm) length of 2-inch diameter, or 3-inch diameter, PVC pipe
- Two (2) PVC End Caps matching pipe diameter  
<https://www.menards.com/main/plumbing/pipe-fittings/pvc-pipe-fittings/sioux-chief-reg-hardhat-trade-pvc-test-cap-dwv/880-02ppk/p-1484292077305.htm>
- Two (2) PVC Clean Out Plugs  
<https://www.menards.com/main/plumbing/pipe-fittings/pvc-pipe-fittings/sioux-chief-cleanout-bushing-with-plug/875-2p/p-1484292077580-c-8571.htm?tid=1624732974396501928&ipos=64>
- Two (2) 1-inch Eye Hooks, nuts, and washers
- Ballast (e.g., Steel Shot, BB's, Nuts)
- Cable Ties
- One (1) Rubber Mallet
- One (1) Vaseline or other Lubricant
- One (1) PVC Cement
- One (1) Hacksaw or reciprocating saw
- One (1) Power Drill and bit
- One (1) Balance or scale

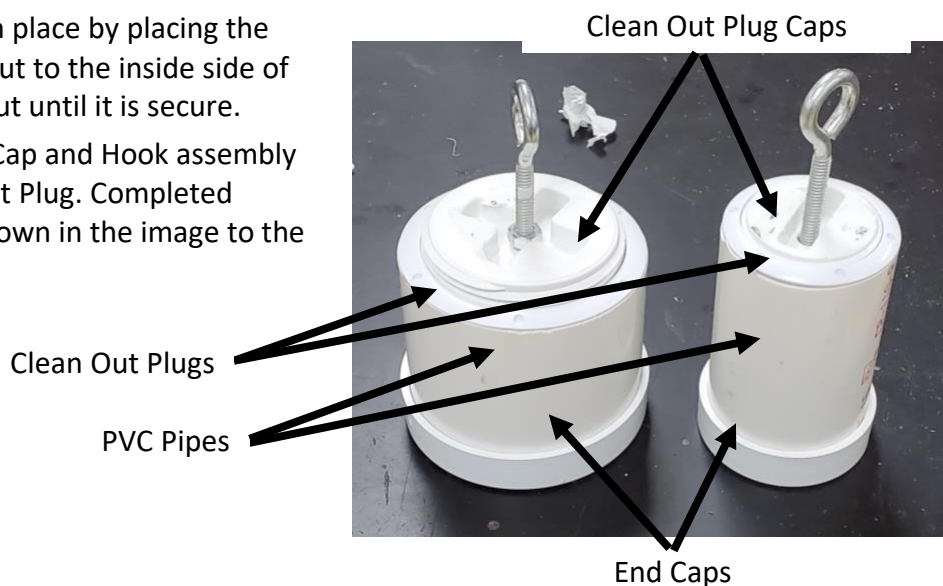
## **Instructions**

- 1) Cut your piece of PVC pipe to the appropriate length. Depending upon your starting length of PVC, you should end up creating two pieces each with a final length of between 3.5 inches (8.89 cm) and 4.0-inches (10.16 cm).
- 2) Insert the uncut end of a PVC pipe inside the End Cap.
- 3) If necessary use Vaseline, or another lubricant, on the PVC pipe to ease insertion in the End Cap.

## Storm the Castle Counterweight Instructions

Updated 11/17/21

- 4) Push or tap, with a rubber mallet or similar tool, to fully seat the PVC pipe into the End Cap.
- 5) Repeat the above steps to insert the Clean Out Plug into the opposite (cut) end of the PVC pipe.
- 6) Use the drill to create a hole in the center of the Clean Out Cap so that you can pass the Eye Hook through it. Note – You might be able to find a Clean Out Plug that is already has a threaded opening in the center of the Cap which would mean you can skip this step.
- 7) Unscrew the Clean Out Cap and pass the Eye Hook through the opening so the Hook is on the outside of the Cap.
- 8) Secure the Eye Hook in place by placing the washer and then the nut to the inside side of the Cap. Tighten the nut until it is secure.
- 9) Secure the Clean Out Cap and Hook assembly back into the Clean Out Plug. Completed counterweights are shown in the image to the right.



- 10) Measure the completed assembly to make sure the overall length of the entire counterweight is less than 15 cm. If the overall length is beyond 15 cm try to reduce the height by lowering the amount of the Eye Hook showing above the Clean Out Plug Cap.
- 11) Mass the entire assembly on the scale and record the result.
- 12) Subtract the mass of PVC assembly from the desired counterweight mass you are building. The counterweight mass for various levels of competitions are as follows:

Tournament Level	“Light” Counterweight Mass (kg)	“Heavy” Counterweight Mass (kg)
Regional	0.5	1.5
State	0.5 – 1.5	1.5 – 2.5
National	0.5 – 1.5	1.5 – 2.5

- 13) Use the scale to measure out the appropriate amount of Ballast so that the total combined mass of the PVC assembly and the Ballast adds up to the desired mass for the counterweight you are building.

## Storm the Castle Counterweight Instructions

Updated 11/17/21

- 14) Add the ballast you just measured out in Step 12 to the PVC assembly by removing the Clean Out Cap and pouring the ballast through the opening.
- 15) Secure the opening by screwing the Clean Out Cap back into place.
- 16) Repeat this process to build additional counterweights.
- 17) If the Eye Hook can't be used to directly secure the counterweight onto the device use the cable ties can be used to make the connection.
- 18) If cable ties are needed to connect the counterweight to the device, reconfirm that the overall length of the counterweight is 15 cm or less. If the overall length is beyond 15 cm try to reduce the height by raising or lowering the amount of the Eye Hook showing above the Clean Out Plug Cap or reduce the size of the cable tie loop.