



<http://www.hauntershagout.com/home/Myarmature.asp>

### **Build A Figure Armature for your haunt**



This article first appeared in Issue 30/31 of Haunted Attraction Magazine. It only takes a few hours to complete and the cost is minimal. The armature stands about six foot tall and can be locked into a pose by tightening the bolts at the joints. It works great as a wall crawler, laying in a coffin or standing in a dark corner of your haunt.



#### **How its made**

The armature is made up of only two types of joints, a revolute joint and a pin and slot joint. The revolute joint is like a hinge and it allows for back and forth movement.

The pin and slot joint gives the armature its side-to-side movement so that it can twist at the waist or cross its arms. By combining these two joints you can give your armatures a full range of motion.

To make the revolute joint two 4-inch pieces of flat stock are connected between two pieces of PVC pipe. The flat stock is attached to the pipe with three bolts. Two bolts on



one end to lock the flat stock in place, and one on the other end to act as the pivot point for the joint. If the armature is to hold something or seems to be slipping I add a 1 1/2" piece of wood dowel with a hole drilled through it into the PVC at the pivot point to make the joint lock in place better.



### Getting started

To save time I start by cutting the PVC into all the lengths that I will need. For the revolute joints I have found it easier to drill the holes in the flat stock at the same time. I do this by taping two 4-foot lengths of flat stock together and marking it in 4-inch lengths. Within the 4-inch lengths I mark the drill holes. The drill holes are placed 1/2 inch from each end and one at 1 1/2" from one end. Now you can drill all the holes in one operation and then cut the flat stock into 4-inch pieces, as you need them.



### The Torso

To make the torso use the 1" PVC 4 way connector and insert a 1" by 2" piece of PVC into the bottom. Next use two 1" tee connectors and attach them together with a piece of 1" by 2" PVC to form a H. Attach one end of the H to the PVC on the 4 way connector.

Next you need to make a slot joint for the back. This joint will allow the torso to twist from side to side. Slide 4 inches of the 1" by 10" piece into a 1 1/4" by 6" piece of PVC. Drill one hole through both and then remove the inner pipe. You will need to make a short slot from the hole that you drilled in it.



To make the slot it is best to use a drill press and fashion a jig to hold it in place. Lower the bit down through the predrilled hole until the bit is through both sides and simply twist the PVC pipe to create the slot.

Once the slot has been created slide the 1" piece back inside the 1 1/4" until the holes line up and attach them with a 2" bolt. Twist them back and forth to make sure the joint moves freely.



I have also added a joint in the back so that the figure can slump or arch. This allows the armature to have a more natural pose. Ok back to building the torso. On the other end of the 1 1/4" piece of PVC place the two pieces of predrilled 4-inch flat stock. Use the flat stock to mark the PVC for drilling. I only drill one hole at a time to assure that everything lines up. Once the hole is drilled attach the flat stock with a 2" bolt and tighten the bolt. Slide a second piece of 1 1/4" by 6" between the two pieces of flat stock.

Be sure to leave a small gap so that the joint can move and mark it for drilling. After the holes are all drilled fastening the other PVC to the flat stock with two 2" bolts. Test the joint to make sure that it bends slightly. Now that you have made the joint, attach it to the H that you made earlier. On the other leg of the H attach a 1" by 5" piece of PVC. Do not glue or bolt any of the connectors yet. They may need to be adjusted later.



### The Arms

Now that you have made the torso the rest should be easy. You will just be going over the same steps that you have already done. You start with the shoulder, it is made from a 1" by 7" piece of PVC. Slide a 1 1/4" by 2" piece over one end until both ends are flush. In the center of the 1 1/4" piece drill a hole so that it goes completely through both pieces. Now its time to make another slot joint, do it just as you did for the torso but this time the slot needs to be a little longer. This will give the arm a greater range of up and down motion.



To attach the upper arm you need two more pieces of flat stock with our predrilled holes. Reassemble the shoulder and place a flat stock on each side of the bolt. Once the bolt is tightened, place a 1 1/4" by 8" between the flat stock and mark it for drilling. You want a gap between the two pieces of PVC. This gap will allow the arm to swivel over the head making the figures movements more realistic. Now drill the holes and attach the upper arm to the shoulder.



The next step is to add side-to-side movement to the arm. This is accomplished by inserting a 1" by 6" piece of PVC three inches into the upper arm that you just made. Then drilling a hole through both by drilling about 1 1/2" from the bottom of the 1 1/4". After drilling the hole its time to make another slot. But I bet you already know that. Once the slot is made reassemble the slot joint and you are on to the Elbow.



To make the elbow you need two more 4-inch pieces of flat stock. Place them at the end of our arm assembly and mark for drilling. Once drilled fasten and tighten with a 1 1/2" bolt. For this joint you want the two pieces of PVC to butt up as you are marking them for drilling. If there were

a space between the PVC the arm would be double jointed. You do not need that so after you have installed the bolts you mark both pieces of PVC for the amount that you need to remove to make to joint bend inward. Disassemble the elbow and then grind out the plastic with a grinder.

Reassemble and check that the joint bends properly. The arm can now move up and down twist side-to-side and bend at the elbow. Next thing on the list is to add a twist to the wrist. Take a  $\frac{3}{4}$ " by 7" piece of PVC and slide it 4 inches into the arm assembly. You are making another slot joint. Drill a hole into both and then make a slot as you did with the other slot joints.

One last thing and the arm is done. You need to add a wrist joint. This time though you will use two 3-inch pieces of flat stock. Drill three holes and make the joint as you did the rest. The arm is done! Just follow your previous steps for the other arm and you are ready to move on to the legs.



### The Legs

The legs are made in the same way as the arms. Start with a 1" by 5" piece of PVC, slide a 1  $\frac{1}{4}$ " by 2" piece over it. This time you want the 1" piece to stick out about a  $\frac{1}{2}$  inch. This will stop the legs from being able to move behind the body or do the splits. Make a slot joint as you

did before. Next take a 1  $\frac{1}{4}$ " by 12" piece and two 4-inch pieces of flat stock and make the hip joint. Leave a small gap so that your armature can spread its legs. (No jokes)



After that is completed it is on to the next and last slot joint for the leg. Insert a 1" by 8" piece 4-inches into the leg assembly and drill a hole about two inches from the bottom. Next make the slot. This will allow the leg to bend from side-to-side. Once done its time to make the knee joint. That is done the same as the elbow by butting up the leg assemble to a 1" by 14" piece of PVC and making the

joint. Once it is made mark the inside of the knee, the extra is to be removed. Remove it with a grinder. All that is left of the leg is the ankle.



I slip a 1  $\frac{1}{4}$ " by 4" piece of PVC over the end of the leg assembly and attach the joint to it. Then the other end of the joint is attached to a 1" tee connector. The final step for the leg is to add the foot. It is just a 1" by 4" piece fitted to the end of the tee. Once both legs are complete take the 1  $\frac{1}{4}$ " 4 way connector, insert a 1  $\frac{1}{4}$ " by 2" piece into each apposing side and insert each leg assembly. After you do so check the

movement of both legs. You want to make sure that they both have the same range of movement. Once they do drill a hole into the 4-way connector to secure each leg.



### **The Neck**

The neck is nothing more than a 1" by 2" piece of PVC jointed to a 1" by 3" piece. The 2" piece is slid into the top of the 1" 4-way connector on the top of the torso. It is not bolted or glued to the torso to allow it to swivel.



### **Assembly**

After all the parts are complete its time to assemble the frame. First you want to check that the range of motion is equal on both arms and that the upper torso pivots equally from side to side. I bolt everything together rather than using glue. This allows me to disassemble the armature if I want to store it.



### **Adding Size**

Now that you have the frame you need to add some thickness to the body. Take the chicken wire and cut a hole in the middle. Guide the neck through the hole and drape the wire like a poncho over the frame. Form the chicken wire into a chest for your armature.

After the Chest is formed it is on to the hips. They are formed in the same way as the chest. You want to cut an opening for the 4-way connector. This will allow you to add a stand so that your figure can be posed standing up. Once all the chicken wire is in place it is a good idea to stuff the inside of it with newspaper to act as filler for the polyfoam.



Coat each side of the chicken wire with foam allowing it to harden. Once the foam is hard you can remove the newspaper. I sometimes use plastic wrap and cover the foam before it starts to cure. Then I can mold the foam somewhat. When I peel off the plastic wrap some of the foam will come off with it. The result is what looks like rotting peeling skin once it is painted.

The final step is to cover the arms and legs with the mattress pad. Cut the pad into strips and wrap it around the PVC then tape it with the duct tape. After the Frame is covered I like to cut out the areas around the bolts so that I can easily tighten and loosen the bolts as needed.



### The Stand

You can build a very simple stand for your armature by bolting a 1 1/4" pipe wall fixture to a 2' by 3' piece of plywood. Then connecting a piece of 1 1/4" pipe to it and slide a piece of 1" PVC over that. A 1 1/4" piece of PVC can be inserted into the bottom of the figure and slid over the 1" PVC with a bolt drilled at the proper height.

### Make Changes

I hope that you find this project useful in your haunts. Now that you know how to build it have fun with it. Add a few inches to the arms and legs for your monsters or add inches to everything to make a giant.

Parts List	PVC Lengths
1 1/4" PVC by 10 foot -1	1 1/4" by 12" -2
1" PVC by 10 foot -2	1 1/4" by 8" -2
3/4" PVC by 10 foot -1	1 1/4" by 6" -2
1" PVC tee connector -4	1 1/4" by 4" -2
1 1/4" PVC 4-way connector -1	1 1/4" by 2" -6
1" PVC 4-way connector -1	1" by 14" -2
3/4" by 1/8 Flat stock 6 foot -2	1" by 10" -3
1/4" by 2" bolts -30	1" by 8" -2
1/4" by 1 1/2" bolts -30	1" by 7" -4
1/4" Nuts -60	1" by 6" -3
1/4" washers -60	1" by 5" -2
Polyfoam -2 cans	1" by 3" -1
Chicken wire -4 foot	1" by 2" -3
Mattress pad -1	3/4" by 7" -2
Duct tape -1 roll	3/4" by 3" -2
1 1/4" dowel (optional) -1	
1" dowel (optional) -1	