

Field Chair for Para-Athlete Construction Manual

By: Hannah McFadden



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1 Introduction

This manual describes how to successfully build a field chair. The field chair provides a sturdy platform for physically disabled students to participate in field sports such as Shot-put, Javelin, and Discus. Children with disabilities are often finding themselves limited when it comes to athletics. Some are unable to walk or even stand. Without the proper equipment provided for them they are not able to participate in any sports.

To promote athletics in physically disabled children a field chair is the best way to go. It is low-cost and easy to build of readily available materials. The chair itself is made out of PVC pipes and plywood. My goal for this project is to show how easy it is for a disabled non-athlete or athlete to get involved in track and field in their schools or competitions. This chair is regulation complaint allowing the athlete to enter into sanctioned competitions.

2 Regulations of International Paralympic Committee (IPC)

- The maximum height of the field chair including cushion (s) used as a seat shall not past 29.5 inches (75 cm).
- Front, side, and back rest may be attached to the seat. They must be nonflexible or movable.
- If you have any questions about regulations visit the United States Paralympic website: <http://www.teamusa.org/US-Paralympics/Sports/Track-and-Field>

3 Materials

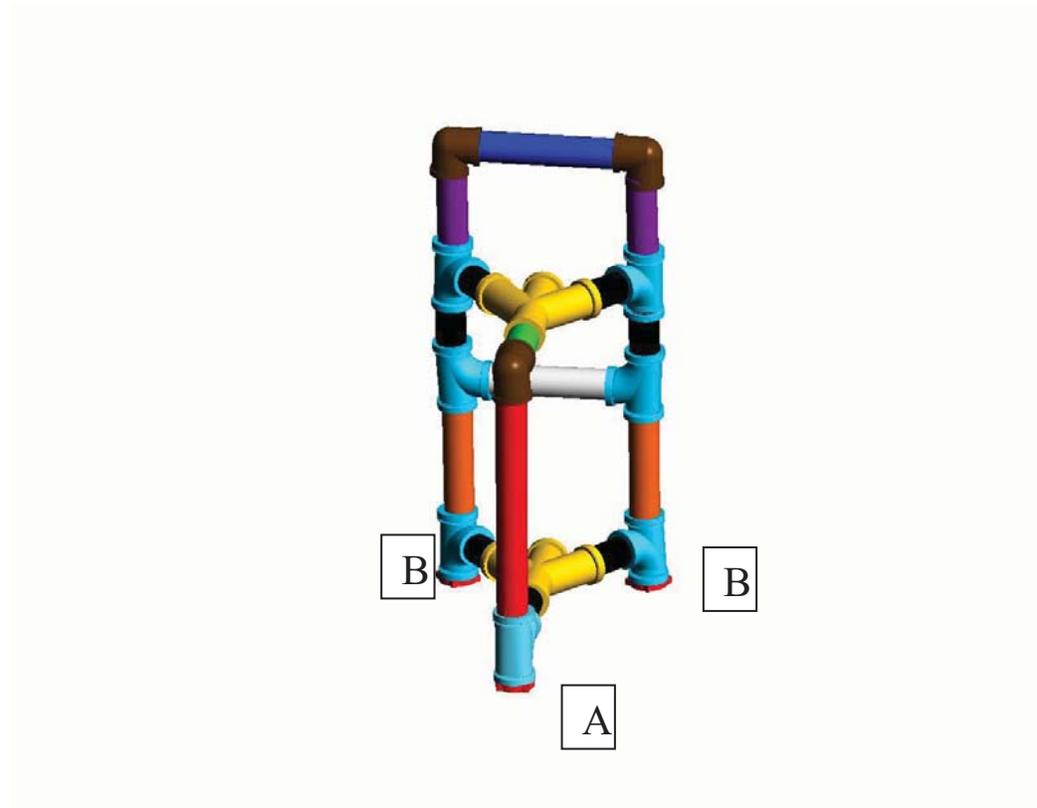
The field chair is made from five kinds of materials:

- 1) PVC pipes
- 2) Plywood
- 3) Washers, nuts, and bolt
- 4) PVC Glue
- 5) Varnish

Tools Required:

- 1) Measuring Tape
- 2) PVC Saw
- 3) Screw Driver
- 4) Hammer
- 5) Paint Brush
- 6) Adjustable Wrench
- 7) Sander (Optional)
- 8) Jig-Saw
- 9) Safety Goggles

For assembling the PVC pipes please use the diagram below to match the correspond pieces.



3.1 Common Pipe fitting

Description	Quantity Per Chair	Stock Image	Diagram image used in this manual
2 inch DWV Sanitary Tee	7		
2 inch 90 Degree Elbow	3		
2 inch Pressure Plug	3		

3.2 Double Wye Fitting

Description	Quantity Per Chair	Stock Image	Diagram image used in this manual
2 inch DWV Double Wye	2		

3.3 Cut Plastic Pipes

All cut plastic pipes should be made of 2 inch diameter schedule 40 PVC pipe.

Length of pipe required	Quantity per chair required at given length	Color of image in diagram
4.25 inch	7	 BLACK
5.5 inch	1	 GREEN
10 inch	1	 WHITE
11 inch	2	 ORANGE
9 inch	2	 PURPLE
11.5 inch	1	 BLUE
20 inch	1	 RED

3.4 Assembly Hardware

The following hardware will be needed to assemble the chair for use.

Description	Quantity per chair
Stainless steel 1 Bolt 5/16"x6"	3
5/16 inch wing nuts	3
5/16 inch washers	15
Stainless Steel countersunk head machine bolt .25"x4"	3
.25 inch nuts	3

3.5 Plywood Seats

The seat will be made out of 15”x 15” of at least $\frac{3}{4}$ inch thickness. The seat is made to create a flat surface for the athlete to sit facing forward on the chair. It is essential to get plywood with at least one side finished, called ACX or G1S plywood, for outdoor exposure.

4 Cutting Parts

The PVC parts that are cut must be smooth and square to fit and support of the athlete’s weight. The plywood seats must be shaped and sanded to make them smooth and comfortable to sit on. These cutting steps utilize power tools.

4.1 PVC Pipe

To measure the PVC pipes use the measuring tape and mark it off with a marker. The best way to cut these pipes is with a PVC saw, with a clamp to hold a block so that the piece of pipe is cut the right length. Then cut all the pieces of that length needed for your field chairs.

4.2 Plywood Seats

- 1) Start off by having a square of plywood that measures up to 15” x 15”.
- 2) Round all corners with a router until there is no sharpness (please see diagram below).
- 3) Use a sander or sand papers on both sides until both are extremely smooth with no rough edges.
- 4) Determine which side will be for the top. Make sure the top is sanded so the athlete does not splinter or hurt them when they are on the seat.



(Square Seat)

5 Assembling and Gluing Plastic Parts

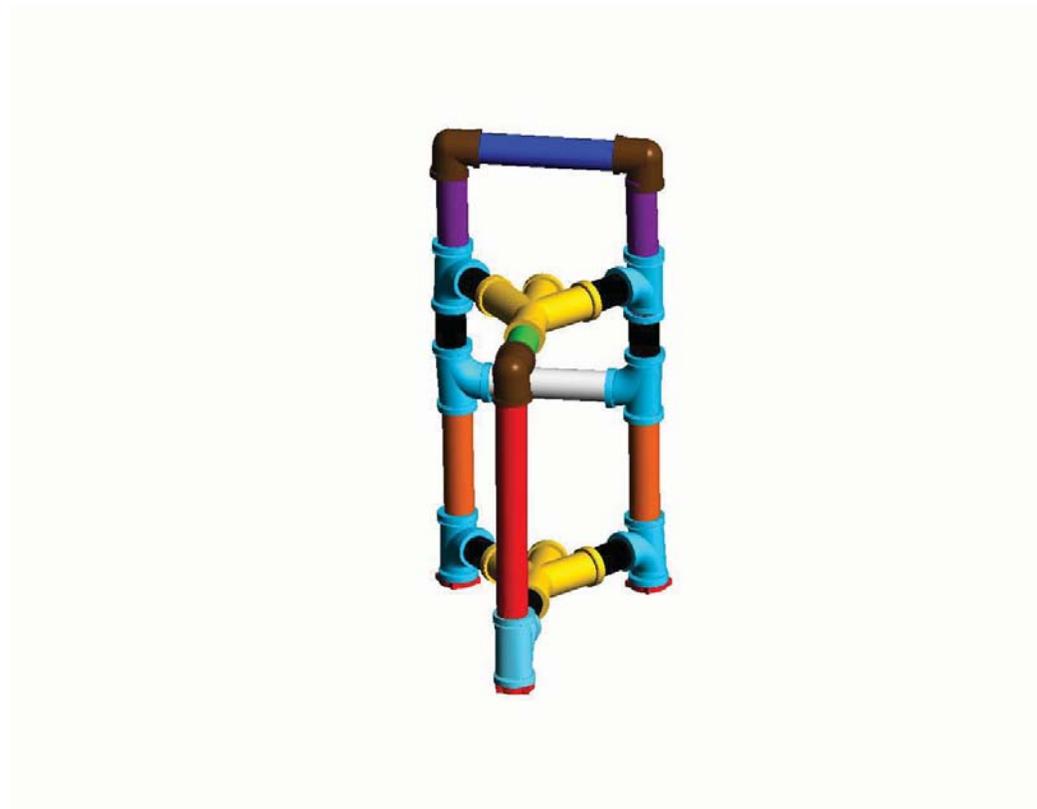
After the PVC pipes have been cut to their correct lengths you are ready to start assembling.

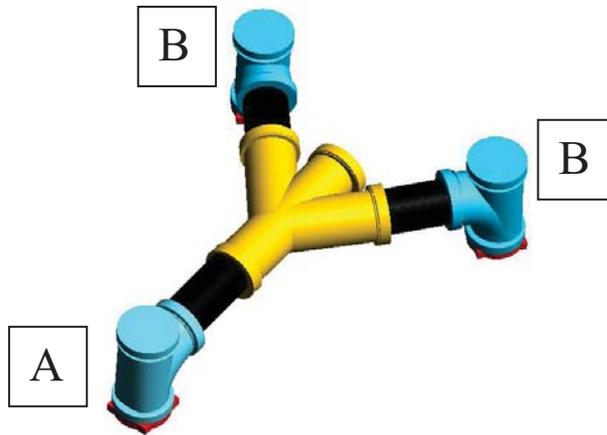
The pipes are glued into three assemblies. Make sure that each joint is completely clean and dry.

When gluing each section place the chair on an even surface to make sure your alignment will be straight. Please read the directions on the glue bottle to let the appropriate amount of time for the glue to dry.

5.1 Base Assembly

The base assembly has three legs. Careful alignment of the final three joints is very important for the chair to sit level on the throwing circle. Make sure to refer to the diagram below that was located on pg. 4 for help!





5.1.1 Base

- 1) Glue three 4.25 inch pipe (black) into the DWV Double Wye (light blue).
- 2) Glue a sanitary tee (blue) on to each 4.25 pipe (black).
- 3) Glue each pressure plug (red) into three sanitary tees (blue).

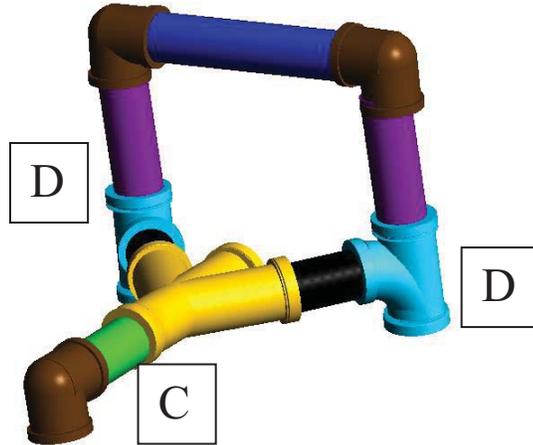
5.1.2 Legs

- 4) Glue the 20 inch pipe (red) into base section A.
- 5) Glue the two 11 inch pipes (orange) into the base sections B.



5.2 Top Assembly

The top assembly portion is used for the para-athlete to keep balance on the chair when they are throwing the implement.



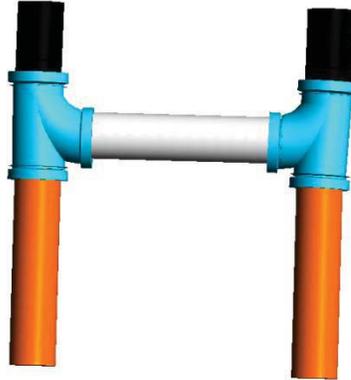
- 1) Glue the 5.5 inch pipe (green) into section C of the DWV Double Wye (light blue).
- 2) Glue two 4.25 inch pipes (black) into the sections of D in DWV Double Wye (light blue).
- 3) Glue two DWV Sanitary Tee (light blue) on to the two 4.25 inch pipes (black).
- 4) While letting the pieces from step three to dry you can start building the head. On the 11.5 inch pipe (dark blue) glue the 90 Degree Elbow (brown) on to both ends.
- 5) Glue the two 9 inch pipes (purple) into the 90 Degree Elbow (brown).
- 6) Glue a 90 Degree Elbow (brown) facing down on to the 5.5 pipe (green).



(What steps 4-5 will look like.)

5.3 Back Assembly

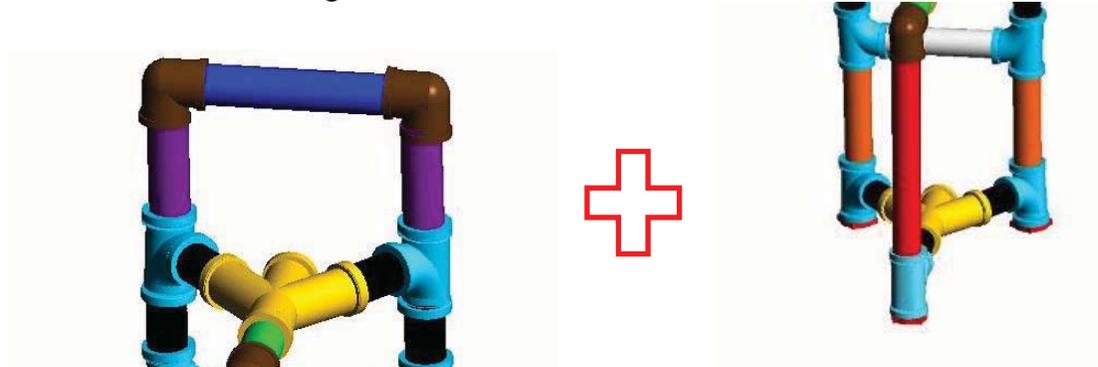
The back is made of two symmetrical sides.



- 1) Glue a 4.25 inch pipe (black) on top of a DWV Double Wye (light blue).
- 2) On the bottom of the DWV Double Wye (light blue) glue on top of the 11 inch (orange) pipe legs from the base(orange).
- 3) Repeat steps 1-2 on this page.
- 4) Connect these two sides by gluing the 10 inch pipe (light blue) on to the middle hole on the DWV Double Wye (light blue).

5.4 Final Alignment

Glue all three sections together to make the field chair.



- 1) From the top assembly glue the DWV Double Wyes (light blue) on top of the 4.25 pipe (black) from the back assembly.

6 Drilling

Six holes are drilled into the chair. Three are drilled into the top, to hold the seat securely. Two are drilled into the joint between the top and the back and one is drilled into the joint between the nose and the nose pipe to install the tie-down bolts.

6.1 Top Drilling

To make sure the holes are in the center, mark the center of each pipe connecting an arm or nose to the double-wye. Carefully position the seat so that it is centered on the chair and the lines are visible when you look down through the holes. Clamp the seat in place, and then recheck its position. Drill through the top of the pipe. Once you have drilled the top of three holes. Remove the seat and drill vertically through the bottom of the pipe so you have three holes straight through.

6.2 Tie Down Drilling

To secure the field chair on the ground you can use tie downs. Each tie down hole should be level and go straight through the fitting, the pipe, and out the other side through the pipe and fitting. Put an eye bolt in the hole to maintain alignment. Then drill a hole through each joint between a bolt and a nut.

6.3 Varnishing the Seats

The wooden seats will deteriorate rapidly if they are not properly finished. Sand carefully and make all the wood smooth before you begin varnishing. Three coats of varnish on the top and two coats on the bottom look very nice. Be sure to sand between coats with very fine sandpaper.