Picnic Table Build
Resource for Hosting a Picnic Table Challenge or Hands-on Student Activity

Objectives

The NAHB Picnic Table Build resource was developed as a hands-on activity/project for high school/secondary student chapters. Local and State home builders associations can host this activity as a challenge or competition among chapters, or anyone can use this as a guide to build a picnic table for their school, community, or other purpose.

This resource is outlined in a competition format for teams to fabricate the picnic table components at their own school/workshop, then travel to a designated location where all teams will assemble their tables on-site and be judged on precision of the component fabrication, the quality of the final product, and the time required to assemble the parts. Student Chapters and/or HBAs may use any or all of this resource to fit the needs of their own picnic table competition or project.

Requirements

Each team (up to 4 members) will construct a 6-foot picnic table according to the Picnic Table Fabrication Packet provided. Team members will cut all boards, pre-drill holes and seal the wood at their home schools. Instructors/coaches may advise the teams, but all work must be done by the students. Teams will transport the parts to a location determined by the competition host and assemble the table in a timed competition. Teams will compile a three-ring binder with the estimate, schedule, safety plan and cutting plan described below and have that available for judges to review. Judges will inspect the binder contents and the picnic table components prior to assembly.

All assembly operations must take place within the designated space. The suggested space for each team is a 10' x 20' construction site. Teams will have access to the competition area at (*location*) starting at X:XX A.M. on Xxxxday. Component parts must be laid out following the pattern shown in Figure 1 by X:XX A.M. All team members must be available to answer judges' questions for 30 minutes (or other length of time designated by the competition host) before assembly begins.

Estimate

The estimate must include the cost of all materials needed to complete the project and the labor required to assemble the table. Estimate the cost of the raw materials in commonly available sizes using the price list that is provided. (The actual prices paid may vary, but use these prices so the judges can easily compare the estimates.) Include 6.5% sales tax. Each team will develop a detailed cutting plan to optimize the use of materials. Teams should try to minimize the material cost by careful planning. Estimate the labor cost for assembly in minutes at a rate of $60/hour/team ($1.00/minute).

Schedule

Teams must carefully plan the order of operations and task assignments to rapidly assemble the picnic table at the competition location. A schedule showing the sequence and duration of activities, and which tasks each team member will be doing must be provided to the judges. The Steps listed in the Picnic Table Fabrication Packet provide guidance, but teams may change the order and/or work on multiple tasks simultaneously to minimize assembly time.

Safely Plan

Teams must be aware of and follow the safety requirements of their schools during the fabrication process. A safety plan is required that identifies tasks to be completed during assembly at the competition location that involve risk of injury and plans to mitigate that risk.

Cutting Plan

Provide a sketch of the lumber ordered to fabricate the picnic table based on the estimate and how the individual pieces will be cut from those boards. The sketch may be neatly hand-drawn to scale or produced electronically.

Procedures

Teams will use tools available at their schools to fabricate the parts prior to traveling to the competition location. A list of tools used to fabricate the parts for the prototype is provided in Table 1.

Teams must bring their own tools to assemble the table at the competition location. Some suggested tools that were used to assemble the prototype are given in Table 2.

Use the prices listed in Table 3 for the estimate.

Specifications

1. All nuts in bolted connections must be tightened until the end of the bolt is flush with the nut. Do not over-tighten and crush wood.

2. Bolts heads should be on the outside of the support assemblies. Nuts should be on the inside – less visible. A washer must be placed on both sides of the bolted connections – next to the bolt head and under the nut.

3. If you decide to cut, for example, 2 – 5’ pieces from one 10’ board you can neglect the width of the saw cut. If the board is exactly 10’ long, cut the piece exactly in half. Those pieces would be roughly 4’ 11 15/16” long. If the board is slightly longer than 10’, cut the pieces 5’ long and discard the excess.

Assembly Rules

1. Material cannot be carried at faster than a normal walking pace.

2. No material, tools or equipment may be thrown.

3. Violation of the rules results in a penalty for each infraction. Deliberate, repeated violations are cause for disqualification.

More Rules

1. Dimensions are given to the nearest 1/16". For proper assembly, all cutting and drilling must be performed to fairly tight tolerances. Take care to ensure that holes are drilled perpendicular to the surface.

2. 3/8" diameter holes are called out for the 3/8" bolts so accurate drilling is essential. Tight connections are desired for the moment-frame design to achieve the required stiffness. (Note that there are no knee braces under the table top as found on most picnic tables.) The prototype was constructed using a 9/16" socket on the cordless screw driver to help draw the bolt through the 3 pieces of material in most connections.

3. All material processing must be performed by the team members using tools that would be available on a typical residential construction site. Computer Numerical Control (CNC) equipment may not be used.

4. Teams may temporarily assemble parts that will be **bolted** together before arriving at the on-site competition location to ensure proper fit. The seats and table top may NOT be assembled prior to the on-site competition. Screw holes (3/16") should be drilled in the pieces as shown in the drawings prior to the on-site competition, but the pieces these are attached to may NOT have any screw holes. Teams will need to implement procedures during assembly at the competition location to ensure that the table is square and parts properly aligned.

5. The table should be designed to rest on a concrete slab in an outdoor environment. Teams must develop a 1) simple, 2) durable, 3) inexpensive method to isolate the legs from wet concrete. Even pressure-treated wood will eventually deteriorate if kept wet. Figure 2 shows the furniture "slider" used for the prototype as an example, but teams are encouraged to find a creative solution and be ready to justify their approach to the judges.

6. Consider the wood grain orientation and quality of the surfaces of the boards when selecting the top face for the 2x6 table and seat boards.

Figure 1. Component Layout to Display to Judges

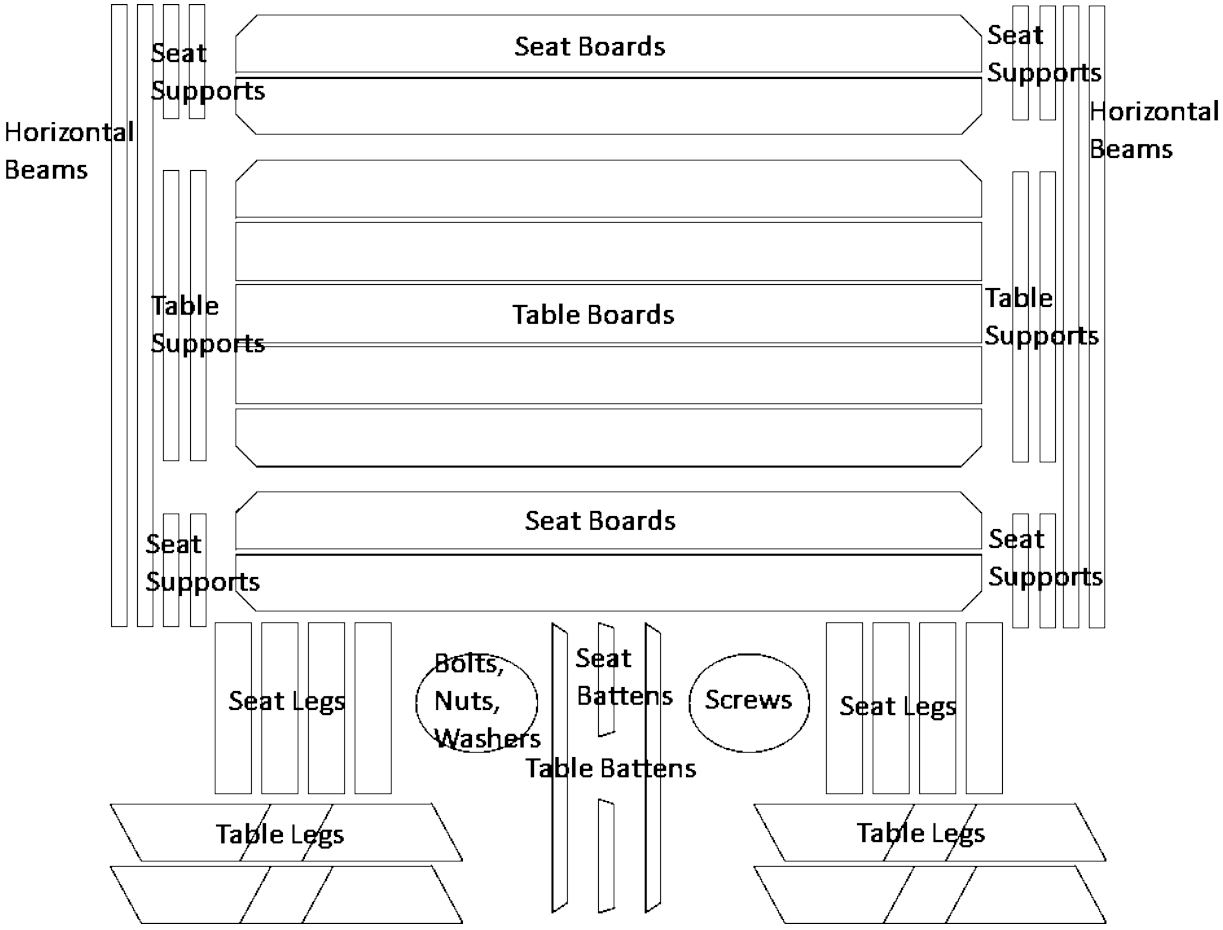

Figure 2. Seat Leg Pad Example

Table 1. Fabrication Equipment

Miter saw
Circular saw
Chisel
Rubber mallet
Sander
Speed square
Tape measure
Drill
3/16” drill bit
3/8” drill bit
6” bar clamps
Carpenter pencil
Sealer applicator

Table 2. Assembly Equipment

Wrenches – 9/16”
Socket – 9/16”
Socket adapter
Screw driver bit
Tape measure
Cordless screw driver
Cordless drill
3/8” drill bit
¼” spacers
3’ bar clamp
Carpenter pencil
Rubber mallet

Table 3. Materials Price List

Kiln Dried Lumber	
2x4x8'	4.25
2x4x10'	7.13
2x4x12'	8.47
2x4x16'	12.56
2x6x8'	8.36
2x6x10'	10.92
2x6x12'	12.27
2x6x16'	16.62
Pressure Treated Lumber	
2x4x8'	6.88
2x4x10'	9.18
2x4x12'	10.98
2x4x16'	14.98
Hardware	
3/8" x 2" Zinc-Plated Hex Bolt	0.38
3/8" x 5" Zinc-Plated Hex Bolt	0.88
3/8" Zinc-Plated Washer	0.16
3/8" Zinc-Plated Nut	0.13
2-1/2" Exterior Screws (lb.)	9.48
Sealer	
Water Seal (1 gallon)	13.98