

Portable Bleacher Seats

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Demonstrations are an integral part of many instructional programs in agricultural occupations, and especially in agricultural mechanics. For a successful demonstration, the students should be grouped so they can see and hear. A classroom with seats on a level floor is not as satisfactory as a bleacher arrangement where seat level is graduated. It is often more practical to take the students to the equipment for demonstration than it is to bring the equipment to the classroom. Forcing students to stand for any length of time does not make for a comfortable or attentive learning situation.

The main disadvantages of bleacher seats are that they are more or less permanent as to location and they take up valuable space when the demonstration is over. The portable tilt-up design shown in this article has proved very satisfactory in that it provides a quickly arranged seating plan for 15-18 people at a moments notice and can be easily moved by one person either up or down. When folded in storage position, the underside of the seat frame can also serve as a stand for charts or as a light blackboard. When folded the whole assembly will go through a standard door.

Seat Frames

The three bleacher frame members are weld fabricated from 1/4" black pipe with 3/16" x 1" x 1" angle iron braces, which also serve as seat and foot supports. The seats are a full 1 1/2" x 9 1/2" x 10', the foot supports are full 1" x 7" x 10', and the backrest is a plain 3/4" board, 8" x 10'. All are bolted to the three frame members.

Care must be taken in cutting and welding the 3/4" x 1" x 1" angle iron for seat and foot rests so as to obtain the 22° angle necessary to have all three seat frames alike. Holes for the foot rests must be drilled before welding. Welding is one of the most critical operations for a successful job and is best done by first laying out the pattern with chalk, square, and straight edge on a level concrete floor, then tack welding in proper alignment before the final welding.

Base Frame

The base frame is the second main assembly and should be carefully laid out and fabricated so as to be square and true and so that all four corners are the same height. The pivot supports must be vertical with pivot bolts in line. This frame is made from 1/4" x 1 3/4" x 1 3/4" angle iron supported on four inch wheels, two caster at one end and two plain at the other.

The bleacher seat frames are mounted and pivoted on the three base frame uprights with 3/4" bolts. Pipe bushings around these bolts will reduce wear and provide easier operation. Although hardly needed, the entire seat assembly can be held in upright position by a single pin at the end with the plain wheels. The wooden seats and foot rests are bolted on as a final operation.

Critical parts of the assembly for smooth operation are the two balance springs. Several trials were made before finding springs which would be short enough in the upright position, which would stretch more than twice their free length, and also have sufficient strength to balance the seat frame for easy operation by one person. Those chosen were 11 1/2" long or 14 1/2" overall and 1 3/4" diameter, made of 3/16" spring wire. If the springs are too stiff or too short the rear of the base frame may lift when in the seating position.

LIST OF MATERIALS AND ESTIMATED COST

Key No.	Total Feet	Est. Cost
1	22 ft. Angle Iron 1/4" x 1 3/4" x 1 3/4", - Base Frame (2 pcs. 84", 2 pcs. 27")	8.60
2	10 ft. Flat iron 1/4" x 1 1/2", - Angle Braces on Main Supports. (6 pcs. - 18")	1.80
3	6 ft. Flat iron 3/8" x 2 1/2", - Main Supports (3 pcs. 22")	2.80
4	4 ft. Flat iron 1/4" x 2 1/2", - Pivot Supports between pipe frame (9 pcs., 5" - 2 at each pivot bolt and 1 at end of frame)	1.20
5	36 ft. Black pipe. 1 1/4", - Seat Frame (3 pcs., - 70", 3 pcs., 68")	9.00
5b	6 ft. Angle iron 1/4" x 2 1/2" x 2 1/2" - Seat Frame Front end supports (cut to lengths indicated)	6.00
6	22 ft. Angle iron 3/16" x 1" x 1", - Seat and Foot rests (3 pcs., 27" - cut and bend as indicated)	3.70
7	3-2" Rubber casters @ \$2.00, - Front of Seat Frame	6.00
	4-4" Wheels (2 plain, 2 caster) @ \$5.00 ea.	20.00
8	3 1/8" x 10" x 10", clear fir. - Seats	11.00
9	2 1" x 7" x 10', clear fir. - Foot Rests	5.50
10	1 3/4" x 9" x 10', clear fir - Back Rest	2.00
11	8' Angle iron, 3/16" x 1 1/4" x 1 1/4", - Base Frame Angle Braces	1.70
12	3 3/4" x 3" machine bolts, - Pivot Bolts	0.75
13	2 Tension springs 1 1/4" dia., 14 1/2" overall length, 11 1/2" spring length, 3/16" wire	
14	1 qt. green enamel, frame	
	1 qt. gray enamel, seats	7.00
	TOTAL	101.05



