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# How To Square Up For A Building Foundation

*It is estimated that in a year's time one out of five supts. is called upon to supervise construction of some kind of a building. It may be a shelter, small service building, halfway house or, as at some clubs, even a large maintenance building. Usually these projects are taken in stride after the initial layout is made. But it is this same layout that so often proves to be the stumbling block. Getting a building site squared up may be the most difficult thing about the entire construction job. This article is presented with the intent of helping the supt. to overcome this initial obstacle with a minimum amount of expense.—Ed.*

By **SIDNEY C. SAILOR**  
Civil Engineer

Many things have to be considered before construction of a building is started. These include the size of the structure, location, type of construction, floor elevation and similar factors. The location of a building usually is referenced

to an existing building, street, lot line or some other convenient object. After this is done, a scaled sketch of the foundation floor plan of the new building should be made, with the direction and distance of the reference points being noted on the plan.

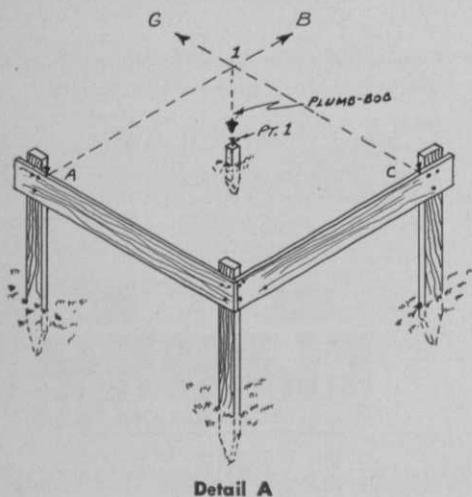
Construction of a building actually starts with the laying out of its dimensions (usually the outside ones) on the ground. It is very important to have all angles square and all linear measurements accurate. We will assume that you do not have a transit available, or are not familiar with the use of this instrument since it is an engineer's tool. As a substitute, we recommend the batter-board method of squaring up a building.

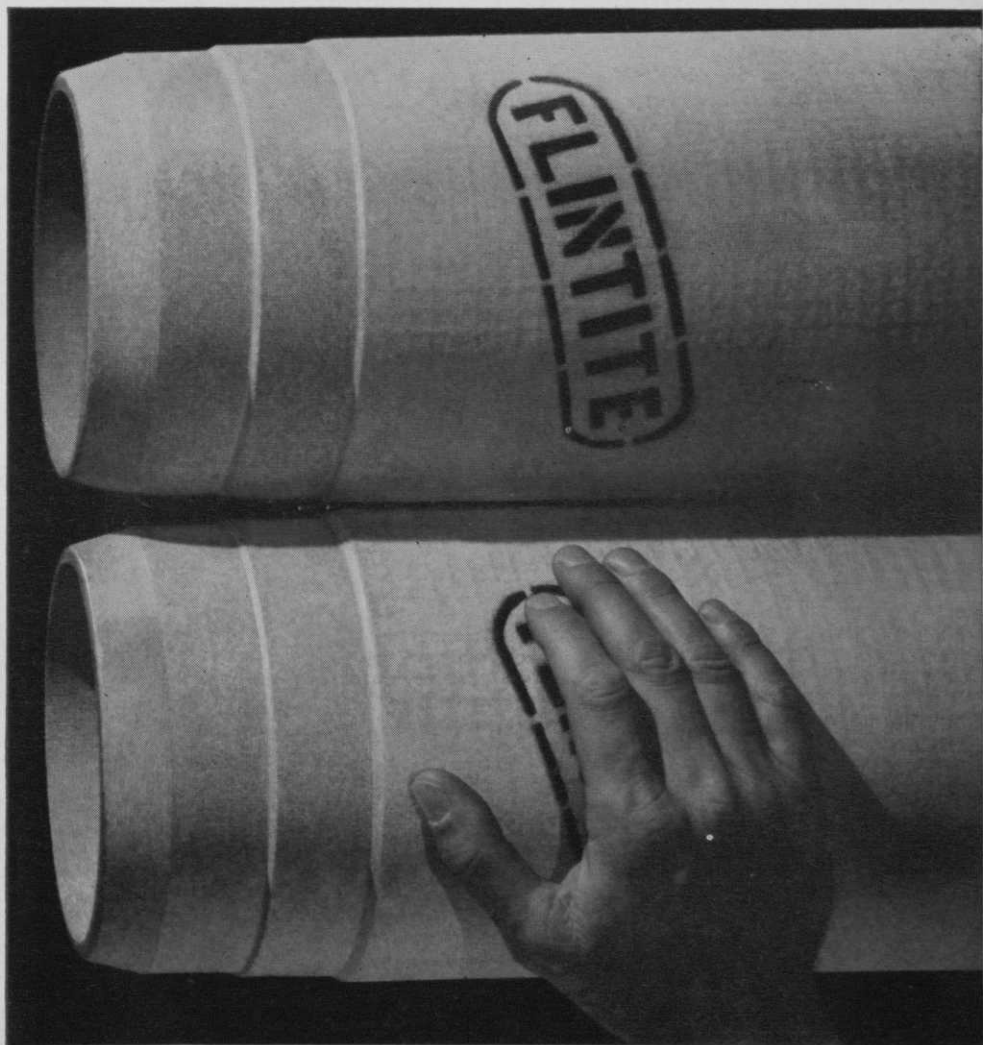
## These Tools Are Needed

In the batter-board method of layout the following tools and miscellaneous equipment are needed: A one-hundred foot steel tape, a carpenter's level, good, strong builder's twine, a carpenter's rule, hammer and nails, a maul or heavy hammer for driving stakes, one-inch boards each at least six feet long and stakes. It's important to have all batter-boards at the same elevation.

There are two methods of transferring elevation. One is the transit-level method, the most accurate, but we are ruling this out because transit-levels often are hard to come by. In the second and more practical one, a 40- or 50- foot piece of garden hose is used. This embodies the principle of water seeking its own level and is explained in Figure 2.

The actual laying out and squaring up of a building site is essentially a simple job. But it is a rather tedious one and care must be taken in making accurate





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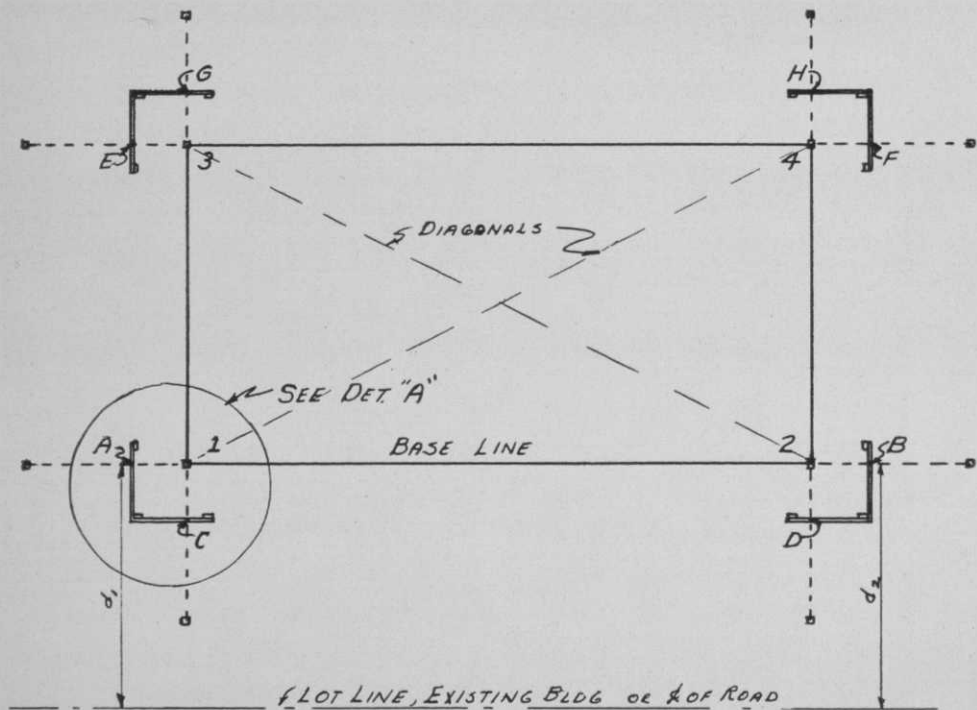


Fig. 1 — After the building is checked and found to be square, the points of intersection for the building lines (see Detail A) are transposed to the ground line. A nail in the top of the stake designates the exact intersection.

To extend the line, A-B, past the batter boards the following steps should be taken.

(1) Tie one end of the builder's twine to the nail on the top of the stake marked '2';

- (2) Extend the line past Stake 1;
- (3) Pull the line very tight and draw up to touch the nail driven in top of Stake 1;
- (4) Any point on this tight line lies on or is an extension of line A-B. This can be done to extend any line;
- (5) A certain amount of care has to be taken because the wind will blow the line and may possibly cause some error.

measurements which incidentally, should be re-checked several times. Referring to Figure 1 again, the layout should be made in these steps:

1. Locate the corners of the building by using a steel tape. This is only to help locate the batter-boards and need not be 100 per cent accurate;

2. Drive three stakes in a triangular pattern (Figure 1) around each of the temporary corners of the building. These should be from four to six feet beyond the building line. The stakes should extend at least two feet above the ground;

3. Nail the two batter-boards to one set of stakes, as shown in Detail A. Use a carpenter's level here to make sure that the boards are level;

4. Install the batter-board setup at the other three corners of the building. Once

again, be sure that all the boards are level and at the same elevation. Use the method described in Fig. 2 in transferring the correct elevation to all batter-boards. The stakes should be securely anchored. In nailing the batter-boards to them, use your maul, as a back-up so the stakes are not jarred loose while nailing;

#### Base Line Established

5. Re-measure accurately from the reference line and mark the tops of the batter-board. You now have two points (A and B) accurately positioned with respect to the reference line. A line tightly drawn between these two points will be the base line of the building. This line is not changed during the squaring off process;

6. Accurately re-measure from the reference point and locate a point (C) on

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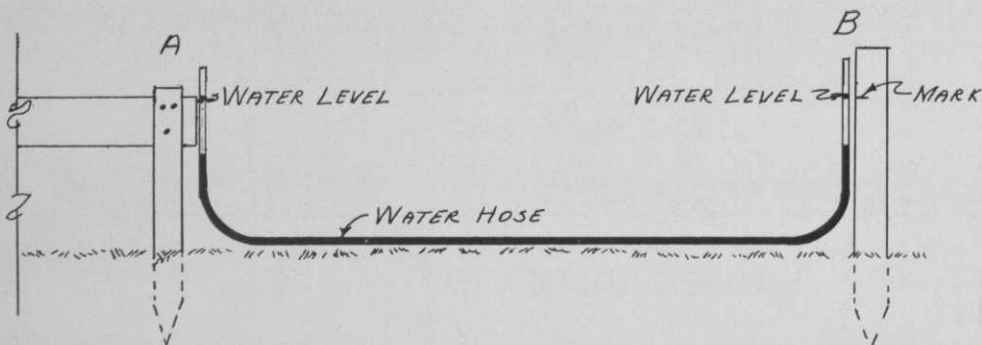


Fig. 2 — This shows a method of leveling one point with respect to another. It consists of a length of ordinary garden hose with a one-foot length of clear plastic hose attached to each end. Point A is the reference elevation. All other batter boards must be placed at the same elevation as the batter board at point A.

Hold the hose as shown here and fill with water so that the water line may be seen in the clear plastic sections of the hose.

Raise or lower the hose at B until the water level at A is even with the top of the batter board at A.

The water level at B is the same as at A. Mark the stake at B even with the water level in the hose. The elevation of this mark is at the same elevation as the top of the batter board at A.

Proceed to the other corner stakes in the above manner.

the top of the batter-board that is perpendicular to the board on which the point (A) is marked;

7. Using a steel tape, measure and lay out the dimensions of the building and mark the points on the top edge of the batter-boards (C-D, A-E, G-H, B-F). In this step the important thing is to keep dimensions as accurate as possible. Point G or H can be approximately located for the first layout.

8. Drive nails into the top of the batter-boards on the marks (A-B, C-G, E-F, and H-D) and connect these points with builder's twine.

#### Double-Check Diagonals

9. Measure the diagonals of the rectangle formed by the building lines. The diagonals must be equal if the building is to be absolutely square. Usually the first measurement will show that the diagonals are not equal. This means that a parallelogram and not a rectangle exists;

10. Never move the base line (A-B or point (C)). Check all measurements, and be sure that the line of the building (E-F) is parallel to the base line. The lines that are supposed to be perpendicular to the base line will not be accurately placed unless the diagonals are equal. There are only two points (G and H) that can be moved to equalize the diagonals.

By trial and error, these points can be moved until the diagonals are equal. This should require no more than three or four movings;

#### Transpose Corners

11. Use a plumb-bob or a carpenter's level to transpose the corner of the rectangle to the ground level. (See intersection of A-B and C-G in Detail A;

12. Reference the lines that extend beyond the batter-boards by use of the taut line method, explained in Figure 1. We suggest putting in these secondary stakes just in case the batter-board stakes are distributed when the building excavation is made.

If your building is not rectangular in shape but is, say, such as an L-shape structure, the procedure described here can be used by breaking down the overall floor plan into a series of rectangular shapes.

#### 18 GCSA Committees

David Moote of Toronto, Can., president of the GCSA, recently appointed 18 committee chairmen to direct various activities of the association. The committees aid in all GCSA activities ranging from internal matters to those dealing with other organizations and groups in golf, turfgrass and related industries.

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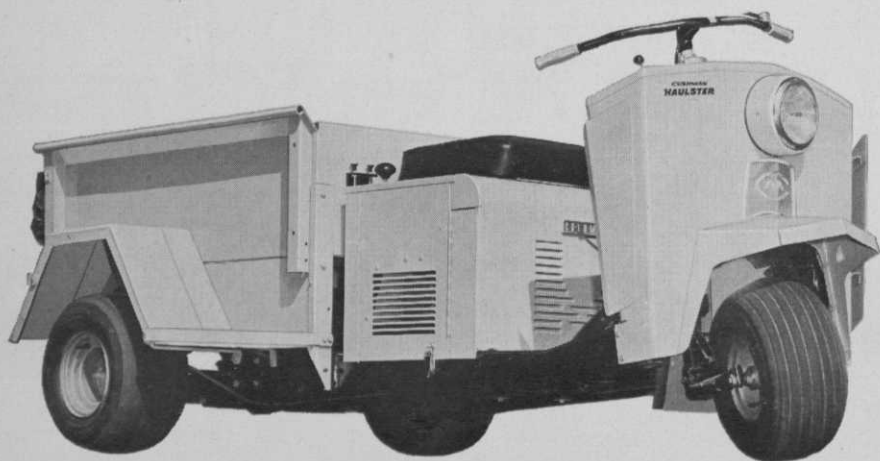
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# Tree Planting Open



North Oak Needed 1,200 more trees on its course . . . So, it got the members to plant them by offering an incentive By TONY KOWSKI

During their spring meeting in 1962, the board of directors at North Oaks GC, a private club located in suburban St. Paul, decided that their golf course would be more beautiful with additional trees. Questions arose, however, as to how to raise the necessary funds to buy the trees, and how to get them planted. Typical answers to these questions might have been, "Assess the membership," and "Let the supt. handle it." North Oak's board, however, had a different answer.

In order to raise the necessary funds and induce volunteer planters, the board decided to hold a tournament. Entries would be limited to members who agreed to donate their time or money to the project.

## Restricted to 100

Whatever amount of time or money the member wished to contribute would entitle him to an entry. The tournament was to be called, "The Tree Planting Open," and it would be held on a Saturday in early May. The board decided to restrict the entry to 100 members and to close the course until all the trees were planted and the tournament was completed.

The board set 1200 three-year old pine trees as its goal and agreed to pay the difference from the total cost of the trees

and the contributions from the entries.

A "landscape committee" was appointed to contact the 260 golfing members. Letters were sent a month in advance to tell each member of the project and tournament and to appeal for a donation of either time or money.

## Donate Money and Labor

In less than two weeks, the Board had received about \$400 from the first 100 entries. Three-fourths of the entrants also offered their time to plant the trees.

Approximately 1200 pine trees of various types including Austrian, Norway, Ponderosa, White and Colorado and Black Hills Spruce were purchased from a local nursery for \$558.00. Since actually \$389.00 had been contributed, the cost to the board was \$169.

On the day before the tournament, the supt. and his staff placed stakes at the spots where the trees were to be planted. The length of the hole and its need for trees determined the number of trees to be planted on each hole.

On Saturday morning, a 7:30 breakfast was held in the clubhouse. From the list of volunteers, the Board had chosen 18 captains, one for each hole on the course. A captain was assigned one planter for each 16 trees he had to plant. Each captain was given his allotted number of