DETERMINING TARGET HEIGHTS FOR GROUND LADDERS: THE CLICK SYSTEM

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There are three essentials to raising a ground ladder properly: teamwork, communications, and safety. Exactly how far to extend the ladder once it is at the raising site requires, in addition, a system that is reliable on the training ground and in the heat of the fireground. When someone is awaiting rescue at a window with smoke billowing out over his head, there is no room for error in placing the ladder properly. With this in mind, firefighters need a way to size up the target height quickly, select the correct ladder, and raise it properly to the objective, the victim. Raising ladders has many objectives, but this article specifically addresses placing a ladder for rescue/entry operations.

The accepted practice for placing a ladder to the roof is to have at least three to five rungs above the roof level. This makes the ladder visible to the crew on the roof in case members have to exit the roof and allows a handhold to facilitate getting on the ladder. The objective is still accomplished if the ladder tip is seven or eight rungs above the roof line.

What about venting? Placing the tip even with the top of the window on the windward side is the accepted practice. If the tip is a little short or long in regard to the target, no big deal--the job can still be done.

However, placing the ladder for rescue (window entry) is another ballgame. The proper target is at or below the sill--a well-established practice. If the ladder is placed too high or too low relative to the window, even by a rung (14 inches), it can impair the operation. If the ladder is placed too low, a person exiting the window may reach for the top rung and possibly fall. Likewise, entering a window from a ladder that is positioned too low is

more precarious than from a properly placed one. Placing the ladder tip too high will put the firefighter and the victim in a position where the products of combustion may hinder their ability to get on the ladder.

When lives are on the line, ladder place-ment must be dead-on accurate, and using the click system can ensure accuracy. It is a method of determining the target height (TH) at a glance, using this information to select the correct ladder, set the ladder butt at the proper distance from the building, and raise the fly accurately to place the ladder tip at the objective.

The Bergen County (NJ) Fire Academy uses the click system to teach firefighter recruits how to raise ladders properly. It is based on the "click" sound that the ladder dogs make when they pass a rung. Each time the dogs clear a rung, a click is heard, and the aluminum or fiberglass ladder moves 14 inches higher (12 inches for wood ladders). (See photo 1.) This system allows the ladders to be raised to the objective by counting the number of clicks.

DETERMINING THE TARGET HEIGHT (TH)

Before selecting the proper ladder, the target height (TH) must be determined. The TH is the height at which the ladder tip makes contact with the building. For entry, this will be just at or below the sill. In most ordinary construction and wood-frame dwellings, the distance from sill to sill vertically is generally about 10 feet. For commercial struc-tures, it is 12 feet. Using this to determine the TH, add downward from the target (the sill) to the ground.

For example, if you wanted to place the ladder to the third-floor window of an apartment house of ordinary construction (see photo 2), you would count downward from the third floor to the ground. It is 10 feet from the third-floor sill to the second floor sill; 10 feet from the second-floor sill to the first-floor sill; and, depending on the building, the distance from the first-floor window to the grade is guesstimated. For our example, we`ll say it`s six feet, giving us a TH of 26 feet. If all you have is the 35-foot, two-section extension ladder and the 24-foot extension ladder, the choice of ladder is easy.

DETERMINING WHERE TO POSITION THE LADDER BUTT

As every book will tell you, determine the distance the ladder butt should be positioned from the wall by dividing the working length of 26 feet (the TH) by four. This places the ladder butt 612 feet from the structure. We can now extend the fly to the objective.

At this point, you may ask how the formula accounts for the distance the ladder tip will drop when we move the butt out from the building. Don`t worry about it--the tip drop compared with the butt movement is relatively small.

To illustrate this point, place a ruler next to a wall. For every inch the base of the ruler moves away from the wall, the tip moves a fraction of that distance. Even if it is feet instead of inches, the change in the distance at the tip is relatively minute compared with the change in the distance at the ground. Figure the target height, figure the ladder butt distance, and raise the ladder--plain and simple.

EXTENDING THE FLY: USING THE CLICK SYSTEM

The most critical information you need to know when using the click system is the bedded length of your ladder. For most aluminum and fiberglass extension ladders, the corresponding bedded lengths are

Ladder extended length Bedded length

24 feet 14 feet

28 feet 16 feet
35 feet (two-section) 20 feet
35 feet (three-section) 15 feet

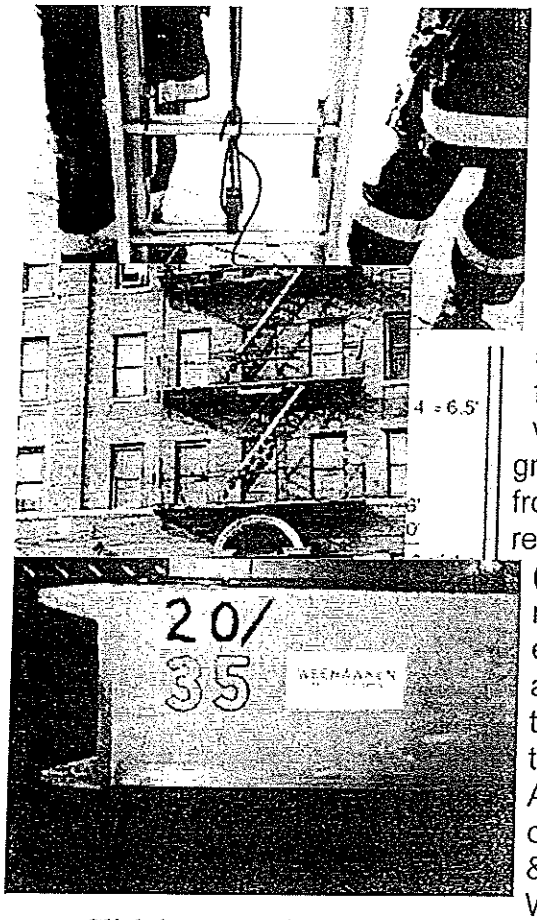
For fireground efficiency, mark the bedded length on the ladder (see photo 3). Once you know the bedded length, the rest is easy subtraction. Simply subtract the bedded length from the target height--the resulting number is the number of clicks you must hear when extending the ladder. In the example, the target height is 26 feet and the bedded length of the two-section, 35-foot ladder is 20 feet. Subtracting the bedded length (20 feet) from the target height (26 feet) gives us six. Thus, six clicks should place the ladder tip at the third-floor windowsill. But we still must consider rung distance.

Since the distance between the ladder rungs is 14 inches for aluminum and fiberglass ladders, for every click, the fly moves up 14 inches. The click system is determined in feet (12 inches). This is no problem. For any target height above the second floor, subtract one click from your final click count to make up for the difference (two inches for every click). So in our example, we would have had to subtract one click from the total, making five clicks the needed clicks to properly place the ladder at the sill. For wood ladders, this subtraction is unnecessary, since the distance between the rungs is 12 inches. Alternatively, for targets above the second floor, simply move the ladder butt slightly away from the wall.

What if the ladder has three sections? With these ladders, each click moves two sections (the intermediate and the fly), and the tip extends twice as far. Divide the total click count by two. In the example, the final total of six clicks is divided by two to make three clicks. We would still subtract one because the target is above the second floor, so two clicks would place this three-section ladder at the proper target, the third-floor sill.

In some extension ladders, the fly section dogs rest on the second rung of the bed section when stored instead of the first. In this case, as soon as the ladder is extended and the dog passes the second rung (the rung it rests on when bedded), that counts as the first click.

The click system is not perfect, but it does work better than any eyeball-and-a-prayer attempt. With practice, the system allows the firefighter in charge of raising the ladder to determine at a glance the target height, the proper ladder needed, where to position the ladder relative to the building, and how far to extend it while he is getting off the apparatus.



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(1) As the halyard is pulled and the ladder dogs clear each rung, a click is heard. The fly section extends 14 inches closer to the objective each time this happens. Note here that the dogs rest on the second rung when the ladder is bedded. As soon as the dog passes this second rung, it counts as the first click. (Photos by Nicole Avillo.)

(2) In buildings of ordinary construction, distances between floors are generally 10 feet. Allowing a six-foot distance between the ground and the first-floor windowsill, the target height for the third-floor windowsill is 26 feet. When raising a 35-foot ground ladder, the ladder butt should be 612 feet from the building and will necessitate five clicks to reach the objective.

(3) Marking ground ladders with the bedded length makes training and fireground operations more efficient. Knowing the bedded length of the ladder along with proficiency in the click system allows the firefighter to extend the ladder properly every time.

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