Standoff Distances on a Budget
A Guide for Master Planners

INTRODUCTION

Anyone involved with military construction knows the most cost effective way to protect a building from explosive threats is to put the proper distance between the threat and the facility. The DoD codified the proper standoff distances as Minimum AT Standards 1 and 2 ("Standoff Distances" and "Unobstructed Space," respectively) in UFC 4-010-01 *DoD Minimum Antiterrorism Standards for Buildings* (1 Oct 13 version). Traditionally, USACE used construction materials like masonry, concrete, and steel which allowed for (relatively) short standoff distances. However, the budget constraints of FY06-FY12 forced USACE to start using lighter materials which require greater standoff distances. With the projected reductions in budgets, this condition is likely to continue into the foreseeable future. However, it is still relatively easy to meet the standoff distance requirements of UFC 4-010-01. This article will help master planners address these requirements and let them know the PDC is available to help.

THE SITUATION

We will begin by clarifying two of the misconceptions about the standoff distance requirement listed in UFC 4-010-01.

Myth: Planners must provide the standoff distances listed in table B-2.

The "Conventional Construction Standoff Distances" (CCSDs) listed in table B-2 represent the least distance at which no specific blast analysis is required for the walls and roofs (doors and windows must still be designed for blast effects). They are the distances at which there is a "reasonable assumption" that the construction type will respond within the limits for the "Low" or "Very Low" level of protection (as defined in table 2-1 in UFC 4-010-01). Shorter distances may be used; however, they must be verified by analysis. The only minimum standoff distance that planners must provide is listed under the column "Minimum Standoff Distance" on table B-1.

Myth: The building must be hardened if the standoff distances listed in tables B-1 and B-2 are not available.

If the CCSD is not available, the design team must show that the selected construction type is sufficient. They can do this through either design *or* analysis. What is listed in the CCSD tables is only the most conservative value (the "reasonable guarantee"). This gives some flexibility if the available standoff distance is only slightly less than what is listed in the CCSD tables.

SIMPLE METHODS FOR CHALLENGING SITES

The following are some simple ways for handling constrained or challenging sites. They are likely to help keep costs down; however, there is no guarantee.

- For many cases where the available standoff distance is just short of the CCSD, simply run a blast analysis. It will likely show a "conventional" wall type is still sufficient.
- For many other cases, the following will likely help reduce the costs of strengthening to resist blast effects:
  - Adjust the construction parameters (e.g. stiffer cross sections, shorter spans, tighter spacing, etc.) to make the wall or roof more blast resistant.
  - Rotate the building to present the shortest wall or roof area to the constrained side.
  - Rotate the building or wall to an oblique angle to the constrained side.
  - Locate any Low Occupancy areas (loading docks, garages, warehouse areas, etc.) toward the constrained side.
  - Use a more robust "conventional" wall or roof type on the constrained side (e.g. masonry in lieu of metal studs). The UFC does not require all walls in a building to be identical.

SIMPLE WAYS TO AVOID PITFALLS

- Check unit pricing. If you plan to use CCSDs listed in tables B-1 and B-2, program for the proper construction parameters. Unit pricing listed in PAX will start to go down as the lighter building materials becomes the norm. If your project needs more robust construction, be sure to budget properly for it.
- Check the roof. Roofs will not likely control standoff distances; however they are still a potential failure mode. This is especially true for buildings adjacent to multi-level parking structures or built into the side of a hill and there is a roadway or parking on the hill above. Also note the CCSDs listed in tables B-1 and B-2 assume certain types of roof construction listed in tables 2-3.
- Check Side-On Pressures. Generally speaking, side-on pressures from blasts are less than the reflected (head-on) pressures. Typically, a building project assumes the building is located near the center of the site. If the building is located toward one edge of the site, it is possible that a side on pressure from a blast on one side could be greater

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than the head-on pressure from the adjacent side. Also note that irregular shapes like re-entrant corners can inadvertently increase blast pressures because of channeling and reflection.

- Record assumptions. Document the assumptions and analyses used to develop the project into the planning document. If the planning team programmed to use a more robust wall type, put that into DD Form 1391. It will help justify increased costs. Also remember it can be 2 or 3 years between the initial planning and the Code 3 parametric designs. Personnel can change and solutions forgotten.

HOW THE PDC CAN HELP

The PDC has engineers that have both experience and expertise in blast design, wrote Minimum AT standards 1 and 2, and developed the CCSDs. They have seen projects from all over the world with just about every challenge you might have. So if you are finding challenges on your project, they are ideally suited to assist. The PDC can:

- Assess, quantify, and solve just about any challenge to meeting AT Standards 1 and 2. This can be particularly useful for recapitalization of existing buildings or for roadway projects. This work can include travel to visit the site both in CONUS and OCONUS.
- Perform specific engineering analyses for blast loading.
- Provide definable, measurable solutions that master planning teams can use to program the proper construction parameters into their project.
- Review and comment on the work of others, be they another USACE district or an A-E firm.

It is best to involve the PDC as soon as you discover you are having challenges with standoff distances. The cheapest time to deal with them is when it's on paper. If you would like our help, please contact the PDC. Please note, the PDC is a fully cost-reimbursable organization.

POINTS OF CONTACT

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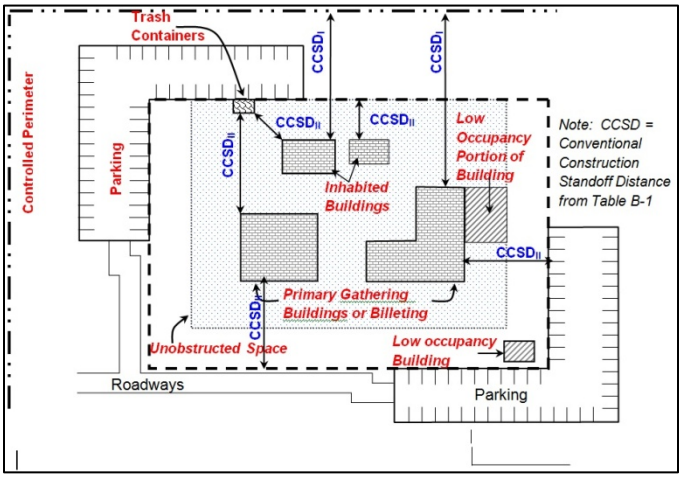
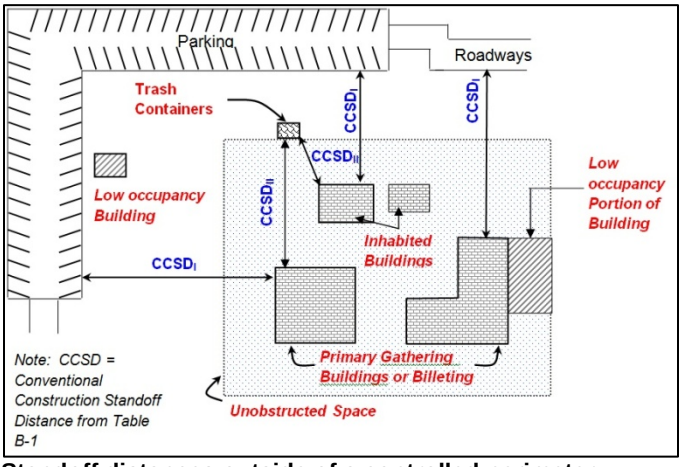


Standoff distances within a controlled perimeter.



Standoff distances outside of a controlled perimeter.

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