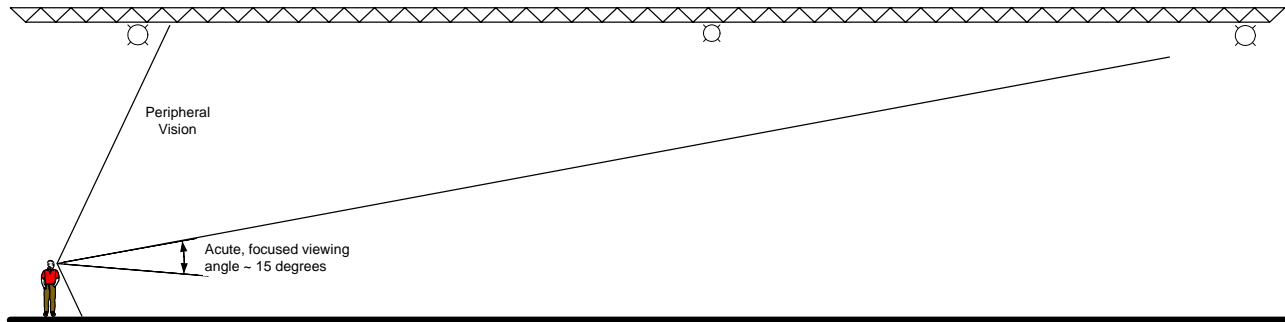


## Proposal for Research on Direct Visual Signaling as a Means for Occupant Notification in Large Spaces

The current requirements for visible signaling in NFPA 72, the *National Fire Alarm Code*, are based on occupants being alerted by indirect signaling effects. That is, they are alerted by the illumination of their surroundings, not by direct viewing of the signaling appliance. The testing that led to the prescriptive requirements was limited to classroom and office type spaces. The methodology was never tested in large, well lit spaces such as warehouses, large “super stores”, etc. Nevertheless, because strobes are required by other codes in these spaces, NFPA 72 is being enforced despite the lack of any technical foundation. The Annex of NFPA 72 explicitly states that there may be more efficient methods of visible signaling in large spaces such as warehouses and distribution centers.

NFPA 72 now permits a performance based design approach that actually exceeds the prescriptive requirements for visible signaling. Ad hoc testing in a large home supply store has shown that such an approach works, but not for the same reasons that it works in smaller spaces. Tests of a system in a large warehouse/super store designed using the prescriptive approach of NFPA 72, 7.5.4.3 (2002 ed.) showed that high ambient light levels resulted in little or no indirect signaling effect. The signal-to-noise ratio produced by the operating strobes was too low. However, with strobes located over the aisles or unobstructed by stock, direct signaling was achieved. This occurred even when occupants did not look up towards the ceiling mounted strobes due to the extended cone of vision as shown in the following figure:



Because of the size of the space, typically two or three strobes are visible in the sight line. The only exception would be when a person is standing right in the corner of the building where only a strobe directly overhead and slightly forward would be visible. The concept of direct signaling in aisled spaces is logical and should work for large aisled stores. However, there are many variables that have not been tested.

A two-phased research initiative is proposed. This proposal is only for Phase 1. In Phase 1, testing will be done in large warehouse stores to test the hypothesis that the current performance based approach provides sufficient direct alerting of occupants. The goal of Phase 1 is to draft material for inclusion in the Annex of the 2006 edition of NFPA 72. Phase 2 will extend testing to other large spaces such as malls and atria. One goal of Phase 2 is to test the method in more challenging visual environments. A second goal is to gather sufficient data to permit drafting of code text permitting or limiting the performance based approach as an acceptable method of occupant notification.

Robert Schifiliti, P.E., current member and past chair of the technical committee on Notification Appliances of NFPA 72 will lead the project and participate in the testing and drafting of the report and comments to NFPA 72.

## **Phase 1: Large Store Testing**

**Test Hypothesis:** The performance based requirements for indirect visible signaling in NFPA 72 are affective in large spaces because they provide direct signaling to the occupants.

Testing will be done in at least four large warehouse type stores. Home Depot and Lowes have indicated a willingness to participate by using their stores for testing. The project will also use hearing impaired persons among the test subjects. Testing will be done with audible signaling turned off. However, the use of hearing impaired persons is desirable to understand the effects of their heightened sensitivity on visible signaling methods.

**Schedule:** Four test series will be done in different locations in late July and August of 2005. Locations will vary based on the availability of stores with systems designed using the current NFPA criteria. A draft report will be issued by October 21, 2005 for consideration by the NFPA 72 Notification Appliances Committee during their meeting October 24 through 26 and for review by the Project Technical Panel. A final report will be issued by November 21.