

“MAYDAY” - Low on air in a big building **Rapid Intervention with a drawing** by *Larry L. Pierson*

As during any firefighter's career, a few stresses come with the job. Early in my career, a few of the facilities in our district helped create a mixed bag of scenarios, each with a mixed bag of threats to my life and those who served with me. I daydreamed of being lost in one of the large buildings, becoming low on air, not being able to tell command where I am and not making it out. After being promoted to a Lt, I worried about not getting my crew out. Now I worry about the frustration of being in the Operations Chief or IC position and not having the information or modern tools to prevent or effectively deal with a lost or trapped firefighter. Rapid Intervention training & implementation has been a blessing yet not as wide spread and fully integrated as we hoped and still remains more of a reactive measure, not proactive. So what can we do that's proactive?

Basics of Preplanning

The process has several names such as Preplanning, Pre-Incident surveys, Site Surveys etc. but they all have one main purpose, gather information, train on it and have it available during incidents. Information stored on a shelf, locked in a box or in a vehicle that isn't accessible when needed isn't much good to our lost and trapped firefighter & crew. The existence of a plan does not help, the distribution and orientation to it does.

Inspections have mitigated countless hazards to facilities and improved life safety issues for workers and civilians all across our region. Often not appreciated enough, these Inspectors may provide a planner with valuable information or it may be performed in conjunction with the inspection process. Either way, assure each function has fluid communication with the other.

Simple items such as name of business, address, contact numbers, occupancy hours etc. are all basic information that should be contained on a preplan. Hydrant locations, PIVs, FDCs, standpipes and other water supply issues should be noted and drawn. Building construction features should be noted, hazardous materials identified, and information on ventilation concerns addressed.



Fig 1 - Note the large framed aerial photo representing 1 million Sq Ft of a textile facility and being used at a command post. Along with paper maps, these tools help bring perspective to large facilities. Photo by Andy Henderson, Beacon Manufacturing Fire in Swannanoa, 2003

There are several more issues the basic plan should entail but what we are going to focus on most in this article are the quality, some special FF survival details and distribution of our facility drawings.

What kind of drawings?

We can go from the most basic; pencil, paper & ruler, to some of the most advanced; CAD (Computer Aided Design) and other software that can produce VRML (Virtual Reality Modeling Language) files which are used in virtual environments and video gaming software. These types of files may be the future basis for HUD (Heads Up Displays) which can be integrated with a firefighters SCBA mask. The pencil & paper drawings are cheap if budgeting is a high concern but you can still produce some spectacular drawings for almost free and still include efforts that can increase survivability on the fireground.

Software that's out there

There are several programs available for use. Some conveniently packaged software may include a drawing program along with NIFRS reporting, personnel tracking, training and other

uses. No one drawing program works well for every department and you don't necessarily need "Fire Department software" to produce the drawings needed. FD specific drawing programs usually have symbols, objects, terminology and other items that FD users will find quite useful. Non FD software will lack the symbols and other items but may have an outlet to create your own and contain some tools that allow more creative output for the right user.

One of the features that has come in quite handy is the ability to import & export .dwg & .dxf files. These are file formats commonly used by architects, engineers and other professionals and you may be able to receive a file from new or old construction, import it, save a lot of grunt work and start with a high level of accuracy.

Software can range from \$49.95 to 3 or \$4,000 and so swings the range of user training required and the quality of the end product. Just remember that the price doesn't always indicate quality or lack thereof. The software that the following graphics are produced from and that we use is from Punch Pro, Architectural Series 4000, available at www.punchsoftware.com

Like the software mentioned above, many programs are primarily targeted to home design. This actually becomes a bonus when you can have a prospective drawer draw their own home, renovation plans and other projects useful to them and the experience becomes knowledge to work the program for a detailed fire preplan.

Preparing for the field drawing

There are a few resources that can help start the drawing before you ever visit the property. Having a good start can save time, increase accuracy and reduce the number of visits needed to complete the drawing. As part of gathering all the information for a preplan, an owner/occupant should be contacted, time scheduled and any effort to build a good relationship with each business. If a team concept is used, have a meeting, go over material and plan for the visit. (Fig 2)

One secret to not consuming too much time is do what work you can before you go. If it is an older business, check and see if you already have a drawing that needs updated or converted from paper/pencil to CAD.

Some type of database management system or list should be used to assist knowing when drawings and plans are due. This can maximize part of your FD rating. Maximum points are acquired for updating preplans every 6 months but it may be difficult depending on the number of facilities and the number of staff assigned. Our fire crews that operate in the facility deserve real updated plans not just changed dates so maintain focus on our survival, not the points. You usually won't see major changes to a facility, so once the drawing is done the first time, the next visit will be much quicker.

Resources to begin the drawing

Some Counties, municipalities & government agencies have given us some invaluable tools to begin preplanning with. Your area may have a GIS (*Geographic Information Systems*) department which can provide aerial, satellite or other imagery from above and include layers to show multiple types of information. Since we are mainly concerned with larger facilities in this article, zooming in to a grocery store (Fig 3) area shows a great image to save and edit for a site plan.

Using this aerial photo, you can sketch a well proportioned building, mark special features such as air conditioners on the roof, skylights, roof structures and other important features. Once we move on to detailed and measured interior features, the matched

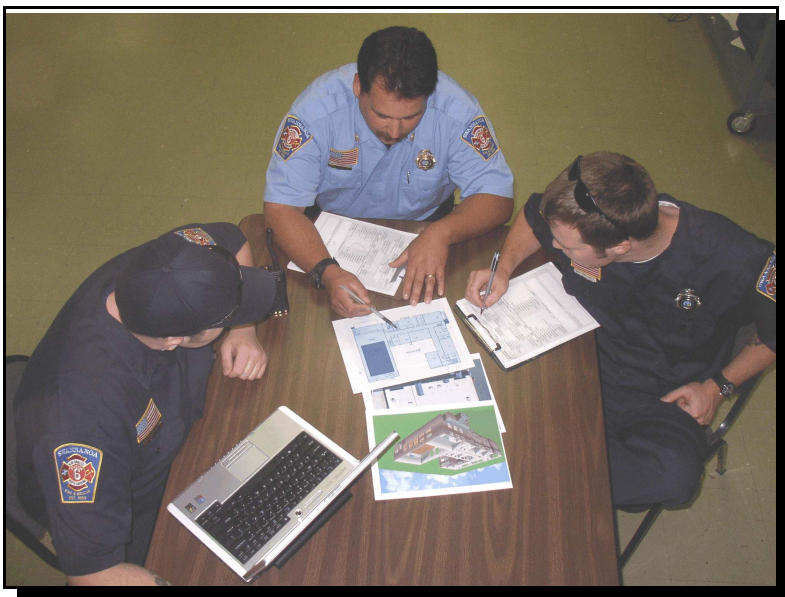


Fig 2 - FF Darren Graves, Asst Chief Dennis Gregory and FF Matt Balance meet to plan a preplanning update trip.

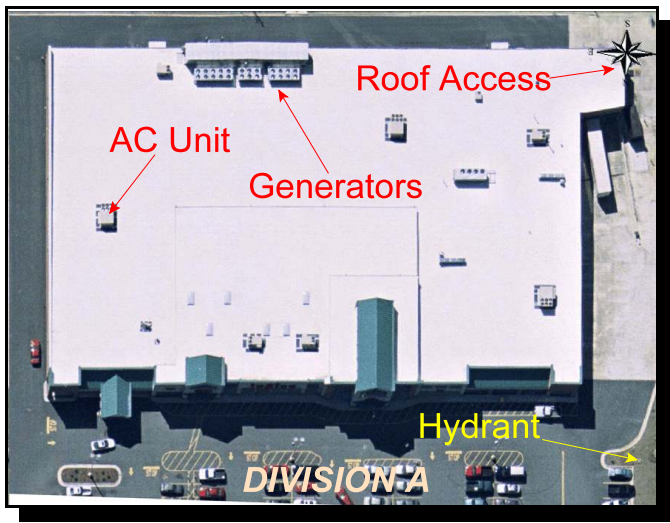


Fig 3

layers could be very valuable for ventilation crews. Such a drawing can be applied to the background of some CAD programs giving you an easy starting point, especially if the GIS service provides measuring tools. Print out what you have made so far and take it to the field to your scheduled appointment.

Conducting the field drawing

Some people have an almost uncanny accuracy for distances and proportions but either way, these aerial photos and other images will help tremendously. The field sketch may look proportioned but when you get to the interior you



Fig 4 - FF Balance records and sketches as Chief Gregory measures. Teamwork helps speed up the process.

will run out of room, things will get out of proportion and begin to look like a 1st grade “Thank you for showing us a fire escape plan” drawing even though those make us smile as much as anything. You should start the drawing and measure from a single point, use a wheel measure (*Fig 4*) or laser (if you can afford one) and go from point to point on the exterior. If you measured correctly your exterior walls will connect back together when transferred to CAD. With large facilities it may pay to draw what you have at this point, print it and bring that back before beginning your interior.

On the point of firefighter survival, note and measure doors, windows and even vents to the exterior. Even the vents are potential firefighter rescue points when you can direct them to the opening.

A Marking system that saves lives

Not only for survival, the following ideas and systems can enhance your communication between Division 1 (Interior 1st floor NIMS) and command or the Operations Chief. These systems are based on an identified and marked grid or location system that is visible on all maps. These ID points can be used to help direct crews to a location to perform a task or can be used to communicate a crew’s location to command, to an exit or to help a Rapid Intervention Team find the crew in need of rescue.

These markings are physical and therefore need an agreement and cooperation with the facility at hand. We may be lucky enough to have a maintenance department at the facility to paint or mark the locations. If we are really lucky, reflective lettering can be employed. Imagine a firefighter and crew crawling low in heavy smoke conditions, becoming lost and shining a flashlight and easily seeing a location marker. They radio the ID to Operations or Command and receive detailed directions to the nearest exit or they refer to their own map and find their way out..... that is thinking survival.

In the Grocery store

We mostly know where the vegetables, milk, bread, pencils, pork chops, rentals DVDs, frozen pizzas and other shopping needs are located but as a firefighter, is it second nature? Each of us have a deeper responsibility to soak in our surroundings when entering any facility.

With grocery stores, we are already blessed with numbered aisles and some familiarity from being a patron. So what happens when we are crawling through smoke in these aisles? Aisles can be marked with their usual numbers and add on some type of distance marker within that aisle and left or right side.



Fig 5 - Markings in grocery store aisles, customers don't notice but a crawling firefighter does.

As shown in (Fig 5), the ID marking is not visible to the everyday customer but remains a life saving point for an emergency operation in low visibility.

The industrial & steel facilities

Like several districts across our region, we still have some industrial & textile facilities left. Trade agreements have pushed out textile industry into a downward spiral leaving us with more and more vacant facilities. They usually entail large square footage areas which translates into a lot of area to get lost in. Some buildings cover so much ground that it can even be easy to get lost when responding to a medical call and wondering which way is out.

The Grid System

Steel columns used for roof support are usually evenly spaced and in some facilities, already lay down a well organized grid pattern. An ID & marking system can be employed and applied to each column in the facility which will help anyone identify their location on the map. (Fig 6 & 7) Your department created system becomes a latitude and longitude type coordinate in the facility.

Use any system you want but keep it consistent from facility to facility. If the facility

has several sections or buildings under one roof, assign a section ID. Next assign rows based on front to back (Division A to C) and then columns left to right (Division B to D). Alternate number and letter designators, place them at waist height on the Division A side of the pole. Placing the ID on the "A" side of the pole always lets the FF know which Division is which way. Paint or scotchlite can be used and if a good relationship has been built with the occupants, it may become a quick assignment to their own maintenance department.

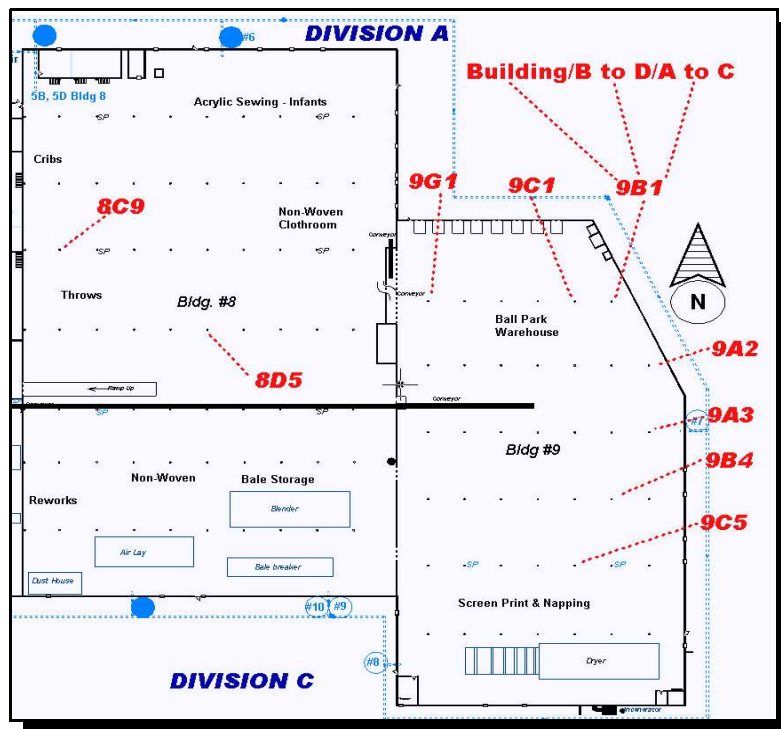


Fig 6 - 2D CAD drawing showing steel columns and ID system.

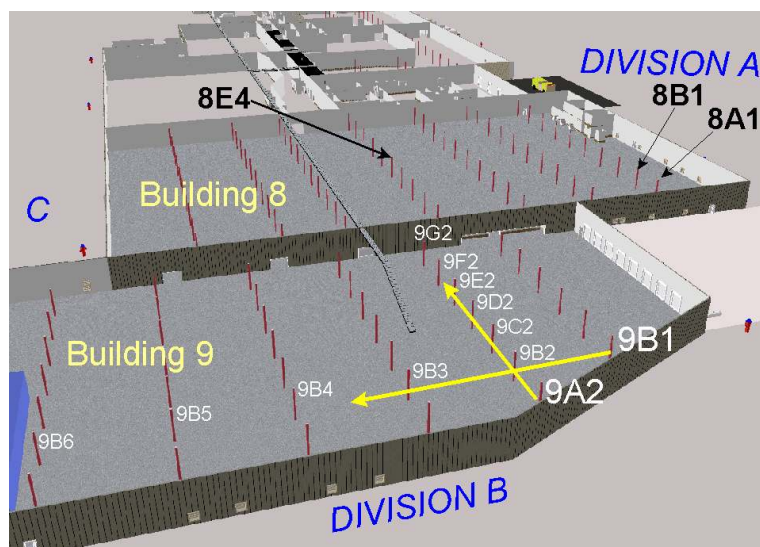


Fig 7 - 3D from the same file.

Other ideas for location markers

Textile facilities will have some areas that contain looms or multiple pieces of the same type machinery. These machines may already have a numbering system for maintenance purposes and could be documented on your drawing. Standpipe ID numbers, markings along walls, numbered garage doors at a dock and regular doors with some ID on them are all information that should be on the drawing.

Distribution of the drawings

Plans in paper format or laptops should at least be on first due engines and command vehicles. Laptops are great to be able to use the 3D walkthrough and easy access to info while enroute but have a backup. Computers fail and if you solely rely on the system, it may come back to haunt you at the wrong time.

Make copies or provide materials for Training Officers, shift supervisors or other personnel so they can be notified of changes. If your using CAD, it can be as easy as e-mailing the updated file. The occupants of the facility you drew may want a copy to use for escape plans and other issues. This will help continue to build a good relationship.

With large facilities, you should have several laminated copies available that can be handed to crew leaders, division supervisors and especially to mutual aid companies who are not familiar with your building.

Table top towns

One of really neat features of some CAD programs is the ability to produce templates that help you construct the facility to scale out of whatever material you choose. Select HO scale from the menu, print the templates, build it and

then go to your local hobby shop and all of the HO scale power poles, cars, railroad track and other items are ready to help you build truly unique table top strategy & tactic sessions.

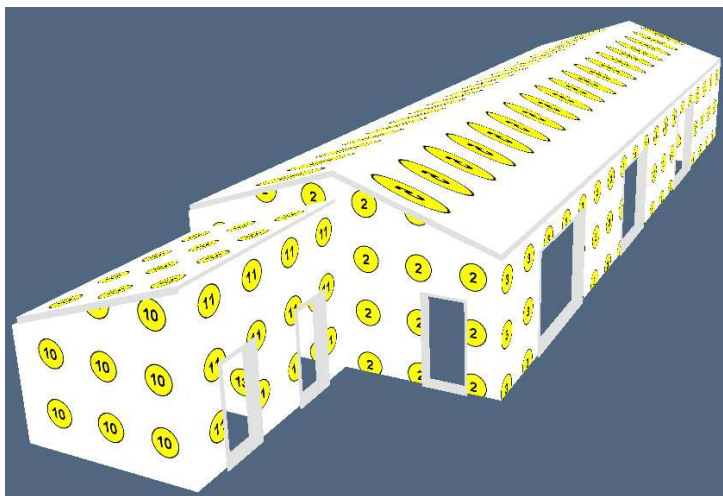


Fig 8 - CAD produced view of numbered walls and openings.

When printed, each number wall is placed over material, cut and then build your building.

Summary

The most basic importance was to actually have a drawing for each facility. There is software available at reasonable prices that can greatly enhance your preplanning program. Regardless of the type of system used, have some marking system in these large facilities and assure they match with your maps. Train on your preplans and the drawings, conduct field tours and maintain a steady flow of and access to the information. Without a doubt, these simple methods will save some of our lives and we deserve to have the best tools available when it's our time to call "Mayday".



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