

# Disaster Communications Issues

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This document is designed to be an overview of various forms of communications that may be used at a disaster scene and service centers. There are many options that can be implemented to supplement and cover communication solutions. The largest concern with communications is knowing the type of disaster you are dealing with, and how it effects communications. For example, a destructive disaster (such as a tornado, earthquake, fire, ice or a flood to just name a few) that physically destroys property will have the largest effect on “wired” technologies. Below are some general thoughts on common technology and issues that are used in communications. Please note that I have tried to think of many common or typical issues, but I am sure I have missed at least a few, so if you think of one please let me know so I can add it accordingly.

## Phone Systems

Phone Systems are the most common and readily available form of communications. Since birth we are taught how to use a phone from that first call to grandma and grandpa, to how to dial 911. Phones are therefore more natural than any other form of communications to the average person in the USA. There are 4 general types communications that come to mind when we think of Phone Service: the basic telephone, wireless phones, pagers and fax machines. Phone service can be disrupted by Power Failures and can be literally cut by humans or the weather. Phone systems are designed around only about 40% of all users actually picking up the phone at the same time. It can therefore be easily over loaded. Additionally phone systems are an expense to someone just to use them.

1. Telephone – this includes the simple single line phone and the multi-line fancy phones will all kinds of bells and whistles.
  - 1.1. Pros:
    - 1.1.1. Number can be published in advance.
    - 1.1.2. When the phone rings you know someone is trying to reach you.
  - 1.2. Cons:
    - 1.2.1. A phone line can only handle one message at a time. While you are dealing with finding information, that person is on hold and the line is tied up.
    - 1.2.2. Verbal – you either have to have an excellent memory or write down the message.
    - 1.2.3. Operators need to be trained on how to use phones with any features.
    - 1.2.4. The ability to transfer calls to the correct people, if you have large environment it is a must. People will call the wrong numbers to try to get information.
    - 1.2.5. Limited reach – you can only go as far as your phone cord.
    - 1.2.6. Many phone systems in businesses (those with multi-line sets) revolve around a switch in the building, this switch requires power. Therefore, if the power goes in the local building, then the phones go too.

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2. Wireless Phones – This includes the 49MHz, 900MHz and other types of cordless phones that you think of around your house. For the purposes of this document, this also includes Cell Phones. While they may seem completely different technologies they revolve around the basic concept of wireless technology. A portable Transmitter-Receiver (transceiver) and a base or cell tower to communicate with.
  - 2.1. Pros:
    - 2.1.1. Highly mobile, can be just about any where at any time.
    - 2.1.2. Just like the phone on the desk but with out the cord.
  - 2.2. Cons:
    - 2.2.1. Just like the phone on the desk, one message at a time and verbal.
    - 2.2.2. Relies on a base station that has power to be up and running. Along with active telephone lines.
    - 2.2.3. Phones get shut off.
    - 2.2.4. They use batteries, usually specialized batteries that are not easily available and generally cannot be pre-charged. What really counts in a disaster is your talk time not your standby time.
    - 2.2.5. See "Wireless Technology" for an overview of other issues.
3. Pagers – These are simple wireless receivers that get the message to the holder.
  - 3.1. Pros:
    - 3.1.1. Highly mobile.
  - 3.2. Cons:
    - 3.2.1. Relies on a base station that has power up and running. Along with active telephone lines and active paging system to send the message.
    - 3.2.2. Coded messages are good but they have to be well documented.
    - 3.2.3. Batteries Die.
    - 3.2.4. Pagers get shut off, even by accident – really, they do.
    - 3.2.5. See "Wireless Technology" for an overview of other issues.
4. Fax Machines.
  - 4.1. Pros:
    - 4.1.1. Details of message are spelled out in black and white.
    - 4.1.2. Can transmit more information than you could write if you where trying to copy the message by hand.
  - 4.2. Cons:
    - 4.2.1. Blind – Assumes the receiver got the message.
    - 4.2.2. Need 2 machines one for inbound messages on a published number and one for outbound messages on an unpublished number.
    - 4.2.3. Sometimes the message can be distorted and unreadable so then you have to call the sender back to get it clarified or resent.
    - 4.2.4. Relies on 120VAC power.
    - 4.2.5. Can only go as far as the cord will let it go.

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5. Things to consider with Phone Systems.
  - 5.1. Is there an emergency phone that will work when the power fails?
  - 5.2. Can the number of lines and locations of the lines best serve the needs of the disaster center or shelter?
  - 5.3. Publish only a few phone numbers to the public and have some private numbers so you can get messages out.
  - 5.4. What do you do if people start calling your Fax number for information and Faxes start coming in on the regular phone lines?

## **Wireless Technology**

Wireless Technology is around us all the time. While we don't really think about it, those radio signals you hear on your car radio don't stop when you power off your car, your receiver stops playing them for you. It is always around us and used in many new ways every day. We have briefly talked about the pros and cons of Wireless Telephones in the other section but here we are going to address some of the additional tools available. But before we begin we need to talk a little about how wireless technology works and factors that can affect it.

Wireless Technology is highly complex when you get into the physics, science and electronics of how it works. But generically speaking it simply involves a transmitter at one site and a receiver at another site or sites tuned to a specific frequency. 2-way radios have the ability to be a transmitter and a receiver (transceiver) and therefore can do either operation. The radios rely on antennas that are set for the frequencies that they are going to transmit on. A properly tuned antenna gives the best results. Therefore it is necessary to have the proper equipment to correctly transmit. Location of the antenna is always important, the higher it is the better it will work is a general rule of thumb.

Radio waves are very odd things. They can bend, bounce and even penetrate objects. Long distance communications rely on the bounce of the atmosphere and earth to skip signals around the earth. Sometimes some signals can bend with the curve of the earth while others simply go out in a straight line. Things like; the weather, sunlight, sunspots and other factors can either enhance or disrupt a radio signal depending on the frequency being used. Even the lay of the land, hills, valleys and buildings can cause problems such as dead spots.

Now that you have survived this little lesson you can now hopefully understand that radio communications may work very well in some circumstances and not very well in others based on the frequencies involved. Generally they work well. However, it must be always remembered that any type of wireless system, unless it uses some form of encryption, is publicly accessible with the right equipment. Now lets talk about some types of common radio communications.

1. Business Radios – These include the radios used by the Police, Sheriff, Red Cross, Civil Defense, Ambulances and private businesses including schools, universities, plumbers and etc.
  - 1.1. Pros:
    - 1.1.1. Typically mobile
    - 1.1.2. Users of these types of radios are generally accustomed to using the radios and know the protocols and policies of using these devices.
    - 1.1.3. Multiple people can receive the message at the same time.

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- 1.2. Cons:
  - 1.2.1. Very controlled – only those that have been entrusted with a radio or have written permission can use it. The agency or business must be licensed with the FCC.
  - 1.2.2. Radios used in this service typically have a limited number of frequencies and range.
  - 1.2.3. In a disaster these agencies need to use their radios so asking to borrow them is out of the question.
  - 1.2.4. Power considerations – How long can the batteries last if it is hand held and backup power for base stations.
  - 1.2.5. Only one station can transmit at a time on the same frequency.
  - 1.2.6. Radios get turned down or powered off.
  
2. Citizen Band and Family Services radios
  - 2.1. Pros:
    - 2.1.1. Highly Mobile
    - 2.1.2. Multiple stations can receive the message at the same time if they are on the same frequency.
    - 2.1.3. Cheap
    - 2.1.4. Available to any person in the USA without needing a license.
  - 2.2. Cons:
    - 2.2.1. Available to any person in the USA without needing a license.
    - 2.2.2. Limited ranges (legally - only few miles).
    - 2.2.3. Limited number of frequencies. 40 in CB and 14 in Family Services.
    - 2.2.4. Voice Communications only.
    - 2.2.5. Power considerations – How long can the batteries last if it is hand held and backup power for base stations.
    - 2.2.6. Only one station can transmit at a time on the same frequency.
    - 2.2.7. Radios get turned down or powered off.
  
3. Amateur Radio
  - 3.1. Pros:
    - 3.1.1. Highly Mobile
    - 3.1.2. Multiple stations can receive the message at the same time if they are on the same frequency.
    - 3.1.3. Available to any USA citizen after passing an exam (3 license classes and Morse code is only required for the 2 highest classes).
    - 3.1.4. Virtually a limitless number of frequencies of operation on various bands.
    - 3.1.5. Everything from Data, Voice, Morse code, Television, satellites and more.
    - 3.1.6. Able to communicate short range and long range (around the world) either directly or through relaying stations.
    - 3.1.7. Many trained skilled communicators with their own equipment that can supplement communications needs for any agency or group. Allowing the people to do the job they need to do.
    - 3.1.8. Letters of Understandings of services that can be provided with various agencies.
    - 3.1.9. FCC may declare a communications emergency and designate frequencies for use nationally for the specific disaster or event.
    - 3.1.10. Free Volunteer Service.

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- 3.2. Cons:
  - 3.2.1. Free Volunteer Service.
  - 3.2.2. FCC Regulations do limit the types of services that can be preformed however disaster support is not one of them.
  - 3.2.3. Power considerations – How long can the batteries last if it is hand held and backup power for base stations. However many amateurs prepare for this type of operations.
  - 3.2.4. A FCC Licensed amateur operator must be present.
  - 3.2.5. Only one station can transmit at a time on the same frequency.
  - 3.2.6. Radios get turned down or powered off.
4. Things to consider with Wireless Technology:
  - 4.1. Radio Frequency Safety is a major concern. This applies to how the human body reacts to different radio frequencies at various power levels at a given distance. The effects can be very similar to microwave oven technology. Generally speaking the engineers are aware of this but others may not be. Amateur Radio operators are required by law to know and abide by various Radio Frequency Safety rules.
  - 4.2. No mater how many times you test something the variables of weather and other external factors can limit your ability communicate. A gym may be a great shelter but can a radio signal get through all the steel in the roof? How about with a foot of snow on top?
  - 4.3. Always remember you have others listening to your conversation, do not send messages that not intended for others to hear, such as the media.
  - 4.4. Tall antenna systems attract lightning.

## **Other Communication Issues**

This section is designed to catch all those things that are related to Disaster Communications but are not pure communication issues. In many cases communications would have some form of presence in these areas.

1. Runners - No matter how high tech any operation is, never under estimate the bandwidth of foot power. It is a necessary means of delivering messages, picking up supplies and simply going to check if the coffee is ready. This is especially necessary in a large setup.
2. Internet
  - 2.1. Has the ability to instantly post messages and updates to web pages.
  - 2.2. Carefully monitor what is posted on the site. The wrong information or picture could suddenly cause real problems.
  - 2.3. Requires 2 basic utilities to function, telephones and power on site and an active web server. Without these elements, it is useless.
3. Speech
  - 3.1. Use plain English – Your set of acronyms may not mean the same thing to me or someone else. Avoid acronyms in a large multi-agency event, for that mater generally.
  - 3.2. If you are using a communications system that requires codes like 10-4 then learn to use them but if in doubt always go back to plan English.

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4. Media
  - 4.1. They are our friends. They can quickly get the word out on radios and televisions that something is going on and where people need to go or call.
  - 4.2. Never openly speculate or guess when talking to media. This can only cause rumors and maybe even panic. Tell them what you do know or are allowed to tell.
  - 4.3. Written statements take time, however you know that right message gets out.
  - 4.4. Monitor media reports and statements and send out corrections if necessary.
  - 4.5. Don't let the media harass you or butt in, create "no media zones".
5. Utilities
  - 5.1. Telephones, power, gas, water or sewage etc – does your site have the necessary resources to stay open if one or more of these stops?
  - 5.2. How can you supplement them?
  - 5.3. What if it is January, how do you heat the building or cool it in July? Just because the Gas is still on doesn't mean that there is electricity to run the blowers.
6. Logistics
  - 6.1. How do we get people from a to b? Where are our supplies?
  - 6.2. How do we know where everyone one is? Head count or roll call? Did that group go to c?
7. Public Address system - Is a public address system needed to direct volunteers, victims and to page staff?
8. Joint Information Center
  - 8.1. The Joint Information Center concept is to provide a central location that disseminates information in timely and collaborative method to the public.
  - 8.2. This would be the place for the Media to get their information from.
  - 8.3. It does not have to be at the site of the disaster.
  - 8.4. Collaborative in that all agencies working a disaster have a representative receiving their information and telling the other agencies that information. This provides a means to produce statements to the public and media that sound concise and show that we are working together.
  - 8.5. Jobs are assigned to various people; media relations, media monitoring, public telephone support, internet postings, chronographer to record the events, office manager to handle copies and faxes, and a manager to coordinate it all.
9. Avoid having all your "eggs" in one basket or "Murphy was an optimist." No matter how well you think you are prepared, stop and look at the setup and ask what other factors could not let us respond to this emergency. If all your equipment is stored in one location, your plans will work as long as that one location is not the epicenter.