

COMMUNICATIONS FAILURES IN DISASTERS

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Communications Failure is a universal and inevitable characteristic of disasters. But many emergency responders and communications specialists fail to understand the types of communications failures and the implications for the response.

DEFINITIONS

Some informal definitions might assist in understanding the examples below:

Mode – the type of communications system being used. This includes data, internet, phone, satellite phone, television and amateur radio. But it also includes ANY way of communicating, such as face-to-face, American Sign Language, morse code, smoke signals, semaphore, tapping and blinking.

Information – the content or the message.

Communications – a TWO way use of the mode. One way use of a mode, like AM/FM radio to broadcast an emergency alert, simply conveys the information. But there is no way to verify, question, alter, or return information. AM/FM radio is simply a mode to convey information, but when you have a talk-back radio show, you have communication.

The main CATEGORIES of communications failures are outlined below. Within each category, there are multiple TYPES of failure.

1. MODE FAILURE

Commonly seen in disasters, mode failure occurs when the disaster destroys, damages or impacts the mode itself. A cell tower knocked down by the wind or burned by the wildfire or unable to operate because the power has been cut is a mode failure. Alternate modes are commonly relied on to work around this situation; satellite phones, amateur radio. As the situation becomes more dire, multiple modes will be used, including runners with hand-written messages.

2. MODE IMPAIRMENT

The mode is working, but is unable to convey the desired information to the location or speed required. The mode does not have the surge capacity required, is not designed to handle emergency communications or cannot reach the locations required.

Examples of mode impairment include

- cell phone towers being overwhelmed by the number of callers attempting to make a connection.
- Amateur radio trying to send more than ten formal messages an hour.
- One phone or one satellite phone in an Emergency Operations Centre when the land-lines go out.
- Information received, but not in time to make a critical decision.
- Mode doesn't reach the required location, such as a staging area or Incident Command Post
- Mode does reach the required location, but the person is not there.
- Mode reaches the person, but they are not at the required location. For example, phoning the Incident Commander on their cell phone, only to find they are sleeping at the hotel after a 20 hour shift.
- Police encrypt radios for security, but nobody can hear their Mayday message.
- Mode can't bridge – commercial radios can't be programmed for ham frequencies, amateur radio can't reach FRS/GRS radios, FRS can't talk to CB radios.
- Over-sending information. "We are literally having to use four to five radios, the telephone system and a cell phone system, and we still can't talk to some officers on detail..." said during a tornado response. Like the office phone call to follow up on the email to confirm the fax detailing the phone answering machine message, over-sending the same information five or ten times simply clogs the system. Only one message will be communication, the rest is redundancy and waste. Unfortunately, you won't know which of the ten messages was the communications and which were going to be waste.
- Too much noise for a person to hear the radio. Riots, rock concerts, noisy EOCs, multiple radios blaring, generators or other noise may overwhelm the mode or the operator.

3. INFORMATION ERRORS

In these cases, the mode was working, but the content of the message was incorrect

- Wrong location (common with 911 calls)
- Wrong situation (much worse or much better than was actually the case)
- Logistical mistakes (wrong size, wrong part number, wrong description, wrong delivery location)

4. RECEIVER SET ERRORS

The receiver makes an error because the receiver has two ears and one brain. Okay, these are human errors. The mode is intact, the mode made the connection (whether fast or slow), the information was accurate, but the person receiving the information didn't process it properly. Examples include:

- What you said isn't what I heard.
- Received the information, but didn't pass it onto others (extremely common).
- Passed the information on, but omitted key parts
- Didn't understand what was critical and what was routine. Priority not recognized or wrong priority assigned.
- Unable to write the information down fast enough and some is lost.
- Got the information down, but didn't act on it.
- Got the information down, but acted on it improperly or inefficiently
- Listening on a different frequency and did not receive the information
- Listening on a multiple modes or using multiple modes; posting on Twitter, but missing Facebook. Post on Facebook, but missed town website. Post on town website, but missed ARES website. Posted on ARES website, but missed the net control. Told Net Control, but missed officer on Satellite phone. Etc.
- Got the information, but didn't have time to action it before it was out-of-date.
- Gave the information to the wrong person.
- Used wrong terminology (looking for "communications person"; information officer versus radio operator)
- Deliberate exaggeration or under-playing of the situation; twitter
- Operator didn't turn radio on upon arrival at the location (ie arrive at EOC but not turning on the radio immediately. Ten minutes later, after sign-in and briefing, was too late for a critical message.
- Operator not monitoring the frequency
- Operator unable to operate the radio due to unfamiliarity.
- Volume turned down
- Operator on wrong frequency
- Fear of using the mode; quite often, satellite phones are not tested due to cost and people are told not to use them. In a disaster, that results in failure to use them or hesitation to use them until it is too late.

- Operator not familiar with the equipment – failure to charge batteries, unable to set tones, unable to field program.

These are simply examples of the wide range of communications failures. Each is distinct and may require a distinct solution to rectify. However, throwing more money at a communications failure may not fix the problem, may not fix the appropriate problem or may not result in significant change to the problem.

AN INTERESTING STORY

A community received an \$18 million dollar Homeland Security grant to purchase interoperability radios for their emergency responders. The \$18M system was purchased, responders were trained, and radios allocated. When the community was destroyed by a tornado, communications failed. In the after action report, it was determined that responders continued to do what they normally do and persisted in using their cellular phones, even though the cell phone tower(s?) had been destroyed. Not one responder used the interoperability radios.

IMPLICATIONS

Amateur radio is an extremely inefficient mode for conveying information during disaster situations. It rarely has the capacity for the volume, amateur radio only reaches three or four out of the hundreds of required locations, most emergency responders are not familiar with amateur radio and don't know how, when, or where, to deploy it. In some cases, they don't know who to call or why to deploy it.

Amateur radio is only one mode and only one set of communications failures.

Probably the most important aspect of communications failures is that improving communications systems automatically will result in further communications failures. This is because most communications failures are due to the receiver set – the people.

For example, if the EOC is too noisy to hear the radio, you buy a set of headphones. But when you put on the headphones, you will have a communications failure because you could only listen to one frequency. If you buy a single earpiece, you will have communications failures because a person is unable to concentrate on listening to two things at the same time.

If you add another mode, say a CB radio or a Twitter feed, you will have communications failures because you can't concentrate on multiple modes at one time. Listening to the CB radio and amateur will result in you missing an important Twitter update. Adding a satellite phone may result in you listening for the Satellite phone, but forgetting that you put your Blackberry down.

Using one frequency for all responders invariably results in too much traffic on one frequency. Splitting the use onto command, tactical, logistics and medical frequencies will reduce the traffic on any one frequency, but will result in impairing the great advantage of a single frequency; situational awareness.

ANY improvement in information speed actually makes the situation worse in disasters; if you can't keep up with the flow of information coming into a command post or EOC, any improvement in information flow will actually make the situation worse. Receiving more information is useless if you can't digest it, sort it, prioritize it, and delegate or act upon it. In fast evolving disaster events, improved communications systems may result in increased communication failures!