TOLEDO FIRE & RESCUE DEPARTMENT

C-108 Thermal Imaging Camera

Emergency Manual

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Purpose

This guideline is created to facilitate the most effective method for deploying the thermal imaging camera (TIC) in a way that provides the most protection to Fire Department personnel and the general public.

Policy/Procedure

It shall be the policy of the Toledo Fire and Rescue Department (TFRD) to utilize the TIC in every structure fire and any other situations as identified where it will enhance the safety of department personnel and facilitate the rescue of all potential victims. Search and suppression activities should occur in compliance with the TFRD's SOPS and standard firefighting practices. The TIC should be viewed as a tool to assist in accomplishing the tactical priorities of the Department.

1. Guidelines:

1. Personnel shall become familiar with the location of the TIC on the apparatus. When the TIC is sent in with the attack crew the typical operator shall be the company officer.

2. When possible, exposures should also be scanned to determine thermal load and probability of risk to adjacent structures.

3. Once the Incident Commander or officer of the engine has completed the above scans and a decision has been made for an aggressive interior attack the TIC shall be taken to the primary entrance for the fire attack crew.

4. Pre-flashover is where the TIC can assist us in preventing serious injury or death. However, the fact remains that the only sure-fire way to guarantee that you survive a flashover is not to be there

when it happens. You must recognize the signs of a pending flashover and then react to these signs so that you are safely out of harm’s way when the flashover occurs.

5. The TIC cannot predict a flashover. It will not tell you or alert you that a flashover is pending; however, it can give you a visual indication of warning signs you would otherwise not see without a TIC, thick smoke acts as an effective visual barrier to what is going on at the ceiling. Convective velocity, thermal layering and even rollovers are often hidden inside the smoke and are difficult or impossible to detect. The TIC has no problem visualizing these events. With the TIC, you can often get a good read of the fire and gas flow path.

6. Whenever possible, the TIC should go in with the attack crew when making entry to the fire structure. The safest and most efficient operation of the TIC occurs when its operator’s view is not obscured by other firefighters. Camera operators must be aware that they tend to move faster than the rest of the team who are possibly operating in zero visibility.

7. In moderate to heavy smoke conditions, the TIC allows the crew to quickly check a smoke filled area to determine whether or not there is fire present. Firefighters should remember that they must stay low even if the majority of the heat is at the ceiling. The possibility of a flashover in the dynamic atmosphere of a structure fire is higher than ever before because of new materials, construction methods and rapid responses the TIC has the potential to greatly speed the fire scene primary search operations. It is essential the primary search be carried out as quickly and thoroughly as possible.

8. Firefighters inside the structure, whether they are using the TIC to assist in fire attack or primary search, must remember not to become overconfident because this tool allows them to see in virtual zero visibility.

9. The Rapid Intervention Team (RIT) shall have a TIC in their equipment cache.

10. The TIC shall be used before and after knockdown to check for fire extension. The imager shall be taken throughout the complete structure to check for extension.

11. The TIC shall also be used on odor investigations inside a structure.

2. TIC Uses:

1. Provides safer navigation in a space where there is zero visibility due to smoke.

2. Allows personnel to 'see“ in a zero visibility environment, which is a very useful addition to traditional search and rescue techniques. The time necessary for completing a primary search can be cut significantly by utilizing the TIC, which is necessary when conducting a Vent enter Isolated Search (VEIS).

3. Assists suppression crews to execute a faster, more effective interior attack. The shortest route to the fire and obstacles in the structure can be determined and located efficiently.

4. Reduces fatigue of interior crews because efficiency in performing searches and suppression is increased.

5. Assists Rapid Intervention Teams to quickly and efficiently locate downed firefighters.

6. May be used to determine fluid level within a container or temperature differences in fluids, which may be useful during an incident involving hazardous materials.

7. May be used as a search tool to locate lost persons in open wilderness areas.

8. The TIC shall be used during overhaul operations to help ensure that the fire is extinguished and to prevent the rekindle of fire.

3. Thermal Imaging Camera Limitations:

1. The TIC allows a two-dimensional view of a smoke filled environment. Depth perception is limited. Firefighters operating the camera should remain low to the ground/floor, scanning the entire area before them. When scanning an area with the TIC begin at the floor and work their way up to the ceiling of the area immediately in front of them. Walking with the TIC is discouraged as trip hazards may be overlooked.

2. Thermal energy does not travel directly through walls. A TIC does not allow an area to be viewed, which is behind a wall. If fire is present inside a wall, the camera will only be able to ‘see’ if the fire has increased the temperature of the wall itself. Fire inside wood clad walls will be picked up much faster than fire on the other side of more significant barriers such as concrete.

3. A human being will not provide sufficient thermal energy to penetrate most standard construction materials or solid items such as furniture. Therefore, it is essential that while conducting a search, rescuers must look under/around beds, sofas, and other objects where victims may have hidden to escape fire.

4. The TIC must be used with the understanding that it is only a mechanical device and it can fail. Firefighters must plan for this possibility by carrying flashlights, maintaining contact with a wall, a hose line, or other routine methods for remaining oriented to location and the position of exits in a zero visibility environment.

5. Water, plastic and glass are all effective barriers for the TIC and may cause a reflective image. The team operating the camera must remember that the image present on the TIC’s screen could be a “mirror image” of themselves or fire behind them being reflected off of glass, plastic or water. To test suspicious images, the crew should wave their arms and determine whether they are seeing their own image.

6. Also, firefighters and occupants, who are wet from hose line operations, could be masked from the TIC’s view during a search because there is a momentary balance of thermal signatures.

7. Be aware that if the controls on the TIC are bumped the unit could become deactivated.

8. The image displayed by the TIC may decrease in quality as soot builds up on the lens and screen while operating on the fire ground. A soft cotton cloth should be used to clean the lens and screen periodically while operating the camera.

9. If the picture displayed don the screen suddenly becomes distorted, check to insure the carrying strap is not in front of the lens.

10. “White Out” is a condition caused by aiming the unit at a very hot object or flame which causes the TIC sensor to become overloaded and the display to show all white, rendering the TIC useless. To correct the problem, aim the TIC away from the extreme heat source and the display should return to normal in less than one minute, often within just a few seconds.

11. The TIC has not been determined to be intrinsically safe as an ignition source. This device is not to be used in a potentially explosive atmosphere.

12. The TIC can also serve as a tool for detecting heat during the overhaul phase of an incident. It must be remembered, however, that the TIC cannot penetrate most construction materials including drywall, plaster and lathe, concrete, glass or plastic. Also, the TIC cannot penetrate water. Due to the TIC having a black and white display, it is sometimes difficult to differentiate between what is heat or fire trapped in a wall and what is radiant heat.

13. Due to the reflective imagery of water masses, it is often hard to differentiate between a pool of water and a hole in the floor. Verify with a tool before committing yourself to stepping through it.

See Also:

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