

# The Effectiveness of Current Fire Fighter Rapid Intervention Teams

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## **Issue**

Rapid Intervention Teams (RITs) are teams of two or more fire fighters designated to be on standby at an emergency scene in the event that other fire fighters become lost, trapped or injured and need to be rescued. This project conducted trials of rescue scenarios with two and four person RITs to compare their effectiveness and explore the limitations of two person teams. The researchers recommend a number of improvements to RIT policies and practices based on the findings.

## **Key findings**

- The results showed that two person RITs have significant limitations. They are significantly slower than four person RITs and are potentially unable to complete some rescue scenarios or to complete them safely.
- Other findings included the importance of regular RIT training for fire fighters, the need for assigned team member roles (team leader, air management and rescuers) and suggested changes to air supply policies to ensure adequate air supply for fire fighter victims and rescuers.
- The recommendations have been incorporated into RIT training offered by the Justice Institute of B.C.

## **Objectives**

- To evaluate the effectiveness of current RIT procedures
- To provide practical recommendations that fire departments can use to improve current RIT policies and practices

## **Methods**

The study measured response times for various rescue scenarios for two person RITs and four person RITs. The simulations were performed by 80 student fire fighters at the Justice Institute of B.C.'s Fire and Safety Training Centre in Maple Ridge and 80 career fire fighters in Port Coquitlam, B.C. and Grande Prairie, Alberta. The rescue scenarios included rescuing one fire fighter 10 feet off a 50 foot hoseline, rescuing two fire fighters 100 feet inside a building, bringing one fire fighter up a flight of stairs and rescuing a fire fighter through a window. All participants received training before conducting the rescues.

The total rescue time was measured for each rescue scenario conducted, as were the individual tasks involved (locating the victim, packaging the victim, and removing the victim from the building). The average times were calculated and statistical analyses were conducted to assess whether there were statistically significant differences in the time required for the two person RITs and the four person RITs.

The researchers also made observations about the challenges experienced during the rescue exercises. The recommendations developed were also informed by a comprehensive literature review.

## Results

The average times for the rescue scenarios are listed below:

- Rescuing a fire fighter located 10 feet away from the nozzle of a hoseline 50 feet inside a building took 11.6 minutes for two person RITs.
- Rescuing two fire fighters from 100 feet inside a building took 16.7 minutes for a four person RIT, and 22 minutes for the same scenario conducted by RITs that started off with two people and requested two additional team members after locating the victims.
- Bringing an unconscious fire fighter up a flight of stairs took 1.7 minutes for a two person RIT.
- Lifting an unconscious fire fighter through a window took 4.6 minutes for a four person RIT and 6.7 minutes for a two person RIT.

Statistical analysis showed that the average rescue times for some of the scenarios were significantly faster for four person RITs:

- Teams starting off with four members were able to rescue two fire fighters from 100 feet inside a building 5 minutes faster than teams that started off with two members and requested two additional people after locating the victims.
- The average time to lift an unconscious fire fighter through a window was significantly faster for a four person RIT (4.6 minutes) than for a two person RIT (6.7 minutes).

Other observations were also made during the scenarios:

- Two of the two person RITs were not able to perform the window rescue scenario.
- It is very difficult for two person RITs to locate, package and remove a victim safely while maintaining the victim's critical air supply and effective fire ground communications.
- RITs were more effective when team members were assigned specific areas of responsibility (team leader, air management, rescuers). RITs without a dedicated air management position were more likely to disrupt and not replace the victim's air supply.
- Participants often noted that the rescues took longer and were more physically demanding than anticipated, and that they benefited from the RIT training received.
- The low air alarm was commonly activated between 10 and 15 minutes into the rescue when fire fighters used 1200L cylinders.

The researchers also note that the average rescue times in the study are likely shorter than in real emergency situations because the scenarios were performed under ideal conditions (e.g., fire fighters were rested, training was received beforehand, there were no obstacles to entering the building).

## Conclusions

Based on the findings, the researchers recommend the following changes to RIT policies and practices (which are discussed in more detail in the full report):

1. Fire service organizations should be aware of the limitations of two person RITs including their slower speed compared to four person RITs and the difficulties they may experience performing rescues.
2. During a fire attack the initial RIT team should consist of at least two members, which should be immediately increased to four members if a rescue is required, with further additional resources

allocated as needed if the incident escalates. RITs should develop a Rescue Action Plan and take other proactive measures.

3. RIT members should be assigned specific areas of responsibility:

1. *Team Leader* – to make decisions, order additional equipment, and to maintain a reliable communication link with Incident Command.
2. *Air Management Position* – responsible for monitoring and maintaining the victim fire fighter(s) air supply.
3. *Rescuers (2)* – responsible for packaging and assisting with removal of the injured fire fighter(s).

A two person RIT team should have a team leader and an air management position. The two person team can then request additional rescuers when required.

4. Fire service organizations should consider using 1800L (45 min.) air cylinders as a minimum cylinder size for interior entry operations that are considered to be immediately dangerous to life and health (IDLH). Commonly used 1200L (30 min.) cylinders may not allow enough air supply for the victim fire fighter or the rescue team members.
5. Fire service organizations should consider adopting policies requiring fire fighters to exit the IDLH atmosphere *prior* to consuming their emergency reserve air supply (last 25% of SCBA cylinder).
6. Fire Service Organizations should conduct RIT training at least annually, with a focus on both theory and practical hands-on drills as part of fire fighter job performance requirements.

## Future directions

The researchers note that there is limited data available on the effectiveness of current RIT protocols, including supplied air systems and rescue tools. They recommend that future research focus on the effectiveness of specific rescue techniques and tools, the effectiveness of three person RITs and five person RITs and the optimal frequency of RIT training.

## Publications and Presentations

The recommendations from this study have been incorporated into the RIT training program that is offered throughout B.C. by the Justice Institute.

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