Firefighter Rehab: An Introduction to NFPA 1584

Establishing a Firefighter Rehabilitation Policy
Overview

This program is designed to accompany the textbook:

Rehabilitation and Medical Monitoring: An Introduction to NFPA 1584 (2008 Standards).
Overview

☆ This program was developed through the EMS Section of the International Association of Fire Chiefs (IAFC).

☆ The IAFC is not responsible for the selection of the authors nor the views and opinions expressed by the authors.
Authors

- James Augustine, MD, FACEP
- Bryan Bledsoe, DO, FACEP, EMT-P
- Dale Carrison, DO, MS, FACEP, FACOEP
- Robert Donovan, MD, FACEP
- Jeffry Lindsey, PhD, EMT-P, CFO, EFO
- Mike McEvoy, PhD, RN, REMT-P, CCRN
- Brandon Johnson, FF/NREMT-P
INTRODUCTION

FIREFIGHTER REHAB
Firefighter Rehabilitation

NFPA 1584 Recommended Practices on the Rehabilitation of Members Operating at an Incident Scene Operations and Training Exercises was published in January of 2003.
Firefighter Rehabilitation

NFPA 1583 (2003) recommended:

- Firefighter rehab be an organized system at incident scene operations and training exercises.
- Firefighter rehab should become an integral part of the department’s safety and health program.
- Firefighter rehab be a part of the National Incident Management System (NIMS).
NFPA 1584 was revised and republished in 2008. This document elevated firefighter rehabilitation from a recommended practice to a standard.
Firefighter Rehabilitation

- Rehabilitation is now a STANDARD rather than a RECOMMENDED PRACTICE.
- Reflects the changing science.
- Terminology compatible with the NIMS.
What is the scope of NFPA 1584?

This standard establishes the minimum criteria for developing and implementing a rehabilitation process for fire department members at incident scene operations and training exercises.
What is the purpose of NFPA 1584?

This standard describes the rehabilitation process for members operating within an incident management system.
To whom does NFPA 1584 apply?

Organizations providing rescue, fire suppression, emergency medical services, hazardous materials mitigation, special operations, and other emergency services, including public, military, private, and industrial fire departments.
Firefighter Rehabilitation

To whom does NFPA 1584 NOT apply?

Industrial fire brigades that might also be known as emergency brigades, emergency response teams, fire teams, plant emergency organizations, or mine emergency response teams.
Firefighter Rehabilitation

What is firefighter rehabilitation?

An intervention designed to mitigate against the physical, physiological, and emotional stress of fire fighting in order to sustain a member’s energy, improve performance, and decrease the likelihood of on-scene injury or death.
Studies have shown that most firefighter deaths and injuries occur during the active phases of fire suppression.
Many deaths and injuries in the fire service can be prevented through utilization of the rehabilitation process.
Firefighter Rehabilitation

Rehab should be part of the NIMS for both the fire ground and training exercises.
When should rehabilitation commence?

Rehabilitation should commence anytime emergency or training operations pose the risk of department members exceeding a safe level of mental or physical endurance.
POLICY DEVELOPMENT

FIREFIGHTER REHAB
Firefighter Rehabilitation

Elements of the rehabilitation process:

1. Initiate rehab.
2. Define responsibilities.
4. Assure safety.
5. Release personnel only when safe to do so.
Firefighter Rehabilitation

Initiation

- Rehab should be initiated at by the following:
  - Request of the Incident Commander (IC).
  - Through previously established guidelines or orders.
Firefighter Rehabilitation

Responsibilities

- The responsibilities and authorities of those staffing the rehab sector must be clearly defined.
- This is especially important when non-fire department personnel are staffing the rehab sector.
Firefighter Rehabilitation

**Accountability**

- Personnel accountability is an essential task of the rehab sector.
- A system must be in place, and followed, to track personnel who enter and leave rehab.
- System must assure that personnel do not leave rehab without approval.
Safety

- Primary role of the rehab sector is to assure that personnel who rotate through are safe.
- This includes safety from:
  - Incident
  - Environment
  - Media
  - Societal threats
  - Prying eyes
Firefighter Rehabilitation

**Release**

- Personnel should only be released from rehab when the rehab staff have determined:
  - They are adequately rested.
  - They are adequately hydrated.
  - They have responded appropriately to care measures.
Release

 Personnel who seem to be taking a prolonged period of time in rehab should be further evaluated and possibly referred to the treatment sector.
Firefighter Rehabilitation

Release

The ultimate decision to allow or disallow a member to return to work is vested in the rehab sector officer through authority delegated by the IC.
Best Practices in Rehab

SMALL DEPARTMENTS

For small departments or those with scarce resources, the best practice is to develop a regional rehabilitation plan. This allows consistent performance and joint purchase of needed equipment, and safety at training operations. It also facilitates mutual aid.
Preparedness

Standard Operating Guidelines (SOGs) should address:

- Relief from climactic conditions
- Rest and recovery
- Active and/or passive cooling or warming as needed based upon the event and climate
- Rehydration

- Calorie and electrolyte replacement
- Medical monitoring
- EMS treatment in accordance with local protocols
- Member accountability
- Release
Firefighter Rehabilitation

- When limited resources strain existing personnel (as occurs early in scene operations), crews can be rotated to less demanding tasks.
- While not ideal, it will limit exertion until adequate resources arrive.
Firefighter Rehabilitation

* Each service should develop specific EMS protocols and procedures that guide both fire and non-fire personnel in evaluation and care of the ill or injured firefighter during emergency operations.
Firefighter Rehabilitation

Rehabilitation protocols are significantly different than standard EMS medical protocols.
Firefighter Rehabilitation

Rehab protocols should specify parameters detailing when to treat and when to release members.
Firefighter Rehabilitation

Firefighter fitness is an essential component of safety and essential for longevity on the job.

Fire departments should support and facilitate ongoing fitness programs.
Because of the demands of the job, all firefighters must maintain an established level of fitness and conditioning. NFPA 1583 details such standards.
Firefighter Rehabilitation

- Proper nutrition is an important and essential component of firefighter health.
- Proper nutrition begins in the station.
- Three meals should be consumed daily to avoid physiologic stress.
Unfortunately, some departments and stations still have diets high in fat content.
Firefighter Rehabilitation

- North American dietary changes over the last 50 years:
  - Increased processed foods.
  - Increased fast foods.
  - Change in carbohydrate, protein and fat dietary balance.
Firefighter Health

Because of physical and environmental demands, nutrition is particularly important for the wildland firefighter.
Wildland firefighters burn almost 5,000 calories a day (although some studies place the caloric demand at 6,000 calories for men and 5,000 calories for women). However, they typically consume about 4,000 calories a day. The differences in calories burned and calories consumed can cause weight loss. Thus, nutrition is a major concern and must be addressed proactively.
PRE-INCIDENT PREPARATION

FIREFIGHTER REHAB
Firefighter Rehabilitation

All personnel must understand:
- How the body regulates core temperature
- Heat stress
- Cold stress
Firefighter Rehabilitation

Because of the known occupational stresses, firefighters should prepare for events that may be physically demanding.

Fundamental tenets include:

- Maintaining hydration
- Assuring adequate nutrition and diet
Some medications and substances can increase fluid loss. The effects can vary.

Substances Causing Fluid Loss

- Diuretics
- Blood pressure medications
- Phenytoin (Dilantin)
- Lithium (Lithobid)
- Alcohol
- Caffeine
- Laxatives
- Theophylline
- Green tea
Firefighter Rehabilitation

Prehydration should be considered based upon expected activity and environmental factors.
Firefighter Rehabilitation

- **Prehydration:**
  - Generally, 500 mL (16 ounces) of fluids within 2 hours immediately prior to the event.
  - Water is initially adequate and can quench thirst, but does not provide electrolytes and carbohydrates.
  - Sports drinks should be considered for electrolyte and calorie replacement when moderate-to high-intensity work is anticipated.
Firefighter Rehabilitation

**Prehydration:**

- Personnel should consume small quantities of fluid at one time (2-4 ounces) and do so frequently.
- Increase the quantity of fluids as physical exertion increases.
Sports drinks should not be diluted or concentrated as these lessen the benefits. The ingredients and taste are carefully formulated to ensure maximum absorption of electrolytes, carbohydrates, and water. Diluting or concentrating a sports drink may inhibit absorption. Sweetening sports drinks will slow gastric emptying time thus inhibiting hydration.
Firefighter Rehabilitation

* Rate of Perceived Exertion Scale:
  * A measure of how hard you feel your body is working.
  * Can help firefighters predict ongoing physical work.
  * It is based upon physical sensations (e.g., heart rate, increased respirations, increased sweating, and muscle fatigue).
  * Either a 10 or 15 point scale (Borg scale).
<table>
<thead>
<tr>
<th>Borg Scale Rating of Physical Exertion (10 point scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>Borg Scale of Rate of Perceived Exertion (15 point scale)</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>16</td>
</tr>
<tr>
<td>17</td>
</tr>
<tr>
<td>18</td>
</tr>
<tr>
<td>19</td>
</tr>
<tr>
<td>20</td>
</tr>
</tbody>
</table>
Firefighter Rehabilitation

- **Acclimatization** (adaption to changing climactic conditions) will help minimize heat and cold stress.
- It serves to enhance a member’s ability to perform under more extreme conditions.
Firefighter Rehabilitation

Heat acclimatization results in:

- Increased sweat production.
- Improved blood distribution.
- Decreased core and skin temperatures.
- Decreased heart rate.
Heat acclimatization is more common in the fire service—especially in wildland firefighters. The risks for hot weather operations are the greatest at the start of the season (March through June). It takes 5-10 days to become acclimatized to a hot environment. Rehab practices should be implemented well ahead of weather and seasonal changes.
THE REHAB SECTOR

FIREFIGHTER REHAB
Firefighter Rehabilitation

Rehabilitation area characteristics:

- Responsibility typically delegated to rehabilitation manager or officer.

Rehab officer:

- Establish and locate the area.
- Notify the IC where rehab sector has been established.
- IC should given final approval based upon overall information.
Firefighter Rehabilitation

Consider environmental conditions when locating rehab sector:
- Wind
- Precipitation
- Direct sunlight
Specialized rehabilitation vehicles are now common in the fire service.

These can protect personnel from the environment and the media.
Firefighter Rehabilitation

- Establishing the rehab sector too close to the incident will prevent adequate mental and physical rest for firefighters.
Firefighter Rehabilitation

- The rehab sector should be readily accessible for personnel.
- Access by the public and the media should be restricted.
Firefighter Rehabilitation

Rehab site characteristics:

- Not too far or too close to the incident.
- Adequate space for PPE removal.
- Protected from environmental conditions.
- Adequate size to handle expected number of firefighters involved in operations or training.
- Adequate space for medical monitoring.
- Controlled ingress and egress for accountability.
Firefighter Rehabilitation

For high-rise incidents, consider putting the rehab sector on a lower floor (if the building is safe).
Firefighter Rehabilitation

- Large scale incidents may require multiple rehabilitation areas.
- Each rehab area must have a specific name consistent with location to avoid confusion.
Best Practices in Rehab

INFORMAL COMPANY OR CREW REHAB

Rehab often takes place informally at the company or crew level. This can occur with SCBA bottle changes, during transitions between activities, at routine incidents (e.g., single-family house fire), or when the incident commander fails to recognize the need for rehab. Tools and supplies needed for informal rehab should be available on each piece of apparatus.
MEDICAL CARE

FIREFIGHTER REHAB
Firefighter Rehabilitation

- Medical monitoring by EMS personnel should be part of rehab operations.
- Medical monitoring is different than medical treatment.
Firefighter Rehabilitation

Preparing for medical monitoring:

- Medical monitoring and treatment area should be established as part of the rehab sector.
- They should be a separate part of the rehab sector.
Firefighter Rehabilitation

Medical Monitoring

- Oxygen
- Airway supplies
- Carbon monoxide (CO) monitor
- Automated external defibrillator (AED)
- EKG monitor
- Blankets
- Pulse oximeter (or CO-Oximeter)

- Orthopedic supplies
- Bleeding supplies
- Cardiac medications
- Cyanide antidotes
- Stretchers
- Hand-washing and equipment decontamination supplies.
- Other medical supplies
Firefighter Rehabilitation

- Routine OTC medications should be available in the medical monitoring sector (e.g., ibuprofen, aspirin, acetaminophen).

- Usage should be monitored and tracked.
Medical monitoring and medical treatment are different. Not all EMS providers are experienced at medical monitoring in the rehab operation. There must be specific protocols for medical monitoring that differ from standard EMS treatment protocols. To avoid confusion, the medical monitoring area and the medical treatment area must be separate.
Firefighter Rehabilitation

**Establishing rehab resources:**

- The IC should assure that the rehab sector has adequate resources.
- The NIMS recommends one EMS provider for every 5 members in rehab.
- Outside agencies (e.g., Red Cross, Salvation Army, FD auxiliary) can be utilized for support.
- Outside agencies must adhere to the tenets of rehab (i.e., no doughnuts).
Firefighter Rehabilitation

- Non-fire-based EMS providers in the rehab sector may be needed.
- The culture of the FD can sometimes be problematic.
- Personnel must know that EMS providers have authority in the rehab sector through the IC.
EMS personnel must understand that medical monitoring and treatment are different. Non-fire EMS providers should be involved in policy development and utilized on the training ground. This will facilitate acceptance by firefighters and a better understanding of fire operations by non-fire EMS personnel. Remember, we fight how we are trained.
REHAB CRITERIA

FIREFIGHTER REHAB
Firefighter Rehabilitation

Rehab criteria:

- Personnel should be provided with rehab or be released from their assignments when:
  - A single 30-minute SCBA bottle has been used.
  - A 20-minute work cycle (without SCBA) has been completed.

- Initial rehab efforts may have to be somewhat delayed early in fire suppression operations because of limited resources.
Firefighter Rehabilitation

At a minimum, members should undergo rehab when:

★ 45-minute or 60-minute SCBA bottle has been used.

★ Following 40 minutes of intense work without an SCBA.
Company officers know their crews. It is important for company officers to stop and periodically assess all crew members for the need to undergo rehab (at least every 45 minutes). In severe conditions, the assessment interval should be decreased accordingly.
Firefighter Rehabilitation

Rehabilitation effort should include the following:

- Relief from climactic conditions.
- Rest and recovery.
- Active and/or passive cooling or warming.
- Rehydration

- Calorie and electrolyte replacement.
- Medical monitoring
- Member accountability
- Release
Rest and recovery:

- Personnel entering rehab for the first time should rest for at least 10 minutes—longer when practical.
- A member should not return to active operations if they do not feel they are adequately rested.
Firefighter Rehabilitation

- Personnel should rest for a minimum of 20 minutes following use:
  - Second 30-minute SCBA bottle.
  - Single 45-minute or 60-minute SCBA bottle.
  - 40 minutes of intense work without SCBA.
Fire departments that have a comprehensive work health program will often have a complete work prediction profile for each firefighter. This information can be made available to the rehab sector personnel to allow them to make more informed decisions about work-to-rest ratios. It takes some of the guessing out of the equation.
ACCOUNTABILITY

FIREFIGHTER REHAB
Firefighter Rehabilitation

- Accountability and tracking is an essential component of firefighter rehab.
- The accountability system should be a part of the overall NIMS scheme used in the region.
Firefighter Rehabilitation

- Simple forms can be used.
- Complex computer tracking systems should be avoided.
# INCIDENT REHAB

Company Level Check In/Out Document

Incident Location: ___________________________ Incident Date: ____________
Rehab Officer: ____________________________________________

<table>
<thead>
<tr>
<th>Dept</th>
<th>Unit Type</th>
<th>Crew Size</th>
<th>Time In</th>
<th>Time Out</th>
<th>Dept</th>
<th>Unit Type</th>
<th>Crew Size</th>
<th>Time In</th>
<th>Time Out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Firefighter Rehabilitation

- Commercial tracking systems are available.
- The tracking system should have interoperability with neighboring departments and agencies.
SUMMARY

MEDICAL MONITORING
Firefighter Rehabilitation

- Rehabilitation on the fire ground is now an NFPA standard.
- Each department should develop and implement a firefighter rehabilitation program.
Firefighter Rehabilitation

* The role of EMS personnel in the rehab sector (whether fire nor non-fire based) should be clearly defined.

* EMS personnel must have the authority for medical decision making in the rehab sector.
Firefighter Rehabilitation

An effective, well-organized rehab system can save firefighter lives and promote longevity in the fire service.
Financial Disclosure

This program was prepared with an unrestricted grant from Masimo. Masimo did not control content or authorship.
Credits

- **Content:** Bryan Bledsoe, DO, FACEP
- **Art:** Robyn Dickson (Wolfblue Productions)
- **Power Point Template:** Code 3 Visual Designs
- The following have allowed use of their images for this presentation:
  - Josh Menzies
  - Glen Ellman
  - Mark C. Ide
  - John Frelich
  - Bryan Bledsoe, DO, FACEP
  - Ed Dickinson, MD, FACEP
  - Houston FD
  - Phoenix FD
Credits

This is a product of Cielo Azul Publishing.