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International Association of Fire Chiefs

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Hazardous Materials Safety, Training and Capability Gap Analysis and Needs Assessment

2024

Introduction

In 2024, the IAFC conducted a nationwide gap analysis and needs assessment of fire service response agencies. These activities were funded through an Assistance for Local Emergency Response Training Grant (ALERT PHMSA Grant # 693JK32340003HMAT) from the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA).

The purpose of the gap analysis and needs assessment is to:

- Assess the hazardous materials response capability to rail incidents.
- Evaluate access to hazardous materials rail response training.
- Determine the use of commodity flow studies and Threat and Hazard Identification and Risk Assessment (THIRA) to evaluate hazardous materials rail transportation risks.
- Gauge the extent of collaborative planning and exercise between railroads, local emergency response, and public safety agencies.

Additionally, the gap analysis and needs assessment aimed to understand the prevalence of existing collaborative planning and exercises between railroads and local emergency response agencies.

The effort engaged 302 participants through a structured electronic feedback form designed collaboratively by a stakeholder group of fire service leaders and International Association of Fire Chiefs staff, guided by a hazmat response subject matter expert (SME). This report provides a detailed analysis of the responses, highlighting key findings and recommendations to enhance hazardous materials response capabilities across the nation.

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Executive Summary

This report presents findings gathered from the Hazardous Materials Safety, Training and Capability Gap Analysis and Needs Assessment.

The findings show that fire department personnel believe significant progress has been made regarding training and operational readiness for railroad hazmat incidents, but obstacles to accessing or delivering to training do remain. While a serious railroad derailment involving hazardous materials is rare, the consequences for failing to complete training regarding hazmat rail response, particularly training that brings fire department personnel and rail industry personnel together, can be significant.

Recent incidents, such as the derailment in East Palestine, Ohio, underscore the need for local responders to work more closely with the railroads operating within their communities to understand the hazardous materials being transported through their response area, particularly regarding the use of commodity flow studies and community risk assessment data. Fire department personnel regularly completing training with railroad personnel as well as the other state and local agencies involved in hazmat response is critical to ensuring more coordinated, effective incident management.

This effort highlights the need for fire departments to prioritize the funding needed to ensure their personnel can participate in critical hazmat response training, strengthen their relationships with the railroads running their response area, and invest the time and effort needed to ensure the available training will result in effective training for their personnel.

Report Analysis

Respondent Demographics

A total of 302 responses were received from 45 states, providing valuable insights into various aspects of hazardous materials response.

The Needs Assessment revealed that 52% of respondents were Command Officers, with an average of 27.5 years of service. Fire departments represented 82% of the agencies, while emergency management agencies and law enforcement accounted for 7% and 2%, respectively. Most respondents (62%) were from cities or towns, with 38% from rural areas and 33% from suburban regions.

Regarding hazardous materials (hazmat) training, 53% of respondents were trained at the Technician level and 78% of Hazmat teams operated in an offensive mode. However, only 51% of departments had a functioning hazardous materials response program, with varying levels of response capability.

The Needs Assessment highlighted that 89% of communities had freight railroad services operating within their boundaries, with CSX being the most reported railroad. Despite this, 58% of respondents were aware of commodity flow studies, but 56% had not requested them. Additionally, only 20% had conducted formal risk assessments. Training and exercises with railroads were deemed highly valuable by 68% of respondents, with 45% training annually.

Identified Challenges

Respondents were given multiple opportunities to highlight potential challenges or obstacles to accessing training throughout the feedback form.

The challenges most commonly identified by respondents were:

1. Limited or no funding available for rail-response training.
2. The department/agency prioritizes other training topics over rail response.
3. Training is not available nearby.
4. Department/agency personnel believe they don't have the time to complete rail-response training.

Additional challenges included a lack of interest in pursuing rail-response training from the members of the department/agency, a lack of sustainability regarding the necessary equipment to complete training, and a lack of training that is truly tactics-based for fire service personnel.

Lack of funding was identified as the most common obstacle to completing any rail-response training, much less regular rail-response training. It is important to note that the funding concern does not merely include the registration cost of any training. The larger funding concerns include, but are not limited to,:

- Course registrations
- Travel to complete training (airfare, mileage, hotel, meals, per diem, etc.)
- Overtime to backfill positions while members are training
- Overtime to cover personnel who attend training while not on duty, if applicable

Challenges regarding a lack of interest in pursuing rail-response training or competing for funding/time with other training topics can be attributed in part to a lack of awareness regarding the potential scale of a significant hazmat-rail response and the potential threats to life and property. A hazmat incident does not have to reach the scale of the derailment in East Palestine, Ohio, to pose a risk to life and property. Increased education for all department personnel regarding the rail lines running through a department/agency's response area and the materials carried by those rail lines, as well as increased education regarding hazmat rail response incidents in similar communities around the country, can help to address a lack of interest from department personnel.

A lack of awareness regarding available training and a belief that department personnel lacked the necessary time to complete the training were also identified as key challenges. The Hazmat Roundtable at the National Fire Academy and the Summit of Hazmat Thought Leaders in Addison, Texas had both previously identified a lack of awareness regarding the available training amongst fire service personnel, so that finding was not a surprise. It is very likely the lack of awareness regarding available training directly speaks to the belief that personnel believe they do not have the time to complete the training as currently many members of the fire service believe they will have to travel a select few locations around the country to complete rail-response training when in reality the training may be offered within their region. The IAFC's Hazmat Risk Assessment & Planning Tool can help to address this obstacle by providing one trusted resource for fire service personnel to seek out information regarding available training.

It is also worth stressing the importance of aligning hazardous materials response programs with national standards and recommended practices, including but not limited to:

- NFPA 470 - Hazardous Materials/Weapons of Mass Destruction (WMD) Standard for Responders
- NFPA 475 - Recommended Practice for Organizing, Managing, and Sustaining a Hazardous Materials/Weapons of Mass Destruction Response Program
- Occupational Safety and Health Administration's Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation 29 CFR Part 1910.120
- NFPA 1010: Standard on Professional Qualifications for Firefighters

Overall, the gap analysis and needs assessment underscores the need for:

- Improved access to and knowledge of available training and other resources, particularly around operating with local and regional partners (EMS personnel, law enforcement personnel, emergency management personnel, etc.). Interagency collaboration is key to successful hazmat response.
- Dedicated funding in the department/agency's budgets for completing rail-response training that does not compete with other training priorities.
- Completing annual hazmat rail commodity flow studies and formal risk assessments to develop risk-specific response plans within communities that include rail lines.

Recommendations

The following recommendations were put together after analyzing all of the responses to the Hazardous Materials Safety, Training and Capability Gap Analysis and Needs Assessment. Recommendations have been grouped by topic area.

1. Community Preparedness and Risk Assessments:

- Hazmat rail commodity flow studies and formal risk assessments (THIRA) should be completed annually to better understand the actual risks and specific hazardous materials that are transported through a given community.
- Commodity flow studies and risk assessments should be used to develop risk-specific response plans. This should be a collaborative, interagency effort and commodity flow studies, risk assessments, and risk-specific response plans should be shared across agencies.
- Railroads should consider proactively providing copies of commodity flow studies to fire departments operating within high-volume corridors rather than waiting for a request from those departments.

2. Enhancement of Training Programs:

- Identifying available hazmat training for rail incident response in one easy-to-find location will increase awareness of available training amongst fire service personnel.
 - The IAFC's Hazmat Risk Assessment & Planning Tool includes a dashboard showing available training around the country and anyone can submit upcoming training for inclusion in the map.
- Access to HazMat training, especially for disciplines with fewer trained individuals such as EMS and law enforcement, should be given higher priority by their agencies and communities.
 - Fire departments should place an increased emphasis on the importance of interagency training so that the other agencies involved in local and regional response will be better prepared for a hazmat rail response within their first due.
- An increased emphasis should be placed on incident management and unified command through tabletop and full-scale exercises completed at the local and regional level.
- Local and regional training should be developed based on commodity flow studies and risk assessments for rail lines operating within their jurisdiction.
- All efforts should be made to increase awareness of and utilization of programs like TRANSCAER and state-provided training.
- AskRail and other response tools, such as plume modeling, should be incorporated in training programs to maintain proficiency amongst responders.

3. Funding and Response Resources:

- Departments with rail lines operating within their response area should include dedicated funding for rail-response training.
 - This funding should not only cover training registration fees but also travel money, overtime funds to backfill positions while members complete training, overtime money for members completing training while off duty, if applicable, and any additional funding necessary for department/agency personnel to complete training locally, regionally, or in other locations around the country.
- If possible, departments/agencies should allocate resources to ensure they can make this training available nearby and accessible to all personnel.
- Departments/agencies should work with their partners within their response area/region to make training available to all personnel, looking at all available avenues to share the cost.
- A greater effort should be made by the industry leaders to share information regarding available grant or other supplemental funding to deliver and/or attend rail-response training.

4. Interagency Collaboration:

- Departments/agencies should complete annual training and exercises with railroads and other local agencies and organizations that respond to related hazmat incidents, focusing on incident management and unified command.
- Departments/agencies should develop response procedures and policies that specify internal and external stakeholders' roles and expectations in responding to a railroad hazmat incident.
 - This should involve:
 - Collaborating with internal agencies and external organizations to improve overall operational readiness and response capabilities.
 - Establishing formal protocols for the agencies and organizations that will be part of Unified Command.

5. Alignment with National HazMat Standards and Regulations

- Ensure that hazardous materials response programs align with NFPA 470/NFPA 475 and OSHA CFR 29 Part 1910.120 standards to maintain high safety and operational standards.

Response Analysis

A further breakdown of the respondent demographics may help provide insight on the information gathered from this effort.

1. Rank Representation
 - 52% of the respondents are Command Officers
 - 14% are company officers
 - 7% are training officers
 - Average of 27.5 years of service
2. Agency representation
 - 82% fire departments
 - 7% are emergency management agencies
 - 2% from law enforcement
3. Jurisdictional representation
 - 62% City/Town
 - 25% County
 - 4% State/Territory
 - 4% Private Sector
 - 1% Federal
4. The geographic representation
 - 38% Rural
 - 33% Suburban
 - 25% Urban
 - 2% Industrial
5. HazMat Training
 - 53% Technician
 - 28% Specialist
 - 24% Operations
 - 6% Awareness
6. HazMat Team Training Level and Operational Modes
 - 78% Technician: Offensive
 - 21% Operations: Defensive
 - 1% Awareness: Non-Intervention

7. Response capability

- 51% of responding departments have a functioning hazardous materials response program.
- 24% Type I
- 21% Type II
- 20% Type III
- 19% Non-typed
- 15% Unsure

8. Regional Response

- 50% of respondents reported having a hazmat response team
- 62% of the teams serve as a regional asset
- 24% do not serve as a regional asset
- 12% support a regional response team
- 2% were not sure

9. Railroad Services

- 89% of the communities that have freight railroad services
 - 44% have Class 1 railroads
 - CSX was the most reported railroad, followed by Norfolk Southern, Union Pacific, Canadian Pacific/KCS, Burlington Northern Santa Fe, and Canadian National.
 - 26% are not sure
 - 24% have both Class 1 and Short Line
 - 5% Short Line only
- 9% do not have rail service
- 1% not sure

10. HazMat Commodity Flow Study Awareness and Utilization

- 58% aware of the availability of commodity flow studies
- 41% unaware of the availability of commodity flow studies
- 56% have not requested commodity flow studies
- 23% not sure
- 20% have requested commodity flow studies
 - *Guidance for Conducting Hazardous Materials Flow Studies Transportation Research Guidebook's Hazardous Materials Cooperative Research Program (HMCRRP) Report 3: Guidebook for Conducting Local Hazardous Materials Commodity Flow Studies updates the U.S. Department of Transportation's Guidance for Conducting Hazardous Materials Flow Surveys. URL, <http://www.trb.org/Main/Public/Blurbs/8be31746-4853-4b77-a5b1-e1bf3547453e.aspx>, to access the site for the guidebook.*

11. Formal Risk Assessment (THIRA)

- 55% have not conducted a risk assessment
- 25% not sure
- 20% have conducted a formal risk assessment

12. Rail Incident Response

- 10% of respondents operated at a hazmat rail incident within the last year.

13. Rail Response Training and Exercises

- 44% use both internal and external training programs
- 40% use only external training
- 16% use only internal training

14. Frequency of training/exercising with the railroad and value (44 responses)

- 45% train annually
- 29% train biannually
- 22% train infrequently
- 2% did not know
- 68% rated training with the railroad as highly valuable
- 31% rated training with the railroad as valuable

15. Training Program Alignment with NFPA 470

- 56% Yes
- 28% Not Sure
- 16% No

16. Alignment with OSHA 1910.120 (HAZWOPER)

- 58% Yes
- 27% Not Sure
- 14% No

17. Participation in TRANSCAER and other rail industry-provided training

- 46% Yes
- 36% No
- 18% Not Sure

18. Obstacles and challenges to hazmat rail training

- Limited funding for training
- Limited funding for backfill/overtime
- Availability of training programs nearby
- Limited scheduling time
- Higher training priorities

Appendix A: Feedback Form Questions

Introduction

The IAFC, in partnership with the Pipeline and Hazardous Materials Safety Administration, is conducting a nationwide gap analysis study among the American fire service on hazardous materials (HazMat) training efficacy and needs.

We are seeking your input on HazMat training across a myriad of topics and locations, but with a specific interest in rail incidents and rural communities. We aim to gain a better understanding of the following:

- The availability of training that covers risk assessments focusing on railroad HazMat incidents and Commodity Flow Studies.
- The availability of HazMat Technician training nationwide.
- The extent of training exercises between the freight rail industry, transportation leads, and first responders for rail incident responses.
- The extent of command & control plans and procedures and operational coordination included in HazMat training programs.
- The major barriers/challenges faced by local fire departments in regard to HazMat training.
- The greatest needs for freight railroad HazMat training for their personnel.
- The extent of locally delivered training aligned with the applicable NFPA standards.

The findings from this study will help inform a summary of findings on major gaps and needs for evolved and expanded HazMat training within the fire and emergency services.

Page One – Demographics

1. First Name
 - a. Text
2. Last Name
 - a. Text
3. Where do you fall within your organizational structure?
 - a. Firefighter
 - b. EMT/paramedic
 - c. Emergency management official
 - d. Local Emergency Management Planning Committee member
 - e. Training officer
 - f. Company Officer
 - g. Command Officer
 - h. Law enforcement officer
 - i. Emergency management official
4. What is your role within your organization?

- a. Multiline text
- 5. Department/Agency Name
 - a. Text
- 6. What is your primary discipline?
 - a. Fire Department
 - b. Emergency Medical Services (EMS)
 - c. Law Enforcement
 - d. Emergency Management
 - e. Other: Fill in the blank
- 7. What best describes your agency?
 - a. Volunteer
 - b. Combination
 - c. Career
 - d. Federal
 - e. Other: Fill in the blank
- 8. What level of government or type of entity do you represent?
 - a. City/Town
 - b. County (or equivalent)
 - c. A region within a State or Territory
 - d. State/Territory
 - e. Tribal Nation
 - f. Federal
 - g. Private Sector
- 9. What state is your department/agency in?
 - a. Dropdown of states
- 10. What best describes your department/agency's primary response area?
 - a. Urban
 - b. Suburban
 - c. Rural
 - d. Industrial
- 11. How many years of service do you have with the fire service and/or EMS?
 - a. Text
- 12. What is your highest level of HazMat training?
 - a. Awareness
 - b. Operations
 - c. Technician
 - d. Specialist

Page Two – Department HazMat Team and Community Railroads

- 13. Does your department/agency have a functioning hazardous materials response program?
 - a. Yes
 - b. No
 - i. IF YES
 - 1. What type of hazmat training does your team have?

- a. Awareness (non-intervention)
- b. Operations (defensive)
- c. Technician-level (offensive)

IF OPERATIONS (DEFENSIVE)

1. Do they have a specific function or mission?
 - d. Decontamination
 - e. Air monitoring
 - f. Communications
 - g. Technical Reference
 - h. No specific function or mission
 - i. Other: fill in the blank
2. Using FEMA's typing definition, what is the team's type?
 - a. Type I
 - b. Type II
 - c. Type III
 - d. Not typed
 - e. Not sure
3. Does your department/agency serve as a regional hazmat asset?
 - a. Yes
 - b. No
 - c. Not sure
 - d. We support a regional hazmat team

14. Is your department/agency trained and equipped to respond to hazmat-related rail incidents?

- a. Yes
- b. No
- c. I'm not sure
 - i. IF NO

1. Do you have assets available to you to provide support for hazmat-related rail incidents?
 - a. Yes
 - b. No
 - c. I'm not sure
 - i. IF YES

1. What assets do you utilize during hazmat-related rail incidents?

- a. TEXT BOX

15. Do freight railroad services run through your community?

- a. Yes
- b. No
 - i. IF YES

1. What is the railroad type?
 - a. Class 1
 - b. Short Line
 - c. Both Class 1 and Short Line
 - d. Not sure
 - i. IF CLASS 1 OR BOTH

1. What Class 1 company operates in your community? Select all that apply.
 - a. CSX
 - b. Norfolk Southern
 - c. Canadian Pacific/Kansas City Southern
 - d. Union Pacific
 - e. Burlington Northern Sante Fe
 - f. Canadian National
 - g. Not sure
 - h. Other: Fill in the blank
 - ii. IF SHORT LINE OR BOTH
 1. What Short Line company operates in your community?
 - a. Text
16. Do you know what a commodity flow study is?
 - a. Yes
 - b. No
 - i. IF YES –
 1. Do you know that a hazmat commodity flow study that lists the top hazardous materials commodities shipped through your community is available to you?
 - a. Yes
 - b. No
 2. Do you know how to request a hazmat commodity flow study for your community from the railroad(s)?
 - a. Yes
 - b. No
 3. Has your department requested a hazmat commodity flow study from the railroad?
 - a. Yes
 - b. No
 - c. Not sure
 - d. IF YES –
 - i. Has that study been used to prioritize your department's hazmat training on the hazmat commodities moving through your community?
 1. Yes
 2. No
 3. Not sure
 17. Has your jurisdiction conducted a formal risk assessment (Threat and Hazard Identification and Risk Assessment or THIRA) that includes hazardous materials transported by rail?
 - a. Yes
 - b. No
 - c. Not sure
 - i. IF YES –

1. How often is this risk assessment conducted?
 - a. Once
 - b. Annually
 - c. Biannually
 - d. As needed
 - e. Not sure
 - f. Other: fill in the blank
2. Has that assessment been used to focus your department's hazmat training?
 - a. Yes
 - b. No
 - c. Not sure

Page Three – HazMat Training

18. Does your department/agency's hazardous materials response program align with NFPA 470/NFPA 475?
 - a. Yes
 - b. No
 - c. Not sure
19. Does your department/agency's hazardous materials response program align with OSHA 1910.120?
 - a. Yes
 - b. No
 - c. Not sure
20. Does your department/agency conduct training for response to hazmat rail incidents?
 - a. Yes
 - b. No
 - c. Not sure
21. Does your department/agency utilize internal or external rail-response training?
 - a. Internal rail-response training that was developed in-house
 - b. External rail-response training
 - c. Both internal and external rail-response training
 - i. IF EXTERNAL OR BOTH
 1. What programs does your department/agency use? Select all that apply.
 - a. Security and Emergency Response Training Center (SERTC)
 - b. TRANSCAER
 - c. Rural Domestic Preparedness Consortium/University of Findlay
 - d. Association of American Railroad or Railroad-provided training
 - e. Short Line Safety Institute
 - f. State Provided Training
 - g. Not sure
 - h. Other: fill in the blank
22. Has your department/agency ever participated in/attended TRANSCAER or other hazmat training provided by the railroad?

- a. Yes
 - b. No
 - c. Not sure
 - i. IF YES-
 - 1. How would you rate the value of TRANSCAER training in better preparing you for a rail incident?
 - a. Not valuable
 - b. Somewhat valuable
 - c. Highly valuable
23. Does your department/agency regularly train and/or exercise with railroad emergency response personnel regarding response to railroad-related hazmat incidents?
- a. Yes
 - b. No
 - c. Not sure
 - i. IF YES-
 - 1. How frequently does your department train or exercise with railroad emergency personnel?
 - a. Annually
 - b. Biannually
 - c. Infrequently
 - d. Unknown
 - 2. How would you rate the value of that training in better preparing you for a rail incident?
 - a. Not valuable
 - b. Somewhat valuable
 - c. Highly valuable
24. What obstacles prevent your department from accessing hazmat rail response training? Select all that apply.
- a. Department/agency personnel don't have the time.
 - b. Department/agency personnel aren't aware of any available training.
 - c. Training is not available nearby.
 - d. Limited or no funding available for rail response training.
 - e. The department/agency prioritizes other training topics.
 - f. Other: fill in the blank
25. What kind of hazmat rail response training do you need that would help improve you readiness for a hazmat rail incident?
- a. Multiline text
26. Based on your experience working with railroad hazardous materials managers, what additional areas of training would enhance incident response, integration, and coordination? Select all that apply.
- a. Incident/Unified Command/Incident management
 - b. Tabletop exercises
 - c. Full Scale exercises
 - d. Other: fill in the blank
 - e. No recommendations

Page Four – HazMat Response

27. How would you rate your department/agency's readiness for a significant hazmat rail incident?
- Not prepared
 - Somewhat prepared
 - Very prepared
28. What technical resources have you utilized during a HazMat incident? Check all that apply.
- Ask Rail mobile application
 - CHEMTREC
 - Emergency Response Guidebook (ERG)
 - CAMEO/ALOHA Plume Modeling Tool
 - Chemical Companion
 - NIOSH Pocket Guide to Chemical Hazards
 - None
 - I have not responded to a HazMat incident
 - Unknown
 - Other: fill in the blank
29. Has your department/agency responded to a hazmat rail-response incident within the last year?
- Yes
 - No
 - Not sure
- IF YES –
 - Do you feel hazmat rail response training helped your department personnel with their incident response?
 - Yes
 - No
 - Not sure
 - IF YES –
 - What training specifically do you believe helped your department/agency personnel prepare for your hazmat rail responses?
 - Multiline text
30. How many rail response incidents has your department/agency responded to in the last five years?
- 1-3
 - 4-6
 - 7-9
 - 10-12
 - 13-15
 - 16-18
 - 19-21
 - 22+
 - Not sure

Page Five

31. Is there anything else you want to share about your experience with hazmat training?
 - a. Multiline text