

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

Lesson Plan 10 HAZMAT

<u>TOPIC:</u>	Tire Fires as a Hazardous Materials Response
<u>LEVEL:</u>	I
<u>TIME:</u>	1 Hour
<u>BEHAVIORIAL OBJECTIVE:</u>	
Condition:	Complete evaluation with 70% accuracy
Behavior:	The student will . . . <ol style="list-style-type: none">1. To establish emergency response protocol for large tire pile fires2. To determine the right firefighting techniques for the emergency3. To recall safety considerations
Standard:	According to the referenced text
<u>REFERENCES:</u>	Slaughter, Rodney. "RINGS OF FIRE: Tire Fire Prevention and Suppression" California State Fire Marshal, June 2004.
<u>MATERIALS NEEDED:</u>	PC projector, projection screen, VCR, multimedia slide show on CD-ROM, speakers.
<u>PREPARATION:</u>	Due to the potential release of toxic chemicals, first responders should handle the tire fire as a HAZMAT incident with fire. The approach to the incident should be in accordance with tactics common to a hazardous materials response. Specifically, the response must be made Safely, Slowly and Methodically.

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>I. HAZMAT OBJECTIVE</p> <ul style="list-style-type: none">A. To establish emergency response protocol for large tire pile firesB. To determine the right firefighting techniques for the emergencyC. To recall safety considerations <p>II. HAZMAT PROCEDURES</p> <ul style="list-style-type: none">A. HAZMAT procedures follow the acronym "SIN" or rather "SINCIAPCPDDD" as the basic initial on-scene actions at all tire fire incidents.B. The goals and priorities of the response must be:<ul style="list-style-type: none">1. Save lives and limit casualties2. Protect the environment3. Limit damage to property4. Restore area to normal as soon as possibleC. Standard HAZMAT procedures are to be implemented immediately to ensure public safety, safety for emergency personnel, site operators, and the environment	<p>From The Response menu click on the HAZMAT button</p> <p>Hazmat Objective Slide</p> <p>Hazmat Slide</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>IV. “I” Isolation</p> <p>A. Tire pile fires, like any hazardous materials incidents, require that control zones be setup to minimize hazards to responding fire personnel, law enforcement, consultants, press, and the public.</p> <p>B. Control zones are those areas at a hazardous materials incident that are designated based upon safety and the degree of hazards.</p> <p>C. The most frequently used terminology for these zones are the hot, warm, and cold zones. These zones are described in more detail</p> <ol style="list-style-type: none">1. Hot Zone: The hot zone is the area immediately surrounding the tire pile fire, and extending far enough to prevent adverse effects from hazardous materials releases to personnel outside the zone. This zone is also referred to as the exclusion zone or restricted zone in other documents.2. Warm Zone: The warm zone or support zone is the area where personnel and equipment decontamination and hot zone support take place. It includes control points for the access corridor and thus assists in reducing the spread of contamination. This zone is also referred to as the decontamination, contaminant reduction, or limited access zone in other documents.3. Cold Zone: The cold zone contains the command post and other support functions that are deemed necessary to control the incident.	<p>Video – Safety Slide 04: Show the fourth of four sections of the “Rings of Fire” video</p> <p>Isolation Side</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>V. “N” Notifications</p> <p>A. State and local emergency response teams should be a component to pre-planning</p> <p>B. In the event of a tire fire, local fire fighting efforts for communities may not have sufficient resources to handle such an emergency</p> <p>C. Pre-incident plans should contain up-to-date emergency contacts for all local, state, and federal agencies or organizations with expertise or responsibility in the management of environmental disasters</p> <p>D. The lists should include phone numbers, facsimile numbers, addresses, and radio frequencies, if applicable</p> <p>E. Since emergency management structures differ across state and county lines, each fire department will have to research its own government structure and laws to determine the appropriate agencies to involve</p> <p>F. These agencies should participate in, or at least become familiar with, the pre-incident plans.</p> <p>G. Examples of concerned agencies would be:</p> <ol style="list-style-type: none">1. State and local Police;2. Public Works agencies;3. State Department of Emergency Management;4. Regional offices of the FEMA;5. State or Federal Environmental Protection Agency6. Resources or Forestry;7. State Fire Marshal office; and8. Finance, Purchasing and Budget agencies.	<p>Notification Slide</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>B. Exposure hazards associated with tire fires can be introduced by</p> <ol style="list-style-type: none"> 1. The smoke plume (from the fire), 2. Water run off (from the water used to put out the fire), 3. Soil contamination (from the oil and heavy metal products) <p>C. The byproducts of a tire fire are smoke, pyrolytic oil, ash and carbon black.</p> <p>D. The first three pose a serious threat to first responders and the environment</p> <p>E. Pyrolytic Oil is free flowing oil that contains the following target compounds: Naphthalene, anthracene, benzene, thiazoles, amines, ethyl benzene, toluene, and various metals such as, cadmium, chromium, nickel and zinc</p> <p>F. Ash contains various heavy metals including lead, arsenic, and zinc</p> <p>G. <i>Smoke</i>: Smoke contains VOCs, SVOCs, PAHs, particulate metals, heavy metals, carbon monoxide, dioxins and furans, sulfur and nitrogen oxides, PCB's and acid gases (hydrochloric, and sulfuric)</p> <p>H. Other agencies will be involved with taking samples and supplying the incident commander with up to date information about toxic levels on and off site</p>	<p>Identification Slide 02</p> <p>Identification Slide 03</p> <p>Identification Slide 04</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>2. Once smothered, the fire will continue to smolder for weeks or months and generate a continuous source of pyrolytic oil</p> <p>3. It is also possible for the smoldering tire fire to periodically break out into open flames creating an unpredictable and hazardous environment for emergency personnel</p> <p>4. Additionally, due to oil residues, this method can result in significant soil and water contamination</p> <p>H. Answer: Extinguishment:</p> <ol style="list-style-type: none">1. Water is generally utilized to fight Class A fires which include absorbent materials such as wood, paper, and cloth.2. By contrast, tires and shredded tires do not absorb water, but instead repel it3. Experience at tire piles has shown that master water streams produce much greater runoff without significantly improving fire knockdown4. Instead, fog streams may be more effective for dousing separated burning product piles5. Fog streams are very effective in fighting shredded or crumb rubber pile fires6. At tire fire sites where water extinguishment has been successful, excavation equipment was used first to separate the burning materials into small manageable piles7. The fire was doused with hand-lines, and a front-end loader was used to move the material to be submerged to complete the overhaul	<p>Overhead Question: Why shouldn't water be used on a large tire fire?</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>I. Answer: Foam Fire Suppressants:</p> <ol style="list-style-type: none">1. Foam suppressants are most effective in extinguishing small tire fires2. Heavy machinery is used to disseminate a larger tire pile into a smaller manageable fire3. In this technique water is used to cool the fire, and then foam is used to douse the fire4. Foam is particularly useful in suppressing oil fires that are common with tire fires <p>J. Non-Standard Firefighting Equipment</p> <ol style="list-style-type: none">1. Because a tire pile fire is very different from a typical structure fire, non-standard fire fighting equipment is necessary to effectively combat the fire2. Non-standard fire fighting equipment includes a variety of heavy equipment and HAZMAT trained equipment operators3. Four types of equipment are usually needed on tire fires including excavators, bulldozers, front-end loaders and dump trucks4. With these specialized machines, the operation can be more efficient and effective	<p>Overhead Question: Why and when would you use foam on a tire fire?</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p data-bbox="228 537 581 569">K. Cost of Extinguishment</p> <ol data-bbox="326 611 1094 968" style="list-style-type: none"><li data-bbox="326 611 1036 642">1. USEPA spent \$2.5 Million on the Westley Tire Fire<li data-bbox="326 684 1094 716">2. Tracy Fire Department spent \$450,000 on the Tracy Fire<li data-bbox="326 758 1052 821">3. These figures do not include clean-up costs for either site<li data-bbox="326 863 1068 968">4. The difference is in firefighting strategies, Westley wa actively extinguished with water and foam, tracy was allowed to burn itself out <p data-bbox="131 1087 542 1119">IX. “P” Protective Equipment</p> <p data-bbox="228 1161 1024 1266">A. Tire fires are hazardous and require dermal and respiratory protection for all personnel responding to and working in the vicinity of the tire fire.</p> <p data-bbox="228 1308 1065 1339">B. The use of personal protective gear is mandatory for tire fires.</p> <p data-bbox="228 1381 776 1413">C. The following is a list of standard PPE:</p> <ol data-bbox="326 1455 1019 1812" style="list-style-type: none"><li data-bbox="326 1455 472 1486">1. Helmet;<li data-bbox="326 1486 548 1518">2. Turnout Coat;<li data-bbox="326 1518 558 1549">3. Turnout Pants;<li data-bbox="326 1549 553 1581">4. Nomex Hood;<li data-bbox="326 1581 1019 1665">5. Latex Gloves (under firefighter gloves to provide secondary protection against absorption of chemicals);<li data-bbox="326 1665 630 1696">6. Firefighting Gloves;<li data-bbox="326 1696 456 1728">7. Boots;<li data-bbox="326 1728 980 1759">8. Self contained breathing apparatus (SCBA) and<li data-bbox="326 1759 659 1812">9. Tyvex Suits (optional)	<p data-bbox="1125 468 1325 499">Action Slide 05</p> <p data-bbox="1125 1014 1442 1045">Protective Equipment 01</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>10. Additionally, heavy equipment operators need to be trained on safety equipment and SCBA</p> <p>X. “C” Containment & Control</p> <p>A. Surrounding and/or isolating unburned tire piles usually accomplishes exposure reduction of burning tire products</p> <p>B. If the exposure can be eliminated, then the fire department has protected the exposure and contained the scope of the incident</p> <p>C. All of the challenges can be managed through the development of an effective pre-incident plan</p> <p>D. In many of the case studies, fire departments attempted to use water to confine and extinguish the fires with “surround-and-drown” tactics because the heavy equipment needed to move unburned tires was not immediately available</p> <p>E. Therefore, the initial stages of the fire are best spent on exposure control and containment of run-off oil and water</p> <p>F. Water is best used to keep unburned tires from burning rather than to extinguish the burning tires</p> <p>G. Once adequate separation is obtained with excavators and bulldozers, an earthen berm can be built around the burning tire pile</p> <p>1. The earthen berms should be at least one half the height of the tire pile, provided that the angle of repose of the pile is not such that material from the top can tumble out of the confining berm</p>	<p>Protective Equipment 02</p> <p>Containment Slide 01</p> <p>Containment Slide 02</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>2. With the berm complete, the tire fire can be considered contained and extinguishment can become the main focus.</p> <p>3. A berm can also be used where adequate separation is not possible; NFPA recommends berms 1 1/2 times the tire pile height.</p> <p>4. However, because heavy equipment and loads of earth must be moved into position to build berms, it is difficult to accomplish this if adequate separation is not available during a fire.</p>	
<p>XI. “P” Protective Actions</p> <p>A. During the initial response to a tire pile fire, it is essential that the threat to the surrounding community be assessed quickly</p> <p>B. The incident commander should consider evacuation of civilians, as a life safety consideration</p> <p>C. Nearby homes, commercial buildings or public places should be considered for evacuation depending on the amount and direction of the smoke plume</p> <p>D. Any area likely to be contacted by direct smoke should be evacuated as a precaution</p> <p>E. Consider closing roads or transportation routes affected by thick smoke</p>	<p>Protective Actions Slide</p>
<p>XII. “D” Decontamination and Cleanup</p> <p>A. Decontamination is the physical and/or chemical process of reducing and preventing the spread of contamination from persons and equipment used within the hot zone of the tire pile fire</p>	<p>Decontamination Slide</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>B. Decontamination takes place within the “Warm Zone” or “decontamination area”</p> <p>C. The entire process of decontamination should be directed toward confinement of the contaminant within the hot zone and the decontamination corridor to maintain the safety and health of response personnel, the general public, and the environment</p> <p>D. Although decontamination is typically performed following exit from the hot zone, the determination of proper decontamination methods and procedures needs to be considered before the incident, as part of the overall pre-incident planning and hazard and risk evaluation process.</p> <p>E. No entry into the hot zone should be permitted until appropriate decontamination methods are determined and established based on the hazards present, except in those situations where a rescue may be possible and emergency decontamination is available.</p> <p>XIII. “D” Disposal</p> <p>A. The role of the emergency responders in this phase is usually limited to support in the form of exposure protection.</p> <p>B. The overall costs of site remediation is extremely high.</p> <ol style="list-style-type: none">1. The Westley tire fire clean-up cost was \$15 million2. The Tracy tire fire clean-up cost was \$12 million3. Both sites had approximately the same number of tires involved in the fire, the difference was fire suppression strategies <p>C. Tires, metal, and other hazardous and non-hazardous debris from a tire fire burn site must be disposed of at a site approved by the CIWMB.</p>	<p>Disposal Slide 01</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>D. Previous experience at tire fire piles has indicated that the pyrolytic oil can be recycled at several types of reclamation plants.</p> <p>E. Recycling of pyrolytic oil is discouraged in the State of California, because the California Environmental Protection Agency (Cal-EPA) classifies pyrolytic oil as a “hazardous waste” under California’s hazardous waste regulations.</p> <p>F. Pyrolytic oil must be sent to an oil recycling facility.</p> <p>XIV “D” Documentation</p> <p>A. This final section describes documentation and preparation of reports</p> <p>B. This report will be thoroughly reviewed and dissected by a variety of interested parties ranging from government officials to investigators representing private parties.</p> <p>C. Documentation of site activities, chronologies of events, and proper laboratory documentation, are all critically important during a tire fire.</p> <p>D. This information is not only necessary to assist the incident commanders and lead agency to determine if the response is effective, but also to be able to accurately present information to the press, public, and government agencies.</p> <p>E. Documented chronology of events, combined with laboratory data, with properly completed chain-of-custody documentation (including sample date and time), is crucial to dissemination of the information to nearby residents and business owners who have been exposed to contaminants from the fire.</p>	<p>Disposal Slide 02</p> <p>Documentation Slide</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

PRESENTATION	APPLICATION
<p>F. At the completion of fire-fighting efforts, the lead agency should prepare and publish a detailed report which at a minimum includes the following information:</p> <ol style="list-style-type: none"> 1. Site Background; 2. Fire Cause and Tire Fire Dynamics; 3. Potential Threats; 4. Agency Response and Unified Command Structure; 5. Fire Suppression Tactics, 6. Health and Safety; 7. Environmental Sampling and Monitoring; and 8. Preliminary Site Assessment Results, if available. <p>G. The report should also contain a section that presents in an objective manner lessons learned during the tire fire event.</p> <p>H. The purpose of this review is to determine what approaches and tactics worked well, and which did not</p> <p>I. This section presents the acronym "SINCIAPCPDDD" or "SIN" which describes the HAZMAT procedures for actions related to a tire fire</p> <p>J. HAZMAT procedures are to be implemented immediately in order to ensure public safety, safety for emergency personnel, site operators, and the environment</p>	<p>HAZMAT 2</p> <p>HAZMAT Questions Slide</p> <p>Instructors Note: From the Response Menu return to the Main Menu Summarize the lecture and click the exit button to end slide show.</p>

INSTRUCTOR GUIDE

RINGS OF FIRE

Tire Fire Prevention and Suppression

SUMMARY:

We have covered quite a bit of material here today. Think of how little you knew or thought you knew about tires and tire fires. We've come a long way to defining the problem, how society is trying to fix the problem, and what we as first responders must do in the meantime. I'm sure that this information will serve you well into the future.

EVALUATION:

1. What is the best response protocol for a tire fire?

Answer: Hazardous Materials Response

1. What is the best method to extinguish a tire fire?

Answer: Allow to burn to a smoldering stage then using heavy equipment pull apart the pile and incrementally extinguish.

2. How much foam should you order when the sales rep calls during a tire fire?

Answer: Trick Question—only as much as you identified in your preplan!

3. What are the major safety concerns during a tire fire?

Answer: Safety of first responders, public safety, and the threat to the environment.

ASSIGNMENT:

None