NOTICE

The United States Government and the State of Texas do not endorse products or manufacturers. Trade or manufacturers’ names appear herein solely because they are considered essential to the object of this report.
MODULE 1
INTRODUCTION

TXDOT WILDLAND FIRE MANAGEMENT Training
Course No. ?????
ISSUE: ?????

PRELIMINARIES
About the Course
OVERVIEW

- 6.0 hours duration
- Primary audience: Directors of operations/maintenance, area engineers, maintenance managers, maintenance supervisors, assistants and crew chiefs

Course Outline
TXDOT WILDLAND FIRE MANAGEMENT TRAINING

Six Learning Modules, approx 1 hour each

1. Introduction
2. Organization and Communication
3. Resources and Equipment
4. Safety
5. Documentation and Data Collection
6. Training Programs
Instructional Materials
TXDOT WILDLAND FIRE MANAGEMENT

• Student Manual
  – Presentation slides
  – Learning exercises (green sheets)
  – Reference pages (white sheets)
  – Review (pink sheets)

• Course Evaluation

Learning Icons
TXDOT WILDLAND FIRE MANAGEMENT TRAINING

...Digging Deeper/Food for Thought

...Video Clip

...Reference Material

...Summary and Review
Instructional Plan
TXDOT WILDLAND FIRE MANAGEMENT TRAINING

- Instructor-led, face-to-face
  - Classroom... presentations, videos
  - Field... fire shelter, hands-on
- Student interaction
- 60 minutes for lunch
- 10-minute breaks following each module

Do’s and Don’ts
TXDOT WILDLAND FIRE MANAGEMENT TRAINING

**DO’s**
- Be on time
- Participate in group discussion/exercises
- Ask questions!
- Respond to questions when prompted by Instructor
- Help your co-workers
- Be responsible for your learning

**DON’Ts**
- Forget to turn off pagers & cell phones or set to vibrate
- Talk among yourselves when the Instructor is talking
- Disrespect others
Learning Objectives

Upon completion of this module, the participant will be able to:

1. Explain TxDOT’S Role in Wildland Fire Management

2. List Best Practices in Handling Wildland Fires
VIDEO 1.1 (02:00)
TxDOT Wildland Fire Management

SPEAKER
John A. Barton, P.E.
Deputy Executive Director/
Chief Engineer
Texas Department of Transportation

Key Themes
TXDOT ADMINISTRATION PERSPECTIVE

- Safety
- Careful planning
- Preparation
- Communication
- Service expectations

- Know your responsibilities
- Coordinate efforts
- Work together
Exercise 1.1
Wildland Fire Management Safety

1. Think about and jot down at least three safety considerations specific to TxDOT wildland fire management operations (individual assignment) (2 minutes).
2. Turn to the person to your left and discuss your ideas (2 minutes).

Be prepared to discuss your answers.
Research Project 0-6735
Best Practices for TxDOT on Handling Wildland Fires

TxDOT Wildland Fire Management Training

What We Learned

TxDOT Interviews

- Districts (10)
  - Abilene
  - Amarillo
  - Austin
  - Beaumont
  - Childress
  - El Paso
  - Fort Worth
  - Lubbock
  - Odessa
  - San Angelo
  - Corpus Christi & Pharr (phone interviews)

- Maintenance Division
INTRODUCTION

Other State Agencies Interviewed

- Department of Public Safety
  - Texas Division of Emergency Management
- Texas A&M Forest Service
  - Asst. Fire Chief, West Region
  - Regional Fire Coordinator, Lubbock
  - Regional Fire Coordinator, Wichita Falls
- Texas Parks & Wildlife

Local Agencies Interviewed

- Bastrop County
- Garza County and City of Post Emergency Management Coordinator
- King County
- Lubbock City Fire Department
- Potter and Randall County Emergency Management
INTRODUCTION

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Best Practices for TxDOT on Handling Wildland Fires

National Weather Service
Lubbock Office

- Science & Operations Officer
- Senior Forecaster

INTRODUCTION

Research Project 0-6735
Best Practices for TxDOT on Handling Wildland Fires

TxDOT Interview Questionnaire

- Advance Preparation
- Notification/Request for services to a TxDOT District
- Communication related to an event within TxDOT
- Communication with outside agencies
- TxDOT responsibilities to ensure employee/public safety
- Resource utilization by TxDOT during wildland fires events
- Information from recent wildland fires
- Effectiveness of current training
- Comments on existing resources/guidance

INTRODUCTION
Advance Preparation
Common Responses from TxDOT

- Do not respond until notified by DPS
- Director of Maintenance (DOM)/ Director of Operations (DOO) receives official notice
- DOM/ DOO contacts Maintenance Supervisor
- DOM/DOO notifies TxDOT EMC

Notification/Request for TxDOT Services
Common Responses

- TxDOT does not engage off the ROW until officially directed by DDC.
- Director of Maintenance (DOM) is the official Point of Contact (POC) for the District.
- Equipment typically requested: dozers, motor-graders, fuel trailers, water trailers, and sign trailers.
- Districts typically have 1-6 requests for assistance annually. One District responded to 50 fires in 2011.
- Governor’s Emergency Disaster Proclamations reach Districts through Maintenance Division.
Communication Related to an Event within TxDOT

Common Responses from TxDOT

- DDC directs DOM to respond to an event, and the DOM then notifies the Maintenance Supervisor(s).
- Involvement of other TxDOT offices varies by district.
- DOM authorizes resource utilization requests.
- Many districts use Daily Activity Reports (DARs) to collect data on events and use Microsoft SharePoint to log that data.
- Coordination between Districts handled DOM to DOM.
- TxDOT public notification duties include traffic control and updating Highway Condition Report (HCR) Drive Texas.
- Advanced briefing/debriefing differ between Districts.

Communication with Outside Agencies

Common Responses from TxDOT

- TxDOT is responsible for notifying counties of wildland fire evacuation routes.
- Districts typically coordinate with DDC, DPS, TA&MFS, local governments, TCEQ, and utility companies during a wildland fire event.
- Interaction with other agencies outside of a wildland fire event is key to effective response during an event.
- There is no standard statewide protocol for interacting with outside agencies during a wildland fire event.
TxDOT Resource Utilization during Events
Common Responses from TxDOT

- Equipment typically used by TxDOT during an event includes: dozers, motor-graders, fuel trailers, water trailers, sign trailers, and traffic control devices.
- Only TxDOT personnel use TxDOT equipment.
- The number of TxDOT personnel deployed during a wildland fires event varies significantly by District and event size, although teams are typically small.

- Volunteer firefighters who are TxDOT employees may be approved for personal leave during an event.
- The amount of TxDOT fuel given to outside agencies varies by District and fire size.
- In addition to fuel, water is the resource most commonly distributed during an event.
- Districts have various individuals assigned by the DOM responsible for filing for reimbursement. Few districts have filed for and/or received reimbursement.
TxDOT Responsibilities to Employee/Public Safety

Common Responses from TxDOT

- TxDOT employees are not firefighters and should avoid direct contact with wildland fires.
- Division response trailers will carry PPE to district employees during major events.
- TxDOT works with the DPS to ensure public safety by deploying traffic control.
- Detailed local maps are a beneficial resource if spotters are not available.

Advanced Preparation, Readiness & Training

Common Responses from TxDOT

- Districts try to keep equipment pre-loaded and ready to deploy whenever possible.
- Districts often watch weather reports and try to stay aware of TA&MFS notifications.
- Districts typically have no formal staging protocols.
Existing Resources/Guidance for Wildland Fires Response
Common Responses from TxDOT

- Districts identified the need for detailed statewide guidance for wildland fire response.
- TxDOT Maintenance Operations Manual should also be updated.
- TxDOT requires FEMA IS training. Additional training resources are available through TA&MFS.

Summary and Review

1. TxDOT’s chief goal is safety.
2. Maintaining communication and a chain of command during a wildland fire incident is critical.
3. TxDOT employees must understand their role during wildland fire response.
Learning Objectives

Upon completion of this section, the learner will be able to:

1. Know what resources the state uses in responding to wildland fire incidents.

2. Understand what role TxDOT plays in the response to wildland fire incidents.
Learning Objectives, cont'd

3. List what agencies TxDOT may interact with during a wildland fire response.

4. Locate important state resources on a map.

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Research Project 0-6735
Best Practices for TxDOT on Handling Wildland Fires

Texas State Emergency Management (EM)

- Covered in Ch. 418 (Emergency Management) and Ch. 421 (Homeland Security) of Texas Govt. Code
- Guidance for State Emergency Management Plan and Annexes found at http://www.txdps.state.tx.us/dem/downloadableforms.htm#stateplan

- **Agencies Involved in Statewide EM**
  - The Governor’s Office of Homeland Security
  - State Emergency Management Council (SEMC)
  - Div. of Emergency Management (TDEM), Texas DPS
  - Texas Forest Service (TA&MFS)
Primary and Secondary State Emergency Functional Responsibilities

**Research Project 0-6735**
Best Practices for TxDOT on Handling Wildland Fires

### Primary and Secondary State Emergency Functional Responsibilities

<table>
<thead>
<tr>
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<th>Function</th>
<th>Primary State Agency</th>
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**Research Project 0-6735**
Best Practices for TxDOT on Handling Wildland Fires

### Primary and Secondary State Emergency Functional Responsibilities

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Texas State Emergency Management

- Texas uses a “tiered” approach to wildland fire response and suppression.
- Local fire departments and counties are the first responders.
- State response activated as wildland fires or conditions exceed the local ability to control.
- If State resources are deemed insufficient, out-of-state agencies are called upon.
- Unless there is imminent threat to life and property, TxDOT can’t respond without DDC approval.

Texas Emergency Assistance Channels

If state resources are inadequate to handle the emergency, the Governor may request aid from other states, the Federal government, or from the federal government.

Employ state resources to respond to emergency needs. For major events, state resources may be deployed in conjunction with the federal government.

Requests: resources from the local Emergency Operations Center.

1. Use own resources first.
2. Share incident and agreements with neighboring counties.
3. If local resources are inadequate, request state assistance from local Emergency Operations Centers.
The Governor’s Office of Homeland Security

- The Director of the Governor’s Office of Homeland Security serves as the
  - Director of the Texas Division of Emergency Management (TDEM), and as
  - Chair of the State Emergency Management Council (SEMC)
- The SEMC has been authorized to issue directives that are necessary to effectively follow the Texas Disaster Act (Ch. 418, Govt. Code)

State Emergency Management Council (SEMC)

- Adjutant General’s Department (AGD)
- American Red Cross (ARD)
- Department of Information Resources (DIR)
- General Land Office (GLO)
- Governor’s Division of Emergency Management (GDEM)
- Office of Rural Community Affairs (ORCA)
- Public Utility Commission of Texas (PUC)
- Railroad Commission of Texas (RRC)
- Salvation Army (TSA)
- State Auditor’s Office (SAO)
- State Comptroller of Public Accounts (CPA)
- Texas Animal Health Commission (TAHC)
- Texas Attorney General’s Office (OAG)
- Texas Building & Procurement Commission (BPC)
- Texas Commission on Environmental Quality (TCEQ)
- Texas Commission on Fire Protection (TCFP)
- Department of Aging & Disability Services (DADS)
- Department of Agriculture (TDA)
- Department of Assisted & Rehabilitative Services (DARS)
- Department of Criminal Justice (TDCJ)
- Department of Housing & Community Affairs (TDHCA)
- Department of Insurance (TDI)
- Department of Protective & Family Services (DPFS)
- Department of Public Safety (DPS)
- Department of State Health Services (DSHS)
- Department of Transportation (TxDOT)
- Texas Education Agency (TEA)
- Texas Engineering Extension Service (TEEX)
Research Project 0-6735
Best Practices for TxDOT on Handling Wildland Fires

---Map of DDC ---

TA&MFS Texas Fire Resource Availability Map

http://TA&MFSfrp.tamu.edu/wildfires/resources.png
Five Types of Emergency Incidents

- These are rated by complexity.
  - Type I incident
  - Type II incident
  - Type III incident
  - Type IV incident
  - Type V incident

- TA&MFS developing teams to handle different types of incidents.
- Currently there are multiple Type III Teams and one Type II Team

 Agencies Responsible for Coordinating Wildfire Response in Texas

- TDEM Disaster District Committees (DDCs)
- Texas Intrastate Fire Mutual Aid System (TIFMAS)
- National Wildfire Coordination Group (NWCG)
- Texas Forest Service (TA&MFS)
Exercise 2.1

TxDOT Wildland Fire Management

In your Learner Groups, discuss the following question:

1. What other agencies are you likely to interact with personally when responding to a wildland fire?
2. Jot down your ideas for discussion.

Be prepared to discuss your answers (2 minutes).
National Incident Management System (NIMS)
http://www.fema.gov/emergency/nims/NIMSTrainingCourses.shtm

ORGANIZATION AND COMMUNICATION

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Best Practices for TxDOT on Handling Wildland Fires

NIMS and TxDOT

- When directed by DDC to serve in emergency incidents, TxDOT plays a critical role in public guidance during emergency incident occurrence and has to work within the NIMS framework.
NIMS Training Requirements for TxDOT Personnel

<table>
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Recommended training for identified personnel. Districts shall ensure at least one district staff member has completed all courses.

VIDEO 2.1 (01:25)
What is NIMS?

CREDIT
“ISS-700.a National Incident Management System, and Introduction, I-700.a”
FEMA
Used with permission.
Incident Command System (ICS) Management Characteristics

14 Management Characteristics

- Common Terminology
- Modular Organization
- Management by Objectives
- Incident Action Planning
- Manageable Span of Control
- Incident Facilities and Locations
- Comprehensive Resource Management
- Integrated Communications
- Establishment and Transfer of Command
- Chain of Command and Unity of Command
- Unified Command
- Accountability
- Dispatch/Deployment
- Information and Intelligence Management
Integrated Communications

Facilitated through development and use of common communications plan and interoperable communications processes and architectures.
- ICS Form 205
- Links operational and support units of various agencies
- Necessary to maintain communications connectivity and discipline
- Planning should address equipment, systems, and protocols necessary to achieve integrated voice and data communications

ICS Form 205

INCIDENT RADIO COMMUNICATIONS PLAN (ICS 265)

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<th>Channel Use</th>
<th>Frequency</th>
<th>Purpose</th>
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R2.3 [2.3]
Establishment and Transfer of Command

Command function must be clearly established from beginning

- Primary agency designates individual at scene responsible for establishing command
- When command is transferred, process must include briefing that captures all essential information for safe and effective operations

Chain of Command and Unity of Command

Chain of Command
- Orderly Line of Authority within the ranks of incident management organization

Unity of Command
- All individuals have a designated supervisor to whom they report at the scene of the incident
- Purpose is to clarify reporting relationships and eliminate confusion
- Incident managers must be able to direct the actions of all personnel under their supervision
Unified Command

Incidents that involve multiple jurisdictions or multiagency involvement require unified command

• Allows agencies to work together effectively without affecting individual agency, authority, responsibility, or accountability

Accountability

ICS principles to ensure accountability:

• Resource Check-In/Check-Out Procedures
• Incident Action Planning
• Unity of Command
• Personal Responsibility
• Span of Control
• Resource Tracking
Dispatch/Deployment

Resources should only respond when requested or dispatched by an appropriate authority through established resource management systems.

- Resources not requested must refrain from spontaneous deployment
- For TxDOT, this request comes down through the DOM

Exercise 2.2
TxDOT Wildland Fire Management

In your Learner Groups, discuss the following question:

1. What TxDOT employees at the District level are required to have ICS 300 and 400 level training?

*Be prepared to discuss your answers (2 minutes).*
Summary and Review

1. Texas responds to wildland fires with various state resources.
2. TxDOT is not a primary response unit, but rather responds to wildland fire incidents as part of a tiered system.
3. There are a number of other agencies with whom TxDOT may interact during a wildland fire incident.
4. DDC directs when TxDOT will respond unless there is imminent threat to life or property.
MODULE 3

Resources and Equipment

Learning Objectives

Upon completion of this section, the participant will be able to:

1. List sources of information for wildland fire response.
2. Explain what heavy equipment might be available for wildland fire response.
Resources for Emergency Response

- Information Resources
- Heavy Equipment
- Personal Protective Equipment (PPE)
- Communication Equipment
- Training Resources

Situation Awareness

Information
- Objective(s)
- Previous Fire Behavior
- Communication
- Weather Forecast
- Who’s in Charge
- Local Factors
Resources for Emergency Response
- Information Resources -

• Training & Education, Experience, Each other
• TxDOT
• FEMA
• TA&MFS
• TICC
• NOAA/NWS

Resources for Emergency Response
- Information Resources -

• TxDOT

http://crossroads/org/mnt/
Resources for Emergency Response

- Information Resources -

- **FEMA**

- **TA&MFS**
  [http://texasforestservice.tamu.edu/main/default.aspx](http://texasforestservice.tamu.edu/main/default.aspx)
Resources for Emergency Response
- Information Resources -

• TA&MFS: Resource Protection

- Resources and Equipment

Resources for Emergency Response
- Information Resources -

• TA&MFS: Predictive Services

Resources for Emergency Response  
- **Information Resources** -

- TA&MFS: Predictive Services

Resources for Emergency Response  
- Information Resources -

• TICC:  
  [Link to TICC website]

Resources for Emergency Response  
- Information Resources -

• TICC: Fuels/Fire Danger  
  [Link to Fuels/Fire Danger page]
Resources for Emergency Response

- **Information Resources** -

  - **TICC: Incident Response**
    [http://ticc.tamu.edu/Response/FireActivity/](http://ticc.tamu.edu/Response/FireActivity/)

  ![TICC Image](image1)

  **RESOURCES AND EQUIPMENT**

  **Meso-West**

  [http://mesowest.utah.edu/cgi-bin/droman/mesomap.cgi?state=TX&rawsflag=3](http://mesowest.utah.edu/cgi-bin/droman/mesomap.cgi?state=TX&rawsflag=3)

  ![Meso-West Image](image2)
Resources for Emergency Response

- **Information Resources** -

- **NOAA/NWS: Fire Weather**
  
  [http://radar.srh.noaa.gov/fire/](http://radar.srh.noaa.gov/fire/)

Resources for Emergency Response

- **Information Resources** -

- **NOAA/NWS**

[Diagram of National Weather Service (NWS) Offices and Centers associated with Texas Department of Transportation (TxDOT) Region]
Resources for Emergency Response
- **Information Resources** -
  - NOAA/NWS: Fire Weather
    
    http://www.nws.noaa.gov/organization.php

Resources for Emergency Response
- **Information Resources** -
  - NOAA/NWS: Fire Weather
    
Resources for Emergency Response

- Information Resources -

- NOAA/NWS: Fire Weather
  http://www.hpc.ncep.noaa.gov/dailywxmap/

- Heavy Equipment -

- Dozer Boss
  DOZB

- Strike Team Leader Dozer
  STLD

- Strike Team Leader Tractor/Plow
  STPL

  All now replaced by

- Heavy Equipment Boss
  HEQB
Resources for Emergency Response
- **Heavy Equipment** -

![Dozer Use Hand Signals]

- **Guidelines for maximum percent slope**
  - 75% downhill maximum
  - 55% uphill maximum
  - 45% sidehill slope

**Resourses and Equipment**
Resources for Emergency Response

- **Heavy Equipment -**

- **Types of Blades**
  - Straight Blade – can be angled to push soil to either side of the dozer
  - ‘U’ Blade – used for pioneering fireline and is often followed by a straight blade
  - Brush Blade – best use is pioneering in brush, clearing and piling slash, mop up work, and certain rehabilitation work
  - V Blade – Best in swampy ground and is also good for pioneering through dense stands of small diameter fuels

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**Exercise 3.1**

**TxDOT Wildland Fire Management**

**Individual Assignment**

1. Does your crew use these hand signs?
2. How can your crew’s communication when using heavy equipment improve?

*Be prepared to discuss your answers (2 minutes).*
Resources for Emergency Response
- Heavy Equipment -

- There is much more on Heavy Equipment such as:
  - safety zone and escape route considerations
  - watershed considerations
  - special considerations
  - use, terminology, and maintenance

For more information contact your TA&MFS Regional Fire Coordinator.

Summary and Review

1. TxDOT employees engaged in responding to wildland fire incidents should be aware of information regarding weather, safety hazards, etc.

2. Heavy equipment operators should follow standard protocols for vehicle operation during wildland fire response.
Learning Objectives

Upon completion of this section, the participant will be able to:

1. Explain what PPE is needed when responding to a wildland fire situation
2. Explain the new regulations regarding communication during a wildland fire situation
Learning Objectives, cont’d

3. Identify radio communication limitations at a wildland fire site
4. Understand various situation risks involved in wildland fire response

Resources for Emergency Response

- **Personal Protective Equipment** -
  - NWCG recommends the following gear for all firefighters:
    - fire resistant shirt and pants or coveralls,
    - helmet,
    - eye protection,
    - heavy-duty leather gloves,
    - 8” tall laceup leather boots, and
    - a fire shelter
  - TxDOT has two District response trailers equipped with wildland fire PPE and available upon request for extreme wildland fires.
Resources for Emergency Response
- Personal Protective Equipment -

- Fire-resistant coveralls
  Topps Economy Nomex IIIA
  $233.50 - $273.00

- Helmet (white)
  Bullard "USRX Series" Helmet
  $176.50
Resources for Emergency Response
- **Personal Protective Equipment** -

- **Eye protection**

  Shark Hunter Range
  Safety Glasses -
  Bouton $4.50 –
  $5.75

Resources for Emergency Response
- **Personal Protective Equipment** -

- **Leather gloves**

  North Star 100% Leather
  Pull-Strap Driver Gloves
  $ 19.50
Resources for Emergency Response
- Personal Protective Equipment -

- Leather steel-toe boots

Fire Flash Xstream Boot 10in
Uppers NFPA – Haix
$ 423.00

Resources for Emergency Response
- Personal Protective Equipment -

- New Generation fire shelter

New Generation Rev-E Fire Shelter
$ 428.50
Resources for Emergency Response  
- Personal Protective Equipment -

- Current Resources for TxDOT employees  
  - Two emergency response trailers equipped with  
    - Nomex Coveralls  
    - Helmets/face shields  
    - Fire Shelters  
- Resources TxDOT Personnel should already be equipped with:  
  - Change of clothes (all cotton)  
  - Glasses/Sun Glasses  
  - Gloves  
  - Boots  

*Remove tags from all clothing

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Exercise 4.1  
TxDOT Wildland Fire Management

In your Learner Groups, discuss the following questions:

1. Why is it important to always wear PPE?
2. Why do we sometimes forget to equip proper PPE?

*Be prepared to discuss your answers (2 minutes).*
• Texas Statewide Interoperability Channel Plan
  http://tsiec.region49.org/
• Most vehicles have radios which comply with the TSICP.
• In some areas with rough terrain, communication is often broken.
• Blackberries

• Texas Statewide Interoperability Channel Plan
  http://tsiec.region49.org/
• 2012 changes
  – Removed Digital P25 requirements
  – Removed reference to P25 compliance by 2015

  – Texas Law 1 TXCALL1D
  – Texas Law 2 TXCALL2D
Resources for Emergency Response
- Communications -

- Texas Statewide Interoperability Channel Plan
  - TxDPS recommended radio programming
  - 21 VHF *Narrowband* (NB) interoperable channels
  - 2 State of Texas VHF NB interoperability calling channels
  - 8 VHF *wideband*
Resources for Emergency Response - Communications -

• Factors that Affect Radio Communications:
  – Knowledge of the radio issued to individuals
  – Net control, frequencies
  – Line of sight restrictions
  – Antenna polarization effect
  – Minimizing noise interference
  – Wideband vs. narrowband
  – Solar flares

Resources for Emergency Response - Communications -

• How to mitigate potential problems
  – Implement effective communication procedures
  – Give a good comprehensive briefing
  – Confirm that relayed information is received, acknowledged, and understood
  – Keep a continuous information flow
  – Establish emergency check-in procedures
  – Provide a minimum of four radios per 20-person crew
  – Include district radio communication technician as part of responders.
Resources for Emergency Response - Communications -

• Five Communication Responsibilities
  – Brief others
  – Debrief your actions
  – Communicate hazards to others
  – Acknowledge messages
  – Ask if you don’t know

Exercise 4.2
TxDOT Wildland Fire Management

In your Learner Groups, discuss the following question:

1. How will the changes to radio operation protocols affect communications at a wildland fire event?
2. List a few of the factors that affect communication that you may encounter.

Be prepared to discuss your answers (2 minutes).
Resources for Emergency Response
- Situational Safety -

• Driving Safety
  - Drive only when well-rested
  - Practice situational awareness
  - Never drive when taking over-the-counter or prescription medications which may impair driving or operating heavy equipment.
  - Delegate navigation or communication to the passenger
  - Constantly move your vision to avoid highway hypnosis
  - Avoid eating or drinking
  - Be patient

Resources for Emergency Response
- Situational Safety -

• Hazardous Materials Encounters
  - Types of hazardous materials
    • Clandestine drug waste
    • Midnight dumping
    • Transportation accidents
  - Self-protection is your first responsibility
  - Respond to all encounters with the three R’s
    • Recognize
    • Retreat
    • Report
  - See OSHA training 1910.120 (q)
Resources for Emergency Response
- **Situational Safety** -

- **Vehicle Entrapment (Wildfire Lessons Learned Center)**
  - Using a vehicle during fire entrapment is an option if in a safety zone
  - Park the vehicle in an area void of vegetation or behind a natural barrier, but never on the downhill side of a road or under overhanging hazards
  - Position the crew portion of the vehicle away from the fire with the parking brake on, motor running, vehicle lights on, windows up, and doors unlocked
  - The reflective materials from fire shelters can be used to cover windows
  - Protect your airway; remain as low as possible and cover mouth and nose with a dry bandana

- **Expect the following conditions:**
  - Temperatures may reach over 200 degrees
  - Smoke and sparks may enter the vehicle
  - Plastic parts may melt and give off toxic gases
  - Windows may crack
  - Exposed skin may receive radiant heat burns
Resources for Emergency Response
- **Situational Safety** -

- **Vehicle Entrapment (Wildfire Lessons Learned Center)**
  - If the vehicle catches fire or windows blow out, and you must exit the vehicle before the fire has passed:
    - Each crewmember should cover himself with a fire shelter
    - Exit the vehicle from side away from the greatest heat
    - Stay together and get as low to the ground as possible while moving away from the vehicle
    - Deploy fire shelter in a safe area.

- **Managing Vehicle Traffic in Smoke**
  - Identify alternate traffic routes
  - Identify important, public roads that may be impacted by smoke
  - Identify adequate equipment and trained personnel to control traffic
  - Identify traffic routes subject to shift in wind directions
Resources for Emergency Response - Additional Safety Concerns -

- Fatigue/Stress
- Heat Disorders
  - Heat cramps
  - Heat exhaustion
  - Heat stroke
- Hydration
  - Dehydration
  - Hyponatremia (over-hydration)
- Hypothermia
- Smoke Exposure

Resources for Emergency Response - Additional Safety Concerns -

- Power Lines
- Gas or water lines
- Buried utility lines
- Liquefied Propane Gas (LPG) Tank Hazards
- Static Electricity Hazards
- Thunderstorms
Exercise 4.3
TxDOT Wildland Fire Management

In your Learner Groups, discuss the following questions:

1. What situational hazards have I encountered in the field?
2. Did I respond properly?
3. What are the proper steps for managing vehicle traffic in smoke?

*Be prepared to discuss your answers (3 minutes).*

Summary and Review

1. TxDOT employees should have appropriate clothing, PPE, and equipment when responding to a wildland fire
2. TxDOT employees may encounter numerous situational safety hazards when responding to wildland fires and should know how to address these hazards
3. TxDOT has two District response trailers that will carry PPE to District employees during a major wildland fire event
MODULE 5

Documentation and Data Collection

Learning Objectives

Upon completion of this section, the participant will be able to:

1. Understand how to use a Daily Activity Report to collect data from a wildland fire situation.

2. Understand how to use the TxDOT MNT website for data collection.
Learning Objectives, cont’d

3. Understand how to use the TxDOT EOC website for data collection.

4. List other data collection resources available.

Documentation and Data Collection

• How do TxDOT districts currently collect data?
  - Emails and Sharepoint
  - Wildland fire resource committed notes made by MS emailed to District Office Manager
  - Maintenance Division Database
  - Daily Activity Reports (DARs)
  - Employee diaries, situation reports, equipment and personnel logs
Research Project 0-6735
Best Practices for TxDOT on Handling Wildfires

Documentation and Data Collection

- DARs

DOCUMENT AND DATA COLLECTION

Research Project 0-6735
Best Practices for TxDOT on Handling Wildfires

TxDOT Crossroads MNT Website
Research Project 0-6735
Best Practices for TxDOT on Handling Wildfires

TxDOT Crossroads MNT EM Portal
Research Project 0-6735
Best Practices for TxDOT on Handling Wildfires

TxDOT EOC Website
Research Project 0-6735
Best Practices for TxDOT on Handling Wildfires

TxDOT EOC Website
### Texas State Emergency Management (EM)
### TxDOT Wildfire Preparedness Mitigation Activities

#### Documentation and Data Collection

- **What other data collection resources are available?**
  - Operational Briefings
  - After Action Reviews (AARs)
  - “Chainsaw” AARs
Documentation and Data Collection

• Operational Briefings
  – Use the standard checklist printed on the inside cover of the National Wildland Fire Coordination Group (NWCG) Incident Response Pocket Guide (IRPG)

• Discuss the following topics
  • Situation
  • Mission/Execution
  • Communications
  • Service/Support
  • Risk Management
• AARs
  – In-depth discussion of event with the objective to identify successes and failures
  – Used to get maximum benefit from every incident or project
Documentation and Data Collection

• AARs
  – Questions to discuss:
    • What was planned?
    • What actually happened?
    • Why did it happen?
    • What are we going to do next time?

• “Chainsaw” AARs
  – Simple, quicker format of AAR
  – Assemble the team and ask one member:
    • What is one thing that went well?
    • What is one thing that went badly?
    • What is one thing you would do differently?
    • What is one thing you learned?
  – Continue to each member
  – Note comments
Documentation and Data Collection

- Report any concerns or safety issues to team leader.
- Follow TxDOT chain of authority when reporting concerns or issues.

Exercise 5.1
TxDOT Wildland Fire Management

In your Learner Groups, discuss the following questions:

1. Do we currently debrief after incidents?
2. Why or why not?
3. List available data collection resources.

*Be prepared to discuss your answers (3 minutes).*
Summary and Review

1. TxDOT has several built-in programs for data collection.
2. There are several other resources available for collecting, discussing, and disseminating data and information related to wildland fire incidents.
MODULE 6
Training Programs

TxDOT Wildland Fire Management Training

Learning Objectives
TXDOT WILDLAND FIRE MANAGEMENT

Upon completion of this section, the participant will be able to:

1. Understand Lookouts Communication Escape Routes Safety Zone (LCES)
2. Understand the basics of fire behavior
3. Understand basic fire suppression methods.
TXDOT WILDLAND FIRE MANAGEMENT TRAINING

The following presentation is a compilation of several presentations by the Texas A&M Forest Service (TA&MFS) and Texas Department of Transportation (TxDOT) district personnel.

It also contains information from the following NWCG training materials: Basic Firefighting (S-130), Intro to wildland fire behavior (S-190), Introduction to ICS (I-100), Human factors in the wildland fire service (L-180), Fireline Handbook (PMS 410-1), Incident Response Pocket Guide (PMS 461), and Dozer Boss (S-232)

Module 6.1: LCES
TxDOT Wildland Fire Management

LCES:
1. Lookouts
2. Communications
3. Escape Routes
4. Safety Zones
Module 6.1: LCES
TxDOT Wildland Fire Management

LCES:

1. Lookouts: A person or persons who is in good communication with supervisors, crewmembers, and adjoining forces who can see “the big picture”.

2. Communications

3. Escape Routes

4. Safety Zones
Module 6.1: LCES
TxDOT Wildland Fire Management

LCES:
1. Lookouts
2. Communications
3. Escape Routes: A previously established, clearly marked, and easily accessible route that leads directly to the safety zone.
4. Safety Zones

Module 6.1: LCES
TxDOT Wildland Fire Management

LCES:
1. Lookouts
2. Communications
3. Escape Routes
4. Safety Zones: A pre-determined area of little or no fuel and where extreme fire behavior can be observed WITHOUT THE USE OF FIRE SHELTERS
Exercise 6.1
TxDOT Wildland Fire Management

Individual assignment:

1. What is LCES?
2. In the TxDOT chain of command who is the Lookout?
3. What methods of Communication are used by TxDOT?
4. What is an Escape route?
5. Where are the Safety zones?

Be prepared to discuss your answers (2 minutes).

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Summary and Review

1. Lookouts provide a valuable perspective on a situation and their...
2. Communication with all levels of command.
3. Escape routes are direct route(s) to a...
4. Safety zone large enough for crew and equipment.
Module 6.2: Fire Behavior Basics
TxDOT Wildland Fire Management

The Fire Triangle:
- Radiation
- Conduction
- Convection
- Wind Speed
- Closed/Open
- Topography

Fuel Types:
1. Grass
2. Shrub
3. Timber Litter
4. Logging Slash
Module 6.2: Fire Behavior Basics
TdDOT Wildland Fire Management

Fuel Characteristics
1. Fuel Moisture
2. Size and Shape (The physical characteristics of fuels)
   - Light/ Heavy
3. Fuel Loading
4. Horizontal Continuity and Vertical Arrangement

Fire Spread
1. Three types of fire spread
   - Creeping
   - Running
   - Torching and spotting
2. These three are in the order of progression. For example, a fire will creep before it starts to run.
Module 6.2: Fire Behavior Basics
TxDOT Wildland Fire Management

Temperature and Relative Humidity

NOON       MIDNIGHT       NOON

MAXIMUM RELATIVE HUMIDITY

TEMPERATURE MINIMUM

Training Programs  SLIDE 6.15

Module 6.2: Fire Behavior Basics
TxDOT Wildland Fire Management

Cold Front

1. Wind Direction will abruptly shift

2. Fire pattern will shift before (strong southerly winds drive fire head N/NW) and (W/NW driving the head fire to the E/SE) following passage of frontal passage.

3. Rapid drop in relative humidity within 24 hours of front of passage

Training Programs  SLIDE 6.16
Module 6.2: Fire Behavior Basics
TxDOT Wildland Fire Management

Thunderstorms
- Indirect unstable air
- Possibility of lightning
- Downdrafts and in-drafts causing wind shifts

Exercise 6.2
TxDOT Wildland Fire Management

Individual assignment:
1. What are the three parts of a fire triangle?
2. What fuel types and structure does your region have?
3. Why does fire burn more rapidly in the afternoon than in the morning or at night?
4. What weather conditions can affect fire in your Region?

Be prepared to discuss your answers (2 minutes).
6.2 Summary and Review

1. Fuel will vary within the region and across as-well-as within districts.

2. Fire spread will change with fuel type, characteristics and weather.

3. Weather is a key factor in fire training into a season, event, during the event, and following the event.

4. Fuels, weather and topography play key rolls in the growth potential of wildland fires.

Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

Resources

1. Kind
   - **Crew** – “An organized group of workers, such as firefighters under the leadership of a crew boss or other designated official, that conduct wildland fire operations.”
Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

Resources Cont.

2. Category
   - **Dozer** – “A tracked vehicle with a front mounted blade used for exposing mineral soil to construct fireline or firebreaks.”
   - **Fire Plow** – “A heavy duty plowshare or disc plow usually pulled by a tractor to construct a fireline.”

Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

Resources Cont.

2. Category
   - **Tractor** – “A rubber tired or tracked rider-controlled automotive vehicle, used in wildland fire management for pulling a disk or a plow to construct fireline by exposing mineral soil.”
Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

Resources Cont.
2. Category
   - Single - An individual, a piece of equipment, crew or team with an identified work supervisor that can be used on an incident.
   - Strike Team - specified combinations of kind type unit resources.
   - Group - Divide incidents into functional areas of operation.

Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

Operations
1. Attack
   - Direct - ... physically separating the burning from unburned fuel.
   - Parallel - ... parallel but not directly at the fire.
   - Indirect - ... control lines are located a considerable distance away from the fire’s active edge.
Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

Operations
2. Other
   - **Mop up** - Extinguishing or removing burning material near control lines.

---

Direct Attack: Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.
Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

1. Attacking the fire directly on the fire’s edge
   - Gives firefighters good view of what the fire is doing
   - Provides a quick escape route to the black area for use of safety zones
   - Ensures a secure anchor point
   - Roll into the fire
   - ANCHOR & FLANK

Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

- Parallel Attack: Method of fire suppression in which fireline is constructed approximately parallel to, and just far enough from the fire edge to enable workers and equipment to work effectively, though the fireline may be shortened by cutting across unburned fingers.
Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

- **Parallel Attack**: The intervening strip of unburned fuel is normally burned out as the control line proceeds, but it may be allowed to burn out unassisted where this occurs without undue delay or threat to the fireline.

1. **Attacking the fire parallel, but not directly on the fire’s edge.**
   - Fire may be burning too hot for direct attack
   - Can see main fire
   - Unburned fuel between you and the fire
   - Roll out [fuels] away from the fire
   - Escape routes and safety zones must be established
Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

Indirect Attack: A method of suppression in which the control line is located some considerable distance away from the fire’s active edge. Generally done in the case of a fast-spreading or high-intensity fire and to utilize natural or constructed firebreaks or fuelbreaks and favorable breaks in the topography.

Indirect Attack: The intervening fuel is usually backfired; but occasionally the main fire is allowed to burn to the line, depending on conditions.
Module 6.3: Suppression Methods
TxDOT Wildland Fire Management

1. Backing off to encircle fire.
   - Use road, streams, other barriers
   - Line will have to be burned out
   - Fire behavior makes direct attack difficult
   - Unburned fuel between you and the fire
   - Roll out away from the fire
   - May or may not be able to see main fire
   - Ensure LCES is in place
   - Fire could potentially jump control lines
   - Ensure solid anchor point

6.3 Summary and Review

1. Various resource kind, category, and types

2. Three primary methods to attacking a fire
   - Direct attack: Attacking the fire directly on the fire’s edge
   - Parallel attack: Attacking the fire parallel to but not directly on the fire’s edge.
   - Indirect attack: Backing off to encircle fire
Exercise 6.3
TxDOT Wildland Fire Management

Individual assignment:
1. What kind, category, and type of recourse does TxDOT provide?
2. What type of attack or function does the team provide?

*Be prepared to discuss your answers (2 minutes).*

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Module 6.4: Training Resources
TxDOT Wildland Fire Management

Online courses
1. Texas A&M Forest Service
   - [http://texasforestservice.tamu.edu/main/default.aspx](http://texasforestservice.tamu.edu/main/default.aspx)
   - [https://tiwa.tamu.edu/RegSysStudent/Home/Home.aspx](https://tiwa.tamu.edu/RegSysStudent/Home/Home.aspx)
2. Texas Interagency Coordination Center
   - [http://ticc.tamu.edu/index.html](http://ticc.tamu.edu/index.html)
   - [http://ticc.tamu.edu/Response/FireActivity/](http://ticc.tamu.edu/Response/FireActivity/)
3. NOAA
   - [http://innovation.srh.noaa.gov/wordpress/imet/](http://innovation.srh.noaa.gov/wordpress/imet/)
Module 6.4: Training Resources
TxDOT Wildland Fire Management

Training & Education
1. Wildfire Academies & Fire Schools
   - http://ticc.tamu.edu/Training/TrainingMain.htm

To find out who your Regional Fire Coordinator is, go to:

http://texasforestservice.tamu.edu/main/article.aspx?id=10580
Exercise 6.4
TxDOT Wildland Fire Management

Individual assignment:

1. Where can resources be found?
2. Where can training opportunities be found?
3. What training opportunities are there?

*Be prepared to discuss your answers*  (2 minutes).

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Summary and Review

1. Training opportunities are available from numerous sources.
2. Many training programs are required for TxDOT personnel.