Tasmanian Forest Industries Fire Weather Evaluation

Level 1

AHCWRK302A - Monitor weather conditions

FPICOR3203B - Evaluate fire potential and prevention

Introduction

- Welcome to the fire weather evaluation training session
- On successful completion of this program you will receive the ForestWorks endorsement for fire weather evaluation
- This endorsement replaces the fire weather observation endorsement.

Introduction

- Housekeeping
  - Emergency exits
  - Facilities
  - House rules
  - Designated smoking areas.

Introduction

- Assessment process
  - On completion of the delivery session an assessment will be conducted to achieve your endorsement
  - This will include:
    - Theory assessment
    - Practical assessment
    - The theory assessment can be undertaken either verbally or in written form
    - Please discuss this with your trainer.

Course Content

This course will cover the following:

- Weather monitoring
- Fire preparedness
- Impact and causes of fire
- Instruments and equipment
- Maintenance
- Elements of weather
- Closure of operations.

Weather Monitoring Period FAQ's

- Fire weather monitoring will be undertaken on forest operations from October 1st through until April 30th (this may be extended due to extreme conditions)
- Readings to be taken from commencement of operation until end of work on each site
- Readings to be taken every 2 hours until a FFDI rating of 12 is reached and then hourly
- The only exception is when it's raining however this should be noted in your log book.

Fire Preparedness

Prior to fire season you will need to:

- Run and test all fire suppression equipment (pumps, extinguishers, hoses and ancillary equipment)
- Recalibrate electronic weather instruments (if required)
- Check fire weather kits to ensure they are compliant
- Training/refresher course undertaken.

Why Monitor Fire Weather?

- To prevent the start of fires in hazardous activities during periods of severe fire weather whilst using machinery or power equipment

- By monitoring fire weather we can minimise the risk of potential fire during the prescribed period.

Impact Of Fire On Operations

- Loss of life or serious injury
- Negative impact on safety of personnel
- Loss of property/equipment
- Loss of income - employer/employee
- Loss of resource
- Legal action if found liable and/or negligent.

Causes Of Fire On Your Operation

- Exhausts on chainsaws
- Discarded cigarette butts
- Welding or grinding
- Friction – dragging timber over rocky terrain
- Illegally lit fires
- Sparks from track plates on rocky terrain
- Direct heat from machinery
- Mechanical maintenance.

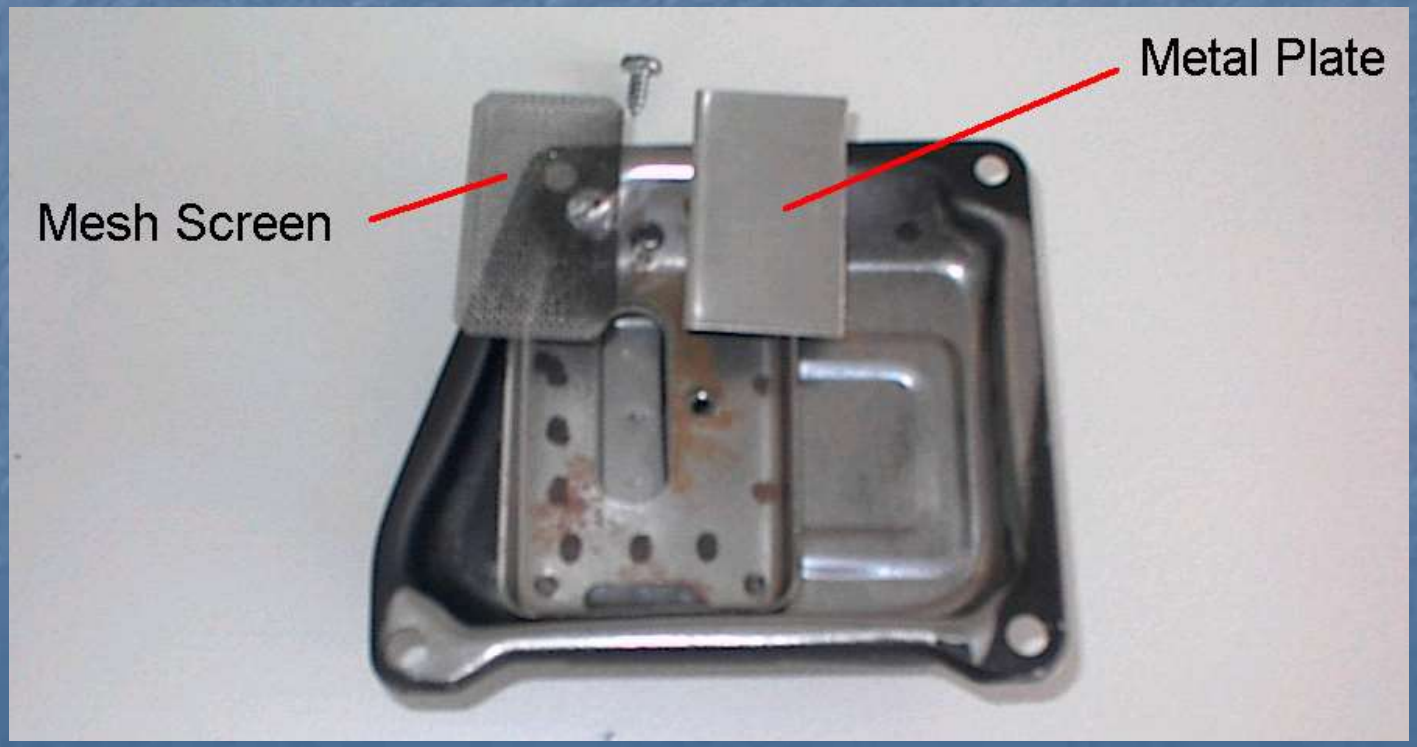
Exhaust Systems

- All exhausts including chainsaws, mobile machinery and portable engines need to be in good working order
- A spark arrestor/s must be fitted and operational.

Stihl Modification

- Replace mesh screen with metal plate during fire season

This modification applies to the Stihl 066 or MS 660.



Fuels On Worksite

All fuels on site must be stored in accordance with the Forest Practices Code. This includes:

- Hydrocarbons
  - Diesel
  - Petrol
  - Oil
- These need to be stored in a mineral earth bund capable of holding all stored fuels on the operation
- This helps to minimise the fire risk on site.

Fire Weather Monitoring Equipment

May include the following:

- Wet and dry thermometers
- Wind speed meter
- Sling psychrometer
- Electronic meter (wind, temp and relative humidity)
- Relative humidity charts
- McArthur forest fire danger meter
- Log book
- Beaufort scale
  - There may be other weather measuring equipment and instruments available.

Locations For Weather Readings

- Old disused log landing – if using wet and dry hanging thermometer
- Close to parking or lunch area
- Landing site
- In a shaded area.

Fire Weather Readings

What are we looking for?

- Drought factor
- Dry temperature
- Wet temperature
- Relative humidity reading (RH)
- Wind speed
  - When calculated using a McArthur scale we arrive at a forest fire danger index (FFDI).

Maintenance

- All electronic meters require calibration as per manufacturers specifications and as per industry requirements
- This must be completed prior to fire season if reading temperature and relative humidity (RH)
- Wicks need to be checked prior to every fire season to ensure that they are clean and well maintained.

Troubleshooting

- All measurement equipment must be kept in the shade
- Always maintain battery life
- Don’t subject equipment to knocks, bumps or drops
- Faulty instruments - is the reading what you’d expect?
- Wet bulbs allowed to dry out?
- Dirty wick affecting evaporation?
- Wrong tables used?

Drought Factor

- Drought factor is a measurement from 0 -10
- 10 being the driest and 0 being the wettest
- The drought factor is obtained via the Bureau of Meteorology or a print out of a current forecast
- If unsure always use a drought factor of 10.

Temperature

- Temperature readings can be collected using thermometers or hand held electronic devices
- Thermometers need to be placed in a shaded area
- Wait for thermometers to stabilise
- Take readings at eye level (1.7 metres).

Thermometers

- The most common thermometers used are the hanging thermometer and the slinging psychrometer
- Both these thermometers utilise a wet and dry bulb
- When using wet thermometers ensure the wick (muslin) is clean – dirty water will give an incorrect reading
- It's recommended that you use distilled clean water.

Wet And Dry Bulbs

- The wet bulb always gives a lower temperature reading
- The dry bulb always gives a higher temperature reading
- These are the two measurements used for calculating relative humidity (RH).

Wet and Dry Hanging Thermometer

Sling Psychrometer

Relative Humidity (RH)

- Relative humidity (RH) is the amount of moisture in the air
- Relative humidity (RH) is expressed as a percentage (%)
- The higher the relative humidity (RH) the more moisture in the air
- The lower the relative humidity (RH) the dryer the air is
- Therefore lower relative humidity (RH) increases the forest fire danger index (FFDI).

Wind Speed

- Take average wind speed measurements over one minute, however ten minutes is ideal
- Must be measured in kilometres per hour
- Wind speed must be taken with the meter facing into the wind
- In case of electronic equipment malfunctioning, use the Beaufort scale.

Wind Meter

Beaufort Scale

ESTIMATING WIND SPEED* Tree-top Effects	km/hr	TERM USED & BEAUFORT SCALE		FIRE NOTES	
Smoke rises vertically Leaves still	Under 1	Calm	0	Slash and Moorland	Top-disposal & Underburning
Smoke drifts slowly Slight leaf movements	1 — 5	Light Air	1		
Wind felt on face Leaves rustle	5 — 10	Light Breeze	2		
Leaves and small twigs moved	10 — 20	Light wind	3	DON'T LIGHT ANY PRESCRIBED FIRES	
Dust raised Small branches moved	20 — 30	Moderate wind	4		
Small trees sway	30 — 40	Fresh wind	5		
Large branches moved Wires whistle	40 — 50	Strong wind	6		
Large trees sway	50 — 60	Near Gale	7		
Breaks twigs off trees	60 — 75	Gale	8		
Breaks branches off	75 — 90	Full Gale	9		

WIND SPEED = 10 minutes average

STRONGEST GUSTS approximately 2 x WIND SPEED

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Wind Speed

- In order to get the correct wind speed the following is recommended:
  - In a clear area, you need to walk 10 x the height of trees downwind or 4 x the height of trees upwind
  - At this distance you can get an accurate measurement of true wind speed.

Wind Speed

- Standard wind measurements are to be taken at eye level, which is approximately 1.7 metres in height
- To get the correct wind speed add half the wind speed again (multiply by 1.5)
  - For example - Wind speed at 1.7 metres = 10 km per hour
  - Therefore add half again (5km per hour) = 15 km per hour at 10 metre height
- This will provide the actual wind speed at a height of 10 metres.

Forest Fire Danger Index (FFDI)

- The forest fire danger index (FFDI) is obtained using the McArthur scale
- A combination of drought factor, temperature, relative humidity (RH) and wind speed are used.

FOREST FIRE DANGER METER Mk5
HIGH
VERY HIGH
EXTREME
MODERATE
LOW
WIND SPEED
AIR TEMPERATURE
RELATIVE HUMIDITY
DROUGHT FACTOR
DEGREES C
km/h
RAINFALL TO 9 A.M. (mm)
NUMBER OF DAYS SINCE RAIN
DANGER INDEX
MOUNT SOIL DRYNESS INDEX
USE OF THE METER
MFG. & DIST. UNDER LICENCE
STYROX (AUST) P/L
UNIT 6/7 JUBILEE AVE.
WARRIEWOOD NSW 2102
PH: 02 9997 1000
FAX: 02 9997 2924
CSIRO
CSIRO Forestry and Forest Products
Bushfire Behaviour and Management
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Fire Danger Rating (FDR)

FIRE DANGER RATING (FDR)	FOREST FIRE DANGER INDEX (FFDI)
LOW – MODERATE	0 – 11
HIGH	12 – 24
VERY HIGH	25 – 49
SEVERE	50 – 74
EXTREME	75 – 99
CATASTROPHIC	100 +

Fire Weather Warnings

- Can be obtained from the following:
  - Local media outlets including radio, T.V. internet and newspaper
  - ABC radio provides frequent fire weather forecasts during the fire season
  - Principal Companies
  - Direct from Bureau of Meteorology Ph – 6221 2054 (24/7)
  - Warnings (recorded message) Ph – 1300 659 216

Or if have you have access to a computer:

- www.bom.gov.au
- www.fire.tas.gov.au
- www.eldersweather.com.au

Weather Warnings

Your operation could be affected by the following:

- Wind warnings
- Fire weather warnings
- Storm warnings.

Log Books

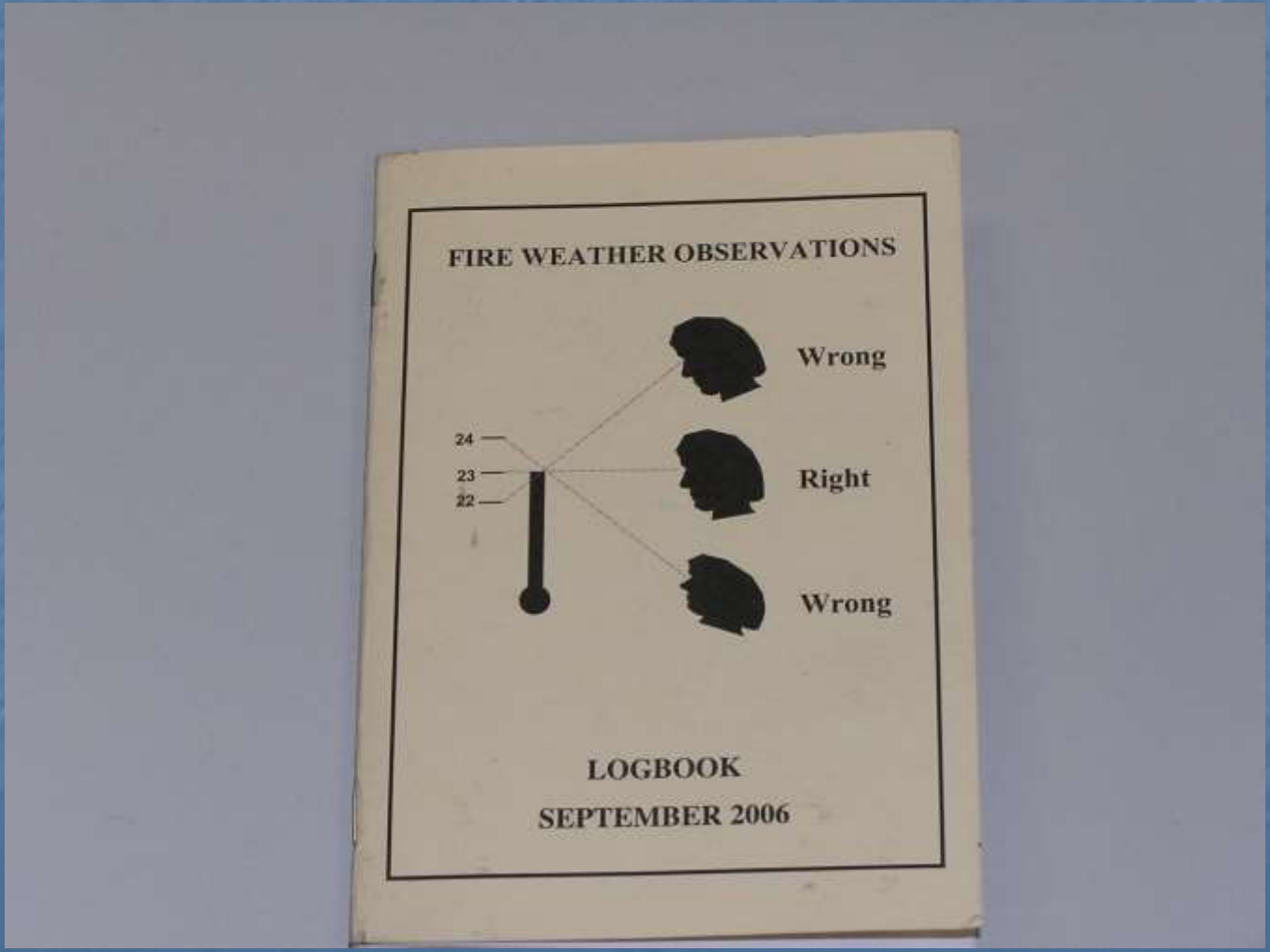
- Log books are required to record all weather readings on your site during fire season
- Log books must be produced for audit when requested
- Log books can be purchased from Forestry Tasmania district offices
- Other acceptable recording methods can be utilised.

Log Books

Log books have provisions for:

- Date
- Time
- Location or coupe
- Drought factor
- Dry and wet bulb readings (temperature in degree C)
- Relative humidity (RH)
- Wind speed and direction (km per hour)
- Fire danger rating (FDR)
- Comments (e.g. rain, showers)
  - FDR is sometimes referred to as FDI (fire danger index) or FFDI (forest fire danger index).

Fire weather log book



Closure Of Operations

SEVERE WEATHER SUSPENSION OF HAZARDOUS ACTIVITIES - minimum standards to be applied

Note: some companies and organisations specify more stringent measures

The following requirements apply to all cable harvesting operations, irrespective of forest or plantation type or time of year

AND

The following requirements apply to all conventional harvesting operations from 1st October until at least 30th April.

Closure Of Operations

All contractors engaged in hazardous forest activities must have on site:

- working set of fire weather measuring instruments
- a fire weather logbook and
- two Fire Weather Evaluators each possessing a current ForestWorks Fire Weather Evaluators licence.

Closure of Operations

Upon commencement of any hazardous forest activities:

- must take & record weather readings every 2 HOURS until end of work on each site each day
- must take & record weather readings HOURLY once the FDR calculated from weather parameters measured at the operation reaches HIGH 12, or is likely to reach this rating within the next hour.

Closure Of Operations

continued:

- must suspend operations when the FFDI calculated from weather parameters measured at the operation reaches HIGH 20 OR relative humidity is equal to or less than 30%

- Suspend operations if no Fire Weather Evaluator is on site at time of scheduled readings.

Closure Of Operations

Procedures required after shutdown:

- Remain on site for at least one hour after shutdown
- Continue to monitor the operational site for any evidence of fire which may be smouldering
- Park all machinery in a safe, clear area
- Continue weather readings as required.

Fire On Operation

Evidence of fire on your site could be, but not limited to:

- Smoke or smell of smoke
- Flame
- Smouldering materials.

Fire On Operation

If there is a fire on your operation you must:

- Stop work immediately
- Notify your Bush Boss or Responsible Officer
- Notify your Company Supervisor
- Tasmanian Fire Service on 000 or 112 on mobile
- Investigate and attempt to suppress the fire with equipment available on site
- Always remember your own safety and the safety and capabilities of your crew.

Fire Fighting Equipment

- All fire fighting and fire weather monitoring equipment should be tested and run prior to the commencement of fire season (1st October)
- Your operation generally will be audited by the principal company prior to the 1st of October
- During fire season try and run fire suppression equipment **weekly** if possible or as a minimum at least once a **month**.

Fire Fighting Equipment

For conventional operations in wet and dry forests and other operations including land clearing, mound ploughing and site preparation you must have on site:

- Mobile tank with no less than 300 litres
- Self priming centrifugal pump producing a pressure of at least 400 kPa (5 hp)
- Minimum of 60 metres of hose (25mm diameter) with a jet nozzle fitted with couplings as used by Tasmania's fire fighting agencies.

Fire Fighting Equipment

continued:

For conventional operations in wet and dry forests and other operations including land clearing, mound ploughing and site preparation you must also have on site:

- 2 rakehoes
- One knapsack or charged air/water extinguisher with a capacity of not less than 9 litres on each machine and within 100 metres of each chainsaw currently in use
- One set of approved fire weather reading instruments and log book.

Fire Fighting Equipment

For cable operations requirements are the same as conventional operations, plus the following:

- No less than 1000 litres of stored water
- Motorised pump (at least 10hp)
- 10 x 30m x 38mm lengths of hose
- 38mm variable fire fighting nozzle
- Knapsack/extinguisher at tail-hold and blocks.

Fire Fighting Equipment

Some operations are classified as low risk activities and only require the following:

- One rakehoe
- One knapsack or charged air/water extinguisher with a capacity of not less than 9 litres on each machine and within 100 metres of each chainsaw currently in use

Exempted low risk activities may include:

- Roading
- Site preparation in pasture,
- Planting, fertilising and pruning with hand saws

Activities must be suspended when an extreme fire weather warning has been issued.

Communications

- It's important that all communication on site is effective, particularly in the event of a fire. This communication may include but not limited to:
- Verbal
- Written
- Hand signals/body language
- Mobile phone (if coverage is available)
- UHF/VHF radio
- Signage.

Harassment And Discrimination

- No comment or action of a discriminatory nature should ever be made in the workplace. This includes but is not exclusive to:
  - Ethnic origin
  - Skin colour
  - Gender
  - Age
  - Sexuality
  - Religion etc.

Summary

- It’s vital that all relevant personnel are adequately trained in fire weather monitoring
- Whilst weather readings are important so is having the correct fire fighting equipment on the worksite and making sure that it is properly maintained.

Where To From Here

Level 2 – Bush Fire Awareness

Pre requisite – Level 1 - Fire Weather Evaluation

- This program is the second level for those individuals who may encounter fire on their operations
- This course covers:
  - PUAFIR215 - Prevent injury
  - PUAFIR309B - Operate pumps
  - PUAEQU001B - Prepare, maintain and test response equipment
  - FPICOR2204B - Follow fire prevention procedures.

Where To From Here

- Level 3 – Wildfire Suppression
- Pre requisite – Level 2 – Bush Fire Awareness
- This program is for those individuals actively involved in the suppression of wildfire
  - PUAFIR204B – Respond to wildfire
  - PUAFIR303B – Suppress wildfire.

Fire Weather Evaluation

- Thankyou for your attendance at the fire weather evaluation session
- Any questions?