Northern Ireland
Fire & Rescue Service

Development Programme

1. Click on the appropriate level of training required
2. Click anywhere this picture to play the PPT

Firefighter Course

Officer Course Day 1

Tabletop Exercise

Officer Course Day 2

Aim

To familiarise Operational Personnel with Wildfire Operational Incidents

Learning Outcomes for FF

Demonstrate knowledge and awareness of :

- Operational Consideration
- Fuels
- Alignment Factors
- WPS
- Potential Risks
- Safety At incidents
- LACES Protocol
- Communications
- Marshalling Vehicles
- Welfare
- PPE

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- LACES Protocol
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- Marshalling Vehicles
- Welfare
- PPE
- Wildfire Behaviour Modes
- Wildfire Behaviour
- Terminology
- Specialist Wildfire group
- Tactical Consideration
- Suppression Techniques

Introduction

- Fire fighting techniques at wildfires vary significantly from those used in urban areas. Due to scarcity of water supplies, fires may have to be extinguished by beating, smothering or on occasions be allowed to burn out.

- Crews may have to transport themselves and equipment over rough terrain under arduous conditions with little rest periods.

- Wildfire can have a significant impact on the economy and environment and more importantly can result in serious injury or death to members of the public or to operational personnel.

Definition Of A Wildfire

- Wildfire is a generic term used to describe any uncontrolled fire in various types of vegetation

- Wildfires may vary in size from a few square metres to hundreds of hectares

Operational Considerations & Tactics

Wildfire incidents are inherently dangerous

- The OiC must carry out a Dynamic Risk Assessment and fully brief all personnel on the risks and precautions to be taken
- Due to rapidly changing fire environment the DRA must be continually reviewed

Considerations On Arrival

- **As part of the initial DRA the OiC should consider the following**
  - Type of Fuel involved and its height
  - Flame Height: if over 1.5m do not tackle with beaters
  - Alignment factors at the time and what is anticipated to be in 30 minutes
  - Potential for Fire-Spread
  - Risk to life, property, livestock, forestry and the environment

Wildfire Fuels

Wildfire fuel types are categorised as:

- Light eg Grass
- Medium – eg Heather / Gorse / Bracken
- Heavy – eg Timber

Woodland

- Woodland can be divided into 2 types :

- Naturally Planted or Regenerated Woodland
  - Oak, Beech, Birch, Sycamore, Ash

  These species do not burn readily and require pre-heating

- Commercial Woodland / Forest Schemes
  - Scots Pine, Corsican Pine, Douglas Fir, Larch, Spruce

  These species apart from Larch have a high resin content and burn fiercely. Larch is less flammable and can have a retarding influence on the fire

Forest Fires

The main types of fire that occur in forests are:

- **Crown Fires**
  - fire travels across tops of trees
- **Torching Fires**
  - fire spreads from bottom to top of tree
- **Undergrowth Fire**
  - slow build-up of waste vegetation
- **Underground Fires**
  - occur in thick decayed vegetation
- **Ladder Type Fires**
  - growing vegetation forms a link between the ground and the upper portion of a tree

Moor, Heath & Peat Bogs

- **Bracken**
  - usually found growing tall & thick dry bracken presents a high fire spread hazard
- **Peat**
  - may be to a depth of 12m surface fire spreads below ground and as peat contains its own oxygen it will continue to burn
- **Moorland**
  - large areas of unenclosed common land can be used as water catchment areas
- **Scrubland**
  - mixed vegetation fire behaviour can be erratic

Wildfire Incidents

- **When dealing with wildfire incidents special consideration should be given to the following:**
  - Topography
  - Slope
  - Aspect
  - Altitude
  - Topographical Affect On The Wind
  - Valleys & Gullies

Topography

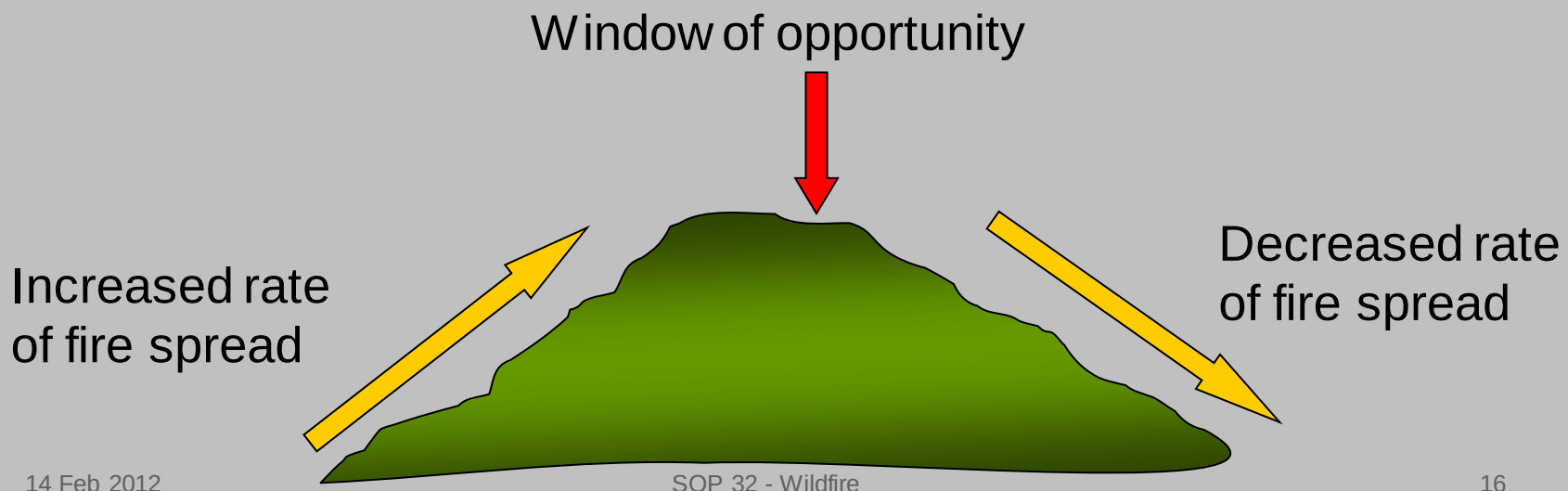
- This refers to the features of the landscape such as hills, gullies, valleys etc. Knowledge of how topographical features influence fire behaviour is essential.
- Changes in topography can often affect fire behaviour and can act as trigger points where opportunity for changes to tactics should be considered.
- Fully understanding this concept will allow for appropriate tactics to be applied.

Slope

- Burning Upslope
  - the flames are nearer to the fuel and therefore it is subjected to a higher level of pre-heating. This along with actual flame contact accelerates fire spread and intensity.
- Burning Downslope
  - has the opposite effect to upslope and therefore fire spread slows
- Flat Ground
  - with no wind and an even fuel the fire will burn in a circular pattern

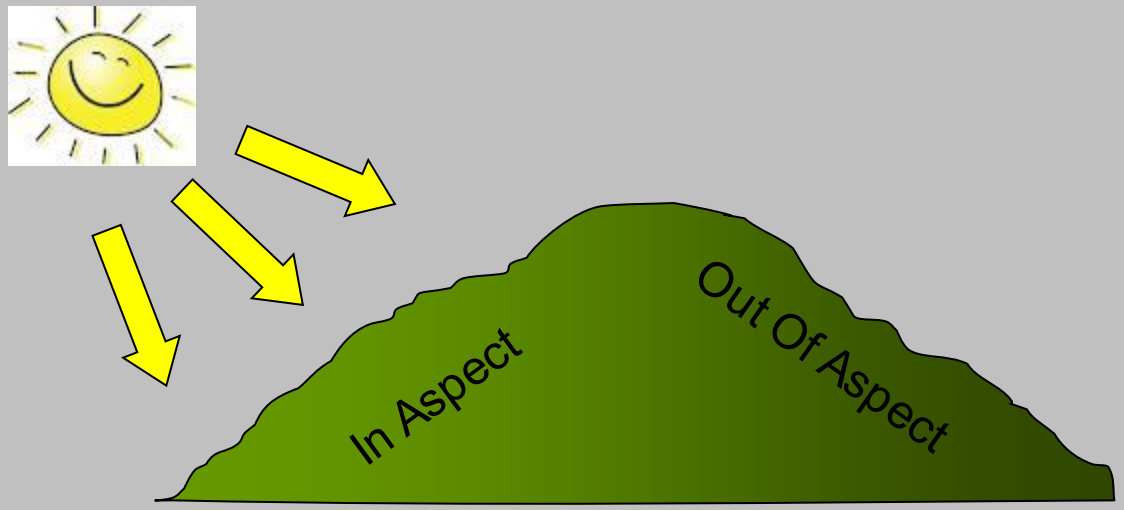
Slope

- Fire will gain or reduce speed when travelling up or down a slope
- It is often easier to allow a fire to continue to the top of a slope, allowing the pre-heating effect on fuel to reduce



Aspect

- Aspect refers to the direction a topographical feature faces, is it in our out of sunlight
- Solar pre-heating can dramatically alter fire behaviour and therefore increase spread and intensity

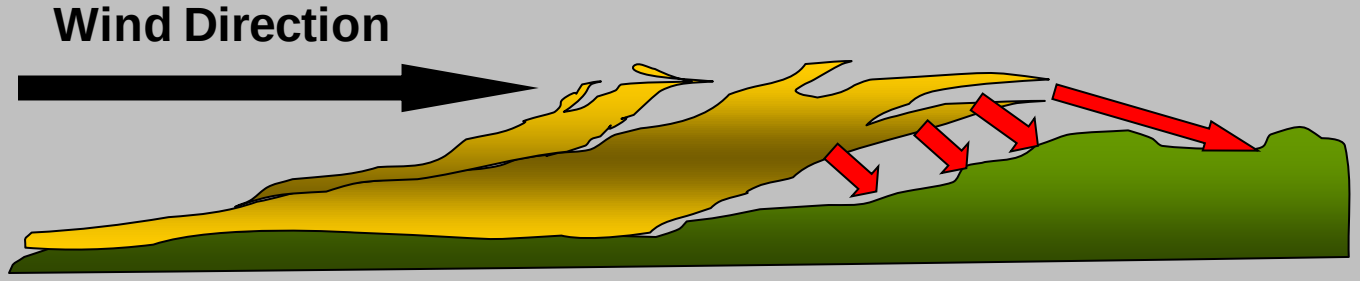


Altitude

- Increases in altitude will have an effect on the type of vegetation
- There will be a greater temperature drop and night with an increase in humidity & moisture levels

Wind

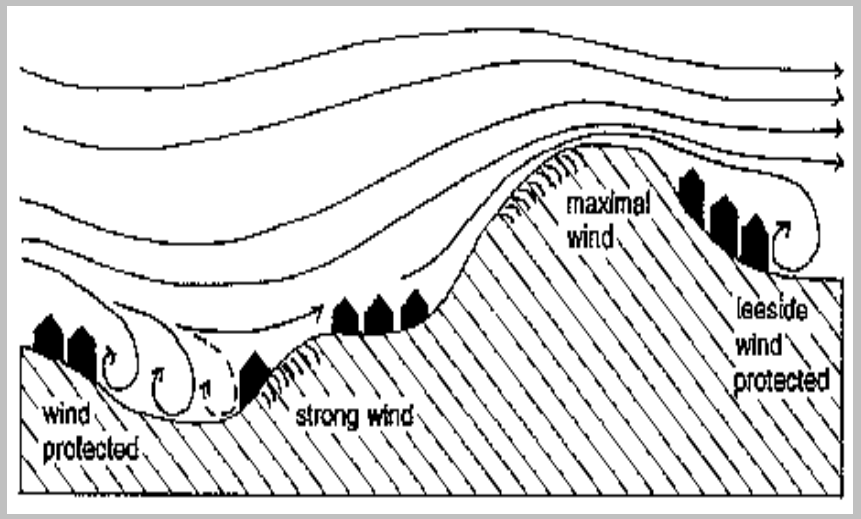
- The main driving force behind a wildfire is wind direction & strength
- Large wildfires can in some cases create their own wind, this can cause erratic fire behaviour
- A strong wind can drive the head of the flame closer to the ground causing pre-heating



Topographical Affect On the Wind

- Features on the landscape can affect the wind and how it behaves. The rougher the surface the more turbulence created

- Areas of high and low wind activity can be created by features such as ridges



Valleys & Gullies

- Steep valleys and gullies can act in a similar way to a chimney and accelerate fire spread
- Crews must take extreme care when working upslope of a fire in either of these features

Wildfire Behaviour Modes

- Wildfire can be described as being in one of 3 behaviour modes:
  - **No Alignment**
    - influenced by none of the forces
  - **Partial Alignment**
    - influenced by some of the forces
  - **Full Alignment**
    - influenced by all of the forces

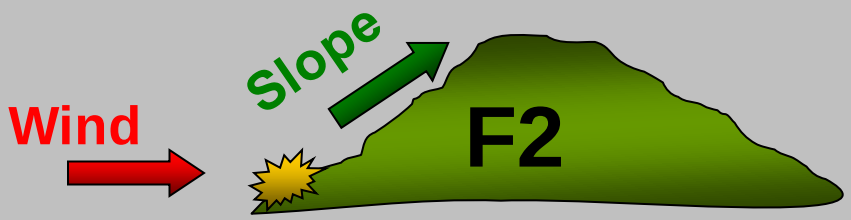
- Each alignment force *(slope, wind, aspect)* acting in the fires favour will increase the severity of the fire by a factor of 1.
- This principle gives us an alignment value known as **The Alignment Factors**

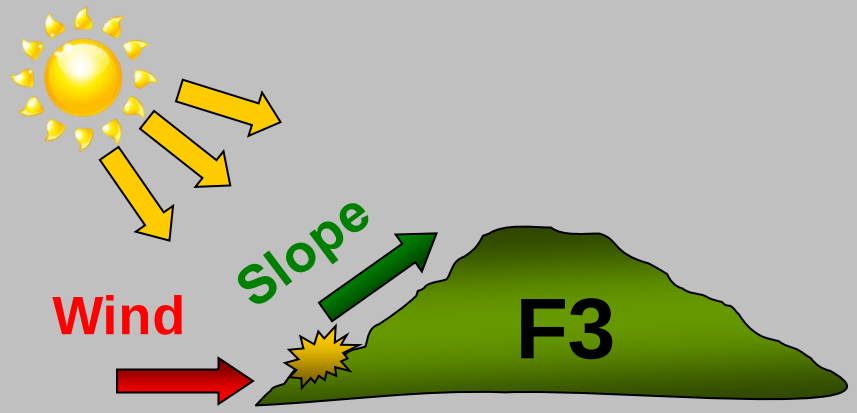
Alignment Factors

- **F0** – When it has no fire alignment
- **F1** – when it has 1 force in its favour
- **F2** – when it has 2 forces in its favour
- **F3** – when it has all 3 forces in its favour

IC's can use this tool to set clear, safe and effective operational activities

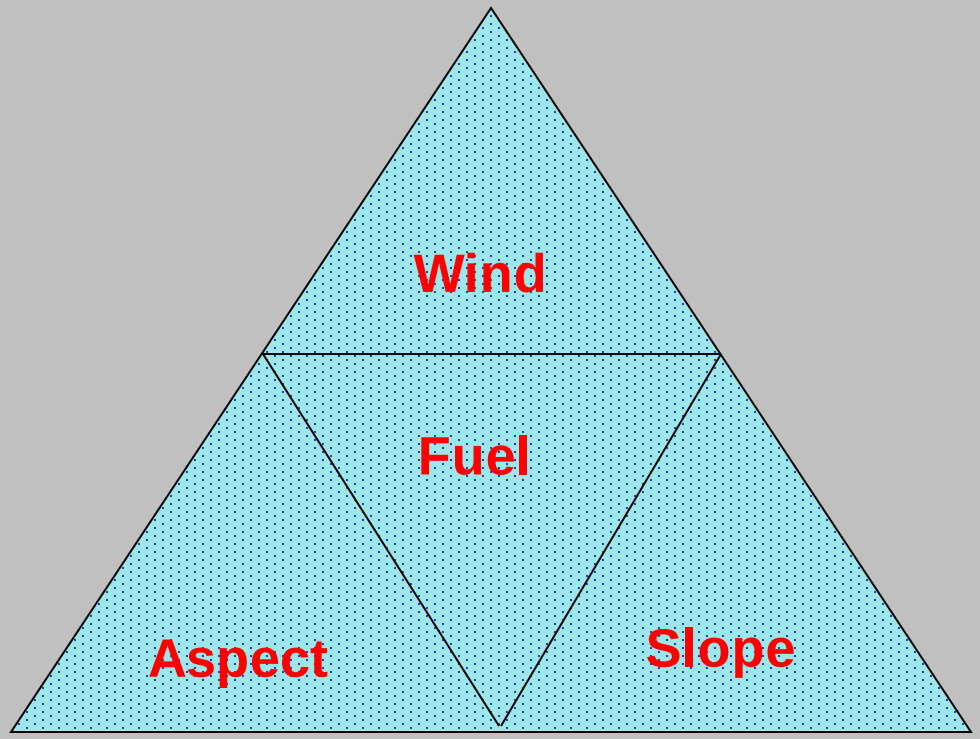
Alignment Factors



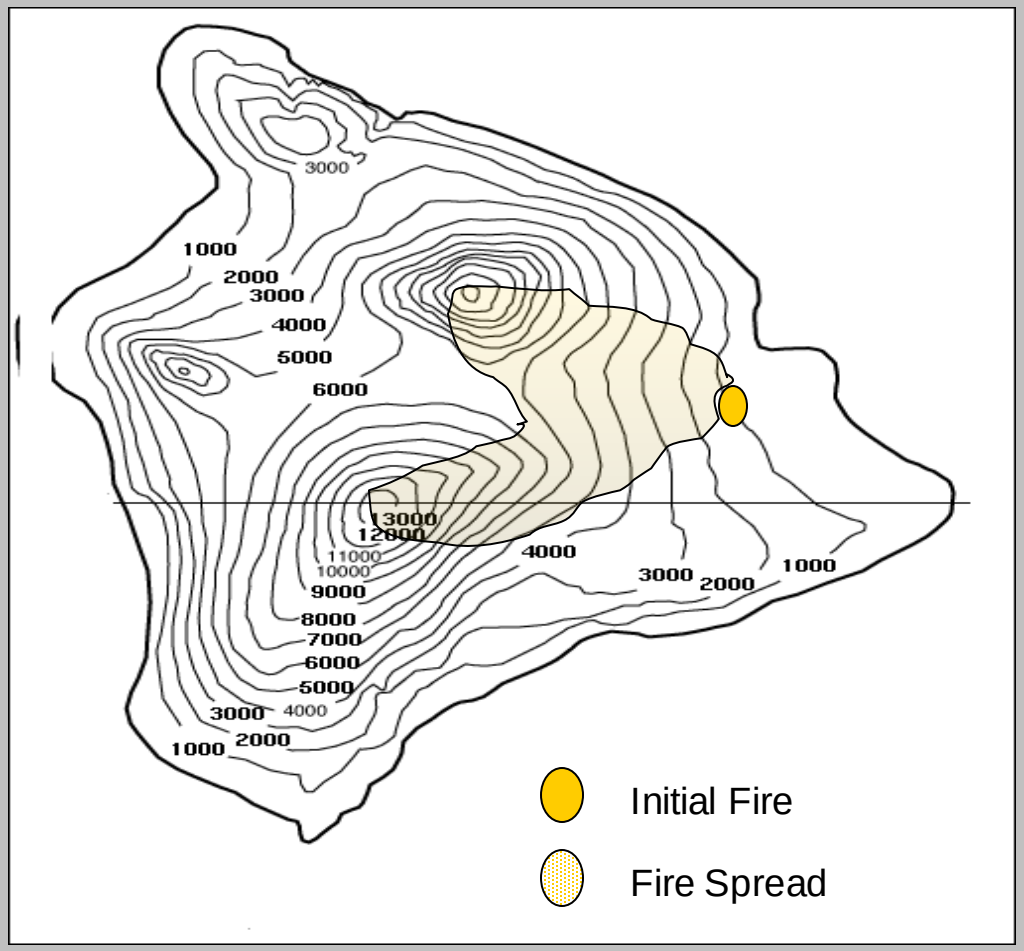


Potential For Fire-Spread

- **When determining the potential for fire spread the following should be taken into account:**



Fire- Spread



Wind Direction

Potential Risks

- Life
  - Members of the public & personnel fighting the fire
- Property
  - Location of property in relation to fire and direction of fire spread
- Livestock
  - Location of livestock and can it be safely moved
- Forestry
  - Has it economic value or can it be sacrificed
- Environment
  - Location of water catchment areas, effect on wildlife

Leaving Wildfires To Burn

- Rarely do wildfires involve life risk, however by committing crews to the incident then we are inserting life risk
- Whilst not standard practice consideration should be given to allow a wild fire to burn out
- If this is to happen then arrangements must be made for re-inspection of the incident at specific intervals or times

Leaving Wildfires To Burn

- **If leaving a Wildfire to burn then the following should be factored into the risk assessment**
  - Risk to life, property, livestock, forestry, wildlife & environment – *consider contacting Environmental Agency to confirm action taken is appropriate*
  - Time of day
  - Ground conditions & topography
  - Location of infrastructure eg power-lines, water catchments areas etc
  - Location of fire breaks both natural & man made
  - Potential for fuel to burn out
  - Maintaining an NIFRS presence at the incident

Safety At Incident

- Adopt the **LACES** protocol
- Safety procedures if surrounded by fire
- Crews operate in minimum teams of 2
- Regular rotation & relief of crews to prevent fatigue
- Monitor crews for signs of dehydration / heat exhaustion
- Appropriate PPE to be worn
- Crews to have torches (due to possible loss of daylight)
- Mobilisation of additional resources eg. Forestry Service, Mountain Rescue, PSNI, DARD

L.A.C.E.S

LACES is a protocol that must be followed by all personnel on the incident ground

L – Lookouts

A – Awareness

C – Communication System

E – Escape Routes

S – Safety Zone

Lookouts

- Lookouts must be appointed to ensure safety of personnel
- Each team must have a lookout
- Wildfire Officers may be deployed as lookouts

Awareness

- **All personnel must be aware of their role**
  - Personnel must appreciate the hazards associated with wildfire, with special consideration given to the following:

Terrain
Vehicles
Smoke
Power Lines
Military Areas
Effects Of Heat

Movement Of
Animals / Wildlife
Fuel Types
Open Water Supplies
Light / Darkness

Communication System

- Communicating safety issues is the responsibility of everyone
- Supervisors must ensure crews are fully briefed
- Radio contact between the Control Point and the operational personnel must be maintained
- Any changes in operational situation, fire behaviour, tactics or planning must be communicated to all personnel
- Radio Comms to be established with other agencies
- Mobile telephones may be used as a back-up to TETRA

Escape Routes

Escape routes are pre-planned routes that take personnel from a place of danger to an area of safety

- Must be established prior to operations
- Must be continually monitored
- Steep hills or slopes should be avoided
- Appliances should not be parked on roads or pathways that are established escape routes or are likely to be designated as escape routes.

Safety Zones

Safety Zones are places where personnel can congregate which are deemed to be free from risk of fire

- The width should be at least 1.5 times the height of surrounding vegetation
- Must be large enough to accommodate everyone
- At wildfires the ‘’Black Area’’ will be the designated safety zone
- Team leaders must ensure that the vegetation within the black area is fully burnt

Risks & Hazards

Personnel may suffer from or be effected by:

- Burns (including sun burn)
- Smoke inhalation
- Reduced Visibility, Isolation, Disorientation
- Being surrounded by fire
- Heat stress, exhaustion, dehydration, fatigue
- Slips, Trips & Falls (stumps, rocks, bogs, wildlife burrows)
- Ankle injuries/foot blisters/insect bites & stings

Communications

- All personnel fully briefed on risks, tactical mode and all control measures that have been instigated.
- All teams to have use of at least one hand held radio
- Radio communications established with other agencies
- Mobile phones may be used by Wildfire Officers as a back up to TETRA
- In some instances MCA or Mountain Rescue may provide VHF radios to assist with communications

Marshalling Of Vehicles

- Access for non off road vehicles may be difficult
- Marshalling area should be set-up at early stage close to the Incident Control Point
- Roads & tracks may be potential escape routes and should be kept clear
- The management and control of vehicle keys should be considered so as vehicles can be moved if required

Welfare

- Welfare Officer should be appointed to manage issues such as feeding, rest areas, fist aid points, drinking water, relief crews etc
- Consider mobilisation of Welfare Module
- Fire Emergency Support Vehicle (FESS) may be mobilised to larger incidents

PPE

- Wildfire Overall
- Wildfire Boots
- Baseball Cap
- Safety Glasses
- Dust Mask
- Gloves

Peel & Reveal

- During the North West Technical Officers' meeting on 2 March 2011 some new information was made available on the issue of what to do in relation to first aid and preventing burn injuries to firefighters after an extreme heat event.

- Upon leaving the risk area the firefighters involved should have all their **PPE removed ASAP** to prevent heat transfer through the multi-layered fire kit. Because the kit is designed to prevent heat transfer there is a lag before the firefighter involved will feel the heat, however once the heat passes through to the skin the kit's design will actually keep the heat in and exacerbate any burn injuries unless removed. Tech R&D has contacted an A&E Chief Consultant and he confirmed that from his perspective the kit should be removed immediately to assess the extent of any injuries and accelerate any treatment. The casualty should then be treated ABC etc. as normal.

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Fire & Rescue Service

ANY QUESTIONS

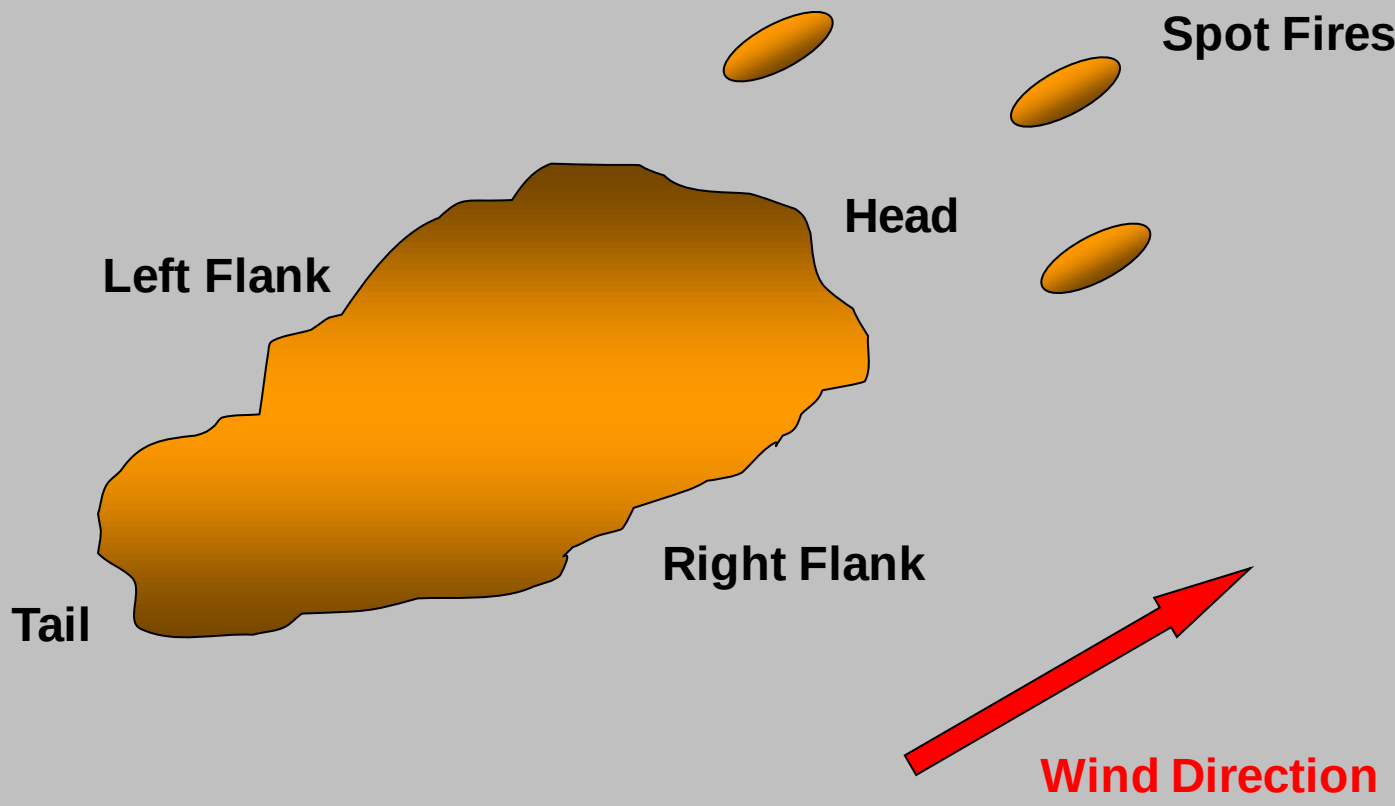
SECTION

B

Parts Of A Wildfire

- Head
  - the part of the fire being influenced by the wind and/or slope the fastest moving part of the fire with greatest flame height
- Flanks
  - are slower moving and influence the intensity of the head a change in wind or slope and they can become a head if possible they should be attacked aggressively
- Tail
  - is the slowest part of the fire as it is usually out of alignment it can be back burning can be influenced by changes in topography or wind direction
- Spot Fires
  - normally found ahead of fire can be caused by burning debris being blown forward can be caused by concealed fire-spread in bogs

Parts Of A Wildfire



Terminology

- **Flame Height**
  - average height of flame from ground level
- **Flame Angle**
  - Angle between the inclined flame and ground at front of fire
- **Flaming Zone**
  - part of the fire that is actively burning
- **Flame Depth**
  - the depth of the continuous flaming zone behind the front edge of the fire
- **Rate Of Spread**
  - the distance a fire spreads over the ground in metres/hour
- **Fire Intensity**
  - the amount of heat being generated by the fire. Operationally, this can be measured using the flame height as a guide

Incident Command System

- ICS must be utilised at all wildfire incidents
- Ensures a safe system of work and accountability system for all personnel
- Additional control may be required if incident is spread over a large area
- Forward Control points established to assist the IC
- The IC should stay at the Incident Control Point
- If the IC has to leave the ICP at anytime then they must remain in contact with the ICP

Sectorisation

- Should take place at an early stage
- Use officers with appropriate skills, consider using wildfire specialists
- Sectors may be named or numbered differently to how they would be at a building on fire.
- Sector Commanders should stay within their sector to provide direct and visible leadership
- Sector Commanders must be fully briefed and understand the Fire Suppression Plan; they in turn must fully brief all personnel under their command

Specialist wildfire Group (SWG)

SWG consists of a number of Wildfire Officers (WFOs) who have received specialist training in:

Fire Behaviour
Fire-spread
Fuel Types
Operational procedures
Suppression Techniques

WFOs can provide specialist advice to IC

Teams of WFOs may be deployed at larger incidents to evaluate and attack the fire

Mobilisation Of WFOs

- **WFOs should be mobilised under the following circumstances:**
  - 4 or more appliances in attendance
  - If RCC deem that the attendance of WFOs is appropriate, due to information received at time of call
  - If IC of an incident that has less than 4 appliances requests mobilisation of WFOs

If WFOs are mobilised to incidents that have 4 or more pumps, resources permitting, a minimum of 2 WFOs should be sent

Role Of The WFO

- **WFOs will assist the IC with assessment of the following factors:**
  - Expected Fire-spread
  - Fire Behaviour & Severity
  - Environmental & Economic Impact
  - Fire Suppression Plan
  - Resources Required
  - Time Of Day & Weather
  - Critical Points
  - Safety Issues

Fire Suppression Plan

- **Once WFOs have identified likely fire-spread, fire behaviour & severity they should then formulate a FSP and mark the following information onto a map of the area**

  - **Fire-spread**
  - **Fire alignment factors (FO,F1,F2,F3)**
  - **Actual & predicted fire footprint**
  - **Areas of high value**
  - **Areas of operational significance such as 'critical points' or 'windows of opportunity'**
  - **RV & feeding points**
  - **Command Areas CP & FCPs**
  - **Allocated resources**
  - **Anchor points**
  - **Safe areas**
  - **Sectors**
  - **Holding areas**
  - **Suitable roads & tracks**
  - **Helicopter landing areas**
  - **Open water supplies**

Documentation

- **At larger incidents the plan should be written down so that:**
  - It's fully understood by the Command Team
  - It enables relevant information to be passed on to sectors, teams and individuals
- **WFOs, on arrival, will complete the necessary Wildfire Risk Assessment pro forma**

Safety

- The knowledge & skills of WFOs will increase the H&S of personnel on the incident ground
- A safety officer will be mobilised as per the mobilising grid
- WFOs may be appointed as team leaders if a team is operating at the head of a fire and/or operations continue during darkness

Wildfire Specialist Teams

- **Teams may perform a number of roles, which include:**
  - Observation of fire behaviour
  - Reconnaissance
  - Identify windows of opportunity
  - Defend critical points
  - Firefighting operations

Wildfire Specialist Teams

- Teams will consist of 2 – 6 members
  - *Observation & Reconnaissance Teams* - 2 personnel
  - *Firefighting Teams* - minimum of 4 personnel
- May have to operate on incident ground for lengthy periods of time
- SRT may be deployed along with WFOs to assist in grid search and navigation

Tactical Considerations

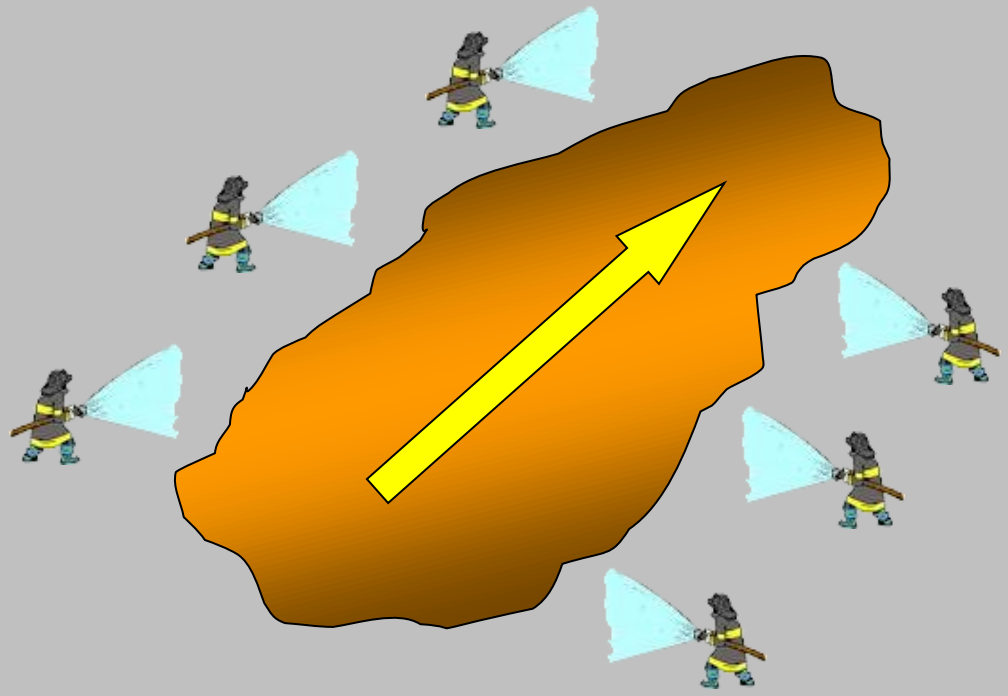
- **Initial Attack - ICs may adopt offensive or aggressive firefighting tactics at an early stage but only after carrying out a full DRA which should include the following:**
  - Current fire situation, including rate of spread, fire behaviour & severity
  - Potential future fire development
  - Access / egress (safe routes)
  - Fuels
  - Critical Points
  - Windows of Opportunity
  - Terrain - including slope/aspect
  - Weather information
  - Control measures required
  - Resources required
  - Specific risk identification

Wildfire Suppression Techniques

- All personnel must be aware of the plan and have an identified escape route in place
- Is best achieved by establishing a line from which firefighting can be carried out
- May require direct or indirect attack:
  - Applying water
  - Laying or applying foam or other fire retardants
  - Beating out
  - Establish a control line by removing vegetation
- A combination of the above methods may be employed

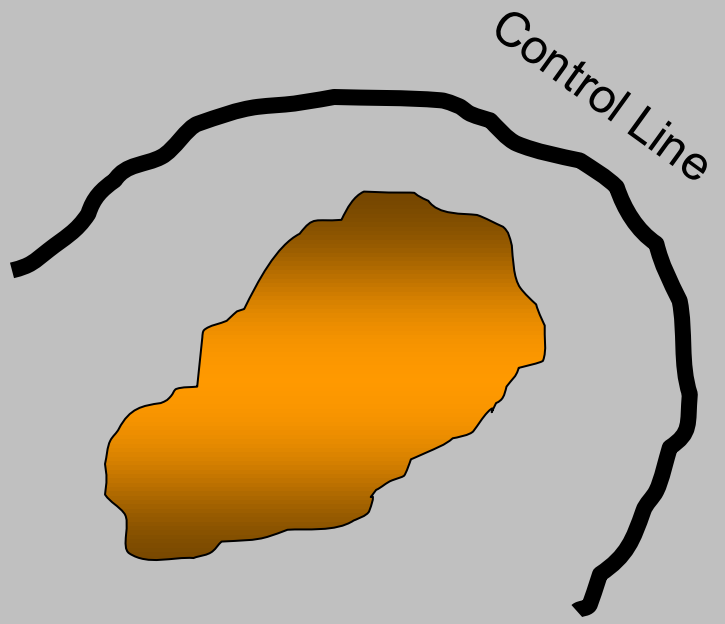
Direct Attack

- **This is where the fire is attacked at the fire perimeter by teams using water, beaters or hand tools**



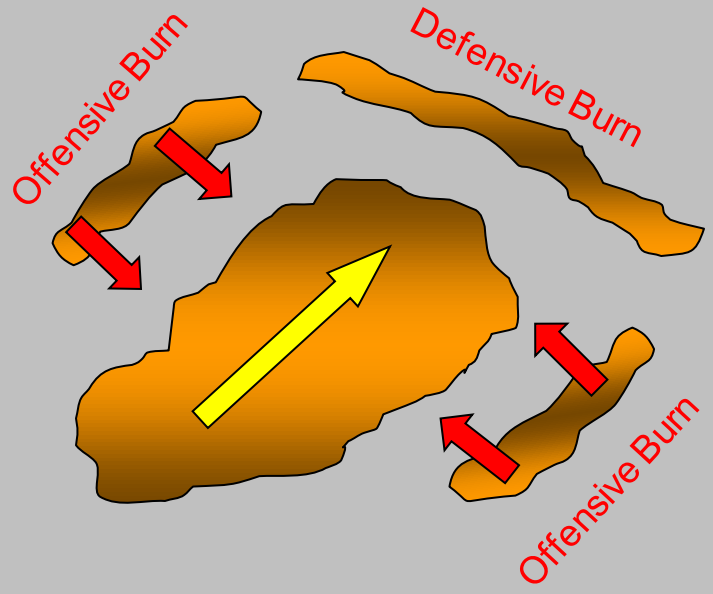
Parallel Attack

- **Involves creating a control line parallel to the fires edge**
  - Must be far enough away to ensure crews safety
  - Monitored by WFO's
  - Constructed by hand
  - Constructed by machinery
    Digger
    Plough
    Swipe/Brush Cutter



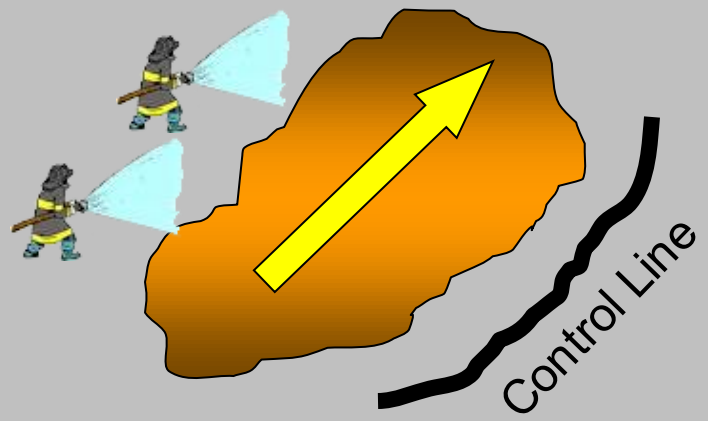
Indirect Attack

- Firefighting operations are carried out away from the fire perimeter
  - **Offensive Burns**
    launched directly at the fire to move towards an approaching fire front
  - **Defensive Burns**
    creates a burn area before the arrival of the fire to starve it of fuel
- Only be used when fire intensity is high with flame height over 3m.
- Most be carried out by specialist officers



Pinching

- This is a tactic where the flanks of the fire are attacked to prevent the fire-front from widening
  - Lowers the intensity of the fire head
  - Can be direct & indirect attack
  - Lookouts should be aware that a change in wind direction may result in a flank fire becoming a head fire



Suppression Strategies

- Wildfires are dynamic and their behaviour will change
- All personnel must be aware of these changes
- May mean an increase in fire severity and speed of travel
- Understanding when & where these changes will occur allows for operational plans to put into effect and increases safety

Suppression Strategies

- **Fire Suppression Strategies must be based on understanding**

- Consideration should be given to:
  - Predicted fire behaviour
  - Where changes will occur
  - Suppression tactics to be used
  - Available resources

  Having considered these factors it is then necessary to identify '*windows of opportunity*'

Suppression Strategies

- Timing is crucial - must be within capabilities of available resources
- To commit with insufficient resources will lead to failure
- May be necessary to wait for fire behaviour to change or until more resources become available
- May need to restrict the fire until more resources become available (Pinching)

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ANY QUESTIONS

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WILDFIRE

WPS
EXERCISE

Aim

To familiarise Operational Personnel with the Wildfire Prediction System (WPS)

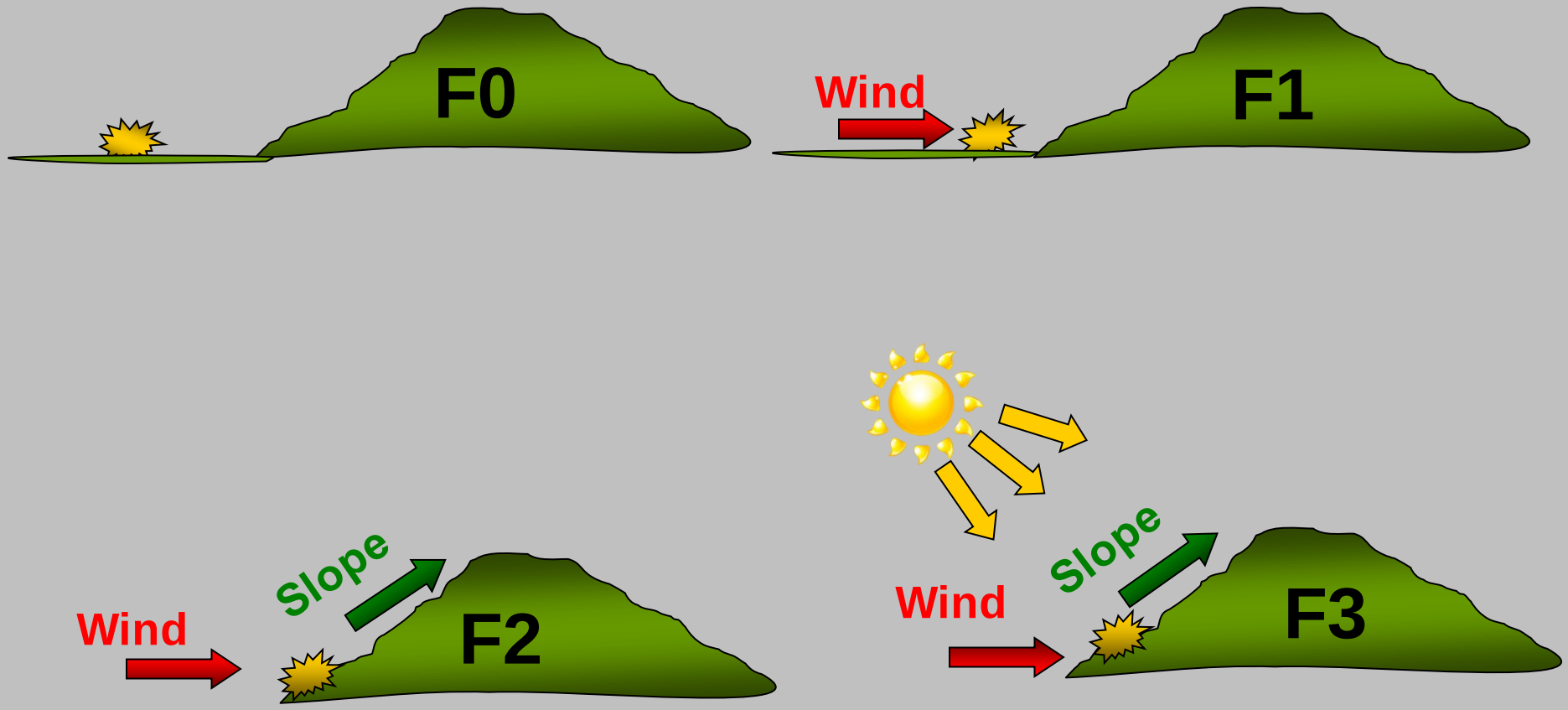
Learning Outcomes

Demonstrate knowledge & understanding of WPS

Alignment Factors & Wildfire Prediction System (WPS)

- **Wildfire is influenced by 3 factors – wind, slope & aspect**
- **Wildfires are classified as Factor 0, 1, 2 or 3**
  - Factor 0 – Fire has no factors of alignment in its favour eg. Level ground, in shade with no wind
  - Factor 1 – Fire has one factor of alignment in its favour eg. A fire burning uphill with no wind or sun
  - Factor 2 – Fire has two factors of alignment eg. Fire burning uphill with sun but no wind
  - Factor 3 – Fire has three factors of alignment eg. Fire burning uphill, with the sun and wind blowing in the same direction as the fire

Alignment Factors



Slope

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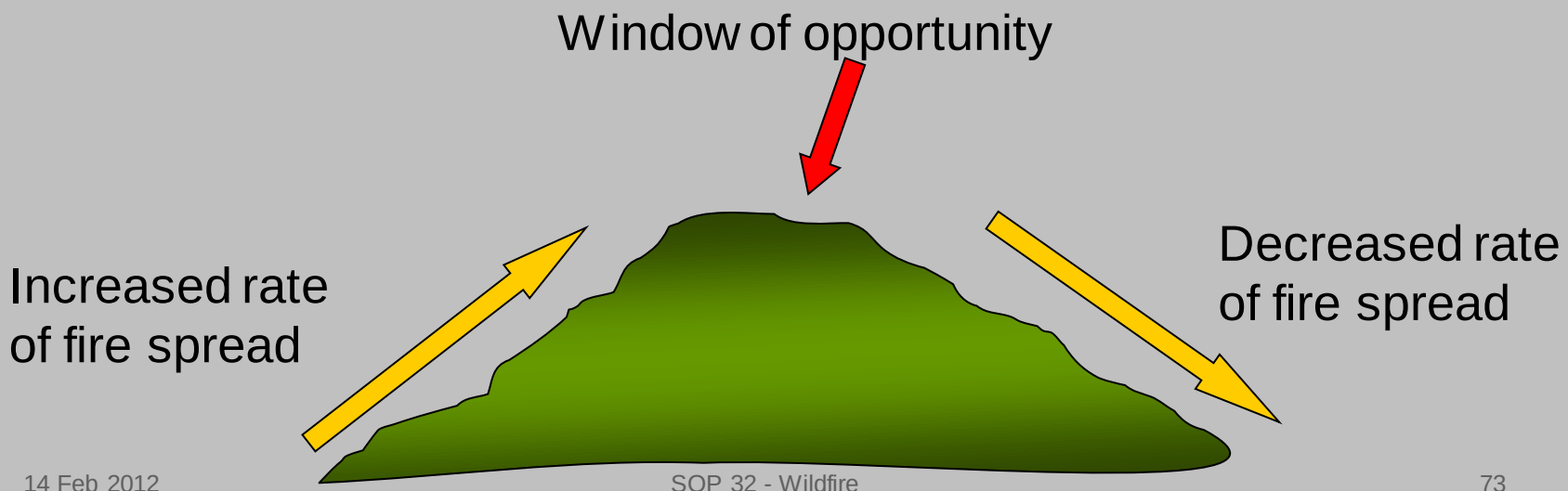
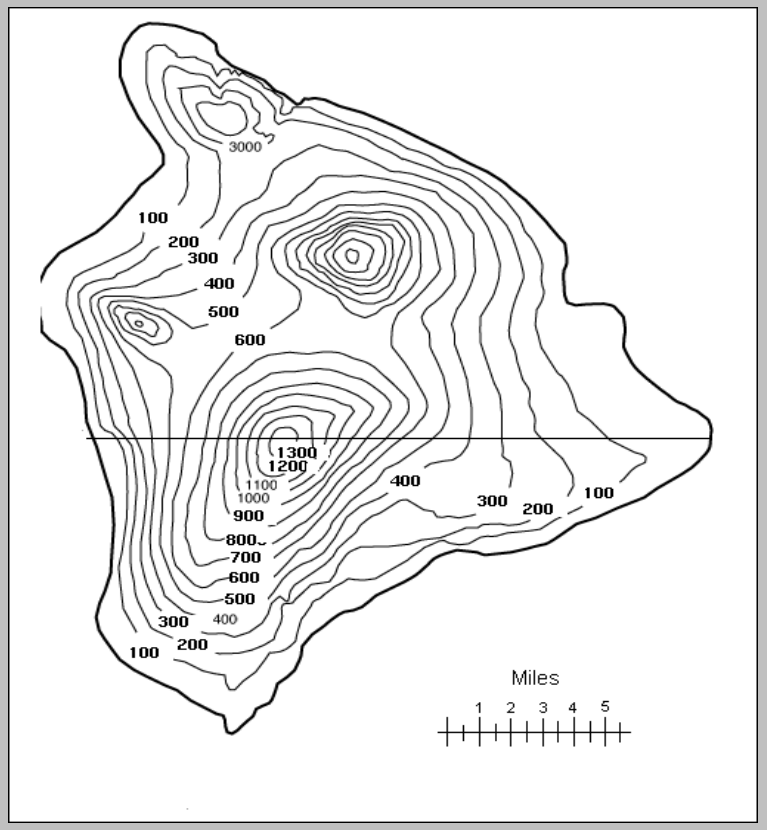
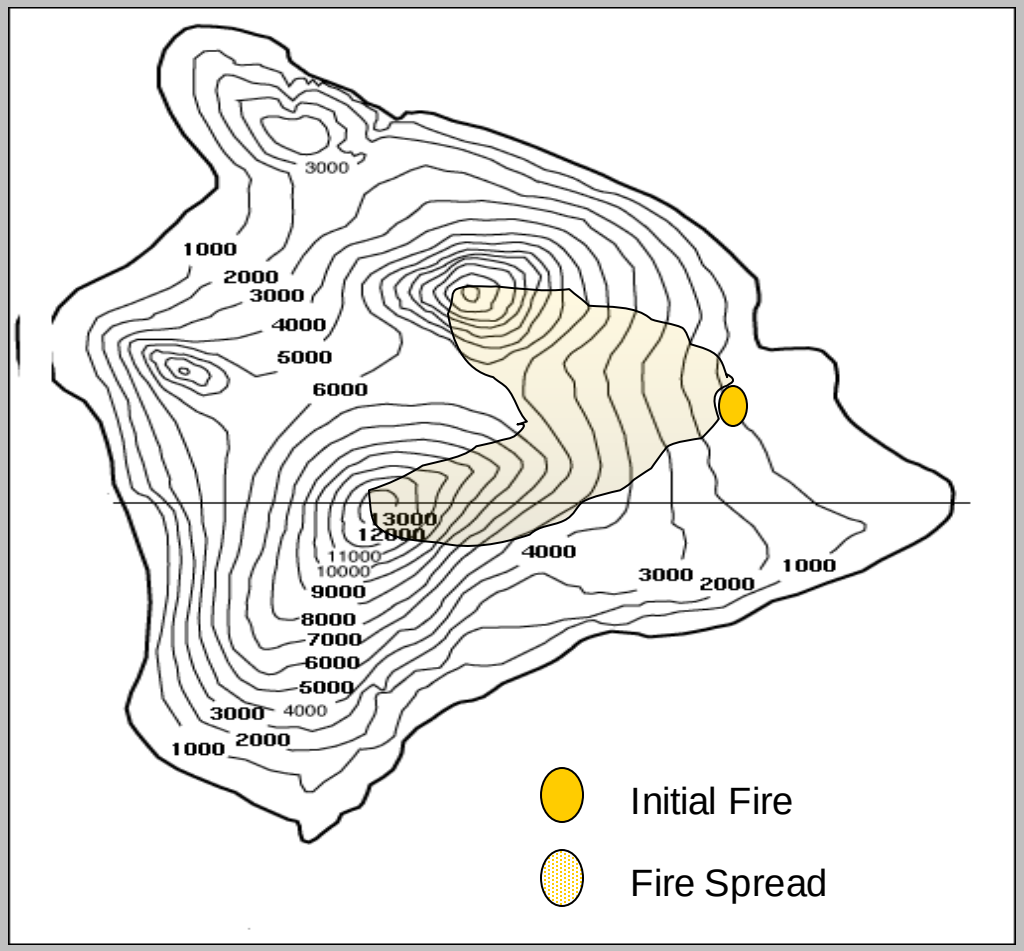


Contour Lines

- A contour line is a line on a map that connects points of equal elevation above a given level, such as sea level
- The lines highlight changes in elevation
- Shows valleys and hills, and the steepness of slopes
- The closer the lines are together the steeper the slope



Fire- Spread



Wind Direction

QUESTIONS

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Fire & Rescue Service

WILDFIRE

MAP READING

TIMETABLE

Timings	Event	Comments
0930 - 0945	Welcome & Introduction	
0945 - 1030	An Introduction to Map Reading	
1030 - 1045	Tea Break	
1045 - 1130	Map Reading Practice	Team Leaders
1130 - 1145	Move to Exercise Location	
1145 - 1200	Safety Brief	
1200 - 1500	Practical Exercise	
1500 - 1600	Debrief	
1600	Depart	

TEAMS

TEAM 1		TEAM 2	

TEAMS

TEAM 3		TEAM 4	

TEAMS

TEAM 5		TEAM 6	

Map Reading: An essential skill for a Wildfire Officer

- General awareness
- Resource deployment
- LACES
- Slope of ground
- Distance measurement
- Hazard awareness
- Water features
- Relief: alteration of fire behaviour
- Vantage points
- Wind activity
- Tactical considerations based on trigger points
- Welfare
- Increased altitude
- MEDEVAC, HLZ, Search.

What Is A Map ?

- A simplified birds eye view of a piece of ground, drawn to scale, showing physical and man made features. It may also show relief.

- When a map shows all of these features it is known as a topographical map

Distance & Scale

1 : 25,000

1 cm = 25,000 cm or 250 metres

1 : 50,000

1 cm = 50,000 cm or 500 metres

Northern Ireland
Fire & Rescue Service

Map Key

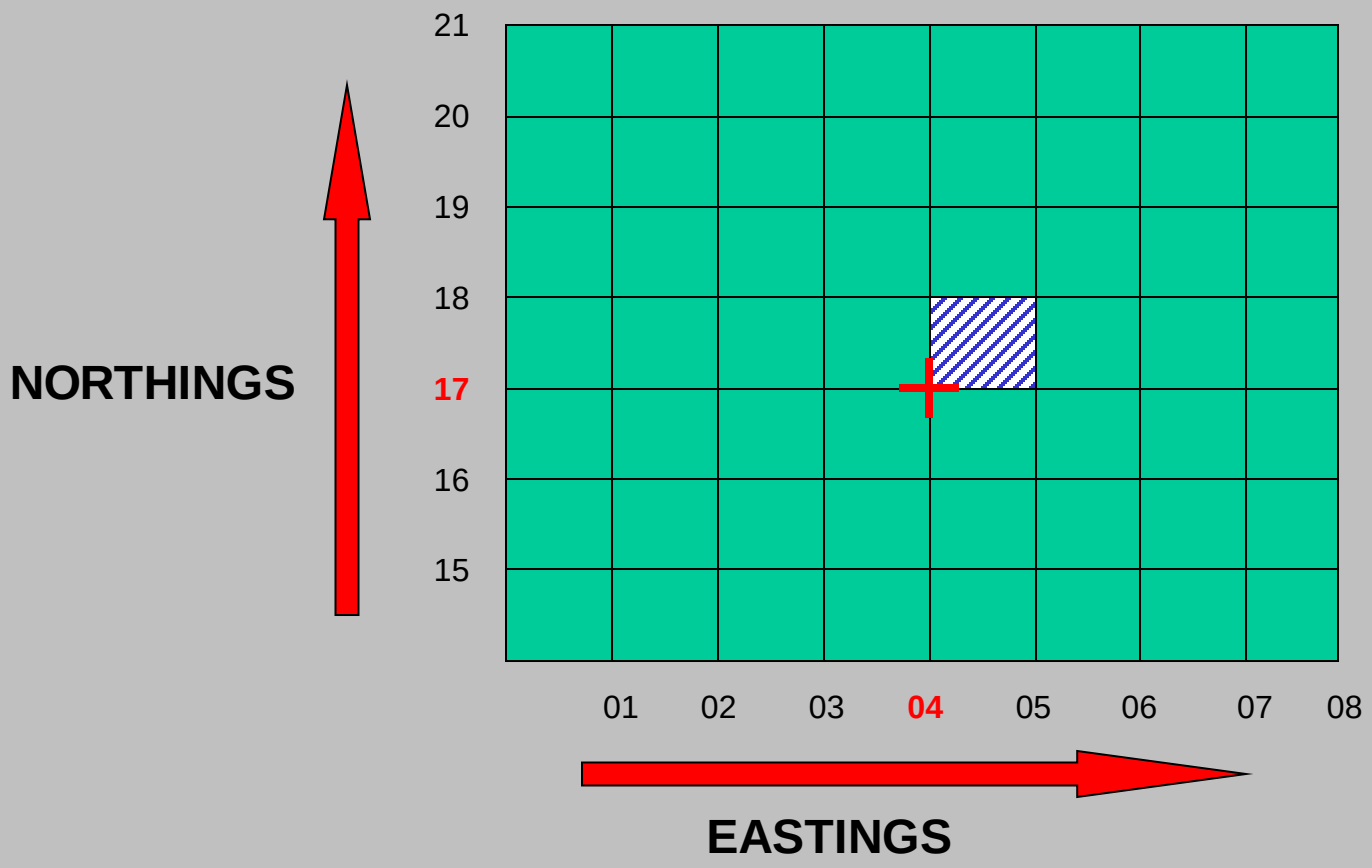
Grid References

Letter first though not always essential

- 4 figure GR: 1km² accuracy
- 6 figure GR: 100m² accuracy
- *8 figure GR: 10m² accuracy
- 10 figure GR: 1m² accuracy/ GPS only

Along the Corridor & Up the Stairs

4 Figure Grid Reference



4 Figure

Grid Reference

0417

4 Figure Grid Reference

- What is the main feature in :

  ‘Grid Square - - - - ’

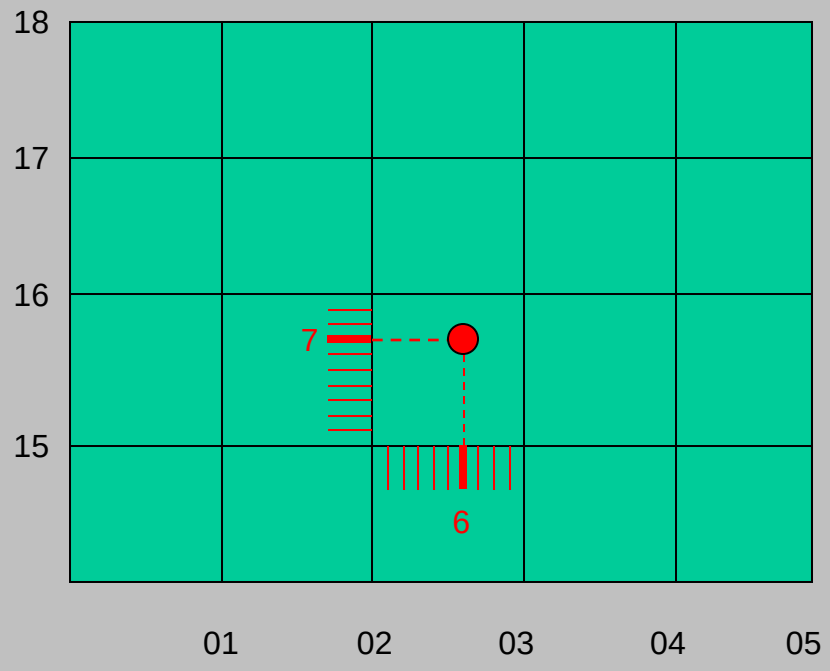
  Answer -

- What type of wood is located in :

  ‘Grid Square - - - - ’

  Answer –

6 Figure Grid Reference



6 Figure

Grid Reference

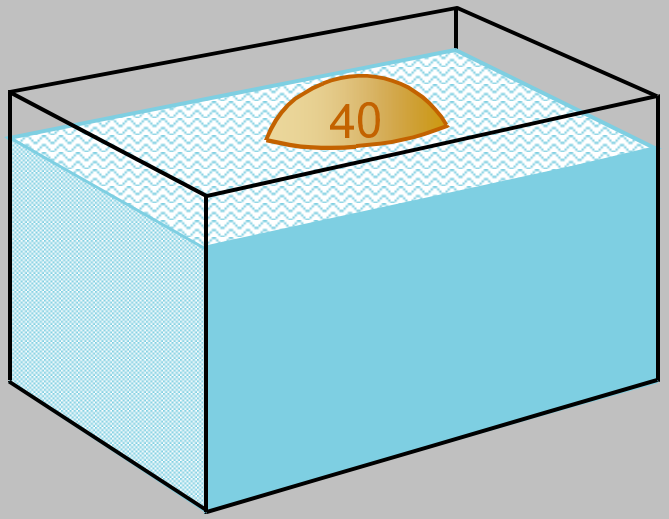
026157

6 Figure Grid Reference

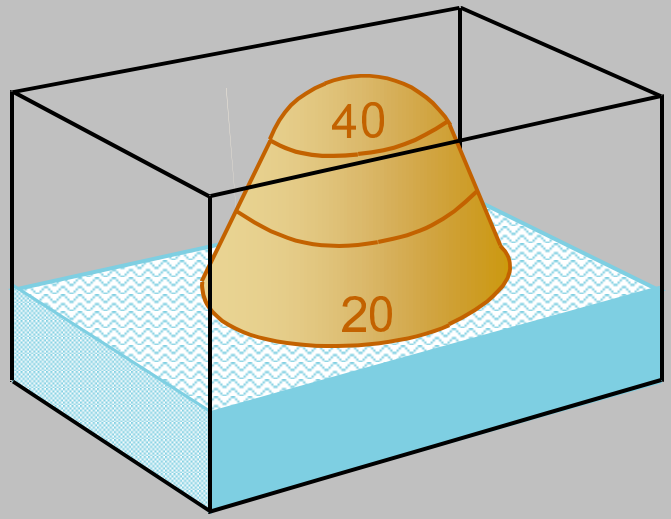
- What is the main feature at ‘Grid Reference’: - - - - - - -
  Answer –
- What is the main feature at ‘Grid Reference’: - - - - - - -
  Answer -
- Give me a 6 figure ‘Grid Reference’ for: - - - - - - -
  Answer : -

Contours

- A Contour Line is a line drawn on a map joining all points of equal height above mean sea level

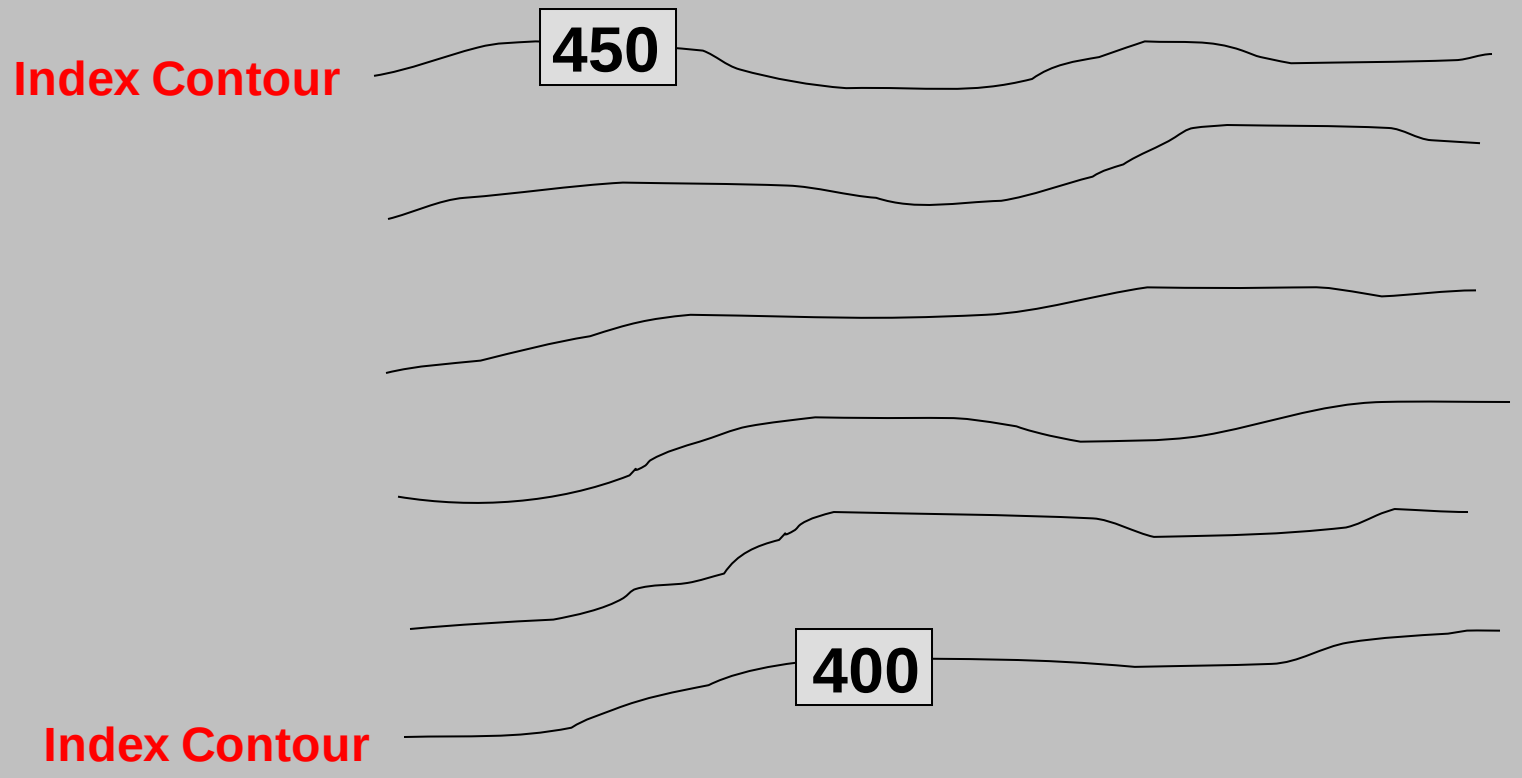


Water level 40 m

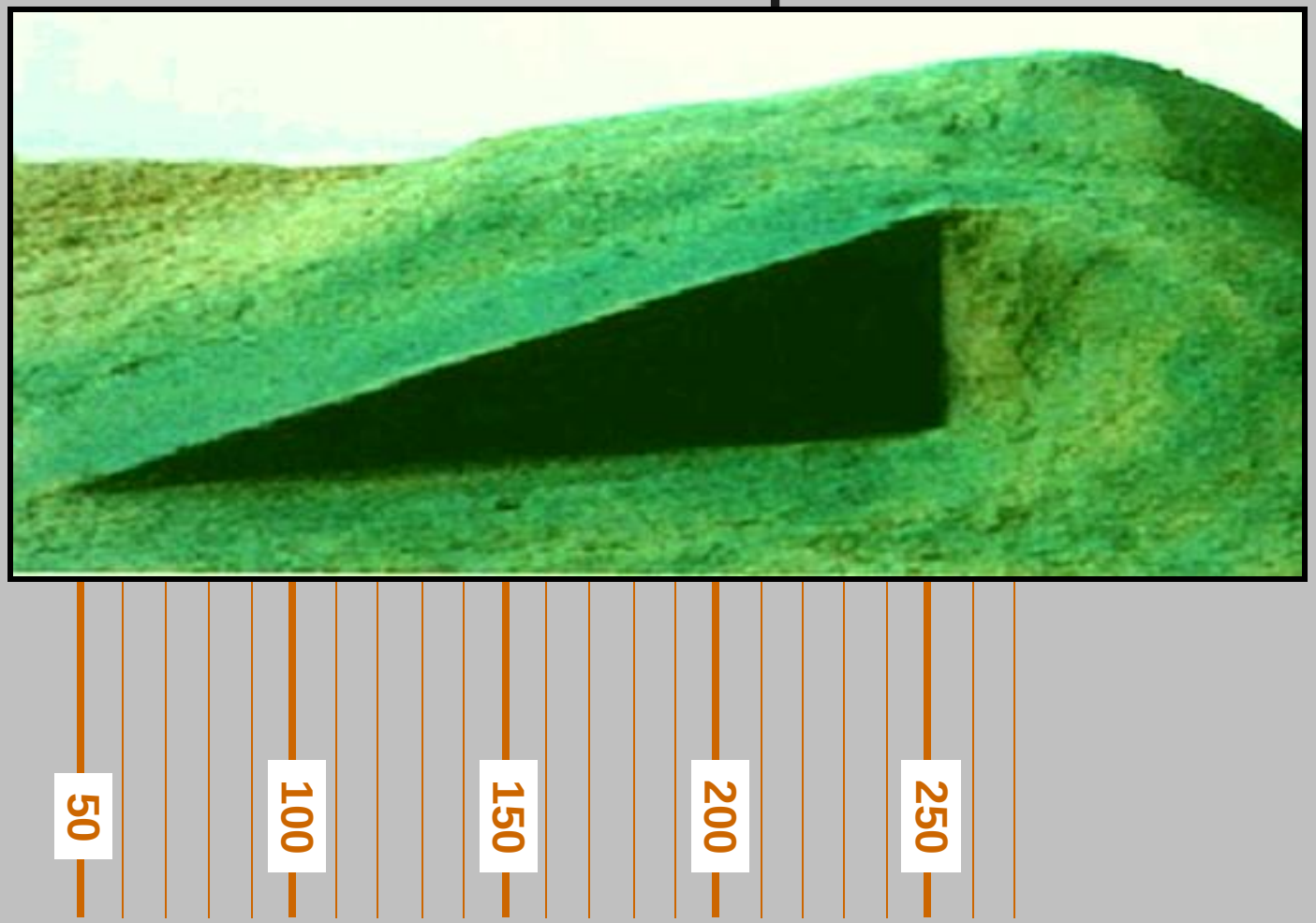


Water level 20 m

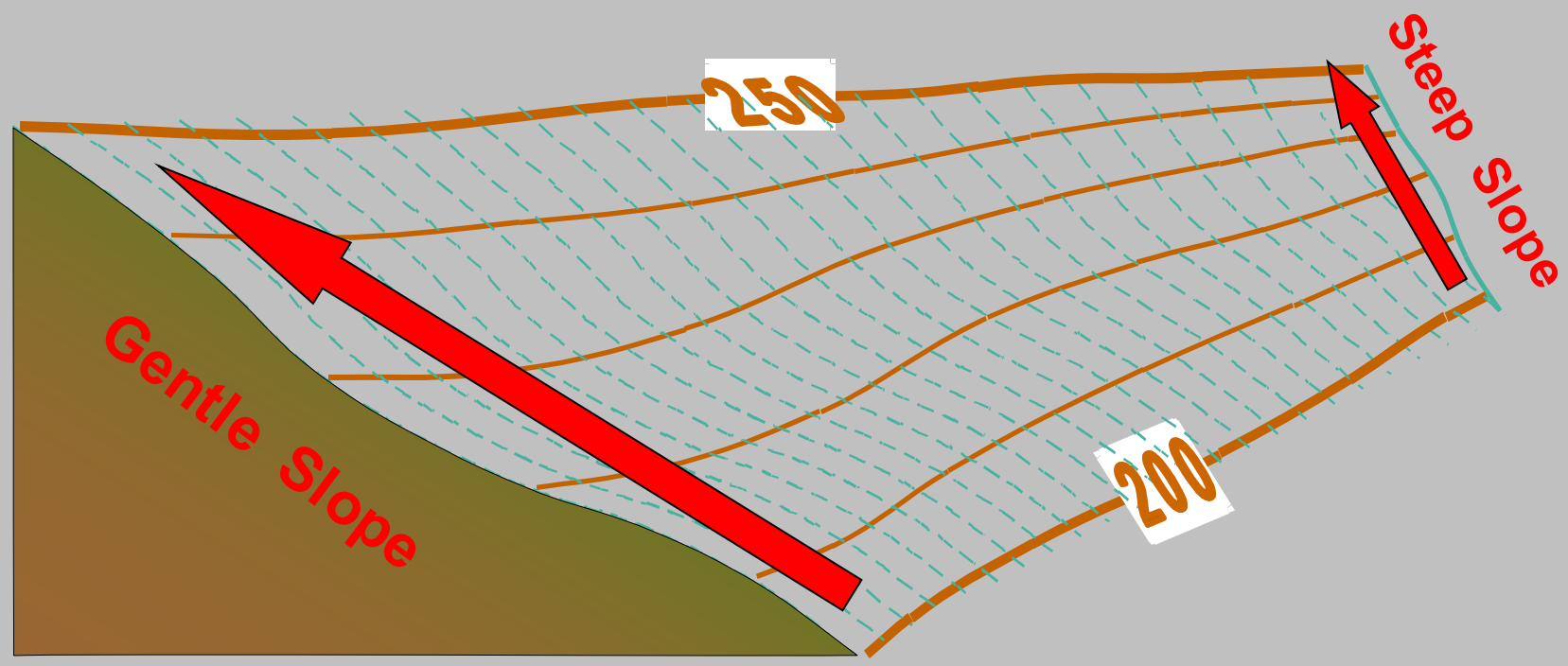
Index Contours



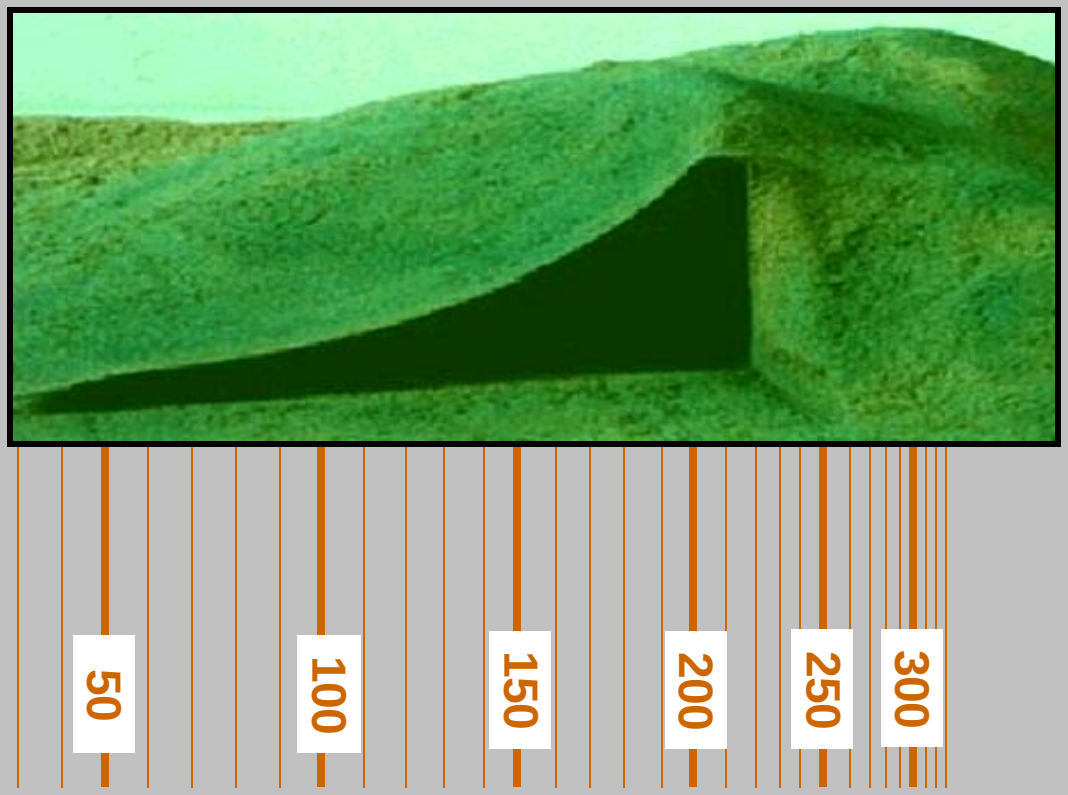
Even Slope



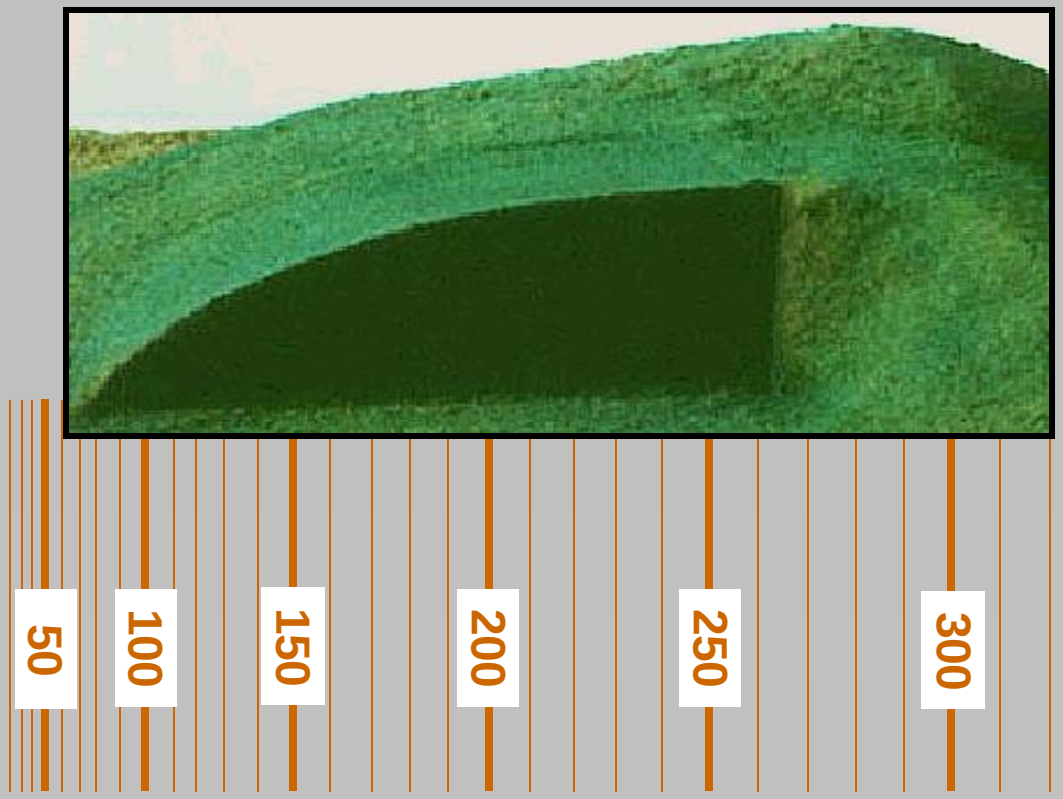
Slopes



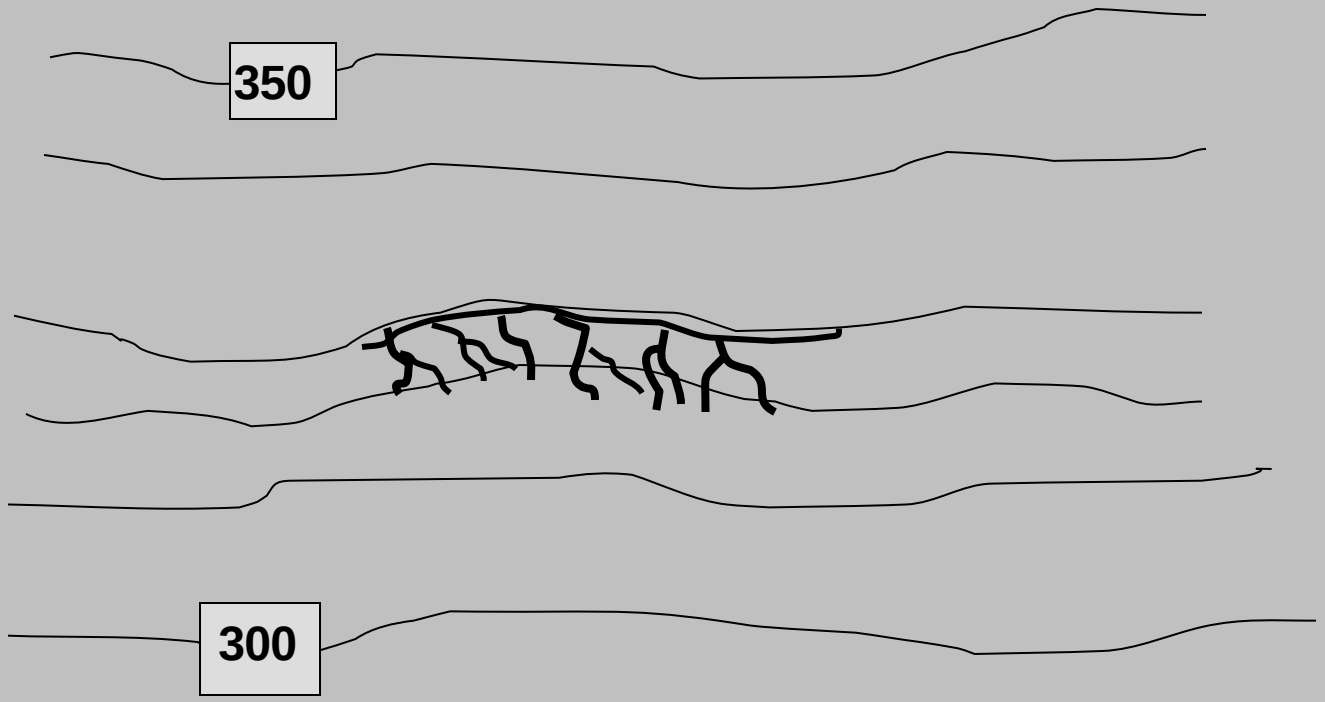
Concave Slope



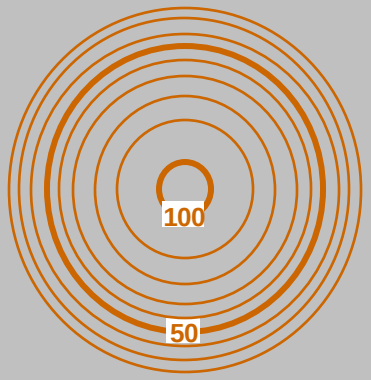
Convex Slope

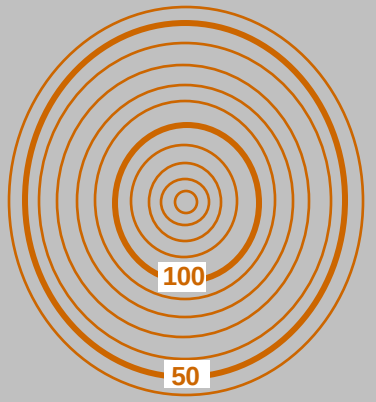


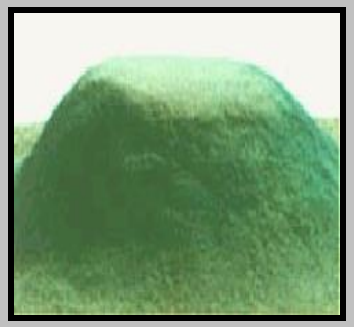
Cliffs

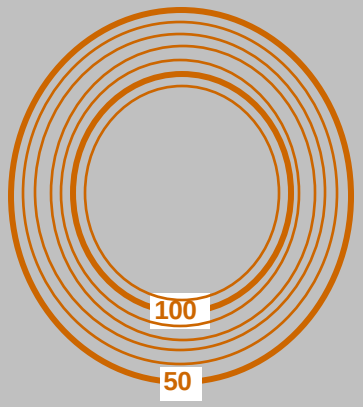


Hills

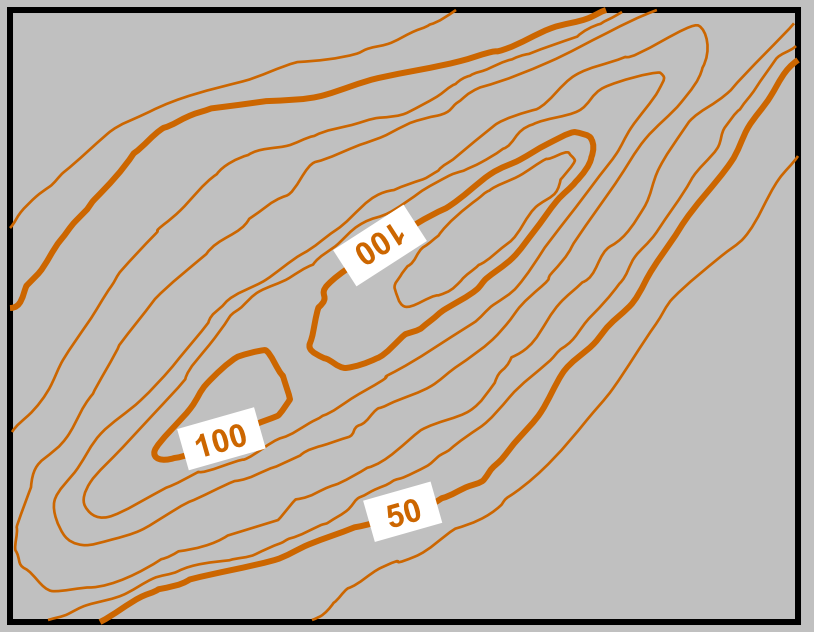








Ridge



QUIZ

- What sort of gradient is located at
  'Grid Reference' : - - - - - -
  Answer –

- What is the feature located at
  'Grid Reference' : - - - - - -
  Answer –

- Give a 6 figure 'Grid Reference' for the top of a cliff
  Answer : - - - - - -

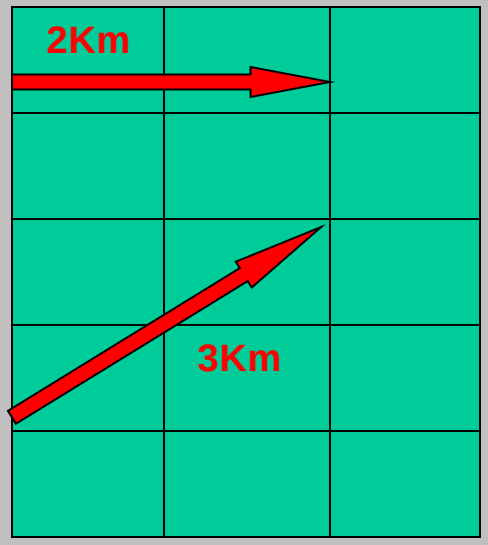
Scale & Distance

Estimation of East - West, North - South and diagonal distances on a 1:25,000 scale map by use of grid lines

1 grid square

= 4 cm

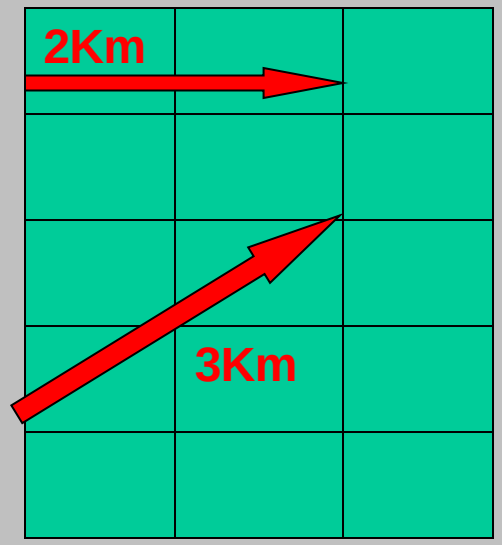
= 1 Km



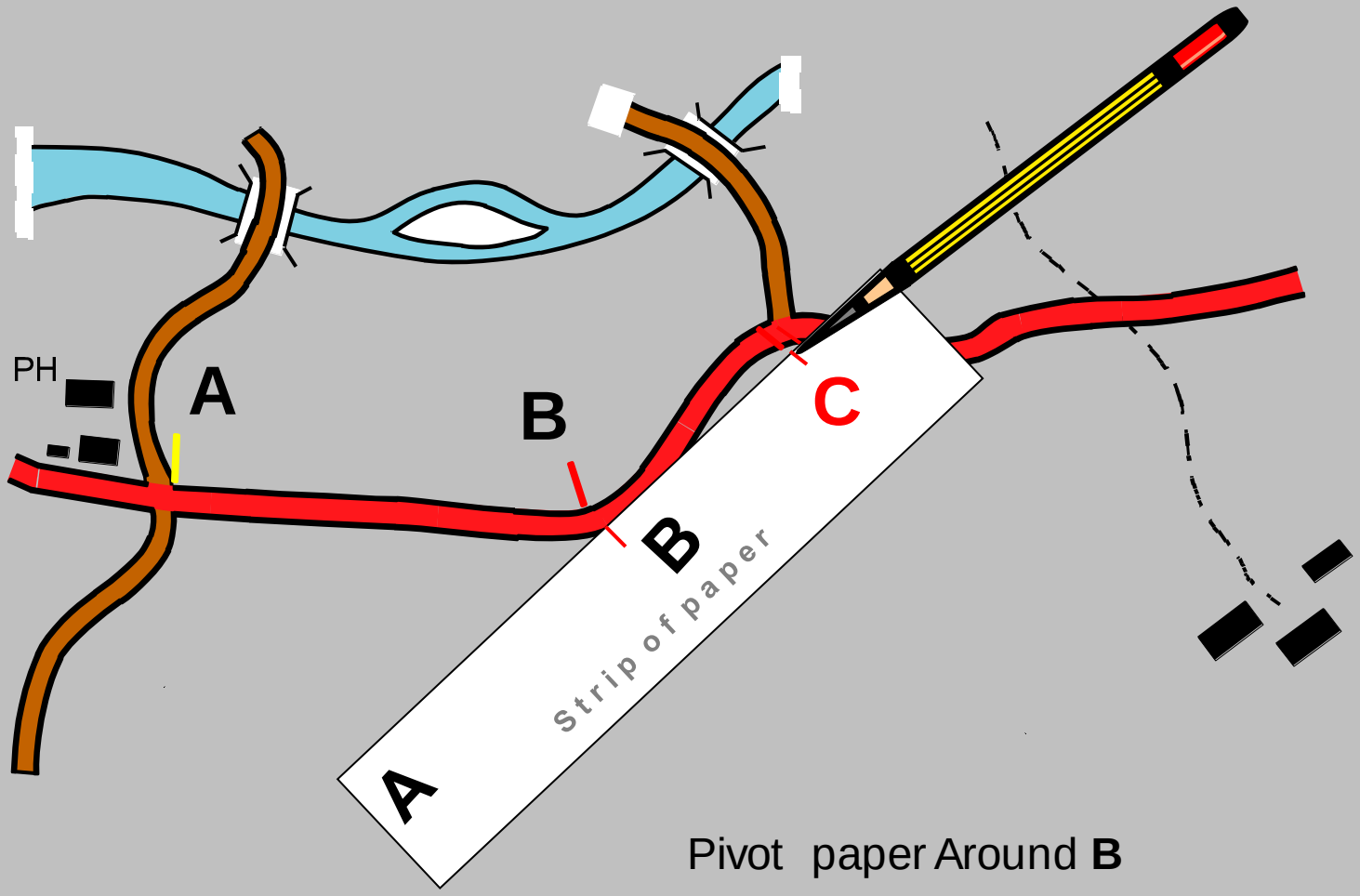
Scale & Distance

Estimation of East - West, North - South and diagonal distances on a 1:50,000 scale map by use of grid lines

1 grid square
= 2 cm
= 1 Km

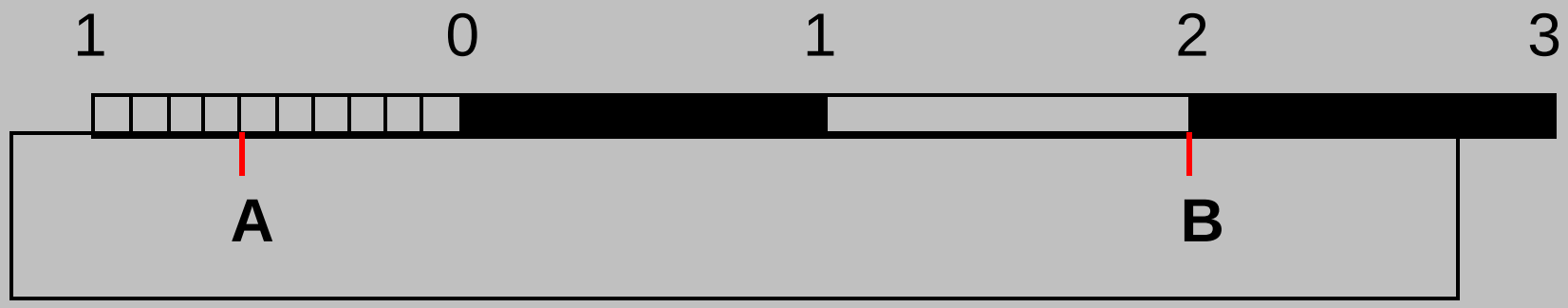


Scale & Distance



Pivot paper Around **B**

USING A SCALE LINE



Move paper until point **B** against a whole division

Read distance from **B** to **A**

2 Whole Km + 0.6Km = 2.6Km

Measuring Distances

- What is the length of ……..

  Answer –
- What is the distance along the road between the junction at - - - - - - and the junction at

  - - - - - -

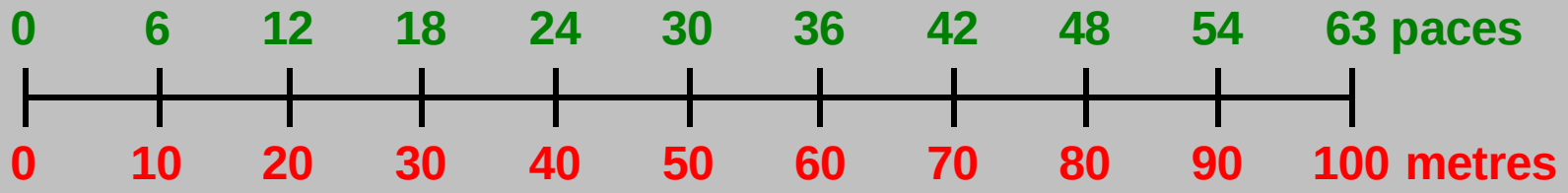
  Answer –
- What is the length of the …….. which starts at Grid Reference - - - - - -

  Answer –

Pacing … made easy

Example : 60 paces = 100 metres

6 paces = 10 metres



If you walk 108 paces

60 paces = 100 metres

48 paces = 80 metres

108 paces = 180 metres

Then to walk 240m

200 metres = 120 paces

40 metres = 24 paces

240 metres = 144 paces

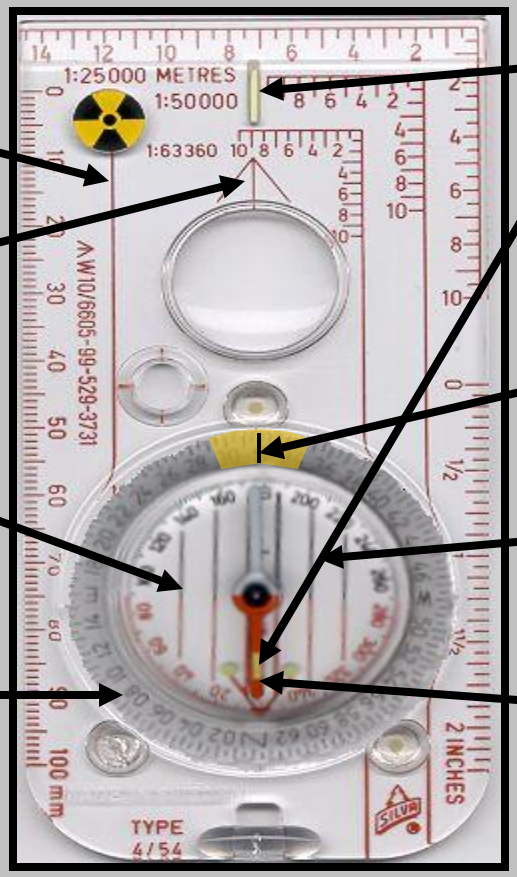
Naismiths Rule

Add one minute to your journey time for every ten metres ascended (every contour climbed)

Contouring

Remember the straightest line between your starting point and destination may not be the quickest, safest or easiest

Compass



BASEPLATE

DIRECTION OF TRAVEL

COMPASS CAPSULE

READING SCALE

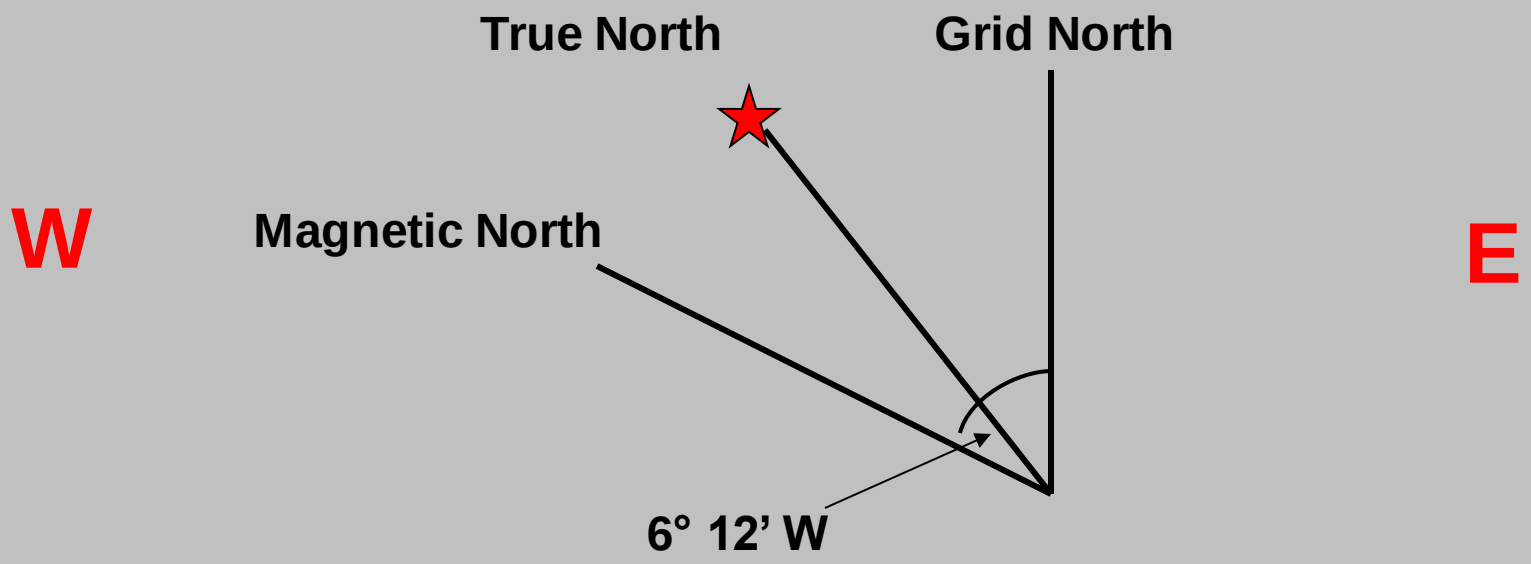
LUMINOUS PATCHES

INDEX LINE

ORIENTING LINES

COMPASS NEEDLE

Magnetic Variation



Mourne Map: Variation 6° 12’ W decreasing about 0° 10’ E annually

Bearing

- **TAKING A GRID BEARING**
- **MARCHING ON A MAGNETIC BEARING**

Step by Step

- **Estimate direction of travel**
- **Mark two points with red pen**
- **Align black line of compass base plate**
- **Rotate housing until orienting lines are aligned with grid lines**
- **Add magnetic variation, read off bearing**
- **Hold compass level and follow direction of travel arrow**

Quiz

- **What is the bearing:**
  from …… Grid Ref - - - - - -
  to the summit of …….. Grid Ref - - - - - -
  Answer -

- **What is the bearing :**
  from …….. Grid Ref - - - - - -
  to …… Grid Ref - - - - - -
  Answer -

SAFETY IN REMOTE AND MOUNTAINOUS TERRAIN

Self & Group Safety

- **PPE**
- **Fitness**
- **Comms**
- **No Lone Working**
- **Escape Routes**
- **First Aid**
- **Food & Hygiene**

Personal Kit List

- **Rucksack**
- **Waterproofs**
- **Walking Boots**
- **Gaiters (Wet Conditions)**
- **Moisture Wicking Clothing**
- **Hat & Gloves**
- **Torch + Backup**
- **Whistle**
- **Map + Compass**
- **GPS**
- **Comms**
- **Sun Protection**
- **Food & Liquid**
- **Personal First Aid**

DO NOT OVER PACK

Getting Around

- **Avoid travelling for long distances on slopes.**
- **Zig zag on steep slopes, scree or loose rock**
- **Try to stay on tracks**
- **Proceed at the pace of the slowest team member**

QUESTIONS