**Fuel availability**

The availability of fuel in forest depend on:

1. **Type of trees:**

Type of trees is an important factor which plays a great role in fire distribution in forest and they are different among themselves in the distribution.

* Intolerant species (light demanding trees) contain resin in their needle leaves (coniferous) and the trees allow the growing of bushes and grasses under their ground and ability of regeneration of leaves are few comparing to deciduous types, therefore the coniferous are abler to fire distribution than deciduous.
* The coniferous also different among themselves to expose to fire, for example (*Pinus spp.*) are abler to catch the fire than the others, because they are intolerant species and contain Resin and vaporized oil and they grow relatively in semi-arid zone and they form wide pure stand. After pine 🌲 *Cedrus spp* and *Picea spp*. become in the second degree to catch the fire.
* The deciduous types are less able to catch the fire comparing to coniferous because their ability in leave regeneration yearly and also because they don’t contain Resin and they don’t permit bush and grass growing, for example these types in relation to forest fire distribution as follow: *Quercus spp. ,Castanea spp. And Fagus spp.*
1. **Age of trees:**

The region which are more exposed to fire distribution are:

1. The area which contain seedling and young timber.
2. The trees which contain dead vegetation.
3. The trees which their branches reach the ground surface.

The mature trees are less exposed to fire distribution according to less containing dry fuel.

1. **Ecological condition**

They effect fire distribution as the following:

1. The existing of forest on poor soils and in scattered form are more exposed to fire than those which grown on rich soils with nutrient.
2. Topography: the slops and foothill in the mountain has great effect on forest fire distribution. The south side exposure in these region more affected to fire distribution than others exposure and flat area. The direction of fire distribution comes from downhill to uphill under the effect of temperature and wind.
* The height above sea level (Altitude above sea level) has effect on fire distribution, the degree of fire distribution is high between (0-500 m) and become lower above this high level.

**4-Form of stand or forest:**

* In the case of homogenous stands and sapling stage will be more exposed to fire especially coniferous than other trees, because they contain bushes, grasses and fuel matter.
* Also in case of not homogenous (heterogeneous) stands the fire distribution is easy while the trees branches reached the ground surface. But the moderate density of forest considers the best forest in case of fire affects. The low density leads to growing grasses and bushes in which they burnt easily.
* The pure stand effected by fire more than mixed forest, so it is better to establish mixed forest, with difference canopy stories.

**5-Forest area:**

The existing of agriculture fields, pasture, natural valley, rocks…etc has positive effect to limit the fire distribution. In other side dividing forest area in the units will decrease the fire distribution.

**6- Amount and characteristic of fuel material:**

1. Moisture contained and low temperature in fuels decreased fire distribution, so the fire lost it is intensity after midnight and started it after sunrise. If the moisture of the fuel reached 25% will be far from the burning.
2. The fuel material in the forest will increase after silvicultural process (cleaning, pruning and thinning) and forest utilization. These helps fire distribution.
* **The limiting of fuel material dangerous requires:**
1. Utilization system.
2. Silvicultural system.
3. Dividing forest area to units.
4. Establishing of fire line and fire strips.
5. Establishing of mixed forest.

**Firebreaks**

When large, continuous areas are planted, it is desirable the area in to units each no larger than 10-15 hectares, separated from each other by firebreaks.

Firebreaks should conform to topography and natural firebreak, and they should be made either on the crests of ridge or run directly up and down the hills. Firebreaks should be strips 8-10 m wide, from which all flammable material has been removed. They must be kept clean of dead vegetation; this is especially critical during the dry season. Firebreaks are occasionally planted with fruit trees or eucalypts, which are low in flammability. If fruit trees are planted, the area around the trees must be thoroughly cultivated.

**Fire lines divided in to following types:**

1. Fire line without vegetation 5-10 m wide, average is 6 meters.
2. Fire line with grasses and bushes: they will be useful for grazing, its width 6-20meters.
3. Fire line with shade of trees: these lines found in the forest which are shaded by the trees beside the lines, its width 0.5-2 meters

**Fire strips:** it is a strips which formed with fire lines and green area, its width approximately 60-120 m. they are found into two shapes

1. Open fire strips: fire line + green area
2. Shaded fire strips: formed from thinning or pruning of trees which present beside fire lines.

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